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ABSTRACT

Large institutional investors own an increasing share of the equity markets in the U.S. The implications of this development for financial markets are still unclear. The paper presents novel empirical evidence that ownership by large institutions predicts higher volatility and greater noise in stock prices as well as greater fragility in times of crisis. When studying the channel, we find that large institutional investors exhibit traits of granularity, i.e., subunits within a firm display correlated behavior, which reduces diversification of idiosyncratic shocks. Thus, large institutions trade larger volumes and induce greater price impact.

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1 Introduction

Recent decades have witnessed the rise of large institutional players in financial markets. Since 1980, the top 10 institutional investors have quadrupled their holdings in U.S. stocks. As of December 2016, the largest institutional investor oversaw 6.3% of the total equity assets, and the top 10 investors managed 26.5% of these assets. Observing these trends, regulators have expressed concerns about systemic risks that could result from the high concentration of assets under a few large actors. The main threat is that institutional investors, when experiencing redemptions, liquidate their portfolios and destabilize asset prices, propagating the effect to other investors' balance sheets.[1] Any potential implications of large institutional investors on the prices of the securities they hold remain unclear and unexplored.

Theoretical arguments suggest that large institutions should impact stock prices more than small institutions. Gabaix (2011) posits that large market players are "granular," i.e., shocks to these agents are not easily diversified when aggregating across units and are reflected in aggregate market outcomes. In particular, aggregate fluctuations can result from firm-level shocks if the distribution of firms is fat-tailed. Applying this notion to financial markets, Gabaix, Gopikrishnan, Plerou, and Stanley (2006) suggest that the trades of large investors can explain excess volatility.

Drawing inspiration from this theory, our empirical contribution is twofold. First, we show that ownership by large institutions is associated with larger volatility in the underlying securities and that this increase reflects an increase in the noise embedded in stock prices. Moreover, we show that during times of market turmoil, stocks with higher ownership by large institutions display significantly larger price drops. This finding is relevant for regulators who are concerned about financial stability.

Second, when studying the channels behind these effects, we find empirical evidence supporting the view that large institutions are granular, i.e., behavior within the subunits of a large firm displays some correlation that limits internal diversification and exacerbates market impact. Specifically, capital flows and trading strategies are more correlated across different entities within

[1] The Office of Financial Research (2013) identifies redemption risk as a major vulnerability of asset managers and points to the fire sale channel as a source of systemic risk. Relatedly, a recent Financial Stability Board publication (2015) remarks that, although research studying market contagion is abundant, a gap exists in the study of the potential effect of large individual organizations.

the same institution than across independent managers. We interpret this evidence as the outcome of centralized functions, such as marketing, research, and risk management, as well as of a unique corporate identity that guides managers' decisions and investors' responses. These results can explain why large institutions have a bigger impact on asset prices than a collection of smaller independent entities. Consistent with this conclusion, we find that the trading activity of large institutions explains their effect on volatility. Top institutions trade in larger volumes and have a greater impact on prices.

Our study has three parts. In the first part, we start from the hypothesis that large investors' trading activity leads to more intense price pressure, which in turn translates into higher stock price volatility. We confirm this prediction by showing a significant relation between ownership by top institutions and stock-level volatility. The economic magnitude of this effect grows over time, coinciding with the rise in the importance of large institutions in financial markets. Toward the end of the sample, the effect is economically large: A one-standard-deviation increase in the largest 10 institutions' ownership is associated with 16% of a standard deviation increase in volatility. While our main tests focus on daily volatility, the effect is also present at lower frequencies (weekly, monthly, quarterly), making it relevant for long-term investors as well.

One might speculate that the increase in volatility that we identify is a desirable outcome of institutional ownership. For example, large institutions could encourage information production and faster price discovery. To shed light on this issue, we investigate whether large institutions are associated with more efficient prices. In fact, focusing on daily return autocorrelation, we find that stocks with higher ownership by top institutions display more negatively autocorrelated returns. This evidence is consistent with the idea that large institutions impound liquidity shocks into prices, which then revert, and lead to noisier prices.

Next, we directly address regulatory concerns and study the effect of large institutional investors on stock prices during periods of market turmoil. Given our conjecture that large investors influence asset prices through a more intense demand for liquidity, we expect the prices of the stocks that they own to be more fragile when aggregate liquidity is low. Accordingly, we find that in turmoil periods, stocks with higher ownership by large institutions experience significantly lower returns, while no effect on the level of returns is present in normal times.

In the second part of the paper, we study the potential drivers of the previous findings. Focusing on the granularity of large institutional investors, we ask whether different units within a large firm display more correlated behavior than independent asset managers. The within-firm correlation, in turn, would prevent the diversification of idiosyncratic shocks, causing these shocks to have a larger impact on asset prices.

We investigate several channels through which the organizational structure of large institional investors can lead to greater volatility in the underlying stocks.

First, intuitive arguments suggest that the various asset managers in the same institution may experience more correlated capital flows than independent entities. For example, institutions typically cultivate a brand name, and therefore affiliated entities are perceived as sharing the destiny of the broader family. Similarly, distribution policies and cross-selling practices (e.g., funds offered in company pension schemes) may increase flow correlation. Consistent with this conjecture, we find that the correlation of flows of mutual funds within the same family is significantly higher than that of independent funds.

Second, investment choices may be correlated across asset managers who operate under the same institution. In particular, institutions often rely on a centralized research division that generates investment views that inform trading decisions across the family. Thus, even though different asset managers have leeway in their portfolio allocation, their behavior may display abnormal correlation due to the family-wide investment directions. The evidence supports this conjecture, as changes in portfolio holdings are significantly more correlated for mutual funds in the same family.

Third, we show that changes in portfolio holdings, which proxy for trading activity, explain the relation between large institutions' ownership and volatility. We drill down on this finding using transaction-level data from Ancerno. We find that large institutions' trades generate greater price impact. The larger size of the trades of this investor class explains their greater impact on prices. This evidence is consistent with the granularity of large institutional investors, as it suggests that different units within the same firm are more likely to trade in the same direction, so that their trades are bigger when they hit the market. In turn, this finding can explain why the prices of stocks owned by large institutions are more volatile, noisier, and more fragile.

The last part of the paper details a case study investigating the effects of large institutional ownership on the volatility of the underlying stocks in a specific setting. We examine the merger of two large institutional investors in 2009. Arguably, this merger is an exogenous event relative to the determinants of the volatility of the underlying portfolios. Securities in the portfolio of the smaller institution are, after the merger, owned by the largest institution in the market. Based on our previous results, we expect their volatility to increase. Indeed, we find a significant increase in post-merger volatility as a function of pre-merger ownership by the smaller firm (the treatment variable).

Overall, our results are consistent with the conjecture that institutional investors, through their large trades, increase the volatility of the underlying securities. Our evidence contributes to the understanding of the determinants of prices and volatility in financial markets.

Our paper relates to a body of economic literature studying the impact of granularity in several contexts. Acemoglu, Carvalho, Ozdaglar, and Tahbaz-Salehi (2012) and Kelly, Lustig, and Van Nieuwerburgh (2013) study the effects on supply chains, and Blank, Buch, and Neugebauer (2009) and Bremus, Buch, Russ, and Schnitzer (2018) study the effects of granularly large banks on the banking industry. Corsetti, Dasgupta, Morris, and Shin (2004) develop a model that explains the impact of one large trader on the behavior of small traders.

In finance, we relate to a literature showing the impact of demand by institutional investors on asset prices. Sias (1996) and Bushee and Noe (2000) find evidence that increases in institutional ownership are accompanied by a rise in stock volatility. Our novel contribution is to identify large institutional investors as a separate and more important contributor to stock price volatility. Other studies have established that aggregate institutional ownership can affect the volatility and correlation of asset returns and liquidity (Greenwood and Thesmar 2011; Anton and Polk 2014; Ben-David, Franzoni, and Moussawi 2018; Agarwal, Hanouna, Moussawi, and Stahel 2017). Our original contribution is to show that *a few large institutions* can induce this effect. Koijen and Yogo (2019) estimate a structural model in which large institutional investors smooth their price impact and therefore have a muted effect on aggregate market volatility. Different from these

authors, we provide direct reduced-form evidence on the effect of ownership structure on volatility.[2]

The paper proceeds as follows. Section 2 lays out our testable conjecture with the aid of a simple model. Section 3 describes the data. Section 4 explores the implications of large institutions for asset prices. Section 5 investigates the channel. Section 6 explores the case study of a merger of two large institutions. Section 7 concludes.

2 Hypothesis Development

To support our empirical analysis, we lay out a simple theoretical framework. Starting from reduced-form equations on the behavior of asset managers and the price-setting mechanism in the market, we develop an equation that illustrates a potential channel through which granular asset managers impact asset prices.[3]

We assume that the dollar demand for a stock that a manager submits to the market depends positively on the size of the manager's portfolio. This reduced-form equation is the outcome of an optimization problem. The manager responds to publicly observable signals, such as earnings announcements, and idiosyncratic institutional shocks, such as unexpected redemptions by the institution's clients. Formally, the market demand for stock *i* by manager *k* at time *t* is a function of the manager's investment in the stock in the prior period, labeled A_{ikt-1}:

[2] We also relate to a literature studying demand- and supply-side drivers of market liquidity, inspired by the theory of Brunnermeier and Pedersen (2008). For example, Hameed, Kang, and Viswanathan (2010) and Aragon and Strahan (2012) identify a significant role of supply-side determinants, which lead to systematic liquidity dry-ups during market downturns. Karolyi, Lee, and Van Dijk (2012) and Kamara, Lou, and Sadka (2008) show that correlated demand for liquidity, proxied by commonality in institutional ownership and related trading volume, is a prominent factor. Koch, Ruenzi, and Starks (2016) show that correlated demand by mutual funds generates liquidity commonality, and Agarwal, Hanouna, Moussawi, and Stahel (2017) document that ETF arbitrage and basket trading generates a distinct liquidity commonality that dominates the effect of open-ended mutual funds. Our work identifies large institutions' trading activity as a novel demand-side determinant of liquidity shocks. Ben-David, Li, Rossi, and Song (2020) present causal evidence that correlated demand by mutual funds, that is generated by return-chasing behavior of mutual fund investors, causes systematic return patterns.

[3] We draw inspiration from Greenwood and Thesmar (2011), but we differ from their work in highlighting the effect of large institutional ownership as a distinct channel for price volatility. The authors, instead, focus on the correlation and volatility of fund flows across asset managers and the concentration in the ownership base of a given company. The structure of our theoretical framework is similar to that of Landier, Sraer, and Thesmar (2017), who study concentration in the bank lending market. Similar reduced-form formulations for investors' asset demands and the price impact of trades are present in Gabaix, Gopikrishnan, Plerou, and Stanley (2006).

$$\Delta A_{ikt} = a_t A_{ikt-1} + \eta_{kt} w_{ikt-1} f(A_{kt-1}), \quad (1)$$

where a_t is a common shock to all managers (e.g., driven by aggregate market news), with variance σ_a^2, and η_{kt} is an idiosyncratic component (e.g., driven by the institution's flows), with variance σ_η^2. The two components are uncorrelated. Also, η_{kt} is uncorrelated across managers. w_{ikt-1} is the weight of the stock in the institution's portfolio. Intuitively, if the manager does not hold the stock, idiosyncratic shocks, such as unexpected redemptions, do not affect the demand for the stock.

A_{kt-1} is the total size of the institution's portfolio. The function f mediates the effect of the size of the institution on the demand for the stock such that $f \geq 0$, $f(0) = 0$, $f' > 0$, and $f'' \leq 0$. This function captures the extent of granularity of a given institution. If institutions can fully diversify idiosyncratic shocks internally, i.e., the case in which $f = 0$, these shocks do not lead to net demand for the stock from the institution. In this case, a large institution is closer to a collection of many independent firms that are exposed to demand shocks that cancel out and do not increase the net demand for the stock. At the other extreme, f is a linear function (i.e., $f'' = 0$) and institutions are fully granular. In this case, the idiosyncratic shock scales up proportionally with the size of the institution, and it fully translates into demand for the stock.

The empirical evidence suggests that large institutions make efforts to smooth shocks internally by exchanging assets across funds within a family in off-market transactions (Gaspar, Massa, and Matos 2006; Bhattacharya, Lee, and Pool 2013). On the other hand, one can reasonably conjecture that the entities within the same large institutions experience correlated flows and implement correlated investment strategies. In other words, different entities within a large firm may be exposed to correlated shocks. If this is the case, one can reasonably conclude that, while the size of the shock may not grow linearly with the size of the institution, the reality is far from a situation in which shocks are fully diversified internally.

Based on models with asymmetric information (e.g., Kyle 1985) or risk-averse market makers (e.g., Grossman and Miller 1988), we assume a reduced-form equation for the price impact of trading. Specifically,

$$R_{it} = \mu \sum_{k \epsilon K} \frac{\Delta A_{ikt}}{m_{it-1}} + e_{it}\,, \quad (2)$$

where m_{it-1} is the market capitalization of the stock at time $t-1$. e_{it} can be thought of as a fundamental shock to stock prices, with a variance-covariance matrix across stocks given by $\Sigma_e = \sigma_e^2(\rho J + (1-\rho)I)$, where J is a square matrix of ones and I is the identity matrix, and both matrices have size equal to the number K of managers in the market. To avoid unnecessarily complicating notation, we assume the price impact parameter μ is the same across stocks.

Combining Equations (1) and (2), and assuming the K investors hold all the outstanding shares of stock i such that $\sum_{k\epsilon K} A_{ikt-1} = m_{it-1}$, we derive the expression for the variance of stock returns:

$$Var(R_{it}) = \sigma_e^2 + \mu^2\sigma_a^2 + \mu^2\sigma_\eta^2 \sum_{k\epsilon K} \left(\frac{w_{ikt-1} f(A_{kt-1})}{m_{it-1}} \right)^2. \quad (3)$$

Hence, the variance of returns has an idiosyncratic fundamental component, σ_e^2; a systematic component due to aggregate shocks driving institutional trades, $\mu^2\sigma_a^2$; and a third component that depends on the shape of the function f and the structure of ownership. Because $w_{ikt-1} = \frac{A_{ikt-1}}{A_{kt-1}}$, if f is linear, the third term corresponds to the Herfindahl-Hirschman index of the managers' ownership shares in the company. Intuitively, if stock ownership is more concentrated, the shocks of individual managers are a bigger fraction of the stock demand and are less easily diversified across managers. Hence, these shocks translate into stronger price pressure and higher variance (Greenwood and Thesmar 2011).

To develop further intuition, we divide and multiply $f(A_{kt-1})$ by A_{kt-1} in Equation (3). Then, we can rewrite the stock price variance as

$$Var(R_{it}) = \sigma_e^2 + \mu^2\sigma_a^2 + \mu^2\sigma_\eta^2 \sum_{k\epsilon K} \left[\frac{A_{kt-1}}{M_{t-1}} \cdot \frac{f(A_{kt-1})}{A_{kt-1}} \cdot \frac{w_{ikt-1}}{q_{it-1}} \right]^2, \quad (4)$$

where $q_{it-1} = \frac{m_{it-1}}{M_{t-1}}$ is the weight of the stock in the market portfolio. The first term in the brackets, $\frac{A_{kt-1}}{M_{t-1}}$, captures the size of an institution's equity portfolio relative to the stock market. Because of this term, return volatility depends on the extent of ownership by large firms. Intuitively, the more large institutions hold the stock, the greater the difficulty in diversifying idiosyncratic institutional

shocks when they reach the market through institutional trades. The second term, $\frac{f(A_{kt-1})}{A_{kt-1}}$, attenuates the effect of institutional size, as a function of the concavity of f (i.e., the extent of granularity). Institutions that manage to diversify shocks internally, even if they are very large, do not have a large price impact and, consequently, they have a smaller effect on volatility. Finally, the third term, $\frac{w_{ikt-1}}{q_{it-1}}$, modulates the impact of a given institution on return volatility as a function of the holdings of that stock. For example, if a stock is not part of an institution's portfolio, that is, $w_{ikt-1} = 0$, that institution does not contribute to return volatility.

Let us consider the case of maximum granularity, i.e. when the function f is linear. Further, let us set $\frac{w_{ikt-1}}{q_{it-1}} = 1$ for ease of intuition. In this scenario, the variance depends exactly on the Herfindahl-Hirschman index of the asset management industry. In such a case, when an asset management sector is populated by atomistic managers, each owning a very small portfolio (i.e., $A_{kt-1} \approx 0$ for all managers k), the effect of institutional shocks on volatility disappears. On the other extreme, if only two large institutions are present in the market, the effect of those institutions on return volatility is maximized.[4]

Hence, Equation (4) contains the main testable prediction of the model:

Stock return volatility is positively related to the amount of that stock owned by large asset managers. The magnitude of this effect depends on the extent of the granularity of large institutions, i.e., the extent to which idiosyncratic shocks to an institution are not diversified internally.

In the next section, we study the relation between large institutions' ownership and volatility. Then, in the following part of the paper, we investigate the channel. In particular, we study the factors that may limit internal diversification of shocks within large institutions.

[4] In fact, the effect on variance would be maximized if only one institution owned the entire market. This is not a realistic scenario because in this case the institution would not find a trading counterparty and there would be no foundation for Equation (2), which assumes that price concessions derive from trading activity.

3 Data Description

To construct our sample, we use institutional ownership data from the first quarter of 1980 to the fourth quarter of 2016 from Thomson-Reuters and the original SEC 13F filings.[5,6] Appendix A provides a list of all institutions that appear among the top 10 during our sample period.

We identify the largest institutional investors in each quarter based on a rolling four-quarter average of the rankings of their aggregate equity holdings. At the top of the ranking, we find a firm, Barclays Global Investors (BGI), that held its position almost uninterruptedly from 1990 to the end of the sample, experiencing a change in the denomination of the reporting entity in 1997 and a merger in 2009, which we will further discuss below. Overall, our sample contains 41 unique institutions that fell within the top 10 institutions at some point during our sample period. They hold an average of $169 billion (inflation-adjusted to the end of 2016) in assets in a given quarter of our sample.

We measure large institutional holdings as aggregated ownership by subsets of large institutions, specifically the top 3, top 5, top 7, and top 10 institutional investors. We use all stocks in the Center for Research in Security Prices (CRSP) universe, regardless of whether they are held by the largest institutional investors. We use data from CRSP and Compustat to construct other stock-level variables. Because the main variables from the 13F filings are at a quarterly frequency, we construct all other variables at a quarterly frequency. Table 1~~, Panel A,~~ provides summary statistics for our sample of institutional investors. Further summary statistics are provided in Internet Appendix Table IA.1. The top 10 institutional investors hold on average 8.1% of the outstanding shares of a given stock, with a standard deviation of ownership of 9%. Ownership of the average stock decreases for the combined top 11 through the top 20 institutions and beyond. The top 30 through the top 50 institutions together hold 2.7% of the shares outstanding of the

[5] The 13F filings require all institutions with investment discretion over $100 million or more of U.S. equity assets at the end of the year to provide detailed quarterly reports of their long holdings in these qualified securities in the next year. See Ben-David, Franzoni, and Moussawi (2012) for institutional details regarding 13F data and an overview of the Thomson-Reuters Institutional Ownership database.

[6] In our preliminary analysis, we noticed that the Thomson-Reuters' data exhibit a substantial increase in stale holdings reports and in the number of dropped institutions, starting in 2013. For example, we found that in 2015 Thomson-Reuters' data underreports institutional ownership in the 13F filings by about 10% due to omissions of institutions and securities. Thomson-Reuters attempted to fix these data quality issues in subsequent updates, but, as of the latest draft of our paper, certain omissions still exist in recent years of the data. In the Internet Appendix, we describe an alternative data collection approach that overcomes these limitations and make it available to other researchers.

average stock in our sample. Ownership by large institutions can be compared to aggregate institutional ownership. We observe that for the average stock in our sample, institutional investors own 38% of its shares (*Ownership by all institutions*).[7]

Figure 1 plots the time series of the percentage of holdings of large institutions over our sample period. We include the holdings of the largest institutional investor as well as those of the groups of the top 3, 5, 7, and 10 largest investors. We observe that the percentage of total shares outstanding held by large institutions in an average U.S. common stock is increasing over time. For example, the largest institution in the economy more than quadruples its holdings from 1.4% of the equity market at the beginning of the sample (1980) to 6.3% at the end of the sample (2016). Similarly, the largest 10 institutions own 5.6% at the beginning of the sample and 26.5% at the end. Over the same period, ownership by all institutions roughly doubles. Comparing this trend to the faster growth of large institutions suggests that ownership has become more concentrated over time. Appendix B provides a detailed description of the variables we use in the study.

4 The Relationship between Large Institutions' Ownership and Asset Prices

4.1 Volatility

The main testable prediction from Section 2 is that large institutions have a larger impact on stock volatility than does a collection of smaller independent managers with the same asets under management (AUM). To study the effect of large institutions on volatility, we start from a simple specification:

$$Volatility_{iq} = Top\ Insts\ Ownership_{i,q-1} + Controls_{i,q-1} + Time\ FE_q + Stock\ FE_i + \varepsilon_{iq}. \quad (5)$$

We estimate Equation (5) using ordinary least squares (OLS) regressions. The variables are measured quarterly at the stock level. The dependent variable is stock volatility measured over the calendar quarter. "Top institutional ownership" is the fraction of shares outstanding

[7] We note the maximum value of *Ownership by all institutions* is 1.27. Indeed, institutional ownership might be above 100%. This rare situation occurs when shares that have been short sold are double-counted. Lewellen (2011) discusses these situations and concludes that they do not represent data errors, but rather are the result of short selling.

collectively held by the top 3, 5, 7, and 10 institutions (*Top insts ownership*). We include the following controls: lagged *log(market cap)*, lagged *book-to-market* ratio, lagged *past 6-month return*, lagged inverse price ratio (*1/price*), lagged *Amihud illiquidity* ratio (Amihud 2002), and lagged total *ownership by "middle" institutions* (which reflects ownership by all institutions ranked below the ones at the top, excluding those included among the bottom institutions, see next). We also add a variable that measures the lagged *Ownership by bottom institutions* whose aggregate equity holdings sum up to that of the largest 10 institutions. Using this variable, we can verify whether the effect of interest originates from the size of assets under management, irrespective of whether the assets are managed by top institutions. Lastly, our specifications include stock and time (at the quarterly frequency) fixed effects. Standard errors are double-clustered at the stock and quarter level throughout our analysis, unless otherwise specified.

The estimates are presented in Table 2, Panel A. We note that up to the 30th largest institution, the positive relation between ownership by large institutions and stock volatility is statistically significant. The magnitude decreases substantially for institutional investors ranked 21st to 30th, and it is indistinguishable from zero for institutional investors ranked 31st to 50th. Furthermore, the effect of ownership by the bottom institutional investors with the same total size as the top 10 institutions is negative, consistent with the view that only large investors affect volatility.

We can calculate the economic magnitude of our results. Focusing on the top 10 investors and using the summary statistics in Table 1, a one-standard-deviation increase in their ownership is associated with an increase in volatility of 3.33% of a standard deviation (0.945*0.090/2.55). As will be seen below, the effect is significantly stronger in the later parts of the sample period (when the asset management industry consolidates) and for the largest institutional investors. In the same specification, ownership by middle institutions has a magnitude of only 0.7% of a standard deviation (0.082*0.228/2.55). Hence, the slope for large institutions is 4.5 times as large.[8]

Greenwood and Thesmar (2011) construct a fragility measure that captures the effective concentration of ownership in a stock, weighted by the volatility and correlation of the trading

[8] In the specifications focusing on the top institutions (up to the top 10), the magnitude of the slope for top institutions is larger than the slope for the "middle" ones by at least 42% and on average 205%. Therefore, the effect of top institutions is economically more important than the effect of "middle" institutions by at least an order of magnitude.

needs of its investors. This variable accounts for large (i.e., concentrated) ownership stakes by institutional investors, irrespective of the size of the institution. Instead, we focus our attention on ownership by large institutions, as a channel distinct from large stakes by institutions of any size. We find a high correlation (54%) between Greenwood and Thesmar's (2011) fragility measure and ownership by the top 10 institutions. Therefore, a test of whether the two effects can coexist in the data is interesting. In Table 2, Panel B, we add Greenwood and Thesmar's (2011) measure to our main regression model. We again find that the coefficient on large institutional ownership is positive and statistically significant. We conclude that ownership by large institutions and fragility capture two partly independent empirical phenomena. This analysis suggests that ownership by large institutions has an impact on volatility that is separate from the effect of concentration, which is captured by the fragility measure.[9]

A potential channel is that large institutions operate on a bigger scale, for example, because they are exposed to larger flows. Thus, when they rebalance their portfolios, they are likely to trade a bigger chunk of the stock, for a given amount of ownership.[10] In Section 5, we explore this trading channel and find supporting evidence.

4.1.1 Nonlinear Relation between Ownership and Volatility

Next, we conjecture that the relation between volatility and ownership is nonlinear and stronger for higher levels of ownership. If the channel behind the effect of interest is the price impact of trades, as the model in Section 2 suggests, this effect should be stronger for higher levels of ownership. When institutions own a small fraction of a stock, they can find multiple trading counterparties. Thus, their price impact is contained. On the other hand, if a top institution owns a large fraction of the stock, finding trading counterparties becomes more complicated and larger

[9] In Internet Appendix Table IA.2, we also show that large institutions' ownership has a separate effect on volatility from concentration, defined as the Herfindahl-Hirschman index of institutional ownership shares, although the two variables have a high correlation, at around 70%. In a specification including both concentration and large institutions' ownership, the explanatory power of the latter variable is strong and comparable to the magnitude in the original specifications of Table 2, Panel A.

[10] This prediction is embedded in the theoretical model in Section 2. In Equation (1) of the model, the shocks to trading, a_t and $\eta_{k,t}$, are applied multiplicatively to the assets under management of the investor. Thus, larger investors trade more intensely for the same realizations of the shocks.

price concessions become necessary. The impact of trading on volatility is, in the latter case, more important.

To test this conjecture, we create dummy variables denoting different intervals on the distribution of ownership. Specifically, every quarter, we break ownership into four quartiles, within each decile of market capitalization. The ownership ranking is done within stock size deciles to control for correlation between ownership and the size of the stock, which in turn correlates with volatility (e.g., institutions hold larger stakes in larger companies, which are also less volatile). Then, we run the volatility regressions including three out of the four ownership dummy variables, the baseline group being the first quartile. Standard errors are clustered by stock and quarter.

The estimates in Table 3 fully support this conjecture. The strength of the relation between ownership and volatility is monotonically increasing from the first to the fourth quartile of ownership. Thus, the positive relation between volatility and ownership is indeed nonlinear and increasing in the level of ownership.

4.1.2 Subsample Analysis

We next carry out subsample analyses to determine whether the effect of large institutions on volatility changes over time. The increasing concentration in stock ownership implies that finding trading counterparties for large trades is more difficult in recent times. Keeping other market characteristics constant, the same amount of trading by a large institution should lead to bigger price movements in recent times. On the other hand, stock market liquidity has significantly improved over our sample period. It remains, therefore, an empirical question whether the impact of large institutions on stock prices increases over time.

We split our sample into three periods: 1980–1990, 1991–2003, and 2004–2016. Corresponding results are shown in Table 4, Panels A, B, and C, respectively. We find that in the

first period, the coefficients on top ownership are generally indistinguishable from zero. However, in the later two periods, the coefficients are positive and statistically significant at the 1% level.[11]

Furthermore, we run our regressions in annual subsamples and plot the coefficients in standard deviation units for a one-standard-deviation change in ownership by the top 10 institutions. We report this result in Figure 2. It is evident from the graph that coefficients increase over time. At the end of the sample, the effect of interest is nearly 16%, which is substantially larger than the average effect in the sample (3.3%). The increase in the effect of interest tracks the overall rise in the size of the largest institutional investors over time as reported in Figure 1. We conclude that the economic magnitude of the relation between large institutions' ownership and volatility has grown along with the increase in their market share.

The nonlinearity in the effect of ownership observed in Table 3, combined with increasing ownership by large institutions (Figure 1), is a valid reason to conclude that the effect of large institutions on volatility rises over time. In the later years of the sample, the distribution of ownership by large institutions shifts to the right, which, combined with the nonlinearity in the relationship between ownership and volatility, allows us to conclude that ownership is more impactful in recent times.

On the other hand, the effect of ownership on volatility should be similar for a given level of ownership throughout time. To this purpose, we run the nonlinear specifications every year. In this case, we define the dummy variables based on the quartiles of the ownership distribution over the entire sample. In this way, we study the effect of the same level of ownership in different periods. Internet Appendix Figure IA.1 reports a five-year moving average of the estimates for the dummies corresponding to the second through the fourth quartiles separately estimated in each year of the sample. We note that the dummies of the nonlinear specification do not display meaningful trends, consistent with the idea that the same level of ownership has a stationary relation to volatility over time.

[11] Summary statistics for these subsamples are in the Internet Appendix, Internet Appendix Table IA.1. In Internet Appendix Table IA.3, we also report tests using different subsamples. We find that the effect of interest is present during the 2007–2009 financial crisis and other crisis periods as well as outside of crisis periods.

4.1.2 Analysis by Size Groups

Based on the conjecture that the channel behind the relation between ownership and volatility is the price impact of trades, this relation should be stronger for smaller stocks, which are less liquid and more prone to price impact.

To evaluate this claim, we run the main specification separately in each of the five size quintiles. The size quintiles are defined in each quarter. We focus on the top 10 institutions for this test. The estimates are presented in Internet Appendix Table IA.4, Panel A. Panel B of this table presents value-weighted regressions. The results confirm that the effect of large institutions' ownership on volatility is stronger for smaller stocks. Overall, this finding corroborates the view that the relation between ownership and volatility is channeled through trades.

4.2 Noise in Prices

The analysis in Section 2 posits that large institutions increase volatility because of the larger price impact of their trades. Price impact is a temporary movement in prices that is subsequently reversed, i.e., it is noise. In what follows, we explore this conjecture by studying the relation between large institutional ownership and return autocorrelation.

Our tests follow the specification in Equations (5) and (6), replacing volatility with a measure of return autocorrelation. Specifically, we use returns adjusted following Daniel, Grinblatt, Titman, and Wermers (1997, hereafter, DGTW 1997) to filter out return variation originating from the size, book-to-market, and momentum stock characteristics and calculate the autocorrelation of daily adjusted returns within a quarter.

In Table 5, we report estimates from the regression of the absolute value of stock-return autocorrelation on *Top institutional ownership* and controls, including stock and quarter fixed effects. Standard errors are double-clustered at the stock and quarter level. The estimates suggest a significantly positive relation between the absolute value of return autocorrelation and large firm ownership (up to the top 10^{th} institution).[12]

[12] Using the statistics in Table 1, a one-standard-deviation change in ownership by the top 10 institutions is associated with a 1.6% of a standard deviation increase in the dependent variable.

In sum, this evidence corroborates the view that large institutions' trades are more conducive to temporary price pressure than trades by smaller institutions. In other words, ownership by large institutions seems to increase the noise in stock prices.

4.3 Price Fragility

In periods of turmoil, portfolio liquidations become more likely and the trades of large institutional investors may be more impactful than in normal times because they take place in an already illiquid market. Therefore, top institutions' trades may induce significant price dislocations at these times.

To test this possibility, we identify periods of market stress by focusing on the return of the overall market. We identify bad times as quarters in which the realization of the excess market return is in the bottom 5% of the quarterly return distribution. We test whether stocks with higher ownership by top institutions earn significantly lower returns in these quarters.

Because stock characteristics, beyond ownership by top institutions, can be a driver of returns during times of market stress, we focus on DGTW-adjusted returns. We further control for these effects through regression controls (size, book-to-market, and past returns). Additionally, we control for liquidity-related effects by including measures of stock-level liquidity in the regression (the Amihud ratio and inverse stock price). These controls absorb the known asset pricing and microstructure effects that are unrelated to large institutions' ownership.

Table 6 shows the results of this analysis. We find that the relation between ownership by large institutions and the level of returns is significantly negative in times of extreme market conditions. Interestingly, the relation is not significantly different from zero in normal periods. This effect is not present for lower-ranked institutions. Hence, we view this result as evidence that orderly liquidations become harder for a large institution in times of market turmoil, given the sheer size of the blocks that are brought to the market during these low liquidity episodes. The economic magnitude is also important. For example, based on Column (4) and the summary statistics in Table 1, in a bad quarter, a one-standard-deviation increase in ownership by the top 10

institutions is associated with lower quarterly returns by 9.17% of a standard deviation (–0.191*0.073/0.148).

The quarterly frequency at which we compute returns justifies the claim that the effect of large institutions is not merely microstructure noise that washes out at lower frequency. Rather, it persists at frequencies that are relevant for long-term investors. Consistent with the evidence in Coval and Stafford (2007), we interpret this finding as the result of the persistence of portfolio flows, which ultimately induces persistence of trades and price impact.[13]

The finding of a negative correlation between large institutional ownership and stock returns during times of market stress is consistent with the view that large institutions, when engaging in liquidations, impose a high liquidity demand on the market. This evidence supports regulators' concern that large institutions may be destabilizing during times of turmoil.[14]

5 The Channel: Granularity of Large Institutional Investors and the Price Impact of Trades

Centralized functions, such as research, marketing, and risk management, may create correlated behavior across the units within a large firm, which in turn generates correlated trades coming from the various divisions within an organization (Brown and Wu 2016). These trades are likely to have a significant price impact because they do not offset one another, but rather they hit the market in the same direction. Price impact and volatility result from the price concessions that liquidity providers require to accommodate the large trades. These effects are mitigated for independent investors because their trading behavior is less correlated. Hence, the price impact of the trades of independent investors should be less pronounced.

[13] Further supporting evidence of the persistence of the effect of large institutional ownership on prices at lower frequency comes from Internet Appendix Table IA.10, Panel A, in which we use weekly, monthly, and quarterly measures of price volatility as dependent variables.

[14] In the Internet Appendix, we also study the relation between skewness and large institutions' ownership. In Internet Appendix Table IA.10, Panel B, we find that stocks that are held by large institutions display significantly lower skewness, which is computed nonparametrically as in Ghysels, Plazzi, and Valkanov (2016). This finding is consistent with Table 6 and supports the conclusion that large institutional investors can be destabilizing for prices.

In this section, we empirically test whether different units within the same institution display more correlated behavior than entities that are part of independent organizations. Then, we study the trading channel for the relation between ownership by large institutions and volatility.

5.1 Correlated Flows

Capital flows across units within large institutions may be correlated for several reasons. Marketing efforts aimed at creating a family brand and at cross-selling an array of family products are likely to increase the correlation of flows to the units within the organization. For example, when a provider of a 401(k)-pension plan includes multiple funds from a given family among the investment options, correlated flows will hit all of the funds in the family. Moreover, mutual funds often inherit the reputation of the umbrella organization and are identified with it, as in "a Fidelity fund." Hence, the stellar performance of a given fund may induce investors to invest in other family funds as well (as in Nanda, Wang, and Zheng 2004). Or, investors may perceive funds in the same family as following a similar investment style and move capital in and out of the family as a result of style investing (Barberis and Shleifer 2003). Also important, events that occur at the level of the parent company may trickle down to affect the entities within it. As an example, Bill Gross's departure from PIMCO triggered outflows from funds at PIMCO that Gross, at the time the CIO of the firm, was not directly managing. Because of these outflows, five of PIMCO's funds appeared in the infamous ranking of the 10 funds with the heaviest customer redemptions in 2014.

The discussion suggests that the correlation of investor flows across units of a unique institution is higher than across independent institutions. Testing this conjecture is not feasible using the quarterly 13F data, because these data do not include investor flows, only changes in long equity positions. To overcome this empirical hurdle, we use mutual fund data. We then test whether the pairwise correlation of flows between funds in the same family (i.e., the same management company) is higher than the correlation between funds in distinct families.[15]

[15] The CRSP Mutual Fund Database does not have an explicit mutual fund family identifier, so we create one manually. We then compute the monthly flows for each share class using the monthly assets and net return figures in CRSP, and then aggregate the flows at the portfolio level. The flow-correlation measure is constructed using 12-month rolling Pearson correlations of the monthly percentage of portfolio flows. To this end, we generate a dataset that includes all combinations of mutual fund pairs. We restrict our sample to only those correlations that have nonmissing flows in

We regress the correlation coefficient on an indicator variable for whether the pair belongs to the same family. Panel A of Table 7 presents the results. Columns (1)–(4) use the entire universe of mutual funds but restrict the sample to a 1% randomly chosen subsample of the data (for computational efficiency). Columns (5)–(8) report results restricted to funds managed by the 20 largest institutions in the same sample. The different columns correspond to different combinations of fixed effects: from a specification with time fixed effects (Columns (1) and (5)) to a specification that includes fixed effects for each fund *i*-year and fund *j*-year (Columns (4) and (8)). The standard errors in these regressions are clustered along three dimensions: year, fund *i*, and fund *j*. Despite the different levels of fixed effects, the results are very similar across specifications. Using the coefficient in Column (1), we find the correlation coefficient is about 3.2% higher when funds are within the same family; that is, it is about twice as large as the sample average correlation. Given that the standard deviation of the dependent variable is approximately 33.2% (Table 1, Panel A), funds that belong to the same family have a correlation that is about 10% of a standard deviation higher than that of the entire population of funds. Hence, the effect is economically significant. We find that the result is robust for funds managed by the top institutions. For this subsample, we find the correlation coefficient is about 2.4% higher when funds are within the same family.

5.2 Correlated Trades

Next, we explore whether trades are more similar across units within an organization than across independent firms. Again, we focus on mutual fund families to identify portfolio holdings of subentities. We posit that mutual funds that are part of a family have access to common resources when making investment decisions. For example, mutual fund managers in the same firm may rely on the same equity research done by a centralized research department; they may share information with neighboring managers in the spirit of Hong, Kubik, and Stein (2005); and they may be bound by the same risk management rules set by the risk management department of

the last 12 months. Finally, to avoid overlapping observations, we keep one observation per fund pair-year as of December. We end up with a sample of 249,665,892 observations on 8,410 different mutual funds belonging to 924 family groups in the period between 1980 and 2016. Table 1 shows the summary statistics for the variables used in this analysis.

the organization. Also relevant, a recent paper by Auh and Bai (2018) shows that there is information sharing between equity and bond mutual funds in the same fund family.

We measure trades at the quarterly frequency using changes in holdings.[16] Given the evidence on the flow correlation that we have just produced, it is natural that same-family funds would adjust their portfolios in the same direction when they receive flows. Hence, to obtain a result that is not mechanically related to our prior evidence, we focus on mutual funds' *active trades*. An active trade is the residual change in a stock quarterly holding after subtracting the change in holding that would result from a simple rescaling of the portfolio proportional to the quarterly flows (Greenwood and Thesmar 2011).

We regress fund-quarter level pairwise correlations in active trades for any two funds in our database on the same-family dummy. The results of the analysis are presented in Table 7, Panel B. Columns (1)–(4) correspond to funds managed by all institutions, and Columns (5)–(8) correspond to funds managed by the largest 20 institutions. The standard errors in these regressions are clustered along three dimensions: year, fund *i*, and fund *j*. The estimates indicate that mutual funds that belong to the same family have a higher correlation between trades. The correlation is about 2.5% higher for same-family funds in the most restrictive specification for all funds and 2.2% higher for funds managed by the largest institutions. Again, the effect is highly economically significant (36% and 32% of a standard deviation for all and large institutions, respectively), given that the standard deviation of the dependent variable is about 6.9%.

5.3 Evidence on the Trading Channel

The model in Section 2 postulates that large institutions affect prices via their trading activity. The following analysis more closely inspects the trading channel.

As a preliminary test, we split institutional holdings based on the extent to which institutions changed the amount of ownership during the quarter. Arguably, substantial changes in

[16] We infer mutual fund portfolio composition from the Thomson-Reuters Mutual Fund Database and the CRSP Mutual Fund Database. We rely on the Thomson-Reuters Mutual Fund Database for historical holdings of mutual fund portfolios between 1980 and 2012, and we rely on the CRSP Mutual Fund Database for the portfolio holdings after 2013 due to Thomson-Reuters data quality issues that also affected its mutual fund ownership database in recent years.

holdings denote positions that are actively traded. Our tests aim to identify holdings by institutions that traded more intensely. Specifically, for each stock-quarter-institution, we separate observations based on whether the percentage change in shares held in an institution's portfolio is above 5%, where this number is the cutoff for the first quartile.[17] Then, at the stock-quarter level, we aggregate beginning-of-quarter ownership by institutions with changes in holdings below and above the cutoff. We repeat the exercise for top and non-top institutions. Then, we run a regression of volatility on actively- and non-actively-traded ownership for top and non-top institutions. We also include the usual controls and stock and quarter fixed effects. Standard errors are clustered by stock and quarter. The estimates in Table 8, Panel A, show that actively-traded ownership by top institutions has the strongest association with volatility during the same quarter. Non-actively-traded ownership provides a placebo test. We still find a significant coefficient on this variable, probably because trading is very rarely zero across all the top institutions that hold the stock. We find the same ranking of coefficients between actively- and non-actively-traded positions for ownership by non-top institutions. Overall, the evidence is consistent with the trading channel, that is, ownership affects volatility to the extent that it leads to trading activity.

These results inspire us to directly use the actual change in ownership by institutions as an explanatory variable for volatility and contrast its effect with that of the level of ownership. If trading is really behind the effect of interest, the predictive power of ownership in these regressions should be absorbed by trading activity. In a stock-quarter-level sample, we regress stock volatility on quarterly absolute changes in holdings by large institutions, beginning-of-quarter holdings by large institutions, the usual controls, and stock and date fixed effects. In some specifications, we break the change in ownership into positive (net buys) and negative (net sells) changes. We also include absolute changes in ownership by all institutions as a control, to study the incremental predictive power of top institutions' trading.

The estimates in Table 8, Panel B, reveal that trading activity by large institutions has an incrementally positive effect relative to institutional trading in general. We note that the level of ownership loses most of its predictive power in these specifications to the advantage of changes in

[17] Other reasonable cutoffs give equivalent results. We note that focusing on instances of zero changes in positions versus nonzero changes is not feasible because too few observations display a zero change in positions.

ownership. This finding supports the conjecture that trading, rather than ownership, matters for explaining volatility.

The tests in Panels A and B of Table 8 can raise the valid criticism that volatility and changes in holdings in the same quarter are co-determined such that the regressions suffer from an endogeneity problem. To address this issue, we use a pre-determined proxy for potential trading activity. Specifically, we sort institutions based on their portfolio turnover in the prior quarter. Following the literature (Carhart 1997), we define turnover as *min(Buys, Sells)/[Average Assets in t and (t-1)]*. Then, at the stock-quarter level, we construct four ownership variables corresponding to ownership by low-/high-turnover institutions and top/non-top institutions. A high-turnover institution is in the top quartile of the distribution. We extend the definition of "top institution" up to the 50th position in the ranking to have enough firms in each of the four buckets. We then use these four ownership variables to predict volatility in the next quarter.

In most of the specifications presented in Table 8, Panel C, ownership by high-turnover top institutions has the largest relation to volatility. Again, these results suggest that the observed link between top institutional ownership and volatility is channeled through trading activity.

Next, we add a new data source to the analysis. Specifically, Ancerno collects detailed data about trades by institutional investors (see Hu, Jo, Wang, and Xie 2018, for a detailed description of this data set). In the version that we have access to, we can observe the identity of the institution. Hence, we can identify the top institutions. Using Ancerno data gives us a unique perspective on whether trading activity combined with large trade sizes by top institutions is responsible for the association we observe between ownership by top institutions and stock volatility. Panel A of Table 9 provides summary statistics.

The evidence in Table 8 suggests that trading is more impactful when originating from large institutions versus from a generic institution. This evidence implies that trades by large institutions should display a bigger price impact. Using Ancerno data, our analysis is at the stock-institution-day level. We follow Anand, Irvine, Puckett, and Venkataraman (2013) and compute the price impact of trading volume in a given stock as the largest deviation between the execution prices throughout the day and the opening price. The significant coefficient on the large institution indicator in Table 9, Panel B, confirms the conjecture (Columns (1), (4), and (7)). The difference

in price impact for large institutions' trades, however, goes away once we control for the size of the trade. We include a second-degree polynomial in trade size because the effect of trade size is typically concave (e.g., Frazzini, Israel, and Moskowitz 2012). Hence, the larger price impact (and the ensuing higher volatility) of top institutions is likely because they trade larger blocks.

We can test that large institutions make larger trades. Using Ancerno data at the daily frequency for each institution, we regress the institutional daily trading volume in a given stock, as a fraction of total stock-level volume, on a dummy for whether the institution ranks among the top.[18] We include a control for the level of stock ownership by that institution at the beginning of the quarter from its 13F filings. We also include stock-by-day fixed effects and cluster standard errors separately by stock, day, and institution. The estimates in Table 9, Panel C, suggest that top institutions trade in larger volumes, even controlling for the level of ownership by the institution.

Finally, given the rise of passive investing, it makes sense to investigate whether the effect of passive institutions on stock prices differs from that of active institutions. This analysis can be conveniently conducted using CRSP mutual fund data, which allows us to identify passive mutual funds, among which we include exchange-traded funds (ETFs).[19] After ranking mutual fund families by their assets under management, we break ownership by top mutual fund families into passive and active based on the type of fund within the family that holds the stock. The estimates in Internet Appendix Table IA.11 suggest that passive ownership has a much stronger relation to volatility than active ownership. To explain these results, we note that passive funds have less leeway in trading given that they tend to trade at the close to minimize tracking error (see e.g., Bogousslavsky and Muravyev 2019). Hence, their trades are likely to generate a bigger price impact.

We perform an additional analysis in which we compare the holdings and changes in holdings of large institutions to those of synthetic institutions of the same size, which are composed of many smaller institutions (during the same quarter). To save space, this analysis is available in

[18] The trading volume at the institution-stock-day level is the sum of shares within an order divided by total trading volume in the stock on a given day by a given institution. We separately consider buy and sell orders. If the institution does not trade a stock on a given day, it is not included in the sample. Merging the Ancerno data with 13F ownership data causes a loss of observations relative to the analysis in Panel B.

[19] See a review of the literature regarding ETFs and the underlying securities in Ben-David, Franzoni, and Moussawi (2017).

the Internet Appendix, Section IA.1. The analysis shows that, compared with synthetic institutions, actual large institutions hold less diversified portfolios and engage in larger position changes. These findings join the earlier evidence in suggesting that the channel for the impact of large institutions on volatility is large and undiversified trades.

This novel evidence adds an interesting qualification to our results and further corroborates the view that the trading channel explains the relation between large institutions' ownership and volatility.

6 Case Study: A Merger of Large Institutional Investors

While the association between large institutional investors and volatility is strong, it may not necessarily reflect a causal relation. For example, one possible explanation for this correlation is that large institutional investors might prefer holding popular stocks, which may be more volatile due to intense trading. In the next analysis, we exploit a natural experiment that can provide causal evidence.

We rely on the merger of BlackRockBlackRock and BGI in December 2009. Our test compares the relation between institutional ownership and stock-level volatility before and after this merger. If the size of the institutional investors affects the volatility of the stocks in their portfolios, ownership by the merged institution should have an impact on the volatility of the stocks that, before the merger, were held by a non-top institution.

An important question relates to the exogeneity of the merger with respect to the outcome variable of interest, stock volatility. We assume that the merger is an exogenous event relative to the volatility of the stocks in the portfolios of the two original institutions. The motivation for the merger resided in Barclays' desire to sell some of its divisions to strengthen its balance sheet following the financial crisis. Hence, the reason for the merger appears to have been unrelated to the volatility of the underlying securities (see also Azar, Schmalz, and Tecu 2017). The merger was announced on June 11, 2009, and was completed in December of 2009. Therefore, we expect the effect of the trading activity of the merged institution to start manifesting itself in stock prices from the first quarter of 2010.

Right before the merger, BGI held equities worth about $596 billion and was the largest institution as of the end of 2009, while BlackRock held equities worth about $156 billion and ranked in the 12th position. After the merger, in December 2009, the combined entity was the largest institutional investor in the equity market, overseeing approximately $815 billion of equities. Hence, the stocks that were owned by BlackRock experienced a change of status following the merger. BlackRock's stocks ended up being owned by the largest institution in the market, while they were previously owned by an institution ranked below the top 10. We exploit this change of status as a natural experiment. The intensity of the treatment for each stock depends on the amount of ownership by BlackRock before the merger.

Our main specification resembles a difference-in-differences approach. Specifically, in our first set of tests, we define the treatment variable to be ownership by BlackRock in 2009/Q3, i.e., the last complete quarter before the merger. This quantity represents the amount by which a stock that was owned by a non-top institution (pre-merger BlackRock) ends up being owned by a top institution after the merger (post-merger BlackRock).

$$Volatility_{iq} = Treatment_i \times Post\ merger_q + Controls_{i,q-1}$$
$$+Time\ FE_q + Stock\ FE_i + \varepsilon_{iq}, \quad (6)$$

where the *Post merger* dummy is an indicator for whether the quarter is 2010/Q1 or later. The main variable of interest is the interaction between *Treatment* and the *Post merger* dummy. We control for the usual stock characteristics (main effects and interactions with the merger indicator) and for time and stock fixed effects. Standard errors are block-bootstrapped, clustering by stock and quarter. The pre-merger window ranges between 2007/Q4 to the completion of the merger (2009/Q4). We look at various post-event windows, from one quarter to eight quarters after the merger, adding one quarter at a time to the estimation sample.

Before estimating Equation (6), we verify that the natural experiment generates a valid "first stage," that is, the combined ownership by the two institutions does not decrease after the merger. To this end, we run a specification replacing the merged entity's ownership for volatility on the left-hand side of Equation (6). The estimates in Internet Appendix Table IA.5. show that the ownership of the combined entity is significantly higher than the pre-merger combined ownership, for stocks with higher pre-merger ownership by BlackRock. Thus, there is no concern

that the combined entity experienced a decline in ownership, which would invalidate our identification.

The estimates of Equation (6) are reported in Table 10, Panel A. The samples in Columns (1)–(8) include post-merger periods ranging from one to eight quarters, respectively. We find a strongly significant effect of treatment after the merger. Using the summary statistics in Table 1, when eight quarters after the merger are in the sample, a one-standard-deviation increase in the interaction variable is associated with a 1.6% increase in volatility in standard deviation units (0.009*4.270/2.340). The economic magnitude is not as large as for the full sample regressions in Table 2. However, this experiment focuses on a single firm and studies the incremental impact relative to the pre-merger BlackRock, which was already a sizeable asset manager (top 12). The strong statistical significance of the result adds credibility to the causal interpretation of the estimates in Table 2.[20]

Panel B of Table 10 reports results in which *Treatment* is instead a dummy for a high level of pre-merger ownership by BlackRock (i.e., stock ownership greater than the median ownership by BlackRock). In this case, the increase in volatility for treated stocks ranges between 13 bps and 25 bps. In units of standard deviation of the dependent variable, these slopes translate to an increase of between 5.5% and 10.6%.

After a merger, there is usually a period of portfolio adjustment. The combined entity may need to close some portfolios and possibly move the capital to other ones. These activities may mechanically lead to more coordinated trading and higher volatility for the portfolio stocks. To insulate our analysis from this potential effect, in Panel C of Table 10, we exclude the four quarters in the first year after the merger. The results remain significant and are of similar magnitude.

To study whether the increase in volatility for treated stocks predates the merger, we generate plots of the quarterly regression coefficients of the treatment variable (in dummy variable

[20] We note that Massa, Schumacher, and Wang (2016) find ownership of the combined entity, as measured *before the merger*, is associated with lower stock volatility after the merger occurs. The difference in our research design is that we use BlackRockBlackRock ownership as a proxy for the increase in ownership by top institutions following the merger. Our motivation is to capture the effect of the behavior of the combined entity *after the merger*, e.g., the effect of nondiversifiable large trades. In this sense, we measure an ex-post effect, whereas Massa, Schumacher, and Wang measure the ex-ante effect triggered by the repositioning of other traders in anticipation of the risk of fire sales sparked by the merger.

form for the above-median ownership by BlackRock) and display them in Figure 3.[21] The figure shows the difference in volatility between the treated stocks and the matched controls. The merger effect is clear. In the pre-period, the difference in volatility between the two groups is not significantly different from zero. However, in the post-merger period, the treated stocks experience significantly higher volatility than the control group in most of the quarters under consideration. What ultimately matters is the double difference between the treatment and control groups before and after the merger, which is proven in the regression analysis of Table 10.

We perform additional robustness analyses for the tests in Table 10. First, in Internet Appendix Table IA.6, we remove the financial crisis from the pre-merger merger period, as it was a period of high volatility. In Panel A, we remove 2008/Q4 from the sample. In Panel B, we remove all quarters from 2008/Q3 through 2009/Q1. In both cases, the results remain significant. Second, in Internet Appendix Table IA.7, we run placebo tests using fictional dates for the merger, before the actual merger date. Specifically, we choose 2008/Q4 in Panel A, and 2007/Q4 in Panel B. Consistent with the effect that we estimate in Table 10 being related to the merger, we do not find any significance around these alternative dates. Second, in Internet Appendix Table IA.8, we replace the treatment variable, i.e., pre-merger ownership by BlackRock, with an alternative treatment, i.e., pre-merger ownership by BGI. Consistent with the fact that firms with large BGI ownership were already exposed to the large firm ownership before the merger, we find no effect of this new treatment variable after the merger. Finally, in Internet Appendix Table IA.9 we replicate the analysis in Table 10 using propensity score matching to generate a control group. Our results are consistent with that of the main analysis.

Table 10, Panels D and E, explore absolute and signed autocorrelation around the BlackRock-BGI merger. Panel D shows that the absolute value of autocorrelation increases for the treated group. Given the exogenous nature of the merger, this result supports a causal interpretation of the association between top institutional ownership and return autocorrelation. Panel E shows that the signed autocorrelation decreases after the merger. That is, the autocorrelation of returns

[21] To construct this graph, we identify a control sample with similar pre-merger volatility to the treated stocks using propensity score matching (Abadie and Imbens 2006).

becomes more negative because of large institutional ownership, consistent with the view that large institutions impound temporary shocks into prices that subsequently revert.

In Internet Appendix, Section IA.2, we confirm the conclusions on flow and trade correlation in the context of the natural experiment of the BlackRock-BGI merger. Overall, the exogenous nature of the merger event with respect to the volatility of the portfolio securities as well as the significance and robustness of the findings in Table 10 corroborate a causal interpretation of the positive relation between volatility and ownership by large institutions.

7 Conclusion

Motivated by the dramatic increase in the concentration of institutional ownership in the stock market, we investigate the effect of large institutional investors on stock prices. We find that ownership by large institutions is associated with higher stock price volatility, autocorrelation in returns (a measure of price inefficiency), and a greater magnitude of price drops at times of market stress (a measure of price fragility).

The paper also presents evidence on the channel through which large institutions affect the volatility of the underlying securities. We find that funds within the same family exhibit higher flow correlation and higher correlation of trades than funds belonging to independent families. Furthermore, large institutions' trades are bigger in absolute value and have a greater impact on prices. This evidence suggests that large institutions are granular. That is, the subentities within the same firm display correlated behavior. Hence, when these asset managers are hit by idiosyncratic shocks, diversification is not as strong as if the shocks hit managers in independent families. As a result, the trades of large institutions are more impactful for prices than the diversified trades of a collection of small institutions.

Our results have implications for regulatory design. In particular, they inform the debate about the optimal size of an asset management firm. Regulators have been questioning the systemic implications of large asset managers. We show that combining different institutions within a unique conglomerate affects the "production function" of all the entities involved. Access to capital as well as the investment and trading activities of the various components within a

conglomerate display a higher correlation than is the case for independent firms. This correlated behavior, combined with the sheer size of the conglomerates, has repercussions on asset price stability that are mostly felt during times of market stress. This last consideration in particular supports the regulatory concerns, and it suggests that excessive concentration in the asset management industry may pose a systemic risk. Of course, any regulatory action should weigh the decrease in price efficiency and the increased potential of large price drops against the economies scale in information production and trading that large institutions can achieve and can pass on to their clients. The ultimate impact of large institutional investors on aggregate welfare remains an open question for future research.

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Figure 1. Time Series of Large Institutions' Ownership

The chart shows the aggregate equity holdings by all institutions and the top institutions over time, as a percentage of total market capitalization of the U.S. equity market.

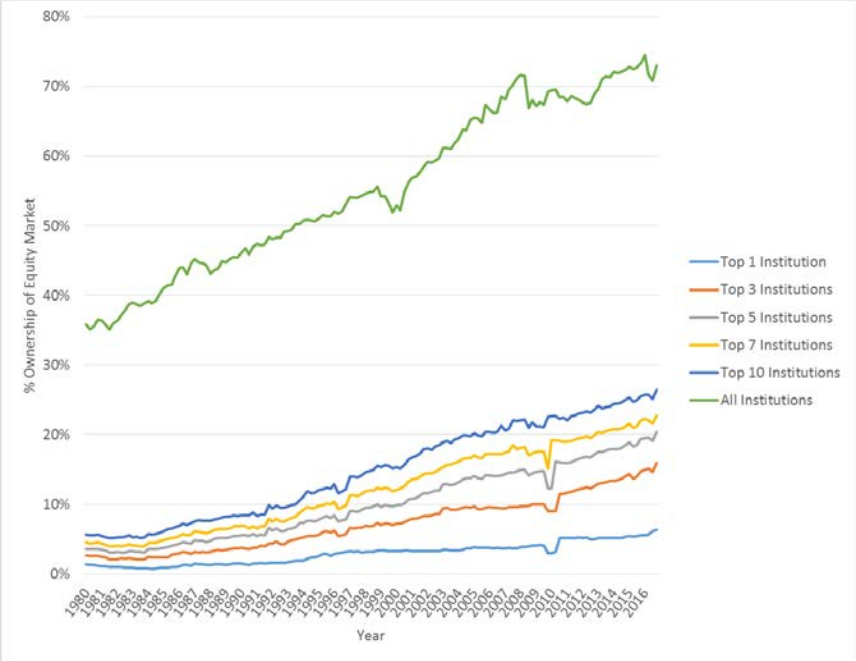

Figure 2. Yearly Coefficients

This figure presents slope coefficients and moving averages of slope coefficients from ordinary least squares (OLS) regressions as in Equation 1, run by year. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during quarter q. The chart presents the standatdized coefficients of the key independent variable, *Top inst ownership*. The slopes are expressed in standard deviation units of the dependent variable for a one-standard-deviation change in top 10 institutions' ownership. The sample period is 1980/Q1–2016/Q4.

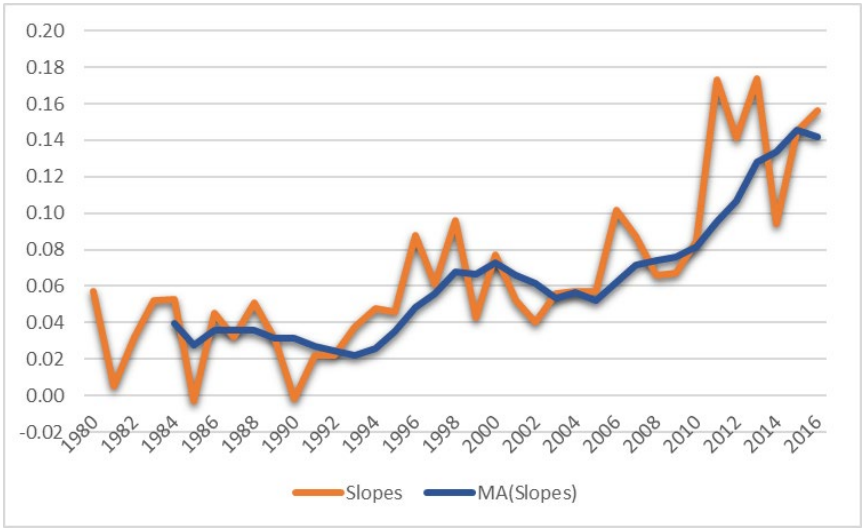

Figure 3. Treatment Effect on Volatility around the Merger of BlackRock and BGI

This figure presents slope coefficients from differences-in-differences regressions. We use the event of the merger between BlackRock and BGI in December 2009 to test the relation between volatility and ownership by large institutions. Point 0 on the x-axis represents the quarter of the merger, 2009/Q4. The dependent variable is the stock's *Daily idiosyncratic volatility*, which is computed from daily returns during the next quarter. The key independent variable, which is represented with 95% confidence standard error bands, is the interaction between a dummy variable that equals one if the firm is in the top 50% of pre-merger ownership by BlackRock and a quarter dummy. The control sample is selected using propensity score matching based on a probit model for the probability of treatment as a function of the average volatility during the pre-period. The chosen algorithm implements *k*-nearest neighbors Mahalanobis matching, with $k = 4$.

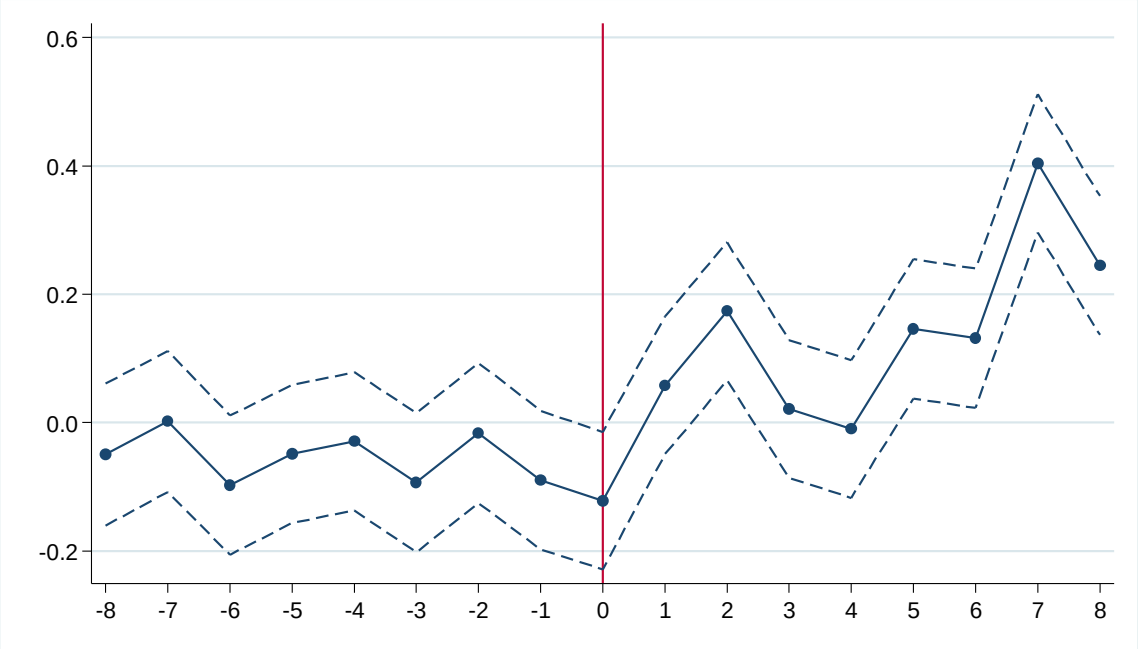

Table 1. Summary Statistics

This table presents summary statistics for key variables used in the analysis, by sample. Unless otherwise specified, the sample period is 1980/Q1–2016/Q4.

	N	Mean	Std Dev	Min	p25	Median	p75	Max
Stock-quarter-level sample								
Daily volatility (%)	666,605	3.510	2.550	0.210	1.834	2.785	4.331	25.691
Top 3 insts ownership (q-1)	666,605	0.042	0.051	0.000	0.002	0.022	0.059	0.339
Top 5 insts ownership (q-1)	666,605	0.056	0.068	0.000	0.005	0.029	0.082	0.517
Top 7 insts ownership (q-1)	666,605	0.067	0.078	0.000	0.008	0.036	0.100	0.610
Top 10 insts ownership (q-1)	666,605	0.081	0.090	0.000	0.011	0.046	0.122	0.709
Top 11-Top 20 ownership (q-1)	666,605	0.033	0.045	-0.165	0.001	0.012	0.051	0.537
Top 21-Top 30 ownership (q-1)	666,605	0.022	0.033	0.000	0.000	0.006	0.032	0.636
Top 30-Top 50 ownership (q-1)	666,605	0.027	0.039	0.000	0.000	0.009	0.042	0.737
Ownership by "middle" institutions (q-1)	666,605	0.282	0.228	0.000	0.074	0.240	0.461	1.000
Ownership by all institutions (q-1)	666,605	0.380	0.301	0.000	0.110	0.320	0.616	1.273
Ownership by bottom institutions (q-1)	666,605	0.017	0.033	0.000	0.000	0.005	0.018	0.311
abs(Changes in ownership) by Top 3 (q)	569,335	0.006	0.010	0.000	0.000	0.002	0.007	0.123
abs(Changes in ownership) by Top 5 (q)	569,335	0.009	0.013	0.000	0.000	0.004	0.011	0.174
abs(Changes in ownership) by Top 7 (q)	569,335	0.011	0.015	0.000	0.001	0.005	0.015	0.221
abs(Changes in ownership) by Top 10 (q)	569,335	0.014	0.019	0.000	0.001	0.007	0.021	0.259
Buys by Top 3 (q)	569,335	0.004	0.008	0.000	0.000	0.001	0.003	0.116
Sells by Top 3 (q)	569,335	0.003	0.007	0.000	0.000	0.000	0.002	0.101
Buys by Top 5 (q)	569,335	0.005	0.010	0.000	0.000	0.001	0.005	0.147
Sells by Top 5 (q)	569,335	0.004	0.008	0.000	0.000	0.000	0.003	0.119
Buys by Top 7 (q)	569,335	0.006	0.011	0.000	0.000	0.002	0.007	0.197
Sells by Top 7 (q)	569,335	0.005	0.009	0.000	0.000	0.001	0.005	0.157
Buys by Top 10 (q)	569,335	0.008	0.013	0.000	0.000	0.003	0.010	0.212
Sells by Top 10 (q)	569,335	0.006	0.011	0.000	0.000	0.001	0.008	0.259
1 / Price (q-1)	666,605	0.246	0.613	0.005	0.038	0.076	0.196	10.548
Amihud illiquidity (q-1)	666,605	0.360	0.588	0.000	0.006	0.074	0.473	4.488
log(Market cap) (q-1)	666,605	5.221	2.086	0.408	3.660	5.059	6.644	11.582
Past 6-month return (q-3 to q-1)	666,605	0.065	0.423	-0.942	-0.161	0.027	0.221	8.536
Book-to-market (q-1)	666,605	0.750	0.658	-0.062	0.334	0.595	0.961	10.142
Greenwood and Thesmar fragility	498,482	0.118	0.195	0.000	0.014	0.047	0.122	1.540
Idiosyncratic volatility	657,736	3.210	2.500	0.281	1.580	2.470	3.970	25.700
Systematic volatilty	657,736	1.300	1.010	0.014	0.651	1.030	1.620	16.100
Daily autocorrelation	591,089	-0.086	0.187	-0.623	-0.210	-0.076	0.045	0.457
abs(Daily autocorrelation)	591,089	0.163	0.127	0.000	0.062	0.133	0.236	0.623
Return Regressions Sample								
DGTW returns	479,839	-0.003	0.135	-0.340	-0.086	0.000	0.077	0.357
Top 10 insts ownership (q-1)	479,839	0.072	0.073	0.000	0.014	0.049	0.110	0.484
During worst quarters (bottom 5% of mkt return):								
DGTW returns	18,758	0.022	0.148	-0.340	-0.070	0.012	0.124	0.357
Top 10 insts ownership (q-1)	18,758	0.078	0.073	0.000	0.017	0.057	0.123	0.396
Merger Experiment Sample (2007/Q4-2009/Q4)								
Daily volatility (%)	61,876	3.790	2.340	0.208	2.240	3.200	4.630	21.800
Continuous treatment × Post	61,876	0.003	0.009	0.000	0.000	0.000	0.002	0.124
Continuous treatment	61,876	0.007	0.013	0.000	0.000	0.003	0.007	0.124
Treatment × Post	61,876	0.250	0.433	0.000	0.000	0.000	1.000	1.000
Treatment	61,876	0.539	0.499	0.000	0.000	1.000	1.000	1.000
Daily autocorrelation	57,189	-0.073	0.163	-0.534	-0.181	-0.066	0.041	0.335
abs(Daily autocorrelation)	57,189	0.142	0.109	0.000	0.055	0.118	0.205	0.534
Mutual Fund Sample								
Pairwise flow correlation	249,665,892	0.030	0.332	-1.000	-0.192	0.028	0.253	1.000
Pairwise return correlation	249,665,892	0.566	0.418	-1.000	0.352	0.729	0.888	1.000
Same management company indicator	249,665,892	0.008	0.088	0.000	0.000	0.000	0.000	1.000
Pairwise correlation of active share weights	115,398,353	-0.257	0.225	-1.000	-0.415	-0.239	-0.084	1.000
Pairwise correlation of active rebalancing trades	126,533,009	0.009	0.069	-1.000	-0.001	0.000	0.003	1.000

Table 2. Ownership by Large Institutional Investors and Stock Volatility

This table presents ordinary least squares regression results. The dependent variable in both panels is the stock's *Daily volatility*, which is computed from daily returns during the next quarter, quarter q. All independent variables are measured during quarter q–1. The key independent variable is the *Top inst ownership* of the largest institutional investors in a given stock. Panel B replicates the analysis from Panel A but includes Greenwood and Thesmar's (2011) fragility measure. Time and stock fixed effects are also included. The sample period is 1980/Q1–2016/Q4. Appendix B provides variable descriptions. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Ownership by Large Institutional Investors and Daily Volatility

Dependent variable:	Daily volatility (q) (%)						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	1.096***	1.080***	1.071***	0.945***	1.146***	0.674***	0.238
	(4.637)	(5.542)	(6.401)	(6.625)	(6.493)	(4.087)	(1.576)
Ownership by "middle" institutions (q-1)	0.152***	0.122**	0.093*	0.082	0.009	0.086	0.115*
	(2.686)	(2.093)	(1.679)	(1.434)	(0.150)	(1.466)	(1.872)
1 / Price (q-1)	0.599***	0.599***	0.598***	0.598***	0.599***	0.600***	0.600***
	(9.845)	(9.840)	(9.831)	(9.838)	(9.867)	(9.874)	(9.876)
Amihud illiquidity (q-1)	1.479***	1.477***	1.476***	1.476***	1.478***	1.481***	1.481***
	(23.635)	(23.562)	(23.548)	(23.533)	(23.571)	(23.622)	(23.638)
log(Market cap) (q-1)	-0.293***	-0.297***	-0.298***	-0.299***	-0.282***	-0.278***	-0.277***
	(-11.164)	(-11.237)	(-11.259)	(-11.440)	(-11.446)	(-11.219)	(-11.212)
Past 6-month return (q-3 to q-1)	-0.109	-0.108	-0.107	-0.106	-0.111	-0.114	-0.114
	(-0.966)	(-0.956)	(-0.948)	(-0.941)	(-0.979)	(-1.005)	(-1.007)
Book-to-market (q-1)	0.013	0.012	0.012	0.013	0.016	0.015	0.015
	(0.480)	(0.455)	(0.466)	(0.478)	(0.589)	(0.560)	(0.577)
Ownership by bottom institutions (q-1)	-1.365***	-1.332***	-1.324***	-1.322***	-1.407***	-1.450***	-1.450***
	(-6.586)	(-6.496)	(-6.418)	(-6.451)	(-6.975)	(-7.117)	(-7.116)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	666,605	666,605	666,605	666,605	666,605	666,605	666,605
Adj R^2	0.666	0.666	0.666	0.666	0.666	0.666	0.666

Table 2. Ownership by Large Institutional Investors and Stock Volatility (Cont.)

Panel B: Including Greenwood and Thesmar's (2011) Fragility Measure

Dependent variable:	Daily volatility (q) (%)						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	1.066***	1.011***	1.074***	0.959***	1.130***	0.629***	0.479***
	(3.813)	(4.223)	(5.427)	(5.625)	(5.299)	(2.887)	(2.802)
Ownership by "middle" institutions (q-1)	0.166**	0.146**	0.110	0.094	0.029	0.005	-0.045
	(2.384)	(2.033)	(1.606)	(1.365)	(0.381)	(0.073)	(-0.551)
1 / Price (q-1)	0.585***	0.585***	0.584***	0.584***	0.585***	0.586***	0.586***
	(9.578)	(9.577)	(9.569)	(9.575)	(9.589)	(9.603)	(9.608)
Amihud illiquidity (q-1)	1.492***	1.491***	1.490***	1.490***	1.490***	1.493***	1.493***
	(23.019)	(22.987)	(22.971)	(22.964)	(22.966)	(22.994)	(23.028)
log(Market cap) (q-1)	-0.349***	-0.350***	-0.352***	-0.352***	-0.338***	-0.329***	-0.327***
	(-11.130)	(-11.148)	(-11.186)	(-11.288)	(-11.331)	(-11.169)	(-11.244)
Past 6-month return (q-3 to q-1)	-0.103	-0.103	-0.102	-0.101	-0.105	-0.109	-0.110
	(-0.936)	(-0.929)	(-0.921)	(-0.915)	(-0.953)	(-0.987)	(-0.988)
Book-to-market (q-1)	-0.021	-0.021	-0.021	-0.021	-0.018	-0.018	-0.017
	(-0.771)	(-0.782)	(-0.781)	(-0.771)	(-0.663)	(-0.653)	(-0.641)
Ownership by bottom institutions (q-1)	-1.373***	-1.353***	-1.344***	-1.342***	-1.399***	-1.428***	-1.427***
	(-5.771)	(-5.721)	(-5.677)	(-5.678)	(-5.976)	(-6.040)	(-6.063)
Greenwood and Thesmar fragility (q-1)	0.178***	0.177***	0.173***	0.175***	0.218***	0.228***	0.240***
	(5.307)	(5.289)	(5.186)	(5.239)	(6.118)	(6.282)	(6.497)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	498,482	498,482	498,482	498,482	498,482	498,482	498,482
Adj R^2	0.665	0.665	0.665	0.665	0.665	0.664	0.664

Table 3. Nonlinear Specification

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during the next quarter, quarter q. All independent variables are measured during quarter q–1. The key independent variables are indicator variables for holdings in different quartiles of the ownership distribution. The quartiles are recomputed every quarter in each of 10 size deciles. Time and stock fixed effects are also included. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Daily volatility (q) (%)			
Institutions:	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)
Indicator for ownership in quartile 4 (highest)	0.117***	0.114***	0.141***	0.146***
	(6.250)	(5.908)	(7.853)	(7.735)
Indicator for ownership in quartile 3	0.041***	0.061***	0.073***	0.106***
	(2.666)	(4.216)	(5.259)	(7.405)
Indicator for ownership in quartile 2	0.010	0.021**	0.035***	0.050***
	(0.879)	(2.060)	(3.501)	(4.671)
Ownership by "middle" institutions	0.322***	0.295***	0.263***	0.251***
	(5.032)	(4.631)	(4.251)	(4.022)
1 / Price (q-1)	0.601***	0.601***	0.601***	0.601***
	(9.932)	(9.932)	(9.939)	(9.936)
Amihud illiquidity (q-1)	1.481***	1.482***	1.483***	1.483***
	(23.634)	(23.659)	(23.677)	(23.681)
log(Market cap) (q-1)	-0.279***	-0.276***	-0.273***	-0.270***
	(-11.601)	(-11.542)	(-11.442)	(-11.155)
Past 6-month return (q-3 to q-1)	-0.103	-0.103	-0.102	-0.101
	(-0.909)	(-0.911)	(-0.905)	(-0.898)
Book-to-market (q-1)	0.009	0.009	0.009	0.010
	(0.340)	(0.352)	(0.343)	(0.356)
Ownership by bottom 10 institutions	-0.636***	-0.637***	-0.636***	-0.639***
	(-5.345)	(-5.337)	(-5.334)	(-5.353)
Stock FE	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes
Observations	666,692	666,692	666,692	666,692
Adj R^2	0.666	0.666	0.666	0.666

Table 4. Ownership by Large Institutional Investors and Stock Volatility – Subperiod Analysis

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during quarter q. The key independent variable is the *Top inst ownership* of the largest institutional investors in a given stock. All independent variables are measured during quarter q–1. In Panel A, the sample period is 1980–1990; in Panel B the sample period is 1991–2003; and in Panel C the sample period is 2004–2016. Time and stock fixed effects are also included. Appendix B provides variable descriptions. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: 1980–1990

Dependent variable:	Daily volatility (q) (%)						
Subperiod	1980-1990						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	0.719	0.237	0.479*	0.125	-0.206	0.127	0.192
	(1.464)	(0.719)	(1.683)	(0.562)	(-0.879)	(0.552)	(0.926)
Ownership by "middle" institutions	0.067	0.085	0.057	0.092	0.127	0.094	0.086
	(0.664)	(0.841)	(0.561)	(0.865)	(1.147)	(0.883)	(0.792)
1 / Price (q-1)	0.222***	0.222***	0.222***	0.222***	0.221***	0.221***	0.221***
	(5.922)	(5.918)	(5.919)	(5.909)	(5.894)	(5.899)	(5.898)
Amihud illiquidity (q-1)	1.579***	1.578***	1.579***	1.578***	1.578***	1.578***	1.578***
	(14.926)	(14.956)	(14.961)	(14.966)	(14.967)	(14.963)	(14.967)
log(Market cap) (q-1)	-0.472***	-0.472***	-0.472***	-0.471***	-0.471***	-0.471***	-0.471***
	(-10.180)	(-10.185)	(-10.201)	(-10.215)	(-10.206)	(-10.200)	(-10.204)
Past 6-month return (q-3 to q-1)	-0.197***	-0.197***	-0.197***	-0.197***	-0.198***	-0.198***	-0.198***
	(-4.483)	(-4.487)	(-4.472)	(-4.481)	(-4.498)	(-4.499)	(-4.493)
Book-to-market (q-1)	-0.175***	-0.174***	-0.174***	-0.174***	-0.174***	-0.174***	-0.174***
	(-4.188)	(-4.173)	(-4.173)	(-4.166)	(-4.168)	(-4.169)	(-4.167)
Ownership by bottom institutions (q-1)	-1.634***	-1.631***	-1.632***	-1.628***	-1.632***	-1.625***	-1.625***
	(-3.337)	(-3.328)	(-3.329)	(-3.322)	(-3.335)	(-3.314)	(-3.319)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	157,063	157,063	157,063	157,063	157,063	157,063	157,063
Adj R^2	0.682	0.682	0.682	0.682	0.682	0.682	0.682

Table 4. Ownership by Large Institutional Investors and Stock Volatility – Subperiod Analysis (Cont.)

Panel B: 1991–2003

Dependent variable:	Daily volatility (q) (%)						
Subperiod	1991-2003						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	1.363***	1.861***	1.978***	2.124***	1.493***	1.374***	1.038***
	(3.967)	(5.717)	(6.045)	(7.168)	(5.931)	(5.193)	(5.243)
Ownership by "middle" institutions	0.662***	0.603***	0.555***	0.473***	0.410***	0.463***	0.481***
	(6.170)	(5.569)	(5.420)	(4.566)	(3.855)	(4.497)	(4.474)
1 / Price (q-1)	1.021***	1.021***	1.020***	1.019***	1.022***	1.023***	1.023***
	(7.180)	(7.175)	(7.166)	(7.166)	(7.199)	(7.203)	(7.204)
Amihud illiquidity (q-1)	1.348***	1.346***	1.345***	1.343***	1.348***	1.351***	1.352***
	(13.320)	(13.305)	(13.279)	(13.266)	(13.325)	(13.365)	(13.390)
log(Market cap) (q-1)	-0.334***	-0.339***	-0.342***	-0.347***	-0.311***	-0.308***	-0.307***
	(-8.067)	(-8.216)	(-8.181)	(-8.366)	(-7.991)	(-7.807)	(-7.858)
Past 6-month return (q-3 to q-1)	-0.096	-0.095	-0.093	-0.090	-0.100	-0.102	-0.102
	(-0.623)	(-0.616)	(-0.605)	(-0.586)	(-0.646)	(-0.658)	(-0.659)
Book-to-market (q-1)	-0.129***	-0.130***	-0.130***	-0.131***	-0.127***	-0.129***	-0.127***
	(-4.285)	(-4.320)	(-4.322)	(-4.343)	(-4.229)	(-4.249)	(-4.224)
Ownership by bottom institutions (q-1)	-1.191***	-1.169***	-1.150***	-1.130***	-1.212***	-1.219***	-1.218***
	(-3.304)	(-3.256)	(-3.191)	(-3.159)	(-3.374)	(-3.389)	(-3.388)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	291,030	291,030	291,030	291,030	291,030	291,030	291,030
Adj R^2	0.712	0.713	0.713	0.713	0.712	0.712	0.712

Table 4. Ownership by Large Institutional Investors and Stock Volatility – Subperiod Analysis (Cont.)

Panel C: 2004–2016

Dependent variable:	Daily volatility (q) (%)						
Subperiod	2004-2016						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	2.030***	1.961***	1.515***	1.262***	1.077***	0.439**	0.240
	(6.228)	(6.953)	(6.990)	(7.943)	(5.561)	(2.132)	(1.028)
Ownership by "middle" institutions	0.269***	0.190**	0.201**	0.216***	0.117	0.212**	0.225**
	(3.407)	(2.372)	(2.553)	(2.703)	(1.442)	(2.667)	(2.496)
1 / Price (q-1)	0.677***	0.673***	0.671***	0.671***	0.669***	0.670***	0.670***
	(8.901)	(8.861)	(8.856)	(8.867)	(8.906)	(8.898)	(8.914)
Amihud illiquidity (q-1)	0.892***	0.888***	0.888***	0.889***	0.890***	0.889***	0.889***
	(14.436)	(14.447)	(14.477)	(14.428)	(14.364)	(14.389)	(14.401)
log(Market cap) (q-1)	-0.491***	-0.501***	-0.497***	-0.495***	-0.460***	-0.458***	-0.458***
	(-9.462)	(-9.450)	(-9.467)	(-9.594)	(-9.307)	(-9.273)	(-9.275)
Past 6-month return (q-3 to q-1)	-0.010	-0.005	-0.007	-0.007	-0.020	-0.024	-0.024
	(-0.161)	(-0.083)	(-0.110)	(-0.114)	(-0.310)	(-0.363)	(-0.360)
Book-to-market (q-1)	0.161***	0.158***	0.160***	0.160***	0.163***	0.164***	0.164***
	(6.034)	(5.924)	(5.971)	(6.015)	(6.127)	(6.184)	(6.208)
Ownership by bottom institutions (q-1)	-1.160***	-1.132***	-1.164***	-1.168***	-1.295***	-1.309***	-1.309***
	(-6.359)	(-6.286)	(-6.413)	(-6.390)	(-7.137)	(-7.187)	(-7.195)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	218,182	218,182	218,182	218,182	218,182	218,182	218,182
Adj R^2	0.673	0.673	0.673	0.672	0.672	0.672	0.672

Table 5. Large Institutional Ownership and Return Autocorrelation

This table presents ordinary least squares regression results. The dependent variable is the absolute value of *autocorrelation* of the DGTW-adjusted returns (Daniel, Grinblatt, Titman, and Wermers, DGTW, 1997) of stocks held by large institutional investors. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	abs(ρ(DGTW-adjusted returns)) (q)						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	0.028***	0.021**	0.014**	0.022***	0.004	-0.022**	-0.011*
	(2.854)	(2.518)	(2.014)	(3.233)	(0.596)	(-2.402)	(-1.754)
Ownership by "middle" institutions	-0.020***	-0.020***	-0.021***	-0.024***	-0.026***	-0.026***	-0.028***
	(-7.394)	(-7.661)	(-7.696)	(-8.430)	(-8.713)	(-8.731)	(-8.854)
1 / Price (q-1)	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(-10.063)	(-10.079)	(-10.097)	(-10.120)	(-10.119)	(-10.116)	(-10.136)
Amihud illiquidity (q-1)	0.064***	0.064***	0.064***	0.064***	0.064***	0.064***	0.064***
	(31.256)	(31.198)	(31.149)	(31.193)	(31.269)	(31.268)	(31.267)
log(Market cap) (q-1)	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(-8.584)	(-8.625)	(-8.606)	(-8.930)	(-8.799)	(-8.945)	(-9.212)
Past 6-month return (q-3 to q-1)	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(-6.364)	(-6.332)	(-6.344)	(-6.265)	(-6.290)	(-6.302)	(-6.232)
Book-to-market (q-1)	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(-3.850)	(-3.885)	(-3.850)	(-3.867)	(-3.743)	(-3.748)	(-3.828)
Ownership by bottom institutions (q-1)	-0.017**	-0.016*	-0.017*	-0.015*	-0.017*	-0.017*	-0.017*
	(-2.018)	(-1.912)	(-1.949)	(-1.735)	(-1.948)	(-1.964)	(-1.944)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	591,089	591,089	591,089	591,089	591,089	591,089	591,089
Adj R^2	0.284	0.284	0.284	0.284	0.284	0.284	0.284

Table 6. Ownership by Large Institutional Investors and Stock Returns during Periods of Market Turmoil

This table presents ordinary least squares regression results. The dependent variable is the quarterly *DGTW excess return* (Daniel, Grinblatt, Titman, and Wermers 1997) of stocks held by large institutional investors. All independent variables are measured during quarter q–1. The table uses the *Top inst ownership* of the largest institutional investors in a given stock as the key independent variable. *Top inst ownership* is interacted with a dummy variable that equals one if the market was in the 5% left tail of returns during a particular quarter. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	DGTW excess returns (quarterly)						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	-0.001	0.000	0.006	0.005	0.002	0.015	-0.014
	(-0.073)	(0.028)	(0.593)	(0.511)	(0.367)	(1.470)	(-1.540)
Top inst ownership (q-1) × Bottom 5% dummy	-0.175*	-0.171**	-0.173**	-0.191***	0.012	-0.001	0.097**
	(-1.728)	(-2.341)	(-2.448)	(-2.966)	(0.329)	(-0.015)	(2.318)
Ownership by "middle" institutions	0.006*	0.006*	0.006*	0.006*	0.006*	0.005	0.007**
	(1.955)	(1.953)	(1.735)	(1.754)	(1.848)	(1.598)	(2.234)
Ownership by "middle" institutions × Bottom 5% dummy	-0.020	-0.016	-0.013	-0.006	-0.015	-0.012	-0.020
	(-1.091)	(-0.864)	(-0.738)	(-0.331)	(-0.793)	(-0.584)	(-1.015)
1 / Price (q-1)	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***
	(-4.204)	(-4.204)	(-4.204)	(-4.205)	(-4.206)	(-4.213)	(-4.194)
1 / Price (q-1) × Bottom 5% dummy	-0.016	-0.016	-0.016	-0.016	-0.015	-0.015	-0.015
	(-1.550)	(-1.516)	(-1.515)	(-1.494)	(-1.405)	(-1.399)	(-1.439)
Amihud illiquidity (q-1)	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
	(-1.623)	(-1.618)	(-1.635)	(-1.632)	(-1.607)	(-1.617)	(-1.624)
Amihud illiquidity (q-1) × Bottom 5% dummy	0.001	0.001	0.001	0.002	0.000	0.001	0.001
	(0.092)	(0.081)	(0.104)	(0.149)	(0.034)	(0.052)	(0.072)
log(Market cap) (q-1)	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***
	(-20.105)	(-19.997)	(-20.140)	(-20.085)	(-20.535)	(-20.525)	(-20.425)
log(Market cap) (q-1) × Bottom 5% dummy	0.008**	0.008**	0.008**	0.009**	0.005	0.005	0.005
	(2.170)	(2.275)	(2.379)	(2.595)	(1.492)	(1.489)	(1.461)
Past 6-month return (q-3 to q-1)	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*
	(1.692)	(1.689)	(1.697)	(1.692)	(1.678)	(1.687)	(1.665)
Past 6-month return (q-3 to q-1) × Bottom 5% dummy	-0.029**	-0.029**	-0.029**	-0.030**	-0.029**	-0.029**	-0.029**
	(-2.450)	(-2.451)	(-2.468)	(-2.492)	(-2.431)	(-2.440)	(-2.446)
Book-to-market (q-1)	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**
	(2.026)	(2.031)	(2.021)	(2.022)	(2.032)	(2.025)	(2.065)
Book-to-market (q-1) × Bottom 5% dummy	0.004	0.004	0.004	0.004	0.003	0.003	0.003
	(0.559)	(0.607)	(0.594)	(0.565)	(0.472)	(0.475)	(0.436)
Ownership by bottom institutions (q-1)	0.068***	0.068***	0.068***	0.068***	0.067***	0.067***	0.067***
	(5.248)	(5.251)	(5.253)	(5.235)	(5.124)	(5.117)	(5.127)
Ownership by bottom institutions (q-1) × Bottom 5% dummy	-0.031	-0.035	-0.035	-0.041	-0.015	-0.015	-0.018
	(-0.388)	(-0.428)	(-0.434)	(-0.500)	(-0.178)	(-0.179)	(-0.211)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	479,839	479,839	479,839	479,839	479,839	479,839	479,839
Adj R^2	0.080	0.080	0.080	0.080	0.080	0.080	0.080

Table 7. Correlation of Fund Flows and Similarities in Holdings and Trades

The table presents tests for whether mutual funds within the same family have correlated flows, correlated returns, and similar portfolio holdings and trades. All panels present results from ordinary least squares regressions on an indicator for membership of the funds in the same family. In Panel A, for each fund pair-year, we compute the 12-month correlation of flows (scaled by lagged total net assets) over the calendar year. The dependent variable is the correlation between each pair of funds. In Panel B, we compute the 12-month correlation of the active trades of two funds over the calendar year. The dependent variable is the correlation of active trades between each pair of funds. In all panels, we use a random sample of 1% of all observations to generate Columns (1)–(4) for computational efficiency. *t*-statistics in parentheses are based on standard errors with three-way clustering: year, fund *i*, and fund *j*. The sample period is 1980/Q1–2016/Q4. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Correlation of Fund Flows within the Same Family

Dependent variable:	Correlation of flows between Fund i and Fund j							
	All institutions				Top 20 institutions			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Same management company (i,j)	0.032***	0.032***	0.032***	0.032***	0.022***	0.024***	0.024***	0.024***
	(8.082)	(10.448)	(10.477)	(10.668)	(4.528)	(6.323)	(6.364)	(7.230)
Year FE	Yes	No	Yes	No	Yes	No	Yes	No
Fund i, Fund j FE	No	Yes	Yes	No	No	Yes	Yes	No
Year × Fund i FE, Year × Fund j FE	No	No	No	Yes	No	No	No	Yes
Observations	2,338,212	2,338,136	2,338,135	2,335,052	612,325	612,253	612,252	603,302
Adj R^2	0.002	0.022	0.024	0.161	0.003	0.037	0.040	0.270

Panel B: Correlation in Active Trades within the Same Family

Dependent variable:	Correlation of active trades between Fund i and Fund j							
	All institutions				Top 20 institutions			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Same management company (i,j)	0.029***	0.026***	0.026***	0.025***	0.025***	0.022***	0.022***	0.022***
	(13.533)	(13.157)	(12.979)	(12.013)	(9.060)	(8.872)	(8.788)	(7.566)
Year FE	Yes	No	Yes	No	Yes	No	Yes	No
Fund i, Fund j FE	No	Yes	Yes	No	No	Yes	Yes	No
Year × Fund i FE, Year × Fund j FE	No	No	No	Yes	No	No	No	Yes
Observations	1,265,379	1,265,253	1,265,253	1,260,278	330,551	330,449	330,449	321,488
Adj R^2	0.006	0.061	0.064	0.233	0.008	0.093	0.099	0.378

Table 8. Evidence on the Trade Channel from Changes in Holdings

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during the same quarter as when holdings changes are measured. In Panel A, the key independent variables are dummy variables for large (above 5%) and small (below 5%) holdings changes by top and non-top institutions. In Panel B, the key independent variables are *abs(Total trades)*, *Buys*, and *Sells*, which represent absolute, positive, and negative changes in ownership, respectively, by top institutional investors in a given stock in quarter q. In Panel C, all independent variables are measured during quarter q–1. The key independent variables are *Holdings* by top and non-top institutions for low- and high-turnover institutions. High-turnover institutions are those in the top quartile in a given quarter. Time and stock fixed effects are also included in all panels and specifications. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Large and Small Changes in Holdings

Dependent variable:	Daily volatility (q) (%)			
Institutions:	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)
Large holdings change by top inst.	2.226***	2.049***	1.966***	1.758***
	(6.707)	(7.000)	(8.016)	(8.416)
Small holdings change by top inst.	1.144***	1.085***	1.027***	0.789***
	(3.582)	(4.275)	(4.590)	(4.125)
Large holdings change by non-top inst.	0.999***	0.986***	0.968***	0.964***
	(12.739)	(12.858)	(12.900)	(12.751)
Small holdings change by non-top inst.	-0.436***	-0.510***	-0.565***	-0.575***
	(-4.584)	(-4.962)	(-5.739)	(-5.597)
1 / Price (q-1)	0.590***	0.589***	0.588***	0.588***
	(9.771)	(9.763)	(9.753)	(9.761)
Amihud illiquidity (q-1)	1.493***	1.489***	1.488***	1.488***
	(24.228)	(24.119)	(24.108)	(24.088)
log(Market cap) (q-1)	-0.324***	-0.328***	-0.329***	-0.329***
	(-12.130)	(-12.249)	(-12.238)	(-12.371)
Past 6-month return (q-3 to q-1)	-0.096	-0.095	-0.094	-0.094
	(-0.854)	(-0.844)	(-0.837)	(-0.834)
Book-to-market (q-1)	0.015	0.015	0.015	0.015
	(0.574)	(0.559)	(0.577)	(0.587)
Stock FE	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes
Observations	331,579	377,612	390,728	399,957
Adj R^2	0.634	0.634	0.633	0.634

Table 8. Evidence on the Trade Channel from Changes in Holdings (Cont.)

Panel B: Changes in Holdings as Continuous Variable

Dependent variable:	Daily volatility (q) (%)							
Institutions:	Top 3	Top 3	Top 5	Top 5	Top 7	Top 7	Top 10	Top 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
abs(Changes in ownership) - Top	3.825***		4.338***		4.549***		4.621***	
	(9.314)		(11.493)		(13.579)		(13.110)	
Buys - Top		1.068**		1.269**		1.245***		1.451***
		(2.286)		(2.608)		(2.993)		(3.232)
Sells - Top		8.198***		9.054***		9.547***		9.329***
		(10.980)		(13.533)		(14.425)		(14.105)
abs(Changes in ownerhip) - All other inst.	0.440***	0.439***	0.439***	0.439***	0.439***	0.438***	0.438***	0.437***
	(43.302)	(43.384)	(43.264)	(43.436)	(43.242)	(43.374)	(43.066)	(43.196)
Top ownership dummy	2.917***	2.974***	2.808***	2.895***	2.714***	2.832***	2.601***	2.734***
	(12.269)	(12.615)	(11.914)	(12.367)	(11.632)	(12.184)	(10.964)	(11.646)
Daily volatility (q-1)	0.602***	0.304*	0.543***	0.243*	0.492***	0.173	0.348***	0.048
	(3.873)	(1.862)	(4.677)	(1.972)	(4.775)	(1.575)	(3.860)	(0.491)
Total institutional ownership	0.350***	0.358***	0.323***	0.333***	0.292***	0.305***	0.277***	0.288***
	(8.153)	(8.307)	(7.352)	(7.565)	(6.995)	(7.237)	(6.452)	(6.632)
1 / Price (q-1)	0.470***	0.469***	0.470***	0.468***	0.470***	0.468***	0.470***	0.469***
	(9.766)	(9.728)	(9.755)	(9.711)	(9.749)	(9.725)	(9.763)	(9.757)
Amihud illiquidity (q-1)	0.712***	0.713***	0.711***	0.713***	0.710***	0.713***	0.711***	0.715***
	(22.517)	(22.550)	(22.450)	(22.484)	(22.478)	(22.545)	(22.611)	(22.648)
log(Market cap) (q-1)	-0.189***	-0.186***	-0.193***	-0.189***	-0.195***	-0.190***	-0.197***	-0.191***
	(-9.939)	(-9.775)	(-10.073)	(-9.809)	(-10.116)	(-9.851)	(-10.405)	(-10.086)
Past 6-month return (q-3 to q-1)	-0.117	-0.114	-0.117	-0.113	-0.117	-0.111	-0.117	-0.110
	(-1.609)	(-1.569)	(-1.608)	(-1.554)	(-1.608)	(-1.534)	(-1.601)	(-1.512)
Book-to-market (q-1)	-0.038**	-0.038**	-0.038**	-0.038**	-0.038**	-0.037**	-0.036**	-0.037**
	(-2.497)	(-2.481)	(-2.518)	(-2.493)	(-2.477)	(-2.476)	(-2.371)	(-2.422)
Ownership by bottom 10 institutions (q-1)	-0.383***	-0.381***	-0.377***	-0.376***	-0.379***	-0.377***	-0.391***	-0.391***
	(-4.701)	(-4.696)	(-4.644)	(-4.639)	(-4.662)	(-4.636)	(-4.828)	(-4.826)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	568,794	568,794	568,794	568,794	568,794	568,794	568,794	568,794
Adj R^2	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.731

Table 8. Evidence on the Trade Channel from Changes in Holdings (Cont.)

Panel C: Holdings by Turnover Level and Size of Institution

Dependent variable:	Daily volatility (q) (%)				
Institutions:	Top 10	Top 20	Top 30	Top 40	Top 50
	(1)	(2)	(3)	(4)	(5)
Holdings by top & high-turnover	0.866***	1.409***	1.536***	1.524***	1.386***
	(4.771)	(6.780)	(7.820)	(8.357)	(7.684)
Holdings by top & low-turnover	0.505**	0.827***	0.649***	0.567***	0.541***
	(2.407)	(4.819)	(4.617)	(3.854)	(4.065)
Holdings by non-top & high-turnover	1.036***	0.806***	0.746***	0.710***	0.756***
	(9.391)	(6.771)	(6.219)	(5.907)	(6.066)
Holdings by non-top & low-turnover	-0.127*	-0.289***	-0.325***	-0.375***	-0.386***
	(-1.729)	(-3.849)	(-4.060)	(-4.919)	(-4.612)
1 / Price (q-1)	1.568***	1.127***	1.122***	1.089***	1.064***
	(14.348)	(14.428)	(13.167)	(13.621)	(14.050)
Amihud illiquidity (q-1)	0.759***	0.684***	0.676***	0.666***	0.653***
	(9.855)	(10.676)	(11.454)	(11.880)	(12.433)
log(Market cap) (q-1)	-0.192***	-0.232***	-0.231***	-0.236***	-0.240***
	(-5.489)	(-6.313)	(-6.307)	(-6.569)	(-6.832)
Past 6-month return (q-3 to q-1)	0.006	0.011	0.013	0.008	0.006
	(0.056)	(0.092)	(0.111)	(0.072)	(0.051)
Book-to-market (q-1)	0.219***	0.211***	0.203***	0.194***	0.191***
	(7.537)	(8.132)	(7.796)	(7.491)	(7.430)
Stock FE	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes
Observations	331,579	377,612	390,728	399,957	405,842
Adj R^2	0.634	0.634	0.633	0.634	0.635

Table 9. Transaction-level Evidence

Panel A reports summary statistics for variables constructed using Ancerno data during the 1999–2014 period. Panel B reports estimates from ordinary least squares (OLS) regressions of price impact on an indicator for top institutions and controls for the size of the trades as a fraction of total daily volume. The dependent variable is computed as the largest deviation between the execution prices throughout the day and the opening price. Stock-day fixed effects are also included. Panel C reports results from OLS regressions of the size of the daily volume for each institution-stock expressed as a fraction of total daily volume. *t*-statistics based on standard errors clustered at the stock, day, and institution level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Summary Statistics

	N	mean	sd	min	p25	p50	p75	max
Price impact	3,017,198	0.212	1.58	-5.82	-0.542	0.116	0.943	6.77
Top3 dummy	3,017,198	0.117	0.322	0	0	0	0	1
Top10 dummy	3,017,198	0.118	0.323	0	0	0	0	1
Top20 dummy	3,017,198	0.12	0.325	0	0	0	0	1
Trade size	1,675,982	0.0142	0.0398	4.66E-06	0.000205	0.00122	0.00756	0.431

Panel B: Price Impact of Trades

Dependent variable:	Price impact of trades								
Institutions:	Top 3			Top 10			Top 20		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Top institution dummy	0.062***	0.034***	0.012	0.062***	0.034***	0.012	0.057***	0.030***	0.008
	(6.857)	(3.819)	(1.288)	(6.833)	(3.812)	(1.298)	(6.413)	(3.420)	(0.938)
Trade size		1.729***	5.052***		1.729***	5.051***		1.734***	5.062***
		(25.817)	(29.039)		(25.824)	(29.048)		(25.853)	(29.078)
Trade size squared			-15.061***			-15.061***			-15.092***
			(-25.339)			(-25.346)			(-25.375)
Stock × Calendar day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,017,198	3,017,198	3,017,198	3,017,198	3,017,198	3,017,198	3,017,198	3,017,198	3,017,198
Adj R^2	0.316	0.316	0.317	0.316	0.316	0.317	0.316	0.316	0.317

Panel C: Trading Volume by Size of Institution

Dependent variable:	Daily Trading Volume		
Institutions:	Top 3	Top 10	Top 20
	(1)	(2)	(3)
Top institution dummy	0.010***	0.010***	0.009***
	(6.961)	(6.801)	(6.178)
Beginning of quarter holdings	0.145***	0.148***	0.158***
	(3.992)	(4.102)	(4.352)
Stock × Calendar day FE	Yes	Yes	Yes
Observations	1,675,982	1,675,982	1,675,982
Adj R^2	0.559	0.559	0.558

Table 10. Stock Volatility around Mergers of Large Institutions

The dependent variable is the daily volatility of the stocks held by large institutional investors in the next quarter. *Daily volatility* is computed from daily returns. We use the exogenous event of the merger between BlackRock and BGI in 2009/Q4 to test the relation between volatility and ownership by large institutions. The key independent variable is the interaction term *Treatment*×*Post-Merger Dummy*, where *Treatment* represents the ownership of BlackRockBlackRock as of 2009/Q3, i.e., before the merger was completed, and *Post-merger dummy* equals 1 for 2010/Q1 and later quarters. In Panel A, the treatment variable is the level of ownership. In Panel B, it is an indicator for ownership in the top half of the distribution. In Panel C, ownership is again a continuous variable, but we skip the first year after the merger. The sample in each column includes 2007/Q4-2009/Q4 plus several quarters after the completion, as specified in the heading. Panels D and E present ordinary least squares regression results of absolute and signed return *autocorrelation* around the BlackRock-BGI merger. The dependent variable is the absolute value of *autocorrelation* of the DGTW-adjusted returns (Daniel, Grinblatt, Titman, and Wermers, DGTW, 1997) of stocks held by large institutional investors. The key independent variable is the *Ownership* of the top institutions in the previous quarter. In Panels D–E, the sample period is 2007/Q4–2011/Q4. *t*-statistics based on bootstrapped standard errors are in parentheses. For Panels D–E, standard errors are bootstrapped. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Treatment Is the Level of Ownership

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q3, 2009							
Window post merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	3.610**	4.528***	3.113***	2.582**	2.778***	3.057***	4.012***	4.270***
	(2.405)	(4.192)	(3.105)	(2.302)	(3.055)	(3.166)	(4.234)	(3.828)
Ownership by all institutions (q-1)	0.980***	0.995***	1.033***	0.986***	0.887***	0.814***	0.812***	0.823***
	(6.654)	(7.462)	(7.485)	(7.664)	(7.049)	(7.151)	(7.508)	(7.586)
1 / Price (q-1)	0.203***	0.247***	0.281***	0.321***	0.341***	0.368***	0.396***	0.417***
	(4.423)	(4.202)	(5.568)	(5.877)	(7.047)	(7.015)	(8.679)	(9.248)
Amihud illiquidity (q-1)	0.872***	0.864***	0.871***	0.864***	0.872***	0.867***	0.901***	0.894***
	(19.810)	(16.759)	(15.760)	(15.318)	(18.083)	(17.547)	(20.112)	(18.231)
log(Market cap) (q-1)	-0.969***	-0.908***	-0.844***	-0.787***	-0.735***	-0.672***	-0.598***	-0.596***
	(-19.569)	(-24.126)	(-25.803)	(-21.940)	(-23.126)	(-21.671)	(-17.931)	(-18.760)
Past 6-month return (q-3 to q-1)	-0.076***	-0.074***	-0.081***	-0.084***	-0.072***	-0.067***	-0.073***	-0.079***
	(-3.344)	(-4.358)	(-3.480)	(-4.301)	(-3.836)	(-3.190)	(-4.990)	(-3.712)
Book-to-market (q-1)	-0.040**	-0.027	-0.002	0.011	0.024	0.043**	0.055***	0.055***
	(-2.044)	(-1.542)	(-0.082)	(0.552)	(1.107)	(2.422)	(3.054)	(3.007)
Ownership by bottom institutions (q-1)	0.212	0.131	0.027	-0.026	-0.101	-0.148	-0.256	-0.347**
	(0.970)	(0.610)	(0.144)	(-0.114)	(-0.523)	(-0.740)	(-1.627)	(-2.095)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	37,266	40,944	44,603	48,241	51,710	55,151	58,550	61,876
Adj R^2	0.576	0.568	0.565	0.569	0.571	0.574	0.563	0.552

Table 10. Volatility of Firms around Mergers of Large Institutions (Cont.)

Panel B: Treatment Is Top 50% Ownership Indicator

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q3, 2009							
Window post merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	0.129***	0.188***	0.158***	0.154***	0.169***	0.179***	0.226***	0.251***
	(3.277)	(5.565)	(5.359)	(4.835)	(6.271)	(5.759)	(7.758)	(7.778)
Ownership by all institutions (q-1)	0.981***	0.992***	1.030***	0.982***	0.886***	0.817***	0.819***	0.833***
	(6.529)	(7.937)	(8.021)	(6.818)	(6.882)	(7.418)	(8.019)	(9.871)
1 / Price (q-1)	0.203***	0.248***	0.281***	0.320***	0.340***	0.367***	0.395***	0.415***
	(4.089)	(4.819)	(6.196)	(6.214)	(6.981)	(7.599)	(7.070)	(8.186)
Amihud illiquidity (q-1)	0.870***	0.856***	0.860***	0.852***	0.856***	0.848***	0.876***	0.866***
	(20.326)	(17.614)	(18.440)	(20.605)	(17.232)	(18.588)	(17.504)	(21.339)
log(Market cap) (q-1)	-0.973***	-0.917***	-0.853***	-0.797***	-0.747***	-0.686***	-0.616***	-0.615***
	(-24.873)	(-26.720)	(-23.558)	(-21.708)	(-19.273)	(-19.861)	(-19.153)	(-22.143)
Past 6-month return (q-3 to q-1)	-0.074***	-0.070***	-0.077***	-0.079***	-0.066***	-0.061***	-0.065***	-0.071***
	(-3.235)	(-3.095)	(-4.357)	(-3.960)	(-3.413)	(-3.529)	(-3.565)	(-4.071)
Book-to-market (q-1)	-0.041**	-0.027	-0.002	0.011	0.023*	0.042**	0.054***	0.053***
	(-2.108)	(-1.250)	(-0.083)	(0.523)	(1.655)	(2.415)	(3.271)	(2.861)
Ownership by bottom institutions (q-1)	0.223	0.161	0.062	0.009	-0.059	-0.099	-0.193	-0.273
	(1.084)	(0.678)	(0.279)	(0.044)	(-0.308)	(-0.534)	(-0.947)	(-1.202)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	37,266	40,944	44,603	48,241	51,710	55,151	58,550	61,876
Adj R^2	0.576	0.568	0.565	0.570	0.571	0.574	0.563	0.553

Table 10. Volatility of Firms around Mergers of Large Institutions (Cont.)

Panel C: Continuous Treatment, Omitting the First Year after Merger Completion

Dependent variable:	Daily volatility (q) (%)			
Treatment:	Ownership by BlackRock: Q3, 2009			
Window post merger:	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)
Treatment × Post-merger dummy	4.608***	4.978***	7.147***	6.958***
	(3.080)	(3.318)	(5.101)	(5.367)
Ownership by all institutions (q-1)	0.819***	0.747***	0.775***	0.799***
	(5.722)	(5.723)	(6.438)	(6.682)
1 / Price (q-1)	0.227***	0.284***	0.329***	0.360***
	(4.776)	(5.720)	(5.806)	(6.940)
Amihud illiquidity (q-1)	0.899***	0.890***	0.931***	0.923***
	(18.697)	(16.354)	(17.612)	(18.241)
log(Market cap) (q-1)	-0.898***	-0.764***	-0.642***	-0.625***
	(-24.538)	(-17.133)	(-19.464)	(-16.449)
Past 6-month return (q-3 to q-1)	-0.067***	-0.081***	-0.098***	-0.107***
	(-3.672)	(-5.092)	(-4.965)	(-6.044)
Book-to-market (q-1)	-0.033	0.004	0.028	0.034
	(-1.453)	(0.195)	(1.450)	(1.640)
Ownership by bottom institutions (q-1)	0.124	0.022	-0.138	-0.256
	(0.603)	(0.107)	(-0.663)	(-1.465)
Stock FE	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes
Observations	37,015	40,456	43,855	47,181
Adj R^2	0.579	0.588	0.573	0.561

Table 10. Large Institutional Ownership and Return Autocorrelation (Cont.)

Panel D: Absolute Value Autocorrelation around the BlackRock-BGI Merger

Dependent variable:	abs(ρ(DGTW-adjusted returns)) (q)							
Treatment:	Ownership by BlackRock Q3, 2009							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	0.021***	0.016***	0.013***	0.016***	0.017***	0.015***	0.013***	0.013***
	(7.530)	(6.673)	(6.024)	(7.366)	(8.059)	(7.628)	(6.736)	(6.734)
Ownership by all institutions (q-1)	-0.030***	-0.029***	-0.022***	-0.024***	-0.024***	-0.023***	-0.024***	-0.025***
	(-3.351)	(-3.504)	(-2.877)	(-3.411)	(-3.630)	(-3.690)	(-4.005)	(-4.466)
1 / Price (q-1)	-0.008**	-0.008***	-0.007**	-0.008***	-0.008***	-0.007***	-0.006**	-0.005**
	(-2.567)	(-2.678)	(-2.535)	(-3.006)	(-3.037)	(-2.882)	(-2.440)	(-2.286)
Amihud illiquidity (q-1)	0.026***	0.027***	0.027***	0.029***	0.030***	0.031***	0.031***	0.031***
	(8.078)	(8.707)	(9.014)	(9.966)	(10.838)	(11.632)	(11.801)	(12.322)
log(Market cap) (q-1)	-0.002	-0.003	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002
	(-0.845)	(-1.401)	(-0.539)	(-0.317)	(-0.617)	(-0.911)	(-0.863)	(-1.144)
Past 6-month return (q-3 to q-1)	-0.001	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	0.000
	(-0.372)	(-0.383)	(-0.443)	(-0.378)	(-0.174)	(-0.200)	(-0.063)	(0.306)
Book-to-market (q-1)	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
	(-3.353)	(-3.798)	(-3.797)	(-3.940)	(-4.112)	(-4.466)	(-4.260)	(-4.711)
Ownership by bottom institutions (q-1)	0.049*	0.038	0.041	0.046**	0.043**	0.030	0.030	0.034*
	(1.690)	(1.408)	(1.636)	(2.017)	(2.039)	(1.458)	(1.525)	(1.792)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,083	36,696	40,313	43,813	47,261	50,638	53,941	57,189
Adj R^2	0.329	0.318	0.307	0.296	0.286	0.277	0.273	0.270

Table 10. Large Institutional Ownership and Return Autocorrelation (Cont.)

Panel E: Signed Autocorrelation around the BlackRock-BGI Merger

Dependent variable:	ρ(DGTW-adjusted returns) (q)							
Treatment:	Ownership by BlackRock Q3, 2009							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	-0.017***	-0.012***	-0.009***	-0.016***	-0.017***	-0.014***	-0.013***	-0.013***
	(-4.083)	(-3.320)	(-2.857)	(-5.263)	(-5.662)	(-4.715)	(-4.475)	(-4.665)
Ownership by all institutions (q-1)	0.050***	0.053***	0.048***	0.053***	0.052***	0.050***	0.048***	0.044***
	(3.654)	(4.240)	(4.035)	(4.867)	(5.197)	(5.253)	(5.394)	(5.167)
1 / Price (q-1)	0.009**	0.010**	0.007*	0.007*	0.006	0.006	0.004	0.003
	(2.147)	(2.426)	(1.829)	(1.815)	(1.627)	(1.622)	(1.062)	(0.917)
Amihud illiquidity (q-1)	-0.039***	-0.040***	-0.039***	-0.040***	-0.042***	-0.043***	-0.042***	-0.042***
	(-9.482)	(-10.329)	(-10.520)	(-11.253)	(-12.115)	(-12.849)	(-13.034)	(-13.649)
log(Market cap) (q-1)	-0.001	0.002	-0.002	-0.004	-0.004	-0.001	-0.000	0.001
	(-0.176)	(0.641)	(-0.689)	(-1.309)	(-1.371)	(-0.352)	(-0.064)	(0.291)
Past 6-month return (q-3 to q-1)	-0.004*	-0.005**	-0.004**	-0.004*	-0.004**	-0.004*	-0.004**	-0.005***
	(-1.900)	(-2.309)	(-2.188)	(-1.896)	(-2.124)	(-1.956)	(-2.343)	(-2.655)
Book-to-market (q-1)	0.006***	0.007***	0.007***	0.007***	0.007***	0.008***	0.008***	0.008***
	(3.547)	(4.128)	(4.078)	(4.142)	(4.404)	(4.997)	(4.934)	(5.368)
Ownership by bottom institutions (q-1)	-0.076*	-0.085**	-0.100***	-0.085**	-0.068**	-0.059*	-0.062**	-0.060**
	(-1.828)	(-2.207)	(-2.791)	(-2.508)	(-2.135)	(-1.941)	(-2.154)	(-2.174)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,083	36,696	40,313	43,813	47,261	50,638	53,941	57,189
Adj R^2	0.352	0.341	0.332	0.321	0.312	0.306	0.301	0.298

Appendix A. Top Institutional Investors

This table lists all the institutional investors that enter the top 10 institution ranking during our sample period. *First quarter* and *Last quarter* indicate the first and last quarter in which the firm is part of the ranking, respectively. *Avg long equity assets* is the average assets managed by the institution over the time that the institution is in our sample, defined in 2016 dollars. *Avg quarterly turnover* measures the percentage of assets under management that are bought and sold within the average quarter. *Top rank* is the average ranking of the firm's size relative to all other institutional investors while it is among the top 10 institutions.

13F Institution Name	13F institution number	Zip code	State	Number of quarters	First quarter	Last quarter	Avg long equity assets ($m)	Avg quarterly turnover	Top rank
Bzw Barclays Glbl Invts	92040	94105	CA	24	6-1990	3-1996	$78,571	2.17%	1.3
Barclays Bank Plc	7900	94104	CA	51	3-1997	9-2009	$480,175	5.02%	1.6
Blackrock Inc	9385	94105	CA	29	12-2009	12-2016	$1,135,744	5.12%	1.6
Fidelity Mgmt & Research Co	27800	02109	MA	101	12-1991	12-2016	$439,065	12.08%	2.2
Fmr Corp	26590	02109	MA	20	3-1986	12-1990	$27,216	18.63%	3.7
Bankers Tr N Y Corp (Deutsche Bk)	7800	10017	NY	95	3-1980	6-2005	$75,098	5.93%	3.8
State Str Corporation	81540	02111	MA	111	6-1988	12-2016	$361,727	4.49%	4.1
Vanguard Group, Inc.	90457	19482	PA	72	3-1999	12-2016	$563,594	2.28%	4.3
Wells Fargo Bank N.A.	92035	94104	CA	37	6-1980	3-1990	$22,942	5.59%	4.5
Prudential Ins Co/Amer	72280	07102	NJ	15	3-1980	9-1983	$6,963	10.73%	4.7
College Retire Equities	18265	10017	NY	74	3-1980	6-1998	$32,609	4.51%	4.7
Capital Research & Mgmt Co	12740	90071	CA	72	9-1990	6-2008	$214,522	7.93%	4.9
Manufacturers Natl	53690	48226	MI	1	3-1980	3-1980	$4,624	.	5.0
Batterymarch Finl Mgmt	8190	02116	MA	18	12-1981	3-1986	$9,479	10.97%	5.7
Equitable Companies Inc (Axa)	25610	10014	NY	63	6-1994	12-2009	$199,440	11.83%	6.0
T. Rowe Price Associates, Inc.	71110	21202	MD	48	3-1980	12-2016	$253,372	8.18%	6.2
Donaldson Lufkin & Jen	23375	10172	NY	13	12-1982	12-1985	$10,347	18.18%	6.2
Citicorp	16260	10022	NY	28	3-1980	3-1988	$8,884	10.96%	6.3
Alliance Capital Mgmt	1250	10105	NY	27	12-1986	6-1993	$23,161	13.11%	6.4
JP Morgan Chase & Company	58835	10017	NY	86	3-1980	12-2016	$93,987	10.15%	6.5
Capital World Investors	11836	90071	CA	37	12-2007	12-2016	$290,516	7.81%	6.6
Mellon National Corp (Mellon Bank)	55390	15219	PA	117	3-1980	3-2013	$118,351	7.03%	6.7
Putnam Investment Mgmt, L.L.C.	72400	02266	MA	42	9-1980	9-2003	$122,707	14.41%	7.4
First Interstate Bancorp	29800	90017	CA	19	6-1981	3-1987	$10,721	7.32%	7.5
Sarofim Fayez	76045	77010	TX	10	12-1980	3-1983	$6,013	7.12%	7.7
BANK OF AMERICA CORP /DE/	62890	28255	NC	5	12-2015	12-2016	$360,834	6.65%	7.8
State Street Resr & Mgmt	81575	02111	MA	12	6-1982	3-1985	$7,742	7.89%	7.8
Wellington Management Co, LLP	91910	02210	MA	102	6-1985	12-2016	$170,433	10.97%	8.0
Bank of New York Mellon Corp	12276	10286	NY	12	3-2014	12-2016	$330,442	5.02%	8.2
New York St Common Ret.	63850	10038	NY	30	12-1986	3-1994	$21,271	3.99%	8.2
Calif Public Emp. Ret.	12000	95811	CA	4	12-1988	9-1989	$16,805	8.20%	8.3
Capital Research Gbl Investors	11835	90071	CA	24	12-2007	12-2013	$224,602	8.52%	8.5
Harris Trust & Sav Bank	43680	60640	IL	3	3-1980	9-1980	$4,558	8.37%	8.7
Janus Capital Corporation	48170	80206	CO	5	3-2000	3-2001	$189,639	15.17%	8.8
Calif Public Empl Retirm	12090	95811	CA	5	6-1986	12-1987	$15,388	5.87%	9.4
Morgan Stanley D Witter	58950	10036	NY	22	12-1997	3-2011	$172,555	10.59%	9.4
Travelers (Citigroup Inc)	84900	55102 (10022)	MN (NY)	17	6-1996	9-2005	$144,163	9.35%	9.4
Legg Mason Inc	50160	21202	MD	4	9-2006	6-2007	$211,066	7.09%	9.5
Northern Trust Corp	65260	60603	IL	22	12-2003	9-2015	$234,467	3.02%	9.7
Chase Manhattan Corp	15230	10017	NY	2	3-1980	6-1980	$4,222	4.20%	10.0
Goldman Sachs & Company	41260	10282	NY	1	9-2007	9-2007	$236,163	17.58%	10.0

Appendix B. Variable Description

Variable	Description	Source
Daily volatility	Standard deviation of the daily log of stock returns within the quarter.	CRSP
Weekly volatility	Standard deviation of the weekly stock returns within the quarter.	CRSP
Idiosyncratic volatility	Standard deviation of the residuals from the Fama and French (1993) + momentum four factor model using daily returns within the quarter.	CRSP
Systematic volatility	The square root of the difference between the daily volatility squared and idiosyncratic volatility squared	CRSP
Monthly range	Maximum of the daily high price during the month minus the lowest of the daily low price during the month, divided by the average of these two numbers.	CRSP
Quarterly range	Maximum of the daily high price during the quarter minus the lowest of the daily low price during the quarter, divided by the average of these two numbers.	CRSP
Nonparametric skewness	Skewness of daily returns using the approach in Ghysels, Plazzi, and Valkanov (2016), and using the 25^{th} and 75^{th} percentiles as cutoffs.	CRSP
DGTW Returns	Cumulative DGTW-Adjusted Returns within quarter, where returns are adjusted following Daniel, Grinblatt, Titman, and Wermers (1997) by benchmarking stocks to 125 portfolios with similar size, book-to-market, and momentum characteristics.	CRSP, Compustat
Daily autocorrelation	Autocorrelation of the daily DGTW-adjusted returns (Daniel, Grinblatt, Titman, and Wermers, DGTW, 1997) within the quarter	CRSP, Compustat
log(Market cap)	The logged market capitalization of the stock (in $ millions) at the end of the month.	CRSP
1/Price	The inverse of the stock price at the end of the quarter.	CRSP
Amihud illiquidity	Absolute return scaled by daily dollar volume in $ million, averaged within the quarter. Based on Amihud (2002).	CRSP
Top *i* inst ownership	The combined percentage ownership of the largest *i* (e.g. 3, 5, 7, or 10) institutions, computed as the number of shares owned at the end of the quarter divided by the number of shares outstanding for that company.	13F, CRSP
Ownership by "middle" institutions	The percentage ownership by all institutions below the top institutions (where top institutions change according to the specification) and above the bottom institutions (as defined below). In summary statistics, we focus on below the top 10.	13F, CRSP
Ownership by all institutions	The percentage ownership by all institutions, computed as the total number of shares owned by all 13F institutional investors at the end of the quarter, divided by the number of shares outstanding.	13F, CRSP
Ownership by bottom institutions	Institutional ownership of the set of the smallest institutions that in aggregate have equity holdings equal to the top 10 institutions.	13F
Past 6-month return (q-3 to q-1)	The stock's six-month momentum return over the two quarters prior to analysis.	CRSP
Book-to-market (q-1)	The stock's book value of equity relative to its market value of equity.	CRSP, Compustat
Greenwood and Thesmar (2011) fragility	The effective concentration of ownership of a financial asset, weighted by the volatility and correlation of the trading needs of its investors (Greenwood and Thesmar 2011).	13F, CRSP
Post-merger dummy	An indicator for whether the quarter in consideration is in 2010/Q1 or later.	–

Appendix B. Variable Description (Cont.)

Variable	Description	Source
Beta of daily returns with those of top inst portfolio	Sensitivity of the stock's daily returns to the portfolio of the largest institutional investors, excluding the holdings of the stock.	CRSP, 13F
Mutual fund flow correlation (i, j)	The correlation between the log (1+flows), where flows are scaled by total net assets, of two funds over a calendar year.	CRSP Mutual Fund Database
Mutual fund return correlation (i, j)	The correlation between the log (1+ monthly returns) of two funds over a calendar year.	CRSP Mutual Fund Database
Same management company indicator (i,j)	An indicator for whether funds (i) and (j) belong to the same management company.	CRSP Mutual Fund Database
Mutual fund active holdings correlation (i, j)	The correlation between the active holding weights (adjusted for the benchmark holding weight) of two funds over a calendar year, after matching each fund to its best-fit index among 34 Russell and S&P indices.	CRSP Mutual Fund Database, Thomson
Mutual fund active trade correlation (i, j)	The correlation between the active trades (adjusted for flow-motivated trades) of two funds over a calendar year.	CRSP Mutual Fund Database, Thomson

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Internet Appendix

IA.1 Large Institutions versus Synthetic Institutions

The evidence that large institutional investors behave in a more correlated way than independent firms suggests two additional conjectures on the granular nature of large institutions. First, the trades of large institutions should be more concentrated, i.e., restricted to a smaller set of stocks. This happens, for example, if the various managers within a given firm rely on the same research sources. Second, we expect that large institutions place trades that are larger in absolute value than the trades placed by a collection of independent institutions that manage the same amount of total assets. This prediction emerges because correlated capital flows and correlated trading behavior prevent diversification of trades so that trades reach the market as a large shock. On the other hand, uncorrelated trades from independent institutions are more likely to be netted against each other.

To test these conjectures, we compare large institutions' trades to the trades of smaller institutions that add up to the same total equity holdings as the large institution. The comparison, therefore, aims to keep the size of the assets under management constant so that we can analyze the effect of variation in the organizational structure. In this analysis, we proxy for trades using the quarterly changes in 13F holdings at the stock level. For each large institution among the top 10 in a given quarter (called here the "original institution"), we generate a sample of 99 "synthetic institutions" in a block bootstrapping procedure. Each synthetic institution results from pooling together institutions that rank below the 10^{th} largest institution. These component institutions are randomly drawn without replacement until the dollar value of the equity holdings of the original institution is matched.[1] For the synthetic institutions to represent a valid benchmark, we assume that the type of investors or investor behavior in the synthetic institutions is comparable to what would prevail in the counterfactual market configuration in which no large institutions were present.

[1] We add a fraction of the last institution drawn to ensure we exactly match the total dollar value of the equity holdings of the random sample to those of the large institution. In 1980, the size of the equity portfolio of the largest institutional investor equaled the aggregate size of about 25 random institutions. In contrast, reflecting the dramatic increase in concentration in the industry, in 2016, 424 random institutional investors were needed to match the size of the top firm.

IA.1.1 Portfolio Holdings

We first examine the size of the universe of stocks that large institutional investors hold. In Internet Appendix Table IA.12, Panel A, we compute the average number of stocks that make up certain fractions of the institutional portfolio. For example, 50% of the equity portfolio of the top institutional investor in the economy consists of 79 stocks on average (the largest holdings). In contrast, the average number of stocks that account for 50% of the portfolio of a similar-size synthetic portfolio is 93. The same pattern appears in almost every cell in the panel: The number of stocks held by the original institutional investors is significantly lower (in the order of 24% to 39% lower) than the number of stocks held in the portfolio of the synthetic institutions. Interestingly, on average the portfolios of the top 10 original institutions contain 1,995 stocks, while 2,550 stocks comprise the portfolio of the synthetic institutions.

These findings imply that the original large institutional investors allocate a given amount of money to a smaller set of stocks than what the synthetic institutions do. In turn, this fact suggests that top institutions are likely to trade each stock in larger amounts and to have bigger price impacts. The next analysis, therefore, focuses on trade size.

IA.1.2 Trade Size

Given the prior findings of correlated flows and similar and concentrated portfolio holdings, we anticipate that the subentities within large institutions are less likely to execute offsetting trades. Hence, we predict that large institutions will execute larger trades in comparison to their synthetic counterparts.

To test this supposition, we study the distributions of trade size (i.e., absolute changes in portfolio holdings) for the original large institutional investors and the synthetic ones. We construct a stock-quarter indicator for whether the original institution's trade is above a given percentile of the distribution of the synthetic institutions' trades. Then, we average this indicator across stocks and quarters. For each top-10 institutional investor, Panel B of Internet Appendix Table IA.12 reports the average across stocks and quarters of this indicator for the 50^{th}, 90^{th}, 95^{th}, and 99^{th} percentiles. On average across the top-10 institutions, 56.1% of trades by the original institution are larger than the trades placed by 50% of the synthetic institutions. Moreover, 16.2%

of the trades are larger than 90% of the synthetic institutions' trades, 9.4% of trades are larger than the 95th percentile, and 3.7% of trades are larger than the 99th percentile. These numbers exceed the percentages expected if the distributions of trade size were the same for the original and synthetic institutions (i.e., we would expect 50% of trades to be above the 50th percentile, 10% to be above the 90th percentile, and 1% to be above the 99th percentile).

In sum, the evidence shows that the quarterly changes in equity portfolio holdings for large institutional investors are significantly larger than for the synthetic institutions. Hence, large institutions impose a higher liquidity demand on the market than smaller independent firms. This liquidity demand can translate into price impact if the investors taking the other side of these trades require price concessions. In turn, the price impact of these trades can explain the effect of large institutions on volatility, noise, and price fragility that we document in the first part of the paper.

IA.2 Further Evidence on the Merger

The following analysis casts the analysis of flows within the case study of the merger between BlackRock and BGI. In regard to flows, we compute the annual pairwise correlation among equity mutual funds using monthly returns within a year. We consider a four-year window centered on the merger (2008–2011). The post-merger period contains the two years after the completion of the merger (i.e., December 2009). We include in our tests the universe of all funds as in Table 9. The treated funds are those that belong to the separate pre-merger companies (either BlackRock or BGI) and end up in the same company after the merger. We also include controls for pairs of funds that were already in the same company (either BlackRock or BGI) before the merger. We use different combinations of fixed effects, and the standard errors are bootstrapped.

Panel A of Internet Appendix Table IA.13 shows that the coefficient on the *Treatment*×*Post-merger dummy* is positive and significant. Following the merger, funds that were part of separate companies experience an increase in flow correlation by an average of 4.3% relative to funds that belonged to the same company before the merger. This effect is economically important, as the standard deviation of the correlation of flows in the sample is about 32%.

We note that in Panel A of Internet Appendix Table IA.13, the interaction term $Post \times BlackRoc\ o\ BG\ pair$ is statistically and economically significant. While not related to the main effect that is being studied here, this result is consistent with our priors. In particular, it can be explained based on the growth of passive investment. Right before the merger, BGI funds were mostly passive (about 98% by AUM), whereas BlackRock funds were mostly active (about 99% by AUM).[2]

Next, we study the correlation in trading activity.[3] To this purpose, we proxy trades with the quarterly change in fund holdings. We compute this correlation for each pair of funds in the

[2] Based on CRSP mutual fund data, BGI funds that were acquired by BlackRock were mostly index funds/ETFs, with the exception of money market funds. For these acquired funds, total assets were $368,785 million, of which index fund assets were $362,329 million, and ETF assets were $358,169.6 million, as of Q4 2009 (the quarter of the merger). We identified 706 share classes (180 portfolios) of BlackRockBlackRock funds in the pre-merger period. For the 663 share classes (178 portfolios) of BlackRockBlackRock funds that were active and part of BlackRockBlackRock in September 2009 (the last quarter prior to the merger effective date), total assets were $305,945 million and index fund assets were $3,362 million.

[3] We can identify 706 share classes for around 180 different funds for BlackRockBlackRock before the merger. For BGI, before the merger, we identify 288 share classes for 248 different funds. Among the BGI funds, after the merger,

quarter as the correlation of the stock-level changes in portfolio weights. We retain the fourth-quarter observations to keep the size of the sample manageable. Panel B of Internet Appendix Table IA.13 replicates the specifications of Panel A using the correlation of holdings changes as the dependent variable. We find that the coefficient on the *Treatment*×*Post-merger dummy* is positive and significant in our most stringent specification. Following the merger, funds that were part of separate companies experience an increase in trade correlation by an average of 0.4% relative to funds that belonged to the same company before the merger. Because the standard deviation of trade correlation in the sample is 16.8%, the economic magnitude is about 2.3% of a standard deviation.

we identify 219 surviving share classes corresponding to 198 funds. Out of these 198 surviving funds, 194 have nonmissing index fund flags in CRSP, i.e., they are classified as pure index or enhanced index funds.

Internet Appendix Table IA.1. Summary Statistics of Additional Variables and Subsamples

This table presents summary statistics for additional key variables used in the Internet Appendix and for the subsamples in Table 4 of the paper. Unless otherwise specified, the sample period is 1980/Q1–2016/Q4.

	N	Mean	Std Dev	Min	p25	Median	p75	Max
Full Sample								
Weekly volatility (%)	667,331	6.840	4.990	0.000	3.580	5.480	8.470	49.300
Monthly range (%)	666,891	18.000	12.600	0.000	9.640	14.600	22.500	196.000
Quarterly range (%)	666,844	38.700	26.800	0.000	20.200	31.300	49.100	200.000
Daily skewness	643,216	-0.023	2.310	-8.900	-0.982	0.000	1.120	8.900
abs(Daily skewness)	643,216	1.510	1.750	0.000	0.336	1.050	2.070	8.900
Top 3 insts ownership	667,331	0.042	0.051	0.000	0.003	0.022	0.059	0.339
Top 5 insts ownership	667,331	0.056	0.068	0.000	0.005	0.029	0.082	0.517
Top 7 insts ownership	667,331	0.067	0.078	0.000	0.008	0.036	0.100	0.610
Top 10 insts ownership	667,331	0.081	0.090	0.000	0.011	0.046	0.122	0.709
Ownership by "middle" institutions	667,331	0.282	0.228	0.000	0.074	0.240	0.461	1.000
S&P 500 Subsample								
Daily volatilty (%)	69,589	2.024	1.158	0.278	1.329	1.742	2.351	21.531
Top 3 Ownership	69,589	0.082	0.054	0.000	0.039	0.067	0.124	0.339
Top 5 Ownership	69,589	0.116	0.071	0.000	0.058	0.100	0.168	0.457
Top 7 Ownership	69,589	0.140	0.083	0.000	0.072	0.124	0.199	0.522
Top 10 Ownership	69,589	0.170	0.095	0.000	0.090	0.155	0.240	0.688
Ownership by "middle" institutions	69,589	0.451	0.140	0.000	0.365	0.461	0.548	1.000
All crisis periods								
Daily volatilty (%)	170,063	4.460	3.140	0.210	2.340	3.600	5.590	25.700
Top 3 insts ownership	170,063	0.037	0.044	0.000	0.003	0.022	0.052	0.327
Top 5 insts ownership	170,063	0.051	0.058	0.000	0.006	0.029	0.076	0.408
Top 7 insts ownership	170,063	0.060	0.068	0.000	0.008	0.035	0.091	0.489
Top 10 insts ownership	170,063	0.075	0.083	0.000	0.011	0.044	0.114	0.598
Ownership by "middle" institutions	170,063	0.283	0.232	0.000	0.073	0.239	0.462	1.000
2008-2009 crisis								
Daily volatilty (%)	34,847	4.740	3.170	0.437	2.590	3.870	5.940	22.700
Top 3 insts ownership	34,847	0.063	0.060	0.000	0.008	0.053	0.098	0.327
Top 5 insts ownership	34,847	0.087	0.076	0.000	0.016	0.078	0.139	0.408
Top 7 insts ownership	34,847	0.102	0.088	0.000	0.022	0.089	0.161	0.488
Top 10 insts ownership	34,847	0.127	0.108	0.000	0.028	0.111	0.204	0.593
Ownership by "middle" institutions	34,847	0.390	0.250	0.000	0.161	0.400	0.591	1.000
Non-crisis periods								
Daily volatilty (%)	495,009	3.180	2.210	0.278	1.720	2.560	3.910	19.300
Top 3 insts ownership	495,009	0.043	0.053	0.000	0.002	0.021	0.063	0.339
Top 5 insts ownership	495,009	0.058	0.071	0.000	0.005	0.029	0.085	0.517
Top 7 insts ownership	495,009	0.069	0.081	0.000	0.008	0.036	0.104	0.610
Top 10 insts ownership	495,009	0.083	0.092	0.000	0.011	0.047	0.125	0.709
Ownership by "middle" institutions	495,009	0.283	0.227	0.000	0.075	0.241	0.461	1.000

Internet Appendix Table IA.1 Summary Statistics of Additional Variables and Subsamples (Cont.)

	N	Mean	Std Dev	Min	p25	Median	p75	Max
Return Comovement Tests								
Beta with portfolio of Top 1	637,502	0.652	0.710	-1.420	0.170	0.593	1.090	2.860
Beta with portfolio of Top 2	635,147	0.637	0.708	-1.470	0.159	0.581	1.070	2.880
Beta with portfolio of Top 3	634,690	0.634	0.716	-1.450	0.149	0.573	1.070	2.890
Beta with portfolio of Top 4	634,792	0.612	0.710	-1.520	0.136	0.554	1.050	2.840
Beta with portfolio of Top 5	634,627	0.602	0.702	-1.510	0.128	0.540	1.030	2.810
Beta with portfolio of Top 6	634,149	0.591	0.700	-1.490	0.120	0.529	1.020	2.840
Beta with portfolio of Top 7	634,876	0.584	0.706	-1.510	0.110	0.521	1.020	2.810
Beta with portfolio of Top 8	634,121	0.582	0.709	-1.520	0.106	0.514	1.020	2.810
Beta with portfolio of Top 9	634,383	0.581	0.715	-1.540	0.102	0.516	1.020	2.830
Beta with portfolio of Top 10	634,305	0.577	0.716	-1.570	0.099	0.514	1.020	2.790
Ownership of Top 1	637,502	0.019	0.027	0.000	0.000	0.007	0.026	0.150
Ownership of Top 2	637,502	0.014	0.022	0.000	0.000	0.006	0.020	0.150
Ownership of Top 3	637,502	0.007	0.014	0.000	0.000	0.000	0.010	0.150
Ownership of Top 4	637,502	0.008	0.019	0.000	0.000	0.000	0.007	0.150
Ownership of Top 5	637,502	0.006	0.014	0.000	0.000	0.000	0.005	0.140
Ownership of Top 6	637,502	0.005	0.014	0.000	0.000	0.000	0.003	0.123
Ownership of Top 7	637,502	0.005	0.015	0.000	0.000	0.000	0.002	0.129
Ownership of Top 8	637,502	0.005	0.012	0.000	0.000	0.000	0.003	0.132
Ownership of Top 9	637,502	0.005	0.012	0.000	0.000	0.000	0.004	0.165
Ownership of Top 10	637,502	0.005	0.012	0.000	0.000	0.000	0.004	0.124

Internet Appendix Table IA.1. Summary Statistics of Additional Variables and Subsamples (Cont.)

	N	Mean	Std Dev	Min	p25	Median	p75	Max
Stock-quarter-level sample: 1980-1990								
Daily volatility (%)	157,063	3.066	2.170	0.210	1.693	2.476	3.722	24.816
Top 3 insts ownership (q-1)	157,063	0.015	0.019	0.000	0.000	0.010	0.024	0.154
Top 5 insts ownership (q-1)	157,063	0.022	0.027	0.000	0.000	0.014	0.036	0.185
Top 7 insts ownership (q-1)	157,063	0.027	0.031	0.000	0.000	0.016	0.043	0.213
Top 10 insts ownership (q-1)	157,063	0.035	0.039	0.000	0.001	0.022	0.058	0.266
Top 11-Top 20 ownership (q-1)	157,063	0.019	0.030	-0.032	0.000	0.005	0.026	0.258
Top 21-Top 30 ownership (q-1)	157,063	0.012	0.023	0.000	0.000	0.002	0.013	0.303
Top 31-Top 50 ownership (q-1)	157,063	0.020	0.034	0.000	0.000	0.003	0.028	0.383
Ownership by "middle" institutions (q-1)	157,063	0.188	0.172	0.000	0.039	0.138	0.305	0.773
Ownership by all institutions (q-1)	157,063	0.229	0.199	0.000	0.055	0.176	0.368	0.777
Ownership by bottom institutions (q-1)	157,063	0.005	0.013	0.000	0.000	0.000	0.005	0.108
1 / Price (q-1)	157,063	0.319	0.919	0.011	0.040	0.076	0.190	10.548
Amihud illiquidity (q-1)	157,063	0.424	0.546	0.000	0.036	0.200	0.615	3.684
log(Market cap) (q-1)	157,063	4.412	1.857	0.408	3.014	4.250	5.697	9.208
Past 6-month return (q-3 to q-1)	157,063	0.057	0.358	-0.839	-0.161	0.025	0.222	2.772
Book-to-market (q-1)	157,063	0.850	0.612	0.002	0.420	0.723	1.125	6.325
Stock-quarter-level sample: 1991-2003								
Daily volatility (%)	291,030	4.088	2.882	0.439	2.109	3.308	5.145	25.691
Top 3 insts ownership (q-1)	291,030	0.032	0.038	0.000	0.003	0.020	0.044	0.258
Top 5 insts ownership (q-1)	291,030	0.040	0.046	0.000	0.006	0.024	0.058	0.370
Top 7 insts ownership (q-1)	291,030	0.049	0.055	0.000	0.008	0.029	0.074	0.401
Top 10 insts ownership (q-1)	291,030	0.062	0.067	0.000	0.010	0.037	0.096	0.488
Top 11-Top 20 ownership (q-1)	291,030	0.028	0.043	-0.137	0.000	0.008	0.041	0.448
Top 21-Top 30 ownership (q-1)	291,030	0.018	0.030	0.000	0.000	0.003	0.023	0.524
Top 31-Top 50 ownership (q-1)	291,030	0.023	0.037	0.000	0.000	0.005	0.034	0.580
Ownership by "middle" institutions (q-1)	291,030	0.254	0.212	0.000	0.065	0.209	0.413	1.000
Ownership by all institutions (q-1)	291,030	0.331	0.263	0.000	0.097	0.276	0.535	1.060
Ownership by bottom institutions (q-1)	291,030	0.015	0.027	0.000	0.000	0.005	0.016	0.210
1 / Price (q-1)	291,030	0.241	0.514	0.007	0.042	0.083	0.215	9.156
Amihud illiquidity (q-1)	291,030	0.441	0.663	0.000	0.012	0.125	0.612	4.488
log(Market cap) (q-1)	291,030	4.976	1.980	0.585	3.505	4.779	6.289	10.797
Past 6-month return (q-3 to q-1)	291,030	0.079	0.481	-0.917	-0.173	0.029	0.239	8.536
Book-to-market (q-1)	291,030	0.730	0.665	-0.062	0.314	0.570	0.928	7.954
Stock-quarter-level sample: 2004-2016								
Daily volatility (%)	218,182	3.056	2.137	0.285	1.683	2.480	3.720	22.686
Top 3 insts ownership (q-1)	218,182	0.074	0.064	0.000	0.012	0.061	0.125	0.339
Top 5 insts ownership (q-1)	218,182	0.101	0.086	0.000	0.020	0.087	0.164	0.517
Top 7 insts ownership (q-1)	218,182	0.119	0.098	0.000	0.028	0.105	0.191	0.610
Top 10 insts ownership (q-1)	218,182	0.138	0.112	0.000	0.033	0.123	0.223	0.709
Top 11-Top 20 ownership (q-1)	218,182	0.049	0.051	-0.165	0.005	0.035	0.078	0.537
Top 21-Top 30 ownership (q-1)	218,182	0.034	0.038	0.000	0.003	0.023	0.051	0.636
Top 31-Top 50 ownership (q-1)	218,182	0.038	0.042	0.000	0.004	0.025	0.057	0.737
Ownership by "middle" institutions (q-1)	218,182	0.388	0.244	0.000	0.166	0.406	0.584	1.000
Ownership by all institutions (q-1)	218,182	0.555	0.325	0.000	0.261	0.596	0.838	1.273
Ownership by bottom institutions (q-1)	218,182	0.029	0.044	0.000	0.005	0.012	0.033	0.311
1 / Price (q-1)	218,182	0.199	0.419	0.005	0.032	0.066	0.174	8.565
Amihud illiquidity (q-1)	218,182	0.206	0.467	0.000	0.001	0.009	0.127	4.301
log(Market cap) (q-1)	218,182	6.132	2.047	1.068	4.605	6.043	7.534	11.582
Past 6-month return (q-3 to q-1)	218,182	0.051	0.381	-0.942	-0.145	0.028	0.199	5.645
Book-to-market (q-1)	218,182	0.706	0.673	0.012	0.313	0.548	0.882	10.142

Internet Appendix Table IA.2. Institutional Holdings and Stock Volatility, Controlling for Concentration

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during the next quarter, quarter q. All independent variables are measured during quarter q–1. The key independent variable is the *Top inst ownership* of the largest institutional investors in a given stock. Importantly, these regressions also control for the institution's *Concentration* in a given stock. Time and stock fixed effects are also included. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Daily volatility (q) (%)							
Institutions:	Top 3	Top 3	Top 5	Top 5	Top 7	Top 7	Top 10	Top 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Top inst ownership		1.111***		1.077***		1.068***		0.937***
		(4.879)		(5.811)		(6.616)		(6.587)
Concentration	5.228***	2.687**	5.852***	2.427**	6.324***	2.190*	6.476***	2.146*
	(3.888)	(2.199)	(4.240)	(2.020)	(4.687)	(1.790)	(4.996)	(1.709)
Ownership by "middle" institutions	0.074	0.098	0.030	0.076	-0.005	0.052	-0.018	0.042
	(1.183)	(1.547)	(0.470)	(1.158)	(-0.087)	(0.835)	(-0.302)	(0.672)
1 / Price (q-1)	0.773***	0.773***	0.773***	0.772***	0.773***	0.771***	0.773***	0.771***
	(12.426)	(12.409)	(12.429)	(12.400)	(12.430)	(12.391)	(12.430)	(12.403)
Amihud illiquidity (q-1)	1.383***	1.379***	1.384***	1.377***	1.384***	1.375***	1.384***	1.375***
	(22.511)	(22.420)	(22.536)	(22.337)	(22.549)	(22.318)	(22.557)	(22.296)
log(Market cap) (q-1)	-0.270***	-0.282***	-0.268***	-0.285***	-0.266***	-0.287***	-0.265***	-0.288***
	(-10.559)	(-10.400)	(-10.525)	(-10.489)	(-10.524)	(-10.519)	(-10.423)	(-10.708)
Past 6-month return (q-3 to q-1)	-0.100	-0.097	-0.100	-0.096	-0.100	-0.095	-0.100	-0.094
	(-0.866)	(-0.848)	(-0.870)	(-0.838)	(-0.872)	(-0.830)	(-0.872)	(-0.823)
Book-to-market (q-1)	0.035	0.033	0.035	0.033	0.035	0.033	0.036	0.033
	(1.335)	(1.274)	(1.347)	(1.248)	(1.355)	(1.259)	(1.358)	(1.273)
Ownership by bottom institutions (q-1)	-1.577***	-1.471***	-1.586***	-1.435***	-1.591***	-1.425***	-1.592***	-1.422***
	(-7.735)	(-7.117)	(-7.787)	(-7.046)	(-7.834)	(-6.936)	(-7.848)	(-6.968)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	638,279	638,279	638,279	638,279	638,279	638,279	638,279	638,279
Adj R^2	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668

Internet Appendix Table IA.3. Ownership by Large Institutional Investors and Volatility during Crisis and Noncrisis Periods

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*. *Daily volatility* is computed from daily returns during quarter q. All independent variables are measured during quarter q–1. The table uses the *Top inst ownership* of the largest institutional investors in a given stock as the key independent variable. Crisis periods (Panel A) are the stock market crash in the fourth quarter of 1987; the credit crunch from the first quarter of 1990 until the fourth quarter of 1992; the Russian debt and long-term capital management (LTCM) crisis in the third and fourth quarters of 1998; the dot-com bubble and the September 11 crisis, from the second quarter of 2000 until the third quarter of 2002; and the subprime lending crisis from the third quarter of 2007 until the fourth quarter of 2009. Panel B, focuses on noncrisis quarters. The sample period is 1980/Q1–2016/Q4. Appendix B provides variable descriptions. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Ownership by Large Institutional Investors and Daily Volatility during Crises

Dependent variable:	Daily volatility (q) (%)							
Sample:	All Crises				2008-2009			
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Top inst ownership (q-1)	1.337**	1.546***	1.645***	1.381***	2.762**	2.479**	2.501***	1.605**
	(2.441)	(3.752)	(4.333)	(4.563)	(3.289)	(3.189)	(3.820)	(3.225)
Ownership by "middle" institutions (q-1)	0.391***	0.331**	0.283**	0.273**	0.721*	0.681	0.612	0.751*
	(3.012)	(2.365)	(2.174)	(2.067)	(1.915)	(1.817)	(1.700)	(2.160)
1 / Price (q-1)	0.459***	0.458***	0.458***	0.458***	0.116	0.115	0.115	0.114
	(6.030)	(6.028)	(6.021)	(6.020)	(0.732)	(0.730)	(0.729)	(0.724)
Amihud illiquidity (q-1)	1.415***	1.414***	1.412***	1.411***	1.001***	1.000***	1.001***	0.993***
	(13.868)	(13.873)	(13.861)	(13.840)	(8.340)	(8.400)	(8.394)	(8.268)
log(Market cap) (q-1)	-0.396***	-0.399***	-0.402***	-0.402***	-1.065***	-1.063***	-1.066***	-1.066***
	(-5.888)	(-5.973)	(-5.959)	(-6.026)	(-3.849)	(-3.830)	(-3.836)	(-3.853)
Past 6-month return (q-3 to q-1)	-0.472***	-0.471***	-0.469***	-0.468***	-0.169	-0.168	-0.167	-0.166
	(-4.106)	(-4.103)	(-4.089)	(-4.082)	(-1.139)	(-1.135)	(-1.132)	(-1.125)
Book-to-market (q-1)	-0.014	-0.014	-0.014	-0.014	-0.151*	-0.151*	-0.151*	-0.151*
	(-0.387)	(-0.404)	(-0.400)	(-0.383)	(-2.104)	(-2.115)	(-2.109)	(-2.102)
Ownership by bottom institutions (q-1)	-1.523***	-1.478***	-1.450***	-1.451***	-0.233	-0.243	-0.229	-0.215
	(-3.187)	(-3.136)	(-3.037)	(-3.051)	(-0.354)	(-0.372)	(-0.351)	(-0.327)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	170,063	170,063	170,063	170,063	34,847	34,847	34,847	34,847
Adj R^2	0.682	0.682	0.682	0.682	0.785	0.785	0.785	0.785

Internet Appendix Table IA.3. The Effect of Ownership by Large Institutional Investors during Crisis and Noncrisis Periods (Cont.)

Panel B: Ownership by Large Institutional Investors and Daily Volatility during Noncrisis Quarters

Dependent variable:	Daily volatility (q) (%)						
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 11-20	Top 21-30	Top 31-50
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top inst ownership (q-1)	0.916***	0.854***	0.870***	0.746***	0.829***	0.468***	0.266*
	(4.578)	(5.549)	(6.161)	(5.598)	(5.293)	(2.928)	(1.971)
Ownership by "middle" institutions (q-1)	0.104**	0.084	0.056	0.053	0.004	0.059	0.071
	(2.066)	(1.658)	(1.115)	(1.035)	(0.077)	(1.115)	(1.349)
1 / Price (q-1)	0.638***	0.638***	0.637***	0.637***	0.638***	0.639***	0.639***
	(8.928)	(8.922)	(8.917)	(8.925)	(8.949)	(8.954)	(8.955)
Amihud illiquidity (q-1)	1.407***	1.404***	1.403***	1.403***	1.405***	1.409***	1.409***
	(22.338)	(22.275)	(22.260)	(22.223)	(22.352)	(22.424)	(22.409)
log(Market cap) (q-1)	-0.269***	-0.272***	-0.274***	-0.274***	-0.259***	-0.256***	-0.256***
	(-12.233)	(-12.382)	(-12.382)	(-12.495)	(-12.507)	(-12.175)	(-12.155)
Past 6-month return (q-3 to q-1)	0.088	0.089	0.089	0.090	0.086	0.084	0.084
	(0.802)	(0.812)	(0.820)	(0.823)	(0.781)	(0.762)	(0.764)
Book-to-market (q-1)	-0.048*	-0.049*	-0.048*	-0.048*	-0.046	-0.046	-0.046
	(-1.660)	(-1.682)	(-1.666)	(-1.666)	(-1.568)	(-1.593)	(-1.581)
Ownership by bottom institutions (q-1)	-1.356***	-1.332***	-1.324***	-1.326***	-1.402***	-1.433***	-1.427***
	(-7.769)	(-7.677)	(-7.632)	(-7.658)	(-8.234)	(-8.332)	(-8.277)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	495,009	495,009	495,009	495,009	495,009	495,009	495,009
Adj R^2	0.677	0.678	0.678	0.678	0.677	0.677	0.677

Internet Appendix Table IA.4. Institutional Holdings and Stock Volatility, by Size

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during the next quarter, quarter q. All independent variables are measured during quarter q–1. The key independent variable is the *Top inst ownership* of the largest institutional investors in a given stock. In Panel A, regressions are sorted by stock size quintiles. In Panel B, regressions are value-weighted by beginning-of-quarter stock market capitalization. Time and stock fixed effects are also included. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Institutional Holdings and Stock Volatility, by Size Quintile

Dependent variable:	Daily volatility (q) (%)				
Stock quintile	Smallest	2	3	4	Largest
	(1)	(2)	(3)	(4)	(5)
Top inst ownership	2.257***	2.069***	0.638***	0.260*	0.307**
	(3.939)	(6.508)	(3.575)	(1.879)	(2.442)
Ownership by "middle" institutions	0.442**	0.312***	0.014	-0.091	-0.108
	(2.326)	(2.808)	(0.167)	(-1.316)	(-1.393)
1 / price (q-1)	0.494***	0.885***	1.919***	2.742***	4.676***
	(9.581)	(9.256)	(12.549)	(4.467)	(6.252)
Amihud illiquidity (q-1)	1.295***	0.881***	0.624***	0.409***	-0.092
	(20.205)	(13.415)	(9.262)	(4.303)	(-0.439)
log(market cap) (q-1)	-0.967***	-0.411***	-0.236***	-0.117***	-0.048*
	(-16.372)	(-8.670)	(-5.989)	(-3.068)	(-1.810)
Past 6-month return (q-3 to q-1)	-0.277***	-0.152**	-0.038	0.058	0.049
	(-3.517)	(-2.118)	(-0.526)	(0.643)	(0.471)
Book-to-market (q-1)	-0.148***	-0.052**	-0.027	0.036	-0.015
	(-4.849)	(-2.022)	(-0.848)	(0.890)	(-0.349)
Ownership by bottom institutions (q-1)	-0.521	-0.872***	-1.588***	-1.697***	-2.320***
	(-1.440)	(-3.539)	(-6.463)	(-5.192)	(-3.156)
Stock FE	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes
Observations	128,057	129,749	130,865	137,560	133,063
Adj R^2	0.676	0.630	0.612	0.636	0.665

Internet Appendix Table IA.4. Institutional Holdings and Stock Volatility, by Size (Cont.)

Panel B: Institutional Holdings and Stock Volatility, Value-Weighted

Dependent variable:	Daily volatility (q) (%)			
Institutions:	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)
Top inst ownership	0.761***	0.753***	0.728***	0.637***
	(3.623)	(4.541)	(4.897)	(5.352)
Ownership by "middle" institutions	0.029	0.004	-0.016	-0.025
	(0.584)	(0.082)	(-0.334)	(-0.491)
1 / Price (q-1)	0.938***	0.937***	0.936***	0.936***
	(15.464)	(15.449)	(15.435)	(15.444)
Amihud illiquidity (q-1)	1.192***	1.189***	1.188***	1.188***
	(22.116)	(22.004)	(21.991)	(21.986)
log(Market cap) (q-1)	-0.184***	-0.187***	-0.188***	-0.189***
	(-6.429)	(-6.516)	(-6.503)	(-6.613)
Past 6-month return (q-3 to q-1)	-0.013	-0.012	-0.011	-0.010
	(-0.112)	(-0.102)	(-0.095)	(-0.087)
Book-to-market (q-1)	0.090***	0.089***	0.090***	0.090***
	(3.162)	(3.143)	(3.153)	(3.161)
Ownership by bottom institutions (q-1)	-1.445***	-1.416***	-1.410***	-1.407***
	(-7.347)	(-7.295)	(-7.186)	(-7.255)
Stock FE	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes
Observations	663,462	663,462	663,462	663,462
Adj R^2	0.648	0.648	0.648	0.648

Internet Appendix Table IA.5. Holdings around the BlackRock/BGI Merger

The dependent variable is the holdings of the stocks held by large institutional investors in the next quarter. We use the exogenous event of the merger between BlackRock and BGI in 2009/Q4 to test the relation between volatility and ownership by large institutions. The key independent variable is the interaction term *Treatment*×*Post-merger dummy*, where *Treatment* represents the ownership of BlackRockBlackRock as of 2009/Q3, i.e., before the merger was completed, and *Post-merger dummy* equals 1 for 2010/Q1 and later quarters. The sample in each column includes 2007/Q4–2009/Q4 plus several quarters after the completion, as specified in the heading. *t*-statistics based on bootstrapped standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	BGI and BlackRock combined ownership							
Treatment:	Ownership by BlackRock: Q3, 2009							
Window post merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	0.607***	0.547***	0.497***	0.439***	0.399***	0.367***	0.337***	0.307***
	(21.890)	(21.430)	(16.805)	(20.060)	(14.242)	(13.653)	(11.129)	(9.743)
Ownership by all institutions (q-1)	0.032***	0.034***	0.035***	0.037***	0.038***	0.039***	0.041***	0.042***
	(14.829)	(19.062)	(17.963)	(20.808)	(23.639)	(27.133)	(24.350)	(25.302)
1 / Price (q-1)	-0.001***	-0.001***	-0.001***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(-2.894)	(-3.748)	(-5.332)	(-5.238)	(-5.191)	(-5.479)	(-5.817)	(-6.678)
Amihud illiquidity (q-1)	-0.015***	-0.013***	-0.012***	-0.012***	-0.011***	-0.010***	-0.009***	-0.009***
	(-40.492)	(-35.204)	(-31.887)	(-31.725)	(-29.932)	(-29.548)	(-26.960)	(-26.414)
log(Market cap) (q-1)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
	(1.174)	(0.951)	(0.652)	(0.255)	(0.899)	(0.851)	(1.363)	(1.623)
Past 6-month return (q-3 to q-1)	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(-8.222)	(-8.805)	(-8.571)	(-10.310)	(-7.568)	(-9.225)	(-8.689)	(-10.035)
Book-to-market (q-1)	-0.000*	-0.000*	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-1.665)	(-1.806)	(-1.164)	(-1.426)	(-1.250)	(-1.399)	(-0.618)	(-0.741)
Ownership by bottom institutions (q-1)	-0.063***	-0.064***	-0.065***	-0.066***	-0.068***	-0.068***	-0.069***	-0.069***
	(-16.635)	(-12.096)	(-17.897)	(-17.287)	(-18.601)	(-21.018)	(-18.485)	(-20.080)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	37,367	41,053	44,721	48,365	51,883	55,378	58,785	62,114
Adj R^2	0.616	0.608	0.597	0.584	0.574	0.563	0.553	0.544

Internet Appendix Table IA.6. Removing the Financial Crisis from the Pre-Period

The dependent variable is the daily volatility of the stocks held by large institutional investors in the next quarter. *Daily volatility* is computed from daily returns. We use the exogenous event of the merger between BlackRock and BGI in 2009/Q4 to test the relation between volatility and ownership by large institutions. The key independent variable is the interaction term *Treatment×Post-merger dummy*, where *Treatment* represents the ownership of BlackRockBlackRock as of 2009/Q3, i.e., before the merger was completed, and *Post-merger dummy* equals 1 for 2010/Q1 and later quarters. The treatment variable is the level of ownership. The sample in each column includes 2007/Q4–2009/Q4 plus several quarters after the completion, as specified in the heading. In Panel A, we remove 2008/Q4 from the sample. In Panel B, we remove all quarters from 2008/Q3 through 2009/Q1. *t*-statistics based on block-bootstrapped standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Removing Quarter 2008/Q4

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q3, 2009							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	5.055***	5.777***	4.314***	3.676***	3.525***	3.790***	4.658***	4.890***
	(3.703)	(4.349)	(3.720)	(3.286)	(3.243)	(3.497)	(4.190)	(4.367)
Ownership by "middle" institutions (q-1)	0.801***	0.778***	0.811***	0.762***	0.687***	0.624***	0.611***	0.621***
	(5.623)	(5.915)	(6.427)	(6.085)	(5.821)	(5.640)	(5.763)	(6.032)
1 / Price (q-1)	0.317***	0.357***	0.381***	0.416***	0.434***	0.461***	0.487***	0.506***
	(6.218)	(7.108)	(7.662)	(8.524)	(9.090)	(9.732)	(10.318)	(10.781)
Amihud illiquidity (q-1)	0.904***	0.900***	0.912***	0.904***	0.908***	0.898***	0.933***	0.923***
	(16.786)	(17.141)	(17.824)	(18.238)	(18.567)	(18.698)	(19.769)	(19.899)
log(Market cap) (q-1)	-1.008***	-0.933***	-0.858***	-0.796***	-0.751***	-0.696***	-0.616***	-0.615***
	(-23.489)	(-22.985)	(-22.363)	(-21.580)	(-21.296)	(-20.604)	(-19.037)	(-19.579)
Past 6-month return (q-3 to q-1)	-0.004	-0.004	-0.014	-0.020	-0.006	-0.001	-0.009	-0.018
	(-0.190)	(-0.204)	(-0.723)	(-1.050)	(-0.349)	(-0.042)	(-0.532)	(-1.054)
Book-to-market (q-1)	-0.020	-0.008	0.016	0.027	0.037**	0.052***	0.062***	0.059***
	(-1.010)	(-0.415)	(0.873)	(1.504)	(2.045)	(2.938)	(3.579)	(3.402)
Ownership by bottom institutions (q-1)	1.356***	1.230***	1.135***	1.013***	0.850***	0.724***	0.586***	0.486**
	(5.709)	(5.478)	(5.193)	(4.781)	(4.183)	(3.675)	(3.030)	(2.530)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,630	37,340	41,018	44,680	48,251	51,735	55,136	58,498
Adj R^2	0.734	0.727	0.721	0.721	0.718	0.717	0.709	0.703

Internet Appendix Table IA.6. Removing the Financial Crisis from the Pre-Period (Cont.)

Panel B: Removing Quarters 2008/Q3 through 2009/Q1

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q3, 2009							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	5.539***	6.238***	4.779***	4.104***	3.886***	4.022***	4.756***	5.077***
	(4.399)	(5.118)	(4.651)	(4.221)	(4.140)	(4.318)	(4.903)	(5.111)
Ownership by "middle" institutions (q-1)	0.840***	0.781***	0.814***	0.729***	0.643***	0.558***	0.550***	0.577***
	(5.152)	(5.244)	(5.889)	(5.402)	(5.177)	(4.906)	(5.108)	(5.561)
1 / Price (q-1)	0.386***	0.434***	0.462***	0.499***	0.513***	0.540***	0.566***	0.582***
	(6.415)	(7.475)	(8.241)	(9.250)	(9.885)	(10.543)	(11.139)	(11.546)
Amihud illiquidity (q-1)	0.864***	0.866***	0.875***	0.869***	0.875***	0.864***	0.906***	0.893***
	(14.676)	(15.217)	(15.988)	(16.587)	(17.040)	(17.239)	(18.502)	(18.644)
log(Market cap) (q-1)	-0.964***	-0.880***	-0.809***	-0.743***	-0.693***	-0.632***	-0.545***	-0.564***
	(-20.575)	(-20.165)	(-20.051)	(-19.534)	(-19.373)	(-18.637)	(-16.938)	(-18.018)
Past 6-month return (q-3 to q-1)	0.018	0.033*	0.036**	0.037**	0.054***	0.064***	0.055***	0.044***
	(0.894)	(1.684)	(1.991)	(2.080)	(3.146)	(3.901)	(3.369)	(2.688)
Book-to-market (q-1)	0.086***	0.092***	0.110***	0.119***	0.126***	0.138***	0.144***	0.134***
	(4.210)	(4.760)	(5.915)	(6.513)	(7.062)	(7.935)	(8.449)	(7.854)
Ownership by bottom institutions (q-1)	1.487***	1.338***	1.228***	1.093***	0.903***	0.753***	0.576***	0.455**
	(6.241)	(5.970)	(5.651)	(5.179)	(4.478)	(3.861)	(3.009)	(2.389)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,338	26,046	29,727	33,386	36,958	40,440	43,844	47,206
Adj R^2	0.756	0.744	0.734	0.731	0.725	0.722	0.712	0.705

Internet Appendix Table IA.7. Time-Based Placebo Test

The dependent variable is the daily volatility of the stocks held by large institutional investors in the next quarter. *Daily volatility* is computed from daily returns. We implement a placebo test to corroborate the results of our event study surrounding the exogenous event of the merger between BlackRock and BGI in 2009/Q4. In this case, we set the merger date to Q4/2008 (Panel A) and Q4/2007 (Panel B). The key independent variable is the interaction term *Treatment*×*Post-merger dummy*, where *Treatment* represents the ownership of BlackRockBlackRock as of 2008/Q3 (Panel A) or 2007/Q3 (Panel B), i.e., before the merger date, and *Post-merger dummy* equals 1 for 2009/Q1 (Panel A) or 2008/Q1 (Panel B) and later quarters. The treatment variable is the level of ownership. *t*-statistics based on block-bootstrapped standard errors are in parentheses. The pre-period includes nine quarters before the placebo merger date. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Placebo-Merger Date Set to Q4, 2008

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q4, 2008							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	-1.227	2.236	-0.142	-1.052	-0.776	-0.630	-0.794	-1.098
	(-0.672)	(1.212)	(-0.099)	(-0.901)	(-0.750)	(-0.662)	(-0.915)	(-1.324)
Ownership by "middle" institutions (q-1)	0.565***	0.364**	0.324**	0.300**	0.342***	0.360***	0.421***	0.430***
	(3.755)	(2.498)	(2.440)	(2.443)	(3.005)	(3.354)	(4.177)	(4.395)
1 / Price (q-1)	0.180***	0.114**	0.137***	0.160***	0.190***	0.224***	0.246***	0.282***
	(2.615)	(2.166)	(2.767)	(3.322)	(4.032)	(4.817)	(5.359)	(6.233)
Amihud illiquidity (q-1)	1.162***	0.912***	0.957***	0.950***	0.944***	0.928***	0.930***	0.923***
	(16.631)	(15.429)	(17.902)	(18.829)	(19.398)	(19.482)	(19.871)	(20.286)
log(Market cap) (q-1)	-1.141***	-1.176***	-1.106***	-1.060***	-1.009***	-0.971***	-0.931***	-0.883***
	(-23.122)	(-26.912)	(-27.518)	(-28.735)	(-29.423)	(-29.604)	(-29.999)	(-29.736)
Past 6-month return (q-3 to q-1)	0.283***	0.283***	0.148***	0.096***	0.082***	0.081***	0.077***	0.066***
	(6.876)	(6.893)	(4.702)	(4.651)	(4.159)	(4.216)	(4.177)	(3.629)
Book-to-market (q-1)	0.225***	-0.019	0.007	0.021	0.032	0.039**	0.051***	0.056***
	(3.635)	(-0.612)	(0.328)	(0.994)	(1.613)	(2.021)	(2.685)	(3.023)
Ownership by bottom institutions (q-1)	0.630***	0.970***	0.995***	0.967***	0.940***	0.905***	0.882***	0.851***
	(2.699)	(4.256)	(4.672)	(4.837)	(5.005)	(5.029)	(5.109)	(5.116)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42,313	46,232	50,093	53,877	57,568	61,199	64,772	68,310
Adj R^2	0.761	0.724	0.720	0.717	0.717	0.713	0.710	0.710

Internet Appendix Table IA.7. Time-Based Placebo Test (Cont.)

Panel B: Placebo-Merger Date Set to Q4, 2007

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q4, 2007							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	-2.050*	-1.126	-0.143	2.130	1.710	1.227	0.549	0.075
	(-1.693)	(-1.030)	(-0.124)	(1.348)	(1.085)	(0.746)	(0.362)	(0.052)
Ownership by "middle" institutions (q-1)	0.519***	0.487***	0.614***	0.773***	0.736***	0.725***	0.658***	0.609***
	(5.454)	(5.216)	(6.141)	(6.508)	(5.897)	(5.838)	(5.657)	(5.560)
1 / Price (q-1)	1.056***	0.912***	0.637***	0.872***	0.509***	0.326***	0.309***	0.321***
	(9.590)	(8.637)	(6.132)	(7.423)	(6.215)	(5.574)	(5.913)	(6.324)
Amihud illiquidity (q-1)	0.553***	0.898***	0.959***	1.198***	1.204***	1.122***	1.141***	1.126***
	(7.578)	(11.888)	(13.864)	(14.771)	(15.239)	(16.706)	(18.893)	(19.617)
log(Market cap) (q-1)	-0.463***	-0.523***	-0.672***	-0.824***	-1.047***	-1.178***	-1.130***	-1.093***
	(-12.280)	(-13.729)	(-16.095)	(-17.404)	(-22.649)	(-28.134)	(-28.900)	(-29.774)
Past 6-month return (q-3 to q-1)	0.242***	0.243***	0.273***	0.234***	0.236***	0.205***	0.100***	0.074***
	(8.683)	(8.772)	(9.590)	(7.300)	(7.096)	(6.186)	(3.741)	(3.913)
Book-to-market (q-1)	-0.144**	-0.019	0.160**	0.346***	0.353***	0.154***	0.101***	0.105***
	(-2.267)	(-0.295)	(2.502)	(4.745)	(5.013)	(4.289)	(4.028)	(4.421)
Ownership by bottom institutions (q-1)	-0.755**	-0.832***	-0.976***	-0.933**	-0.908**	-1.015**	-0.984**	-0.994***
	(-2.248)	(-2.580)	(-2.892)	(-2.287)	(-2.093)	(-2.405)	(-2.447)	(-2.587)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42,965	47,159	51,301	55,437	59,434	63,290	67,040	70,724
Adj R^2	0.658	0.653	0.653	0.728	0.734	0.736	0.733	0.729

Internet Appendix Table IA.8. Ownership-Based Placebo Test

The dependent variable is the daily volatility of the stocks held by large institutional investors in the next quarter. *Daily volatility* is computed from daily returns. We implement a placebo test to verify the results of our event study surrounding the exogenous event of the merger between BlackRock and BGI in 2009/Q4. In this case, the key independent variable is the interaction term *Treatment*×*Post-merger dummy*, where *Treatment* represents the alternative treatment ownership by BGI as of 2009/Q3, i.e., before the merger date, and *Post-merger dummy* equals 1 for 2010/Q1 and later quarters. The treatment variable is the level of ownership. *t*-statistics based on block-bootstrapped standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Daily volatility (q) (%)							
Treatment (Placebo):	Ownership by BGI: Q3, 2009							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	-0.342	0.553	0.300	-0.205	-0.019	-0.074	0.212	0.486
	(-0.314)	(0.570)	(0.322)	(-0.221)	(-0.020)	(-0.080)	(0.232)	(0.537)
Ownership by "middle" institutions (q-1)	0.911***	0.940***	0.974***	0.922***	0.827***	0.761***	0.752***	0.763***
	(6.763)	(7.388)	(7.941)	(7.535)	(7.146)	(6.933)	(7.084)	(7.417)
1 / Price (q-1)	0.184***	0.233***	0.267***	0.311***	0.331***	0.360***	0.391***	0.414***
	(3.384)	(4.356)	(5.044)	(6.000)	(6.476)	(7.114)	(7.830)	(8.271)
Amihud illiquidity (q-1)	0.895***	0.888***	0.894***	0.885***	0.894***	0.891***	0.927***	0.918***
	(17.324)	(17.702)	(18.057)	(18.426)	(18.823)	(18.999)	(20.065)	(20.202)
log(Market cap) (q-1)	-0.916***	-0.858***	-0.801***	-0.748***	-0.696***	-0.635***	-0.562***	-0.562***
	(-22.841)	(-22.498)	(-21.953)	(-21.315)	(-20.627)	(-19.556)	(-17.895)	(-18.263)
Past 6-month return (q-3 to q-1)	-0.086***	-0.083***	-0.088***	-0.089***	-0.078***	-0.070***	-0.075***	-0.080***
	(-4.107)	(-4.053)	(-4.463)	(-4.681)	(-4.202)	(-3.923)	(-4.280)	(-4.586)
Book-to-market (q-1)	-0.029	-0.016	0.008	0.020	0.032*	0.050***	0.062***	0.062***
	(-1.453)	(-0.824)	(0.403)	(1.038)	(1.690)	(2.689)	(3.360)	(3.370)
Ownership by bottom institutions (q-1)	1.089***	1.030***	0.958***	0.865***	0.699***	0.596***	0.480**	0.400**
	(4.645)	(4.587)	(4.402)	(4.113)	(3.466)	(3.051)	(2.493)	(2.098)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	36,437	40,030	43,554	47,034	50,347	53,631	56,873	60,033
Adj R^2	0.753	0.747	0.743	0.742	0.741	0.741	0.733	0.728

Internet Appendix Table IA.9. Differences-in-Differences with Matching Sample

The dependent variable is the daily volatility of the stocks held by large institutional investors in the next quarter. *Daily volatility* is computed from daily returns. We implement a placebo test to verify the results of our event study surrounding the exogenous event of the merger between BlackRock and BGI in 2009/Q4. In this case, the key independent variable is the interaction term *Treatment*×*Post-merger dummy*, where *Treatment* represents an indicator for ownership in the top half of the distribution of ownership by BlackRock in 2009/Q3, i.e., before the merger date, and *Post-merger dummy* equals 1 for 2010/Q1 and later quarters. The treatment variable is the level of ownership. The control sample is selected using propensity score matching based on a probit model for the probability of treatment as a function of the average volatility during the pre-period. The chosen algorithm implements *k*-nearest neighbors Mahalanobis matching, with $k = 4$. *t*-statistics based on block-bootstrapped standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Daily volatility (q) (%)							
Treatment:	Ownership by BlackRock: Q3, 2009							
Window after merger:	+1 qtr	+2 qtrs	+3 qtrs	+4 qtrs	+5 qtrs	+6 qtrs	+7 qtrs	+8 qtrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment × Post-merger dummy	0.118***	0.174***	0.144***	0.127***	0.140***	0.144***	0.181***	0.200***
	(2.828)	(4.749)	(3.995)	(3.615)	(4.031)	(4.175)	(5.257)	(5.839)
Ownership by "middle" institutions (q-1)	0.572***	0.572***	0.576***	0.551***	0.480***	0.424***	0.421***	0.450***
	(4.158)	(4.455)	(4.643)	(4.550)	(4.147)	(3.836)	(3.911)	(4.313)
1 / Price (q-1)	0.366***	0.401***	0.424***	0.421***	0.438***	0.463***	0.494***	0.520***
	(4.775)	(5.331)	(5.379)	(5.265)	(5.439)	(5.739)	(6.238)	(6.588)
Amihud illiquidity (q-1)	0.551***	0.535***	0.537***	0.541***	0.549***	0.560***	0.608***	0.600***
	(8.747)	(8.786)	(8.929)	(9.241)	(9.443)	(9.811)	(10.793)	(10.831)
log(Market cap) (q-1)	-0.785***	-0.718***	-0.651***	-0.609***	-0.567***	-0.512***	-0.454***	-0.468***
	(-17.230)	(-16.780)	(-15.973)	(-15.519)	(-14.948)	(-14.145)	(-13.036)	(-13.909)
Past 6-month return (q-3 to q-1)	-0.093***	-0.087***	-0.091***	-0.083***	-0.064***	-0.054***	-0.057***	-0.061***
	(-4.053)	(-3.948)	(-4.248)	(-4.028)	(-3.200)	(-2.820)	(-3.022)	(-3.251)
Book-to-market (q-1)	-0.030	-0.012	0.021	0.041	0.054**	0.075***	0.083***	0.083***
	(-1.151)	(-0.460)	(0.835)	(1.606)	(2.125)	(2.961)	(3.391)	(3.363)
Ownership by bottom institutions (q-1)	0.760***	0.749***	0.652***	0.583**	0.491**	0.449**	0.341	0.301
	(2.937)	(3.010)	(2.668)	(2.477)	(2.181)	(2.054)	(1.580)	(1.414)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,496	30,265	33,023	35,815	38,549	41,278	44,035	46,766
Adj R^2	0.752	0.747	0.742	0.743	0.742	0.742	0.734	0.726

Internet Appendix Table IA.10. Additional Dimensions of Return Distribution

In this table, the dependent variables are additional dimensions of the stock return distribution. All independent variables are measured during quarter *q*–1. All panels use the *Top inst ownership* of the largest institutional investors in a given stock as the key independent variable. Panel A uses *Weekly volatility* (Columns (1)–(4)), *Monthly range* (Columns (5)–(8)), and *Quarterly range* (Columns (9)–(12)), where monthly and quarterly range are the percentage difference between the highest and lowest price in the month or quarter, respectively. Panel B uses the *Nonparametric daily skewness* (Columns (1)–(4)) and the absolute value of *Nonparametric daily skewness* (Columns (5)–(8)), computed as in Ghysels, Plazzi, and Valkanov (2016). The sample period is 1980/Q1–2016/Q4. All regressions include stock and calendar quarter fixed effects, and *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Volatility and Range

Dependent variable:	Weekly volatility				Monthly range				Quarterly range			
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 3	Top 5	Top 7	Top 10	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Top inst ownership (q-1)	1.696***	1.728***	1.776***	1.431***	2.302*	2.152*	2.617***	1.970**	3.653	4.250**	5.580***	4.591***
	(3.334)	(4.141)	(4.845)	(4.625)	(1.673)	(1.921)	(2.666)	(2.456)	(1.417)	(2.025)	(3.125)	(3.038)
Ownership by "middle" institutions (q-1)	0.333***	0.282**	0.229*	0.243*	0.579*	0.542	0.412	0.467	0.944	0.772	0.436	0.450
	(2.732)	(2.270)	(1.920)	(1.965)	(1.676)	(1.521)	(1.212)	(1.303)	(1.327)	(1.050)	(0.621)	(0.613)
1 / Price (q-1)	1.284***	1.283***	1.282***	1.282***	2.527***	2.526***	2.524***	2.525***	6.498***	6.496***	6.491***	6.492***
	(13.402)	(13.397)	(13.384)	(13.400)	(8.095)	(8.092)	(8.085)	(8.093)	(16.151)	(16.139)	(16.127)	(16.139)
Amihud illiquidity (q-1)	1.320***	1.317***	1.315***	1.315***	3.214***	3.210***	3.206***	3.207***	3.209***	3.201***	3.189***	3.189***
	(14.483)	(14.414)	(14.393)	(14.418)	(12.911)	(12.858)	(12.838)	(12.842)	(11.827)	(11.777)	(11.746)	(11.742)
log(Market cap) (q-1)	-0.671***	-0.676***	-0.679***	-0.678***	-1.347***	-1.352***	-1.360***	-1.356***	-3.557***	-3.572***	-3.593***	-3.591***
	(-10.709)	(-10.743)	(-10.758)	(-10.865)	(-7.931)	(-7.924)	(-7.941)	(-8.006)	(-11.201)	(-11.202)	(-11.246)	(-11.363)
Past 6-month return (q-3 to q-1)	-0.078	-0.076	-0.075	-0.074	-0.012	-0.010	-0.007	-0.007	-0.664	-0.658	-0.649	-0.646
	(-0.272)	(-0.266)	(-0.260)	(-0.258)	(-0.020)	(-0.017)	(-0.011)	(-0.011)	(-0.618)	(-0.613)	(-0.605)	(-0.602)
Book-to-market (q-1)	0.139*	0.138*	0.138*	0.139*	0.114	0.113	0.112	0.114	0.719**	0.716**	0.715**	0.717**
	(1.961)	(1.948)	(1.950)	(1.957)	(0.635)	(0.630)	(0.628)	(0.634)	(1.993)	(1.986)	(1.981)	(1.986)
Ownership by bottom institutions (q-1)	-2.289***	-2.236***	-2.217***	-2.234***	-6.406***	-6.358***	-6.288***	-6.335***	-13.933***	-13.768***	-13.579***	-13.614***
	(-5.239)	(-5.145)	(-5.095)	(-5.194)	(-5.575)	(-5.583)	(-5.471)	(-5.556)	(-6.352)	(-6.336)	(-6.186)	(-6.218)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	667,331	667,331	667,331	667,331	666,882	666,882	666,882	666,882	666,835	666,835	666,835	666,835
Adj R^2	0.540	0.540	0.540	0.540	0.539	0.539	0.539	0.539	0.554	0.554	0.554	0.554

Internet Appendix Table IA.10. Additional Dimensions of Return Distribution (Cont.)

Panel B: Skewness

Dependent variable:	Daily volatility (q) (%)							
Sample:	Nonparametric daily skweness				abs(Nonparametric daily skweness)			
Institutions:	Top 3	Top 5	Top 7	Top 10	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Top inst ownership (q-1)	-0.951***	-0.771***	-0.669***	-0.618***	0.925***	0.795***	0.706***	0.582***
	(-5.265)	(-5.501)	(-5.435)	(-5.249)	(6.689)	(7.303)	(6.769)	(6.481)
Ownership by "middle" institutions (q-1)	0.055	0.065*	0.074*	0.092**	0.009	-0.004	-0.014	-0.016
	(1.462)	(1.674)	(1.829)	(2.312)	(0.340)	(-0.161)	(-0.511)	(-0.538)
1 / Price (q-1)	-0.044	-0.043	-0.042	-0.042	0.152***	0.151***	0.150***	0.150***
	(-1.473)	(-1.452)	(-1.432)	(-1.438)	(5.100)	(5.088)	(5.079)	(5.085)
Amihud illiquidity (q-1)	0.022	0.024	0.024	0.025	-0.027	-0.029	-0.030	-0.030
	(0.804)	(0.869)	(0.886)	(0.918)	(-1.271)	(-1.347)	(-1.368)	(-1.369)
log(Market cap) (q-1)	-0.034**	-0.032**	-0.031**	-0.031**	-0.082***	-0.084***	-0.085***	-0.085***
	(-2.504)	(-2.307)	(-2.267)	(-2.185)	(-7.606)	(-7.713)	(-7.684)	(-7.685)
Past 6-month return (q-3 to q-1)	0.136***	0.135***	0.135***	0.134***	0.001	0.002	0.002	0.003
	(7.271)	(7.246)	(7.222)	(7.209)	(0.115)	(0.210)	(0.253)	(0.305)
Book-to-market (q-1)	0.035***	0.035***	0.035***	0.035***	-0.020**	-0.020***	-0.020**	-0.020**
	(2.733)	(2.768)	(2.733)	(2.715)	(-2.556)	(-2.620)	(-2.569)	(-2.532)
Ownership by bottom institutions (q-1)	0.795***	0.778***	0.782***	0.775***	-0.071	-0.052	-0.055	-0.058
	(6.226)	(6.167)	(6.189)	(6.131)	(-0.726)	(-0.530)	(-0.566)	(-0.595)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	643,216	643,216	643,216	643,216	643,216	643,216	643,216	643,216
Adj R^2	0.112	0.112	0.112	0.112	0.145	0.145	0.145	0.145

Internet Appendix Table IA.11. Active and Passive Mutual Fund Ownership

This table presents ordinary least squares regression results. The dependent variable is the stock's *Daily volatility*, which is computed from daily returns during the next quarter, quarter q. All independent variables are measured during quarter q–1. The key independent variables are ownership levels by active and passive mutual funds. Calendar quarter and stock fixed effects are also included. The sample period is 1980/Q1–2016/Q4. *t*-statistics based on standard errors clustered at the stock and quarter level are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Daily volatility (q) (%)			
Institutions:	Top 3	Top 5	Top 7	Top 10
	(1)	(2)	(3)	(4)
Top active mutual fund ownership	0.091***	0.110***	0.020	0.050*
	(2.930)	(3.815)	(0.735)	(1.934)
Top passive mutual fund ownership	0.505***	0.557***	0.662***	0.696***
	(4.097)	(4.574)	(5.063)	(5.342)
Ownership by other mutual funds	-0.006	-0.008**	-0.027	-0.050**
	(-1.446)	(-2.414)	(-1.338)	(-2.549)
1 / Price (q-1)	1.253***	1.254***	1.254***	1.255***
	(11.711)	(11.716)	(11.717)	(11.718)
Amihud illiquidity (q-1)	1.019***	1.018***	1.020***	1.019***
	(27.268)	(27.263)	(27.369)	(27.350)
log(Market cap) (q-1)	-0.234***	-0.235***	-0.233***	-0.234***
	(-8.323)	(-8.370)	(-8.353)	(-8.375)
Past 6-month return (q-3 to q-1)	-0.075	-0.074	-0.075	-0.074
	(-0.630)	(-0.624)	(-0.628)	(-0.626)
Book-to-market (q-1)	0.048*	0.048*	0.048*	0.048*
	(1.767)	(1.761)	(1.768)	(1.764)
Stock FE	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes
Observations	583,921	583,921	583,921	583,921
Adj R^2	0.664	0.664	0.664	0.664

Internet Appendix Table IA.12. Comparison to Synthetic Institutions: Small Universe and Large Trades

The table compares the portfolio holdings and trade sizes of large institutional investors to synthetic institutional investors. For each top-10 institutional investor and quarter, we create 99 synthetic institutions composed of smaller institutions that together equal the size (assets under management) of the top institution. Then, we sort the portfolio holdings (stocks) by their value in the portfolio and count how many stocks make a certain fraction of the portfolio value. We compare these numbers to the number of stocks held by the original institutional investors that make up the same portfolio fraction. Panel A presents the average number of stocks held in the original portfolio relative to the number of stocks held in the synthetic portfolio. In Panel B, we compare the size of the trades of large institutions to those of synthetic institutions. For each stock-quarter within a portfolio, we calculate the change in the value of portfolio holdings since the last quarter. Then, for each institution-quarter, we calculate the percentage of trades that have a larger absolute value than a certain percentile in the distribution of trade sizes by the synthetic institutions. The panel shows the average percentage of trades by large institutional investors that are above the 50th, 90th, 95th, and 99th percentiles of the distribution of trades of the synthetic institutions.

Panel A: Number of Stocks Contained in the Portfolios of Large Institutional Investors

	Average number of stocks that make up X% of the equity porfolio													
	100%		99%		90%		80%		70%		60%		50%	
Institutional investor	Orig.	Synth.	Orig.	Synth.	Orig.	Synth.	Orig.	Synth.	Orig.	Synth.	Orig.	Synth.	Orig.	Synth.
Top 1	2,836	3,056	1,658	1,634	637	654	339	370	205	230	128	147	79	93
Top 2	2,736	2,843	1,543	1,537	555	620	304	352	187	219	118	141	73	90
Top 3	2,202	2,702	1,235	1,480	409	603	233	343	147	214	94	137	60	88
Top 4	2,044	2,646	1,156	1,453	416	592	235	338	149	211	97	135	62	87
Top 5	1,571	2,491	937	1,376	379	562	221	321	144	201	95	129	62	83
Top 6	1,607	2,407	889	1,332	342	545	194	312	124	196	81	126	53	81
Top 7	1,562	2,422	873	1,342	336	549	194	314	124	197	82	127	54	81
Top 8	1,766	2,394	975	1,325	376	543	211	311	132	195	85	126	55	81
Top 9	1,682	2,283	966	1,270	363	523	203	301	127	189	81	122	52	79
Top 10	1,922	2,240	1,055	1,248	381	515	211	296	132	186	85	120	56	77
Average	1,995	2,550	1,130	1,401	420	571	235	326	147	204	95	131	61	84
Difference	-28%		-24%		-36%		-39%		-38%		-38%		-38%	

Panel B: Trades by Large Institutional Investors Relative to Trades by Synthetic Institutions

	%Stock-quarter with abs(trade) of top institutions			
	> 50th pctile	> 90th pctile	> 95th pctile	> 99th pctile
	(1)	(2)	(3)	(4)
Top 1	52.7%	14.8%	8.5%	4.3%
Top 2	51.3%	12.4%	6.7%	3.3%
Top 3	45.7%	12.9%	7.7%	3.4%
Top 4	57.2%	17.1%	9.7%	4.1%
Top 5	53.6%	15.7%	9.1%	3.5%
Top 6	57.8%	18.3%	10.6%	4.0%
Top 7	62.6%	21.0%	12.6%	4.7%
Top 8	59.4%	15.9%	9.0%	3.2%
Top 9	60.5%	16.8%	9.8%	3.5%
Top 10	60.1%	17.1%	9.9%	3.5%
Average	56.1%	16.2%	9.4%	3.7%

Internet Appendix Table IA.13. Correlation of Flows and Trades around the BlackRock-BGI Merger

In Panel A, the dependent variable is the correlation of flows between fund *i* and fund *j*, and in Panel B the dependent variable is the correlation of the change in holdings between fund *i* and fund *j*. For each fund pair-year, we compute the 12-month *correlation of flows* (scaled by lagged total net assets) over the calendar year. We use the exogenous event of the merger between BlackRock and BGI in 2009 to test the relation between flow or holding changes correlation and ownership by large institutions. The *Treatment* dummy identifies funds that before the merger were in separate asset management firms (either BGI or BlackRock). The annual sample ranges between 2008 and 2011. The *Post-merger dummy* identifies the years 2010 and 2011. We also include a dummy for pairs of funds that were in the same company (either BlackRock or BGI) before the merger (*BlackRock or BGI pair*). *t*-statistics based on bootstrapped standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Fund Flow Correlation around the BlackRock-BGI Merger

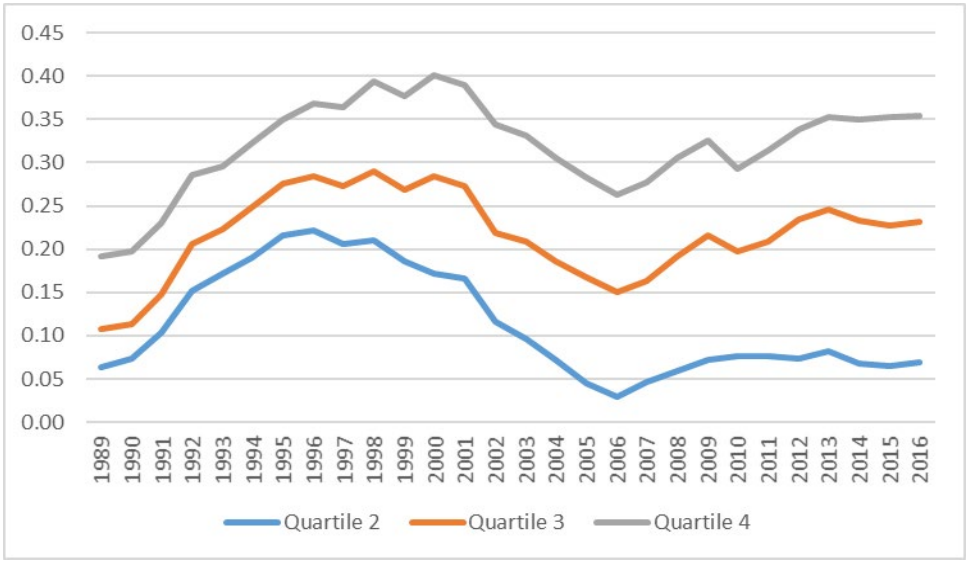
Dependent variable:	Correlation of Flows between Fund i and Fund j			
	(1)	(2)	(3)	(4)
Treatment × Post-merger dummy	0.043***	0.043***	0.043***	0.043***
	(5.949)	(5.995)	(5.955)	(5.983)
Treatment Dummy	-0.028***	-0.015**	-0.028***	-0.015**
	(-4.656)	(-2.459)	(-4.691)	(-2.449)
Post × BlackRock or BGI pair	0.059***	0.061***	0.058***	0.061***
	(4.907)	(5.165)	(4.902)	(5.125)
BlackRock or BGI pair	-0.000	0.004	-0.000	0.005
	(-0.018)	(0.501)	(-0.033)	(0.533)
Post-merger dummy	-0.009***	-0.011***		
	(-4.614)	(-5.346)		
Constant	0.044***			
	(25.995)			
Fund i, Fund j FE	No	Yes	No	Yes
Year FE	No	No	Yes	Yes
Observations	28,022,747	28,022,747	28,022,747	28,022,747
Adj R^2	0.000	0.044	0.001	0.045

Internet Appendix Table IA.13. Correlation of Flows and Trades around the BlackRock-BGI Merger

Panel B: Holding Changes Correlation Around the BlackRock-BGI Merger

Dependent variable:	Correlation of change in holdings between Fund i and Fund j			
	(1)	(2)	(3)	(4)
Treatment × Post-merger dummy	0.003*	0.004***	0.003*	0.004***
	(1.752)	(9.731)	(1.730)	(7.273)
Treatment Dummy	-0.008***	-0.003**	-0.008***	-0.003**
	(-3.872)	(-2.259)	(-3.725)	(-2.130)
Post × BlackRock or BGI pair	0.002*	0.003***	0.002*	0.003**
	(1.930)	(3.310)	(1.837)	(2.566)
BlackRock or BGI pair	-0.009***	-0.003**	-0.009***	-0.003**
	(-8.874)	(-2.155)	(-8.479)	(-1.972)
Post-merger dummy	-0.005***	-0.005***		
	(-16.220)	(-15.393)		
Constant	0.012***			
	(31.499)			
Fund i, Fund j FE	No	Yes	No	Yes
Year FE	No	No	Yes	Yes
Observations	27,519,752	27,519,752	27,519,752	27,519,752
Adj R^2	0.000	0.008	0.001	0.008

Internet Appendix Figure IA.1: Time Series of Ownership Quartile Dummies of Top Institutions



Internet Appendix IA.C. Correcting Thomson-Reuters Data Problems and Sample Construction

After June 2013, we use the 13F data parsed directly from the SEC EDGAR filings system to supplement the Thomson-Reuters 13F data, which has serious data quality issues – most notably omitted institutions and excluded securities.[1] To remedy these data quality issues, we use the original 13F filings provided on the U.S. Securities and Exchange Commission (SEC) website as the source of our 13F data beginning in June 2013.[2] The sample we use is currently available on the WRDS website as the WRDS SEC 13F Holdings database, along with the code used to clean the data. Our methodology consists of the following steps.

Because there are multiple filings per holding report period due to amendments, corrections, and confidential treatment-related reporting, we first divide the sample into subsets that include only one report per holding period at calendar quarter ends. We choose the first reported filing to ensure that we avoid backfilling bias, especially due to amendments that might contain confidentially treated securities. We identify one filing per holding report date (calendar quarter end date, or *rdate* variable) from which to extract the holdings. However, in a few instances, institutional investors attempt to fix errors and correct their holding reports a few days after the original filings were submitted with the SEC.[3] Therefore, for each reporting period, we extract the most updated filing within one month of the original filing date.

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[1] For example, BlackRockBlackRock Inc. has stale data after September 2013; it is completely dropped from Thomson in 2014; and it is added back to Thomson in 2015 with a fraction of the assets under management that were historically associated with BlackRockBlackRock. Additionally, we find a substantial number of excluded securities (e.g., ETFs) in recent quarters for unknown reasons. We reported many of these data quality issues to WRDS and Thomson-Reuters, and we worked with WRDS to provide a detailed report that includes the code on how to fix Thomson-Reuters 13F data problems using original SEC 13F filings. Please see the WRDS report for a comprehensive discussion of the data quality issues and the code to fix these issues by cleaning the 13F data from SEC filings before appending them to Thomson history: https://wrds-www.wharton.upenn.edu/documents/752/Research_Note_-Thomson_S34_Data_Issues_mldAsdi.pdf. The mapping table between Thomson's mgrno and SEC's CIK is available on the WRDS server under the WRDS_13F_Link.

[2] Asset managers also report positions that are managed for clients. For example, consider CalPERS, which uses BlackRockBlackRock as one of its asset managers. According to CalPERS' investment statement (https://www.calpers.ca.gov/docs/forms-publications/facts-at-a-glance.pdf), it has about $160 billion in public equity. Because its 13F assets as of the end of June 2015 accounted for only about $67 billion (http://www.sec.gov/Archives/edgar/data/919079/000114036115032277/xslForm13F_X01/primary_doc.xml), CalPERS is likely to have a few billion dollars reported by asset managers, such as BlackRockBlackRock and others. Those assets are reported under the respective asset managers' 13Fs.

[3] See for example, Acadian Asset Management (CIK= 0000916542), which filed a corrected filing (https://www.sec.gov/Archives/edgar/data/916542/000114036113030478/0001140361-13-030478-index.htm) on

Then, we aggregate holding information at the CIK registrant level, because we want to capture ownership at the parent level. In the case of BlackRock, which has seven reporting entities, we aggregate holdings across all seven reporting entities as described in the next section.

After that, we use shares outstanding from CRSP to winsorize extreme holding information that we suspect is due to reporting errors or to erroneous CUSIP information. Whenever any holding by a single SEC registrant exceeds 50% of shares outstanding, we winsorize this observation to 50%.

Finally, we use historical holdings to map each CIK entity to its corresponding Thomson-Reuters' mgrno. If a CIK entity in the SEC data has the same number of securities that are matched to a mgrno for an institutional entity in Thomson-Reuters and has the identical shares held in 10 or more holdings, or more than 80% of the holdings, then we consider them to be a match. We additionally flag this match using the spelling distance between names of both entities in SEC filings and the Thomson-Reuters database.[4] The link table is provided on the WRDS server as WRDS_13FLink dataset. When linking the SEC data to Thomson-Reuter's mgrno, we find that many newly filing SEC 13F entities do not have a corresponding entity in Thomson-Reuter, which is one of the data quality problems in the Thomson-Reuters database. We assign new mgrnos for those entities using the negative number portion of the CIK. We then insert the linked post-June 2013 holdings data[5] sourced from SEC filings into the Thomson-Reuters ownership data prior to June 2013 using the holdings report date variable (rdate). This dataset is then used to derive

August 6, 2013, one day after the original filing was reported to the SEC (https://www.sec.gov/Archives/edgar/data/916542/000114036113030262/0001140361-13-030262-index.htm). The original filing has substantial double-counting errors that overstated Acadian's holdings in every security by a factor of 2-to-1.

[4] We are able to match 3,224 of the 3,271 mgrnos in Thomson-Reauters with holdings data in June 2013 to a valid CIK (98.6%). We also made sure to manually verify that the remaining 47 institutions are in the SEC 13F sample.

[5] Thomson-Reuters carries forward the data from one quarter to the next, causing stale holdings data to be populated for multiple quarters. One can easily detect carry-forward practices in Thomson-Reuters by comparing the vintage date, fdate, with the holdings report, rdate, in the s34type1 dataset in the Thomson-Reuters database. Carry-forward quarters occur when multiple fdate reports are sourced and "carried forward" from the same holding period (rdate). We notice that several top institutions in our sample have stale data in sporadic quarters prior to June 2013 in our sample (for example, BlackRockBlackRock Inc. in March 2010). To avoid problems arising from stale data, we download, parse, and merge the SEC's 13F-sourced data for those institutions during the quarters when their data are stale in Thomson.

consistent measures of institutional trades over time. All trades and holdings datasets are constructed based on this cleaned dataset.

IA.C1. BlackRockBlackRock Inc. Company Aggregation

In 13F filings, BlackRock discloses the holdings of its various subsidiaries in seven different CIK reporting entities or registrants, reflecting various affiliated entities and financial management arms in several geographic areas. The Thomson-Reuters database merges these seven CIKs into the following mgrno identifiers: 9385, 11386, 39539, 56790, 91430, and 12588.[6] We manually verified that all BlackRock entities, as well as the top 10 13F institutional investors, do not have stale data in the Thomson-Reuters 13F ownership database.[7] When reporting its beneficial ownership positions (13G and 13D filings[8]), BlackRock's parent company reports the ownership of all of its seven 13F entities in one report that reflects the aggregate holding at the parent institution level. In a similar fashion, we aggregate the holdings by these separate BlackRock entities to reflect the overall ownership by any affiliated BlackRock entity in our paper.

If we take the reporting quarter of December 2014 as an example, BlackRock has its seven distinct 13F registrants, i.e., separate filing entities, each of which reported separate 13F holdings for a total of more than $1,488 billion worth of U.S. assets.[9] Only the long portion of the equity

[6] We additionally verify that these entities are only merged when BlackRockBlackRock appears in the manager name.
[7] Whenever we notice that Thomson-Reuters carried forward previous-quarter holdings for a top institution, we manually downloaded and parsed the holdings from the 13F report source on SEC's EDGAR.
[8] 13G filings require entities that acquire ownership in a public company of more than 5% but less than 10% of the outstanding stock to file a report with their beneficial ownership within 45 days after the end of the calendar year in which the Exchange Act registration becomes effective. If the security holder holds more than 10%, then the holder must file within 10 business days once the threshold is met.
[9] Anderson and Brockman (2018) present recent evidence showing the lack of reliability of Form 13F filings, and they document the widespread presence of significant reporting errors, even among a select group of high-profile bank holding companies. The authors conclude that "widespread reliance on 13F filings for institutional ownership figures is unwarranted." In our attempt to investigate this claim, we focus on their Table 9, which is instrumental in showing the inaccuracy in the 13F data. The authors compare institutional holdings of Dow 30 firms based on institutions' 13F filings as of December 2014, mainly for BlackRockBlackRock and State Street, versus the underlying firms' DEF14A filings (i.e., annual proxy statements), and conclude that "any reliance on 13F-reported figures is fraught with problems." Once the ownership of various BlackRockBlackRock 13F entities are aggregated, the total ownership figures line up almost perfectly with the DEF14A schedule positions, which are typically based on 13G or 13D filings reported at the beginning of the calendar year preceding the mailing date of proxy statements to shareholders.

assets traded on U.S. exchanges are reported on 13Fs. The filings also show 38 different subadvisors reporting within the seven BlackRock entities. See Table A.2 for a complete list of BlackRock subsidiaries.

According to BlackRock 13G and 13D filings, the beneficial reporting owner in all BlackRock holdings is the parent entity of all 38 BlackRock subsidiaries reporting under the seven BlackRock 13F reporting registrants. Because of the requirements of the 13G filing, all affiliated subsidiaries with shared economic and voting interest should submit a single holdings report for each security in which they maintain beneficial ownership of 5% or more. The holdings of BlackRock in 13G filings to 13F filings can be compared only after aggregating across all seven 13F BlackRock entities. For example, Table A.3 illustrates the holdings of Coca Cola Co., Apple Inc., and other Dow 30 companies by each of the seven BlackRock registrants that have 13F filings in December 2014. Each advisor's holdings are reported on a separate record with its respective CIK, and then the total ownership of all BlackRock entities is reported along with the beneficial ownership reported at the parent company level in proxy statements (DEF 14A filings) as well as the 13G or 13D reports. As the table illustrates, the reported holdings by the BlackRock parent company are approximately equal to, if not exactly the same as, the sum of the positions in each stock reported by BlackRock-affiliated subsidiaries on their respective 13F filings. Therefore, to reconstruct the ownership at the BlackRock parent entity level, one needs to sum for each stock the ownership positions reported under all seven 13F registrants.

IA.C2. Comparing the SEC 13F Sample to Other 13F Databases

We compared the SEC 13F sample with more accurate feeds of institutional ownership, namely the Thomson-Reuters Global Ownership feed (also called the OP feed), which is a separate feed from the legacy Thomson Institutional Ownership feed (Spectrum or SP feed) provided through WRDS. We find that while the SP feed understates overall institutional ownership due to the aforementioned data quality problems, the Thomson-Reuters OP feed is more in-sync with the original 13F filings reported on the SEC website. We decide to use the SEC filings instead of the Thomson-Reuters OP for two reasons.

First, the holdings data in the Thomson-Reuters Global Ownership database (OP) is retroactively "refreshed" in every update to reflect entities and holdings information as of the date of the data refresh. Therefore, the database is not as historical as the true SEC filings. This problem is more pronounced for entities that change due to mergers and acquisitions, etc. We do not know the full extent of this bias, however, because we did not compare vintages across time.

Additionally, the Thomson-Reuters Global Ownership database (OP) makes many assumptions that are not transparent in disaggregating the holdings from the CIK registrant level to entities at the subadvisor level. For example, using the BlackRock example, the legacy Thomson-Reuters SP feed aggregates the seven BlackRock CIK filing entities, as discussed earlier, into three mgrnos. The newer Thomson-Reuters OP feed, on the other hand, disaggregates them into their subadvisor entities and makes several assumptions when splitting individual holdings between those mutually exclusive subentities. Thomson does not currently provide historical mappings between the subadvisor and the parent entities. For this reason, we believe that the original SEC 13F filings are more reliable for the purposes of our study.

Internet Appendix Table IA.C.1. BlackRock Registrants as of December 2014

According to the SEC, the following are the seven distinct BlackRock registrants with available holdings reports for the quarter ending in December 2014.

1. BlackRock Institutional Trust
    a. CIK: 0000913414
    b. Address: San Francisco, CA
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/913414/0001086364-15-002005-index.htm
    d. Other Included Managers: None
    e. AUM: $626 Billion
2. BlackRock Group LTD
    a. CIK: 0001003283
    b. Address: London, UK
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/1003283/0001086364-15-002004-index.htm
    d. Other Included Managers: 15 subadvisors included in the 13F, https://www.sec.gov/Archives/edgar/data/1003283/000108636415002004/xslForm13F_X01/primary_doc.xml (bottom of page)
    e. AUM: $187 Billion
3. BlackRock Fund Advisors
    a. CIK: 0001006249
    b. Address: San Francisco, CA
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/1006249/0001086364-15-002003-index.htm
    d. Other Included Managers: None
    e. AUM: $404.6 Billion
4. BlackRock Japan Co. Ltd
    a. CIK: 0001085635
    b. Address: Tokyo, Japan
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/1085635/0001086364-15-002006-index.htm
    d. Other Included Managers: None
    e. AUM: $26 billion

Internet Appendix Table IA.C.1. BlackRock Registrants as of December 2014 (Cont.)

5. BLACKROCK ADVISORS LLC
    a. CIK: 0001086364
    b. Address: Wilmington, DE
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/1086364/0001086364-15-002000-index.htm
    d. Other Included Managers: Just one more advisor is included, "BlackRock Capital Management, Inc."
    e. AUM: $99 billion
6. BlackRock Investment Management, LLC
    a. CIK: 0001305227
    b. Address: Princeton, NJ
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/1305227/0001086364-15-002001-index.htm
    d. Other Included Managers: None
    e. AUM: $75.5 billion
7. BlackRock Inc.
    a. CIK: 0001364742
    b. Address: New York, NY
    c. Dec 2014 Filing: https://www.sec.gov/Archives/edgar/data/1364742/0001086364-15-002009-index.htm
    d. Other Included Managers: 15 other distinct subadvisors are included in this 13F filing https://www.sec.gov/Archives/edgar/data/1364742/000108636415002009/xslForm13F_X01/primary_doc.xml (bottom of page)
    e. AUM: $70 billion

Internet Appendix Table IA.C.2: Complete List of BlackRock Subsidiaries Reporting Under the Seven 13F Registrants as of December 2014

	Blackrock Registrant (Reporting) Entity	Reporting Entity CIK	Other Included Managers		Other Blackrock Subsidiaries Reporting under Registrant	Number of Holdings	Holdings Total Value ($1000)
1	BlackRock Institutional Trust Company, N.A.	0000913414	0			3,922	$626,027,770
2	BlackRock Group LTD	0001003283	15	1	BlackRock Fund Managers Limited	12,443	$186,818,691
				2	BlackRock Investment Management (UK) Limited		
				3	BlackRock Pensions Limited		
				4	BlackRock (Netherlands) B.V.		
				5	BlackRock International Limited		
				6	BlackRock Asset Management Ireland Limited		
				7	BlackRock Advisors (UK) Limited		
				8	BlackRock Asset Management Deutschland AG		
				9	BlackRock Asset Management Pensions Limited		
				10	BlackRock (Luxembourg) S.A.		
				11	IShares (DE) I InvAG Mit Teilgesellschaftsvermogen		
				12	BlackRock Life Limited		
				13	BlackRock Fund Management Company S.A.		
				14	BlackRock Private Equity Partners AG		
				15	BlackRock Investment Management (Korea) Ltd.		
3	BlackRock Fund Advisors	0001006249	0			3,767	$404,623,550
4	BlackRock Japan Co. Ltd	0001085635	0			1,326	$26,137,286
5	Blackrock Advisors LLC	0001086364	1	1	BlackRock Capital Management, Inc.	4,328	$99,336,078
6	BlackRock Investment Management, LLC	0001305227	0			4,136	$75,499,302
7	BlackRock Inc.	0001364742	15	1	BlackRock Financial Management, Inc.	7,296	$69,935,124
				2	BlackRock Investment Management (Taiwan) Limited		
				3	BlackRock Investment Management (Australia) Limited		
				4	BlackRock (Channel Islands) Limited		
				5	BlackRock Asset Management Australia Limited		
				6	BlackRock Asset Management Canada Limited		
				7	BlackRock (Isle of Man) Limited		
				8	BlackRock Fund Managers (Isle of Man) Limited		
				9	BlackRock Investments Canada, Inc.		
				10	BlackRock Asset Management International Inc.		
				11	BlackRock Hong Kong Ltd		
				12	BlackRock (Singapore) Limited		
				13	Blackrock Realty Advisors, Inc.		
				14	BlackRock Asset Management North Asia Ltd		
				15	BlackRock Brasil Gestora de Investimentos Ltd		
		31+7=38 Total Entities				Total AUM	$1,488,377,801

Internet Appendix Table IA.C.3: Comparison of BlackRock 13F Holdings and Beneficial Ownership Reports (DEF 14A)

Many of the various BlackRock beneficial ownership filings are reported under CIK 0001364742, such as the beneficial ownership in Apple Inc. reported in the 13G/A filed on February 2, 2015: https://www.sec.gov/Archives/edgar/data/320193/0001086364-15-001457-index.htm

Selected DOW 30 Holdings by Blackrock 13F Entities					DEF 14A	13G or 13D
Blackrock 13F Entity CIK	Company Name Header	Ticker	Shares	Sum	*Total Blackrock's Beneficial Ownership*	*Total Blackrock's Beneficial Ownership*
0000913414	COCA COLA CO	KO	103,282,137			
0001003283	COCA COLA CO	KO	34,217,107			
0001006249	COCA COLA CO	KO	50,884,796			
0001085635	COCA COLA CO	KO	4,734,543			
0001086364	COCA COLA CO	KO	11,640,414			
0001305227	COCA COLA CO	KO	10,343,319			
0001364742	COCA COLA CO	KO	10,820,928	**225,923,244**	*236,175,490*	*236,175,490*
0000913414	INTERNATIONAL BUS	IBM	24,239,164			
0001003283	INTERNATIONAL BUS	IBM	7,499,285			
0001006249	INTERNATIONAL BUS	IBM	11,479,988			
0001085635	INTERNATIONAL BUS	IBM	1,139,231			
0001086364	INTERNATIONAL BUS	IBM	2,215,934			
0001305227	INTERNATIONAL BUS	IBM	2,374,827			
0001364742	INTERNATIONAL BUS	IBM	2,282,649	**51,231,078**	*53,231,078*	*53,231,078*
0000913414	CHEVRON CORP NEW	CVX	49,929,564			
0001003283	CHEVRON CORP NEW	CVX	17,900,762			
0001006249	CHEVRON CORP NEW	CVX	28,619,521			
0001085635	CHEVRON CORP NEW	CVX	2,582,909			
0001086364	CHEVRON CORP NEW	CVX	8,783,493			
0001305227	CHEVRON CORP NEW	CVX	5,602,483			
0001364742	CHEVRON CORP NEW	CVX	5,335,652	**118,754,384**	*118,754,384*	*118,754,384*
0000913414	APPLE INC	AAPL	154,653,443			
0001003283	APPLE INC	AAPL	46,032,985			
0001006249	APPLE INC	AAPL	72,534,355			
0001085635	APPLE INC	AAPL	7,475,488			
0001086364	APPLE INC	AAPL	5,287,045			
0001305227	APPLE INC	AAPL	14,712,569			
0001364742	APPLE INC	AAPL	15,236,776	**315,932,661**	*317,321,796*	*315,936,494*
0000913414	MCDONALDS CORP	MCD	26,184,328			
0001003283	MCDONALDS CORP	MCD	9,931,224			
0001006249	MCDONALDS CORP	MCD	15,688,850			
0001085635	MCDONALDS CORP	MCD	1,176,091			
0001086364	MCDONALDS CORP	MCD	7,067,676			
0001305227	MCDONALDS CORP	MCD	3,956,257			
0001364742	MCDONALDS CORP	MCD	3,168,689	**67,173,115**	*67,173,115*	*67,173,115*
0000913414	GOLDMAN SACHS	GS	11,208,242			
0001003283	GOLDMAN SACHS	GS	3,406,643			
0001006249	GOLDMAN SACHS	GS	4,790,266			
0001085635	GOLDMAN SACHS	GS	482,362			
0001086364	GOLDMAN SACHS	GS	1,937,495			
0001305227	GOLDMAN SACHS	GS	1,458,803			
0001364742	GOLDMAN SACHS	GS	1,037,903	**24,321,714**	*25,071,873*	*25,071,873*

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