Global Volatility and Firm-Level Capital Flows[*]

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Abstract

We investigate the impact of global volatility on the equity portfolio flows of institutional investors worldwide. Our findings reveal that their equity allocations decrease during periods of high volatility, while retail investors emerge as net buyers. This pattern is evident in both developed and emerging markets, is economically stronger for foreign than domestic institutions, and is dominated by discretionary flow component. Furthermore, when volatility is high, foreign investors do not reduce their holdings uniformly but instead rebalance their portfolios from small-cap to large-cap stocks, consistent with their endogenous learning about asset payoffs. This information-driven rebalancing forecasts an increase in return volatility for small-cap stocks and a decrease for large-cap stocks.

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1 Introduction

Portfolio flows are a significant determinant of stability in global financial markets. Their significance becomes particularly apparent during periods of high volatility and global market stress, when substantial capital outflows can escalate into panics, leading to a depletion of wealth, heightened stock price volatility, and reduced economic output (Allen and Gale (1998)). Empirical research has demonstrated that foreign investors tend to retrench their capital significantly during times of global stress (Forbes and Warnock (2012), Broner, Didier, Erce, and Schmukler (2013)). This line of research, however, relies on aggregate data and thus it has some limitations when it comes to identifying the economic forces driving the flow dynamics. First, it cannot connect the flow of aggregate capital to specific investor and firm characteristics, especially if the composition of assets and investors changes over time. Second, estimates that do not account for heterogeneity in the flow data tend to blend factors that are at the discretion of portfolio managers with those that depend on demand pressure from their external clients or regulatory and investor constraints. Finally, it cannot differentiate between explanations based on portfolio-wide fire sales and those based on stock-investor-specific information asymmetries. Nonetheless, effective policies targeting capital flows and financial stability require a comprehensive understanding of the forces driving international flow dynamics.

To address these limitations, we embrace novel and detailed micro-level data to understand the drivers of global portfolio flows. Our study utilizes panel data on institutional investors' stock portfolios, encompassing nearly 30,000 firms from 41 economies, spanning the 2000–2020 period. Specifically, we investigate how individual asset managers' portfolios respond to global equity market volatility,[1] which we measure as a within-quarter volatility of daily stock returns. Since our approach is highly granular, it allows us to identify discretionary factors influencing portfolio flows and evaluate competing hypotheses regarding their dynamics. We also examine the implications of these portfolio flows for financial stability, measured by stock return volatility and liquidity. Our research is among the first to leverage high-granularity data to scrutinize the determinants of global portfolio flows and their influence on financial market stability.

To establish our benchmark results, we relate percentage changes in *firm-level* equity shares to levels of global volatility. We find that institutional investors, in aggregate, tend to reduce their av-

[1] Other papers showing the importance of detailed micro-level investment data include Coppola, Maggiori, Neiman, and Schreger (2021), Maggiori, Neiman, and Schreger (2020), which study international investment positions, and Camanho, Hau, and Rey (2018) whose focus is on the interaction of exchange rates and portfolio rebalancing.

erage stock positions in times of high global volatility. A one-standard-deviation increase in global volatility is associated with a statistically significant, but economically modest, 1.9 percentage-point reduction in average stock-level institutional portfolio flow.[2] Given our firm-level evidence, we are able to absorb any variation specific to country-level controls, such as levels and volatility of exchange rates, interest rates, and volatility of local market returns, thereby shifting our focus from macro-level to firm-investor-level drivers. Further, including various time-varying firm characteristics allows us to rule out explanations related to changing firm-specific risk exposures. Finally, by employing firm-fixed effects, we absorb any variation in flows resulting from time-invariant firm unobservables, such as stable aggregate preferences for specific assets, which are less reflective of the active response of investors to volatility changes.

Theories examining the impact of market stress on portfolio flows, such as the theory of sudden stops, typically concentrate on emerging markets. In our data, we are able to contrast flows in emerging and developed countries. We find that the estimated effects are strong for firms in both types of markets even though the economic magnitude of the results is relatively smaller in developed markets. Another critical aspect in the discussion of global shocks and investor portfolio flows is the role of foreign investors. Our findings indicate that both domestic and foreign institutional investors tend to decrease their average stock investments during periods of high global market volatility, while domestic retail investors act as net buyers. The reduction is economically and statistically more pronounced for foreign investors. On average, a one-standard-deviation increase in global volatility is associated with about 2.4 percentage-point drop in average stock flows by foreign investors and a 1.8 percentage-point reduction by domestic investors. Additionally, we observe that the response of investors–both domestic and foreign–is markedly negative and comparable across firms in developed and emerging markets.

Although our firm-level evidence provides a more comprehensive understanding of flow dynamics compared to market-level analyses, it still does not consider inherent differences among investors and their potential heterogeneous selection into individual assets. Consequently, our results are consistent with a number of economic explanations, such as an increase in risk aversion of institutional investors, portfolio-level differences in investor clienteles, as well explanations based on permanent skills or style preferences of institutional investors for certain assets. Moreover, the firm-level results presume a stable investor base composition under different market conditions. However, it is possible that investors with more elastic portfolio responses are relatively more likely

[2]All portfolio flow effects are expressed as percentage points change in quantity of stock held.

to participate in the market during high-volatility periods, which could lead the firm-level results to merely reflect this composition effect. To assess the relative importance of all such channels, we turn to *investor-firm-level* data. The results from these more granular tests, while generally in line with the firm-level evidence, significantly amplify the estimated effect of global volatility on investor-firm-level outflows. Moreover, estimates centered on periods of extreme volatility, such as the Global Financial Crisis or the Covid crisis, display an even more pronounced increase in responses.

We further assess the underlying sources of variation in the data by progressively saturating our specification with firm-level and investor-level controls. In the first set of tests, in which we transition from firm-level to firm-investor-level analyses, we find that institutional flows decline by nearly 5.5 and 6 percentage points per one-standard-deviation increase in global volatility for developed and emerging markets, respectively. This effect is more than double that of firm-level tests, implying that the composition of investors captured in firm-level data is likely skewed towards those with lower sensitivity of portfolios to changing global volatility. Additionally, the investor-firm-level effect grows by almost 50% once we account for the stable selection of firms into individual portfolios using firm-investor fixed effects. In the full sample, the decrease in institutional flows amounts to nearly 8.6 percentage points per one-standard-deviation increase in global volatility. The result for emerging markets becomes especially robust and statistically significant, with the decrease in equity flows for that sample reaching almost 14 percentage points. Consequently, the selection of institutional investors to specific stocks plays an important role in driving the economic magnitude of portfolio flows–a result that could not have been anticipated from tests using aggregate data or firm-level data alone. Relatively speaking, by moving from evidence based solely on firm-level data to investor-firm-level data, we observe an increase in the economic effect of flow sensitivity by a factor of five for the developed markets sample and a factor of six for the sample of firms in emerging markets.

In the subsequent series of tests, we connect the investor-firm-time variation to stock ownership by foreign institutions vs. domestic institutions. These tests enable us to gauge the relative significance of *discretionary* determinants of flows, such as time-varying investor-level risk aversion, versus *non-discretionary* factors, such as time-varying portfolio redemptions. The latter poses a particularly significant alternative that is challenging to reject in tests that rely on aggregate data. Our findings indicate that, within the sample of all firms, foreign investors exhibit a higher tendency to reduce their equity flows compared to domestic institutions. In the specification accounting for

for time-invariant selection of investors into stocks, we observe that domestic institutions decrease their flows by approximately seven percentage points in response to a one-standard-deviation rise in global volatility. Remarkably, foreign investors reduce their equity flows by around three percentage points more for the sample of firms in developed markets and by nearly seven percentage points in emerging markets. Furthermore, the relative distinction between domestic and foreign investors almost doubles for both developed and emerging markets after considering time-varying investor-level unobservables. This result implies that factors related to time-varying investor flows or time-varying institutional constraints may generate a significant downward bias when estimating the sensitivity of investors' discretionary flows.

To evaluate the robustness of our findings while utilizing global volatility as an indicator of market stress, we employ as proxies the 2008-2009 global financial crisis and the Covid-19 shock. An added advantage of using crisis episodes is the ability to rule out a potential, though, in our view improbable, reverse causality concern where investor flows could influence *global* equity return volatility but are unlikely to drive major crises. Our findings reveal that our results are intensified with this alternative measure, reinforcing the significance of equity volatility as an indicator of market stress. It is noteworthy that the impact of crisis episodes on flows is more pronounced in the sample of firms in emerging markets, consistent with the prevalent macro view of global stress affecting emerging economies more substantially (Calvo, Leiderman, and Reinhart (1996), Rothenberg and Warnock (2011)). To buttress our identification, we also show the robustness of our results to employing an instrumented global volatility measure based on the Granular Instrumental Variable (GIV) approach of Gabaix and Koijen (2023). The instrumented global volatility has a statistically significant effect on institutional flows, with a larger impact on foreign flows compared to domestic flows–consistent with our baseline results. Overall, our portfolio evidence, derived from granular data at both firm and investor levels, strongly supports explanations based on market-wide redemptions in equity holdings by both domestic and foreign institutions during periods of elevated global volatility. Crucially, our evidence implies that findings from previous research relying on more aggregated data may considerably underestimate the effect of global volatility on *individual* portfolio flows.

In order to sharpen the focus of our empirical analysis and shed light on the potential economic mechanism underpinning our results, we build a model of portfolio choice with time-varying aggregate shocks. Specifically, our model features investor and firm-level heterogeneity, which are the primary characteristics of our data, and, additionally, incorporates a natural aspect of investing in financial markets under imperfect information by allowing investors to optimize their learning about asset payoffs.[3] Thanks to this rich heterogeneity, our model can be used to differentiate between explanations driven by risk aversion shocks implying market-wide outflows, relative to those premised on differential learning about individual assets. In the model, we consider three investor types: domestic retail, domestic institutional, and foreign institutional. These investors differ in size and their ability to process information about asset payoffs. Building on past empirical evidence (Bena, Ferreira, Matos, and Pires (2017), Kacperczyk, Sundaresan, and Wang (2021)), we posit and empirically verify that foreign institutional investors are more informed than their domestic counterparts, who are in turn more informed than retail investors. These investors make learning and trading decisions about a set of risky assets that are heterogeneous in terms of their size and payoff volatility.[4] We model the global volatility shock as a shock to the aggregate volatility of payoffs. We demonstrate that in response, foreign investors tend to rebalance their portfolios away from small stocks towards large stocks, relative to domestic investors. Additionally, we show that this cross-sectional pattern critically depends on the endogenous responses of learning to the shock and does not persist in an exogenous learning environment. Intuitively, large stocks offer larger unconditional excess returns, all else being equal, which in the model translates to more substantial learning gains. This effect is further amplified in states of higher global volatility or increased risk aversion, meaning that investors prefer large stocks on average but even more so following the shock. Since foreign investors are more sophisticated, their learning has a comparatively more significant effect on their holdings than the learning of domestic investors. The model exhibits a similar mechanism for high versus low-volatility stocks, with investors rebalancing towards high-volatility stocks. However, the size effect dominates quantitatively. In the cross-section, we demonstrate that the model predicts a robust positive relationship between institutional ownership and stock turnover.

Motivated by the theoretical results, we proceed to study the responses to global volatility shocks in the cross-section of assets. Our findings reveal that during periods of high global volatility, foreign investors tend to withdraw their capital from small-cap stocks significantly more than from

[3]Our model is based on the framework of Kacperczyk, Nosal, and Stevens (2019), but is closely related to a number of contributions that use a noisy rational expectations framework to study the impact of investor heterogeneity, such as Van Nieuwerburgh and Veldkamp (2009), Van Nieuwerburgh and Veldkamp (2010) or Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016).

[4]Our assumptions contrast with other theoretical models of flows, such as Albuquerque, Bauer, and Schneider (2009), Albuquerque, Bauer, and Schneider (2007) or Brennan and Cao (1997), who propose a dynamic model of trading and learning with exogenous information, multiple countries and a single asset per country, or Kodres and Pritsker (2002), who focus on the effects of cross-country correlations in returns. Within the context of our analysis, our model with multiple assets provides a better map to the data.

large-cap stocks. This effect holds while controlling for a range of firm characteristics, as well as firm and investor-fixed effects. We also observe that this effect is more pronounced in a sample of firms from developed markets compared to those from emerging markets. Nonetheless, this stark flow asymmetry across assets is evident for both country types when we associate holdings with periods of extreme volatility, such as the Global Financial Crisis and Covid. Furthermore, we find that in response to global stress, investors rebalance towards high-volatility assets, even after controlling for size and other factors. These predictions are consistent with the proposed theoretical mechanism and do not support explanations that solely rely on indiscriminate liquidation of stocks driven by home bias or differences in risk aversion, as these explanations would not imply variations in retrenchment across assets. In general, our findings uncover an alternative, information-driven flight-to-quality effect, different than a typical documented for aggregate assets.

We present further robustness checks for our findings. First, when we limit our sample to non-U.S. investors, our results remain consistent. Second, we demonstrate that most of our results do not differ qualitatively across investor groups of varying size. However, the magnitude and significance of estimates vary somewhat across these groups; the response of foreign ownership to global volatility increases as investor size decreases. The rebalancing effect towards large stocks is present for all groups but is less significant for the smallest investors, while the rebalancing towards volatility is strongest for medium-sized investors. Additionally, our results maintain their overall magnitudes and significance levels when excluding firms or investors in tax havens. Our findings remain qualitatively similar when using an absolute change in ownership as the outcome variable. Finally, different clustering methods preserve the significance of most estimates, except for the coefficient of the interaction term between $Gvol$, FOR, and Vol, which becomes insignificant under alternative clustering assumptions.

In the final section of the paper, we explore the implications of the flow dynamics on financial stability, which we assess using firm-level stock return volatility and stock turnover. Our findings indicate that *outflows* from both domestic and foreign institutional investors are linked to subsequent increases in firm volatility and decreases in firm turnover, implying that institutional flows contribute to market stabilization. While the effect on volatility is observed in both developed and emerging markets, the impact on turnover primarily manifests in developed markets. Considering that foreign investors, on average, withdraw less from large stocks during times of stress, these results suggest that such firms may indeed benefit from the presence of foreign investors.

Related Literature Our paper contributes to a body of empirical literature relating international capital flows to aggregate shocks. Broner, Didier, Erce, and Schmukler (2013) use data on flows by foreign and domestic agents, disaggregated into broad direct, portfolio, and other categories. They show that foreign flows of all types are pro-cyclical and they go down in periods of crises. Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018) study debt flows by sector (public, bank, corporate) in response to global shocks, finding large responses of international bank flows to the shock. Forbes and Warnock (2012) find that global risk is strongly associated with extreme international capital flows events, and that domestic macroeconomic factors play a lesser role. Fratzscher (2012) studies capital flows during the global financial crisis at the fund level, finding significant relocation across countries. Chari, Stedman, and Lundblad (2022) study the effects of global shocks on the tails of the distribution of country-level flows to emerging markets.

Within the flow literature, some studies focus on the distinction between discretionary and outside flows. Shek, Shim, and Shin (2018) show that discretionary sales by bond fund managers are a significant part of total sales, in addition to sales driven by redemptions. Raddatz and Schmukler (2012) also document that a part of the cross-country relocation in response to aggregate shocks is due to fund managers' decisions. In our analysis, we are able to capture the discretionary response of managers' equity allocations to shocks by controlling for the time-varying fund effects. To our knowledge, we are the first to study responses of international portfolio flows at the firm-investor level. The granularity of our data allows us to capture the average behavior of domestic and foreign investors, as well as the stock-specific responses of each of the investor types. We show that in the disaggregated data, the estimated sensitivities to global shocks increase by almost an order of magnitude. Crucially, the new cross-sectional dimension allows us to generate additional testable predictions to distinguish between different economic mechanisms of flows dynamics.

The literature utilizing cross-sectional variation in the flow data is fairly sparse. Two notable exceptions include Hau and Lai (2017) and Coppola, Maggiori, Neiman, and Schreger (2021). Hau and Lai (2017) study the aggregate behavior of distressed global funds during the global financial crisis. They find a shift in such funds' portfolio positions towards more liquid stocks. Their study is based on the data aggregated at the firm level and thus they abstract from cross-investor variation, which is the central aspect of our design. Notably, even though our cross-sectional result is implied by a different framework based on information rents, our empirical findings are consistent with theirs to the extent that large stocks are more liquid. Moreover, even within our theoretical model, large stocks that are more learned about would generate higher turnover. In this regard, the information friction may be a micro-foundation of differences in liquidity. In another study, Coppola, Maggiori, Neiman, and Schreger (2021) show a significant scope of financing of global firms through foreign subsidiaries. Our analysis is independent of such activity, as our focus is on the impact of global shocks on local equity markets and its implications for local market stability.

Our paper also relates to a vast theoretical literature on international portfolio investment flows. Coeurdacier and Rey (2013) give a comprehensive discussion of determinants of home bias in portfolios in a variety of theoretical setups, including ones based on information frictions, first explored in Van Nieuwerburgh and Veldkamp (2009). Albuquerque, Bauer, and Schneider (2009), Albuquerque, Bauer, and Schneider (2007), Brennan and Cao (1997) consider models with exogenous signals in which investors are heterogeneous with respect to the quality of their signals. Albuquerque, Bauer, and Schneider (2009) feature foreign investors that have superior information about global shocks and show such model can generate a positive flow-return relationship for U.S. investors. Caballero and Simsek (2020) consider the implication of foreign investor fickleness and retrenchment in response to local liquidity shocks. Relative to these contributions, which model country-specific assets as a single index, we use a multi-asset environment to be able to map the predictions of our model into cross-sectional predictions in our data. We also explicitly solve for the endogenous allocation of information across assets. We show that endogenous information choice allows us to account for the cross-sectional response of foreign versus domestic investors to global shocks.

From a different perspective, our paper connects to the growing literature on demand systems of asset managers and the price elasticity of their portfolio choices. An influential paper by Gabaix and Koijen (2021) shows that institutional flows in equity markets exhibit low price elasticity. They argue that institutional constraints may be the driving force.[5] Our results are consistent with these findings, but our main focus is on measuring the response of discretionary flows across investor types and assets, rather than on estimating elasticities of aggregate flows. The distinct advantage of our study is that we can directly quantify the importance of institutional constraints for investor-level flows by exploiting the investor-time variation in our data. We find that controlling for investor-time fixed effects, the estimated response of flows increases by an order of magnitude, thus confirming the importance of fund-level constraints for price elasticities.

Our paper also relates to studies of macroeconomic uncertainty. Notable recent examples of

[5] For a model with institutional constraints and additional discussion of demand system estimation strategies, see also Koijen and Yogo (2019).

papers pointing out the importance of financial market uncertainty and realized volatility in financial markets for macroeconomic outcomes in the U.S. include Berger, Dew-Becker, and Giglio (2020) and Ludvigson, Ma, and Ng (2021). Since our outcome of interest are global portfolio flows, our shock is global realized equity portfolio volatility. However, our measure of global volatility is highly correlated with country-level volatilities, index of option-implied volatility VIX, and the measure of financial uncertainty derived by Ludvigson, Ma, and Ng (2021).[6]

Finally, we provide evidence on the relationship between institutional flows and firm-level volatility and liquidity, thus contributing to the broader literature studying the interaction of institutional ownership and asset returns, such as Gompers and Metrick (2001), Campbell, Lettau, Malkiel, and Xu (2001), Schwert (1989), or theoretically Gabaix et al. (2006).

The rest of the paper is organized as follows. In Section 2, we describe the data. Section 3 presents the results related to capital flows and global volatility using different dimensions of data aggregation. In Section 4, we propose a model of the economic mechanism behind the findings, and then test the model's unique predictions vis-à-vis the data. In Section 5, we present empirical results on the link between institutional flows and financial stability. Section 6 concludes.

2 Data

Our primary dataset is a panel derived from the integration of multiple databases. Firstly, we obtain global institutional holdings data from FactSet,[7] and firm-level international stock market and accounting data from Thomson/Refinitiv Datastream. FactSet provides holdings information for a diverse array of institutions, including mutual funds, hedge funds, bank trusts, pension funds, insurance companies, and sovereign wealth funds. Our data, updated quarterly, covers the period between 2000 and 2020. We retain firms with a minimum of three years of complete data and markets with at least 10 firms per quarter. Our focus is on ordinary shares, thereby excluding preferred shares, American Depositary Receipts (ADR), and Global Depositary Receipts (GDR) from our sample. In cases of dual listings, only primary listings are retained. The final dataset comprises 30,230 distinct firms and 13,145 portfolios across 41 different economies. In Appendix B, we present the distribution of our sample coverage relative to the IMF Coordinated Portfolio

[6]In Appendix A, we report correlations between our measure of global volatility, individual countries' volatilities, as well as measures used in Ludvigson, Ma, and Ng (2021), Baker, Bloom, and Davis (2016), the world uncertainty index of Ahir, Bloom, and Furceri (2022), and global policy uncertainty index of Davis (2016).

[7]FactSet has been employed for analyses of institutional investors in studies such as Ferreira and Matos (2008), Kacperczyk, Sundaresan, and Wang (2021), Koijen and Yogo (2022).

Investment Survey (CPIS) data for individual countries in the year 2020. On average, our sample covers a significant portion of equity in the IMF, approximately 60%. However, some countries are more represented than others. It is important to note that the IMF data encompasses all types of equity, whereas we concentrate on primary listings of ordinary shares, so some deviation is expected.

Institutional ownership is assessed at both the firm and investor-firm levels. At the investor-firm level, institutional ownership, denoted as $IO_{i,j,t}$, represents the proportion of firm i's shares held by institution j at time t. An indicator variable, D_FOR, is assigned a value of one when an institution and a firm in its portfolio are based in different economies; otherwise, it is set to zero. At the firm level, foreign institutional ownership ($FOR_{i,t}$) signifies the proportion of firm i's shares held at time t by institutions located in a different economy than where the stock is listed. If a stock is not owned by any foreign institution but is held by at least one domestic institution, $FOR_{i,t}$ is set to zero. Conversely, domestic institutional ownership ($DOM_{i,t}$) indicates the fraction of firm i's shares held at time t by all institutions based in the same economy where the stock is listed, in relation to the firm's total outstanding shares. If a stock is not owned by any domestic institution but is held by at least one foreign institution, $DOM_{i,t}$ is set to zero. Firm-level total institutional ownership ($IO_{i,t}$) is obtained by summing $DOM_{i,t}$ and $FOR_{i,t}$. In our empirical analyses, equity flows are defined as the log change in institutional ownership, represented by $\Delta Log(IO)$. To mitigate the impact of outliers, we winsorize all variables at the 1% level.

Firm-level control variables encompass the natural logarithm of firm size ($Logsize$); quarterly stock return (Ret) and its volatility (Vol), calculated using daily returns within a quarter; book-to-market ratio (BM); $Leverage$, which is the book debt divided by total assets; $Turnover$, determined as the trading volume divided by the total outstanding shares; and Profitability ($PRratio$), defined as the ratio of gross profits to total assets. In addition to firm characteristics, we employ institution-level control variables. Institutional assets under management ($Log(InsAUM)$) represent the sum of values of all stock holdings at the most recent quarter end. Institution return ($InsRet$) is gauged as the value-weighted portfolio return of stocks held at the most recent quarter end. All firm and institution-level control variables are demeaned in the regression analysis. To mitigate the impact of outliers, we winsorize all variables at the 1% level.

We source macro-level variables from Thomson/Refinitiv Datastream. Our primary independent variable is global stock market volatility ($Gvol$), which is based on the return of the MSCI ACWI index. This index is among the most popular and comprehensive global indices. $Gvol$ measures the end-of-quarter daily volatility of realized returns, an indicator that has been shown to influence macroeconomic activity in the US context.[8] Local stock market volatility ($Lvol$) is determined by the volatility based on daily returns of country-specific stock market indices. ΔIR represents the quarterly change in the three-month interest rate. Foreign exchange rate return ($FXret$) corresponds to the quarterly change in the exchange rate relative to the US dollar. Foreign exchange rate volatility ($FXvol$) is calculated using the volatility based on daily exchange rate fluctuations. For US firms, both $FXret$ and $FXvol$ are set to zero.

We present summary statistics in Tables C.1, C.2, and C.3 in Appendix C. On average, firms in developed markets exhibit higher institutional ownership than those in emerging markets. US firms have the highest ownership at 60.84%, with 55.34% attributable to domestic institutional investors and 5.5% to foreign institutional investors. Firms in emerging markets display a higher average foreign institutional ownership (5.07%) compared to domestic ownership (2.44%). At the firm-institution level, the average value of the indicator variable D_FOR is 0.462, indicating that 46.2% of stocks have some foreign institutional ownership. Lastly, among approximately 13,145 institutions, investment advisors represent the most dominant institutional type, followed by hedge funds. Banks hold the largest average number of stocks, trailed by endowments and pension funds.

3 Empirical Results

In this section, we present our empirical results on the relationship between institutional ownership and global volatility. We first show the effect of global volatility on institutional flows aggregated at the firm level. Next, we zoom in on investor-level effects, overall and separately in developed and emerging markets. Then, we present evidence on the relative importance of foreign vs. domestic investors. Finally, as a robustness, we show the corresponding set of results during periods of crisis, such as the Global Financial Crisis and the Covid-19 episode.

3.1 Institutional Investors

In our first test, we estimate the impact of global volatility on firm-level institutional flows using quarterly data:

[8] See Berger, Dew-Becker, and Giglio (2020) and references therein. Our measure correlates with country-level indices in our dataset, which we control for, and hence is not a strictly US-centric measure. In Appendix A, we report correlations of $Gvol$ with local market volatilities ($Lvol$), as well as other measures of volatility and economic uncertainty used in the literature.

$$\Delta LogIO_{i,t} = a_0 + a_1 Gvol_t + a_2 \text{Firm Controls}_{i,t-1} + a_3 \text{Country Controls}_{i,t} + \mu_i + \epsilon_{i,t} \quad (1)$$

where $\Delta logIO_{i,t}$ is a quarterly change in natural logarithm of institutional ownership of firm i between quarter $t-1$ and t. $Firm\ Controls$ is a vector of firm controls including $Logsize$, $Volatility$, $Turnover$, $Leverage$, $Book\ to\ Market\ ratio$, and $Prratio$, all measured with one quarter lag. Using these controls allows us to rule out explanations based on time-varying firm-specific risk exposures. $Country\ Controls$ is a vector of economy-level controls, including $Lvol$, ΔIR, $FXret$, and $FXvol$. Many of these controls have been used in prior studies as important determinants of global portfolio flows. We also account for time-invariant firm-level heterogeneity using firm-fixed effects, which addresses the possibility that fund flows could simply reflect stable preferences for particular assets. Given that individual firms in our sample do not change their primary location, including firm-fixed effects also absorbs economy level time-invariant heterogeneity. We double cluster standard errors at economy and year/quarter level. Our coefficient of interest is a_1. We present the results in Table 2.

In column 1, we consider all firms in our sample. The results indicate a statistically strong negative relationship between $Gvol$ and institutional ownership as the coefficient is significant at the 1% level. A one-standard-deviation increase in $Gvol$ is associated with a 1.9 percentage points drop in institutional flows. We further report the results within subsamples of firms in developed (in column 2) and emerging economies (in column 3). We find a statistically significant and negative effect in both markets. In terms of economic magnitudes, the results are significantly stronger in a sample of firms in emerging markets with the respective effects equal to 1.8 and 2.4 percentage-point drops. Overall, the results suggest that institutional investors reduce their equity positions in times of high global volatility even though the economic value of the effect is relatively modest.[9]

One concern with interpreting these firm-level regressions is that they mask the underlying investor-level heterogeneity. In particular, some investors may reduce their stock holdings because they are generally more risk averse or they face different regulatory constraints. In turn, other

[9] Alternatively, in this and subsequent tests, we also employ the change of ownership ($IO_t - IO_{t-1}$) as a dependent variable. The results are qualitatively similar and reported in Appendix C. It is worth noting that in investor-firm specifications, some observations with new entry share holdings and liquidated share holdings contain holdings that are zero in either the current or previous period. For these observations, the zero values would be omitted when computing the log change or percentage change. To avoid this, we replace these zero values with 1 (i.e., holding one share) to preserve these observations in the data. This enables us to compare the coefficient estimates from firm-level and investor-firm level regressions.

investors may increase their holdings in response to the shocks. In addition, investors may differ in their preferences for holding different stocks. If the composition of investors changes with global stress, our firm-level results capture the combined investor-specific and composition effects, not uncovering the underlying investor elasticities. The granularity of our data allows us to unpack many of these confounding effects since we observe changes in firm-level equity positions separately for each institutional investor. To this end, we estimate the following regression model using investor-firm-level data:

$$\Delta LogIO_{i,j,t} = b_0 + b_1 Gvol_t + b_2 \text{Firm Controls}_{i,t-1} + b_3 \text{Country Controls}_{i,t} + \\ + b_4 \log(\mathrm{InsAUM_{j,t-1}}) + b_5 InsRet_{j,t-1} + \mu_i + \mu_j + \epsilon_{i,j,t} \quad (2)$$

The controls of the model mimic those of the firm-level regression, with the exception that the current model also includes institutional investors' assets under management ($log(InsAUM)$) and portfolio returns ($InsRet$). Also, in some specifications, we include investor and investor*firm-fixed effects. The coefficient of interest is b_1. Table 3 shows the results for the unconditional sample and the samples based on firms from developed and emerging markets.

In columns 1, 4, and 7, we report the results for the specification with firm-fixed effects. We find that the effect of global volatility increases in magnitude across all sets of firms. For the unconditional sample (column 1), the increase is roughly equal to a 5.5 point decrease in stock flows as a function of one-standard-deviation increase in global volatility. This result suggests that investors with a smaller sensitivity to global shocks are more likely to participate in the market during periods of high volatility. Relative to the results based on firm-level data, the effect is about three times larger for the sample of firms in both developed and emerging markets.

In columns 2, 5, and 8, we further include investor-fixed effects, which allows us to control for time-invariant investor characteristics. Across all specifications, we find a slightly different coefficient relative to the specifications with only firm-fixed effects. These results suggest that time-invariant investor characteristics, such as managerial skill or background, or permanent institutional constraints, are not significant predictors of the volatility effect.

Finally, in columns 3, 6, and 9, we report the results for the regressions that additionally include firm*investor-fixed effects. Including these fixed effects accounts for a possible selection of institutions into specific stocks that could vary with the global volatility shocks. As an example, margin constraints faced by individual investors typically differ for various stocks. Similarly, asset managers may exhibit heterogenous firm-specific preferences towards stocks, due to home bias or informational advantage. When we include the additional fixed effects, we find that the coefficient of *Gvol* increases 50% for the sample of all firms and firms in developed markets, and it doubles for the sample of firms in emerging markets. In terms of economic magnitudes, institutional investors tend to reduce their stock flows in both samples by about 8 percentage points per one-standard-deviation increase in global volatility. The effect becomes even stronger for the sample of firms in emerging markets, where the corresponding reduction in ownership equals about 13.5 percentage points. The results emphasize the importance of firm-investor variation for the economic mechanism of institutional flows. More broadly, they indicate that any evidence based on aggregate data may be subject to significant biases if one aims to pin down the precise sensitivity of individual investors to global volatility shocks. Summarizing, in our sample, the effects estimated at the firm level are significantly biased downwards due to heterogeneity, with significant selection of investors into specific stocks.

3.2 The Role of Foreign Investors

In this section, we further explore the underlying heterogeneity in investor base by focusing on foreign investors. Foreign investors play an important role in the discussion of portfolio flows because they tend to be more sensitive to global shocks and the discussion of macroeconomic importance of portfolio flows has focused a lot on the role such investors play in the markets, specifically in the context of sudden stops and investor retrenchment.

We begin our analysis by repeating our firm-level analysis in model (1), separately for foreign and domestic institutional investors. Notably, in this analysis, the omitted investor category are retail investors. Specifically, we estimate the following two regression models:

$$\Delta Log(DOM)_{i,t} = c_0 + c_1 Gvol_t + c_2 \text{Firm Controls}_{i,t-1} + c_3 \text{Country Controls}_{i,t} + \mu_i + \epsilon_{i,t} \tag{3}$$

$$\Delta Log(FOR)_{i,t} = d_0 + d_1 Gvol_t + d_2 \text{Firm Controls}_{i,t-1} + d_3 \text{Country Controls}_{i,t} + \mu_i + \epsilon_{i,t} \tag{4}$$

We present the results in Table 4. Columns 1-2 focus on the sample of all firms, columns 3-4 on the sample of firms in developed markets, and columns 5-6 on the sample of firms in emerging markets. In each subgroup, we first show the results for domestic investors and next for foreign investors. Our results indicate that both types of investors tend to retrench from holding stocks in their portfolios in times of high-volatility episodes. The economic magnitude of the effect is 1.4 percentage-point reduction in portfolio flows for domestic investors and 2.1 percentage-point reduction for foreign investors. Foreign investors reduce their flows by more in emerging markets. The respective effects for firms in emerging markets are 0.4 percentage points and 2.8 percentage points reduction for domestic and foreign investors, respectively. Interestingly, by market clearing, retail investors must be the buyers of the stocks during high-volatility episodes.

As we argued before, the above results show the average effect at the firm level. However, they abstract from significant heterogeneity among investors, which, as we have showed for overall flows, could generate a bias in the estimated effect of the pure volatility shock. We thus exploit again the investor-firm-level variation in our data, allowing for different responses of domestic and foreign institutions. Specifically, we estimate the following regression model:

$$\Delta LogIO_{i,j,t} = e_0 + e_1 Gvol_t + e_2 D\_FOR_{i,j} + e_3 D\_FOR_{i,j} * Gvol_t + e_4 \text{Firm Controls}_{\mathrm{i,t-1}} + \\ + e_5 \text{Country Controls}_{\mathrm{i,t}} + e_6 \log(\text{InsAUM}_{\mathrm{j,t-1}}) + e_7 InsRet_{j,t-1} + \mu_i + \mu_j + \epsilon_{i,j,t} \quad (5)$$

where $D\_FOR_{i,j}$ is an indicator variable equal to one if an investor j in firm i is located in a country that is different than the primary location of the firm, and zero if it is located in the same country. Our main coefficients of interest in the regression are e_1 and e_3, which measure the effect of volatility on domestic investors and incrementally on the foreign investors, respectively.

We present the estimated coefficients in Table 5. We first consider a sample of all firms, in columns 1-4. In column 1, we present the results from the baseline model, with firm-fixed effects. In this specification, the coefficient of e_1 is negative and statistically significant, confirming our earlier result that domestic institutions tend to reduce their average exposure to equity holdings in periods of higher global volatility. This effect implies a 5.5 percentage-point drop for a one-standard-deviation increase in global volatility. In column 2, we further account for the possibility that the average effect could be driven by a differential selection of institutions into different stocks by using firm*investor-fixed effects. This fixed effect simultaneously allows us to control for time-invariant institutional differences, such as the institutional mandate or permanent skill of the manager. Absorbing this variation increases the economic significance of our results. The effect of domestic institutions increases by almost 50% in absolute terms, and is highly statistically significant. The incremental contribution of foreign investors to the decrease in flow also gets larger but the effect is statistically insignificant.

Considering that the interaction effect between $Gvol$ and D_FOR is distinctly identified at the firm, investor, and time level, we can enhance our regression model by incorporating firm*time-fixed effects. This enables us to account for any time-series variation in our effects, on average, as well as absorb any variations among stocks that could impact their attractiveness, such as their differential exposure to business cycles or varying popularity among investors. By incorporating time-fixed effects, we effectively absorb the average effect of volatility, allowing us to interpret only the coefficient of the interaction term, e_3. We present the results from estimating the model in column 3. Compared to column 2, the coefficient decreases but remains statistically insignificant. This suggests that time-fixed effects and their interaction with firm-fixed effects do not play a significant role in explaining the investment decisions of foreign investors compared to domestic ones.

We further consider an even more saturated model that additionally includes investor*time-fixed effects, which allows us to account for any time-varying effects at the institutional level, such as differences and fluctuation in managerial risk aversion or in institutional flows. This specification additionally helps us identify more precisely the drivers of the economic mechanism, specifically to control for the effect of average risk aversion, which is a common proposed explanation behind global portfolio flows. We present the results in column 4. The effect on e_3 is quite striking. Now, the coefficient becomes not only economically large but also statistically significant. On average, a one-standard-deviation increase in $Gvol$ is associated with an additional 8.2 percentage-point reduction in foreign flows relative to the base case of domestic institutional flows. This result indicates that any tests of the behavior of foreign flows that ignore time-varying institution-level variation in the data likely understate the true effect of such flows to global volatility shocks.

Building on the results from the unconditional sample, we further revisit the results in the subsamples of firms from developed markets (columns 5-8) and emerging markets (columns 9-12). The results for developed markets largely mirror those obtained for the full sample. We find that both domestic and foreign investors reduce their equity flows in times of high global volatility. The retrenchment effect is economically larger for foreign investors. The magnitudes of the effect increases, in absolute terms, when we absorb in our regressions the institution-specific time-varying effects. Quantitatively, the results change when we consider the sample of firms in emerging markets. We observe an economically large incremental retrenchment by foreign investors. These results are statistically and economically strong for specifications in columns 10-11. The effect is economically larger but statistically less precise when absorbing time-varying institutional components. Thus, it seems that controlling for fund flows or differences among managers is crucial for our economic mechanism in both developed markets and emerging markets.

3.3 Additional Results and Robustness

In Appendix C, we provide additional robustness checks for our empirical findings.

First, we recognize that the regression models we have used so far assume that the relationship between global volatility and investor equity flows is linear. However, the relationship could feature significant nonlinearities. As an example, the literature on international portfolio flows often zooms in on extreme events, which can be interpreted as episodes of extreme volatility. Following this insight, we also evaluate the economic significance of our results conditioning on extreme realizations of global shocks. Specifically, we define an indicator variable GFC that is equal to one for quarters from 2008Q3 to 2009Q2, and $COVID$ that is equal to one for 2020Q1. These are periods of extreme market turbulence. For all the other periods, GFC or $COVID$ is equal to zero.

Specifically, in Table C.11, we present the results of the model in which we use the GFC and $COVID$ indicator variables as measures of global volatility instead of $Gvol$. In column 1, we show the average effect for all institutional investors. We find a strong negative results on equity flows. In periods of high volatility, average equity flows of institutional investors drop by about 13.8 percentage points (=1-$e^{-0.148}$) for GFC period and 59 percentage points (=1-$e^{-0.896}$) for $COVID$ period. In column 2, we further show the differential effect between domestic and foreign investors. We find that foreign investors amplify this effect. In column 3, we additionally absorb firm*time and investor*time variation. In this saturated model, the additional effect of foreign ownership relative to the domestic ownership is a reduction in equity exposure by 63 percentage points more for $COVID$ period. The effect is economically significant for both variables, but remains strongly statistically significant for the COVID variable only. In the next columns (columns 4-9), we present the effect for the subsamples of firms in developed and emerging markets. Like before, we find a strong negative effect of foreign ownership for firms in both markets, with the effect in emerging economies much stronger and statistically significant in the most saturated model. This result is consistent with the economic narrative of sudden stops, which typically refers to severe flows in emerging markets.

Next, in Table C.4, we examine our results after excluding U.S investors from the data, finding outcomes similar to those when considering all investors. In turn, in Table C.5, we explore the role of investor size by dividing investors into terciles based on their assets under management in a given quarter's distribution. Generally, our findings are not qualitatively different across the three investor groups, with the main estimates consistently displaying the same sign. However, the magnitude and significance of the estimates vary somewhat across the groups, with foreign ownership's response to global volatility increasing as investor size decreases. The rebalancing effect towards large stocks persists for all groups, but is less significant for the smallest investors. The rebalancing towards volatility appears strongest for the medium-sized investors. Table C.6 presents results estimated using data that excludes firms (Panel A) or investors (Panel B) domiciled in tax havens. The overall magnitudes and significance levels closely resemble the results in the overall sample, indicating that tax haven domicile or listings do not impact our findings. In Table C.7, we present results using a change in ownership ($IO_t - IO_{t-1}$) as the outcome variable, which remain qualitatively similar for this alternative measure. In Table C.8, we show results for an instrumented global volatility measure, utilizing the Granular Instrumental Variable approach of Gabaix and Koijen (2023). The instrumented global volatility has a statistically significant effect on institutional flows, with a larger impact on foreign flows compared to domestic flows–results consistent with the baseline findings. Finally, we explore the effect of different clustering on the significance of our estimates in Table C.9. Different clustering assumptions preserve the significance of most estimates, with the sole exception being the coefficient of the interaction term between $Gvol$, FOR, and Vol, which becomes insignificant under these alternative clustering assumptions.

4 The Economic Mechanism

In this section, we introduce a model that helps us rationalize the observed responses of investors' portfolio flows to shifts in aggregate volatility as well as motivate additional empirical tests. The model solves for general equilibrium portfolio choice with endogenous information acquisition. While, in principle, one could think of alternative economic mechanisms, our modeling framework lends itself naturally to capture two features of the institutional ownership data and thus can be more closely squared against our empirical tests. First, assets held in institutional portfolios display significant heterogeneity in terms of their supply (size) and volatility of payoffs. Second, institutional investors differ in terms of their portfolio size and information processing capacity. The first feature is obvious, while the second one can be supported by extant research and data, as we discuss below.

Motivating information asymmetry The core friction in our model lies in the asymmetric information among different types of investors. Specifically, we argue that foreign institutional investors are, on average, more informed than domestic institutional investors, who in turn possess more information than domestic retail investors. We validate this assumption on two grounds: by referring to related literature and by our own empirical documentation of the relationship between institutional type and their performance.

Extant empirical literature shows that investors display preference for holding domestic assets, a so-called "equity home bias". At the same time, conceptual arguments on the relative trading abilities of foreign and domestic investors are mixed. On one hand, some papers, such as Stiglitz (2000), argue that informational asymmetries prevent foreign capital from being profitably invested, while others, such as van Nieuwerburgh and Veldkamp (2009), suggest that informed investors should exhibit home bias in information acquisition decisions. On the other hand, certain domestic assets can attract attention of informed foreign investors. These investors are likely to base their entry to domestic markets on their ability to trade profitably off of their information (Kacperczyk, Sundaresan, and Wang (2021)). Because of the frictions associated with foreign entry, their information must be able to compensate them for the cost of entry, similar to the intuition of the trade model of Melitz (2003).

Early empirical evidence on the relative performance of domestic and foreign investors has largely come from individual markets and has been mixed. Some papers find that local investors outperform foreigners, on average (Shukla and van Inwegen Gregory (1995) in the United States; Hau (2001) in Germany; Choe, Kho, and Stulz (2005) in Korea; and Dvorak (2005) in Indonesia), while others find that foreign investors who participate in a market are better informed than local investors (Grinblatt and Keloharju (2000) in Finland; and Bailey, Mao, and Sirodom (2007) in Singapore and Thailand). With a growing globalization and reduction of trading barriers, most recent studies document abnormal return performance of foreign investors. Onishchenko and Ulku (2019) show that foreigners in Korea trade at more favorable prices compared with domestic institutions. Using daily flow data in Indian equity market, Acharya, Anshuman, and Kumar (2019) find that stocks experiencing abnormally high foreign fund flows observe a permanent price increase (an "information" effect), and stocks experiencing abnormally low (negative) foreign fund flows suffer from a partly transient price decline (i.e., both an "information" effect as well as a "price pressure" effect). Acharya, Anshuman, and Kumar (2022) further show that, while foreign outflows contribute to transient volatility for stocks experiencing outflows, trading by foreign investors also generates new information. Using daily trading data, Lundblad, Shi, Zhang, and Zhang (2022) find that the order flow from foreign investors presents strong predictive power for future stock returns in the Chinese market and such investors display the ability to process local firm-level public news.

While most of the research to date compares investor performance in a single market, some studies also use a large sample of fund managers in multiple markets. Froot, Connell, and Seasholes (2001) find that international inflows have positive forecasting power for future equity returns in emerging markets. Froot and Ramadorai (2008) suggest that the positive relationship between international portfolio flows and closed-end fund performance is linked to fundamentals. Bae, Ozoguz, Tan, and Wirjanto (2012) find that stocks with a high degree of foreign investability are associated with a reduced-price delay to global market information, indicating that foreign investors have an advantage in processing global market news. He, Li, Shen, and Zhang (2013) find a positive relation between foreign block shareholdings and stock price informativeness. Fang, Maffett, and Zhang (2015) show that foreign analysts' coverage increases, and foreign analyst forecast dispersion and error decrease after increases in foreign institutional ownership. Ferreira, Matos, Pereira, and Pires (2017) find that both domestic and foreign institutional investors have significant forecasting power for one-quarter-ahead stock returns, and conclude that the predictability off foreign flow is more likely consistent with price pressure effect. Finally, Doring, Drobetz, El Ghoul, Guedhami, and Schroder (2020) find a positive relation between institutional ownership and firm value, especially that of foreign institutional owners.

In addition, some studies also investigate foreign institutional effect on other corporate aspects. Bena, Ferreira, Matos, and Pires (2017) show that greater foreign institutional ownership increases long-term investment in several forms of real capital. Using two exogenous shocks to foreign ownership, Kacperczyk, Sundaresan, and Wang (2021) show that greater foreign ownership increases stock price informativeness. This increase arises from new information that foreign investors bring in, and displacement of less informed domestic retail investors. In their study, domestic institutions also play a similar positive role, though smaller than the one played by foreign investors.

As a second way of validating our assumption, we revisit empirical estimates of results from the literature on information-driven trades by employing a larger data sample and longer data period. Specifically, we study the link between institutional ownership (IO, DOM, and FOR) and future stock-level returns and price informativeness (PI). We estimate the following pooled regression model using firm-level quarterly frequency data:

$$Ret_{i,t+h} = a_0 + a_1 FOR_{i,t} + a_2 DOM_{i,t} + a_3 \text{Firm Controls}_{i,t} + \mu_c + \mu_t + \epsilon_{i,t+h} \tag{6}$$

$$\begin{aligned} E_{i,t+h}/A_{i,t} = a_0 + a_1 log(M/A)_{i,t} \times FOR_{i,t} + a_2 log(M/A)_{i,t} \times DOM_{i,t} + a_3 log(M/A)_{i,t} + \\ + a_4 FOR_{i,t} + a_5 DOM_{i,t} + a_6 \text{Firm Controls}_{i,t} + \mu_i + \mu_t + \epsilon_{i,t+h} \end{aligned} \tag{7}$$

In the above models, we measure stock returns and earnings next quarter and over next four quarters. The coefficients of interest in both regressions are a_1 and a_2, though they measure price informativeness in the second formula (e.g., Kacperczyk, Sundaresan, and Wang (2021)), defined as the sensitivity of future earnings to current stock prices, conditional on institutional ownership. $log(M/A)_{i,t}$ is the natural logarithm of market capitalization ($M_{i,t}$) to total assets ($A_{i,t}$). $(E/A)_{i,t}$ is earnings before interest and taxes ($EBIT$), divided by total assets. Furthermore, we also replace DOM by total ownership IO in order to control for total institutional ownership effect and separate out the effect due to foreign institutional investors. We present the results in Table 9, both for the aggregate sample of stocks, as well as separately for stocks in developed and emerging markets. In panel A, we report the results for future stock returns, while in panel B for their price informativeness.

The results indicate a strong positive effect of foreign institutional investors for both future returns of the stocks they hold, as well as their future price informativeness. The results are particularly strong for the subsample of stocks in developed markets, consistent with our earlier results on the movement of portfolio flows. Overall, the above results provide strong support for the assumption of our model we derive and calibrate in our subsequent sections.

4.1 Model Setup

We set up a portfolio choice model in which investors are limited in their ability to process information about asset payoffs. We consider three groups of investors, indexed by j: domestic institutional, foreign institutional, and domestic retail. This classification aligns well with the empirical distribution observed in our portfolio data. Consistent with our earlier discussion, investors display heterogeneity in terms of their information capacity, while assets exhibit heterogeneity with regard to their supply and volatility. The specifics of our framework build upon the model of Kacperczyk, Nosal, and Stevens (2019), extending it to encompass three investor types, but the outcome variables are different.

A continuum of investors of mass one, indexed by j, with common risk aversion $\rho > 0$, solve a sequence of portfolio choice problems, to maximize mean-variance utility over wealth W_j in each period. The financial market consists of one risk-free asset, with price normalized to 1 and payoff r, and $n > 1$ risky assets, indexed by i, with prices p_i, and independent payoffs $z_i = \overline{z} + \varepsilon_i$, with $\varepsilon_i \sim \mathcal{N}\left(0, \sigma_i^2\right)$.[10] The risk-free asset has unlimited supply, and each risky asset has fixed supply, $\bar{x}_i$. For each risky asset, non-optimizing "noise traders" trade for reasons orthogonal to prices and payoffs (e.g., liquidity, hedging, or life cycle), such that the net supply available to the (optimizing) investors is $x_i = \bar{x}_i + \nu_i$, with $\nu_i \sim \mathcal{N}\left(0, \sigma_{xi}^2\right)$, independent of payoffs and across assets. Following Admati (1985), we conjecture that prices are $p_i = a_i + b_i\varepsilon_i - c_i\nu_i$, for some coefficients $a_i, b_i, c_i \geq 0$.

Investors know the distributions of the shocks, but not their realizations (ε_i, ν_i). Prior to making their portfolio decisions, investors can obtain information about some or all of the risky asset payoffs, in the form of signals. The informativeness of these signals is constrained by each investor's capacity to process information. We consider three investor types: mass $\lambda_f \in (0, 1)$ are foreign institutional investors with capacity K_f, λ_d of investors are domestic institutional investors, with capacity K_d, and $\lambda_r = 1 - \lambda_f - \lambda_d$ of investors are domestic retail investors, with capacity $K_r = 0$.[11]

Higher capacity can be interpreted as having more resources to gather and process news about different assets, and it translates into signals that track the realized payoffs with higher precision. A bound on this capacity limits investors' ability to reduce uncertainty about payoffs. Given this constraint, they choose how to allocate attention across different assets. We use the reduction in the entropy (Shannon (1948)) of the payoffs conditional on the signals as a measure of how much capacity the chosen signals consume.[12]

Individual optimization Optimization occurs in two stages. In the first stage, investors solve their information acquisition problem, and in the second stage, they choose portfolio holdings. We first solve the optimal portfolio choice in the second stage, for a given signal choice. We then solve for the ex-ante optimal signal choice.

[10] Under simplifying assumptions of independence of signals across assets, assuming independent payoffs is without loss of generality. See Van Nieuwerburgh and Veldkamp (2010) for a discussion of how to orthogonalize correlated assets under such assumptions.

[11] Assuming zero capacity for domestic retail investors simplifies the analysis but is not crucial for our results. As long as retail investors have lower capacity than either of the institutional investors, our results go through.

[12] Starting with Sims (2003), entropy reduction has become a frequently used measure of information in a variety of contexts in economics. This learning process captures the key trade-offs investors face when deciding how to allocate their limited capacity across multiple investment decisions, as a function of their objective and of the risks they face.

Given prices and posterior beliefs, the investor chooses portfolio holdings to solve

$$U_j = \max_{\{q_{ji}\}_{i=1}^n} E_j\left(W_j\right) - \frac{\rho}{2} V_j\left(W_j\right) \tag{8}$$

$$s.t. \;\; W_j = r\left(W_{0j} - \sum_{i=1}^n q_{ji} p_i\right) + \sum_{i=1}^n q_{ji} z_i, \tag{9}$$

where E_j and V_j denote the mean and variance conditional on investor j's information set, and W_{0j} is initial wealth. Optimal portfolio holdings depend on the mean $\widehat{\mu}_{ji}$ and variance $\widehat{\sigma}_{ji}^2$ of investor j's posterior beliefs about the payoff z_i, and is given by $q_{ji} = \frac{\widehat{\mu}_{ji} - rp_i}{\rho \widehat{\sigma}_{ji}^2}$.

Given the optimal portfolio holdings as a function of beliefs, the ex-ante optimal distribution of signals maximizes ex-ante expected utility, $E_{0j}\left[U_j\right] = \frac{1}{2\rho} E_{0j}\left[\sum_{i=1}^n \frac{\left(\widehat{\mu}_{ji} - rp_i\right)^2}{\widehat{\sigma}_{ji}^2}\right]$. The choice of the vector of signals $s_j = (s_{j1}, ... s_{jn})$ about the vector of payoffs $z = (z_1, ..., z_n)$ is subject to the constraint $I\left(z; s_j\right) \leq K_j$, where K_j is the investor's capacity for processing information about the assets and $I\left(z; s_j\right)$ quantifies the reduction in the entropy of the payoffs, conditional on the vector of signals (defined below).

Following Kacperczyk, Nosal, and Stevens (2019), we assume that the signals s_{ji} are independent across assets and investors. Then, the total quantity of information obtained by an investor is the sum of the quantities of information obtained for each asset, $I\left(z_i; s_{ji}\right)$. As shown in that paper, in this case, the investor's problem boils down to choosing the precision of posterior beliefs for each asset to solve[13]

$$\max_{\left\{\widehat{\sigma}_{ji}^2\right\}_{i=1}^n} \sum_{i=1}^n G_i \frac{\sigma_i^2}{\widehat{\sigma}_{ji}^2} \quad s.t. \;\; \frac{1}{2} \sum_{i=1}^n \log\left(\frac{\sigma_i^2}{\widehat{\sigma}_{ji}^2}\right) \leq K_j, \tag{10}$$

$$G_i \equiv \left(1 - rb_i\right)^2 + \frac{r^2 c_i^2 \sigma_{xi}^2}{\sigma_i^2} + \frac{\left(\bar{z} - ra_i\right)^2}{\sigma_i^2}, \tag{11}$$

where G_i are the utility gains from learning about asset i. These gains are a function of equilibrium prices and asset characteristics only; they are common across investor types, and taken as given by each investor.

The linear objective and the convex constraint imply that each investor specializes, monitoring only one asset, regardless of her level of sophistication. For all other assets, portfolio holdings are determined by prior beliefs. If there are multiple assets that are tied for the highest gain, the investor randomizes among them, with probabilities that are determined in equilibrium, but they

[13] The investor's objective omits terms from the expected utility function that do not affect the optimization.

continue to allocate all capacity to a single asset (see Lemma 1 in Appendix D).

Given the solution to the individual optimization problem, equilibrium prices are linear combinations of the shocks. The price of asset i is given by $p_i = a_i + b_i\varepsilon_i - c_i\nu_i$, with (for derivation, see Appendix E)

$$a_i = \frac{1}{r}\left[\bar{z} - \frac{\rho\sigma_i^2\bar{x}_i}{(1+\Phi_i)}\right],\ b_i = \frac{\Phi_i}{r(1+\Phi_i)},\ c_i = \frac{\rho\sigma_i^2}{r(1+\Phi_i)}, \tag{12}$$
$$\Phi_i \equiv m_{fi}(e^{2K_f}-1) + m_{di}(e^{2K_d}-1),$$

where Φ_i measures the information capacity allocated to learning about asset i in equilibrium, and $m_{fi} \leq \lambda_f, m_{di} \leq \lambda_d$ are the masses of foreign and domestic institutional investors who choose to learn about asset i.

Prices reflect payoff and supply shocks, with relative importance determined by the amount of attention allocated to each asset, Φ_i. If there is no learning, the price only reflects the supply shock ν_i and $b_i = 0$. As the attention allocated to an asset increases, the price co-moves more with the payoff.

Main drivers of trades and learning Given the price coefficients, the gain from learning about asset i is given by

$$G_i = \frac{1+\rho^2\xi_i}{(1+\Phi_i)^2}, \tag{13}$$

where $\xi_i \equiv \sigma_i^2(\sigma_{xi}^2 + \bar{x}_i^2)$ summarizes asset-specific exogenous part of the gain.

This gain is increasing in the fundamental volatility of the asset σ_i^2 and supply $\bar{x}_i$, which gives clear preference of investors to learn about assets with (i) large supply or (ii) high volatility.

Intuitively, the average excess return on highly volatile or large-supply assets is higher, due to their lower average price. This can be seen through a_i in equation (12): for the same amount of learning Φ_i an asset with a higher supply $\bar{x}_i$ or higher volatility σ_i will have a lower average price, which depends only on a_i. However, capturing that higher return requires lowering the possibility of mistakes by investing information capacity into that asset. Hence, the returns from investing capacity in high volatility or size assets is higher for the same Φ_i. We can also see from the price coefficients why the pure size effect can be potentially quantitatively dominant: compared with large size assets, high volatility assets have an additional disadvantage that their loading on the noise term, c_i, is also higher, and so they are characterized by more noisy excess returns.

Equilibrium Without loss of generality, let assets be indexed so that $\xi_i > \xi_{i+1}$. Then, in equilibrium, an endogenously determined number $k \leq n$ of the first k assets is learned about, with masses m_{fi},m_{di} pinned down by the condition that the gain is equalized among assets that are learned about, i.e. $G_i = G_l$ for $i, l \leq k$ and $G_k > G_i$ for $i > k$. These results are derived in Appendix F.

The equilibrium gains from learning are asset-specific and depend only on the properties of the asset, ξ_i, and on the amount of attention devoted to that asset, across all investors, Φ_i. The model uniquely pins down the number of assets that are learned about and the amount of attention allocated to each asset. Aggregate capacity in the economy may be high enough that in equilibrium it is spread across multiple assets. In this case, each investor continues to allocate her entire capacity to a single asset, but the investor randomizes, with the probability of learning about each asset being determined by the equilibrium conditions in Lemma 2 in Appendix F.

With heterogeneous investor capacity, the model does not pin down how much attention each investor class contributes: All that matters is the total capacity Φ_i allocated to each asset. In our analysis, we follow Kacperczyk, Nosal, and Stevens (2019), and focus on a symmetric equilibrium allocation, in which institutional investors contribute capacity in proportion to their size in the population, so that $\frac{m_{fi}}{\lambda_f} = \frac{m_{di}}{\lambda_d}$. This assumption is motivated by our result that the gains from learning are the same for the two investor types, so that it is not obvious why they would choose different strategies.

4.2 Numerical Results

In this section, we present the numerical results from the model. The simplicity of the model prevents a full calibration exercise. However, below, we provide numerical examples that map qualitatively to patterns in the data; in Appendix G, we derive additional results, which show that our conclusions are robust to a wide range of parameter choices.

Parameter choices For the calibration of the model, we set the risk-free rate to 2%, normalize $\bar{z} = 10$ and $n = 10$, and set λ_f to be 10 times smaller than λ_d. We arbitrarily set $\bar{x}_i$ to be uniformly distributed along the $[1, 2]$ interval, set the coefficient of variation of the noise shock to be 0.2, and set the volatility of the payoff shock to be negatively correlated with the size and vary between 2.8 for the smallest stock to 1.9 for the largest stock. Finally, we choose the remaining parameters to match the domestic and foreign average ownership of 21% and 8.6%, respectively, and the average market excess return of 4.3%.[14] These targets in the model pin down the risk aversion coefficient ρ, capacities K_f, K_d and level of sizes λ_f, λ_d. We pick these parameters together to match the three targets and at the same time have positive learning about all assets in equilibrium. Parameters are reported in Table 1.

Table 1: Parameter Values in the Baseline Model

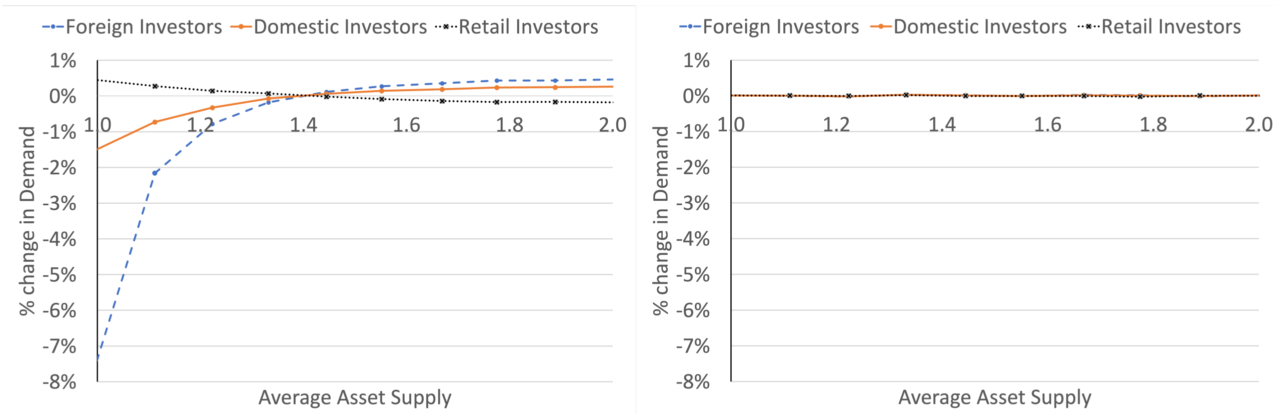
Parameter	Symbol	Value
Risk-free rate	r	2%
Number of assets	n	10
Mean payoff, supply	$\bar{z}$	10 for all i
Vol. of asset payoffs	σ_i	linear from 2.8 to 1.9
Mean payoff, supply	$\bar{x}_i$	linear from 1 to 2
Vol. of noise shocks	σ_{xi}	0.2 coefficient of variation for all i
Risk aversion	ρ	1.09
Information capacities	K_f, K_d	2.18, 1.26
and investor masses	λ_f, λ_d	$0.0125, 0.125$

Below, we analyze the model's predictions for two experiments. In the first experiment, we consider the response of investors' portfolios to an aggregate increase in the volatility of all assets' payoffs. In the second experiment, we consider a shock that increases foreign investors' risk aversion. For each experiment, we additionally provide results of our model in the case when the information choice is exogenous, i.e. it is fixed at the baseline parameterization optimum and is not allowed to respond to shocks. These additional results illustrate that our model's predictions crucially depend on the information choice being endogenous and responding to the respective shock.

Payoff volatility shock In the first experiment, we introduce a shock to the volatility of all assets, which we assume changes from σ_i to $\bar{\sigma}_i = 1.2\sigma_i$. We subsequently compute the change in investors' asset ownership in response to the shock. Figure 1, panel (a), presents the results. Foreign investors increase their holdings of the large-supply assets and reduce holdings of the small-supply assets, both relative to domestic institutional investors and domestic retail investors. This relocation is dictated by the fact that large assets provide more information rents, as implied by equation (13). In response to the shock, *ceteris paribus*, the gain G_i increases more for large assets than small assets, and investors reoptimize their learning towards them. Since foreign investors have larger capacity, in equilibrium, their relocation of learning implies the largest change in ownership.

[14] This is the market real excess return over the 3-month t-bill rate over the period 2000-2020.

The crucial role of endogenous learning choice can be demonstrated by studying the model's response to the volatility shock under the counterfactual assumption that learning is not permitted to be reoptimized, as presented in panel (b) of Figure 1. In that case, ownership does not change differentially across assets for either investor.



(a) Benchmark

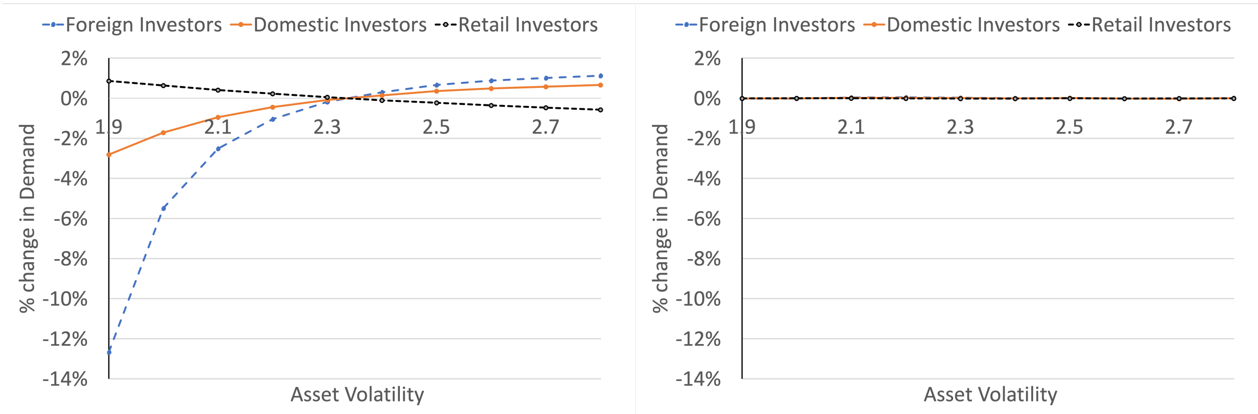
(b) No adjustment of information choice

Figure 1: Model: response to aggregate volatility shock.

Figure 1 clearly indicates that the preference for size pointed out in Section 4.1 dominates the response to the aggregate volatility shock. In order to demonstrate the effect of preference for volatility, we shut down size heterogeneity and compute the response of the model to the aggregate shock again. The heterogeneous response now works solely via differing volatilities of the assets. Figure 2 presents the results. As we show in Appendix G and discuss below, size is the quantitatively dominant feature of stocks in our model. However, as Figure 2 indicates, when controlling for size heterogeneity, investors clearly rebalance their portfolios towards more volatile stocks.

Our last cross-sectional prediction pertains to stock turnover. In Figure 3, we demonstrate the relationship between stock turnover and institutional ownership in the cross-section, comparing the low- and high-volatility equilibria. Turnover displays a pronounced positive correlation with institutional ownership and uniformly decreases in the high-volatility equilibrium.

Robustness of the results Given that some of our parameter choices are arbitrary, we carry out an extensive sensitivity and robustness analysis of our results. Specifically, in Appendix G, we present three sets of results. First, we calculate our results for various asset sizes by modifying the distribution of $\bar{x}_i$. It is important to note that the gain from learning increases monotonically in both asset volatility and size, as indicated by equation (13). However, in our model, we make an



(a) Benchmark

(b) No adjustment of information choice

Figure 2: Model: response to aggregate volatility shock, no heterogeneity in size.

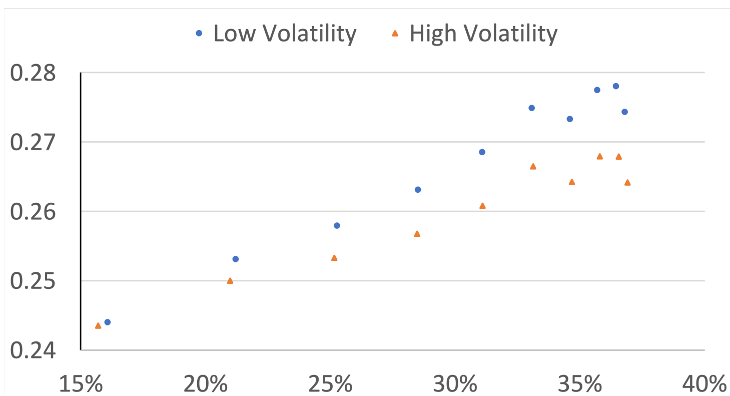


Figure 3: Model: turnover as a function of institutional ownership, low- and high-volatility equilibrium.

empirically motivated assumption that size and volatility are negatively correlated. This creates a tension in the model between a preference for large and volatile assets, and in principle, the volatility effect could dominate the size effect. It is therefore a quantitative question which effect prevails: switching to large, low-volatility assets or small, high-volatility assets. As we demonstrate in Figure G.3, the size differences between the largest and smallest supply assets would have to be virtually non-existent for the volatility effect to dominate. In particular, our results hold for all cases in which the size differential is at or above 1.5. Since in our data, the 25-75 interquartile range for size falls above 5, we consider our setting of 2 to be conservative. For added robustness, in the second set of tests, we conduct an experiment in which we entirely eliminate the heterogeneity in asset volatility. Figure G.4 shows that in this case, our qualitative conclusions hold for all variations of the size distribution. Lastly, in another experiment, we vary the size differences among investors,

λ_f versus λ_d from the benchmark setting of $\frac{\lambda_f}{\lambda_d} = 0.1$ to $\lambda_f = \lambda_d$. Figure G.5 demonstrates that, for all variations in sizes, our results remain valid. In addition, in Appendix Appendix G, we present results from the model where we shock the foreign investor risk aversion instead of the aggregate volatility. This version of the shock captures disturbances that affect foreign investors and their outside options rather than the local market. The results, presented in Figures G.6 and G.7, show that a similar retrenchment results in the local market in response to this shock, one which is similarly asymmetric across assets.

4.3 Cross-sectional Results in the Data

Motivated the the cross-sectional predictions of the theoretical mechanism presented in the previous section, below, we, we explore the cross-sectional variation in firm size present in our data, as measured by stock market capitalization. Since our model also considers firm volatility as a source of heterogeneity, we directly control for it in the regression. Our goal is to document the response to increases in global volatility of foreign investors across small-cap stocks and large-cap stocks. To this end, we estimate the following regression model:

$$\Delta LogIO_{i,j,t} = g_0 + g_1\{Gvol_t,\ D\_FOR_{i,j},\ Logsize_{i,t-1}\} + g_2\{Gvol_t,\ D\_FOR_{i,j},\ Vol_{i,t-1}\} + g_3\text{Firm Controls}_{\text{i,t}-1} + g_4\text{Country Controls}_{\text{i,t}} + g_5\log(\text{AUM}_{\text{j,t}-1}) + g_6 InsRet_{j,t-1} + \mu_i + \mu_j + \epsilon_{i,j,t} \quad (14)$$

where $\{Gvol_t,\ D\_FOR_{i,j},\ Logsize_{i,t-1}\}$ and $\{Gvol_t,\ D\_FOR_{i,j},\ Vol_{i,t-1}\}$ denote the set of all interaction terms between the three variables in curly brackets. We present the findings in Table 6. In columns 1-4, we present the findings for all firms in our sample by successively saturating the model with additional fixed effects. Across all four specifications, we find a negative and statistically significant effect of $Gvol$ on stock holdings. The result is stronger when we focus on holdings by foreign investors. Importantly, we find that the coefficient of the interaction term between $Gvol$ and FOR is negative, which means that companies with very small market caps tend to observe outflows during high-volatility episodes. However, this effect gets reversed when we consider companies with large market capitalization, as is shown by the positive coefficient of the triple interaction term between $Gvol$, FOR, and $Logsize$. In our sample, a standard deviation of $Logsize$ is approximately 1.83, which means that for a one-standard deviation increase in size, the outflow effect gets reversed fully for specifications in columns 1-2, and by roughly 30% in the most saturated model in column 4. Of course, the reversal could become even stronger if we focused on a subset of very large firms. Turning to interactions with volatility, we find strongly statistically signifiant positive coefficient of the triple interaction term between $Gvol$, FOR, and Vol, indicating a shift towards more volatile stocks. These results are fully consistent with our theoretical model and suggest that foreign investors distinguish between small and large, and more and less volatile companies, consistent with their learning incentives.

We now examine the effects separately for firms in developed and emerging economies. As with the full sample, our results for firms in developed economies closely resemble those in terms of economic magnitudes. However, when focusing on firms in emerging economies, we observe distinct results. Although the direction of the effects largely aligns with the unconditional sample, the magnitudes of the effects are economically smaller and the coefficients are statistically insignificant. This suggests that foreign investors in these markets exhibit behavior less consistent with the learning model and more in line with a model driven by a uniform increase in risk aversion.

In Appendix C, Table C.12, we present robustness results for periods with extreme levels of stress, using our GFC indicator variable. The results are largely in line with our earlier findings. One intriguing distinction is that, in this case, we find that the cross-sectional variation in size matters for both developed and emerging markets, while the volatility effect loses statistical significance. This outcome suggests that during periods of extreme stress, foreign institutional investors differentiate among the stocks they sell, and their portfolio choices are not simply driven by a blanket withdrawal from all holdings in their portfolios. In this context, it can be argued that portfolio flows are not merely driven by uninformed panic due to heightened risk aversion, but rather reflect a situation in which informed investors incorporate their information advantages when buying and selling securities. Put differently, the effect of extreme volatility is not just a retrenchment of capital from risky securities, but also a process of reallocating capital within a set of risky assets.

The results in Table 6 and Table C.12 show portfolio adjustments at the intensive margin. Of equal interest is the adjustment on the extensive margin. Do investors drop stocks of some companies in periods of high volatility and enter stocks in times of low volatility? To study this question, we define two variables: $Exit_{i,j,t}$ is an indicator variable equal to one if institution j's $Holding_{i,t-1} > 0$, $Holding_t = 0$, and zero otherwise; $Entry_{i,j,t}$ is an indicator variable equal to one if institution j's $Holding_{i,t-1} = 0$, $Holding_t > 0$, and zero otherwise. Using these definitions, we estimate the following regression models:

$$Exit_{i,j,t} = h_0 + h_1\{Gvol_t,\ D\_FOR_{i,j},\ Logsize_{i,t-1}\} + h_2\{Gvol_t,\ D\_FOR_{i,j},\ Vol_{i,t-1}\} + \\ +h_3\text{Firm Controls}_{\text{i,t}-1} + h_4\text{Country Controls}_{\text{i,t}} + h_5\log(\text{InsAUM}_{\text{j,t}-1}) + h_6 InsRet_{j,t-1} + \mu_i + \mu_j + \epsilon_{i,j,t} \quad (15)$$

$$Entry_{i,j,t} = i_0 + i_1\{Gvol_t,\ D\_FOR_{i,j},\ Logsize_{i,t-1}\} + i_2\{Gvol_t,\ D\_FOR_{i,j},\ Vol_{i,t-1}\} + \\ +i_3\text{Firm Controls}_{\text{i,t}-1} + i_4\text{Country Controls}_{\text{i,t}} + i_5\log(\text{InsAUM}_{\text{j,t}-1}) + i_6 InsRet_{j,t-1} + \mu_i + \mu_j + \epsilon_{i,j,t} \quad (16)$$

We present the results in Table 7. Columns 1-5 display the results for the exit decision, while columns 6-10 show the results for the entry decision. In line with our earlier findings, we observe that investors are more likely to exit and less likely to enter individual stocks during high-volatility episodes. Furthermore, we find that the decision to exit individual stocks is more likely for foreign investors compared to domestic institutions (column 3). On the entry margin, the effect is still negative but statistically weak. Lastly, when we examine the exit and entry decisions for stocks with different sizes, we find that the exit decision is stronger for smaller stocks, but only in the regression without controlling for investor*time fixed effect. In contrast, the decision of foreign investors to enter is more likely for large stocks, and the effect is highly statistically significant. For robustness, we also consider the extensive margin effects in the subsamples of firms from developed and emerging markets. The results are presented in Table C.10 of the Appendix. Overall, our findings suggest that the effect of global volatility is significant for both intensive and extensive margin adjustments, and it is generally statistically stronger for exit than entry, except in the case of size distribution where the entry decision is more stable.

5 Implications for Financial Stability

In this section, we study the implications of our results for financial stability. In particular, we study the role of the changing ownership structure for future firm-level stock return volatility and stock turnover, measured as trading volume over the number of shares outstanding. We associate greater (smaller) firm-level volatility (turnover) with more instability in the market. We consider two measures of stability: one-quarter ahead and one compounded over the period of subsequent four quarters. We estimate the following regression model:

$$Stability_{i,t+1} = j_0 + j_1\{log(Hold_{i,t}/Hold_{i,t-1}),\ Gvol_t,\ Logsize_{i,t}\} + j_2\text{Firm Controls}_{\text{i,t}} + \mu_i + \mu_t + \epsilon_{i,t} \tag{17}$$

where $Stability$ is a generic variable for $Volatility$ and $Turnover$, $Hold$ is a generic variable for foreign, domestic and total ownership, measured at the stock level. $\{log(Hold_{i,t}/Hold_{i,t-1}),\ Gvol_t,\ Logsize_{i,t}\}$ denote the set of all interaction terms between the three variables in curly brackets. Our vector of firm controls includes $Volatility$, $Logsize$, B/M, $Leverage$, $Turnover$, and $Profitability$, all measured in quarter t. We report the results of the estimation in Table 8. Panel A shows the results for the volatility regression. In column 1, we present the results for the changes in ownership. We find that an increase in both domestic and foreign ownership predicts subsequent decline in firm-level volatility. The result is statistically and economically significant. In columns 2-3, we study this effect conditional on the level of $Gvol$ and $Logsize$. We find that in times of high volatility institutional investors' increase in ownership is more likely to stabilize firm level return volatility, especially for larger stocks.

Our sample demonstrates that periods of high volatility typically witness an outflow of capital from stocks, which implies that such periods lead to financial instability via a portfolio retrenchment channel. Intriguingly, based on our economic mechanism, this destabilizing force is not symmetric, as large stocks do not actually experience significant outflows of capital; in fact, they may see an increase in flows. In this regard, our results suggest that episodes of high volatility may lead to instability for some stocks (small-cap stocks) while promoting stability for others (large-cap stocks). When controlling for the effect of total ownership, we find that foreign investors can stabilize markets more effectively than domestic investors.

Panel B displays the results for stock turnover. Firstly, in the sample of firms from all economies, we find that an increase in holdings by either domestic or foreign institutions predicts a subsequent increase in stock turnover, which we interpret as improved liquidity. This pattern is also consistent with the results from our model, as discussed in Section 4.2, where we demonstrate that turnover is positively related to institutional ownership. The effect is asymmetric across periods of high and low global volatility, especially for emerging markets during turbulent times. When we condition the results on the location of firms, we find a similar set of results for the sample of firms in developed markets. Secondly, when controlling for the effect of total ownership, our findings indicate that foreign investors can enhance liquidity more effectively during both good and bad times compared to domestic investors.

6 Concluding Remarks

Global portfolio flows play an increasingly important role in the distribution of welfare and financial stability worldwide, as evidenced by recent episodes of market-wide stress. Consequently, it is crucial to understand their drivers in order to discern specific mechanisms driving their distribution and the resulting financial policies. This task becomes challenging when using aggregate country-level flow data, as any empirical evidence may be subject to multiple explanations. This paper aims to characterize global portfolio flows using novel micro-level evidence on equity holdings at the firm and investor level. Utilizing more granular data allows us to distinguish among various explanations of flows. Our results indicate that policies aimed at regulating aggregate flows versus regulating holdings of institutions by type or holdings of specific asset classes can have very different implications for the resulting portfolio reallocation. Specifically, our findings suggest that solely focusing on regulating cross-border capital flows as a whole is an overly blunt instrument and can have unintended consequences in terms of rebalancing foreign investment flows across stocks, providing more stability to some firms at the expense of others.

We also propose an equilibrium model that guides us in contrasting two competing hypotheses: one based on market-wide responses to shocks and another one specific to individual securities. The model's predictions suggest that cross-sectional variation in firm size is an important characteristic to differentiate between the two explanations. When applied to the data, our results align with the mechanism in which flows are not simply driven by uninformed panics but rather result from differential learning among investors with varying information sets. These findings broadly imply that global volatility spikes need not destabilize all assets equally, and policies attempting to impose uniform measures may not be the most successful.

Although data limitations restrict our analysis to only equity flows, we consider our study an important step towards uncovering the mechanisms behind international capital flows. By using highly disaggregated data, we can isolate the relative contributions of various economic drivers to the dynamics of global equity flows.

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Table 2: **Global Volatility and Capital Flows: Firm-Level Heterogeneity**

This table presents the firm level regression results for relation between the global volatility and institutional ownership changes based on firm-quarter sample between 2000 and 2020. We report the results for the full sample, developed and emerging market samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variable is global volatility ($Gvol$). Control variables include firm characteristics ($Log(Size)$, Vol, $Turnover$, $Leverage$, BM, $PRratio$) and macro variables ($Lvol$, ΔIR, $FXRet$, $FXvol$). The data section provides detailed definitions of these variables. All regression models include firm fixed effect. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL	**Developed**	**Emerging**
	(1)	(2)	(3)
		$\Delta Log(IO)_{i,t}$	
$Gvol_t$	-3.744***	-3.501***	-4.707***
	(0.873)	(0.934)	(1.465)
$Log(Size)_{i,t-1}$	0.012**	0.014***	0.007
	(0.005)	(0.005)	(0.007)
$Vol_{i,t-1}$	-0.049	-0.058	0.634**
	(0.091)	(0.087)	(0.293)
$Turnover_{i,t-1}$	-0.004	-0.022	0.025
	(0.017)	(0.016)	(0.015)
$Leverage_{i,t-1}$	-0.009	-0.003	-0.031**
	(0.020)	(0.025)	(0.014)
$BM_{i,t-1}$	-0.006	-0.007	-0.002
	(0.004)	(0.005)	(0.006)
$PRratio_{i,t-1}$	0.037***	0.034***	0.054*
	(0.008)	(0.007)	(0.027)
$Lvol_{c,t}$	1.731*	1.328	2.996*
	(0.865)	(0.882)	(1.425)
$\Delta IR_{c,t}$	-0.001	0.001	-0.002
	(0.005)	(0.012)	(0.003)
$FXRet_{c,t}$	0.084	0.046	0.146***
	(0.055)	(0.064)	(0.041)
$FXvol_{c,t}$	-2.281*	-0.507	-4.836**
	(1.350)	(1.823)	(2.036)
Firm FE	Yes	Yes	Yes
Observations	1,258,336	972,267	286,069
R^2	0.029	0.031	0.028

Table 3: **Global Volatility and Capital Flows: Investor-Firm-Level Heterogeneity**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on investor-firm-quarter sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variable is global volatility ($Gvol$). In addition to the control variables in Table 2, investor characteristic variables ($Log(InsAUM)$ and $InsRet$) are also included. The data section provides detailed definitions of these variables. Regression models include firm, investor, firm*investor fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL			**Developed**			**Emerging**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$		
$Gvol_t$	-11.188***	-10.055***	-15.959***	-11.391***	-10.198***	-15.708***	-12.127	-13.270*	-26.960**
	(1.731)	(1.669)	(5.742)	(1.547)	(1.578)	(5.047)	(7.464)	(7.331)	(13.592)
$Log(Size)_{i,t-1}$	-0.077***	-0.033**	-0.153***	-0.079***	-0.038**	-0.160***	-0.029	0.031	-0.032
	(0.013)	(0.016)	(0.029)	(0.012)	(0.015)	(0.027)	(0.028)	(0.028)	(0.047)
$Vol_{i,t-1}$	0.337	0.217	0.417	0.305	0.196	0.343	3.658**	3.050**	5.682**
	(0.683)	(0.558)	(1.485)	(0.674)	(0.559)	(1.490)	(1.617)	(1.350)	(2.250)
$Turnover_{i,t-1}$	-0.263***	-0.261***	-0.365***	-0.285***	-0.283***	-0.399***	0.102	0.103	0.180
	(0.037)	(0.042)	(0.078)	(0.023)	(0.027)	(0.059)	(0.081)	(0.077)	(0.137)
$Leverage_{i,t-1}$	-0.044	-0.017	-0.191*	-0.037	-0.011	-0.177	-0.152	-0.159	-0.387*
	(0.061)	(0.052)	(0.100)	(0.068)	(0.058)	(0.112)	(0.123)	(0.114)	(0.196)
$BM_{i,t-1}$	-0.152***	-0.155***	-0.303***	-0.160***	-0.166***	-0.311***	-0.035	-0.029	-0.138
	(0.028)	(0.026)	(0.047)	(0.029)	(0.026)	(0.048)	(0.056)	(0.055)	(0.081)
$PRratio_{i,t-1}$	0.104***	0.089***	0.122***	0.094***	0.078***	0.103***	0.189	0.212	0.319
	(0.021)	(0.020)	(0.040)	(0.016)	(0.015)	(0.030)	(0.221)	(0.198)	(0.354)
$Log(InsAUM)_{j,t-1}$	-0.015***	-0.266***	-0.454***	-0.017***	-0.264***	-0.445***	0.000	-0.324***	-0.552***
	(0.004)	(0.015)	(0.027)	(0.003)	(0.014)	(0.024)	(0.004)	(0.024)	(0.037)
$InsRet_{j,t-1}$	0.215*	0.258*	0.302	0.180	0.215*	0.255	0.436**	0.572***	0.602
	(0.126)	(0.136)	(0.255)	(0.115)	(0.124)	(0.235)	(0.154)	(0.166)	(0.346)
$Lvol_{c,t}$	2.348	-0.234	-4.164	1.540	-1.223	-5.600*	15.277*	15.655**	19.945**
	(1.772)	(2.053)	(3.892)	(1.343)	(1.581)	(3.244)	(7.493)	(6.914)	(8.960)
$\Delta IR_{c,t}$	-0.046*	-0.035	-0.036	-0.048*	-0.039	-0.046	-0.040*	-0.011	0.021
	(0.025)	(0.029)	(0.050)	(0.027)	(0.031)	(0.051)	(0.020)	(0.021)	(0.037)
$FXRet_{c,t}$	0.456	0.310	0.286	0.305	0.174	0.147	1.101***	0.953***	0.812
	(0.339)	(0.272)	(0.407)	(0.378)	(0.298)	(0.416)	(0.313)	(0.317)	(0.558)
$FXvol_{c,t}$	-3.871	-5.583	12.248	4.408	2.369	24.362**	-50.587***	-53.329***	-59.541**
	(5.470)	(5.505)	(10.923)	(5.580)	(5.258)	(11.039)	(13.602)	(13.784)	(22.246)
Firm FE	Yes	Yes		Yes	Yes		Yes	Yes	
Investor FE		Yes			Yes			Yes	
Firm * Investor FE			Yes			Yes			Yes
Observations	116,689,815	116,689,765	116,342,566	106,693,766	106,693,705	106,365,611	9,996,049	9,995,847	9,976,955
R^2	0.003	0.009	0.028	0.003	0.009	0.028	0.003	0.010	0.027

Table 4: **Global Volatility and Domestic/Foreign Capital Flows: Firm-Level Heterogeneity**

This table presents the firm level regression results for relation between the global volatility and domestic and foreign institutional ownership changes based on firm-quarter sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variable is the change of the natural logarithm of domestic ownership $\Delta Log(DOM)$ and foreign ownership $\Delta Log(FOR)$. The main independent variable is global equity volatility ($Gvol$). Control variables are the same as those in Table 2. The data section provides detailed definitions of these variables. All regression models include firm fixed effect. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL		**Developed**		**Emerging**	
	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Log(DOM)_{i,t}$	$\Delta Log(FOR)_{i,t}$	$\Delta Log(DOM)_{i,t}$	$\Delta Log(FOR)_{i,t}$	$\Delta Log(DOM)_{i,t}$	$\Delta Log(FOR)_{i,t}$
$Gvol_t$	-2.775***	-4.239***	-3.311***	-3.985***	-0.847	-5.582***
	(0.828)	(0.459)	(0.950)	(0.447)	(0.976)	(1.246)
$Log(Size)_{i,t-1}$	0.006	0.018***	0.008	0.020***	-0.002	0.015**
	(0.006)	(0.004)	(0.007)	(0.004)	(0.009)	(0.006)
$Vol_{i,t-1}$	-0.062	-0.002	-0.056	-0.000	0.039	0.531*
	(0.098)	(0.093)	(0.104)	(0.098)	(0.200)	(0.279)
$Turnover_{i,t-1}$	-0.030***	0.002	-0.028*	-0.023	-0.036*	0.047***
	(0.011)	(0.020)	(0.015)	(0.015)	(0.021)	(0.005)
$Leverage_{i,t-1}$	0.006	-0.016	0.004	-0.011	0.011	-0.035**
	(0.022)	(0.014)	(0.028)	(0.018)	(0.007)	(0.015)
$BM_{i,t-1}$	-0.003	-0.008***	-0.005	-0.010***	0.004	-0.001
	(0.005)	(0.003)	(0.007)	(0.003)	(0.004)	(0.006)
$PRratio_{i,t-1}$	0.027***	0.030***	0.030***	0.027***	0.016	0.040
	(0.005)	(0.008)	(0.006)	(0.006)	(0.020)	(0.036)
$Lvol_{c,t}$	1.203	1.420**	1.333	0.881**	0.663	3.158**
	(0.817)	(0.550)	(0.995)	(0.407)	(1.041)	(1.346)
$\Delta IR_{c,t}$	-0.004	-0.002	-0.004	-0.000	-0.005	-0.002
	(0.005)	(0.006)	(0.011)	(0.015)	(0.005)	(0.002)
$FXRet_{c,t}$	0.076	0.045	0.112	0.016	0.019	0.072
	(0.057)	(0.053)	(0.077)	(0.068)	(0.057)	(0.041)
$FXvol_{c,t}$	-1.335	-0.656	-1.365	2.561	-1.823	-5.333***
	(1.848)	(1.364)	(2.703)	(1.504)	(1.542)	(1.836)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,258,336	1,258,336	972,267	972,267	286,069	286,069
R^2	0.037	0.022	0.024	0.021	0.050	0.030

Table 5: **Global Volatility and Domestic/Foreign Capital Flows: Investor-Firm-Level Heterogeneity**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership change based on investor-firm-quarter sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variable is global equity return volatility ($Gvol$). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL				Developed				Emerging			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta Log(IO)_{i,j,t}$				$\Delta Log(IO)_{i,j,t}$				$\Delta Log(IO)_{i,j,t}$			
$Gvol_t$	-11.898***	-15.602***			-11.701***	-15.187***			-9.383	-20.046		
	(1.460)	(3.878)			(1.261)	(3.414)			(9.829)	(14.781)		
$D\_FOR_{i,j}$	0.093***				0.095***				0.240**			
	(0.020)				(0.021)				(0.088)			
$Gvol_t * D\_FOR_{i,j}$	1.716	-0.869	-3.526	-16.869*	0.824	-1.404	-2.760	-16.026*	-4.745	-12.185*	-18.262**	-25.792
	(2.016)	(5.332)	(6.167)	(8.778)	(2.312)	(5.421)	(5.860)	(8.276)	(5.653)	(6.598)	(8.254)	(31.167)
$Log(Size)_{i,t-1}$	-0.081***	-0.153***			-0.083***	-0.160***			-0.001	0.018		
	(0.013)	(0.029)			(0.012)	(0.027)			(0.033)	(0.057)		
$Vol_{i,t-1}$	0.321	0.416			0.289	0.342			10.107***	14.179**		
	(0.702)	(1.487)			(0.692)	(1.491)			(2.714)	(5.182)		
$Turnover_{i,t-1}$	-0.265***	-0.365***			-0.287***	-0.399***			0.049	0.112		
	(0.038)	(0.077)			(0.023)	(0.055)			(0.103)	(0.177)		
$Leverage_{i,t-1}$	-0.044	-0.191*			-0.037	-0.177			-0.151	-0.404*		
	(0.061)	(0.100)			(0.069)	(0.113)			(0.137)	(0.216)		
$BM_{i,t-1}$	-0.154***	-0.303***			-0.162***	-0.312***			-0.021	-0.118		
	(0.028)	(0.048)			(0.030)	(0.048)			(0.059)	(0.085)		
$PRratio_{i,t-1}$	0.104***	0.122***			0.094***	0.103***			0.200	0.349		
	(0.021)	(0.039)			(0.017)	(0.030)			(0.251)	(0.391)		
$Log(InsAUM)_{j,t-1}$	-0.018***	-0.454***	-0.322***		-0.019***	-0.445***	-0.323***		-0.011***	-0.612***	-0.335***	
	(0.003)	(0.027)	(0.021)		(0.003)	(0.024)	(0.020)		(0.004)	(0.043)	(0.043)	
$InsRet_{j,t-1}$	0.220*	0.301	-0.009		0.185	0.254	0.071		0.481**	0.661*	-0.507**	
	(0.126)	(0.255)	(0.146)		(0.115)	(0.234)	(0.124)		(0.167)	(0.372)	(0.190)	
$Lvol_{c,t}$	2.296	-4.147			1.505	-5.567			14.510*	20.239*		
	(1.840)	(3.940)			(1.425)	(3.278)			(8.311)	(10.261)		
$\Delta IR_{c,t}$	-0.048*	-0.036			-0.050*	-0.046			-0.028	0.017		
	(0.026)	(0.051)			(0.028)	(0.052)			(0.016)	(0.029)		
$FXRet_{c,t}$	0.460	0.282			0.307	0.143			0.968***	0.703		
	(0.343)	(0.407)			(0.381)	(0.413)			(0.297)	(0.527)		
$FXvol_{c,t}$	-5.010	12.856			3.787	25.472*			-45.738***	-55.021**		
	(6.131)	(13.671)			(6.583)	(14.176)			(13.523)	(21.911)		
Firm FE	Yes				Yes				Yes			
Firm * Investor FE		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Firm * Quarter FE			Yes	Yes			Yes	Yes			Yes	Yes
Investor * Quarter FE				Yes				Yes				Yes
Observations	116,689,815	116,342,566	116,185,127	116,177,670	106,693,766	106,365,611	106,256,581	106,247,012	9,996,049	9,976,955	9,928,546	9,881,570
R^2	0.003	0.028	0.089	0.179	0.003	0.028	0.084	0.180	0.003	0.027	0.130	0.259

Table 6: **Global Volatility and Capital Flows: The Economic Mechanism**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variables are global equity return volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL				Developed				Emerging			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$\Delta Log(IO)_{i,j,t}$											
$Gvol_t$	-11.306***	-15.101***			-11.136***	-14.736***			-5.226	-14.294		
	(1.766)	(3.862)			(1.567)	(3.484)			(9.230)	(13.625)		
$D\_FOR_{i,j}$	0.111***				0.119***				0.276***			
	(0.021)				(0.023)				(0.081)			
$Gvol_t * D\_FOR_{i,j}$	-0.198	-3.147	-4.523	-17.910*	-1.747	-4.285	-3.903	-17.181*	-8.740*	-18.542***	-18.329*	-24.666
	(1.914)	(5.789)	(5.677)	(9.005)	(2.279)	(5.914)	(5.406)	(8.527)	(4.642)	(5.976)	(8.960)	(30.575)
$Gvol_t * Log(Size)_{i,t-1}$	2.130***	2.692***			2.286***	2.916***			3.946***	4.109		
	(0.383)	(0.805)			(0.444)	(0.805)			(1.284)	(2.738)		
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.027***	0.005	-0.065*	-0.088	-0.028***	0.008	-0.063*	-0.091	0.006	-0.055	-0.010	0.252
	(0.010)	(0.026)	(0.037)	(0.070)	(0.009)	(0.027)	(0.037)	(0.078)	(0.018)	(0.195)	(0.181)	(0.164)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	2.997***	3.995***	4.807***	3.600***	3.338***	4.004***	4.682***	3.640***	-0.976	1.980	3.971	4.654
	(1.088)	(1.157)	(0.627)	(1.133)	(0.933)	(1.144)	(0.667)	(1.150)	(2.093)	(2.358)	(2.725)	(2.938)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	-8.241	-7.327	-30.934*	17.143***	-8.288	-13.219	-36.118*	15.470***	-301.807	40.186	2.759	-102.364
	(45.400)	(62.321)	(18.092)	(5.064)	(43.753)	(60.887)	(18.473)	(3.590)	(655.649)	(608.413)	(600.031)	(504.912)
$Gvol_t * Vol_{i,t-1}$	-14.108	-26.974			-11.133	-23.242			-170.364	-213.290		
	(57.418)	(65.085)			(56.049)	(63.898)			(636.045)	(693.424)		
$D\_FOR_{i,j} * Vol_{i,t-1}$	0.033	-0.911	0.062	-1.127**	-0.017	-1.316	0.064	-1.158**	4.206	5.886	6.858	13.609
	(0.685)	(1.525)	(0.752)	(0.493)	(0.724)	(1.660)	(0.732)	(0.439)	(7.124)	(8.224)	(10.264)	(13.580)
$Log(Size)_{i,t-1}$	-0.100***	-0.194***			-0.104***	-0.203***			-0.033	0.013		
	(0.013)	(0.020)			(0.013)	(0.018)			(0.031)	(0.190)		
$Vol_{i,t-1}$	0.469	1.213			0.443	1.362			10.903	10.931		
	(1.394)	(2.494)			(1.403)	(2.553)			(7.384)	(8.294)		
$Turnover_{i,t-1}$	-0.268***	-0.371***			-0.291***	-0.407***			0.040	0.103		
	(0.038)	(0.080)			(0.023)	(0.058)			(0.105)	(0.179)		
$Leverage_{i,t-1}$	-0.039	-0.183*			-0.031	-0.168			-0.156	-0.402*		
	(0.061)	(0.099)			(0.069)	(0.113)			(0.137)	(0.223)		
$BM_{i,t-1}$	-0.151***	-0.298***			-0.159***	-0.307***			-0.023	-0.117		
	(0.029)	(0.047)			(0.030)	(0.048)			(0.059)	(0.084)		
$PRratio_{i,t-1}$	0.100***	0.114***			0.090***	0.093***			0.200	0.344		
	(0.021)	(0.041)			(0.016)	(0.031)			(0.258)	(0.421)		
$Log(InsAUM)_{j,t-1}$	-0.018***	-0.455***	-0.322***		-0.020***	-0.446***	-0.323***		-0.011**	-0.613***	-0.335***	
	(0.003)	(0.027)	(0.020)		(0.003)	(0.024)	(0.020)		(0.004)	(0.043)	(0.041)	
$InsRet_{j,t-1}$	0.199	0.273	-0.009		0.161	0.223	0.070		0.439**	0.631	-0.500**	
	(0.130)	(0.259)	(0.146)		(0.118)	(0.238)	(0.126)		(0.170)	(0.365)	(0.234)	
$Lvol_{c,t}$	1.903	-4.907			1.053	-6.425*			14.262	19.612*		
	(1.911)	(4.423)			(1.511)	(3.604)			(8.442)	(10.337)		
$\Delta IR_{c,t}$	-0.050*	-0.037			-0.052*	-0.047			-0.032*	0.015		
	(0.025)	(0.052)			(0.028)	(0.052)			(0.018)	(0.028)		
$FXRet_{c,t}$	0.464	0.298			0.329	0.180			0.992***	0.732		
	(0.327)	(0.402)			(0.363)	(0.412)			(0.298)	(0.529)		
$FXvol_{c,t}$	-2.808	16.721			6.552	30.289**			-44.424***	-54.506**		
	(6.251)	(13.940)			(6.205)	(14.031)			(13.660)	(21.894)		
Firm FE	Yes				Yes				Yes			
Firm * Investor FE		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Firm * Quarter FE			Yes	Yes			Yes	Yes			Yes	Yes
Investor * Quarter FE				Yes				Yes				Yes
Observations	116,689,815	116,342,566	116,185,127	116,177,670	106,693,766	106,365,611	106,256,581	106,247,012	9,996,049	9,976,955	9,928,546	9,881,570
R^2	0.003	0.028	0.089	0.179	0.003	0.028	0.085	0.180	0.004	0.027	0.130	0.259

Table 7: **Global Volatility and Capital Flows: Exit and Entry**

This table presents the investor-firm level regression results for relation between the global uncertainty and institutional exit and entry based on sample between 2000 and 2020. The dependent variable $Exit_{i,j,t}$ is equal to one if institution j's$holding_{i,t-1} > 0$, $holding_t = 0$, and zero otherwise. The dependent variable $Entry_{i,j,t}$ is equal to one if institution j's $holding_{i,t-1} = 0$, $holding_t > 0$, and zero otherwise. The main independent variables are global index volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Exit					Entry				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Gvol_t$	1.177***	1.203***		1.213***		-0.054	-0.019		-0.025	
	(0.212)	(0.167)		(0.166)		(0.082)	(0.070)		(0.078)	
$Gvol_t * D\_FOR_{i,j}$		-0.063	0.911***	-0.023	0.865**		-0.084	-0.190	-0.084	-0.145
		(0.240)	(0.306)	(0.265)	(0.339)		(0.063)	(0.114)	(0.063)	(0.095)
$Gvol_t * Log(Size)_{i,t-1}$				-0.034					0.028*	
				(0.052)					(0.015)	
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$				-0.004***	-0.006**				0.005***	0.005***
				(0.001)	(0.002)				(0.001)	(0.001)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$				-0.197**	-0.086				0.040	0.068***
				(0.095)	(0.086)				(0.025)	(0.020)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$				1.309	-0.327				-0.621	-0.983***
				(2.920)	(0.285)				(0.695)	(0.133)
$Gvol_t * Vol_{i,t-1}$				1.686					0.324	
				(4.266)					(0.721)	
$D\_FOR_{i,j} * Vol_{i,t-1}$				-0.043	0.015				0.059	0.030***
				(0.034)	(0.018)				(0.057)	(0.009)
$Log(Size)_{i,t-1}$	-0.013***	-0.013***		-0.010***		0.002*	0.002*		-0.000	
	(0.001)	(0.001)		(0.001)		(0.001)	(0.001)		(0.001)	
$Vol_{i,t-1}$	-0.005	-0.005		-0.000		-0.036	-0.036		-0.070	
	(0.040)	(0.040)		(0.075)		(0.051)	(0.051)		(0.080)	
$Turnover_{i,t-1}$	0.016***	0.016***		0.016***		0.000	0.000		0.001	
	(0.002)	(0.002)		(0.002)		(0.001)	(0.001)		(0.002)	
$Leverage_{i,t-1}$	0.018***	0.018***		0.017***		0.021***	0.021***		0.022***	
	(0.004)	(0.004)		(0.004)		(0.004)	(0.004)		(0.004)	
$BM_{i,t-1}$	0.013***	0.013***		0.013***		0.015***	0.015***		0.015***	
	(0.002)	(0.002)		(0.002)		(0.001)	(0.001)		(0.001)	
$PRratio_{i,t-1}$	-0.009***	-0.009***		-0.009***		-0.003**	-0.003**		-0.003**	
	(0.002)	(0.002)		(0.002)		(0.001)	(0.001)		(0.001)	
$Log(InsAUM)_{j,t-1}$	0.002**	0.002**		0.003**		-0.004**	-0.004**		-0.004**	
	(0.001)	(0.001)		(0.001)		(0.002)	(0.002)		(0.002)	
$InsRet_{j,t-1}$	-0.010	-0.010		-0.009		-0.008	-0.008		-0.008	
	(0.014)	(0.014)		(0.014)		(0.005)	(0.005)		(0.005)	
$Lvol_{c,t}$	-0.237*	-0.235*		-0.216		-0.046	-0.045		-0.057	
	(0.120)	(0.125)		(0.154)		(0.059)	(0.058)		(0.069)	
$\Delta IR_{c,t}$	0.004	0.004		0.004		0.003**	0.003**		0.003*	
	(0.002)	(0.002)		(0.002)		(0.001)	(0.001)		(0.001)	
$FXRet_{c,t}$	-0.021	-0.021		-0.023		-0.018	-0.018		-0.016	
	(0.025)	(0.025)		(0.026)		(0.013)	(0.013)		(0.013)	
$FXvol_{c,t}$	-0.926	-0.882		-1.030		0.080	0.139		0.226	
	(0.742)	(0.873)		(0.894)		(0.352)	(0.377)		(0.362)	
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE			Yes		Yes			Yes		Yes
Investor * Quarter FE			Yes		Yes			Yes		Yes
Observations	116,424,649	116,424,649	116,260,167	116,424,649	116,260,167	116,424,649	116,424,649	116,260,167	116,424,649	116,260,167
R^2	0.144	0.144	0.282	0.144	0.282	0.079	0.079	0.159	0.079	0.159

Table 8: **Institutional Flows and Future Firm Stability**

This table presents the firm level regression results for relation between the institutional ownership changes and future stock stability (volatility and liquidity) based on sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. Panel A reports the results for firm volatility, and Panel B reports the results for firm liquidity that is measured by turnover ratio. The dependent variables are the stock return volatility in next quarter $Vol_{i,t+1}$ for Panel A, and liquidity in next quarter $Turnover_{i,t+1}$ for Panel B. The main independent variables of interest are $\Delta Log(FOR)$, $\Delta Log(DOM)$, $\Delta Log(IO)$, and their interaction terms with global index volatility ($Gvol$) and firm size. Control variables include firm characteristics ($Log(Size)$, Vol, $Turnover$,$Leverage$, BM, $PRratio$). The data section provides detailed definitions of these variables. All regression models include firm, economy* quarter fixed effects. Robust standard errors clustered at firm and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Firm Volatility

	ALL						Developed						Emerging					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	$Vol_{i,t+1}$						$Vol_{i,t+1}$						$Vol_{i,t+1}$					
$\Delta Log(FOR)_{i,t}$	-0.048**	0.140***	0.125***	0.010	0.136***	0.104***	-0.045**	0.145***	0.130***	0.012	0.145***	0.111***	-0.052**	0.089**	0.071*	-0.043	-0.029	-0.059
	(0.018)	(0.027)	(0.024)	(0.017)	(0.026)	(0.024)	(0.019)	(0.028)	(0.024)	(0.018)	(0.026)	(0.024)	(0.024)	(0.038)	(0.039)	(0.026)	(0.059)	(0.064)
$\Delta Log(DOM)_{i,t}$	-0.118***	0.044*	0.051**				-0.170***	0.033	0.063*				0.009	0.078***	0.085***			
	(0.015)	(0.026)	(0.022)				(0.018)	(0.039)	(0.035)				(0.013)	(0.022)	(0.022)			
$\Delta Log(IO)_{i,t}$				-0.171***	0.006	0.071**				-0.240***	-0.004	0.105**				-0.007	0.094**	0.102**
				(0.017)	(0.034)	(0.029)				(0.021)	(0.048)	(0.040)				(0.018)	(0.037)	(0.042)
$\Delta Log(FOR)_{i,t} * Gvol_t$		-21.736***	-20.747***		-14.547***	-12.994***		-21.967***	-20.906***		-15.356***	-13.192***		-16.721***	-15.914***		-1.944	-1.574
		(2.548)	(2.194)		(2.350)	(2.330)		(2.622)	(2.271)		(2.352)	(2.224)		(3.314)	(3.396)		(6.607)	(7.494)
$\Delta Log(DOM)_{i,t} * Gvol_t$		-18.986***	-18.120***					-23.679***	-23.233***					-8.138***	-8.994***			
		(3.171)	(2.631)					(4.912)	(4.327)					(2.405)	(2.327)			
$\Delta Log(IO)_{i,t} * Gvol_t$					-20.776***	-23.006***					-27.522***	-33.547***					-11.690***	-10.854**
					(4.263)	(3.509)					(6.062)	(4.909)					(3.993)	(4.760)
$\Delta Log(FOR)_{i,t} * Gvol_t * Log(Size)_{i,t}$			-5.190**			-4.178*			-5.074**			-3.376			-5.518**			-11.318***
			(2.308)			(2.331)			(2.540)			(2.430)			(2.285)			(2.154)
$\Delta Log(FOR)_{i,t} * Log(Size)_{i,t}$			0.119***			0.087***			0.119***			0.084***			0.108***			0.134***
			(0.021)			(0.020)			(0.023)			(0.021)			(0.025)			(0.031)
$\Delta Log(DOM)_{i,t} * Gvol_t * Log(Size)_{i,t}$			0.981						-0.909						2.376			
			(1.333)						(1.840)						(1.728)			
$\Delta Log(IO)_{i,t} * Gvol_t * Log(Size)_{i,t}$						-3.269*						-7.074***						3.992*
						(1.696)						(1.686)						(2.349)
$\Delta Log(DOM)_{i,t} * Log(Size)_{i,t}$			0.056***						0.083***						-0.019			
			(0.013)						(0.017)						(0.016)			
$\Delta Log(IO)_{i,t} * Log(Size)_{i,t}$						0.091***						0.126***						-0.014
						(0.015)						(0.016)						(0.023)
$Gvol_t * Log(Size)$			-0.274			-0.344			-0.395			-0.474			0.274			0.280
			(1.131)			(1.141)			(1.231)			(1.234)			(0.807)			(0.816)
$Vol_{i,t}$	0.187***	0.187***	0.187***	0.187***	0.187***	0.187***	0.185***	0.185***	0.184***	0.185***	0.185***	0.184***	0.230***	0.230***	0.230***	0.230***	0.230***	0.230***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.006)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
$Log(Size)_{i,t}$	-0.270***	-0.270***	-0.268***	-0.270***	-0.270***	-0.267***	-0.290***	-0.289***	-0.287***	-0.289***	-0.289***	-0.285***	-0.184***	-0.184***	-0.187***	-0.184***	-0.184***	-0.186***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)	(0.022)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
$Turnover_{i,t}$	0.097***	0.097***	0.099***	0.098***	0.097***	0.099***	0.109***	0.108***	0.111***	0.109***	0.109***	0.111***	0.030	0.030	0.031	0.030	0.030	0.031
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.026)	(0.026)	(0.025)	(0.025)	(0.025)	(0.025)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
$Leverage_{i,t}$	0.382***	0.382***	0.381***	0.381***	0.382***	0.380***	0.395***	0.396***	0.394***	0.395***	0.395***	0.394***	0.342***	0.342***	0.341***	0.342***	0.342***	0.341***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
$BM_{i,t}$	0.028**	0.028**	0.027**	0.028**	0.028**	0.027**	0.033**	0.033**	0.033***	0.033**	0.033**	0.032***	0.024**	0.024**	0.024**	0.024**	0.024**	0.024**
	(0.011)	(0.011)	(0.010)	(0.011)	(0.011)	(0.010)	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)	(0.012)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
$PRratio_{i,t}$	-0.115***	-0.114***	-0.113***	-0.114***	-0.114***	-0.113***	-0.133***	-0.133***	-0.132***	-0.132***	-0.132***	-0.132***	-0.057	-0.057	-0.057	-0.057	-0.057	-0.057
	(0.024)	(0.024)	(0.023)	(0.024)	(0.024)	(0.023)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economy * Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,203,736	1,203,736	1,203,736	1,203,736	1,203,736	1,203,736	926,084	926,084	926,084	926,084	926,084	926,084	277,652	277,652	277,652	277,652	277,652	277,652
R^2	0.733	0.733	0.733	0.733	0.733	0.733	0.743	0.744	0.744	0.744	0.744	0.744	0.584	0.585	0.585	0.584	0.584	0.585

Table 8 (Continued)

Panel B: Firm Liquidity

	ALL						Developed						Emerging					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	$Turnover_{i,t+1}$						$Turnover_{i,t+1}$						$Turnover_{i,t+1}$					
$\Delta Log(FOR)_{i,t}$	0.037***	0.046***	0.052***	0.037***	0.042***	0.047***	0.043***	0.049***	0.055***	0.044***	0.047***	0.052***	-0.018*	0.028*	0.035**	-0.074***	-0.038**	-0.032
	(0.003)	(0.008)	(0.007)	(0.003)	(0.008)	(0.007)	(0.003)	(0.009)	(0.008)	(0.003)	(0.007)	(0.006)	(0.009)	(0.015)	(0.015)	(0.010)	(0.019)	(0.022)
$\Delta Log(DOM)_{i,t}$	0.025***	0.027***	0.031***				0.014***	0.017*	0.022**				0.047***	0.049***	0.055***			
	(0.003)	(0.006)	(0.006)				(0.003)	(0.010)	(0.009)				(0.006)	(0.010)	(0.011)			
$\Delta Log(IO)_{i,t}$				0.002	0.014**	0.014**				0.001	0.008	0.013				0.047***	0.055***	0.056**
				(0.003)	(0.005)	(0.006)				(0.003)	(0.009)	(0.011)				(0.008)	(0.019)	(0.021)
$\Delta Log(FOR)_{i,t} * Gvol_t$		-1.036	-1.734**		-0.543	-1.078		-0.599	-1.382		-0.366	-0.976		-5.368***	-5.675***		-4.298**	-4.232
		(0.855)	(0.781)		(0.798)	(0.747)		(0.989)	(0.888)		(0.756)	(0.634)		(1.429)	(1.402)		(1.998)	(2.547)
$\Delta Log(DOM)_{i,t} * Gvol_t$		-0.301	-0.876					-0.350	-0.962					-0.245	-0.571			
		(0.716)	(0.602)					(1.247)	(1.143)					(0.947)	(1.117)			
$\Delta Log(IO)_{i,t} * Gvol_t$					-1.343**	-1.805***					-0.898	-1.621					-1.004	-1.317
					(0.511)	(0.579)					(1.157)	(1.371)					(2.198)	(2.561)
$\Delta Log(FOR)_{i,t} * Gvol_t * Log(Size)_{i,t}$			0.180			0.097			0.023			-0.019			1.539			1.814*
			(0.382)			(0.410)			(0.365)			(0.445)			(0.949)			(0.974)
$\Delta Log(DOM)_{i,t} * Gvol_t * Log(Size)_{i,t}$			0.121						0.186						0.036			
			(0.177)						(0.282)						(0.488)			
$\Delta Log(IO)_{i,t} * Gvol_t * Log(Size)_{i,t}$						0.127						0.055						-0.298
						(0.280)						(0.531)						(0.638)
$\Delta Log(FOR)_{i,t} * Log(Size)_{i,t}$			-0.001			0.002			0.003			0.003			-0.035***			-0.035***
			(0.004)			(0.004)			(0.004)			(0.005)			(0.009)			(0.010)
$\Delta Log(DOM)_{i,t} * Log(Size)_{i,t}$			-0.000						0.001						-0.011**			
			(0.002)						(0.003)						(0.005)			
$\Delta Log(IO)_{i,t} * Log(Size)_{i,t}$						-0.005						-0.002						0.003
						(0.003)						(0.004)						(0.008)
$Gvol_t * Log(Size)$			1.073***			1.078***			1.134***			1.135***			0.693**			0.698**
			(0.324)			(0.327)			(0.331)			(0.334)			(0.301)			(0.300)
$Vol_{i,t}$	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001*	0.001*	0.001**	0.001**	0.001**	0.001**	0.010***	0.010***	0.010***	0.011***	0.011***	0.010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Log(Size)_{i,t}$	0.018***	0.018***	0.008**	0.018***	0.018***	0.008***	0.022***	0.022***	0.012***	0.022***	0.022***	0.012***	0.000	-0.000	-0.006	0.000	0.000	-0.006
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$Turnover_{i,t}$	0.362***	0.362***	0.360***	0.362***	0.362***	0.360***	0.373***	0.373***	0.370***	0.372***	0.372***	0.369***	0.332***	0.332***	0.331***	0.332***	0.332***	0.331***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)
$Leverage_{i,t}$	0.054***	0.054***	0.054***	0.054***	0.054***	0.054***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.040***	0.040***	0.040***	0.040***	0.040***	0.040***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
$BM_{i,t}$	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$PRratio_{i,t}$	0.008**	0.008**	0.008**	0.009**	0.009**	0.008**	0.010***	0.010***	0.010**	0.010***	0.010***	0.010**	0.013	0.013	0.012	0.013	0.013	0.012
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economy * Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,203,736	1,203,736	1,203,736	1,203,736	1,203,736	1,203,736	926,084	926,084	926,084	926,084	926,084	926,084	277,652	277,652	277,652	277,652	277,652	277,652
R^2	0.663	0.663	0.664	0.663	0.663	0.664	0.672	0.672	0.673	0.672	0.672	0.673	0.645	0.645	0.646	0.645	0.645	0.645

Table 9: **Institutional Ownership and Future Stock-Level Returns and Price Informativeness**

This table presents the firm level regression results for relation between the institutional ownership and future return and price informativeness based on sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variables are the stock return in next quarter (year) for Panel A, and earnings over asset in next quarter (year) ($E_{i,t+1}/A_{i,t}$) for Panel B. The main independent variables are institutional ownership levels, IO, DOM, and FOR. Control variables include firm characteristics ($Log(Size)$, Ret, Vol, $Turnover$,$Leverage$, BM, and $PRratio$). The data section provides detailed definitions of these variables. In Panel A, regression model includes economy and quarter fixed effects. In Panel B, regression model includes firm and quarter fixed effects. Robust standard errors clustered at firm and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Firm Return

	ALL				**Developed**				**Emerging**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Ret_{i,t+1}$	$Ret_{i,t+1}$	$Ret_{i,t+1\to4}$	$Ret_{i,t+1\to4}$	$Ret_{i,t+1}$	$Ret_{i,t+1}$	$Ret_{i,t+1\to4}$	$Ret_{i,t+1\to4}$	$Ret_{i,t+1}$	$Ret_{i,t+1}$	$Ret_{i,t+1\to4}$	$Ret_{i,t+1\to4}$
$FOR_{i,t}$	0.043***	0.018	0.176***	0.088**	0.045***	0.021	0.168***	0.084**	0.012	0.042*	0.089**	0.248***
	(0.012)	(0.014)	(0.031)	(0.034)	(0.014)	(0.017)	(0.038)	(0.039)	(0.016)	(0.025)	(0.041)	(0.064)
$DOM_{i,t}$	0.023***		0.083***		0.022***		0.078***		-0.029		-0.148**	
	(0.008)		(0.016)		(0.008)		(0.016)		(0.022)		(0.060)	
$IO_{i,t}$		0.022***		0.079***		0.021***		0.074***		-0.028		-0.148***
		(0.008)		(0.015)		(0.008)		(0.015)		(0.019)		(0.054)
$Ret_{i,t}$	0.026**	0.026**	0.062**	0.062**	0.025**	0.025**	0.061**	0.061**	0.016	0.016	0.061*	0.061*
	(0.011)	(0.011)	(0.026)	(0.026)	(0.012)	(0.012)	(0.027)	(0.027)	(0.016)	(0.016)	(0.032)	(0.032)
$Log(Size)_{i,t}$	-0.000	-0.000	-0.005**	-0.004**	0.000	0.000	-0.002	-0.002	-0.003**	-0.003**	-0.016***	-0.016***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
$Vol_{i,t}$	-0.256	-0.258	0.812**	0.805**	-0.221	-0.222	1.045**	1.038**	-0.559***	-0.559***	-1.353***	-1.353***
	(0.171)	(0.171)	(0.403)	(0.402)	(0.184)	(0.184)	(0.433)	(0.432)	(0.186)	(0.186)	(0.444)	(0.443)
$Turnover_{i,t}$	-0.020***	-0.020***	-0.074***	-0.073***	-0.021***	-0.021***	-0.075***	-0.074***	-0.020***	-0.020***	-0.072***	-0.072***
	(0.004)	(0.004)	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.009)	(0.003)	(0.003)	(0.008)	(0.008)
$Leverage_{i,t}$	0.004	0.004	0.024**	0.024**	0.007	0.007	0.036***	0.036***	-0.007	-0.007	-0.024*	-0.024*
	(0.006)	(0.006)	(0.011)	(0.011)	(0.007)	(0.007)	(0.013)	(0.013)	(0.005)	(0.005)	(0.014)	(0.014)
$BM_{i,t}$	0.014***	0.014***	0.044***	0.044***	0.014***	0.014***	0.045***	0.045***	0.011***	0.011***	0.035***	0.035***
	(0.002)	(0.002)	(0.005)	(0.005)	(0.002)	(0.002)	(0.005)	(0.005)	(0.002)	(0.002)	(0.006)	(0.006)
$PRratio_{i,t}$	0.027***	0.028***	0.095***	0.095***	0.026***	0.026***	0.094***	0.094***	0.035***	0.035***	0.094***	0.094***
	(0.003)	(0.003)	(0.009)	(0.009)	(0.004)	(0.004)	(0.009)	(0.009)	(0.008)	(0.008)	(0.020)	(0.020)
Economy FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,163,608	1,163,608	1,163,608	1,163,608	898,938	898,938	898,938	898,938	264,670	264,670	264,670	264,670
R^2	0.145	0.145	0.158	0.158	0.148	0.148	0.156	0.156	0.175	0.175	0.215	0.216

(Continued)

Panel B: Firm Price Informativeness

	ALL				Developed				Emerging			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$E_{i,t+1}/A_{i,t}$	$E_{i,t+1}/A_{i,t}$	$E_{i,t+1\to4}/A_{i,t}$	$E_{i,t+1\to4}/A_{i,t}$	$E_{i,t+1}/A_{i,t}$	$E_{i,t+1}/A_{i,t}$	$E_{i,t+1\to4}/A_{i,t}$	$E_{i,t+1\to4}/A_{i,t}$	$E_{i,t+1}/A_{i,t}$	$E_{i,t+1}/A_{i,t}$	$E_{i,t+1\to4}/A_{i,t}$	$E_{i,t+1\to4}/A_{i,t}$
$log(M/A)_{i,t} * FOR_{i,t}$	1.854***	0.842***	8.556***	4.788***	1.884***	0.741***	8.714***	4.440***	1.345***	0.195	6.275***	0.618
	(0.204)	(0.215)	(0.768)	(0.765)	(0.238)	(0.246)	(0.895)	(0.887)	(0.273)	(0.430)	(1.047)	(1.765)
$log(M/A)_{i,t} * DOM_{i,t}$	0.932***		3.472***		1.041***		3.897***		1.124***		5.544***	
	(0.059)		(0.229)		(0.062)		(0.247)		(0.307)		(1.471)	
$log(M/A)_{i,t} * IO_{i,t}$		0.928***		3.457***		1.038***		3.886***		1.092***		5.336***
		(0.059)		(0.228)		(0.062)		(0.246)		(0.290)		(1.396)
$FOR_{i,t}$	-0.236	-0.669***	-1.304	-2.334**	-0.678**	-0.991***	-3.183***	-3.705***	0.325	-0.489	1.221	-0.668
	(0.213)	(0.215)	(0.964)	(1.007)	(0.275)	(0.263)	(1.193)	(1.196)	(0.332)	(0.484)	(1.360)	(2.089)
$DOM_{i,t}$	0.399***		0.879*		0.288**		0.413		0.802**		2.062	
	(0.103)		(0.472)		(0.111)		(0.510)		(0.334)		(1.617)	
$IO_{i,t}$		0.417***		1.010**		0.301***		0.530		0.791**		1.877
		(0.102)		(0.465)		(0.110)		(0.504)		(0.310)		(1.499)
$log(M/A)_{i,t}$	0.005	0.009	0.516***	0.529***	-0.185***	-0.182***	-0.318	-0.305	0.827***	0.829***	4.168***	4.183***
	(0.057)	(0.057)	(0.186)	(0.186)	(0.063)	(0.063)	(0.208)	(0.208)	(0.070)	(0.070)	(0.225)	(0.224)
$E_{i,t}/A_{i,t}$	0.264***	0.264***	0.830***	0.830***	0.273***	0.273***	0.847***	0.847***	0.187***	0.187***	0.616***	0.616***
	(0.014)	(0.014)	(0.040)	(0.040)	(0.014)	(0.014)	(0.041)	(0.041)	(0.020)	(0.020)	(0.050)	(0.050)
$Log(Size)_{i,t}$	0.416***	0.416***	0.726***	0.721***	0.501***	0.500***	1.173***	1.167***	-0.005	-0.003	-1.503***	-1.499***
	(0.033)	(0.033)	(0.121)	(0.121)	(0.034)	(0.034)	(0.137)	(0.137)	(0.058)	(0.058)	(0.178)	(0.178)
$Vol_{i,t}$	-0.664**	-0.657**	-1.839	-1.800	-0.819**	-0.812**	-2.655**	-2.619**	-3.006**	-2.988**	-7.320*	-7.252*
	(0.304)	(0.303)	(1.129)	(1.128)	(0.313)	(0.313)	(1.168)	(1.168)	(1.292)	(1.292)	(4.069)	(4.063)
$Turnover_{i,t}$	0.075***	0.074***	0.136	0.129	0.058*	0.057*	0.031	0.023	0.047	0.046	0.085	0.083
	(0.025)	(0.025)	(0.107)	(0.107)	(0.033)	(0.033)	(0.142)	(0.142)	(0.033)	(0.033)	(0.117)	(0.116)
$Leverage_{i,t}$	0.500***	0.503***	2.963***	2.973***	0.565***	0.567***	3.301***	3.312***	0.423**	0.424**	2.515***	2.521***
	(0.128)	(0.128)	(0.447)	(0.447)	(0.140)	(0.140)	(0.505)	(0.505)	(0.169)	(0.169)	(0.592)	(0.593)
$BM_{i,t}$	-0.073***	-0.073***	-0.535***	-0.535***	-0.115***	-0.115***	-0.703***	-0.703***	0.040	0.041	-0.099	-0.095
	(0.024)	(0.024)	(0.107)	(0.107)	(0.031)	(0.031)	(0.133)	(0.133)	(0.026)	(0.026)	(0.100)	(0.100)
$PRratio_{i,t}$	3.485***	3.487***	12.765***	12.772***	3.571***	3.572***	13.279***	13.287***	2.766***	2.770***	9.100***	9.113***
	(0.133)	(0.133)	(0.605)	(0.605)	(0.150)	(0.150)	(0.646)	(0.646)	(0.227)	(0.228)	(0.945)	(0.945)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	676,236	676,236	676,236	676,236	507,420	507,420	507,420	507,420	168,816	168,816	168,816	168,816
R^2	0.627	0.627	0.735	0.735	0.639	0.639	0.742	0.742	0.453	0.453	0.622	0.622

Online Appendix

A Correlation of Gvol with different volatility measures

Figure A.1 displays the calculated correlation coefficients between our measure of global volatility (Gvol), country-specific volatilities, and other measures of uncertainty used in the literature. Financial Uncertainty, MacroUncertainty, and RealUncertainty are measures employed in Jurado, Ludvigson, and Ng (2015). VIX refers to the CBOE Volatility Index. EPU is the baseline Economic Policy Uncertainty index, as constructed by Baker, Bloom, and Davis (2016). The measures we use are directly taken from Ludvigson, Ma, and Ng (2021)'s data files. WUI is the World Uncertainty Index, as constructed by Ahir, Bloom, and Furceri (2022). GEPU_current and GEPU_ppp are global economic policy uncertainty indices, created by Davis (2016). Both of these indices can be accessed at http://www.policyuncertainty.com/.

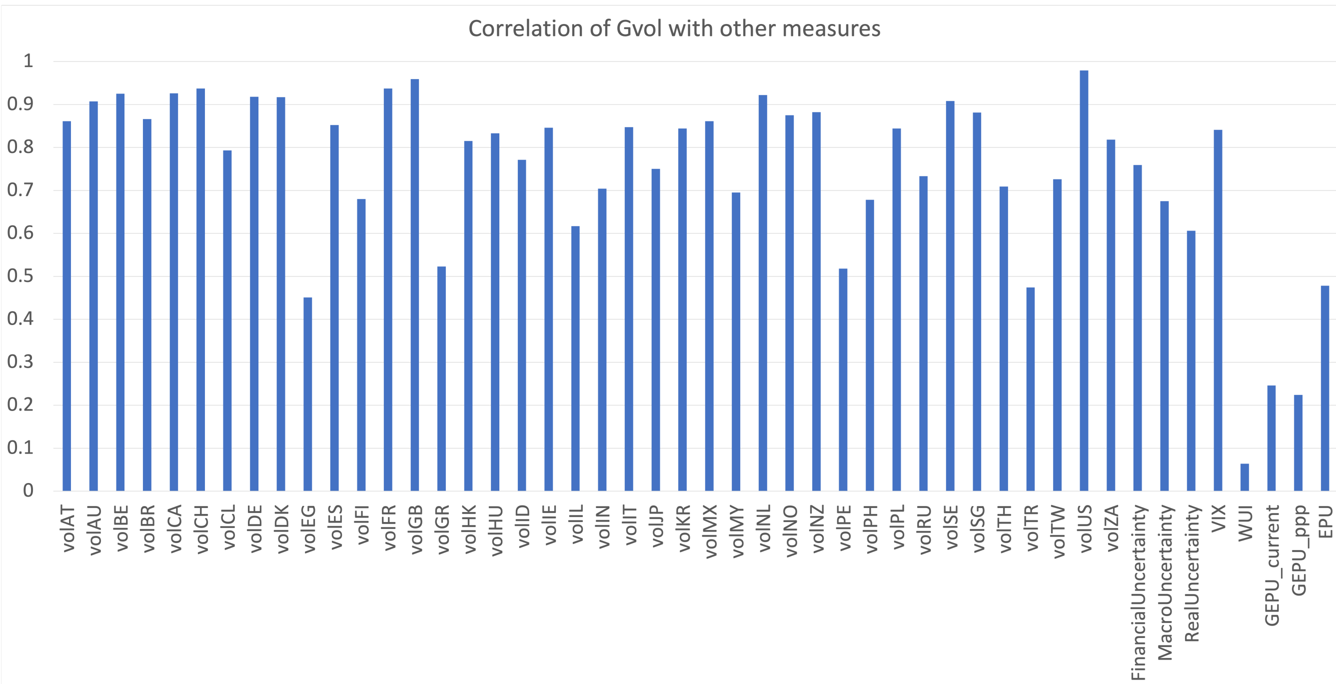


Figure A.1: Correlation of Gvol with country-specific volatility measures and other measures of uncertainty.

B Coverage ratio of cross-border holdings

Figure B.2 presents the ratio of foreign cross-border holdings from FactSet database over IMF coordinated portfolio investment survey data (CPIS) at year 2020 sample. We use the "equity and investment fund shares" statistics from CPIS portfolio investment data .

C Additional tables

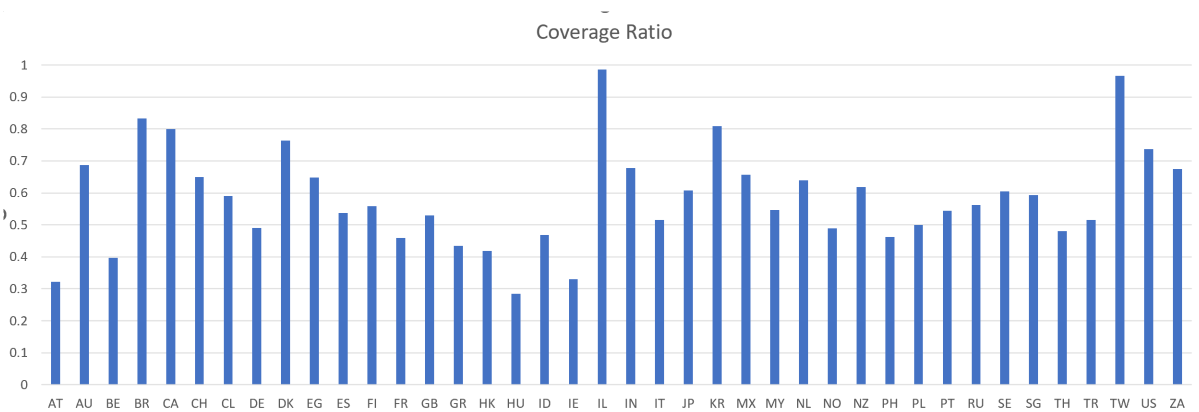


Figure B.2: Coverage of cross-border holdings of stocks.

Table C.1: **Summary Statistics: Ownership**

The sample period is 2000-2020 and in quarterly frequency. # of firms is the number of firms in each country. *IO*, *FOR* and *DOM* are equal-weighted total, foreign and domestic firm level institutional ownership in percentage levels across the whole sample, respectively.

Economies	*IO%*	*DOM%*	*FOR%*	# of firms
Developed Economies				
Australia	10.35	2.60	7.75	1075
Austria	14.65	2.09	12.57	93
Belgium	12.16	2.20	9.96	150
Canada	20.74	9.31	11.42	1988
Denmark	11.61	1.49	10.13	167
Finland	20.79	9.67	11.11	168
France	13.41	5.40	8.01	794
Germany	16.15	4.96	11.18	778
Hong Kong	5.22	0.84	4.38	924
Ireland	41.28	0.43	40.85	86
Israel	11.36	6.23	5.12	304
Italy	11.09	2.39	8.71	404
Japan	11.14	5.03	6.11	4081
Netherlands	31.74	3.47	28.27	177
New Zealand	8.20	1.39	6.81	116
Norway	15.66	7.66	7.99	244
Portugal	12.51	1.09	11.43	47
Singapore	4.69	0.56	4.13	423
Spain	14.05	4.32	9.73	209
Sweden	22.17	14.38	7.79	436
Switzerland	19.15	6.52	12.63	286
United Kingdom	31.42	23.13	8.28	1904
United States	60.84	55.34	5.50	8007
Emerging Economies				
Brazil	13.98	1.03	12.95	223
Chile	5.01	1.24	3.77	102
Egypt	5.41	0.00	5.41	86
Greece	8.35	1.48	6.87	205
Hungary	6.81	0.87	5.94	28
India	11.51	6.62	4.89	1187
Indonesia	4.77	0.29	4.49	302
Malaysia	4.46	1.78	2.68	723
Mexico	15.67	5.47	10.20	128
Peru	12.37	6.06	6.31	39
Philippines	5.20	0.05	5.15	133
Poland	12.36	9.98	2.37	442
Russia	6.85	0.24	6.61	120
South Africa	15.58	6.45	9.13	314
South Korea	4.46	0.21	4.25	1524
Taiwan	6.65	0.56	6.09	1208
Thailand	3.90	0.09	3.80	386
Turkey	5.56	0.09	5.47	219
Developed	27.37	20.06	7.31	22861
Emerging	7.50	2.44	5.07	7369
All	21.43	14.79	6.64	30230

Table C.2: **Summary Statistics: Variables**

The sample period is 2000-2020 and in quarterly frequency. This table reports the mean, standard deviation, median, 10 and 90 percentiles for institutional ownership, market, and accounting variables. Panel A reports statistics on institution-firm level, and Panel B reports statistics on firm level. In Panel A, D_FOR is a dummy variable that equals to one if the institution and firm are from different economics, $Gvol$ is quarterly volatility based on daily return for MSCI ACWI index. Firm variables include the natural logarithm of firm market capitalization ($Log(size)$), stock volatility, stock return, turnover ratio, leverage, book-to-market (BM) and profitability ($PRratio$). Institution investor variables include the natural logarithm of institution investor's total asset under management (Log(InsAUM)) and institution investor's return ($InsRet$). Economic-wide variables include local market stock return volatility ($Lvol$), change of three-month interest rate (ΔIR), currency return ($FXRet$), currency volatility ($FXvol$).

Variables	Mean	STD	Q10	Median	Q90
Panel A: Investor - Firm Level					
$\Delta Log(IO)$	0.098	3.394	-1.117	0.000	1.513
D_FOR	0.462	0.500	0.000	0.000	1.000
$Gvol$	0.009	0.005	0.005	0.007	0.014
$Log(Size)$	8.388	1.830	5.774	8.420	10.943
Vol	0.028	0.038	0.011	0.019	0.040
$Turnover$	0.447	0.410	0.088	0.331	0.933
$Leverage$	0.232	0.183	0.002	0.213	0.477
BM	0.548	0.444	0.126	0.444	1.097
$PRratio$	0.319	0.238	0.065	0.266	0.631
$Log(InsAUM)$	8.117	2.487	4.774	8.278	11.189
$InsRet$	0.045	0.093	-0.077	0.150	0.150
$Lvol$	0.012	0.007	0.006	0.010	0.010
ΔIR	-0.039	0.377	-0.317	0.000	-0.317
$FXRet(\%)$	0.000	0.029	-0.027	0.000	0.029
$FXvol$	0.002	0.003	0.000	0.000	0.006
Panel B: Firm Level					
$\Delta Log(IO)$	0.018	0.284	-0.155	0.000	0.201
$Gvol$	0.009	0.005	0.005	0.007	0.014
$\Delta Log(DOM)$	0.002	0.303	-0.158	0.000	0.188
$\Delta Log(FOR)$	0.024	0.342	-0.189	0.000	0.262

Table C.3: **Summary Statistics: Institutional Investors' Portfolios**

The sample period is 2000-2020 and in quarterly frequency. This table reports number of institution portfolios for each institution type and average number of stock holdings per institution portfolio per quarter.

Institution Type	# of Institutional Investor Portfolios	# of Stock Holdings
Banks/Custodial	8	1081
Insurance Companies	141	194
Investment Companies	805	353
Investment Advisors	7114	308
Pension Funds and Endowments	406	523
Hedge Funds/Venture Capital	4671	132
Total	13145	267

Table C.4: **Global Volatility and Capital Flows: Excluding US Stocks or Investors**

This table presents the investor-firm level regression results for relation between the global volatility and non-US institutional ownership changes based on sample between 2000 and 2020. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variables are global index volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: No US firms				Panel B: No US investors			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Log(IO)_{i,j,t}$				$\Delta Log(IO)_{i,j,t}$			
$Gvol_t$	-5.447	-15.101**			-0.739	-2.635		
	(4.816)	(5.835)			(4.066)	(6.953)		
$D\_FOR_{i,j}$	0.183***				0.181***			
	(0.028)				(0.029)			
$Gvol_t * D\_FOR_{i,j}$	-8.973***	-14.358***	-14.419**	-19.860*	-9.298***	-14.266**	-15.229**	-21.557*
	(1.818)	(4.995)	(5.970)	(10.441)	(1.905)	(5.407)	(6.567)	(10.963)
$Gvol_t * Log(Size)_{i,t-1}$	4.821***	5.435***			5.043***	5.801***		
	(0.558)	(0.966)			(0.582)	(0.972)		
$Gvol_t * Vol_{i,t-1}$	3.099	-27.391			8.054	-13.998		
	(16.241)	(21.274)			(15.238)	(20.753)		
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.360	0.729	3.355***	5.503***	1.102	1.873	5.179***	6.452***
	(0.766)	(0.924)	(0.694)	(1.577)	(0.684)	(1.113)	(1.347)	(1.628)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	-26.577**	-25.646	-23.583***	13.942*	-23.237	-4.914	-5.263	-0.427
	(11.931)	(17.466)	(6.824)	(7.098)	(19.980)	(15.501)	(6.321)	(7.254)
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.001	-0.027	-0.112**	-0.172***	-0.006	-0.043	-0.131**	-0.177***
	(0.010)	(0.038)	(0.049)	(0.049)	(0.009)	(0.035)	(0.051)	(0.054)
$D\_FOR_{i,j} * Vol_{i,t-1}$	0.488***	0.568*	-0.782***	-1.532***	0.737**	0.961	-0.938***	-1.486***
	(0.098)	(0.330)	(0.169)	(0.242)	(0.311)	(1.059)	(0.285)	(0.294)
$Log(Size)_{i,t-1}$	-0.121***	-0.131***			-0.118***	-0.115***		
	(0.026)	(0.035)			(0.026)	(0.033)		
$Vol_{i,t-1}$	-0.359	-0.698**			-0.205	-0.767**		
	(0.373)	(0.260)			(0.563)	(0.334)		
$Turnover_{i,t-1}$	-0.142**	-0.101			-0.220***	-0.205***		
	(0.068)	(0.096)			(0.042)	(0.074)		
$Leverage_{i,t-1}$	0.046	-0.043			-0.012	-0.170		
	(0.165)	(0.234)			(0.122)	(0.179)		
$BM_{i,t-1}$	-0.161***	-0.277***			-0.164***	-0.275***		
	(0.044)	(0.071)			(0.041)	(0.066)		
$PRratio_{i,t-1}$	0.121*	0.175*			0.124***	0.174***		
	(0.060)	(0.097)			(0.041)	(0.064)		
$Log(InsAUM)_{j,t-1}$	-0.013***	-0.496***	-0.287***		-0.024***	-0.547***	-0.343***	
	(0.003)	(0.035)	(0.023)		(0.005)	(0.036)	(0.035)	
$InsRet_{j,t-1}$	0.333**	0.414	-0.256**		0.216	0.282	-0.093	
	(0.154)	(0.303)	(0.115)		(0.148)	(0.287)	(0.131)	
$Lvol_{c,t}$	5.985	9.479			0.209	-5.508		
	(4.979)	(6.254)			(3.576)	(7.125)		
$\Delta IR_{c,t}$	-0.037	0.031			-0.085*	-0.024		
	(0.039)	(0.063)			(0.049)	(0.069)		
$FXRet_{c,t}$	0.469	0.309			0.429	0.254		
	(0.336)	(0.400)			(0.345)	(0.403)		
$FXvol_{c,t}$	-8.885	0.588			-9.662	6.290		
	(10.266)	(20.204)			(8.198)	(16.030)		
Firm FE	Yes				Yes			
Firm * Investor FE		Yes	Yes	Yes		Yes	Yes	Yes
Firm * Quarter FE			Yes	Yes			Yes	Yes
Investor * Quarter FE				Yes				Yes
Observations	49,064,384	48,980,492	48,843,927	48,814,379	48,738,047	48,649,429	48,485,200	48,481,577
R^2	0.003	0.026	0.108	0.204	0.003	0.029	0.112	0.202

Table C.5: **Global Volatility and Capital Flows: Investor Portfolio Size**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on three subsamples. In each quarter (quarter and firm domicile), we split investor-firm observations equally into large, medium and small subsamples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variables are global index volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Portfolio Size Sorted by Time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Large			Medium			Small		
	$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$		
$Gvol_t$	-4.545			-12.303***			-24.667***		
	(2.838)			(3.937)			(6.738)		
$Gvol_t * D\_FOR_{i,j}$	-8.990**	-8.525***	-12.729**	-6.819	-7.013	-17.401	-1.862	-7.385	-22.735*
	(3.471)	(3.087)	(4.946)	(7.880)	(8.336)	(10.884)	(11.297)	(10.902)	(11.775)
$Gvol_t * Log(Size)_{i,t-1}$	2.468***			5.332***			5.084**		
	(0.745)			(1.175)			(2.038)		
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.042	-0.103***	-0.106**	0.040	-0.084	-0.082	0.001	-0.254**	-0.120
	(0.026)	(0.026)	(0.046)	(0.029)	(0.060)	(0.087)	(0.057)	(0.104)	(0.121)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	5.028***	5.897***	6.914***	1.784	3.136**	4.393**	2.888	4.495***	1.149
	(1.216)	(1.064)	(1.303)	(1.423)	(1.457)	(1.807)	(2.032)	(1.164)	(2.009)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	96.916	4.421	-3.562	0.869	0.103	24.242	-93.720	-89.373***	-8.083
	(61.928)	(5.402)	(4.156)	(71.014)	(47.717)	(16.680)	(61.636)	(23.580)	(10.233)
$Gvol_t * Vol_{i,t-1}$	-107.475			-27.065			16.127		
	(76.797)			(59.142)			(56.820)		
$D\_FOR_{i,j} * Vol_{i,t-1}$	-1.146	-0.951***	-1.215**	-1.468	-0.172	-1.214**	-0.797	0.923	-0.967
	(1.203)	(0.329)	(0.482)	(1.866)	(1.191)	(0.502)	(1.750)	(1.774)	(0.771)
$Log(Size)_{i,t-1}$	-0.051***			-0.289***			-0.404***		
	(0.012)			(0.035)			(0.063)		
$Vol_{i,t-1}$	0.908			1.692			1.510		
	(1.569)			(3.144)			(3.605)		
$Turnover_{i,t-1}$	-0.252***			-0.466***			-0.575***		
	(0.077)			(0.095)			(0.118)		
$Leverage_{i,t-1}$	-0.080			-0.137			-0.427***		
	(0.060)			(0.120)			(0.154)		
$BM_{i,t-1}$	-0.195***			-0.312***			-0.490***		
	(0.036)			(0.049)			(0.074)		
$PRratio_{i,t-1}$	0.066*			0.158***			0.159**		
	(0.039)			(0.048)			(0.072)		
$Log(InsAUM)_{j,t-1}$	-0.382***	-0.137***		-0.512***	-0.287***		-0.682***	-0.558***	
	(0.042)	(0.050)		(0.048)	(0.018)		(0.035)	(0.031)	
$InsRet_{j,t-1}$	0.247	0.167		0.345	0.135		0.370	-0.158	
	(0.224)	(0.214)		(0.276)	(0.188)		(0.309)	(0.124)	
$Lvol_{c,t}$	-1.079			-6.612			-8.895		
	(3.751)			(4.612)			(6.364)		
$\Delta IR_{c,t}$	-0.033			-0.024			-0.033		
	(0.041)			(0.053)			(0.073)		
$FXRet_{c,t}$	0.288			0.056			0.445		
	(0.302)			(0.420)			(0.606)		
$FXvol_{c,t}$	4.595			21.017			38.271*		
	(10.358)			(15.728)			(21.332)		
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE		Yes	Yes		Yes	Yes		Yes	Yes
Investor * Quarter FE			Yes			Yes			Yes
Observations	38,806,098	38,609,424	38,609,386	38,606,631	38,434,714	38,434,305	38,423,688	38,225,144	38,217,984
R^2	0.032	0.138	0.178	0.043	0.122	0.192	0.050	0.131	0.246

Table C.5 (Continued)

Panel B: Portfolio Size Sorted by Time and Firm Domicile

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Large			Medium			Small		
	$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$		
$Gvol_t$	-3.936*			-13.983***			-23.436***		
	(2.331)			(3.887)			(6.489)		
$Gvol_t * D\_FOR_{i,j}$	-7.431**	-7.757***	-12.455***	-3.413	-5.853	-15.771	-6.105	-12.975	-25.282**
	(3.130)	(2.839)	(4.441)	(7.056)	(8.111)	(9.863)	(10.767)	(11.605)	(12.598)
$Gvol_t * Log(Size)_{i,t-1}$	2.407***			5.252***			4.407**		
	(0.720)			(1.203)			(1.827)		
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.033	-0.085***	-0.086*	0.077**	-0.087	-0.053	0.008	-0.277***	-0.114
	(0.026)	(0.024)	(0.047)	(0.030)	(0.068)	(0.085)	(0.058)	(0.092)	(0.106)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	4.629***	5.304***	6.476***	2.000	3.362**	3.906**	3.883**	6.123***	2.390
	(1.150)	(1.008)	(1.220)	(1.406)	(1.578)	(1.691)	(1.645)	(0.735)	(2.191)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	92.271	1.494	-15.239***	-16.248	-3.721	-0.567	-74.349	-70.173**	-4.027
	(58.272)	(4.585)	(2.835)	(63.779)	(47.614)	(14.892)	(64.640)	(27.340)	(9.469)
$Gvol_t * Vol_{i,t-1}$	-103.802			-12.020			2.992		
	(75.023)			(53.334)			(61.864)		
$D\_FOR_{i,j} * Vol_{i,t-1}$	-1.302	-0.996***	-1.140***	-1.379	-0.213	-0.975**	-0.873	0.511	-0.930
	(1.232)	(0.271)	(0.416)	(1.802)	(1.145)	(0.423)	(1.769)	(1.836)	(0.734)
$Log(Size)_{i,t-1}$	-0.066***			-0.316***			-0.395***		
	(0.011)			(0.045)			(0.078)		
$Vol_{i,t-1}$	1.049			1.639			1.480		
	(1.610)			(3.034)			(3.637)		
$Turnover_{i,t-1}$	-0.266***			-0.470***			-0.545***		
	(0.063)			(0.103)			(0.147)		
$Leverage_{i,t-1}$	-0.115**			-0.182			-0.411**		
	(0.053)			(0.117)			(0.195)		
$BM_{i,t-1}$	-0.196***			-0.313***			-0.455***		
	(0.035)			(0.053)			(0.089)		
$PRratio_{i,t-1}$	0.066*			0.170***			0.209***		
	(0.034)			(0.046)			(0.076)		
$Log(InsAUM)_{j,t-1}$	-0.369***	-0.135***		-0.494***	-0.276***		-0.676***	-0.544***	
	(0.039)	(0.038)		(0.039)	(0.040)		(0.039)	(0.052)	
$InsRet_{j,t-1}$	0.216	0.166		0.302	0.101		0.400	-0.174	
	(0.205)	(0.244)		(0.267)	(0.170)		(0.317)	(0.132)	
$Lvol_{c,t}$	-2.894			-7.206			-7.520		
	(3.101)			(4.955)			(6.996)		
$\Delta IR_{c,t}$	-0.031			-0.026			-0.040		
	(0.037)			(0.053)			(0.076)		
$FXRet_{c,t}$	0.258			0.197			0.344		
	(0.295)			(0.388)			(0.560)		
$FXvol_{c,t}$	3.993			21.264			33.087		
	(9.964)			(15.307)			(20.501)		
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE		Yes	Yes		Yes	Yes		Yes	Yes
Investor * Quarter FE			Yes			Yes			Yes
Observations	38,796,639	38,584,580	38,583,424	38,591,917	38,424,587	38,414,243	38,417,896	38,224,130	38,210,314
R^2	0.033	0.137	0.180	0.044	0.122	0.198	0.050	0.133	0.250

Table C.6: **Global Volatility and Capital Flows: Excluding Tax Havens**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on two subsamples: without firms in tax haven market or without investors from tax haven market. Tax haven markets include Ireland, Singapore, Switzerland and the Netherlands, and the Cayman Islands, British Virgin Islands, Luxembourg, Hong Kong and Bermuda. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variables are global index volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: No tax haven firms				Panel B: No tax haven investors			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Log(IO)_{i,j,t}$				$\Delta Log(IO)_{i,j,t}$			
$Gvol_t$	-11.332***	-14.934***			-11.378***	-15.055***		
	(1.744)	(3.709)			(1.674)	(3.798)		
$D\_FOR_{i,j}$	0.107***				0.119***			
	(0.020)				(0.021)			
$Gvol_t * D\_FOR_{i,j}$	0.199	-2.784	-4.261	-18.139*	-0.350	-3.554	-5.538	-18.569**
	(1.904)	(5.864)	(5.679)	(9.225)	(1.753)	(5.798)	(5.469)	(9.081)
$Gvol_t * Log(Size)_{i,t-1}$	2.098***	2.676***			2.099***	2.669***		
	(0.352)	(0.791)			(0.364)	(0.776)		
$Gvol_t * Vol_{i,t-1}$	-13.023	-25.415			-13.455	-25.001		
	(57.540)	(65.631)			(57.175)	(64.924)		
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	3.049***	4.102***	4.874***	3.603***	2.779**	3.824***	4.972***	3.761***
	(1.102)	(1.121)	(0.611)	(1.148)	(1.068)	(1.151)	(0.615)	(1.030)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	-8.700	-8.750	-32.270*	17.809***	-10.583	-9.180	-31.955*	20.723***
	(46.874)	(63.886)	(18.423)	(4.627)	(46.079)	(63.171)	(18.041)	(5.821)
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.027***	0.003	-0.062*	-0.076	-0.026**	0.008	-0.061*	-0.098
	(0.010)	(0.027)	(0.036)	(0.069)	(0.010)	(0.027)	(0.033)	(0.066)
$D\_FOR_{i,j} * Vol_{i,t-1}$	0.022	-0.995	0.085	-1.136**	0.023	-0.983	0.021	-1.189**
	(0.708)	(1.569)	(0.752)	(0.464)	(0.702)	(1.639)	(0.640)	(0.445)
$Log(Size)_{i,t-1}$	-0.100***	-0.194***			-0.102***	-0.198***		
	(0.013)	(0.020)			(0.013)	(0.019)		
$Vol_{i,t-1}$	0.435	1.203			0.461	1.237		
	(1.390)	(2.510)			(1.369)	(2.520)		
$Turnover_{i,t-1}$	-0.269***	-0.375***			-0.272***	-0.381***		
	(0.037)	(0.077)			(0.035)	(0.075)		
$Leverage_{i,t-1}$	-0.035	-0.174			-0.041	-0.183*		
	(0.064)	(0.104)			(0.058)	(0.093)		
$BM_{i,t-1}$	-0.150***	-0.294***			-0.154***	-0.300***		
	(0.028)	(0.046)			(0.029)	(0.045)		
$PRratio_{i,t-1}$	0.097***	0.107***			0.100***	0.111***		
	(0.020)	(0.039)			(0.020)	(0.039)		
$Log(InsAUM)_{j,t-1}$	-0.019***	-0.457***	-0.325***		-0.019***	-0.443***	-0.316***	
	(0.003)	(0.028)	(0.019)		(0.003)	(0.025)	(0.020)	
$InsRet_{j,t-1}$	0.190	0.260	-0.003		0.199	0.262	0.055	
	(0.127)	(0.253)	(0.149)		(0.128)	(0.251)	(0.146)	
$Lvol_{c,t}$	1.931	-5.213			1.929	-5.034		
	(1.936)	(4.331)			(1.785)	(4.108)		
$\Delta IR_{c,t}$	-0.048*	-0.036			-0.049*	-0.039		
	(0.024)	(0.051)			(0.025)	(0.050)		
$FXRet_{c,t}$	0.478	0.316			0.440	0.269		
	(0.346)	(0.402)			(0.323)	(0.393)		
$FXvol_{c,t}$	-3.729	15.780			-2.613	16.231		
	(6.427)	(13.910)			(6.401)	(13.809)		
Firm FE	Yes				Yes			
Firm * Investor FE		Yes	Yes	Yes		Yes	Yes	Yes
Firm * Quarter FE			Yes	Yes			Yes	Yes
Investor * Quarter FE				Yes				Yes
Observations	110,351,165	110,014,944	109,872,040	109,863,768	108,039,780	107,707,099	107,543,684	107,537,019
R^2	0.003	0.028	0.088	0.180	0.003	0.028	0.089	0.179

Table C.7: **Global Volatility and Capital Flows: Change of Ownership Level**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on sample between 2000 and 2020. The dependent variable is the change of the ownership $\Delta(IO)$ (in basis points). The main independent variables are global index volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	$\Delta(IO)_{i,j,t}$			
$Gvol_t$	-12.862***	-14.875***		
	(1.494)	(3.867)		
$D\_FOR_{i,j}$	0.001			
	(0.042)			
$Gvol_t * D\_FOR_{i,j}$	-4.325	-4.229	-5.760	-11.530***
	(2.747)	(4.083)	(4.335)	(3.834)
$Gvol_t * Log(Size)_{i,t-1}$	8.609***	10.565***		
	(1.174)	(2.230)		
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	0.005	0.168***	0.092	0.048
	(0.020)	(0.029)	(0.059)	(0.040)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	0.929	1.490	2.914*	2.969**
	(0.985)	(1.617)	(1.488)	(1.264)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	60.688	95.042	21.631	30.680
	(117.535)	(152.147)	(62.951)	(30.932)
$Gvol_t * Vol_{i,t-1}$	-41.313	-78.584		
	(113.818)	(144.335)		
$D\_FOR_{i,j} * Vol_{i,t-1}$	0.238	-1.847	0.008	-0.898*
	(1.642)	(4.167)	(0.893)	(0.478)
$Log(Size)_{i,t-1}$	-0.235***	-0.395***		
	(0.021)	(0.041)		
$Vol_{i,t-1}$	0.010	1.353		
	(2.213)	(4.668)		
$Turnover_{i,t-1}$	-0.354***	-0.532***		
	(0.063)	(0.133)		
$Leverage_{i,t-1}$	-0.125**	-0.262***		
	(0.061)	(0.081)		
$BM_{i,t-1}$	-0.135***	-0.295***		
	(0.035)	(0.073)		
$PRratio_{i,t-1}$	0.128***	0.062		
	(0.040)	(0.076)		
$Log(InsAUM)_{j,t-1}$	0.045***	-0.425***	-0.272***	
	(0.007)	(0.036)	(0.020)	
$InsRet_{j,t-1}$	0.488***	0.671**	0.746***	
	(0.177)	(0.261)	(0.138)	
$Lvol_{c,t}$	2.404	-3.233		
	(1.963)	(4.182)		
$\Delta IR_{c,t}$	-0.082**	-0.083		
	(0.032)	(0.063)		
$FXRet_{c,t}$	0.639**	0.499		
	(0.299)	(0.357)		
$FXvol_{c,t}$	-5.990	0.226		
	(8.045)	(13.456)		
Firm FE	Yes			
Firm * Investor FE		Yes	Yes	Yes
Firm * Quarter FE			Yes	Yes
Investor * Quarter FE				Yes
Observations	116,752,679	116,405,834	116,248,336	116,241,338
R^2	0.002	0.042	0.086	0.121

Table C.8: **Global Volatility and Capital Flows: GIV Estimation**

This table presents the firm level regression results for relation between the global volatility and institutional ownership changes based on firm-quarter sample between 2000 and 2020. We report the results for the full sample, developed and emerging market samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variable is a granular instrument variable (GIV) for global volatility ($Gvol$). We construct GIV by the difference between firm size-weighted turnover ratio and equal-weighted turnover ratio. Control variables include firm characteristics ($Log(Size)$, Vol, $Turnover$, $Leverage$, BM, $PRratio$) and macro variables ($Lvol$, ΔIR, $FXRet$, $FXvol$). The data section provides detailed definitions of these variables. All regression models include firm fixed effect. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL				**Developed**				**Emerging**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	First Stage	Second Stage			First Stage	Second Stage			First Stage	Second Stage		
	$Gvol_t$	$\Delta Log(IO)_{i,t}$	$\Delta Log(DOM)_{i,t}$	$\Delta Log(FOR)_{i,t}$	$Gvol_t$	$\Delta Log(IO)_{i,t}$	$\Delta Log(DOM)_{i,t}$	$\Delta Log(FOR)_{i,t}$	$Gvol_t$	$\Delta Log(IO)_{i,t}$	$\Delta Log(DOM)_{i,t}$	$\Delta Log(FOR)_{i,t}$
$GIV_{i,t}$	0.0615***				0.0639***				0.0560***			
	(0.0167)				(0.0168)				(0.0160)			
$Gvol_t$		-5.9185***	-4.5856**	-6.5092***		-6.1435***	-5.5388**	-6.6191***		-5.6964*	-0.2482	-7.2243**
		(2.2237)	(1.9006)	(2.2420)		(2.1243)	(2.2457)	(2.1489)		(3.0193)	(1.2291)	(3.1278)
$Log(Size)_{i,t-1}$	0.0003	0.0117***	0.0061**	0.0177***	0.0002	0.0144***	0.0084***	0.0202***	0.0004*	0.0076*	-0.0026	0.0157***
	(0.0002)	(0.0027)	(0.0025)	(0.0025)	(0.0002)	(0.0025)	(0.0029)	(0.0022)	(0.0002)	(0.0041)	(0.0023)	(0.0040)
$Vol_{i,t-1}$	-0.0004	-0.0552	-0.0668*	-0.0080	0.0013	-0.0638	-0.0609	-0.0060	-0.0283**	0.6288***	0.0424	0.5218**
	(0.0020)	(0.0380)	(0.0389)	(0.0397)	(0.0017)	(0.0386)	(0.0416)	(0.0390)	(0.0135)	(0.2212)	(0.1381)	(0.2369)
$Turnover_{i,t-1}$	-0.0004**	-0.0043	-0.0304***	0.0020	-0.0003*	-0.0226***	-0.0279***	-0.0232***	-0.0002	0.0241***	-0.0362***	0.0461***
	(0.0001)	(0.0035)	(0.0035)	(0.0040)	(0.0001)	(0.0046)	(0.0047)	(0.0047)	(0.0001)	(0.0042)	(0.0053)	(0.0049)
$Leverage_{i,t-1}$	0.0004	-0.0101*	0.0059	-0.0170***	0.0002	-0.0044	0.0029	-0.0118**	0.0010**	-0.0312***	0.0115*	-0.0350***
	(0.0003)	(0.0059)	(0.0067)	(0.0056)	(0.0002)	(0.0063)	(0.0077)	(0.0059)	(0.0005)	(0.0106)	(0.0062)	(0.0103)
$BM_{i,t-1}$	0.0002*	-0.0065***	-0.0028	-0.0087***	0.0002*	-0.0076***	-0.0056*	-0.0105***	0.0004**	-0.0019	0.0041*	-0.0012
	(0.0001)	(0.0024)	(0.0024)	(0.0022)	(0.0001)	(0.0025)	(0.0029)	(0.0023)	(0.0002)	(0.0039)	(0.0022)	(0.0035)
$PRratio_{i,t-1}$	-0.0001	0.0368***	0.0272***	0.0293***	-0.0001	0.0335***	0.0302***	0.0268***	0.0001	0.0540***	0.0162**	0.0407***
	(0.0001)	(0.0035)	(0.0042)	(0.0036)	(0.0001)	(0.0039)	(0.0048)	(0.0037)	(0.0003)	(0.0113)	(0.0077)	(0.0104)
$Lvol_{c,t}$	0.3592***	3.0216*	2.2778*	2.7678	0.3537***	2.8619*	2.6260*	2.4102	0.4159**	3.6244	0.2833	4.2005
	(0.1340)	(1.7285)	(1.2985)	(1.8333)	(0.1267)	(1.5268)	(1.4872)	(1.6589)	(0.1658)	(2.7836)	(0.8560)	(2.9064)
$\Delta IR_{c,t}$	0.0001	-0.0022	-0.0052	-0.0027	0.0009*	0.0004	-0.0046	-0.0003	-0.0005***	-0.0024	-0.0046	-0.0026
	(0.0003)	(0.0048)	(0.0048)	(0.0051)	(0.0006)	(0.0106)	(0.0104)	(0.0109)	(0.0002)	(0.0038)	(0.0037)	(0.0035)
$FXRet_{c,t}$	-0.0004	0.0852	0.0772	0.0466	0.0009	0.0523	0.1167	0.0219	-0.0052	0.1402**	0.0221	0.0626
	(0.0034)	(0.0650)	(0.0746)	(0.0512)	(0.0036)	(0.0804)	(0.1020)	(0.0628)	(0.0035)	(0.0617)	(0.0456)	(0.0600)
$FXvol_{c,t}$	0.0279	-1.9275	-1.0406	-0.2869	0.1352	0.4563	-0.5531	3.5210	-0.1419	-4.9778*	-1.7368*	-5.5682**
	(0.1219)	(1.2404)	(1.2998)	(1.5637)	(0.1054)	(1.8289)	(1.9933)	(2.2185)	(0.1853)	(2.5075)	(1.0428)	(2.5915)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$F-value$	71.21				58.01				53.69			
Observations	1,258,336	1,258,336	1,258,336	1,258,336	972,267	972,267	972,267	972,267	286,069	286,069	286,069	286,069
R^2	0.748	0.029	0.037	0.022	0.754	0.031	0.024	0.021	0.753	0.027	0.050	0.028

Table C.9: **Global Volatility and Capital Flows: Alternative Cluster Standard Errors**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes. IThe dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variables are global index volatility ($Gvol$), foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at firm and quarter levels, or at quarter level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cluster at firm and quarter levels				**Cluster at quarter level**			
	$\Delta Log(IO)_{i,j,t}$							
$Gvol_t$	-11.306***	-15.101**			-11.306***	-15.101**		
	(3.185)	(6.660)			(3.180)	(6.886)		
$D\_FOR_{i,j}$	0.111***				0.111***			
	(0.019)				(0.019)			
$Gvol_t * D\_FOR_{i,j}$	-0.198	-3.147	-4.523	-17.910*	-0.198	-3.147	-4.523	-17.910*
	(1.407)	(4.280)	(5.391)	(9.481)	(1.391)	(4.419)	(5.573)	(9.805)
$Gvol_t * Log(Size)_{i,t-1}$	2.130***	2.692**			2.130***	2.692**		
	(0.478)	(1.040)			(0.468)	(1.069)		
$Gvol_t * Vol_{i,t-1}$	-14.108	-26.974			-14.108	-26.974		
	(31.582)	(52.531)			(31.138)	(53.836)		
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	2.997***	3.995***	4.807***	3.600***	2.997***	3.995***	4.807***	3.600***
	(0.670)	(0.900)	(1.075)	(1.132)	(0.657)	(0.918)	(1.109)	(1.167)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$	-8.241	-7.327	-30.934	17.143	-8.241	-7.327	-30.934	17.143
	(20.143)	(34.853)	(19.579)	(23.980)	(19.584)	(35.398)	(19.608)	(24.777)
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	-0.027***	0.005	-0.065***	-0.088***	-0.027***	0.005	-0.065***	-0.088***
	(0.009)	(0.025)	(0.024)	(0.022)	(0.009)	(0.024)	(0.024)	(0.022)
$D\_FOR_{i,j} * Vol_{i,t-1}$	0.033	-0.911*	0.062	-1.127***	0.033	-0.911*	0.062	-1.127***
	(0.185)	(0.480)	(0.343)	(0.364)	(0.178)	(0.478)	(0.338)	(0.363)
$Log(Size)_{i,t-1}$	-0.100***	-0.194***			-0.100***	-0.194***		
	(0.015)	(0.022)			(0.014)	(0.022)		
$Vol_{i,t-1}$	0.469	1.213*			0.469	1.213*		
	(0.330)	(0.645)			(0.320)	(0.652)		
$Turnover_{i,t-1}$	-0.268***	-0.371***			-0.268***	-0.371***		
	(0.022)	(0.039)			(0.020)	(0.037)		
$Leverage_{i,t-1}$	-0.039	-0.183***			-0.039	-0.183***		
	(0.033)	(0.061)			(0.030)	(0.058)		
$BM_{i,t-1}$	-0.151***	-0.298***			-0.151***	-0.298***		
	(0.028)	(0.047)			(0.028)	(0.048)		
$PRratio_{i,t-1}$	0.100***	0.114***			0.100***	0.114***		
	(0.021)	(0.035)			(0.018)	(0.030)		
$Log(InsAUM)_{j,t-1}$	-0.018***	-0.455***	-0.322***		-0.018***	-0.455***	-0.322***	
	(0.003)	(0.024)	(0.018)		(0.003)	(0.024)	(0.018)	
$InsRet_{j,t-1}$	0.199	0.273	-0.009		0.199	0.273	-0.009	
	(0.130)	(0.294)	(0.115)		(0.130)	(0.304)	(0.118)	
$Lvol_{c,t}$	1.903	-4.907			1.903	-4.907		
	(2.417)	(4.830)			(2.414)	(4.992)		
$\Delta IR_{c,t}$	-0.050	-0.037			-0.050	-0.037		
	(0.037)	(0.078)			(0.037)	(0.080)		
$FXRet_{c,t}$	0.464*	0.298			0.464*	0.298		
	(0.248)	(0.406)			(0.247)	(0.420)		
$FXvol_{c,t}$	-2.808	16.721			-2.808	16.721		
	(6.473)	(15.354)			(6.414)	(15.835)		
Firm FE	Yes				Yes			
Firm * Investor FE		Yes	Yes	Yes		Yes	Yes	Yes
Firm * Quarter FE			Yes	Yes			Yes	Yes
Investor * Quarter FE				Yes				Yes
Observations	110,888,009	110,481,035	110,421,295	110,420,477	110,930,751	110,181,213	110,114,467	110,102,257
R^2	0.005	0.048	0.093	0.174	0.004	0.048	0.103	0.197

Table C.10: **Global Volatility and Capital Flows: Exit and Entry by Economy Group**

Panel A: Developed Markets

	Exit					Entry				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Gvol_t$	1.228***	1.231***		1.241***		-0.064	-0.046		-0.052	
	(0.175)	(0.136)		(0.140)		(0.073)	(0.055)		(0.061)	
$Gvol_t * D\_FOR_{i,j}$		-0.008	0.897***	0.060	0.854**		-0.049	-0.199*	-0.057	-0.156
		(0.249)	(0.291)	(0.281)	(0.325)		(0.076)	(0.107)	(0.078)	(0.092)
$Gvol_t * Log(Size)_{i,t-1}$				-0.042					0.023*	
				(0.052)					(0.013)	
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$				-0.004***	-0.006**				0.005***	0.005***
				(0.001)	(0.003)				(0.001)	(0.001)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$				-0.210**	-0.089				0.047*	0.070***
				(0.088)	(0.091)				(0.025)	(0.021)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$				1.482	-0.379				-0.819	-1.002***
				(2.946)	(0.299)				(0.808)	(0.117)
$Gvol_t * Vol_{i,t-1}$				1.509					0.422	
				(4.185)					(0.891)	
$D\_FOR_{i,j} * Vol_{i,t-1}$				-0.031	0.015				0.063	0.026***
				(0.036)	(0.017)				(0.058)	(0.008)
$Log(Size)_{i,t-1}$	-0.012***	-0.012***		-0.010***		0.002*	0.002*		-0.000	
	(0.001)	(0.001)		(0.001)		(0.001)	(0.001)		(0.001)	
$Vol_{i,t-1}$	-0.001	-0.001		-0.003		-0.035	-0.035		-0.070	
	(0.039)	(0.040)		(0.075)		(0.052)	(0.052)		(0.081)	
$Turnover_{i,t-1}$	0.017***	0.017***		0.017***		0.001	0.001		0.001	
	(0.002)	(0.002)		(0.002)		(0.001)	(0.001)		(0.001)	
$Leverage_{i,t-1}$	0.017***	0.017***		0.017***		0.021***	0.021***		0.021***	
	(0.004)	(0.004)		(0.005)		(0.005)	(0.005)		(0.005)	
$BM_{i,t-1}$	0.013***	0.013***		0.013***		0.015***	0.015***		0.015***	
	(0.003)	(0.003)		(0.003)		(0.001)	(0.001)		(0.001)	
$PRratio_{i,t-1}$	-0.008***	-0.008***		-0.008***		-0.003**	-0.003**		-0.003**	
	(0.002)	(0.002)		(0.002)		(0.001)	(0.001)		(0.001)	
$Log(InsAUM)_{j,t-1}$	0.002*	0.002*		0.002*		-0.004**	-0.004**		-0.004**	
	(0.001)	(0.001)		(0.001)		(0.002)	(0.002)		(0.002)	
$InsRet_{j,t-1}$	-0.009	-0.009		-0.008		-0.008	-0.008		-0.008	
	(0.013)	(0.013)		(0.014)		(0.005)	(0.005)		(0.005)	
$Lvol_{c,t}$	-0.223	-0.223		-0.202		-0.013	-0.012		-0.022	
	(0.145)	(0.145)		(0.160)		(0.045)	(0.045)		(0.054)	
$\Delta IR_{c,t}$	0.004	0.004		0.004		0.003**	0.003**		0.003**	
	(0.002)	(0.003)		(0.003)		(0.001)	(0.001)		(0.001)	
$FXRet_{c,t}$	-0.015	-0.015		-0.017		-0.020	-0.020		-0.019	
	(0.025)	(0.025)		(0.026)		(0.015)	(0.015)		(0.015)	
$FXvol_{c,t}$	-1.511*	-1.505		-1.693*		-0.143	-0.104		-0.013	
	(0.789)	(0.931)		(0.955)		(0.402)	(0.442)		(0.423)	
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE			Yes		Yes			Yes		Yes
Investor * Quarter FE			Yes		Yes			Yes		Yes
Observations	106,440,804	106,440,804	106,322,545	106,440,804	106,322,545	106,440,804	106,440,804	106,322,545	106,440,804	106,322,545
R^2	0.146	0.146	0.285	0.146	0.286	0.079	0.079	0.161	0.080	0.161

Table C.10 (Continued)

Panel B: Emerging Markets

	Exit					Entry				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Gvol_t$	0.744	0.091		-0.132		0.155	0.696		1.093	
	(0.638)	(0.694)		(0.650)		(0.219)	(0.738)		(0.899)	
$Gvol_t * D\_FOR_{i,j}$		0.750**	0.853	0.982**	0.689		-0.622	-0.279	-1.038	-0.319
		(0.262)	(1.308)	(0.435)	(1.295)		(0.797)	(0.447)	(0.948)	(0.448)
$Gvol_t * Log(Size)_{i,t-1}$				-0.196					0.336	
				(0.217)					(0.196)	
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$				-0.001	-0.013**				0.009*	0.012
				(0.006)	(0.006)				(0.005)	(0.009)
$Gvol_t * D\_FOR_{i,j} * Log(Size)_{i,t-1}$				0.053	-0.197				-0.275	0.004
				(0.159)	(0.139)				(0.212)	(0.102)
$Gvol_t * D\_FOR_{i,j} * Vol_{i,t-1}$				-9.140	-0.310				12.018	-20.393
				(10.162)	(22.688)				(26.966)	(20.003)
$Gvol_t * Vol_{i,t-1}$				21.408					-2.866	
				(24.187)					(31.270)	
$D\_FOR_{i,j} * Vol_{i,t-1}$				0.035	0.045				0.546	0.701
				(0.336)	(0.272)				(0.680)	(0.673)
$Log(Size)_{i,t-1}$	-0.021***	-0.021***		-0.019***		0.005**	0.005**		-0.004	
	(0.003)	(0.003)		(0.006)		(0.002)	(0.002)		(0.005)	
$Vol_{i,t-1}$	-0.575**	-0.575**		-0.742*		-0.264*	-0.264*		-0.809	
	(0.249)	(0.249)		(0.425)		(0.146)	(0.146)		(0.694)	
$Turnover_{i,t-1}$	0.007	0.007		0.007		-0.005	-0.005		-0.005	
	(0.007)	(0.007)		(0.007)		(0.006)	(0.006)		(0.006)	
$Leverage_{i,t-1}$	0.025**	0.025**		0.025**		0.025***	0.025***		0.025***	
	(0.009)	(0.009)		(0.011)		(0.004)	(0.004)		(0.005)	
$BM_{i,t-1}$	0.008**	0.008**		0.008*		0.015***	0.015***		0.015***	
	(0.004)	(0.004)		(0.004)		(0.002)	(0.002)		(0.002)	
$PRratio_{i,t-1}$	-0.021	-0.021		-0.021		-0.009	-0.009		-0.008	
	(0.017)	(0.017)		(0.018)		(0.007)	(0.007)		(0.008)	
$Log(InsAUM)_{j,t-1}$	0.008***	0.008***		0.008***		-0.002	-0.002		-0.002	
	(0.001)	(0.001)		(0.001)		(0.002)	(0.002)		(0.002)	
$InsRet_{j,t-1}$	-0.014	-0.014		-0.013		-0.009	-0.009		-0.009	
	(0.019)	(0.019)		(0.018)		(0.007)	(0.007)		(0.008)	
$Lvol_{c,t}$	-0.405	-0.397		-0.385		-0.330	-0.336		-0.346	
	(0.490)	(0.493)		(0.498)		(0.271)	(0.265)		(0.277)	
$\Delta IR_{c,t}$	0.002	0.002		0.002		-0.000	-0.000		-0.000	
	(0.001)	(0.001)		(0.001)		(0.001)	(0.001)		(0.001)	
$FXRet_{c,t}$	-0.038	-0.038		-0.039		-0.002	-0.002		-0.002	
	(0.031)	(0.031)		(0.030)		(0.011)	(0.011)		(0.011)	
$FXvol_{c,t}$	1.548	1.529		1.497		1.106*	1.121*		1.098*	
	(0.905)	(0.902)		(0.890)		(0.579)	(0.579)		(0.570)	
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE			Yes		Yes			Yes		Yes
Investor * Quarter FE			Yes		Yes			Yes		Yes
Observations	9,983,845	9,983,845	9,888,525	9,983,845	9,888,525	9,983,845	9,983,845	9,888,525	9,983,845	9,888,525
R^2	0.120	0.121	0.322	0.121	0.323	0.069	0.069	0.202	0.069	0.202

Table C.11: **Global Volatility and Domestic/Foreign Capital Flows: Alternative Uncertainty Measure**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on investor-firm-quarter sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variable is the global financial crisis dummy (GFC) and COVID-19 crisis dummy (COVID). Control variables are the same as those in Table 3. The data section provides detailed definitions of these variables. Regression models include firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL			**Developed**			**Emerging**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$			$\Delta Log(IO)_{i,j,t}$		
GFC	-0.148	-0.170		-0.150	-0.166		-0.244	-0.123	
	(0.168)	(0.160)		(0.164)	(0.159)		(0.226)	(0.204)	
$GFC * D\_FOR_{i,j}$		0.052	-0.186		0.042	-0.170		-0.138	-0.429
		(0.074)	(0.159)		(0.077)	(0.154)		(0.151)	(0.483)
$COVID$	-0.896***	-0.800***		-0.848***	-0.768***		-1.349***	-0.961***	
	(0.194)	(0.194)		(0.195)	(0.195)		(0.229)	(0.186)	
$COVID * D\_FOR_{i,j}$		-0.183***	-1.059***		-0.164***	-0.994***		-0.455**	-2.386***
		(0.050)	(0.155)		(0.049)	(0.146)		(0.162)	(0.325)
$Log(Size)_{i,t-1}$	-0.128***	-0.128***		-0.136***	-0.136***		-0.015	-0.015	
	(0.026)	(0.026)		(0.026)	(0.026)		(0.049)	(0.049)	
$Vol_{i,t-1}$	0.224	0.235		0.188	0.199		3.858**	3.842**	
	(0.501)	(0.502)		(0.503)	(0.504)		(1.718)	(1.715)	
$Turnover_{i,t-1}$	-0.402***	-0.401***		-0.434***	-0.434***		0.172	0.172	
	(0.034)	(0.034)		(0.036)	(0.036)		(0.128)	(0.128)	
$Leverage_{i,t-1}$	-0.141**	-0.141**		-0.132*	-0.132*		-0.288	-0.288	
	(0.066)	(0.066)		(0.067)	(0.067)		(0.191)	(0.193)	
$BM_{i,t-1}$	-0.290***	-0.289***		-0.302***	-0.301***		-0.084	-0.083	
	(0.048)	(0.048)		(0.049)	(0.049)		(0.087)	(0.087)	
$PRratio_{i,t-1}$	0.086**	0.087**		0.069*	0.070*		0.279	0.278	
	(0.035)	(0.035)		(0.037)	(0.037)		(0.318)	(0.325)	
$Log(InsAUM)_{j,t-1}$	-0.438***	-0.438***		-0.430***	-0.430***		-0.528***	-0.528***	
	(0.027)	(0.026)		(0.026)	(0.026)		(0.041)	(0.041)	
$InsRet_{j,t-1}$	0.522*	0.522*		0.465	0.464		0.897***	0.901**	
	(0.296)	(0.296)		(0.293)	(0.293)		(0.309)	(0.312)	
$Lvol_{c,t}$	-0.494	-0.758		-2.220	-2.441		22.317**	22.202**	
	(4.749)	(4.801)		(4.968)	(5.013)		(7.986)	(7.983)	
$\Delta IR_{c,t}$	-0.015	-0.015		-0.024	-0.023		0.024	0.024	
	(0.080)	(0.080)		(0.091)	(0.091)		(0.041)	(0.041)	
$FXRet_{c,t}$	0.148	0.144		-0.016	-0.017		0.766	0.773	
	(0.402)	(0.404)		(0.412)	(0.416)		(0.544)	(0.546)	
$FXvol_{c,t}$	-3.680	-3.393		8.273	8.481		-74.740***	-74.125***	
	(13.377)	(13.794)		(14.829)	(15.438)		(20.339)	(20.362)	
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE			Yes			Yes			Yes
Investor * Quarter FE			Yes			Yes			Yes
Observations	116,342,566	116,342,566	116,177,670	106,365,611	106,365,611	106,247,012	9,976,955	9,976,955	9,881,570
R^2	0.028	0.028	0.179	0.028	0.029	0.180	0.028	0.028	0.262

Table C.12: **Global Volatility and Capital Flows: The Mechanism and Alternative Uncertainty Measure**

This table presents the investor-firm level regression results for relation between the global volatility and institutional ownership changes based on sample between 2000 and 2020. We report the results for the full sample, developed and emerging economics samples. The dependent variable is the change of the natural logarithm of ownership $\Delta Log(IO)$. The main independent variables is the global financial crisis dummy GFC and COVID-19 dummy $COVID$, foreign institution dummy $D\_FOR_{i,j}$ and their interaction terms with firm size ($Log(Size)$) and volatility (Vol). Control variables are the same as those in Table 3. Regression models include firm, firm*investor, firm*quarter, investor*quarter fixed effects. Robust standard errors clustered at economy and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL		**Developed**		**Emerging**	
	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Log(IO)_{i,j,t}$		$\Delta Log(IO)_{i,j,t}$		$\Delta Log(IO)_{i,j,t}$	
GFC	-0.131		-0.128		0.066	
	(0.152)		(0.151)		(0.137)	
$GFC * D\_FOR_{i,j}$	0.005	-0.185	-0.010	-0.171	-0.280*	-0.287
	(0.078)	(0.159)	(0.079)	(0.154)	(0.158)	(0.447)
$GFC * Log(Size)_{i,t-1}$	0.049*		0.051**		0.088	
	(0.025)		(0.025)		(0.059)	
$GFC * Vol_{i,t-1}$	-2.659		-2.521		-8.123	
	(1.822)		(1.837)		(8.741)	
$GFC * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	0.081***	0.072**	0.073**	0.070**	0.044	0.118*
	(0.030)	(0.033)	(0.030)	(0.032)	(0.045)	(0.061)
$GFC * D\_FOR_{i,j} * Vol_{i,t-1}$	0.311	-0.030	0.079	-0.078	5.456	-5.432
	(0.817)	(0.769)	(0.860)	(0.719)	(7.518)	(5.595)
$COVID$	-0.838***		-0.809***		-0.874***	
	(0.205)		(0.207)		(0.200)	
$COVID * D\_FOR_{i,j}$	-0.256***	-1.113***	-0.261***	-1.046***	-0.827***	-2.248***
	(0.052)	(0.159)	(0.052)	(0.150)	(0.174)	(0.340)
$COVID * Log(Size)_{i,t-1}$	0.125***		0.127***		0.227***	
	(0.019)		(0.019)		(0.045)	
$COVID * Vol_{i,t-1}$	-0.473		-0.476		-12.141*	
	(0.351)		(0.357)		(6.860)	
$COVID * D\_FOR_{i,j} * Log(Size)_{i,t-1}$	0.075***	0.128***	0.078***	0.119***	-0.094*	0.267***
	(0.009)	(0.018)	(0.009)	(0.018)	(0.051)	(0.032)
$COVID * D\_FOR_{i,j} * Vol_{i,t-1}$	-0.372	0.341*	-0.292	0.250	-18.014***	0.076
	(0.233)	(0.199)	(0.237)	(0.188)	(5.665)	(7.508)
$D\_FOR_{i,j} * Log(Size)_{i,t-1}$	0.034	-0.039*	0.039*	-0.043*	-0.032	0.222*
	(0.024)	(0.023)	(0.023)	(0.022)	(0.160)	(0.123)
$D\_FOR_{i,j} * Vol_{i,t-1}$	-0.687*	-0.954**	-1.118***	-0.989***	3.693	6.215
	(0.381)	(0.380)	(0.374)	(0.362)	(2.490)	(3.998)
$Log(Size)_{i,t-1}$	-0.149***		-0.157***		0.002	
	(0.023)		(0.024)		(0.155)	
$Vol_{i,t-1}$	0.681		0.888		0.764	
	(0.606)		(0.608)		(2.181)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Investor FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm * Quarter FE		Yes		Yes		Yes
Investor * Quarter FE		Yes		Yes		Yes
Observations	116,342,566	116,177,670	106,365,611	106,247,012	9,976,955	9,881,570
R^2	0.028	0.179	0.029	0.180	0.029	0.262

Table C.13: **Institutional Flows and Future Stock Return**

This table presents the firm level regression results for relation between the institutional ownership changes and future stock return based on sample between 2000 and 2020. We report the results for the full sample, developed and emerging market samples. Panel A reports the results for firm volatility, and Panel B reports the results for firm liquidity that is measured by turnover ratio. The dependent variables are the stock return in next quarter $Ret_{i,t+1}$. The main independent variables of interest are $\Delta Log(FOR)$, $\Delta Log(DOM)$, $\Delta Log(IO)$, and their interaction terms with global index volatility ($Gvol$) and firm size. Control variables include firm characteristics (lagged stock return Ret, $Log(Size)$, Vol, $Turnover$,$Leverage$, BM, $PRratio$). The data section provides detailed definitions of these variables. All regression models include firm, economy* quarter fixed effects. Robust standard errors clustered at firm and quarter levels are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	ALL				**Developed**				**Emerging**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Ret_{i,t+1}$				$Ret_{i,t+1}$				$Ret_{i,t+1}$			
$\Delta Log(FOR)_{i,t}$	0.010***	0.002	0.036***	0.008	0.011***	0.003	0.034***	0.011	0.006	0.001	0.041***	0.001
	(0.003)	(0.003)	(0.007)	(0.007)	(0.003)	(0.003)	(0.008)	(0.007)	(0.005)	(0.006)	(0.010)	(0.015)
$\Delta Log(DOM)_{i,t}$	0.016***		0.041***		0.017***		0.046***		0.013***		0.027***	
	(0.003)		(0.006)		(0.003)		(0.007)		(0.003)		(0.006)	
$\Delta Log(IO)_{i,t}$		0.014***		0.048***		0.017***		0.054***		0.006		0.038***
		(0.003)		(0.007)		(0.004)		(0.009)		(0.005)		(0.011)
$Gvol_t * \Delta Log(FOR)_{i,t}$			-3.108***	-1.048			-2.728***	-1.072			-4.366***	-0.878
			(0.877)	(0.814)			(0.944)	(0.797)			(0.978)	(1.645)
$Gvol_t * \Delta Log(DOM)_{i,t}$			-2.860***				-3.348***				-1.494**	
			(0.700)				(0.835)				(0.609)	
$Gvol_t * \Delta Log(IO)_{i,t}$				-3.408***				-3.608***				-3.273***
				(0.812)				(1.064)				(1.109)
$Gvol_t * \Delta Log(FOR)_{i,t} * Log(Size)_{i,t}$			1.292***	0.887*			1.060**	0.776			2.080***	1.112
			(0.473)	(0.523)			(0.438)	(0.492)			(0.711)	(0.957)
$Gvol_t * \Delta Log(DOM)_{i,t} * Log(Size)_{i,t}$			0.456**				0.433*				0.146	
			(0.201)				(0.233)				(0.281)	
$Gvol_t * \Delta Log(IO)_{i,t} * Log(Size)_{i,t}$				0.377				0.213				0.793
				(0.345)				(0.357)				(0.557)
$\Delta Log(FOR)_{i,t} * Log(Size)_{i,t}$			-0.011**	-0.010**			-0.011***	-0.011**			-0.004	-0.001
			(0.004)	(0.004)			(0.004)	(0.004)			(0.007)	(0.010)
$\Delta Log(DOM)_{i,t} * Log(Size)_{i,t}$			-0.004*				-0.003				-0.003	
			(0.002)				(0.002)				(0.004)	
$\Delta Log(IO)_{i,t} * Log(Size)_{i,t}$				0.003				0.004				-0.001
				(0.003)				(0.004)				(0.007)
$Gvol_t * Log(Size)_{i,t}$			-0.266	-0.265			-0.235	-0.237			-0.388**	-0.383**
			(0.171)	(0.174)			(0.196)	(0.198)			(0.164)	(0.166)
$Ret_{i,t}$	-0.057***	-0.057***	-0.057***	-0.057***	-0.059***	-0.059***	-0.059***	-0.059***	-0.046***	-0.045***	-0.046***	-0.046***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
$Vol_{i,t}$	0.204***	0.205***	0.201***	0.200***	0.205***	0.205***	0.201***	0.201***	0.212*	0.213*	0.213*	0.213*
	(0.056)	(0.056)	(0.056)	(0.056)	(0.057)	(0.056)	(0.056)	(0.056)	(0.111)	(0.111)	(0.111)	(0.111)
$Log(Size)_{i,t}$	-0.061***	-0.061***	-0.059***	-0.059***	-0.061***	-0.061***	-0.059***	-0.059***	-0.063***	-0.063***	-0.059***	-0.059***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$Turnover_{i,t}$	-0.017***	-0.017***	-0.017***	-0.017***	-0.018***	-0.019***	-0.018***	-0.018***	-0.014***	-0.014***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
$Leverage_{i,t}$	0.005	0.005	0.005	0.005	0.009	0.009	0.009	0.009	-0.012*	-0.012*	-0.012*	-0.012*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
$BM_{i,t}$	0.006***	0.006***	0.005***	0.005***	0.006**	0.006**	0.005**	0.005**	0.005***	0.005***	0.005***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$PRratio_{i,t}$	0.021***	0.021***	0.021***	0.021***	0.018***	0.019***	0.019***	0.019***	0.038***	0.038***	0.038***	0.038***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.007)	(0.007)	(0.007)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economy * Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,181,825	1,181,825	1,181,825	1,181,825	908,663	908,663	908,663	908,663	273,162	273,162	273,162	273,162
R^2	0.309	0.309	0.309	0.309	0.277	0.277	0.277	0.277	0.418	0.418	0.419	0.419

D Solution to capacity allocation problem

Lemma 1. *The solution to the capacity allocation problem (10)-(11) is a corner: Each investor allocates capacity to reducing posterior uncertainty for the asset with the largest learning gain G_i. If multiple assets have equal gains, the investor randomizes among them.*

Proof of Lemma 1. The linear objective function and the convex constraint imply that each investor allocates all capacity to learning about a single asset. Let $\widehat{\sigma}^2_{ji} = e^{-2K_{ji}}\sigma_i^2$. Then the optimization problem can be written as $\max_{\{K_{ji}\}_{i=1}^n} \sum_{i=1}^n G_i e^{2K_{ji}} \quad s.t. \quad \sum_{i=1}^n K_{ji} \leq K_j$. Suppose the investor allocates capacity to learning about 2 assets. WLOG, let these assets be indexed by 1 and 2, and suppose $G_2 \leq G_1$. Then, $K_{j1} + K_{j2} = K_j$ and the value of the objective function is

$$\sum_{i=1}^n G_i e^{2K_{ji}} = G_1\left(e^{2K_{j1}} - 1\right) + G_2\left(e^{2K_{j2}} - 1\right) + \sum_{i=1}^n G_i$$

$$\overset{(1)}{\leq} G_1\left(e^{2K_{j1}} - 1\right) + G_1\left(e^{2K_{j2}} - 1\right) + \sum_{i=1}^n G_i$$

$$\overset{(2)}{\leq} 2G_1\left(e^{K_j} - 1\right) + \sum_{i=1}^n G_i \overset{(3)}{<} G_1\left(e^{2K_j} - 1\right) + \sum_{i=1}^n G_i,$$

where (1) follows from the assumption WLOG that $G_2 \leq G_1$, (2) follows from the fact that for $K_{j1} + K_{j2} = K_j$, $e^{2K_{j1}} + e^{2K_{j2}}$ is maximized at $K_{j1} = K_{j2} = K_j/2$, and (3) follows from the fact that $(e^{2K_j} - 1)^2 > 0$ for $K_j > 0$. This chain of inequalities shows that splitting capacity across two assets yields strictly lower utility than investing all capacity in a single asset, even if the gains from learning are equal across assets. Splitting capacity among more than two assets would lower utility even more.

Let l_j index the asset about which investor j learns. The investor's objective is $\left(e^{2K_j} - 1\right) G_{l_j} + \sum_{i=1}^n G_i$. Since $e^{2K_j} > 1$, the objective is maximized by allocating all capacity to the asset with the largest utility gain: $l_j \in \arg\max_i G_i$. The variance of the investor's posterior beliefs is

$$\widehat{\sigma}^2_{ji} = \begin{cases} e^{-2K_j}\sigma_i^2 & \text{if } i = l_j, \\ \sigma_i^2 & \text{if } i \neq l_j. \end{cases}$$

□

E Derivation of (12)

The market clearing condition for each asset in state (z_i, x_i) is
$\int_{M_{fi}} \frac{s_{ji} - rp_i}{e^{-2K_f}\rho\sigma_i^2} dj + \int_{M_{di}} \frac{s_{ji} - rp_i}{e^{-2K_d}\rho\sigma_i^2} dj + (1 - m_{fi} - m_{di})\left(\frac{\overline{z} - rp_i}{\rho\sigma_i^2}\right) = x_i$,
where M_{fi} denotes the set of measure $m_{fi} \in [0, \lambda]$ of foreign investors who choose to learn about asset i, and M_{di} denotes the set of measure $m_{di} \in [0, 1-\lambda]$, of domestic institutional investors who choose to learn about asset i.
Using the conditional distribution of the signals, $\int_{M_{fi}} s_{ji} dj = m_{fi}[\overline{z} + (1 - e^{-2K_f})\varepsilon_i]$ for the foreign investors, and analogously for the domestic investors. Then, the market clearing condition can be written as $\alpha_1\overline{z} + \alpha_2\varepsilon_i - x_i = \alpha_1 rp_i$, where
$\alpha_1 \equiv \frac{1 + m_{fi}\left(e^{2K_f} - 1\right) + m_{di}\left(e^{2K_d} - 1\right)}{\rho\sigma_i^2}$ and $\alpha_2 \equiv \frac{m_{fi}\left(e^{2K_f} - 1\right) + m_{di}\left(e^{2K_d} - 1\right)}{\rho\sigma_i^2}$.
We obtain identification of the coefficients in $p_i = a_i + b_i\varepsilon_i - c_i\nu_i$ as
$a_i = \frac{1}{r}\left[\overline{z} - \frac{\bar{x}_i}{\alpha_1}\right]$, $b_i = \frac{\alpha_2}{r\alpha_1}$, and $c_i = \frac{1}{r\alpha_1}$.
Let $\Phi_i \equiv m_{fi}\left(e^{2K_f} - 1\right) + m_{di}\left(e^{2K_d} - 1\right)$ be a measure of the information capacity allocated to learning about asset i in equilibrium. Further substitution yields
$a_i = \frac{1}{r}\left(\overline{z} - \frac{\rho\sigma_i^2\bar{x}_i}{1 + \Phi_i}\right)$, $b_i = \frac{1}{r}\left(\frac{\Phi_i}{1 + \Phi_i}\right)$, $c_i = \frac{1}{r}\left(\frac{\rho\sigma_i^2}{1 + \Phi_i}\right)$.

F Learning allocation

Lemma 2. *Let k denote the endogenous number of assets that are learned about. The allocation of information capacity across assets, $\{\Phi_i\}_{i=1}^n$, is uniquely pinned down by the conditions $G_i = \max_{h\in\{1,...,n\}} G_h$ for all $i \in \{1,...,k\}$, and $G_i < \max_{h\in\{1,...,n\}} G_h$ for all $i \in \{k+1,...,n\}$, where in equilibrium the gain from learning about each asset is $G_i = \frac{1+\rho^2\xi_i}{(1+\Phi_i)^2}$.*

Proof of Lemma 2. Substituting a_i, b_i, and c_i in $G_i \equiv (1-rb_i)^2 + \frac{r^2c_i^2\sigma_{xi}^2}{\sigma_i^2} + \frac{(\bar{z}-ra_i)^2}{\sigma_i^2}$ and using $\xi_i = \sigma_i^2(\sigma_{xi}^2 + \bar{x}_i^2)$ gives $G_i = \frac{1+\rho^2\xi_i}{(1+\Phi_i)^2}$. Let $\phi \equiv \lambda_f(e^{2K_f}-1) + \lambda_d(e^{2K_d}-1)$, which is a measure of aggregate information capacity of the whole economy. In a symmetric equilibrium, in which the masses of investors learning about asset i, m_{id}, m_{if}, are proportional to the population masses, λ_f, λ_f, we can write $\Phi_i = m_i\phi$, where $m_i = \frac{m_{id}}{\lambda_d} = \frac{m_{if}}{\lambda_f}$.

By Lemma 1, each investor learns about a single asset among the assets with the highest gain. WLOG, assets are ordered such that $\xi_i > \xi_{i+1}$, for all $i \in \{1,...,n-1\}$. First suppose that all investors learn about the same asset. Since G_i is increasing in ξ_i, this asset is asset 1. All investors learn about asset 1 as long as $\phi \leq \sqrt{\frac{1+\rho^2\xi_1}{1+\rho^2\xi_2}} - 1$. At this threshold, some investors switch and learn about the second asset. For $\phi > \sqrt{\frac{1+\rho^2\xi_1}{1+\rho^2\xi_2}} - 1$, equilibrium gains must be equated among all assets with positive learning mass. Otherwise, investors have an incentive to switch to learning about the asset with the higher gain. Moreover, the gains of all assets with zero learning mass must be strictly lower. Otherwise, an investor would once again have the incentive to deviate and learn about one of these assets.

To derive expressions for the mass of investors learning about each asset in the symmetric equilibrium we consider, note that $m_{fi} = \lambda_f m_i$ and $m_{di} = \lambda_d m_i$. Then, the necessary and sufficient conditions for determining $\{m_i\}_{i=1}^n$ are:

(i) $\sum_{i=1}^k m_i = \lambda_f + \lambda_d$;

(ii) For $i \leq k$, $\frac{1+\phi m_i}{1+\phi m_1} = c_{i1}$, for any $i \in \{2,...,k\}$, where $c_{i1} \equiv \sqrt{\frac{1+\rho^2\xi_i}{1+\rho^2\xi_1}} \leq 1$, with equality *iff* $i = 1$;

(iii) $m_i = 0$ for any $i \in \{k+1,...,n\}$.

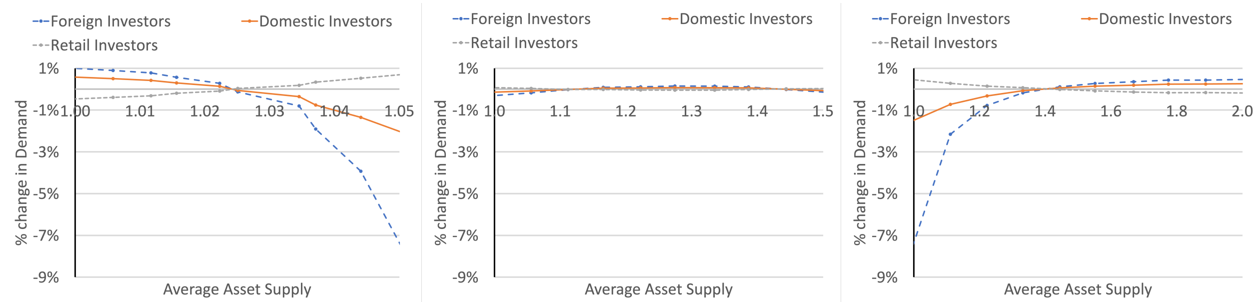
Recursively, $m_i = c_{i1}m_1 - \frac{1}{\phi}(1-c_{i1})\ \forall i \in \{2,...,k\}$. Using $\sum_{i=1}^k m_i = \lambda_f + \lambda_d$, and defining $C_k \equiv \sum_{i=1}^k c_{i1}$, we obtain the solution for m_1 given by $m_1 = \frac{\lambda_f+\lambda_d}{C_k} + \frac{1}{\phi}\left(\frac{k}{C_k} - 1\right)$. Using this expression, we obtain the solution for all m_i, $i \in \{1,...,k\}$, $m_i = \frac{(\lambda_f+\lambda_d)c_{i1}}{C_k} + \frac{1}{\phi}\left(\frac{kc_{i1}}{C_k} - 1\right)$. □

G Robustness Results

This section presents additional numerical results from alternative parametrizations of the model. We use them to verify the robustness of the results from the benchmark parametrization to alternative settings of parameters relative to the baseline calibration in the main body of the paper.

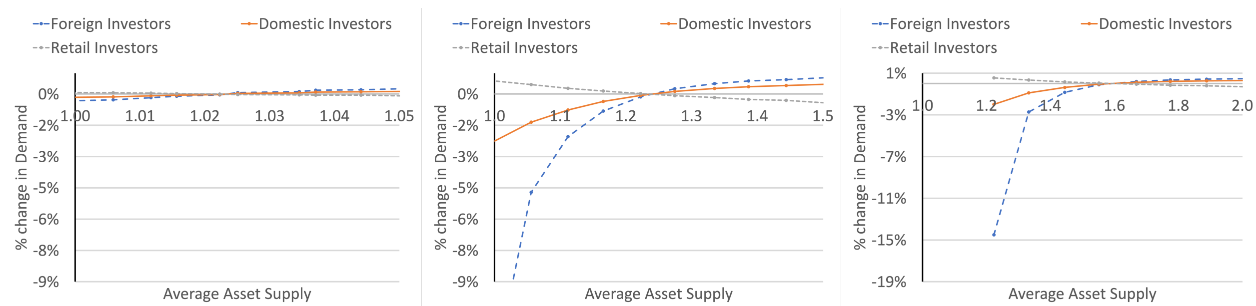
First, Figure G.3 examines the sensitivity of our results to the setting of the upper bound on $\bar{x}_i$, representing the spread of size in the parameterized model. In the model, we assume, in line with empirical patterns, that size is negatively related to idiosyncratic asset volatility. This creates a tension in the model: in response to the volatility shock, investors desire to switch to larger, high volatility assets. Thus, it is a quantitative question which effect dominates: switching to larger, lower volatility assets or smaller, higher volatility assets. As Figure G.3 shows, we must significantly reduce size heterogeneity across assets below the baseline setting of a factor of 2 between the highest and lowest in order for the volatility incentive to dominate. We consider the setting of 2 in the baseline parametrization as conservative, given that in our dataset, the 25%-75% interquartile range for size is above 5 for all countries we study. We conclude that for the empirically relevant heterogeneity in size, our results hold robustly.

The results of Figure G.3 are confirmed and reinforced by the next experiment, in which we study the effects of heterogeneity in size for a parametrization of the model in which we shut down heterogeneity in volatility (Figure G.4). In this case, the size effect is always present and the cross-sectional response to the volatility shock is always consistent with the baseline results.



(a) $\bar{x}_i \in (1, 1.05)$ (b) $\bar{x}_i \in (1, 1.5)$ (c) $\bar{x}_i \in (1, 2)$

Figure G.3: Response to aggregate volatility shock: robustness with respect to upper bound on $\bar{x}_i$.



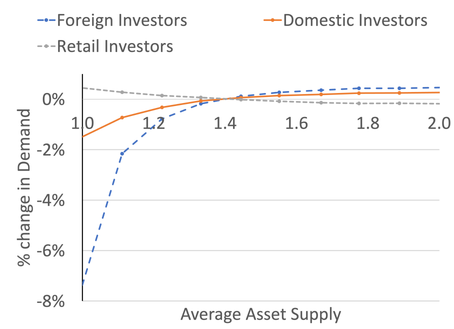
(a) $\bar{x}_i \in (1, 1.05)$ (b) $\bar{x}_i \in (1, 1.5)$ (c) $\bar{x}_i \in (1, 2)$

Figure G.4: Response to aggregate volatility shock: robustness with respect to upper bound on $\bar{x}_i$; no volatility heterogeneity.

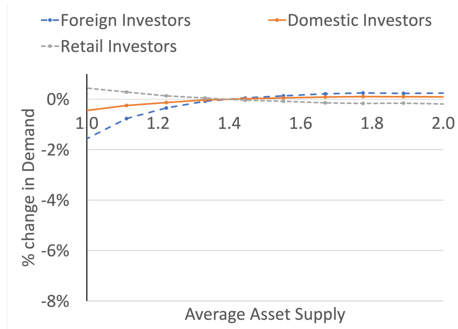
Finally, Figure G.5 presents the response of the model to the aggregate volatility shock for different specifications of the size of the foreign investors, λ_f, varying it from the baseline value of 0.0125 to the value $\lambda_f = \lambda_d = 0.125$. As the figure shows, the magnitudes of the response vary across the parametrizations, but the qualitative conclusions of the model do not change.

Foreign risk aversion shock In our second set of robustness results, we study the effect of heterogeneity in shock to risk aversion across investors by considering a 20% shock to foreign investors' risk aversion. We show that in this experiment foreign investors retrench from all assets more than domestic investors, resulting in an average effect of changes in foreign holdings that is also negative. This retrenchment varies systematically across assets, with small assets exhibiting a larger drop in foreign ownership (panel (a) of Figure G.6). This effect is strong enough such that, relative to domestic institutional investors, foreign investors relocate their holdings towards large assets. This can be clearly seen from panel (b) of Figure G.6, which presents the ratio of high shock demand to low shock demand for each asset, relative to that ratio computed for an asset with the highest $\bar{x}_i$.[15] In terms of the cross-sectional response of domestic versus foreign institutional investors, as for the case of the volatility shock, it is driven in this case by endogenous information adjustment. Specifically, when we do not allow for endogenous learning response, as illustrated in Figure G.7, panel (a), both foreign and domestic institutional investors have a differential response across assets, a larger drop or smaller increase for small-supply assets. However, there is no difference in the response across investors. As panel (b) of Figure G.7 indicates, the drop in ownership of the small-supply

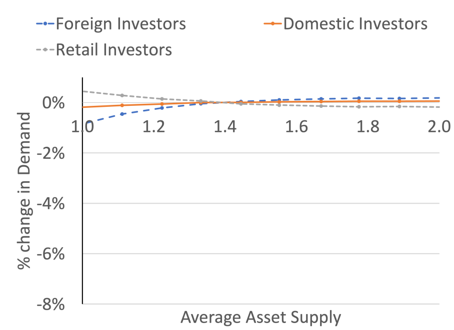
[15] Specifically, each point in panel (b) of Figure G.6 is computed for each investor group as $\frac{\text{high foreign } \rho \text{ demand(asset } i)}{\text{low foreign } \rho \text{ demand(asset } i)} \Big/ \frac{\text{high foreign } \rho \text{ demand(asset 1)}}{\text{low foreign } \rho \text{ demand(asset 1)}}$.



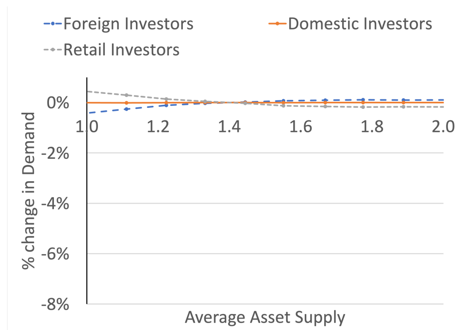
(a) $\lambda_f = 0.0125$, foreign ownership 8.6%



(b) $\lambda_f = 0.0406$, foreign ownership 24%



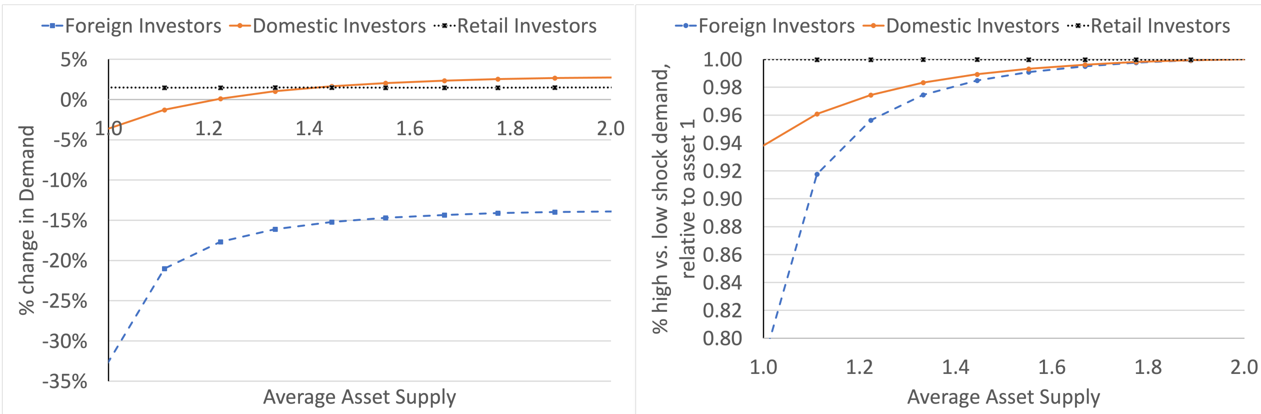
(c) $\lambda_f = 0.0688$, foreign ownership 35%



(d) $\lambda_f = 0.125$, foreign ownership 51%

Figure G.5: Response to aggregate volatility shock: robustness with respect to λ_f.

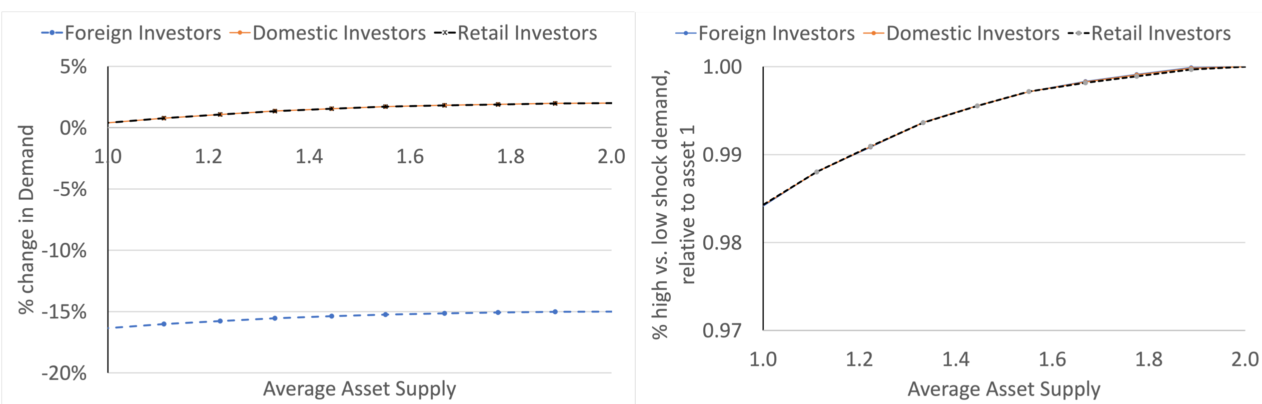
assets versus large-supply assets is essentially identical across investors.



(a) Benchmark

(b) Ex-post relative to ex-ante ownership relative to asset 1

Figure G.6: Model: response to foreign risk aversion shock.



(a) Level response under exogenous information

(b) Ex-post relative to ex-ante ownership relative to asset 1 under exogenous information

Figure G.7: Model: response to foreign risk aversion shock. exogenous information case.