Variation in mutual fund equity holdings during global economic crises*

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Abstract
We analyze how mutual funds from 37 countries reallocate portfolio equity holdings across countries and industries in response to large shocks to the global economy during 2000-2021 time period. We find that global concentration and active share in equities increase during economic crises, suggesting that mutual fund portfolios become less diversified, while fund managers engage more actively in markets and securities' selection. The patterns of higher portfolio concentration vary across all markets and industries and depend on the risk characteristics and cultural distance between the home and target market. Overall, equity reallocation decisions of mutual fund managers during global economic crises appear to be more consistent with informed, active trading rather than passive investing.

Keywords: decentralized investment; economic crises; mutual fund holdings; international finance
JEL Classification: G11; G15; G23; Z10

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I. Introduction

Over the past 20 years, the world has experienced three major economic crises: the dot-com bubble at the beginning of the 21st century, the 2007-2009 Global Financial Crisis (GFC hereafter), and the recent COVID-19 pandemic. During periods of economic distress investors shift capital from equity to government bonds and money market funds and away from foreign markets demonstrating flight-to-safety across and within asset classes as risk and risk premiums increase (Adrian et al. (2019), Baele et al. (2020), Habib et al. (2020)). Less is known about how professional money managers change allocations within equity class during periods of global economic crises. This information is vital to investors who must decide how to allocate assets efficiently to managers and whether any portfolio adjustments are necessary. From an investor's perspective, understanding how and why investment managers adjust equity holdings during periods of global crises is essential because decentralizing investment decisions creates agency and coordination problems for the investor that are not easily solved (Sharpe (1981), Van Binsbergen et al. (2008), Blake et al. (2013)).

In this study, we explore international portfolio concentration and the active share of 68,189 mutual fund portfolios from 37 countries over the 2000-2021 period to identify patterns in mutual fund managers' equity reallocations during periods of economic crises. Specifically, we examine whether mutual fund managers condition their country and industry diversification and security selection decisions on the state of global economic conditions. We analyze whether mutual fund managers adjust their equity holdings and make predictable decisions that help investors construct more efficient portfolios. Our analysis of global reallocations within equity class allows us to draw a novel set of conclusions and inferences regarding patterns in international equity holdings of mutual fund portfolios during periods of global economic distress.

Mutual funds are well-suited for our study of equity reallocation patterns because the investor has a limited ability to align incentives with the manager.[1] Thus knowing how the

[1]Van Binsbergen et al. (2008) show how setting proper benchmarks for managers can mitigate inefficiencies. However, this approach cannot be employed by most mutual fund investors because the benchmark is set for

portfolio behaves conditionally is critical for the investor. Additionally, mutual fund managers generally have little flexibility in asset allocation decisions (e.g., substituting cash or bonds for stocks), yet they enjoy a good deal of flexibility in choosing the weights of the equities in their style bucket. Equity mutual fund managers with global exposure can tactically adjust toward a global market portfolio or exploit equity diversification strategies that reduce exposure to global market risk during periods of crises. Fund managers may potentially decrease the equity portfolio volatility to avoid negative relative performance, and they have a strong incentive to do so as markets experience time-varying volatility. The time-varying risk and return creates a problem for mutual fund managers as they are legally bound to provide daily liquidity. Therefore, during periods when returns are low and liquidity demand is high, redemption risk is high. If the manager's risk aversion increases, this will cause the manager to choose a more conservative portfolio (Van Binsbergen et al. (2008)). Any portfolio shift driven by fund redemption risk distorts the investor's portfolio. Hedging redemption risk benefits the fund manager at the investor's expense and may necessitate a portfolio adjustment. Very little is known about how much fund managers modify their portfolios in these circumstances.

Alternatively, if the manager has superior information sufficient to weather the storm and investors have confidence that this is the case, then redemption risk may not be a concern. Potentially there will be no need for the investor to make portfolio adjustments. Mutual fund managers may pursue more selective strategies in this situation, concentrating holdings in particular equity markets or industries. If their strategy is formulated on an information advantage, it should provide an opportunity for higher excess returns to informed investors and potentially mitigate some of the incentive problems discussed above. Informed mutual fund managers should theoretically concentrate their portfolios more when there is more uncertainty to maximize return on their information advantage (Van Nieuwerburgh and Veldkamp (2009)). From the perspective of the uninformed investor, this gives the illusion of increasing the

all shareholders of a fund, not by each specific investor. Even though many funds exist for each asset class, the within-class benchmarks have minimal variation. Therefore, the investor cannot rely on mandates to eliminate agency problems with the managers.

portfolio's risk. This may attenuate some of the inefficiency caused by any increased risk aversion of the manager. Being informed implies the manager's conditional variance declines by concentrating the portfolio while the investor's uninformed perception of the portfolio's risk increases. From the uninformed investor's perspective, the holdings imply the manager's risk aversion decreased when this is simply an artifact of the asymmetric information. The bottom line is that for an investor to maximize the efficiency of a decentralized portfolio, it is necessary to know a great deal about how mutual fund managers revise their portfolios when there are material shocks to the global economy and increased uncertainty.

To test how mutual fund managers reallocate their portfolio equity holdings across countries and industries in response to large shocks to the global economy, we analyze several measures of portfolio concentration across securities, industries, and countries. Our findings show that mutual funds become less diversified and engage more in active security selection during economic crises. The average measures for all mutual funds in the data show that global and industry concentrations drift up throughout the sample period without much sensitivity to the economic crises periods. Aggregate measures of portfolio concentration that are not sensitive to distress periods may still yield interesting patterns when considering offsetting moves.[2] We find patterns in economic crisis period holdings to be more insightful when we examine disaggregated country-level data. For example, we find that portfolios become globally more concentrated relative to the passive world benchmark portfolio. This concentration is driven by changes in mutual fund home bias and by increased focus in foreign country allocation.

We show that home bias increases during economic crises. This finding is not limited to mutual funds that reside in relatively low equity risk markets, but we observe that home bias increases broadly across home markets, and even more so in home markets where equity risk is high. Similarly, the increased focus in foreign target markets does not seem to be driven

[2]For example, a French investor may swap a UK position for a US position with a different risk profile leaving portfolio concentration unchanged. Tactically shifting the positions leaves the aggregate measure unchanged, but there is a reallocation of risk in the French portfolio.

by increased allocation to safe foreign target markets. Rather, a target market's equity risk is positively related to mutual fund managers' portfolio weight of the market during crises. During crises, equity investment increases especially to foreign markets that have and/or are expected to return above the passive world benchmark, have higher betas and equity risk, and are culturally similar to the mutual fund's home market. We also find that on a large scale, portfolios become more concentrated in foreign target markets that are close based on business climate and geographic distance in addition to cultural distance. We also find that mutual funds' active share increases during economic crises. It does not appear that fund managers are driven by attempts to avoid negative performance relative to the passive benchmark, but rather that they may see global turmoil as an opportunity to pursue higher risk-adjusted returns.

These findings make an important contribution to the existing literature. In contrast to previously documented flight-to-safety in aggregate capital flows during periods of economic crises, our findings on mutual funds' equity reallocations do not support flight to safer equity markets, but rather suggest reallocations to markets where mutual fund managers may have an advantage in analyzing information. Our findings suggests the information advantage-based equity reallocation patterns within mutual funds' portfolios.

We also investigate industry allocation at the aggregate portfolio level and industry allocation across foreign target markets during economic crises. We find that aggregate industry concentration increases at the portfolio level during crises. Again, this finding does not support increased diversification by mutual fund managers during global turmoil. When investigating disaggregated industry data, we find that mutual fund managers overweight industries in foreign target markets that are similar to their home market industry base, consistent with the information-based evidence presented in Schumacher (2018). Mutual fund managers also allocate more to defensive industries than non-defensive industries in foreign markets in periods of turmoil. We find that during crises equity allocation increases especially to industries that are similar to home markets and are defensive. This finding provides further support to the

idea that mutual fund managers attempt to capitalize on market uncertainty and employ their information advantage in their equity allocation decisions during periods of global economic distress.

Our results indirectly support that allocations to less distant foreign markets in crises periods are consistent with informed investing documented by Fedenia et al. (2022). Our results contrast with the behavior of individual investors who tend to retrench from foreign markets during times of economic turmoil (Milesi-Ferretti and Tille (2011); Forbes and Warnock (2012)) and reverse course during economic expansions. Overall, our results on equity reallocations align with prior studies documenting flight-to-safety across various asset classes, but our analysis indicates that portfolio revisions are not uniform across target markets and industries with increases in active positions being the norm. Broadly speaking, mutual fund managers behave like informed investors in crises suggesting that concerns over agency problems between investors and equity mutual fund managers may be overstated.

The remainder of the paper is organized as follows. Section II contains a brief review of related studies highlighting our contributions to the literature. In Sections III and IV, we discuss our data, variable construction and methodology. We present the results in Section V and conclude in Section VI.

II. Background and Literature Review

Our study contributes and provides important implications to the field of investors' decentralized decision-making and agency problems between investors and professional money managers. The role of professional money managers, such as mutual fund managers, in creating value for investors has been debated in previous studies. Many studies show that, on average, actively managed funds do not outperform passive benchmarks (e.g., Daniel et al. (1997), Fama and French (2010)). Furthermore, studies dating back to Sharpe (1981) argue of the potential conflict of interest between investors and professional money managers. Mahoney (2004), Kacperczyk et al. (2008), among others, discuss and examine the agency

conflict in the mutual funds' setting.

Other studies examine changes in mutual funds' allocations in response to changes in macroeconomic conditions. While some studies document insignificant and sometimes negative market timing performance of mutual funds (e.g., Becker et al. (1999)), Jiang et al. (2007) find that actively managed equity funds have positive market timing ability which is especially evident in shifts in industry weights in response to changes in macroeconomic conditions. Chevalier and Ellison (1997) argue that the agency conflict between fund managers and investors creates an incentive to alter the fund manager's risk-taking behavior during certain times. Potentially, this agency conflict is more severe during periods of economic crises since fund managers have incentives to hedge redemption risk at the investor's expense. Yet, Kacperczyk et al. (2014) document that US mutual fund managers actively adjust their investment allocations based on US business cycles. Indeed, skilled fund managers employ time-varying strategies linked to market timing in recessions and stock picking during booms. Similarly, Moskowitz (2000) discusses the value of active management conditioning on different phases of the business cycle, while Avramov and Wermers (2006) identify fund managers with superior skills during changing business conditions. The relevant implication of these studies is that, at least some, mutual fund managers actively engage in portfolio adjustments during economic cycles. Our analysis of global mutual funds allows us to explore active adjustments in equity allocations across markets and industries during global economic crises and make inferences regarding the presence and severity of agency issues in decentralized investments.

Even though we do not conduct a performance analysis, prior evidence on the outperformance of concentrated portfolios (e.g., Coval and Moskowitz (2001), Kacperczyk et al. (2005), Hiraki et al. (2015)) offers useful insights we can employ for our analysis. Choi et al. (2017) find that home country, foreign country, and industry concentration are associated with higher risk-adjusted returns of institutional investors' portfolios, suggesting that institutional investors concentrate their holdings in home and select foreign markets as if they possess an information advantage in these markets. Based on the outperformance results of these previous

studies, we can make some predictions regarding the value-enhancing strategies of mutual fund managers in our setting. Furthermore, prior theoretical studies offer conflicting predictions on the effects of increased market uncertainty on portfolio composition, providing a strong motivation for our empirical analysis. While the traditional portfolio theory (e.g., Levy and Sarnat (1970)) advocates for international diversification as a risk reduction strategy, a more recent theory by Van Nieuwerburgh and Veldkamp (2009) on information advantage posits for higher excess returns to informed investors during heightened market uncertainty. In our paper, we determine whether mutual fund managers increase their equity concentration in home and foreign markets and industries or increase portfolio diversification in equities across global markets in response to heightened economic uncertainty.

Our study also contributes to a vast literature on changes in asset allocations during periods of economic uncertainty. Ang and Bekaert (2002) develop a theoretical model of international asset allocations with risk-averse investors demanding safer assets during periods with low returns and high volatility. Several papers document empirically that during times of market uncertainty, some investors rebalance their portfolios toward higher quality, more liquid, and safer assets (e.g., Adrian et al. (2019), Beber et al. (2009), Habib et al. (2020)). This flight-to-safety phenomenon reflects the notion that some investors experience a sudden and strong preference for holding liquid and safe assets during periods of heightened economic uncertainty. Our study documents information-based reallocations within mutual funds' equity portfolios rather than flight-to-safety effects.

We also contribute to the literature analyzing the distance to holdings during uncertain economic conditions. Giannetti and Laeven (2012), for example, document a "flight home" effect in the market of syndicated loans, where lenders favor domestic borrowers during financial crises. Furthermore, Giannetti and Laeven (2016) suggest that during uncertain economic times, many investors prefer geographically close investments and rebalance their portfolios towards local stocks. The authors show that during times of increased market uncertainty, the local bias in US investor portfolios increases significantly. Extending these studies, we

analyze the effect of cross-national distance between the mutual fund's home market and the foreign target market on equity reallocation decisions.

Other studies document aggregate asset reallocations in international markets during periods of economic uncertainty. Chalmers et al. (2013) find that US fund investors decrease the risk of their portfolios (flight-to-safety) in times of deteriorating US economic conditions by directing capital away from equities and towards money market funds. Investors also shift away from foreign equity (flight home) and appear to have even less international diversification during US economic downturns. Milesi-Ferretti and Tille (2011) document heavy selling of foreign assets worldwide and a drastic drop in international capital flows during the GFC. Forbes and Warnock (2012) conclude that during the GFC several countries received increased capital inflow attributed to domestic investors liquidating foreign investments and reallocating to domestic markets. By contrast to the "flight-to-familiar" notion, Vermeulen (2013) documents that investors actively rebalance their foreign investments during the GFC, but not before, towards markets with lower correlation with their home markets to exploit international diversification benefits. Our study contributes to this literature by analyzing changes in equity allocations across countries and industries during the three major global economic crises of the past 20 years. In contrast to prior studies that analyze cross-asset aggregate flows, we analyze fund-level reallocations within one asset class — equity. We present novel findings on time series patterns of home bias and foreign market concentration of equities and analyze how these patterns change during periods of global economic turmoil. Our analysis of the safety/risk characteristics of domestic and foreign target markets allows us to determine whether fund managers gravitate towards safer equity markets during periods of global economic distress.

III. Data

The main focus of the paper is the examination of mutual funds' holdings and their portfolio- and country-level concentrations across countries and industries. To compute these

concentration measures, we use quarterly mutual fund holdings data from FactSet from the first quarter of 2000 to the first quarter of 2021. The FactSet holdings data include information on security holdings of many types of institutional investors. For this study, we limit ourselves to open-end mutual funds. We obtain information on fund-level security holdings in a given quarter, including the number of shares and the market value of each security, along with many other mutual fund and security characteristics. We filter out all non-equity mutual funds, funds with missing data points and funds with fewer than 10 holdings in a given quarter. We filter out mutual funds that do not have any investment outside of their home market.[3] We also require that the funds' and securities' home markets have all necessary country-level control variables.

From FactSet, in addition to holdings, we collect data on the mutual fund's country of domicile (the location of the fund's main operations), and the security's country of exchange. We refer to the fund's domicile country as the home country and define the fund's holdings as domestic (foreign) if the institution's home country is the same as (different from) the security's country of exchange. We exclude index funds from our analysis since we want to analyze the active decisions of mutual fund managers with respect to international portfolio allocations through time and during periods of global crises. After applying all the data filters, our final sample consists of 68,189 mutual funds located in 37 home countries.[4]

IV. Methodology and Variable Construction

We focus on time-series patterns of mutual funds' equity allocation and how these patterns change in times of global crises. In this section, we first identify periods of global crises and then describe the construction of portfolio concentration measures. Then we review the construction of the various cross-national distance measures, describe the industries to be

[3]In an unreported analysis, we run our main tests on the sample of mutual funds with at least 10% exposure to foreign equity. The results remain qualitatively similar.

[4]For more information on FactSet data, see Ferreira and Matos (2008), who provide an extensive set of summary statistics and discuss the comprehensiveness and limitations of the data.

perceived resilient during crises, and various country-level measures we use.

A. Global Crises

Time periods with a global crisis are represented by a dummy variable *Crisis* which is equal to one for the time period from January 2001 to September 2002 (aftermath of the dot.com bubble), October 2007 to March 2009 (the GFC), and February 2020 to March 2021 (COVID related uncertainty), and is zero otherwise. *Crisis* captures major economic shocks observed during our sample period that had significant effects on global financial markets. The proxy *Crisis* is consistent with the definition presented in Broner et al. (2013), who differentiate between domestic and global crisis episodes in some of their analyses.[5] As an alternative measure of increased global uncertainty, we use change in implied volatility from the prior quarter to the current quarter, ΔVIX.

Previous studies employ proxies for economic downturns, such as the market volatility index (VIX), country- or region-specific measures, or indicators based on the sector of the economic downfall, such as debt, currency, or a banking crisis (e.g., Forbes and Warnock (2012), Giannetti and Laeven (2016), and Guiso et al. (2018)). However, these proxies are typically US-, region-, or sector-centered, while we study global mutual fund managers across home and foreign markets, so we use identifiable global economic downturns. Given the global nature of our data and research questions, we employ a conservative indicator for global economic crises throughout our analyses and note that if our proxy unintentionally omits some periods of economic turmoil with significant global impact, that works against us finding significant results.

B. Portfolio Concentration Measures

We use the FactSet data to compute several portfolio concentration measures across countries and industries. All variables are computed quarterly, and the time index is suppressed

[5]Broner et al. (2013) define global crises as those that happen during the following time periods: 1980-1984 (the Latin American debt crisis), 1998-1999 (the Asian and Russian crises), and 2007-2009 (the GFC). Their sample ends in 2009.

when warranted for parsimony. We begin with a measure of mutual funds' global portfolio concentration in equities across all countries, which indicates the degree of global diversification. To define that measure, we first calculate the country bias for each mutual fund i, as the difference between the actual portfolio weight of the fund's holdings in a given country relative to the overall portfolio value and the expected portfolio weight of each country relative to the float-based world market capitalization, as reported by FactSet. For every portfolio and time period, we then aggregate country biases to define global concentration (GC) as:

$$GC = \frac{1}{2} \sum_{c \in C} \left| \frac{x_c}{\sum_{c \in C} x_c} - \frac{v_c}{\sum_{c \in C} v_c} \right|, \tag{1}$$

where C denotes the set of countries, v_c denotes the market capitalization of country c, and x_c denotes dollars invested in country c. GC is half the sum of the absolute value of all country biases and indicates the degree of a fund's portfolio concentration across home and foreign markets. Specifically, it shows the fraction of the fund's entire portfolio that should be reallocated to achieve full diversification across global markets. Thus, a high (low) value of GC indicates a low (high) degree of diversification across global markets. Notably, changes in the GC reflect active decisions made by mutual fund managers that are not attributable to changes in market values or currency exchange rates.

We next analyze the factors that drive the global diversification changes in equity portfolios. We first examine whether changes in GC are attributed to changes in allocations to the home market. This is the global diversification analog to the flight-home effect documented in aggregate flows in previous studies as discussed above. For this inquiry, we calculate home bias (HB) as:

$$HB = \frac{x_H}{\sum_{c \in C} x_c} - \frac{v_H}{\sum_{c \in C} v_c}, \tag{2}$$

where x_H denotes investor dollars in the home country H, x_c denotes investor dollars in country c, v_H denotes the market capitalization of the home country H, and v_c denotes the market capitalization of country c. *HB* is the difference between the actual portfolio weight of the fund's holdings in the home country and the home country market capitalization weight in the global market portfolio. The weights are calculated relative to the world market capitalization. This measure captures the weight of the home country in the fund's portfolio relative to that country's weight in the aggregate world market portfolio. Positive (negative) values indicate that the fund overweights (underweights) its home country.

Of course, flight-home is not the only possible factor driving changes in global concentration. Mutual fund managers may shift allocations to safer, closer, or more familiar foreign markets; thus, increasing concentration in select foreign markets consistent with flight-to-quality or flight-to-familiar patterns. To the contrary, mutual fund managers may shift away from concentrated portfolios and increase diversification across foreign markets consistent with the predictions of the traditional portfolio theory. To analyze these patterns in mutual fund equity portfolios, we compute foreign concentration (FC) for each portfolio as follows:

$$FC = \frac{1}{2} \sum_{f \in \{C|H\}} \left| \frac{x_f}{\sum_{f \in \{C|H\}} x_f} - \frac{v_f}{\sum_{f \in \{C|H\}} v_f} \right|, \tag{3}$$

where $\{C|H\}$ denotes the set of all countries excluding the home country (H) of the mutual fund, x_f denotes the dollars invested by the mutual fund manager in foreign country f, and v_f denotes the market capitalization of foreign country f.[6] This measure indicates whether the fund's portfolio allocated to foreign equities is well diversified across foreign markets. *FC* equals zero if a portfolio's allocation in foreign countries is exactly in line with the coun-

[6]Note that *FC* is computed for all foreign markets, even if the fund investment in a country is zero. We define the set of foreign markets as countries with a positive float weight according to FactSet. At least one foreign institutional investor must be present in each included foreign market to ensure that the country is open to foreign investors.

tries' market capitalization weights. A value greater than zero indicates the fraction of the fund's foreign holdings that should be reallocated across foreign countries to achieve perfect diversification in foreign equities.

In addition to country-level concentration measures, we construct industry concentration (IC) to measure the fraction of the portfolio that should be reallocated across industries globally to achieve full global industry diversification, as follows:

$$IC = \frac{1}{2} \sum_{i \in I} \left| \frac{x_i}{\sum_{i \in I} x_i} - \frac{v_i}{\sum_{i \in I} v_i} \right|, \tag{4}$$

where $\{I\}$ denotes the set of all industries, x_i denotes the dollars invested by the mutual fund manager in industry i, and v_i denotes the market capitalization of industry i. Industries are defined based on the two-digit SIC code.

Finally, we construct the portfolio active share (AS), which measures the portfolio's deviation from the MSCI All Country World Index (ACWI). It is the share of portfolio equity holdings that differs from the value-weighted index of global stocks. We follow intuition and construct the measure following Cremers and Petajisto (2009). The measure captures active security selection decisions of the mutual fund managers, with a higher active share indicating more active portfolio management as opposed to passive indexing.

C. Cross-national Distance Measures

An extensive number of studies document that cross-national distance affects portfolio allocations in international markets (e.g., Chan et al. (2005), Beugelsdijk and Frijns (2010)). Furthermore, Fedenia et al. (2022) document that institutional investors earn higher returns in culturally similar foreign markets, suggesting that these allocation decisions are associated with an investor's information advantage. One possibility we investigate is whether mutual fund managers increase their allocations to less distant foreign markets to leverage their information advantage during economic crises.

Using the data and methodology outlined in Fedenia et al. (2022), we utilize 38 measures of cross-national distance to obtain the value-weighted average distance to holdings across four dimensions: business climate, culture, geography, and industry. The value-weighted average distance to holdings for a generic dimension is:

$$VW\ distance = \sum_{f \in \{C|H\}} D(f,H) \frac{x_f}{\sum_{f \in \{C|H\}} x_f}, \tag{5}$$

where $D(f,H)$ denotes the distance from foreign country f to the home country H. $D(f,H)$ is multiplied, or value-weighted, by the dollars invested by the mutual fund manager in foreign country f, x_f, scaled by the market capitalization of foreign country f, v_f. We assign each of the 38 variables that capture cross-national characteristics to the relevant dimension of interest as an explanatory variable. Then we extract standardized factor scores for each of the four dimensions. We aggregate the standardized factor scores to form an euclidean distance, which is then further scaled such that the home country has zero distance from itself. This process yields a single bilateral distance for each home market and foreign market pair for each dimension. We utilize the cross-national distance metric to investigate whether global crises affect holdings' patterns in foreign markets across several dimensions documented in prior studies to be cross-sectionally correlated with foreign investments (e.g., Beugelsdijk and Frijns (2010), Anderson et al. (2011), Fedenia et al. (2022)).

D. Measures of Industry Concentration and Resilience to Crisis

We also investigate changes in industry allocations in the foreign target market conditioning on industry allocation patterns at the home market. Specifically, we investigate whether funds' industry allocations in foreign markets during crisis periods relate to the funds' industry allocations in the home market. In this case, we measure foreign country industry bias, ($FCIB$), following Schumacher (2018), who documents that international mutual funds overweight industries that are comparatively large in their domestic stock market. We examine

whether patterns in *FCIB* change during crisis periods.

Furthermore, firms in defensive industries are known to be more resilient to crises than firms in other industries. We construct an explanatory variable, *Defensive* which indicates whether a firm is from a crisis resilient industry. The determination is based on the stock's Fama-French industry classification with industries 2=Food Products, 3=Candy and Soda, 4=Beer and Liquor, 5=Tobacco Products, 11=Healthcare, 13=Pharmaceutical Products, 27=Precious Medals, and 31=Utilities considered defensive, and the stocks in other industries as non-defensive.

E. Country Level Measures

To analyze the determinants of changes in country bias during global crises and whether mutual funds increase concentration in less risky equity markets, we require several country-level measures. We begin with the variable *Equity Risk*, which allows us to explore whether changes in country concentration depend on the safety or stability of the target market. For each country on annual basis, we construct *Equity Risk* as the first principal component of four country-level variables: 1) volatility (computed as the annualized standard deviation of the previous 12 months of the equity market return); 2) equity market capitalization; 3) equity market volume; and 4) safe currency indicator (set equal to one for US dollar, Swiss franc, Japanese yen, and British pound, and zero otherwise). *Equity Risk* is higher (lower) for less (more) stable and safe markets. We differentiate between the equity risk of the fund's home market, *Home Equity Risk*, and that of the target market, *Target Equity Risk*, calculated for each foreign target market.

We also estimate the home and target market's equity risk using *Home Beta* and *Target Beta*, calculated as the rolling beta of a given market based on the 36 months of that market's monthly returns against the MSCI ACWI index. In addition, we include past (-2,0) and forward looking (0,3) quarterly market returns for the target market (*Target return*) and the world market portfolio (*World return*). Finally, we control for *Fund Size*, measured as the total market value of the fund's portfolio.

V. Results

We first describe our sample and summary statistics on our key variables. We then discuss the results of our analysis examining the relation between portfolio concentration and indicators of global crises.

A. Sample Description and Summary Statistics

To give a sense of our data and portfolio concentration measures, we calculate the number of funds, average values of portfolio concentrations, and distances to holdings over the entire sample period for each of the 37 investor countries in our sample. Table 1 presents the results for each country in alphabetical order using the International Organization for Standardization (ISO) three-digit country codes and for the overall sample. The number of funds represented from each country varies from 12 funds from the Philippines (PHL) to 15,475 funds from the US for a total of 68,189 funds in the sample.

Table 1 shows that *GC* and *FC* are very large (above 0.5) for all countries, suggesting that mutual funds in all countries need to reallocate over half of their foreign and total holdings to achieve perfect foreign and global diversification, respectively. Many countries have these measures above 0.7, indicating that they need to reallocate over 70% of their holdings (total and foreign) to achieve perfect global and foreign diversification.

The average *HB* is non-negative for all countries, meaning that mutual funds from all counties overweight their home markets. Furthermore, the sample average home bias is 0.48, indicating that, on average, mutual funds overweight their home markets by about 48%. Considering, for example, countries with more than 100 funds, mutual funds in Brazil (BRA) have an average *HB* of 0.96, meaning that Brazilian funds overweight Brazil by 96%; funds in South Africa (ZAF) overweight the home market by over 60%; Australia (AUS), Japan (JPN), France (FRA), Israel (ISR), Malaysia (MYS), and Poland (POL) each have a *HB* higher than 0.50, meaning that mutual funds in these countries overweight their home markets by over 50%. The US mutual funds overweight the US market by 36%.

We see a similar pattern of high portfolio concentration across industries, with an average value of *IC* of 0.62 for the entire sample, indicating that mutual funds, on average, should reallocate 62% of their holdings to achieve perfect industry diversification. The average *IC* is over 0.50 for all countries, meaning that, on average, mutual funds in all countries hold quite concentrated industry portfolios.

Table 1 also presents the average values for our five distance to holdings measures (*All, Industry, Business, Culture, Geography*). The sample averages range from 0.28 for *Business* distance to holdings to 0.38 for *Industry* distance to holdings, demonstrating that the distance to holdings, though not close to zero, is relatively short, especially in terms of business climate and cultural distance. Furthermore, there is a significant variation in these distance measures across countries. Funds from some countries invest very close to home, with distance to holdings measures at or below 0.04 for Brazil (BRA), China (CHN), Indonesia (IDN), and India (IND). Funds in other countries, (e.g., Spain (ESP), Italy (ITA), Hong Kong (HKG), Portugal (PRT), and Singapore (SGP)) choose to hold equities in more distant countries, with distance measures close to or above 0.5. These distance measures are value-weighted by market capitalization, so it is not surprising that all five measures for the US are close to sample averages of about 0.3.

——————Insert Table 1 here——————

Figure 1 shows the time series patterns in portfolio concentration measures for the median values of *GC*, *HB*, *FC*, and *IC* across our sample period. The measures are standardized for ease of comparison. The figure shows that there is a significant variation in portfolio concentration measures across time and types. For example, *HB* increases drastically before the GFC and during the COVID-19 pandemic; it drops after the GFC. *GC*, on the other hand, demonstrates an overall increasing pattern with a sharp increase at the beginning of the sample period and a general overall increase during the rest of the sample period. *FC* demonstrates sharp increases and decreases, in line with the *HB*; however, while the intensity of changes mirror those of *HB*, the direction of changes is often opposite those for *HB*. Finally, the time

series pattern for IC is relatively smooth and increasing over time. Overall, this figure suggests that there are some dynamic and heterogeneous patterns in the time series trends of portfolio concentration measures. These patterns suggest that mutual fund managers adjust equity holdings across countries and industries in times of global crises; however, these adjustments are not uniform.

——————Insert Figure 1 here——————

Table 2 presents the summary statistics of all our concentration measures and other variables used in the analysis. The table is split into three panels: Portfolio level (Panel A), Country level (Panel B), and Country-Industry level (Panel C). The table demonstrates the range of values for all measures with minimum (Min) and maximum (Max) values reported and the skewness of the variables' distributions according to mean, median, and standard deviation (Std Dev). This table is especially useful for assessing the economic significance of the results presented in our regressions' analysis.

——————Insert Table 2 here——————

B. Portfolio Concentration and Global Economic Turmoil

In this subsection, we present the results of our ordinary least squares (OLS) regressions testing the relation between portfolio-level country concentration measures and global economic uncertainty. We hypothesize that mutual fund managers change their portfolio concentrations in response to changes in global economic uncertainty. As discussed above, theoretical models offer conflicting predictions on the direction of that relation.

We start with the analysis of portfolio concentration across countries. Table 3 presents the results. In the regression for Panel A, the dependent variable is the fund's quarterly GC in specifications (1) and (2) and the change in quarterly GC, ΔGC, in specifications (3) and (4). In the regression for Panel B the dependent variable is the fund's quarterly active share (AS) in specifications (1) and (2) and the change in quarterly active share, ΔAS, in specifications (3) and (4). The key independent variable in each specification is a proxy for periods of global economic uncertainty: *Crisis* indicator in specifications (1) and (3), ΔVIX, measured as a

change in quarterly implied volatility of the S&P 500 Index options in specifications (2) and (4).[7]

——————Insert Table 3 here——————

In all regressions, we control for *Fund Size* and include home market-year fixed effects to control for systematic differences in the home market environment, which could affect equity allocation decisions. These fixed effects control for time-variant and invariant omitted variables and characteristics of a home market, allowing us to make inferences regarding the effects of changes in global economic uncertainty on portfolio concentration. Standard errors are clustered at the fund level to allow for correlations in fund-level observations over time.

The results in Panel A of Table 3 show that, during periods of global economic crises and increased global market uncertainty, mutual funds increase portfolios' global concentration. The coefficients on both economic uncertainty measures (*Crisis* and ΔVIX), are positive and statistically significant in all specifications (GC and ΔGC) suggesting that mutual funds become less diversified across countries during economic downturns. This increased global concentration is consistent with either increased home bias, foreign country concentration, or both.

Specifications (1) and (2) in Panel B of Table 3 indicate that mutual fund managers increase active share and deviate more from the world index during global crises when global volatility is high. This suggests that mutual fund managers engage more in active security selection and less in passive indexing during periods of heightened economic uncertainty. This increase in active management is consistent with the results presented in Panel A on global concentration, suggesting that fund managers, in general, diversify less internationally (concentrate more across countries) and pursue active rather than passive equity allocation strategies during global economic meltdowns. The results for ΔAS in specifications (3) and

[7]For robustness, in unreported analysis, we employ a global rather than an S&P 500 VIX as another proxy for global economic uncertainty. The global VIX is computed as the equally-weighted average of monthly volatility indices of countries that report volatility index. However, VIX is available only for 13 markets significantly reducing our sample size and coverage. Results are qualitatively similar and omitted for the sake of brevity.

(4) of Panel B, Table 3, are positive and statistically significant for *Crisis* (specification 3) and positive but insignificant for ΔVIX (specification 4).

The economic magnitudes of the effect of *Crisis* on the portfolio-level concentration measures are quite small despite the statistical significance of the estimates. A fund manager with a mean level of *GC* and *AS*, increases *GC* and *AS* by 0.35% and 0.58% during economic crises, respectively. The patterns in portfolio-level adjustments are not uniform across fund managers and our subsequent investigation focuses on disentangling these adjustments to equity holdings by focusing on country- and industry-level analyses.

In Table 4, we examine whether an increase in global country concentration is driven by an increase in home bias using a set of regressions where the dependent variable is the fund's *HB*. These regressions include home market fixed effects to control for time-invariant omitted variables and characteristics of a home market.

——————Insert Table 4 here——————

Specifications (1) and (2) are analogs to the corresponding specifications in Table 3 replacing *GC* with concentration in the home market, *HB*. We control for *Fund Size* and include home market-year fixed effects. We find that the coefficient on *Crisis* is positive and statistically significant, indicating that mutual funds increase their *HB* during global crises. The coefficient on ΔVIX, however, is statistically insignificant. Apparently, the *HB* increase is not driven by just global volatility. There must be country-level or fund-level changes during crisis periods that are responsible for the patterns in *HB*.

We then examine whether the increase in *HB* is widespread across all home markets or varies depending on the equity risk of the market. To address this issue, we add *Home Equity Risk* and *Home Beta* into specifications (3) - (5) in Table 4. *Home Equity Risk* has a high value when home market equity is risky; *Home Beta* has a high value when the volatility of the home market's returns is high relative to the world index.

In specification (3), we examine how these measures of *Home Equity Risk* and *Home Beta* relate to *HB* without regard to global economic uncertainty. The coefficients on both

measures are negative and significant, indicating that mutual funds have a lower *HB* in riskier home markets and in home markets with higher volatility in response to changes in the world market index. Specification (4) shows attenuation of the inverse relation in times of crisis. In specification (5), we examine whether crisis periods interact with *Home Equity Risk* to impact the *HB*. The positive coefficient on the interaction term suggests that funds in countries where *Home Equity Risk* increases in crisis periods tend to have more *HB* than funds where this is not the case. A portfolio with a mean level of *HB* in a country with a mean level of *Home Equity Risk* increases *HB* by 2.40% during a crisis. The effect magnifies when the *Home Equity Risk* increases during a crisis. If the *Home Equity Risk* increases by one standard deviation during a crisis, then *HB* increases by 4.92%.

Having established that mutual funds increase *GC* and *HB* during periods of economic uncertainty, we then analyze the relation between economic uncertainty and two other measures of portfolio concentration: *FC* and *IC*. Table 5 presents the results with *FC* as the dependent variable in specifications (1) and (2) and *IC* as the dependent variable in specifications (3) and (4). As before, we examine two proxies of global economic uncertainty: *Crisis* in specifications (1) and (3) and ΔVIX in specifications (2) and (4), controlling for *Fund Size* and home market-year fixed effects. We find that the coefficients on *Crisis* are positive and statistically significant for both measures of portfolio concentration, indicating that mutual funds also increase *FC* and *IC* during crises.

——————Insert Table 5 here——————

We next examine whether mutual funds increase concentration in certain types of foreign markets. Previous studies document that investors tend to concentrate their holdings in foreign countries that are similar to their home market in terms of culture, business climate, and geographical distance (Fedenia et al. (2022)). Furthermore, institutional investors tend to concentrate their foreign holdings in industries that are comparatively large in the home market (Schumacher (2018)). We investigate how crisis periods affect these patterns in mutual fund equity holdings. Table 6 presents the results of regressions that use different measures

of portfolio concentration across five value-weighted cross-national distance measures: *All* (specification 1), *Business* (specification 2), *Culture* (specification 3), *Geography* (specification 4), and *Industry* (specification 5). The negative and significant coefficients in specifications (1)-(4) indicate that, during global economic crises, mutual fund managers allocate larger amounts of equity to foreign markets that are closer to the home market in terms of the business climate, culture, and geographical distance. In terms of economic magnitude, for a mutual fund with a mean level distance to holdings measures, the distance to holdings decreases by 5.10% in terms of business and cultural distance and by 4.40% in terms of geographical distance during crisis periods. The insignificant coefficient in specification (5), however, suggests that mutual fund managers do not change portfolio concentration patterns during economic crises based on the industry similarity between the foreign and home markets.

——————Insert Table 6 here——————

We next investigate whether market risk characteristics affect country allocations of mutual funds during global economic crises. The dependent variable in this set of regressions is *CB* (foreign country bias), which measures portfolio overweight of a given foreign market for each mutual fund relative to the market's weight in the world market portfolio. In this set of regressions, we control for *Fund Size* and include home country and target country fixed effects to account for country-wide variations in home and foreign markets. In specification (1) in Table 7, we include measures of *Equity Risk* and *Beta* of the target and home markets. We also include target and world markets' past and forward-looking returns. The purpose of this specification is to get a sense of *CB* in relation to the risk and return characteristics of the target market while controlling for home market risk characteristics and world equity returns. The results for specification (1) indicate that mutual fund managers overweight less risky foreign markets. We observe a statistically significant negative sign on *Target Beta* and statistically insignificant negative sign on *Target Equity Risk*. The results in specification (1) also show that mutual fund managers overweight foreign markets with higher past and forward-looking returns. Furthermore, as world equity markets show better past and forward-

looking performance relative to the foreign market, mutual fund managers' equity allocation to the foreign market decreases. Finally, mutual fund managers overweight foreign markets if their home markets have higher *Home Equity Risk* and *Home Beta*.

——————Insert Table 7 here——————

In specification (1), we create a baseline of the link between mutual fund managers' overweight of foreign markets and the market's risk and return characteristics. Next, we examine how global economic crisis affects the relation of *CB* and target market's equity risk and return. We find that in specifications (2) and (3), the coefficient on *Crisis* is negative and statistically significant, indicating that mutual fund managers decrease *CB* during global economic crises. In specifications (3) and (4), we interact *Crisis* with measures of equity risk and return. All interaction terms, with the exception of the *Crisis* x *Target Equity Risk*, are statistically significant. The results in specifications (3) and (4) suggest that mutual fund managers retain or increase their equity allocation to countries that have relatively strong returns during crises. We do not observe mutual fund managers overweighting safe foreign target markets during economic crises. The interaction terms of *Crisis* and *Target Equity Risk* and *Target Beta* are either statistically insignificant or positive. The three-way interaction term of *Crisis* x *Target Equity Risk* x *Target Beta* in specification (4) is positive and statistically significant. Similar to findings in Table 4 on home bias, we show that reallocation in foreign equities is not driven by flight-to-safety, rather the opposite. Mutual fund managers increase foreign concentration in holdings during economic crises, but appear to increase allocation to certain types of foreign markets that are riskier than their existing positions. In addition, we find that the interaction terms *Crisis* x *Home Equity Risk* are statistically significant and negative in specifications (3) and (4). This means that during economic crises equity allocation is lower to foreign markets when home market equity risk is high. This provides additional support for findings in Table 4 that showed that home market allocations increase to home markets with higher *Home Equity Risk* during crisis periods.

We then examine whether mutual fund managers increase *CB* during periods of crisis in

foreign markets close to the fund's home market and how foreign market equity risk plays a role in the relation. We include home country - foreign country closeness measures specific to each country pair as key independent variables. We measure closeness in terms of *Close Culture*, *Close Business*, *Close Geography*, and *Close Industry* with indicator variables, so that one equals the closest 10th percentile of foreign markets to the home country and zero otherwise. We also include interaction terms of *Crisis* and the closeness indicators. The results are presented in Table 8 where *CB* is the dependent variable. All regressions include home and target country fixed effects. Specifications (1) and (2) are based on the full sample of funds. The results in specification (1) show that the coefficients on *Close Business*, *Close Geography*, and *Close Industry* are positive and statistically significant, consistent with previous studies that investors overweight foreign markets that are close to their home market along these dimensions (e.g., Fedenia et al. (2022)). The coefficient on *Close Culture* is not statistically significant in the overall sample. In specification (2), we examine whether and how economic crises alter the relation between the closeness indicators and *CB* by including *Crisis* interacted with *Close Culture*, *Close Business*, *Close Geography*, and *Close Industry*. The coefficient on *Crisis* is negative and statistically significant, similar to the finding in Table 7. The interaction term of *Crisis* x *Close Culture* is positive, statistically significant, and large in magnitude relative to the other interaction terms, suggesting that during economic crises mutual fund managers intensify their exposure to countries that are culturally close. Thus, the impact of cultural closeness on foreign equity investment seems to be more important during periods when uncertainty is high. By contrast, *Close Business*, *Close Geography*, and *Close Industry* have negligible coefficients on the interaction terms and therefore are not sensitive to the varying uncertainty in markets. This contrast is essential for differentiating cultural distance from other distance metrics in the context of portfolio concentration.

——————Insert Table 8 here——————

We then partition the sample into safe (specification 3) and risky (specification 4) foreign target markets based on the values of *Target Equity Risk*. The subsample of safe foreign

markets includes the four safest markets in each time period, while all other markets are included in the risky category. We repeat the analysis from specification (2) with the partitioned sample. We find differential cultural and industry closeness effects on *CB* between the risky versus safe markets. The interaction term of *Crisis* x *Close Culture* is positive and statistically significant in both safe and risky foreign markets, but much larger in magnitude in the safe foreign markets. By contrast, the interaction term of *Crisis* x *Close Industry* is only positive and statistically significant in risky foreign markets. The effect of the other two closeness variables *Close Business* and *Close Geography* interacted with *Crisis* are similar across risky versus safe countries. The results provide support for information driven portfolio reallocation during crisis periods. Both cultural and industry closeness between an investor and their holdings have been shown to be drivers of information advantage (Schumacher (2018), Fedenia et al. (2022)). We find that this relation magnifies during periods of market uncertainty, when returns to information should be the highest (Van Nieuwerburgh and Veldkamp (2009)).

In Table 9, we present the results of determinants of mutual fund managers' allocations to industries in foreign countries during global economic crises. The dependent variable is *FCIB* (foreign country industry bias), which measures the deviation from the optimal weight of a given industry in a given foreign country in the mutual fund's portfolio. In all regressions, we control for *Fund Size* and include home market-year and target market-year fixed effects. The results for specification (1) show whether home market industry bias (*Home IB*) influences the allocation to the same industry in a foreign market. The positive and statistically significant coefficient on *Home IB* confirms that mutual fund managers increase industry bias outside of the home market if they tend to overweight that industry at home (Schumacher (2018)). This result also supports informed overweighting of equities in foreign markets. As indicated by the positive coefficient on *Defensive*, we find that mutual fund managers overweight industries in foreign markets if the industry is more resilient to economic downturns. In specifications (2) and (3), we include the *Crisis* indicator and interact *Crisis* with *Home IB*. This is to test if the information driven allocation magnifies during global economic crises. We also include the

Crisis x *Defensive* interaction term to test if flight-to-safety driven allocation magnifies during global economic crises. In these specifications, the negative coefficients on *Crisis* indicate that mutual fund managers decrease foreign country industry bias during crises. The statistically insignificant interaction terms indicate that the mutual fund managers decrease allocation without regard to the home industry bias (and related information advantage) and without regard to safety of the industry (and related flight-to-safety) during economic crises.

——————Insert Table 9 here——————

Finally, in specification (4), we include *Crisis* x *Home IB* x *Defensive* interaction term. First, the interaction of *Home IB* and *Defensive* is positive and statistically significant, indicating mutual fund managers that have industry overweight in home market in defensive industries also have more *FCIB* than fund managers in non-defensive industries. The three way interaction term *Crisis* x *Home IB* x *Defensive* is also positive and statistically significant. This indicates that during crisis periods, mutual fund managers increase allocation to industries they overweight in their home market when those industries are defensive. Summarizing, mutual fund managers decrease *FCIB* during economic crises. However, they increase *FCIB* in industries with higher overweight in the home market especially if the industry is defensive. The result again supports information based equity reallocation during crisis periods.

Taken together, results suggest that mutual fund managers pursue active equity reallocation strategies during periods of global economic crises. We do not find evidence that mutual fund managers retrench to more diversified, low risk portfolios to manage their increased redemption risk during periods of economic distress. To the contrary, mutual fund managers appear to pursue selective strategies of increasing portfolio concentration across countries and industries, and more active security selection strategies. Our analyses suggest that these strategies are attributed to information-based trading rather than flight-to-safety motives. Overall, our findings suggest that mutual fund managers pursue strategies consistent with value-enhancing in decentralized investments during periods of global economic distress.

VI. Conclusion

We examine the time series patterns in global portfolio concentration by equity mutual funds over the 2000-2021 period to determine whether and how mutual fund managers change equity allocations across countries (home and foreign) and industries during periods of global economic crises. We test two conflicting predictions on the effects of increased economic uncertainty on portfolio allocation decisions. On one hand, the traditional portfolio theory suggests large gains from international diversification through reduction in risk, implying that investors should hold widely diversified portfolios, especially during times of heightened market uncertainty. On the other hand, the information-based theory of home bias suggests performance gains to portfolio concentration of informed investors in response to an increase in global economic uncertainty. We examine which of these strategies are prevalent in fund managers' equity reallocation decisions during times of economic distress. This analysis is important for decentralized investment practices so that investors can adjust their portfolios accordingly.

We document that mutual fund managers increase active share and portfolio concentrations across countries and industries during global economic crises. Furthermore, the patterns of increasing concentration vary depending on the market's risk, distance to the home market, and industry structure. For example, mutual fund managers increase their home bias and concentration in certain types of foreign markets. Interestingly, the equity risk of the market does not negatively impact allocation choices during crises periods. Mutual fund managers increase their home bias in equities, and more so when the home market's equity is risky. Foreign country weights are also higher in foreign markets with higher equity risk. We also observe increased allocation to markets that are closer to the mutual fund's home market in terms of culture, business climate, and geographical distance. During economic crises, mutual fund managers also increase industry concentration and overweight industries they invest heavily in their home market.

Overall, our findings suggest that mutual fund managers take an active rather than a

passive role in increasing portfolio concentration (decreasing international diversification) and use more active security selection practices during periods of heightened global economic uncertainty. Furthermore, the results suggest that mutual fund managers base their reallocation decisions on information advantage rather than flight-to-safety motives in international markets during economic turmoil.

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Tables

Table 1: **Portfolio Concentration Measures** The table shows the distribution of the sample by mutual funds' home markets. It shows the number of funds from each home market, followed by portfolio concentration measures: global concentration (*GC*), home bias (*HB*), foreign concentration (*FC*) and industry concentration (*IC*). The last columns show several distance to holdings measures. These are value weighted distances of all cross-national distance measures (*All*), difference in industry structures (*Industry*), distance in business environment (*Business*), cultural distance (*Culture*), and geographical distance (*Geography*) between home and foreign target markets, respectively.

Home	Funds	*GC*	*HB*	*FC*	*IC*	*All*	*Industry*	*Business*	*Culture*	*Geography*
ARG	14	0.92	0.40	0.88	0.65	0.34	0.41	0.29	0.33	0.33
AUS	757	0.84	0.63	0.61	0.67	0.27	0.28	0.19	0.26	0.35
AUT	1,279	0.82	0.26	0.75	0.74	0.41	0.56	0.39	0.40	0.42
BRA	996	0.98	0.96	0.56	0.65	0.03	0.04	0.03	0.03	0.04
CAN	2,888	0.70	0.49	0.54	0.54	0.41	0.40	0.37	0.39	0.35
CHE	3,720	0.75	0.17	0.70	0.64	0.46	0.51	0.39	0.45	0.46
CHN	2,750	0.90	0.88	0.52	0.65	0.02	0.02	0.02	0.02	0.02
DEU	4,313	0.79	0.24	0.76	0.65	0.44	0.50	0.42	0.43	0.41
DNK	820	0.74	0.28	0.65	0.61	0.41	0.55	0.36	0.41	0.44
ESP	6,926	0.78	0.30	0.73	0.61	0.45	0.59	0.42	0.44	0.44
FIN	478	0.83	0.28	0.78	0.67	0.44	0.60	0.39	0.44	0.46
FRA	5,918	0.85	0.50	0.76	0.66	0.35	0.38	0.29	0.36	0.33
GBR	7,814	0.75	0.26	0.72	0.56	0.44	0.46	0.36	0.44	0.48
GRC	151	0.72	0.15	0.70	0.55	0.47	0.53	0.40	0.47	0.49
HKG	875	0.84	0.10	0.85	0.52	0.49	0.52	0.45	0.50	0.46
HUN	63	0.84	0.25	0.78	0.66	0.45	0.59	0.41	0.46	0.46
IDN	41	0.99	0.98	0.52	0.67	0.03	0.04	0.03	0.03	0.04
IND	1,940	0.97	0.96	0.51	0.68	0.02	0.02	0.02	0.02	0.02
IRL	423	0.68	0.07	0.66	0.51	0.47	0.67	0.35	0.46	0.49
ISR	1,478	0.85	0.66	0.63	0.69	0.33	0.37	0.29	0.33	0.37
ITA	1,706	0.73	0.15	0.72	0.57	0.48	0.59	0.41	0.48	0.50
JPN	2,052	0.85	0.66	0.55	0.54	0.15	0.13	0.12	0.15	0.17
KOR	30	0.95	0.81	0.55	0.52	0.10	0.10	0.09	0.09	0.11
MEX	416	0.84	0.63	0.58	0.78	0.24	0.32	0.23	0.24	0.21
MYS	298	0.92	0.71	0.65	0.59	0.22	0.23	0.20	0.22	0.22
NLD	927	0.68	0.14	0.66	0.61	0.45	0.52	0.40	0.44	0.49
NZL	21	0.84	0.38	0.79	0.65	0.44	0.60	0.30	0.43	0.53
PHL	12	0.96	0.84	0.58	0.67	0.12	0.15	0.12	0.11	0.14
POL	295	0.94	0.58	0.87	0.63	0.40	0.46	0.38	0.41	0.41
PRT	296	0.84	0.21	0.79	0.65	0.44	0.58	0.39	0.44	0.44
RUS	21	0.90	0.66	0.78	0.73	0.38	0.45	0.38	0.37	0.41
SGP	609	0.84	0.09	0.84	0.54	0.51	0.55	0.46	0.52	0.52
SWE	1,118	0.79	0.40	0.72	0.58	0.45	0.51	0.43	0.45	0.46
THA	259	0.99	0.97	0.55	0.56	0.06	0.05	0.05	0.06	0.06
TUR	24	0.95	0.88	0.60	0.59	0.14	0.16	0.14	0.14	0.15
USA	15,475	0.58	0.36	0.70	0.58	0.35	0.37	0.27	0.34	0.40
ZAF	986	0.88	0.63	0.77	0.69	0.39	0.43	0.29	0.37	0.50
Total	68,189									
Mean		0.84	0.48	0.69	0.62	0.33	0.38	0.28	0.32	0.34

Table 2: **Summary Statistics of Variables** The table shows the distribution of each variable. Panel A shows portfolio-level summary statistics. Panel B shows country-level summary statistics. Panel C shows country-industry-level summary statistics.

Panel A: Portfolio level summary statistics

Variable	Mean	Median	Std Dev	Min	Max
Global concentration	0.734	0.764	0.203	0.076	1.000
Active share	0.762	0.801	0.156	0.309	1.000
Home bias	0.378	0.379	0.378	-0.541	1.000
Foreign concentration	0.707	0.749	0.213	0.081	1.000
Industry concentration	0.570	0.520	0.227	0.069	1.000
Industry distance to holdings	0.448	0.510	0.260	0.000	1.000
Business distance to holdings	0.335	0.408	0.182	0.000	0.652
Cultural distance to holdings	0.386	0.479	0.200	0.000	0.598
Geographic distance to holdings	0.407	0.501	0.222	0.000	0.722
All distance to holdings	0.391	0.489	0.203	0.000	0.582
Fund Size	3.529	3.559	2.392	-13.816	14.038
Home Equity Risk	10.092	7.000	10.571	1.000	56.000
Home Beta	1.096	1.040	0.263	0.042	3.352
Crisis	0.155	0.000	0.362	0.000	1.000
VIX	19.128	16.520	8.357	9.510	53.540
ΔVIX	0.061	-0.065	0.491	-0.461	2.885

Panel B: Country level summary statistics

Variable	Mean	Median	Std Dev	Min	Max
Country bias	0.104	0.034	0.203	-0.541	1.000
Target Equity Risk	17.329	14.000	14.058	1.000	56.000
Target Beta	1.143	1.108	0.308	-0.056	3.352
Home Equity Risk	9.509	4.000	10.435	1.000	56.000
Home Beta	1.083	1.034	0.247	-0.056	3.194
Crisis	0.164	0.000	0.370	0.000	1.000
Fund Size, log	4.163	4.218	2.256	0.000	14.038
Country return (1,3)	0.013	0.020	0.116	-0.629	0.911
World return (1,3)	0.017	0.030	0.084	-0.348	0.318
Country return (-2,0)	0.017	0.023	0.117	-0.629	0.911
World return (-2,0)	0.019	0.030	0.084	-0.348	0.318
Close, all (Indicator)	0.116	0.000	0.320	0.000	1.000
Culturally Close (Indicator)	0.096	0.000	0.294	0.000	1.000
Industry Close (Indicator)	0.100	0.000	0.301	0.000	1.000
Business Climate Close (Indicator)	0.104	0.000	0.305	0.000	1.000
Geography Close (Indicator)	0.087	0.000	0.281	0.000	1.000

Panel C: Country-Industry level summary statistics

Variable	Mean	Median	Std Dev	Min	Max
FCIB	0.136	0.038	0.241	-0.631	1.000
Home IB	0.004	-0.004	0.120	-0.494	1.000
Defensive (Indicator)	0.142	0.000	0.349	0.000	1.000
Crisis (Indicator)	0.143	0.000	0.350	0.000	1.000
Fund Size	17.552	17.641	1.842	4.116	23.950

Table 3: **Global Concentration of Holdings** The table shows the results from OLS regressions where the dependent variable is the fund's quarterly global concentration (GC) in specifications (1) and (2) in Panel A and change in the quarterly global concentration (ΔGC) in specifications (3) and (4). The dependent variable is the fund's quarterly active share (AS) in specifications (1) and (2) in Panel B and change in the quarterly active share (ΔAS) in specifications (3) and (4).The sample is from 2000 to 2021. It includes all FactSet open-end mutual funds that meet our data filters. Observations are quarterly, thus the dataset is at fund-quarter level. The independent variables include an indicator variable for *Crisis*, which includes all crisis periods in the sample. As alternative measures of global uncertainty, we also include change in implied volatility, from prior quarter to the current quarter (ΔVIX). We control for the logarithm of fund size (*Fund Size*). All regressions include home market-year fixed effects. Standard errors are clustered at the fund level to allow for correlation across fund level observations and over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Panel A: Global concentration

	(1)	(2)	(3)	(4)
Variables	GC	GC	ΔGC	ΔGC
Crisis	0.0026***		0.0053***	
	[5.63]		[10.71]	
ΔVIX		0.0014***		0.0024***
		[10.07]		[17.22]
Fund Size	-0.0090***	-0.0090***	-0.0010***	-0.0010***
	[-28.73]	[-28.72]	[-28.19]	[-28.11]
Observations	1,465,688	1,465,688	1,405,893	1,405,893
Adjusted R^2	0.3283	0.3283	0.0160	0.0161
Home Market-Year FE	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund

Panel B: Active share

	(1)	(2)	(3)	(4)
	AS	AS	ΔAS	ΔAS
Crisis	0.0044***		0.0040***	
	[9.84]		[6.87]	
ΔVIX		0.0008***		0.0002
		[5.22]		[0.91]
Fund Size	0.0084***	0.0084***	-0.0004***	-0.0004***
	[25.10]	[25.09]	[-12.44]	[-12.54]
Observations	1,145,867	1,145,867	1,090,796	1,090,796
Adjusted R^2	0.1747	0.1747	0.0201	0.0201
Home Market-Year FE	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund

Table 4: **Home Bias of Holdings** The table shows the results from OLS regressions where the dependent variable is the fund's quarterly home bias (*HB*) in all specifications (1)-(5). The sample is from 2000 to 2021. The sample includes all FactSet open-end mutual funds that meet our data filters. Observations are quarterly, thus the dataset is at fund-quarter level. The independent variables include an indicator variable for *Crisis*, which includes all crisis periods in the sample: dot.com crisis, GFC, and COVID-19 pandemic. As alternative measures of global uncertainty, we also include change in implied volatility, from prior quarter to the current quarter (ΔVIX). Other independent variables include a measure for *Home Equity Risk* that takes on high values when home market equity is risky and *Home Beta*, which is computed based on three years of monthly returns to the home market, using ACWI World as the benchmark. We include an interaction term between *Crisis* and *Home Equity Risk*, as well as *Crisis* and *Home Beta* in specification (5). We also control for the logarithm of fund size (*Fund Size*). Specifications (1)-(5) include home market fixed effects. Standard errors are clustered at the fund level to allow for correlation across fund level observations and over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

	(1)	(2)	(3)	(4)	(5)
Variables	*HB*	*HB*	*HB*	*HB*	*HB*
Crisis	0.0077***			0.0071***	-0.0057
	[9.18]			[8.57]	[-1.43]
ΔVIX		-0.0003			
		[-0.99]			
Home Equity Risk			-0.0027***	-0.0028***	-0.0029***
			[-20.87]	[-21.02]	[-21.99]
Home Beta			-0.0155***	-0.0136***	-0.0136***
			[-5.76]	[-5.02]	[-4.83]
Crisis x Home Equity Risk					0.0009***
					[9.50]
Crisis x Home Beta					0.0037
					[0.90]
Fund Size	-0.0068***	-0.0067***	-0.0068***	-0.0068***	-0.0068***
	[-9.68]	[-9.66]	[-9.72]	[-9.74]	[-9.74]
Observations	1,465,697	1,465,697	1,465,697	1,465,697	1,465,697
Adjusted R^2	0.2259	0.2258	0.2265	0.2265	0.2266
Home Market FE	YES	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund	Fund

Table 5: **Fund Portfolio Concentration** The table shows the results from OLS regressions where the dependent variables include several measures of fund portfolio concentration. In specifications (1)-(2), the dependent variable is the quarterly portfolio level foreign concentration (FC). In specifications (3)-(4), the dependent variable is the fund's quarterly industry concentration (IC). The sample is from 2000 to 2021. It includes all FactSet open-end mutual funds that meet our data filters. Observations are quarterly, thus the dataset is at fund-quarter level. The independent variables include an indicator variable for *Crisis*, which includes all crisis periods in the sample: dot.com crisis, GFC, and COVID-19 pandemic. As alternative measures of global uncertainty, we also include change in implied volatility, from prior quarter to the current quarter (ΔVIX). We also control for the logarithm of fund size (*Fund Size*). All specifications include home market-year fixed effects. Standard errors are clustered at the fund level to allow for correlation across fund level observations and over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

	(1)	(2)	(3)	(4)
Variables	*FC*	*FC*	*IC*	*IC*
Crisis	0.0018***		0.0037***	
	[3.15]		[7.77]	
ΔVIX		0.0015***		-0.0033***
		[8.83]		[-21.65]
Fund Size	-0.0014***	-0.0014***	-0.0341***	-0.0341***
	[-3.77]	[-3.77]	[-88.31]	[-88.33]
Observations	1,465,688	1,465,688	1,465,688	1,465,688
Adjusted R^2	0.1368	0.1368	0.2238	0.2238
Home Market-Year FE	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund

Table 6: **Value-weighted Distance to Holdings during Crisis Periods** The table shows the results from OLS regressions where the dependent variables include several measures of fund portfolio concentration, using multiple measures of Value-weighted Distance to Holdings. The dependent variables in specifications (1)-(5) are value-weighted distances of all cross-national distance measures (*All*), distance in business environment (*Business*), cultural distance (*Culture*), geographical distance (*Geography*) and difference in industry structures (*Industry*) between home and foreign target markets, respectively. The sample is from 2000 to 2021. It includes all FactSet open-end mutual funds that meet our data filters. Observations are quarterly, thus the dataset is at fund-quarter level. The independent variables include an indicator variable for *Crisis*, which includes all crisis periods in the sample: dot.com crisis, GFC, and COVID-19 pandemic. We also control for the logarithm of fund size (*Fund Size*). All specifications include home market fixed effects. Standard errors are clustered at the home market level to allow for correlation across country-level observations and over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

	(1)	(2)	(3)	(4)	(5)
Variables	*All*	*Business*	*Culture*	*Geography*	*Industry*
Crisis	-0.0189**	-0.0171*	-0.0197**	-0.0179**	0.0515***
	[-2.12]	[-1.71]	[-2.18]	[-2.17]	[4.09]
Fund Size	0.0136***	0.0112***	0.0134***	0.0156***	0.0165***
	[4.45]	[5.09]	[4.30]	[4.42]	[4.43]
Observations	1,435,264	1,435,264	1,435,264	1,435,264	1,435,264
Adjusted R^2	0.3181	0.3424	0.3120	0.2789	0.3305
Home Market FE	YES	YES	YES	YES	YES
Error cluster	Home	Home	Home	Home	Home

Table 7: **Country Bias in Holdings during Crisis Periods** The table shows the results from OLS regressions where the dependent variable is the quarterly Country bias (*CB*). The sample includes positions across 37 different foreign target markets from FactSet open-end mutual funds from 2000 to 2021. Observations at fund-target market-quarter level. The independent variables are an indicator variable for *Crisis*, which includes all crisis periods in the sample: dot.com crisis, GFC, and COVID-19 pandemic; the target country's equity risk (*Target Equity Risk*); the fund's home country's equity risk (*Home Equity Risk*); the *Target Beta* and *Home Beta* relative to the MSCI ACWI index, measured as the rolling beta of the market, based on 36 months of monthly returns; the previous and next quarterly returns for both the target market (*Country ret*) and the world market (*World ret*); and the logarithm of fund size (*Fund Size*). All regressions include home and target market fixed effects. Standard errors are clustered at the fund level to allow for correlation across fund level observations over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Variables	(1) *CB*	(2) *CB*	(3) *CB*	(4) *CB*
Target Equity Risk	-0.0000	-0.0000	-0.0001**	0.0006***
	[-1.46]	[-1.14]	[-2.19]	[11.07]
Target Beta	-0.0040***	-0.0045***	-0.0060***	0.0052***
	[-7.70]	[-8.51]	[-11.32]	[5.43]
Home Equity Risk	0.0007***	0.0007***	0.0008***	0.0008***
	[15.00]	[15.23]	[16.41]	[16.46]
Home Beta	0.0164***	0.0151***	0.0153***	0.0151***
	[13.91]	[12.62]	[12.70]	[12.48]
Country ret (q, 0,3)	0.0204***	0.0204***	0.0125***	0.0113***
	[19.45]	[19.50]	[11.10]	[9.91]
World ret (q, 0,3)	-0.0265***	-0.0278***	-0.0122***	-0.0108***
	[-18.11]	[-19.21]	[-7.75]	[-6.89]
Country ret (q, -2,0)	0.0351***	0.0356***	0.0256***	0.0245***
	[33.68]	[34.18]	[23.30]	[22.22]
World ret (q, -2,0)	-0.0511***	-0.0556***	-0.0406***	-0.0392***
	[-36.28]	[-38.60]	[-23.82]	[-23.14]
Fund Size	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	[-3.15]	[-3.15]	[-3.31]	[-3.31]
Crisis		-0.0038***	-0.0098***	-0.0030
		[-12.02]	[-5.07]	[-1.34]
Crisis x Home Equity Risk			-0.0004***	-0.0004***
			[-11.21]	[-11.27]
Crisis x Home Beta			0.0018	0.0019
			[1.00]	[1.05]
Crisis x Country ret (q, 0,3)			0.0316***	0.0334***
			[14.85]	[15.58]
Crisis x World ret (q, 0,3)			-0.0479***	-0.0493***
			[-14.27]	[-14.69]
Crisis x Country ret (q, -2,0)			0.0401***	0.0419***
			[20.20]	[20.87]
Crisis x World ret (q, -2,0)			-0.0479***	-0.0494***
			[-15.49]	[-15.97]
Crisis x Fund Size			0.0000***	0.0000***
			[4.08]	[4.07]
Crisis x Target Equity Risk			-0.0000	-0.0003***
			[-0.18]	[-5.02]
Crisis x Target Beta			0.0074***	0.0013
			[9.96]	[1.03]
Target Equity Risk x Target Beta				-0.0005***
				[-15.07]
Crisis x Target Equity Risk x Target Beta				0.0003***
				[6.03]
Observations	8,083,268	8,083,268	8,083,268	8,083,268
Adjusted R^2	0.1182	0.1183	0.1184	0.1185
Home FE	YES	YES	YES	YES
Target FE	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund

Table 8: **Country Bias in Holdings during Crisis Periods** The table shows the results from OLS regressions where the dependent variable is the quarterly Country bias (*CB*). The sample is from 2000 to 2021. It includes all FactSet open-end mutual funds that meet our data filters and all of their positions across 37 different foreign target markets. Observations are quarterly, thus the dataset is at the fund-target market-quarter level. The independent variables include an indicator variable for *Crisis*, which includes all crisis periods in the sample: dot.com crisis, GFC, and COVID-19 pandemic. In addition, we include several indicator variables for close distance between home and target country pairs (1= closest 10th percentile of target markets to home country and 0 otherwise). These closeness indicators are constructed for each distance measure: *Close Culture*, *Close Business*, *Close Geography* and *Close Industry*. These closeness indicators are specific to each home country - target country pair. We also include interaction terms of *Crisis* and closeness indicators. In addition, we partition the sample in the last two specifications into safe and risky target markets based on target country's equity risk (*Target Equity Risk*) so that safe markets are the four safest markets in each time period and the rest comprise the risky markets. In all specifications, we include *Target Beta*, past (-2,0) and future (0,3) quarterly returns for both the target market (*Country ret*) and the world market (*World ret*), and the logarithm of fund size (*Fund Size*). These control variable are not included in the table for brevity. All regressions include home and target market fixed effects. Standard errors are clustered at the fund level to allow for correlation across fund level observations over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

	(1)	(2)	(3)	(4)
Variables	*CB-all*	*CB-all*	*CB-safe*	*CB-risky*
Close Culture	-0.0008	-0.0027*	-0.0629***	0.0149***
	[-0.56]	[-1.90]	[-15.64]	[11.20]
Close Business	0.0568***	0.0571***	0.0915***	0.0354***
	[42.42]	[41.90]	[17.91]	[25.68]
Close Geography	0.0701***	0.0704***	0.2155***	0.0619***
	[45.23]	[44.59]	[27.66]	[38.62]
Close Industry	0.0092***	0.0094***	-0.0144***	-0.0159***
	[9.90]	[10.06]	[-7.77]	[-20.05]
Crisis		-0.0107***	0.0995***	-0.0213***
		[-5.16]	[15.80]	[-9.25]
Crisis x Close Culture		0.0132***	0.0294***	0.0026***
		[15.24]	[10.64]	[3.26]
Crisis x Close Business		-0.0019**	-0.0119***	-0.0025**
		[-2.10]	[-4.23]	[-2.58]
Crisis x Close Geography		-0.0020*	-0.0071*	-0.0058***
		[-1.85]	[-1.67]	[-5.02]
Crisis x Close Industry		-0.0012	-0.0011	0.0179***
		[-1.20]	[-0.64]	[15.20]
Observations	7,919,293	7,919,293	1,753,412	6,165,881
Adjusted R^2	0.1433	0.1435	0.1332	0.1783
Home FE	YES	YES	YES	YES
Target FE	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund

Table 9: **Foreign Country Industry Concentration in Holdings during Crisis Periods** The table shows the results from OLS regressions where the dependent variable is the fund's quarterly Foreign Country Industry Bias in each of the target markets (*FCIB*). The sample is from 2000 to 2021. It includes all FactSet open-end mutual funds that meet our data filters and all of their positions in each of the 49 Fama French industries in each of the 37 different foreign target markets. Observations are quarterly, thus the dataset is at fund-target market-FF Industry-quarter level. The independent variables include home market industry bias (*Home IB*), measure similar to *FCIB*. We include *Crisis* which includes all crisis periods in the sample: dot.com crisis, GFC, and COVID-19 pandemic. We include indicator variable for *Defensive* industries and several interaction terms of the key variables. We also include the logarithm of fund size (*Fund Size*). All regressions include home market-year and target market-year fixed effects. Standard errors are clustered at the fund level to allow for correlation across fund level observations over time. Robust t-statistics are in brackets (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Variables	(1) *FCIB*	(2) *FCIB*	(3) *FCIB*	(4) *FCIB*	(5) *FCIB*
Home IB	0.3373***	0.3373***	0.3368***	0.3373***	0.3054***
	[53.04]	[53.04]	[51.40]	[53.04]	[43.46]
Defensive	0.0219***	0.0219***	0.0219***	0.0217***	0.0206***
	[18.24]	[18.24]	[18.24]	[17.56]	[17.84]
Crisis			-0.0023**	-0.0026**	-0.0026**
			[-2.25]	[-2.49]	[-2.52]
Crisis x Home IB			0.0040		-0.0076
			[0.67]		[-1.16]
Crisis x Defensive				0.0019	0.0014
				[1.64]	[1.22]
Home IB x Defensive					0.1867***
					[11.82]
Crisis x Home IB x Defensive					0.0343**
					[2.47]
Fund Size	-0.0168***	-0.0168***	-0.0168***	-0.0168***	-0.0168***
	[-21.33]	[-21.33]	[-21.33]	[-21.33]	[-21.32]
Observations	12,391,930	12,391,930	12,391,930	12,391,930	12,391,930
Adjusted R^2	0.1757	0.1757	0.1757	0.1757	0.1770
Home Market-Year FE	YES	YES	YES	YES	YES
Target Market-Year FE	YES	YES	YES	YES	YES
Error cluster	Fund	Fund	Fund	Fund	Fund

Figure 1: **Portfolio Concentration Measures** The figure shows the median values of portfolio concentration measures over time. The median values are computed quarterly based on all available funds. The concentration measures include: *GC*, *HB*, *FC*, and *IC*. All the measures are standardized for ease of comparison.