

Differential Treatment in the Bond Market: Sovereign Risk and Mutual Fund Portfolios

Converse, Nathan and Enrico Mallucci

Please cite paper as:

Converse, Nathan, and Enrico Mallucci (2019). Differential Treatment in the Bond Market: Sovereign Risk and Mutual Fund Portfolios. International Finance Discussion Papers 1261.

<https://doi.org/10.17016/IFDP.2019.1261>



International Finance Discussion Papers

Board of Governors of the Federal Reserve System

Number 1261

October 2019

Board of Governors of the Federal Reserve System

International Finance Discussion Papers

Number 1261

October 2019

Differential Treatment in the Bond Market: Sovereign Risk and Mutual Fund Portfolios

Nathan Converse and Enrico Mallucci

NOTE: International Finance Discussion Papers are preliminary materials circulated to stimulate discussion and critical comment. References to International Finance Discussion Papers (other than an acknowledgment that the writer has had access to unpublished material) should be cleared with the author or authors. Recent IFDPs are available on the Web at www.federalreserve.gov/pubs/ifdp/. This paper can be downloaded without charge from the Social Science Research Network electronic library at www.ssrn.com.

Differential Treatment in the Bond Market: Sovereign Risk and Mutual Fund Portfolios*

Nathan Converse[†]

Enrico Mallucci[‡]

Abstract

How does sovereign risk affect investors' behavior? We answer this question using a novel database that combines sovereign default probabilities for 27 developed and emerging markets with monthly data on the portfolios of individual bond mutual funds. We first show that changes in yields do not fully compensate investors for additional sovereign risk, so that bond funds reduce their exposure to a country's assets when its sovereign default risk increases. However, the magnitude of the response varies widely across countries. Fund managers aggressively reduce their exposure to high-debt countries and high-risk countries. By contrast, they are more lenient toward core developed markets. In this sense, these economies appear to receive preferential treatment. Second, we document what determines the destination of reallocation flows. When fund managers reduce their exposure to a country in response to its sovereign risk, they shift their assets to countries outside the immediate geographic region while at the same time avoiding countries with high debt-to-GDP ratios and markets to which they are already heavily exposed. These results are supportive of models of sovereign default that assign a nontrivial role to the preferences of international creditors.

JEL classification: F3, F32, F36, G1, G11, G15, G2, G23

Keywords: Sovereign risk, mutual funds, international capital flows, spillovers

*The views in this paper are solely the responsibility of the authors and should not be interpreted as representing the views of the Board of Governors of the Federal Reserve System or any other person associated with the Federal Reserve System. Kaede Johnson, Rayhan Momin, Andreson Monken, and Lizzy Stanton provided excellent research assistance. Sebnem Kalemli-Ozcan, Matteo Maggiori, Wenxin Du, Cedric Tille, Colin Weiss, and Matthew Pritsker generously provided us with their feedback. We thank participants in the University of York Asset Pricing Workshop, Society for Computational Economics meetings, and the European Economic Association meetings, as well as seminar participants at the Federal Reserve Board.

[†]Division of International Finance; Board of Governors of the Federal Reserve System; Washington, D.C. 20551; U.S.A.; E-mail: Nathan.L.Converse@frb.gov

[‡]Division of International Finance; Board of Governors of the Federal Reserve System; Washington, D.C. 20551; U.S.A.; E-mail: Enrico.Mallucci@frb.gov

1 Introduction

How do financial intermediaries modify their bond portfolios in response to sovereign risk? Surprisingly, this question has received relatively little attention.¹ Empirical work on portfolio dynamics has focused on their relationship with returns, without unpacking the factors that affect returns, such as default risk. And the extensive theoretical literature on sovereign default has frequently modeled foreign creditors as risk neutral, deep pocketed, price setters with little or no empirical support for this assumption.²

In this paper, we answer this question by constructing and analyzing a new database that combines information on sovereign default risk extracted from CDS contracts with micro-level data on the portfolio allocations of international bond mutual funds at the monthly frequency.³ We first show that bond fund managers reallocate away from countries with higher sovereign risk. We then document how the sensitivity of this relationship between portfolio shares and sovereign risk varies according to the characteristics of both the country and the fund in question. Finally, having shown that bond fund managers reallocate away from risk, we explore the factors that determine to which countries they reallocate.

The extensive country coverage and high frequency of our CDS dataset along with the the granularity of our mutual fund data enable us to build a detailed picture of investors' response to sovereign risk. In particular we use our novel dataset to address two basic questions. First, how do mutual fund managers adjust the weight assigned to a country in their portfolio when that country's sovereign risk changes? We find that a country's portfolio share is negatively related to its sovereign risk, even when we control for the returns offered by the country's sovereign bonds. At the same time, fund managers' behavior is highly heterogeneous, with the intensity of the reallocation away from risk crucially depending on countries' and funds' characteristics. The portfolio weights of countries with weaker fundamentals, such as a high level of default risk, high debt-to-GDP ratio, relatively less developed financial markets, or a large share of foreign currency debt are more sensitive to changes in default risk. By contrast, the relationship between portfolio share and sovereign risk is weaker for countries with shorter

¹Two notable exceptions are [Broner et al. \(2014\)](#) and [Andritzky \(2012\)](#). Authors of these papers analyze the behavior of domestic and foreign investors in the sovereign debt market using aggregate data and find that foreign investors cut their holdings of a countries sovereign bonds when default risk increases, while domestic investors increase them.

²Papers by [Lizarazo \(2013\)](#), [Pouzo and Presno \(2016\)](#), [Arellano et al. \(2017\)](#) are exceptions, but these authors themselves highlight the lack of a serious treatment of lenders behavior in the broader literature.

³Throughout the paper, we define *international* mutual funds as those funds which own assets from more than one country.

average debt maturity, countries which have a relatively large weight in the fund’s portfolio, and when the country in question is the fund’s home country. Core developed markets such as the U.S., Japan and the core European economies are an exception to these patterns, enjoying what we call preferential treatment: Portfolio weights assigned to these countries are not affected by changes to sovereign risk, and this differential treatment cannot be explained by stronger fundamentals.

The second question we address in this paper is: What determines which countries bond fund managers reallocate into when they shift their portfolios away from markets with high sovereign risk? We find evidence that managers reallocate towards countries outside the geographic region (e.g. Latin America) or country group (e.g. emerging markets) where sovereign risk has increased. We also find that fund managers avoid high-debt countries when reallocating. At the same time, our results offer only limited evidence that fund managers contribute to cross-country contagion by selling the assets of neighboring countries when sovereign risk rises in a particular country. Even absent contagion, however, the picture we uncover is one of differential treatment, with neighboring countries and countries with weaker fundamentals receiving fewer reallocation flows when other countries’ sovereign risk increases.

In order to measure default risk, we extract risk-neutral default probabilities from CDS contracts written on sovereign bonds using the methodology proposed by [Pan and Singleton \(2008\)](#), obtaining default probabilities for 13 developed markets and 14 emerging markets for the period 2002 to 2018. This measure of sovereign risk has two appealing features. First, the default probabilities are extracted from CDS contracts which are traded daily and thus, unlike credit ratings, incorporate information about sovereign risk as soon as it is revealed. Second, CDS are traded in separate markets from those in which the bond funds purchase securities, so we avoid regressing quantity on price.⁴ We then merge our sovereign risk measure with a fund-level dataset on the cross-country portfolios of 460 bond mutual funds that we obtain from the commercial data provider EPFR Global. The EPFR country allocations dataset provides us with the value of each fund’s assets in each of the countries in its portfolio each month, as well as a host of other information such as the domicile of the fund and the fund’s performance each month.

We use the resulting merged dataset to estimate an empirical model that relates fund-level

⁴That is not to say that the CDS and bond markets are unrelated. On the contrary, this paper can be viewed as documenting how movements in the CDS market affect institutions participating in the market for the underlying bonds. [Czech \(2019\)](#) demonstrates a causal effect of CDS market events on liquidity and prices in the corporate bond market.

portfolio weights to each country’s sovereign default risk, funds’ past portfolio weights, and the returns on each country’s sovereign bonds. Our econometric specification is derived using the approach laid out in [Raddatz and Schmukler \(2012\)](#), extended to allow fund managers to respond to default risk.⁵ Because we include both default risk and returns in all specifications, we can interpret the coefficient on default risk as capturing its effect on portfolio weights, net of the price effect. To our knowledge our paper is the first to study how fund portfolios relate to an explicit measure of sovereign risk.

This paper contributes to four areas of research. First, we make a direct contribution to the literature on the determinants of mutual fund portfolios.⁶ Previous work has studied the relationship between mutual funds’ portfolio weights and factors such as transparency ([Gelos and Wei, 2005](#)), the implementation of capital controls ([Forbes et al., 2016](#)), and currency denomination ([Maggiori et al., forthcoming](#)). However, the literature has primarily focused on how funds respond to changing returns. For example, [Broner et al. \(2006\)](#) show that when funds underperform they shift their portfolio weights to more closely resemble the average weights of other funds. [Raddatz and Schmukler \(2012\)](#) find that bond fund managers rebalance in response to changes in returns, dampening the changes in weights due to asset price fluctuations, but slash portfolio weights when a country enters a crisis. And in a recent paper, [Camanho et al. \(2017\)](#) show that funds rebalance their portfolios to offset changes in foreign share due to valuation gains and losses. By contrast [Bergant and Schmitz \(2019\)](#) find that Euro-area investors, including fund managers, chase returns by increasing the portfolio weights of securities that have recently appreciated in value, rather than rebalancing to keep portfolio weights constant. Our paper extends this area of research by studying how investors’ portfolios change in response to one of the underlying *determinants* of returns: the probability of sovereign default. We document this relationship in detail and establish several new facts.

Second, our research informs the literature on cross-country financial contagion. Whereas much of this work has focused on whether market comovement increases during periods of financial stress (see [Forbes, 2012](#), for an overview), we provide evidence on whether reallocation by bond mutual funds contributes to such comovement. There have long been concerns that delegated portfolio management of the type offered by bond mutual funds may create incentives for contagion, as in the model of [Calvo and Mendoza \(2000\)](#). [Kaminsky et](#)

⁵Recent work has used a similar approach to develop an empirical model of rebalancing by equity fund managers([Camanho et al., 2017](#)) and Euro-area investors ([Bergant and Schmitz, 2019](#)).

⁶[Didier et al. \(2013\)](#) provide a detailed description of the portfolios of international equity funds and present evidence that information frictions constrain the set of securities that they purchase within a given country. This paper complements their work in that we focus on bond funds’ cross-country portfolio choices.

al. (2004) provide empirical evidence on this question by examining the portfolios of 13 Latin America equity funds. They find that mutual fund managers do contribute to contagion, selling assets in one country when returns on assets in the other countries to which they are exposed fall. We expand on this work in two ways: first, we study a much larger sample of bond mutual funds which invest in nearly all regions of the world. And second, we focus our analysis on one important determinant of bond prices: Default risk. We confirm the findings of Kaminsky et al. (2004) that funds contribute to contagion in Latin America, but see little evidence of contagion outside that particular region.

Third, our work informs the growing body of research on reach-for-yield behavior. This literature has demonstrated that investors, including as U.S. insurance companies (Becker and Ivashina, 2015), foreign investors in the U.S. bond market (Ammer et al., 2018), and U.S. corporate bond funds (Choi and Kronlund, 2017) all increase the portfolio weights of high-yielding assets relative to other assets with the same credit rating, taking the credit rating as an indicator of default probability. Our paper confirms this result, in that we show that higher yields are associated with a larger portfolio share, conditional on default probability. However, the focus of this paper is different. The reach-for-yield literature focuses on investors' decisions around changes in the risk premium component of CDS spreads. We, instead, examine how portfolios change with the the risk-neutral default probability.

Finally, our paper also speaks to the macro literature on sovereign defaults. In particular, our results are informative about country characteristics that amplify investors' concerns about sovereign risk. We find that investors react more to sovereign risk when debt is higher and the size of the private credit market is small. This result confirms the intuition of Gennaioli et al. (2014) that the size of private credit is a key determinant of sovereign risk. Also, we find evidence that the maturity structure of government bonds influences investors' behavior as suggested by several papers (e.g. Arellano and Ramanarayanan, 2012; Sanchez et al., 2018). When we look at currency denomination, we find that fund managers are more sensitive to default risk in countries where a large share of government debt is denominated in foreign currency. This results confirms the existence of "original sin" on the part of emerging market issuers. Our findings on regarding the destination of reallocation flows are also informative for the sovereign default literature. The rich spillovers we identify are at odds with the predictions of standard sovereign default models that assume risk neutral investors with deep pockets. In this sense, we interpret our results as suggestive that sovereign default model that allow for cross-country contagion through investors (e.g. Arellano et al., 2017;

Park, 2013) are better suited to describe reality.⁷

In the next section, we discuss in detail the novel dataset we construct. Section 3 describes our econometric framework, while Section 4 presents the results regarding the relationship between a country’s sovereign risk and the portfolio weight that fund managers assign to that country. In section 5 we analyze the factors that determining the destination of reallocation flows and assess whether bond mutual funds contribute cross-country financial contagion. Section 6 explores the robustness of our results along a number of different dimensions, and Section 7 concludes.

2 Data

To evaluate the influence of sovereign risk on fund managers’ portfolio allocation decisions we create a database that merges information on sovereign default risk with data on the country weights of bond mutual funds. To measure default risk, we extract the default probability embedded in credit default swaps (CDS). CDS contracts provide insurance against a sovereign borrower defaulting on its debt. For example, consider the case of a 5-year CDS contract that trades at 10 basis points. This means that a buyer of the credit protection would pay 10 basis point every year to insure against the risk of default. If there is no default, the buyer will pay this amount to the protection seller till the end of the 5-year contract. If instead there is a default, the CDS issuer will purchase the defaulted bond from the the CDS buyer at the bond’s par value of 100, after which the contract is terminated.

There are two key advantages in using CDS spreads data. First, CDS prices, unlike other measures of sovereign risk such as credit ratings, are available at high frequency as they are continuously traded. This feature is appealing to us as mutual fund managers’ respond fairly quickly to sovereign risk. Second, prices of CDS contracts, unlike credit ratings, are determined by market forces. Hence, they reflect investors’ perception of default risk. This is also appealing to us as we aim to uncover how a class of investors—fund managers—adjust their portfolios in response to default risk.

⁷In a recent paper Hébert and Schreger (2017) estimate the economic cost of sovereign defaults studying the impact of sovereign credit risk on equity returns in Argentina. In our paper we also aim to study the impact on sovereign default risk on the economy. Yet, our main focus is the portfolio of global investors. Additionally, our work does not only concentrate on the Argentina, but it looks at default risk in a broader sample of 27 countries.

We follow the methodology proposed by [Pan and Singleton \(2008\)](#) to extract the risk-neutral default probability embedded in five-year CDS contracts. This method uses the term structure model for defaultable sovereign debt developed by [Duffie et al. \(2003\)](#) along with data on CDS spreads for bonds of different maturities to compute the risk-neutral arrival rate of a default event. In particular, we work with default probabilities computed under the risk-neutral \mathbb{Q} -measure, which include a price of risk, and do not attempt to convert them to physical probabilities.⁸ To implement Pan and Singleton’s decomposition we collect data on one-, three- and five-year CDS spreads from Markit for a sample of 27 countries (13 advanced economies and 14 emerging markets). We also collect data on the yield curve from the Treasury constant-maturity curve published by the Federal Reserve. With these data we compute default probabilities implied by CDS spreads at the monthly frequency for the 27 countries in our sample between 2002 and 2018.⁹

Table 1 reports summary statistics for the default probabilities we extract from CDS spreads. Argentina, which was in default for a substantial portion of our sample period, has the highest average default probability at 43.7 percent. The next closest average default probabilities are Brazil and Turkey, at around ten percent. In general, the countries with the highest default probabilities are emerging markets, although default risk is also elevated in Portugal, Italy, and Spain. Figure 1 plots the default probabilities that we have calculated, and makes clear the significant variation in these probabilities within countries over time. Interestingly, while default risk is on average higher in emerging markets, its variance is not. Argentina, Portugal, Brazil, and Belgium are some of the countries that display the highest variation of default risk. United States, Canada, Mexico, and Chile are instead some of the countries that display the lowest variation of default risk.

For data on the the portfolio allocation decisions of investors we rely on the country allocations data set published by EPFR Global. The dataset contains information on the cross-country asset allocations of just over 700 bond mutual funds at the end of each month beginning in July 2002.¹⁰ Importantly, the EPFR dataset is free of survivorship bias. This is important for our analysis, since for example fund that increase their holdings of a country’s bonds when the sovereign default probability increases might be more likely to fail. We drop

⁸We refer the reader to [Pan and Singleton \(2008\)](#) and [Longstaff et al. \(2011\)](#) for the details of the estimation method.

⁹We follow [Pan and Singleton \(2008\)](#) in assuming a recovery rate of 25 percent in the event of a default, bearing in mind their finding that allowing recovery rates to vary across countries or over time in practice has little effect on the default probabilities generated by their methodology.

¹⁰Note that EP FR also provides data on the assets, flows, and returns of roughly 7,200 bond mutual funds which have a mandate that restricts their investment portfolio to a single country. Since the managers of these funds do not face an international portfolio choice problem, we do not include them in our analysis.

from our dataset funds that report allocations for less than 12 months as well as funds with less than \$10 million in assets. We also exclude from our analysis funds with extremely high or low values for monthly inflows or aggregate fund returns (specifically we drop funds in the top and bottom one percent of the distribution for either of these variables). After this data cleaning we are left with 460 funds domiciled in 21 different countries.

Figure 2 provides an overview of the aggregate portfolio of the bond funds in our dataset. At the end of 2018, the funds in our dataset held \$350 billion in assets, making our sample is large enough to be representative of the fund management industry as a whole. Comparing our dataset with data from industry groups and regulators in the top three domicile countries in our sample (Luxembourg, Ireland, and the U.S.), we estimate that our dataset includes roughly 75 percent of the universe of international bond mutual fund assets worldwide.¹¹

Assets held by funds in our database amount to 1.4 percent of the bonds issued in the countries in our sample and held by foreigners. This overall share is low because mutual funds with a multi-country mandate hold a very low share of bonds issued in large developed markets. For emerging markets, the funds in our sample account roughly seven percent of the bonds held by foreigners overall. The share is substantially higher for some individual EMs, such as Russia (16 percent), Thailand (12 percent), and Columbia (11 percent).¹² Thus while the funds we analyze represent a subset of global investors, they are nonetheless an important subset. At the same time, the share of bonds outstanding held by funds in our sample is sufficiently low that it is unlikely that the hedging behavior of the funds in our sample drives movement in CDS spreads (we discuss this issue in more detail in the next section).

In the left panel of figure 2, we see that roughly half of the assets held by the funds in our dataset are bonds issued in the U.S. and Europe, while bonds issued in emerging markets account for a further one third of the fund assets in the sample. Note that on average six percent of the fund assets in our sample are held in cash, with the cash share increasing in times of financial stress such as during the global financial crisis and following China's surprise currency devaluation in the summer of 2015.

¹¹We focus on the top three mutual fund domiciles because there is no single source for data on the worldwide universe of international (i.e. not domestic) mutual funds. Data on the universe of mutual funds come from the Banque Centrale du Luxembourg, the Central Bank of Ireland, and the U.S. Investment Company Institute. Recall that because we are analyzing cross-country portfolio choices, our dataset includes only mutual funds that invest in more than one country. The universe of mutual funds is much larger if one includes single country funds.

¹²Data on bonds held by foreigners come from the international investment position section of the IMF's Balance of Payments Statistics.

The right panel of Figure 2 plots the assets of the funds in our sample broken down according to the legal domicile of the funds. Around 45 percent of the funds in the sample are domiciled in the U.S. Unsurprisingly given their role as international financial centers, Luxembourg and Ireland account for a combined 40 percent of fund assets.¹³ Complete summary statistics on the portfolio shares of the funds in our sample are provided in the Appendix. The fact that we analyze the behavior of funds located in many countries is one of the novel contributions of this paper, as most previous work on the behavior of bond fund managers has focused exclusively on U.S. funds.

The EPFR dataset also provides information on the mandate of the funds in our sample. In this paper, we make use of two aspects of the mandate information: the sector of the funds' investments and the currency. As shown in Table 2, nearly half of the 460 funds in our sample have a sector-specific mandate. Of those, just over half invest only in sovereign bonds, while corporate bond funds are evenly split between investment grade and high yield. For the emerging market funds in our sample, a key feature of the fund mandate is whether the fund is permitted to invest in local currency-denominated bonds or instead is limited to so-called hard currency bonds, meaning those denominated in US dollars, euros, yen or some other major currency. More than half of the EM funds in the sample hold only hard currency assets while 30 percent are dedicated local currency funds. The remainder of the EM funds invest in both types bonds. However, local currency funds are on average larger thus and actually account for a larger share of the assets of the funds in our sample than do hard currency funds.

We merge the portfolio allocations data with our data on sovereign default risk in 27 countries to create a fund-country-date monthly panel. In analyzing this dataset we must decide how to treat zero values for funds' country portfolio weights. While some zero weights represent an actual decision on the part of the fund manager not to hold bonds issued by a country's residents, the majority of zeros in the sample simply reflect restrictions imposed by the fund's mandate. For example, most Latin America funds have zero portfolio weights on Asian countries. Consequently we treat zeros as "true" zeros only if the country has a non-zero portfolio weight at some point during the life of the fund. If the fund has never had a non-zero portfolio weight for a country, we record the associated fund' portfolio weights for that country as missing. Thus, our final dataset is a three-way fund-country-month panel with 686,892 individual observations.

¹³The sharp 2014 increase in the fund assets invested in European bonds along with a similar jump in the assets of funds domiciled in Europe represents an improvement in the coverage of the EPFR dataset.

3 Econometric Framework

To empirically study how fund managers react to sovereign risk, we begin with an identity that defines the law of motion of the portfolio weight w_{ijt} that fund i assigns to country j at time t :

$$w_{ijt} = w_{ijt-1} \frac{R_{ijt} + f_{ijt}}{R_{it} + f_{it}}. \quad (1)$$

The portfolio weight increases if R_{ijt} , the gross returns on fund i 's assets in country j , is larger than R_{it} , the gross return on the fund's total portfolio, or if f_{ijt} , the net flow of money from fund i to country j , is larger than f_{it} , the net flow of money into the fund from end investors.

Following [Raddatz and Schmukler \(2012\)](#), we log-linearize equation (1) to obtain:

$$\omega_{ijt} = \omega_{ijt-1} + (r_{ijt} - r_{it}) + (f_{ijt} - f_{it}) + \epsilon_{ijt}. \quad (2)$$

Where ω_{ijt} is the log of the portfolio weight of country j at time t in fund i , r_{ijt} is the net return on the fund i 's investment in country j , and f_{ijt} is the net flow of money from fund i to country j . The term ϵ_{ijt} captures the approximation error from the log linearization.

Because we aim to understand the relationship between mutual fund portfolios and default risk, we model relative flows ($f_{ijt} - f_{it}$) as a function relative default risk ($\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}$), where λ_{jt} is the log of the probability of sovereign default in country j at time t and $\bar{\lambda}_{i,k \neq j,t}$ is the log of the asset-weighted average default risk of all the other countries to which fund i is exposed at time t .¹⁴ At the same we follow [Raddatz and Schmukler \(2012\)](#) by allowing flows to depend on lagged portfolio weights and relative returns so that the relative flows equation is:

$$f_{ijt} - f_{it} = \delta \omega_{ijt-1} + \phi (r_{ijt} - r_{it}) + \gamma (\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) + \psi_{ij} + \theta_t + \nu_{ijt}. \quad (3)$$

The term ψ_{ij} is a destination country-fund fixed effect, capturing the fact that a particular fund manager may on average have a preference for investing in certain countries for example because of the fund's particular benchmark.¹⁵ We also include time fixed effects θ_t . Finally, ν_{ijt} is an error term.

¹⁴Formally, $\bar{\lambda}_{i,k \neq j,t}$ is $\bar{\lambda}_{i,k \neq j,t} \equiv \sum_{k \neq j} \hat{w}_{ikt} \lambda_{kt}$, where \hat{w}_{ikt} is country k 's weight in fund i 's portfolio at time t , calculated excluding j from the portfolio.

¹⁵An alternative approach is to explicitly control for the country's weight in the fund's benchmark, as in [Gelos and Wei \(2005\)](#) and [Forbes et al. \(2016\)](#).

Plugging equation (3) back in (2), we obtain our regression equation:

$$\omega_{ijt} = \beta\omega_{ijt-1} + \zeta(r_{ijt} - r_{it}) + \gamma(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) + \psi_{ij} + \psi_t + \nu_{ijt}, \quad (4)$$

where $\beta \equiv 1 + \delta$, and $\zeta \equiv 1 + \phi$. Our main coefficient of interest is γ . It measures how fund managers modify their exposure to country j when sovereign risk in country j increases relative to the rest of the portfolio. Ideally we would want to conduct our estimation using the return r_{ijt} of each fund's particular bond holdings in each country. However our dataset does not provide information at the security level. Consequently, throughout the paper we approximate r_{ijt} with a measure of r_{jt} that is the average returns on the bonds issued in each country. Specifically, we use the JPMorgan EMBIG Total Return Index to approximate the fund's country-specific returns. In all regressions, we correct for heteroskedasticity clustering the error terms at the fund level.

Our main identifying assumption is that the individual mutual funds that make up our dataset are small relative to the size of the markets in which they trade, in particular the CDS market. Mutual fund managers do participate in the CDS market, but to the extent that individual managers take the price of CDS contracts as given, we are able to rule out the possibility that our estimate of γ is contaminated by reverse causality. This assumption is plausible as long as the size of the assets managed by individual fund managers is small relative to the size of the market. In our sample, individual fund manager never hold more than 0.8 percent of the total debt outstanding of any of countries in our sample.¹⁶ It thus appears quite plausible that the funds in the sample act as price takers in the CDS market, making it unlikely that any relationship between portfolio shares and sovereign risk that we uncover is driven by reverse causality.

The specification in equation 4 is relatively parsimonious, with relative returns the only explicit control variable. However, the fund-country fixed effects ensures that no cross sectional country or fund characteristics will generate omitted variable bias.¹⁷ Similarly, our inclusion of a full set of time fixed effects controls for all factors that might affect portfolio weights

¹⁶From 2016 onward the largest fund in the sample was the Vanguard Total International Bond Index Fund, with assets of nearly \$100 billion at the end of our sample period, of which approximately \$85 billion were allocated to the countries in our sample. This represented 0.8 percent of the outstanding bonds of those countries.

¹⁷Because fund's portfolio weights are correlated with unobservable manager preferences omitting the fund-country fixed effect or estimating the model in differences would generate inconsistent estimates. However, as equation (4) is a dynamic panel model estimating coefficients using least squares is also asymptotically biased, with the bias of order $1/T$, where T is the time-series length of the typical fund. In our database T is relatively large: 40 observations for the average fund. Hence least squares estimation of equation (4) performs well relative to alternatives such as GMM (Judson and Owen, 1999).

which vary over time but not across countries. This is particularly important because [Longstaff et al. \(2011\)](#) show that default probabilities move closely with global factors. This leaves factors that vary over time within individual countries over time as the only potential sources of omitted variable bias. In [Section 6.2](#) we show that the inclusion of such variables has a negligible impact on our estimates of γ , suggesting that omitted variable bias is not distorting our results.

4 Sovereign Risk and Portfolio Weights

Column (1) of [Table 3](#) reports our baseline results obtained estimating equation (4). We find that the coefficients on lagged weights and relative returns are positive and significant, confirming that portfolio weights are serially correlated and positively correlated with returns. Reassuringly the point estimate for the coefficient on lagged portfolio weights is close to those reported by [Raddatz and Schmukler \(2012\)](#), whom we followed in constructing our specification. The estimated coefficient on bond returns is positive and significant, confirming that investors tend to increase their holdings of assets that pay higher returns. Our point estimate for bond returns differs from the one reported by [Raddatz and Schmukler \(2012\)](#). However, this is not surprising given that we separately include our measure of default risk, which is in turn one of the drivers of returns.

Turning to the coefficient γ on relative default risk—our main variable of interest—we find that fund managers actively adjust their portfolios when default risk changes. Specifically, our estimates suggest that fund managers on average reduce their exposure to a generic country j by five percent when excess default risk in country j increases by one percent. Because the coefficients for excess returns and for excess default risk are both significant, our results suggest that the increase in yields that accompanies a rise in default risk does not fully compensate managers for the additional risk.

In the remainder of this section we explore heterogeneity in the relationship between portfolio weights and sovereign default risk, both at the country level and at the fund level. We find that the intensity of fund managers' reaction to sovereign risk crucially depends on country-specific characteristics such as the size of government debt, and also characteristics that are specific to the fund-country match, such as the size of a fund's exposure to a specific country. However, we also find evidence of preferential treatment for core developed markets: even when we control for a variety of country characteristics, fund managers appear less

sensitive to sovereign risk in core developed markets than elsewhere. In Subsection 4.2, we present evidence that the sensitivity of portfolio weights to default risk also depends on the characteristics of the fund itself.

4.1 Heterogeneous Effects: Country Characteristics

We now assess whether fund managers respond differently to sovereign risk depending on the observable characteristics of the country where the debt has been issued. To check for the existence of heterogeneous effects we augment equation (4) by interacting our relative default risk variable with a variable $dummy_{ijt}$ that is equal to one when country j belongs to a group of countries sharing a given characteristic:

$$\begin{aligned} \omega_{ijt} = & \beta\omega_{ijt-1} + \zeta(r_{ijt} - r_{it}) + \gamma(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \\ & + \gamma_1 dummy_{ijt} * (\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) + \gamma_2 dummy_{ijt} + \psi_{ij} + \psi_t + \nu_{ijt}. \end{aligned} \quad (5)$$

The coefficient γ_1 tests for the existence of heterogeneous effects: when γ_1 is significant, fund managers treat countries for which $dummy_{ijt}$ is equal to one differently from other countries.

The first heterogeneity we explore is between Developed and Emerging Markets.¹⁸ Column (2) in Table 3 reports results obtained setting $dummy_{ijt}$ equal to one when the country is a developed market and zero otherwise. Taken at face value this result implies that fund managers treat developed and emerging economies similarly, as the coefficient γ_1 of the interaction term is not significant. This result, however, masks a strong heterogeneity *within* developed markets. In column (3) we report estimates obtained when we restrict our sample to developed markets and set $dummy_{ijt}$ equal to zero for Peripheral Euro-Area Economies (Italy, Portugal, and Spain) and equal to one for the remaining Core Developed Markets (CDMs). In this specification, the coefficient γ_1 is positive and significant and the sum of the coefficients γ and γ_1 is close to zero. These results suggest that fund managers respond differently to risk in Eurozone periphery economies versus other developed markets: portfolio weights of CDMs' are not affected by changes in sovereign risk. On the contrary, portfolio weights in the Eurozone periphery decline in response to an increase in sovereign risk in those countries. Column (4) confirms that results still hold when we run the same regression on the

¹⁸Developed markets are: Australia, Belgium, Canada, Switzerland, Germany, France, Italy, the United Kingdom, Japan, Portugal, Sweden, Spain, and the US. Emerging Markets are: Argentina, Brazil, Chile, China, Colombia, Hong Kong, Indonesia, Korea, Mexico, Poland, Russia, Thailand, Turkey, and South Africa.

full sample, which includes Emerging Market Economies (EMEs).¹⁹ The results in columns (3) and (4) provide some preliminary evidence that core developed markets enjoy what we call preferential treatment. Whereas for EMEs and the peripheral European countries, greater default risk is associated with smaller portfolio weights, for the core developed markets default risk appears not to matter. We explore this preferential treatment in more depth below.

We now shift from grouping countries according to some ex-ante classification to grouping them according to their economic fundamentals. Results are reported in Table 4. We begin this portion of the analysis testing for the existence of nonlinearities in the way fund managers react to risk. That is, we test whether fund managers are more sensitive to sovereign risk when they invest in riskier countries. To this end, we rank the countries in our sample according to their default probability each month.²⁰ According to our ranking, Argentina is the riskiest country, as its default probability falls in the top decile of the distribution in more than 89 percent of the periods in our sample. Brazil, Portugal, and Turkey also frequently fall in the top decile of the default risk distribution. Germany, instead, is the safest country as it falls in the lowest decile of the default-risk distribution more than 73 percent of the time. Column (1) in table 4 reports results obtained setting $dummy_{ijt}$ equal to one when country j falls in the upper half of the default-risk distribution at time t . We find that the coefficient γ_1 of the interaction term is negative and significant.²¹ Hence, we conclude that the portfolio weights that fund managers assign to riskier countries are more sensitive to sovereign risk than the portfolio weights of safer countries. In Table A7 in the Appendix we show that results do not change when we replace the dummy variable $dummy_{ijt}$ in regression 5 with our continuous measure of default risk λ_{jt} .

We next test whether country characteristics generally seen as drivers of default risk also affect the intensity of investors' response to sovereign risk. In particular, we focus on four

¹⁹An interesting question is whether fund managers' attitude towards peripheral euro-area economies changed during the euro-area debt crisis. To test this hypothesis we regress equation 4 on the Eurozone periphery subsample interacting our default risk variable with a dummy that is equal to one between 2009 and July 2012, the month of Draghi's "whatever it takes" speech. Results show that investors were indeed more sensitive to sovereign risk during the sovereign debt crises, but not significantly so.

²⁰We re-compute the countries' rankings each month because we want to measure each country's riskiness relative to the alternative investment opportunities available in that point in time. We also explored two alternative rankings. The first one ranks countries according to their mean default probability over the entire sample. The second one ranks countries according to default probabilities observed over the entire sample period. Results do not change significantly when either of the two alternative rankings are adopted.

²¹As default-risk rankings are computed in every period, they vary over time. As equation (5) indicates, we therefore include the dummy for high risk countries in our regressions on its own as well as interacted with default risk. The associated coefficient γ_2 is not significant and is not reported in table 4 for brevity.

characteristics: the size of government debt, financial development, the currency composition of government debt, and its maturity structure. We measure these characteristics using respectively the debt-to-GDP ratio, the private credit-to-GDP ratio, the share of government debt that is issued in foreign currency, the share of government debt issued on short-term maturities, and the years since the last default. Results for country characteristics are reported in columns (2)-(5) of Table 4. Once again results in Table 4 are obtained summarizing country characteristics with dummy variables set equal to one if country j falls above the median for a particular variable in a given month t . However, our results are little changed when we use continuous variables as reported in Table A7 in the Appendix.

In column (2) we examine whether the size of a country’s public debt affects the sensitivity of its portfolio weight to default risk. We set $dummy_{ijt}$ in equation (5) equal to one when the debt-to-GDP ratio of country j at time t is greater than the median value. We find that the coefficient γ_1 for the interaction term is not significant. This is not surprising. Several of the core developed markets in our sample have very high debt-to-GDP ratios, and yet as we saw in Table 3 this group’s portfolio shares are not sensitive to changes in sovereign risk. Running the regression in column (3) on a sample restricted to emerging markets generates a statistically significant coefficient. Moreover, in column (5) of 4, where we control for whether or not the country is a developed market, the debt variable is significant.

Previous work has found that countries with deeper credit markets are less likely to default (Gennaioli et al., 2014; Erce and Mallucci, 2018). We therefore allow the sensitivity of the portfolio weight assigned to a country to vary with the country’s level of financial development (column 3). We set $dummy_{ijt}$ equal to one if country j ’s private credit-to-GDP ratio lies above the median value observed at time t .²² We find that the coefficient γ_1 of the interaction term is positive and significant suggesting that fund managers are less sensitive to default risk in countries that have larger financial sectors.

We also test the hypothesis that investors behave differently with countries that issue a large fraction of debt in foreign currency as suggested by the large literature on the “original sin” (column 5). Once again, we construct our dummy variable in such a way that it is equal to one when country j ’s share of government debt that is issued in foreign currency exceeds the median value observed in time t . We find that the coefficient γ_1 is negative and significant thereby supporting the “original sin” hypothesis that countries that issue debt in foreign currency are riskier. In column (6) we turn to the maturity structure of government debt.

²²The credit-to-GDP ratio is frequently used in the sovereign default literature to measure financial development.

We find that the portfolio weights of countries that issue a large fraction of government debt using short-term maturities are less sensitive to sovereign risk. This result is consistent with the idea that incentives to default are lower for countries that issues short-term debt.

In columns (6) and (7), we analyze whether fund managers' behavior are affected by characteristics that are specific to the fund-country pair. First, in column (6) we evaluate whether fund managers' response to sovereign risk is different when funds are investing in the economy in which the fund is legally domiciled. To this end we set the dummy variable $dummy_{ijt}$ equal to one when the domicile of investor i coincides with the destination country j and zero otherwise. We find that the coefficient associated with the interaction term is positive, in line with the home bias documented by Broner et al. (2014) and Andritzky (2012) in banks' bond holdings. That said, we remain cautious in interpreting this result. When we include the full set of controls in the regression (column 9), the coefficient on the own-country dummy become statistically insignificant. This suggests that significance of the own-country interaction may reflect the fact that most domestic holdings in our sample are by funds in core developed markets, for which portfolio weights are generally less sensitive to default risk.

Do fund managers respond differently to default risk depending on the whether the country in question makes up a larger or smaller share of their portfolio? On the one hand, higher default risk in a country with a small portfolio weight might not merit an adjustment, particularly in the presence of transaction costs. On the other hand, managers may have assigned a country a large weight because they are confident about its economic prospects, and thus do not feel the need to make adjustments based on default risk. In column (7) we check whether fund managers respond differently to sovereign risk when default risk increases in countries toward which they are heavily exposed. To this end, we calculate the median weight in every period t . Whenever country j 's share fund in i 's portfolio is greater than the median value observed at time t , we set $dummy_{ijt}$ equal to one. We find that the coefficient γ_1 for the interaction term is positive and significant, suggesting that there is a positioning overhang behavior: funds are less likely to reduce their exposure toward countries where they invest a large fraction of their portfolio.

We have shown that the sensitivity of portfolio weights to default risk is lower for core developed markets and for countries with better fundamentals, broadly speaking. Does this simply reflect the fact that when default is less likely, investors trade CDS contracts less frequently, making their prices less informative? In column (8) we address this concern by interacting our relative default risk variable with a dummy indicating countries with high

bid-ask spreads in the market for each country’s CDS contracts. As with other variables, we define “high” as being in the top half of the distribution in each period. This tests whether the heterogeneity we have been discussing is the result of cross-country variation in CDS market liquidity. We find that the coefficient on the default risk-bid-ask spread interaction is not significant, allaying this concern.

In Table 3 we presented evidence that core developed markets are treated differently by fund managers, in that default risk matters appeared not to matter for the portfolio weights that managers assign to that set of countries. We now conduct a more rigorous test of the hypothesis that core developed markets enjoy preferential treatment. In column (9) of Table 4 include the interaction of our default risk measure with the core DM dummy alongside all default risk-country characteristic interactions we have so far discussed. We find that the coefficient on the core DM interaction remains positive and significant. Hence, country observables cannot fully account for the differential treatment toward CDMs. And we conclude that core developed markets enjoy a preferential treatment.

4.2 Heterogenous Effects: Fund Characteristics

So far we have shown that funds reallocate away from countries with higher sovereign risk and that the intensity of this reallocation depends on the characteristics of the country in question. In this section, we ask whether the extent to which fund managers flee sovereign risk depends on the characteristics of the fund itself. In addition to time invariant characteristics like the fund’s mandate, we also look at how funds’ recent performance and investor attitudes towards risk affect the relationship between portfolio weights and sovereign default probabilities. The results of this exercise are reported Table 5.

Column 1 shows that a fund’s portfolio weights are less sensitive to default risk the higher the fund’s returns in the previous period.²³ This suggests that when managers are performing well they are more tolerant of additional risk in their portfolios. In Column 2 we test whether larger funds are more or less sensitive to risk, but find that this is not the case.²⁴ We also interact our measure of sovereign default risk with the log of the VIX, which is widely used as a measure of risk aversion in global financial markets and which we use here as an indicator

²³The results are very similar when relative sovereign risk is interacted with contemporaneous performance.

²⁴This result is very robust. We ran the same regression with log assets and with dummies indicating funds in the top 50 percent of the size distribution and the top 20 percent. In no case was the risk-size interaction significant.

of fund managers' attitudes towards risk. As expected, the results in column 3 confirm that when financial market participants are broadly speaking more risk averse, the relationship between portfolio weights and sovereign risk is significantly stronger.²⁵

Next we examine whether fund managers' sensitivity to sovereign default risk varies with the mandate of the fund. One might expect that managers of emerging market funds are more tolerant of default risk, but in column 4 we find no significant difference in sensitivity between dedicated emerging market funds and the two other types of bond funds in our dataset ("Developed Market" and "Global").²⁶ Within the EM asset class, our data let us distinguish between funds investing in only so-called hard currency bonds, those investing only local currency bonds, and those who invest in both types. As reported in Column 5, we find that hard currency funds are less sensitive to sovereign default risk than local currency or mixed-currency funds. This result is somewhat surprising given that the default probabilities we use in our regressions were calculated using CDS contracts written on dollar-denominated sovereign debt. We see the greater sensitivity of local- and mixed-currency funds as reflecting two features of sovereign debt. First, default on foreign and domestic currency debt is correlated (Reinhart, 2010). And second, from the perspective of the international mutual funds in our dataset, local currency debt is subject to additional risks, including exchange rate risk (if the exposure is unhedged) and the imposition of capital controls (Du and Schreger, 2016, discuss these risks in detail).

Comparing dedicated corporate bond funds with those that invest in only sovereign bonds as well as funds investing in both types of bonds, we find that corporate bond funds' portfolio allocations are less sensitive to sovereign default risk (column 6).²⁷ This is intuitive, in that while sovereign risk and the risk associated with corporate bonds issued in that country are correlated, the correlation is less than one-for-one.

Finally, in column (6) we check whether funds managers react differently to sovereign risk when their fund is affiliated with a bank. The coefficient on the interaction between sovereign risk and an indicator for bank-affiliated funds is statistically significant and implies that bank-affiliated funds' negative relationship between portfolio weight and sovereign risk is nearly 80 percent stronger for bank-affiliated funds. This result is consistent with the finding by Frye (2001) that investment funds affiliated with deposit-taking banks adopt relatively conservative

²⁵We also ran this regression using other measures of global financial conditions, including S&P500 returns and the broad US dollar exchange rates. Results were very similar.

²⁶We confirm that there is no significant difference in sensitivity between any of these three types of funds.

²⁷We include both high yield (HY) and investment grade (IG) funds in the category of corporate bond funds. We do not find a difference in sensitivity between IG and HY funds.

investment strategies.²⁸

Taken as a whole, the cross-fund heterogeneity in the portfolio share-sovereign risk relationship that we have found offers two broad messages. First, the magnitude of the relationship between portfolio weights and sovereign risk intensifies in bad times. In good times, when funds are performing well and global investors are relatively tolerant of risk, the relationship is relatively weak, but strengthens if conditions deteriorate. Second, the investor base matters for the relationship between portfolio shares and default probability, so that on aggregate a country in which a relatively higher share of debt is held by local- or mixed-currency funds or corporate bond funds can expect to see relatively larger swings in capital flows when sovereign risk fluctuates.

5 Sovereign Risk and Spillovers

The previous section presented evidence that bond fund managers reallocate away from sovereign risk, with the intensity of the reallocation depending on country and fund characteristics. In this section, we investigate the destinations of that same reallocation: what factors affect fund managers' choices about where to shift their assets when sovereign risk increases in a particular country. The analysis touches a long-standing concern in international macroeconomics and finance: Contagion. Does financial distress spread from one country to others? Or more formally, does asset price comovement increase in bad times?

As part of our analysis, we will assess whether bond fund managers contribute to contagion by withdrawing from particular countries when default risk increases elsewhere in their fund's portfolio. Previous work by (Calvo and Mendoza, 2000) has highlighted the fact that delegated portfolio management structure of mutual funds creates an incentive for managers to participate in contagion (although Kodres and Pritsker (2002) show that such incentives are by no means a necessary condition for contagion), and found some empirical evidence that mutual funds do contribute to contagion (Kaminsky et al., 2004).

To understand the spillovers generated when bond fund managers reallocate away from risk, we begin by rearranging equation (4) to break up the two components of excess default risk: the default risk λ_{jt} of country j , and the average default risk in other countries in fund

²⁸There is a large literature on the investment decisions of bank-affiliated funds, but it is focused almost exclusively on equity funds. See Golez and Marin (2015) for an overview.

i 's portfolio $\bar{\lambda}_{i,k \neq j,t}$. The estimable regression equation becomes

$$\omega_{ijt} = \beta\omega_{ijt-1} + \zeta(r_{jt} - r_{it}) + \gamma\lambda_{jt} + \gamma_1\bar{\lambda}_{i,k \neq j,t} + \psi_{ij} + \psi_t + \nu_{ijt}. \quad (6)$$

The coefficient γ_1 measures how fund managers modify their exposure to country j in response to default risk in other countries in the portfolio.

Column (1) in Table 6 reports estimates for equation (6). The coefficient γ_1 is positive and significant, so that the portfolio weight of the country j depends not only on default risk in country j but also on default risk in the other countries in the portfolio. The positive sign shows that—after we control for the riskiness of country j by including λ_{jt} as a regressor—fund managers rebalance their portfolio away from countries where default risk has increased and toward other countries in the portfolio. This result is in fact implied by the reallocation we found in the previous section. Reallocation away from one country requires an increased weight on at least one other country. We nonetheless include these regression results to provide a baseline for our analysis of what factors determine which countries receive more or less (or none) of the reallocated funds.

5.1 Regional Spillovers

We begin by examining whether a country's portfolio weight is sensitive to sovereign risk in other countries the same broad country group or geographic region. This constitutes our first test of whether bond funds contribute to contagion. We modify regression (6) to allow the portfolio weight assigned to country i to depend on three types of sovereign risk: risk in the country itself (λ_{jt} as before), average risk elsewhere in the same geographic region ($\lambda_{it \in Bloc}$), and default risk outside the region ($\lambda_{it \notin Bloc}$), so that equation (6) becomes

$$\omega_{ijt} = \beta\omega_{ijt-1} + \zeta(r_{jt} - r_{it}) + \gamma\lambda_{jt} + \gamma_1\lambda_{it \in Bloc} + \gamma_2\lambda_{it \notin Bloc} + \psi_{ij} + \psi_t + \nu_{ijt}. \quad (7)$$

We consider five partially overlapping blocs of countries: emerging markets, core developed markets, the Eurozone periphery, Latin American markets, and emerging Asian markets.²⁹ A negative value of γ_1 would imply that bond fund managers participate in contagion by withdrawing from one country when default risk is higher in another country in the group or region. Note that in these regressions we necessarily drop funds that invest only in one region, since these funds have no other option than to increase the portfolio weights of funds

²⁹EMEs include Latin America and EM Asia, as well as Turkey and South Africa.

in the region of their mandate. To include such funds would bias or results against a finding of contagion. As a result, the sample sizes in these regressions are substantially lower.

Results, reported in Table 6, provide some limited evidence that bond mutual funds contribute to regional contagion. For emerging markets, the coefficient γ_1 is negative, but only statistically significant for Latin America. This result is consistent with earlier work by Kaminsky et al. (2004), who found that Latin America-focused mutual funds contributed to contagion in the region during the 1990s. Thus it does appear that when sovereign risk increases in, for example Brazil, fund managers can be expected to reduce the weights of other Latin American countries in their portfolios. The point estimate for emerging Asia is actually larger than that for Latin American and emerging markets as a whole, but is very imprecisely estimated, partly because the size of the EM Asia sample is relatively small. By contrast, we find no evidence that bond funds contribute to regional contagion in developed markets (columns 6 and 7), even within the Eurozone periphery. In general, the estimated coefficient γ_2 is significant and positive, indicating that even if fund managers do not contribute to contagion, they nonetheless move assets out of the immediate region when cutting exposure to countries where sovereign risk has increased.

5.2 Country Characteristics and Flight from Risk

We have seen that when fund managers shift their portfolios away from default risk, they tend to shift assets out of the geographic region. Are their country characteristics other than geography that determine where managers reallocate? To answer this question, we examine whether the country characteristics we studied in Section 4.1 also affect fund managers' choices about where to reallocate when they reduce the portfolio weight of countries with higher default risk. We modify equation (6) to include interaction terms between the variable $\bar{\lambda}_{i,k \neq j,t}$ and the set of variables ($dummy_{ijt}$) that we analyzed in Section 4.1:

$$\begin{aligned} \omega_{ijt} = & \beta\omega_{ijt-1} + \zeta(r_{jt} - r_{it}) + \gamma\lambda_{jt} + \gamma_1\bar{\lambda}_{i,k \neq j,t} \\ & + \gamma_2\bar{\lambda}_{i,k \neq j,t} * dummy_{ijt} + \gamma_3 * dummy_{ijt} + \psi_{ij} + \psi_t + \nu_{ijt}. \end{aligned} \quad (8)$$

Our coefficient of interest is now γ_2 . It captures whether the portfolio weight of a generic country j is more sensitive to sovereign risk in other countries when country j has a specific characteristic.

Coefficient estimates for equation (8) are reported in Table 7. In column (1) we test whether

a country with a relatively high level of default risk can be expected to receive fewer reallocation flows when risk increases elsewhere in a fund’s portfolio. At first glance, the result is surprising: riskier countries receive more reallocation flows. Recall, however, that fund managers make portfolio reallocation decisions based on the *relative* risk and returns of the assets available to them. For this reason the main regressor of interest in our specifications in Section 4 was default risk in country j relative to average default risk elsewhere in the fund’s mandate. Thus, when risk increases elsewhere, a risky country become relatively more attractive. This is the effect the result in column (1) is picking up.

Zooming in further on the causes of default risk, we see that fund managers avoid reallocating towards high-debt countries, as highlighted by the negative and significant coefficient in column (3). Managers also appear to prefer countries with relatively higher shares of foreign currency debt when reallocating away from risk (column 4). Interestingly, our results indicate that reallocation flows do not go to the fund’s home country (column 6), perhaps because managers maintain fixed allocations to home versus foreign assets. Finally, in column (7) we see that countries with relatively large portfolio weights receive relatively fewer reallocation flows. This may reflect a reluctance on the part of managers to increase their holdings of assets of countries two which they are already very exposed absent any change in the country itself.

6 Robustness Exercises

In this section we run a number of additional regressions to make sure that our results remain robust when we modify our econometric specifications. In short, we find that our results are remarkably stable.

6.1 Active Portfolio Shares

We begin our robustness exercise confirming that the relationship that we find between portfolio weights and default probabilities is not driven by changes in bond prices. If bond prices fall when default risk increases, the portfolio weight of the country where risk has increased will fall mechanically due to the change in relative prices even if fund managers take no action. In deriving our specification from the law of motion for portfolio weights

(equation 1), we explicitly accounted for this possibility including bond yields as a control in our regressions. Hence, our results provide an estimate of the impact of default risk on portfolio weights net of the price effect. In this section we adopt an alternative approach to net out the price effect. We transform the portfolio weight variable so that it only reflects active reallocation by fund managers and excludes changes in weight due to price changes.

As discussed in Kraay and Ventura (2000) and Tille and van Wincoop (2010), changes in portfolio weights can be decomposed into a passive component attributable to return differentials and an active component reflecting decisions taken by investors. In this paper we are studying how sovereign risk affects fund managers’ decisions, so we are interested in the active reallocation. We therefore check whether our results remain similar when we replace our fund weight variable ω_{ijt} with a measure of the “active” weight ω_{ijt}^{act} that we compute following the methodology proposed by Ahmed et al. (2018).³⁰

Regression estimates for this alternate specification are reported in Table A8 in the Appendix. Broadly speaking, the results presented in Section 4 still hold, with the sign and magnitude of the point estimates unchanged, although the significance level changes in some cases. Fund managers reallocate away from countries with high sovereign risk (column 1). The portfolio share-default probability relationship is significantly stronger for riskier countries (column 2), countries that have less developed financial markets (column 4), countries with a high fraction of foreign currency debt (column 5) or a low fraction of short-term debt (column 6). And once again, the relationship is weaker for the country in which the fund is located (column 7) and for countries that account for a large fraction of a fund’s portfolio (column 8).

6.2 Additional Regressors

Default probabilities are forward looking and may change in response to a wide variety of country-specific macroeconomic news.³¹ This raises the possibility that relationship that we find between portfolio shares and default risk in fact reflects adjustments in portfolio

³⁰Ahmed et al. (2018) propose a methodology for calculating the active *change* in weights ($\Delta\omega_{ijt}^{act}$). To make our results directly comparable to those in Sections 4 and 5, we define the *level* of the active portfolio weight as the synthetic portfolio weight that would occur in period t if the passive reallocation between periods $t - 1$ and t were set to zero: $\omega_{ijt}^{act} = \omega_{ijt-1}^{act} + \Delta\omega_{ijt}^{act}$.

³¹As documented in Longstaff et al. (2011), global factors such as the VIX, U.S. stock returns, and U.S. bond yields and spreads explain a substantial share of the variation in default risk. However, we include a full set of time fixed effects in all our specifications, allowing us to focus on the role of country-specific variation in default risk.

weights in response to changes in the economic outlook for the country in question. To control for this possibility, we collect data from Consensus on investors’ expectations on output growth, inflation, and fiscal surpluses for each country in our sample. Consensus data have two characteristics that are especially appealing to us. First, data are reported at the monthly frequency, thus they track at a relatively high frequency investors’ expectations about macroeconomic variables. Second, they are forward looking as it is also the case for default probabilities embedded in CDS spreads. Including Consensus data in our regressions, therefore, allows us to assess whether the coefficients we obtained in Section 4 reflect investors’ reactions to changes in default risk, or to changes in the more general economic outlook.

Table A9 in the Appendix reports estimates for our augmented regressions that includes Consensus data. The point estimates for the coefficient on default risk are similar to those reported in Tables 3 and Table 4. This indicates that results presented in the previous sections are indeed capturing investors’ reaction to default risk, rather than their reaction to changes in the countries’ general macroeconomic outlook.

6.3 Correlation between Relative Returns and Relative Risk

In this section, we verify that our results are not distorted by the strong correlation between the two main independent variables in our regressions: default risk and bond yields. In all our regressions we control for excess returns to ensure that the relationship between portfolio weights and default risk is not a mechanical results of changes in the prices of bonds. However, default risk is of course an important driver of the return of government bonds. Hence, there is a concern that the two variables are comove so closely that our coefficient estimates are being distorted by multicollinearity.

A quick inspection of the simple correlation between the two variables is already reassuring. The correlation is just 0.04 suggesting that multicollinearity should not be a major concern. Nonetheless, to further address the issue we run several of our regressions using a version of our excess default risk variable that has been orthogonalized with respect to the excess return variable that we include in all our specifications. Specifically, we regress excess default risk $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ against excess returns $(r_{ijt} - r_{it})$, then take the residuals from that regression, which we call $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth}$ and use them to re-run our baseline regression (column 1 in Table 3) as well as the regressions in Table 4 examining the how the portfolio share-

default risk relationship varies with country characteristics. The results of this exercise are reported in Table A10 in the Appendix. Our estimates do not appear to be biased due to multicollinearity. In fact, point estimates for our second-stage regression are almost unchanged relative to those reported in Table 3.

7 Conclusions

This paper documents how investors react to sovereign risk by analyzing a novel database that combines sovereign default probabilities extracted from CDS spreads with monthly data on the portfolios of individual bond mutual funds. Fund managers reduce their exposure to countries in which default risk increases. This relationship holds even though we control for changes in bond prices, suggesting these do not fully compensate investors for additional risk. We also find that the sensitivity of funds' country allocations to sovereign default risk is highly heterogeneous, depending on characteristics of both the country and the fund in question. Fund managers reallocate away from sovereign risk much more intensively when the country in question has an already high default probability, a high public debt burden, or issues. Conversely, the relationship between sovereign risk and portfolio weights is weaker, although still significant, for countries with large credit markets and which issue government debt with short-term maturities. At the same time, we find evidence that core developed markets enjoy what we call preferential treatment in the sovereign debt market: Fund managers do not modify the portfolio weights of core developed markets when sovereign risk increases in those countries. This lack of sensitivity is not explained by these countries having stronger fundamentals, nor by cross country differences in the liquidity of the CDS contracts from which we extract our default risk measure.

The intensity of reallocation varies across funds as well as across countries. In particular, we find that past performance matters. Fund's portfolio weights are less sensitive to default risk the higher the fund's return in the previous period. At the same time, funds owned by banks are more sensitive to sovereign risk, suggesting that they adopt more conservative strategies than their peers.

We also investigate which countries are on the receiving end of reallocation flows when fund managers shift their portfolios away from countries with high sovereign risk. Here too we see differential treatment. Fund managers tend to shift assets to countries outside the geographic region where sovereign risk has increased. That said, we find only weak

evidence of intra-regional contagion. Countries in the region where risk has increased do not receive reallocation flows, but managers generally do not cut the portfolio shares a country when risk rises elsewhere in the same region. Apart from geography, we see that countries with relatively high debt-to-GDP ratios do not receive reallocation flows in response to higher sovereign risk elsewhere. In addition, fund managers avoid reallocating into countries where their portfolio weights are relatively large already. Nor do we observe flight home reallocation into bonds issued by the fund's home country.

Taken as a whole, our results suggest that the relation between investor portfolios and sovereign risk is complex. The evidence presented in this paper on the behavior of an important class of cross-border investors is supportive of sovereign default models which include a richer characterization of foreign creditors (as in [Lizarazo, 2013](#); [Pouzo and Presno, 2016](#); [Arellano et al., 2017](#)). The theoretical literature on sovereign default has been dominated by models that assume that international investors are risk-neutral and have deep pockets. This assumption implies that investors' response to sovereign risk should not vary with countries' and funds' characteristics and also that there should be no cross-country spillovers. By presenting ample evidence of both heterogeneity in the portfolio weight-sovereign risk relationship as well as cross-country spillovers, this paper shows this assumption to be counterfactual, at least for one large segment of the international investor base.

This paper's characterization of the behavior of investment funds is important not only because these institutions hold a large share of emerging markets' outstanding debt, but also because they are less regulated than other financial intermediaries. Consequently, changes in their portfolios are not primarily driven by regulatory requirements. At the same time we acknowledge the importance of studying the behavior of other international creditors. Using the methodology we have developed in this paper in order to study banks' portfolio choices, in particular, could provide important insights due to their centrality in the financial system.

References

- Ahmed, Shaghil, Stephanie Curcuru, Francis E. Warnock, and Andre Zlate**, “Decomposing International Portfolio Flows,” 2018. Mimeo.
- Ammer, John, Stijn Claessens, Alexandra Tabova, and Caleb Wroblewski**, “Searching for Yield Abroad: Risk-Taking through Foreign Investment in U.S. Bonds,” Technical Report 1224, Board of Governors of the Federal Reserve System 2018.
- Andritzky, J.**, “Government Bonds and Their Investors: What are the Facts and do they Matter?,” Technical Report 12/158, International Monetary Fund 2012.
- Arellano, Cristina and Ananth Ramanarayanan**, “Default and the Maturity Structure in Sovereign Bonds,” *Journal of Political Economy*, 2012, 120 (2), 187–232.
- , **Yan Bai, and Sandra Lizarazo**, “Sovereign Risk Contagion,” Working Paper 24031, National Bureau of Economic Research November 2017.
- Becker, Bo and Victora Ivashina**, “Reaching for Yield in the Bond Market,” *The Journal of Finance*, 2015, 70 (5), 1863–1902.
- Bergant, Katharina and Martin Schmitz**, “Valuation Effects and International Capital Flows: Security-Level Evidence from Euro Area Investors,” 2019. Mimeo.
- Broner, Fernando A., R. Gaston Gelos, and Carmen M. Reinhart**, “When in peril, retrench: Testing the portfolio channel of contagion,” *Journal of International Economics*, 2006, 69 (1), 203 – 230. Emerging Markets.
- Broner, Fernando, Aitor Erce, Alberto Martin, and Jaume Ventura**, “Sovereign Debt Markets in Turbulent Times: Creditor Discrimination and Crowding-Out Effects,” *Journal of Monetary Economics*, 2014, 61 (C), 114–142.
- Calvo, Guillermo A. and Enrique G. Mendoza**, “Rational contagion and the globalization of securities markets,” *Journal of International Economics*, 2000, 51 (1), 79 – 113.
- Camanho, Nelson, Harald Hau, and Helene Rey**, “Global Portfolio Rebalancing Under the Microscope,” August 2017. Mimeo.
- Choi, Jaewon and Mathias Kronlund**, “Reaching for Yield in Corporate Bond Mutual Funds,” *The Review of Financial Studies*, 11 2017, 31 (5), 1930–1965.

- Czech, Robert**, “Credit default swaps and corporate bond trading,” Bank of England working papers 810, Bank of England July 2019.
- Didier, Tatiana, Roberto Rigobon, and Sergio L. Schmukler**, “Unexploited Gains from International Diversification: Patterns of Portfolio Holdings Around the World,” Technical Report 5 December 2013.
- Du, Wenxin and Jesse Schreger**, “Local Currency Sovereign Risk,” *Journal of Finance*, 2016, *71* (3), 1027–1070.
- Duffie, Darrell, Lasse Heje Pedersen, and Kenneth J. Singleton**, “Modeling Sovereign Yield Spreads: A Case Study of Russian Debt,” *The Journal of Finance*, 2003, *58* (1), 119–159.
- Erce, Aitor and Enrico Mallucci**, “Selective Sovereign Defaults,” International Finance Discussion Papers 1239, Board of Governors of the Federal Reserve System (U.S.) Nov 2018.
- Forbes, Kristin**, “The Big C: Identifying Contagion,” Working Paper 18465, National Bureau of Economic Research October 2012.
- , **Marcel Fratzscher, Thomas Kostka, and Roland Straub**, “Bubble thy neighbour: Portfolio effects and externalities from capital controls,” *Journal of International Economics*, 2016, *99*, 85 – 104.
- Frye, Melissa B.**, “The Performance of Bank-Managed Mutual Funds,” *Journal of Financial Research*, 2001, *24* (3), 419–442.
- Gelos, R. Gaston and Shang-Jin Wei**, “Transparency and International Portfolio Holdings,” *The Journal of Finance*, 2005, *60* (6), 2987–3020.
- Gennaioli, Nicola, Alberto Martin, and Stefano Rossi**, “Sovereign Default, Domestic Banks, and Financial Institutions,” *Journal of Finance*, 04 2014, *69* (2), 819–866.
- Golez, Benjamin and Jose M. Marin**, “Price support by bank-affiliated mutual funds,” *Journal of Financial Economics*, 2015, *115* (3), 614 – 638.
- Hébert, Benjamin and Jesse Schreger**, “The Costs of Sovereign Default: Evidence from Argentina,” *American Economic Review*, October 2017, *107* (10), 3119–3145.
- Judson, Ruth A and Ann L Owen**, “Estimating dynamic panel data models: a guide for macroeconomists,” *Economics Letters*, 1999, *65* (1), 9 – 15.

- Kaminsky, Graciela, Richard K. Lyons, and Sergio L. Schmukler**, “Managers, investors, and crises: mutual fund strategies in emerging markets,” *Journal of International Economics*, 2004, *64* (1), 13–134.
- Kodres, Laura E. and Matthew Pritsker**, “A Rational Expectations Model of Financial Contagion,” *The Journal of Finance*, 2002, *57* (2), 769–799.
- Kraay, Aart and Jaume Ventura**, “Current Accounts in Debtor and Creditor Countries,” *The Quarterly Journal of Economics*, 2000, *115* (4), 1137–1166.
- Lizarazo, Sandra Valentina**, “Default risk and risk averse international investors,” *Journal of International Economics*, 2013, *89* (2), 317 – 330.
- Longstaff, Francis A., Jun Pan, Lasse H. Pedersen, and Kenneth J. Singleton**, “How Sovereign Is Sovereign Credit Risk?,” *American Economic Journal: Macroeconomics*, April 2011, *3* (2), 75–103.
- Maggiore, Matteo, Brent Neiman, and Jesse Schreger**, “International Currencies and Capital Allocation,” *Journal of Political Economy*, forthcoming.
- Pan, Jun and Kenneth J. Singleton**, “Default and Recovery Implicit in the Term Structure of Sovereign ‘CDS’ Spreads,” *Journal of Finance*, October 2008, *63* (5), 2345–2384.
- Park, JungJae**, “Contagion of Sovereign Default Risk: the Role of Two Financial Frictions,” MPRA Paper 55197, University Library of Munich, Germany Jan 2013.
- Pouzo, Demian and Ignacio Presno**, “Sovereign Default Risk and Uncertainty Premia,” *American Economic Journal: Macroeconomics*, July 2016, *8* (3), 230–66.
- Raddatz, Claudio and Sergio L. Schmukler**, “On the international transmission of shocks: Micro-evidence from mutual fund portfolios,” *Journal of International Economics*, 2012, *88* (2), 357–374.
- Reinhart, Carmen M.**, “This Time is Different Chartbook: Country Histories on Debt, Default, and Financial Crises,” NBER Working Papers 15815, National Bureau of Economic Research, Inc Mar 2010.
- Sanchez, Juan M., Horacio Sapriza, and Emircan Yurdagul**, “Sovereign default and maturity choice,” *Journal of Monetary Economics*, 2018, *95* (C), 72–85.
- Tille, Cedric and Eric van Wincoop**, “International capital flows,” *Journal of International Economics*, March 2010, *80* (2), 157–175.

Tables and Figures

Figure 1. Risk Neutral Default Probabilities

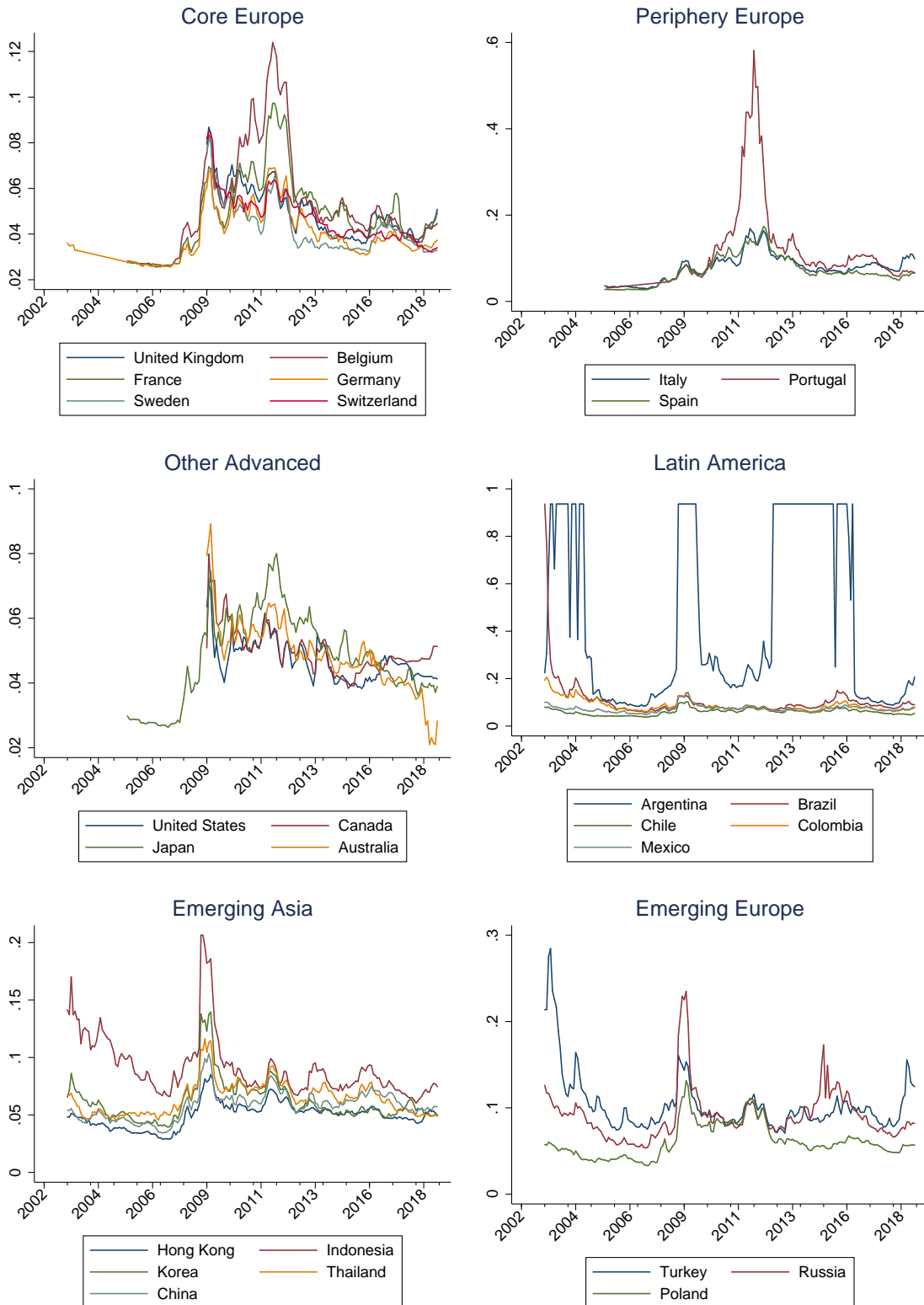
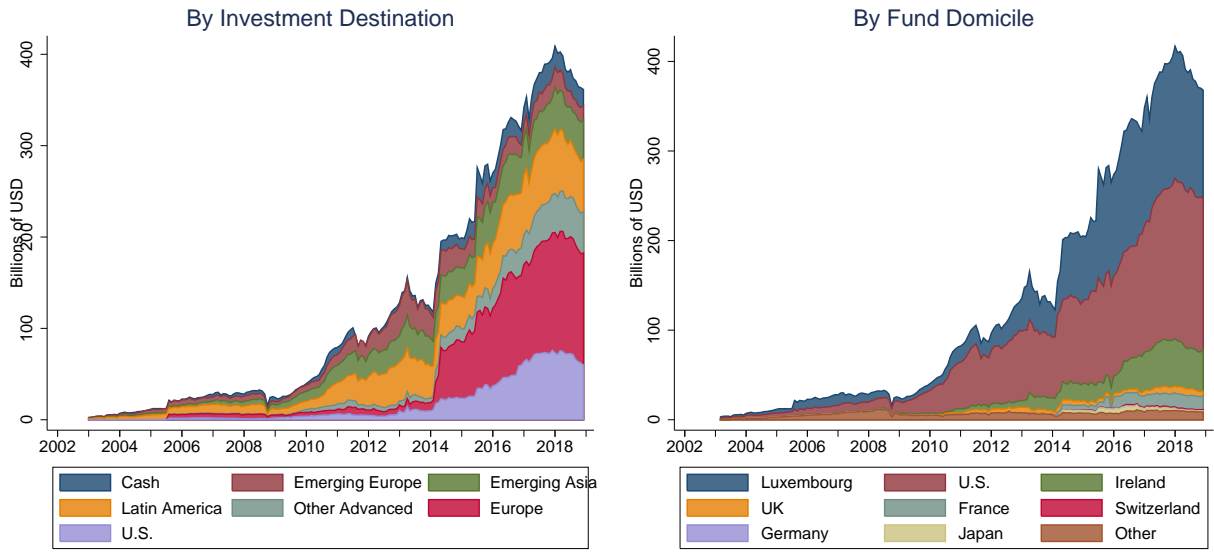


Figure 2. Assets of International Bond Funds



Source: EPFR, authors' calculations

Table 1. Summary Statistics, Sovereign Default Probabilities

	Mean	Median	Min	Max	St.Dev.	N
Argentina	0.437	0.237	0.083	0.936	0.367	192
Australia	0.049	0.048	0.021	0.089	0.011	120
Belgium	0.053	0.047	0.026	0.124	0.023	161
Brazil	0.106	0.086	0.057	0.936	0.087	192
Canada	0.050	0.048	0.038	0.080	0.007	120
Switzerland	0.047	0.045	0.032	0.085	0.011	120
Chile	0.060	0.061	0.038	0.103	0.013	192
China, P.R.: Mainland	0.058	0.058	0.034	0.103	0.013	192
Colombia	0.088	0.079	0.059	0.206	0.026	192
Germany	0.040	0.037	0.026	0.069	0.011	167
Spain	0.073	0.065	0.027	0.174	0.034	161
France	0.049	0.046	0.026	0.097	0.017	161
United Kingdom	0.050	0.047	0.036	0.087	0.011	120
China, P.R.: Hong Kong	0.050	0.051	0.029	0.085	0.011	192
Indonesia	0.091	0.084	0.060	0.206	0.027	192
Italy	0.078	0.078	0.030	0.169	0.031	161
Japan	0.048	0.048	0.026	0.080	0.013	161
Korea, Republic of	0.062	0.056	0.039	0.140	0.018	192
Mexico	0.073	0.072	0.048	0.140	0.015	192
Poland	0.061	0.057	0.033	0.132	0.020	192
Portugal	0.129	0.092	0.031	0.581	0.104	128
Russian Federation	0.091	0.084	0.054	0.235	0.030	192
Sweden	0.043	0.039	0.032	0.082	0.011	120
Thailand	0.064	0.063	0.045	0.116	0.014	192
Turkey	0.104	0.095	0.071	0.285	0.034	192
United States	0.047	0.046	0.038	0.071	0.006	120
South Africa	0.084	0.084	0.044	0.151	0.020	192

Note: This table reports the summary statistics for the sovereign default probabilities extracted from CDS prices using the method detailed in [Longstaff et al. \(2011\)](#).

Table 2. Mutual Fund Sample by Fund Mandate

	Number of Funds	Assets (USD billion)
Total	460	412.3
<u>o/w Reporting sectoral mandate</u>	223	166.2
Sovereign	114	64.4
Investment grade corporate	56	48.2
High yield corporate	53	53.7
<u>o/w Emerging market funds</u>	205	102.9
Hard currency	105	40.8
Local currency	62	49.1
Blend currency	38	13.0

This table presents descriptive statistics for the mandate of mutual funds. The first column reports the number of funds in each category. The second column reports the average value (in billions of USD) of the the assets under management for each category of funds.

Table 3. Portfolio Weights and Sovereign Risk

	(1)	(2)	(3)	(4)
ω_{ijt-1}	0.882*** (0.00620)	0.882*** (0.00620)	0.877*** (0.00733)	0.882*** (0.00620)
$r_{jt} - r_{it}$	0.576*** (0.0534)	0.578*** (0.0534)	0.297*** (0.0730)	0.578*** (0.0534)
$\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}$	-0.0501*** (0.00612)	-0.0531*** (0.00646)	-0.105*** (0.0197)	-0.0548*** (0.00625)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Developed}$		0.0149 (0.00975)		
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Core Developed}$			0.0590*** (0.0194)	0.0310*** (0.00939)
<i>N</i>	166227	166227	56658	166227
Fund-Country FE	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes
Sample	Full	Full	DM only	Full
R ²	0.967	0.967	0.974	0.967

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1} is the log of the lagged portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is the difference between country's j sovereign default risk and the average sovereign risk in other countries in the portfolio. Sovereign risk is defined as the probability of a credit event in the next five years. Interaction terms capture heterogenous responses. Dummy variables "Developed" and "Core Developed" are defined in Section 4.1. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 4. Portfolio Weights, Sovereign Risk, and Country Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ω_{ijt-1}	0.881*** (0.00620)	0.882*** (0.00620)	0.875*** (0.00745)	0.876*** (0.00709)	0.877*** (0.00687)	0.882*** (0.00621)	0.853*** (0.00802)	0.880*** (0.00658)	0.867*** (0.00858)
$r_{jt} - r_{it}$	0.581*** (0.0537)	0.577*** (0.0533)	0.547*** (0.0534)	0.602*** (0.0571)	0.620*** (0.0563)	0.577*** (0.0533)	0.547*** (0.0519)	0.596*** (0.0540)	0.546*** (0.0543)
$\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}$	-0.0313*** (0.00725)	-0.0510*** (0.00687)	-0.0443*** (0.00740)	-0.0402*** (0.00695)	-0.0597*** (0.00671)	-0.0510*** (0.00625)	-0.0423*** (0.00697)	-0.0535*** (0.00760)	-0.0506*** (0.0141)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Risk}$	-0.0263*** (0.00693)								-0.0272** (0.0120)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Debt}$		0.00385 (0.00745)							-0.0384** (0.0158)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Fin Dev}$			0.0179** (0.00825)						0.0227** (0.0101)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High FX Debt}$				-0.0189** (0.00754)					0.00345 (0.0138)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High ST Debt}$					0.0148*** (0.00560)				-0.00999 (0.00876)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Own Country}$						0.0665** (0.0304)			-0.0285 (0.0361)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Large Weight}$							0.0180** (0.00825)		0.0594*** (0.0171)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Bid-Ask Spread}$								0.000719 (0.00545)	0.00317 (0.00508)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Core DM}$									0.0453** (0.0202)
<i>N</i>	163235	166227	136170	136314	148016	166227	166227	152921	108200
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Full	Full	Full
R ²	0.967	0.967	0.968	0.966	0.967	0.967	0.968	0.966	0.967

34

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1} is the log of the lagged portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is the difference between country's j sovereign default risk and the average sovereign risk in other countries in the portfolio. Sovereign risk is defined as the probability of a credit event in the next five years. Interaction terms capture heterogenous responses. Dummy variables "High Risk", "High Debt", "High Fin Development", "High FX Debt", "High ST Debt", "Own Country Debt", "Large Weight", "High Bid-Ask Spread", and "Core DM" are defined in Section 4.1. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5. Portfolio Weights, Sovereign Risk, and Fund Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ω_{ijt-1}	0.8822*** (0.0062)	0.8822*** (0.0062)	0.8821*** (0.0062)	0.8820*** (0.0062)	0.8857*** (0.0085)	0.8818*** (0.0062)	0.8819*** (0.0062)
$r_{jt} - r_{it}$	0.5581*** (0.0536)	0.5766*** (0.0534)	0.5712*** (0.0533)	0.5786*** (0.0535)	0.7596*** (0.0751)	0.5745*** (0.0533)	0.5749*** (0.0534)
$\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}$	-0.0513*** (0.0062)	-0.0506*** (0.0061)	0.0035 (0.0252)	-0.0392*** (0.0114)	-0.0708*** (0.0082)	-0.0568*** (0.0058)	-0.0420*** (0.0064)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Lagged Performance}$	0.0027*** (0.0009)						
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Assets}$		0.0004 (0.0007)					
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Log VIX}$			-0.0188** (0.0079)				
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{EM Fund}$				-0.0170 (0.0121)			
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Hard Cur. (EM only)}$					0.0222** (0.0099)		
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Dedicated Corporate Fund}$						0.0305** (0.0133)	
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Bank-affiliated Fund}$							-0.0325*** (0.0112)
N	163853	166227	166227	166227	87048	166227	166227
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.9672	0.9670	0.9670	0.9670	0.9505	0.9670	0.9670

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1} is the log of the lagged portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is the difference between country's j sovereign default risk and the average sovereign risk in other countries in the portfolio. Sovereign risk is defined as the probability of a credit event in the next five years. Interaction terms capture heterogeneous responses. Variables "Lagged Performance", "Assets", "Log VIX", "EM Fund", "Hard Cur. (EM only)", "Dedicated Corporate Fund", and "Bank-affiliated Fund" are defined in Section 4.2. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 6. Regional Spillovers

	(1)	(2)	(3)	(4)	(5)	(6)
ω_{ijt-1}	0.882*** (0.00629)	0.872*** (0.0130)	0.888*** (0.0130)	0.882*** (0.00872)	0.875*** (0.00813)	0.856*** (0.0120)
$r_{jt} - r_{it}$	0.576*** (0.0542)	0.823*** (0.152)	0.809*** (0.0967)	0.612*** (0.125)	0.235*** (0.0858)	0.252 (0.208)
λ_{jt}	-0.0535*** (0.00627)	-0.0628*** (0.0169)	-0.0631*** (0.0102)	-0.00235 (0.0502)	-0.0406** (0.0177)	-0.0687 (0.0433)
$\bar{\lambda}_{i,k \neq j,t}$	0.0471*** (0.00747)					
$\bar{\lambda}_{it \in EMEs}$		-0.00815 (0.0133)				
$\bar{\lambda}_{it \notin EMEs}$		0.0122*** (0.00429)				
$\bar{\lambda}_{it \in Lat_Am}$			-0.0140** (0.00677)			
$\bar{\lambda}_{it \notin Lat_Am}$			0.0582*** (0.0125)			
$\bar{\lambda}_{it \in EM_Asia}$				-0.0275 (0.0426)		
$\bar{\lambda}_{it \notin EM_Asia}$				0.00760 (0.0108)		
$\bar{\lambda}_{it \in Core_DMs}$					0.0107 (0.0211)	
$\bar{\lambda}_{it \notin Core_DMs}$					0.0260*** (0.00555)	
$\lambda_{it \in Euro_Periphery}$						0.0492 (0.0545)
$\bar{\lambda}_{it \notin Euro_Periphery}$						0.0795** (0.0366)
N	166317	33956	42005	23019	41014	12459
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.967	0.961	0.959	0.970	0.974	0.976

This table presents the results of ordinary least square regressions at the monthly frequency of log cash weights on different variables. ω_{ijt-1} is the log of the lagged cash weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. λ_{jt} measures sovereign default risk in country j , where sovereign risk is the probability of a credit event in the next five years. The variable $\bar{\lambda}_{i,k \neq j,t}$ is the average sovereign risk in the other countries in the portfolio. $\bar{\lambda}_{it \in EMEs}$ is the weighted mean default risk in EMEs countries that have a positive weigh in fund i 's portofflio. $\bar{\lambda}_{it \notin EMEs}$ is the weighted mean default risk in non-EMEs countries that have a positive weight in fund i 's portfolio. $\bar{\lambda}_{it \in Lat_Am}$, $\bar{\lambda}_{it \notin Lat_Am}$, $\bar{\lambda}_{it \in EM_Asia}$, $\bar{\lambda}_{it \notin EM_Asia}$, $\bar{\lambda}_{it \in Core_DMs}$, $\bar{\lambda}_{it \notin Core_DMs}$, $\bar{\lambda}_{it \in Euro_Periphery}$, and $\bar{\lambda}_{it \notin Euro_Periphery}$ are similarly defined.

Table 7. Cross-country Spillovers and Country Fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ω_{ijt-1}	0.881*** (0.00620)	0.882*** (0.00621)	0.875*** (0.00746)	0.876*** (0.00712)	0.876*** (0.00688)	0.882*** (0.00621)	0.853*** (0.00802)
$r_{jt} - r_{it}$	0.579*** (0.0538)	0.575*** (0.0535)	0.545*** (0.0532)	0.597*** (0.0572)	0.620*** (0.0562)	0.577*** (0.0534)	0.547*** (0.0519)
λ_{ijt}	-0.0553*** (0.00637)	-0.0517*** (0.00621)	-0.0399*** (0.0102)	-0.0553*** (0.00676)	-0.0566*** (0.00650)	-0.0537*** (0.00619)	-0.0420*** (0.00629)
$\bar{\lambda}_{i,k \neq j,t}$	0.0361*** (0.00687)	0.0565*** (0.00863)	0.0429*** (0.00806)	0.0389*** (0.00685)	0.0508*** (0.00697)	0.0484*** (0.00768)	0.0448*** (0.00965)
$\bar{\lambda}_{i,k \neq j,t} \times \text{High Risk}$	0.0206*** (0.00663)						
$\bar{\lambda}_{i,k \neq j,t} \times \text{High Debt}$		-0.0237*** (0.00836)					
$\bar{\lambda}_{i,k \neq j,t} \times \text{High Fin Dev}$			-0.0161** (0.00792)				
$\bar{\lambda}_{i,k \neq j,t} \times \text{High FX Debt}$				0.0273*** (0.00915)			
$\bar{\lambda}_{i,k \neq j,t} \times \text{High ST Debt}$					-0.00777 (0.00579)		
$\bar{\lambda}_{i,k \neq j,t} \times \text{Own Country}$						-0.0657* (0.0347)	
$\bar{\lambda}_{i,k \neq j,t} \times \text{Large Weight}$							-0.0268*** (0.00989)
N	163235	166227	136170	136314	148016	166227	166227
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Full
R^2	0.967	0.967	0.968	0.966	0.967	0.967	0.968

This table presents the results of ordinary least square regressions at the monthly frequency of log cash weights on different variables. ω_{ijt-1} is the log of the lagged cash weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. λ_{jt} measures sovereign default risk in country j , where sovereign risk is the probability of a credit event in the next five years. The variable $\bar{\lambda}_{i,k \neq j,t}$ is the average sovereign risk in the other countries in the portfolio. Interaction terms capture heterogenous responses. Dummy variables “High Risk”, “High Debt”, “High Fin Development”, “High FX Debt”, “High ST Debt”, “Own Country Debt”, and “Large Weight” are defined in Section 4.1. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Appendix

Table A1. Data Sources

Variable	Source	Frequency
Mutual fund portfolio shares	EPFR	Month-end
CDS spreads	IHS Markit	Monthly average
Bond yields	JPMorgan	Monthly average
Debt to GDP ratio	IMF-IFS	Annual, interpolated to monthly
Private Credit to GDP ratio	IMF-IFS	Quarterly, interpolated to monthly
Short-term debt share	WB-QEDS	Quarterly, interpolated to monthly
CDS market bid-ask spreads	Bloomberg	Monthly average
Forecast GDP growth one year ahead	Consensus Economics	Monthly
Forecast Inflation one year ahead	Consensus Economics	Monthly
Forecast Fiscal Balance one year ahead	Consensus Economics	Monthly

Table A2. Summary Statistics, Portfolio Shares, Global Funds

	Mean	Median	Min	Max	St.Dev.	N
Argentina	0.447	0.000	0.000	13.130	1.224	6,560
Australia	1.824	0.806	-4.921	23.300	2.404	6,560
Belgium	1.081	0.410	0.000	13.737	1.583	6,560
Brazil	1.570	0.000	0.000	21.381	3.230	6,560
Canada	2.780	2.022	-0.975	33.300	3.250	6,560
Cash	4.544	2.372	-43.489	58.020	8.978	6,560
Switzerland	1.445	0.409	0.000	72.450	5.630	6,560
Chile	0.150	0.000	-0.340	4.358	0.440	6,560
China, P.R.: Mainland	0.406	0.000	0.000	11.709	1.136	6,560
Colombia	0.275	0.000	0.000	6.240	0.880	6,560
Germany	5.080	3.816	-13.195	52.824	5.372	6,560
Spain	2.239	1.556	0.000	22.940	2.610	6,560
France	4.483	3.710	0.000	22.810	4.049	6,560
United Kingdom	7.400	6.333	0.000	73.100	7.595	6,560
China, P.R.: Hong Kong	0.140	0.000	0.000	5.000	0.424	6,560
Indonesia	1.044	0.000	0.000	12.570	2.377	6,560
Italy	3.877	2.570	0.000	35.313	4.326	6,560
Japan	5.749	0.540	-0.300	39.884	8.859	6,560
Korea, Republic of	1.689	0.000	0.000	19.870	3.840	6,560
Mexico	2.189	0.800	-11.500	24.874	3.679	6,560
Poland	1.029	0.000	0.000	25.900	2.241	6,560
Portugal	0.383	0.000	0.000	7.259	0.862	6,560
Russian Federation	0.575	0.000	0.000	14.392	1.569	6,560
Sweden	1.236	0.620	0.000	13.530	1.748	6,560
Thailand	0.121	0.000	0.000	7.958	0.588	6,560
Turkey	0.212	0.000	-0.260	12.180	0.682	6,560
United States	34.408	33.126	-0.520	98.900	23.843	6,560
South Africa	0.443	0.000	0.000	10.000	0.956	6,560

Table A3. Summary Statistics, Portfolio Shares, Global Emerging Market Funds

	Mean	Median	Min	Max	St.Dev.	N
Argentina	3.047	2.130	0.000	39.360	3.944	10,528
Australia	0.007	0.000	0.000	3.750	0.095	10,334
Brazil	11.413	10.099	-0.640	73.000	6.953	10,528
Canada	0.028	0.000	0.000	2.892	0.192	10,334
Cash	2.472	3.245	-56.180	61.120	10.218	10,528
Switzerland	0.007	0.000	0.000	3.450	0.117	10,334
Chile	1.383	0.815	-0.190	16.860	1.928	10,528
China, P.R.: Mainland	2.057	0.000	-0.100	28.831	3.714	10,528
Colombia	3.847	3.586	0.000	17.219	2.585	10,528
Germany	0.004	0.000	-6.139	3.255	0.185	10,528
Spain	0.012	0.000	0.000	4.181	0.147	10,334
France	0.002	0.000	0.000	1.701	0.039	10,334
United Kingdom	0.031	0.000	-0.001	8.592	0.208	10,334
China, P.R.: Hong Kong	0.425	0.000	0.000	13.445	1.359	10,528
Indonesia	5.709	5.430	0.000	21.000	3.589	10,528
Italy	0.021	0.000	0.000	9.930	0.313	10,334
Japan	0.000	0.000	0.000	0.773	0.014	10,334
Korea, Republic of	0.948	0.000	-3.670	22.478	2.437	10,528
Mexico	9.642	9.556	0.000	33.805	4.591	10,528
Poland	2.988	1.200	-0.040	25.630	3.953	10,528
Portugal	0.013	0.000	0.000	2.029	0.105	10,334
Russian Federation	8.500	7.687	0.000	31.600	5.657	10,528
Sweden	0.007	0.000	0.000	1.852	0.072	10,334
Thailand	1.445	0.000	0.000	13.800	2.435	10,528
Turkey	5.999	5.600	0.000	25.700	3.697	10,528
United States	0.040	0.000	-0.571	18.573	0.440	10,334
South Africa	3.955	2.627	0.000	30.920	3.970	10,528

Table A4. Summary Statistics, Portfolio Shares, Latin America Funds

	Mean	Median	Min	Max	St.Dev.	N
Argentina	5.586	2.060	0.000	40.200	8.530	794
Brazil	21.090	19.950	0.000	62.300	16.230	794
Cash	5.876	5.100	-24.937	38.006	7.678	794
Chile	2.961	0.692	0.000	13.462	3.737	794
Colombia	7.177	6.785	0.000	24.220	4.192	794
Germany	0.000	0.000	-0.000	0.013	0.000	794
Mexico	18.311	17.695	1.370	45.380	9.612	794
Poland	0.029	0.000	0.000	12.342	0.572	794
Turkey	0.026	0.000	0.000	10.650	0.510	794
United States	0.032	0.000	0.000	10.203	0.513	777
South Africa	0.006	0.000	0.000	4.420	0.157	794

Table A5. Summary Statistics, Portfolio Shares, Emerging Asia Funds

	Mean	Median	Min	Max	St.Dev.	N
Argentina	0.017	0.000	0.000	4.888	0.199	1,816
Australia	0.697	0.000	0.000	17.240	1.838	1,784
Canada	0.049	0.000	0.000	2.342	0.232	1,784
Cash	4.347	2.300	-15.720	42.840	5.940	1,816
Switzerland	0.015	0.000	0.000	5.975	0.231	1,784
Chile	0.000	0.000	0.000	0.389	0.013	1,816
China, P.R.: Mainland	18.027	12.615	0.000	77.826	18.071	1,816
Germany	0.035	0.000	0.000	12.400	0.575	1,816
France	0.017	0.000	0.000	2.344	0.177	1,784
United Kingdom	0.149	0.000	0.000	4.872	0.590	1,784
China, P.R.: Hong Kong	7.320	6.000	0.000	27.500	6.664	1,816
Indonesia	12.260	11.549	0.000	37.410	6.508	1,816
Japan	0.098	0.000	0.000	4.469	0.463	1,784
Korea, Republic of	13.403	12.895	0.000	43.699	9.483	1,816
Mexico	0.011	0.000	0.000	1.577	0.086	1,816
Russian Federation	0.007	0.000	0.000	2.509	0.115	1,816
Sweden	0.007	0.000	0.000	1.464	0.094	1,784
Thailand	6.420	5.535	0.000	25.430	5.478	1,816
Turkey	0.001	0.000	0.000	1.262	0.032	1,816
United States	0.000	0.000	-8.641	7.524	0.337	1,784
South Africa	0.001	0.000	0.000	0.139	0.008	1,816

Table A6. Summary Statistics, Portfolio Shares, Emerging Europe Funds

	Mean	Median	Min	Max	St.Dev.	N
Belgium	0.016	0.000	0.000	6.900	0.332	431
Cash	4.249	2.980	-7.720	31.080	4.429	445
Germany	0.002	0.000	0.000	0.960	0.046	445
Poland	30.064	28.280	8.720	66.100	9.943	445
Russian Federation	8.084	5.330	0.000	35.231	8.696	445
Turkey	12.266	8.300	0.000	33.875	10.275	445

Table A7. Country Characteristics and Sensitivity to Default Risk: Continuous Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ω_{ijt-1}	0.882*** (0.00618)	0.874*** (0.00798)	0.880*** (0.00674)	0.879*** (0.00675)	0.881*** (0.00626)	0.876*** (0.00806)	0.880*** (0.00658)	0.865*** (0.0124)
$r_{jt} - r_{it}$	0.578*** (0.0536)	0.560*** (0.0728)	0.500*** (0.0510)	0.577*** (0.0548)	0.585*** (0.0540)	0.577*** (0.0534)	0.595*** (0.0540)	0.566*** (0.0595)
$\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}$	-0.0481*** (0.00768)	-0.0421*** (0.0132)	-0.0500*** (0.00923)	-0.0563*** (0.00837)	-0.0565*** (0.00674)	-0.0526*** (0.00724)	-0.0530*** (0.00722)	-0.0183 (0.0202)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \lambda_{jt}$	-0.0427 (0.0359)							-0.765** (0.325)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Debt (\%GDP)}$		0.0000531 (0.000157)						0.000105 (0.000291)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Financial Development}$			0.00336** (0.00164)					0.00169 (0.00258)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{FX Debt Share}$				0.00912 (0.0133)				0.0399 (0.0497)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{ST Debt Share}$					0.0440 (0.0274)			0.00724 (0.0575)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \omega_{ijt-1}$						0.000580** (0.000285)		-0.0000862 (0.000499)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Bid-Ask Spread}$							0.0000775 (0.0000955)	-0.000342 (0.00155)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Core DM}$								0.00883 (0.0190)
<i>N</i>	166227	76326	147004	147917	160364	166227	152921	58291
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Full	Full
R ²	0.967	0.965	0.968	0.966	0.967	0.967	0.966	0.965

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1} is the log of the lagged portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is the difference between country's j sovereign default risk and the average sovereign risk in other countries in the portfolio. Sovereign risk is the probability of a credit event in the next five years. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is also interacted with a set of variables capturing country characteristics: default risk, debt-to-GDP ratio, financial development—defined as the private credit-to-GDP ratio—, the foreign currency share of government debt, the short-term share of government debt, lagged portfolio weights, the bid-ask spread, and a dummy for advanced core economies. Estimations include fixed effects. Standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table A8. Active Portfolio Weights

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ω_{ijt-1}^{act}	0.759*** (0.0139)	0.755*** (0.0143)	0.758*** (0.0139)	0.740*** (0.0158)	0.755*** (0.0149)	0.747*** (0.0154)	0.759*** (0.0139)	0.725*** (0.0158)	0.760*** (0.0134)	0.732*** (0.0157)
$r_{ijt} - r_{it}$	-0.436*** (0.0697)	-0.435*** (0.0704)	-0.425*** (0.0692)	-0.399*** (0.0736)	-0.424*** (0.0743)	-0.395*** (0.0697)	-0.435*** (0.0695)	-0.447*** (0.0669)	-0.413*** (0.0705)	-0.419*** (0.0787)
$\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}$	-0.0685*** (0.00910)	-0.0552*** (0.0115)	-0.0729*** (0.0110)	-0.0605*** (0.0130)	-0.0513*** (0.0123)	-0.0934*** (0.0122)	-0.0705*** (0.00944)	-0.0629*** (0.00925)	-0.0765*** (0.00916)	-0.0697** (0.0338)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Risk}$		-0.0222 (0.0142)								-0.0280 (0.0181)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Debt}$			0.0203 (0.0186)							-0.0537 (0.0361)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Fin Dev}$				0.0201 (0.0174)						0.0332* (0.0193)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High FX Debt}$					-0.0287* (0.0165)					-0.0108 (0.0286)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High ST Debt}$						0.0406*** (0.0105)				-0.000655 (0.0143)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Own Country}$							0.0958* (0.0501)			-0.0515 (0.0466)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Large Weight}$								0.0483*** (0.0142)		0.112*** (0.0278)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Bid-Ask}$									0.00233 (0.00841)	-0.00541 (0.00731)
$(\lambda_{ijt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Core DM}$										0.0259 (0.0413)
N	120805	118536	120805	100180	99620	107526	120805	120805	110728	80559
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
R ²	0.955	0.955	0.955	0.956	0.957	0.956	0.955	0.957	0.955	0.958

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1}^{act} is the log of the lagged active portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is the difference between country's j sovereign default risk and the average sovereign risk in other countries in the portfolio. Sovereign risk is the probability of a credit event in the next five years. Interaction terms capture heterogenous responses. Dummy variables "High Risk", "High Debt", "High Fin Development", "High FX Debt", "High ST Debt", "Own Country Debt", "Large Weight", "High Bid-Ask Spread", and "Core DM" are defined in Section 4.1. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table A9. Additional Regressors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ω_{ijt-1}	0.874*** (0.00751)	0.874*** (0.00752)	0.874*** (0.00751)	0.869*** (0.00870)	0.871*** (0.00842)	0.870*** (0.00807)	0.874*** (0.00752)	0.847*** (0.00927)	0.872*** (0.00786)
$r_{ijt} - r_{it}$	0.559*** (0.0575)	0.559*** (0.0576)	0.560*** (0.0575)	0.511*** (0.0530)	0.592*** (0.0619)	0.600*** (0.0599)	0.560*** (0.0574)	0.525*** (0.0563)	0.584*** (0.0575)
$\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}$	-0.0559*** (0.00663)	-0.0387*** (0.00861)	-0.0567*** (0.00741)	-0.0572*** (0.00830)	-0.0445*** (0.00770)	-0.0675*** (0.00800)	-0.0571*** (0.00684)	-0.0507*** (0.00742)	-0.0599*** (0.00792)
GDP Forecast	0.00167 (0.00103)	0.00152 (0.00104)	0.00178* (0.00102)	-0.00167 (0.00109)	0.00229* (0.00117)	0.00174 (0.00113)	0.00163 (0.00103)	-0.0000240 (0.000915)	0.00211** (0.00104)
Inflation Forecast	0.00292*** (0.000529)	0.00286*** (0.000532)	0.00304*** (0.000568)	-0.000249 (0.00117)	0.00262*** (0.000600)	0.00282*** (0.000577)	0.00290*** (0.000529)	0.00315*** (0.000571)	0.00296*** (0.000539)
Fiscal Surplus Forecast	-0.0625 (0.0924)	-0.0445 (0.0911)	-0.0671 (0.0929)	-0.0763 (0.123)	-0.00877 (0.0972)	-0.104 (0.0952)	-0.0641 (0.0921)	0.0519 (0.0827)	-0.0615 (0.0927)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Risk}$		-0.0224** (0.00874)							
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Debt}$			0.00446 (0.00946)						
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Low Fin Dev}$				0.0195** (0.00930)					
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High FX Debt Sh}$					-0.0172* (0.00980)				
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High ST Debt Sh}$						0.0194*** (0.00631)			
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Own Country}$							0.0727** (0.0317)		
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{Large Wgt}$								0.0236** (0.00949)	
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t}) \times \text{High Bid-Ask Spread}$									0.00453 (0.00586)
N	131399	131399	131399	111418	111826	121459	131399	131399	121489
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.969	0.969	0.969	0.970	0.968	0.969	0.969	0.970	0.968

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1} is the log of the lagged portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})$ is the difference between country's j sovereign default risk and the average sovereign risk in other countries in the portfolio. Sovereign risk is the probability of a credit event in the next five years. GDP, inflation, and fiscal surplus next year forecasts are taken from Consensus. Interaction terms capture heterogenous responses. Dummy variables "High Risk", "High Debt", "High Fin Development", "High FX Debt", "High ST Debt", "Own Country Debt", "Large Weight", "High Bid-Ask Spread", and "Core DM" are defined in Section 4.1. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table A10. Orthogonalized Default Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ω_{ijt-1}	0.882*** (0.00620)	0.881*** (0.00620)	0.882*** (0.00620)	0.875*** (0.00745)	0.876*** (0.00710)	0.877*** (0.00687)	0.882*** (0.00621)	0.853*** (0.00803)	0.880*** (0.00659)	0.868*** (0.00859)
$r_{jt} - r_{it}$	0.529*** (0.0544)	0.535*** (0.0546)	0.531*** (0.0543)	0.512*** (0.0555)	0.555*** (0.0579)	0.572*** (0.0573)	0.530*** (0.0543)	0.514*** (0.0530)	0.547*** (0.0552)	0.506*** (0.0558)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth}$	-0.0501*** (0.00612)	-0.0306*** (0.00720)	-0.0511*** (0.00688)	-0.0439*** (0.00737)	-0.0388*** (0.00679)	-0.0595*** (0.00668)	-0.0510*** (0.00625)	-0.0427*** (0.00697)	-0.0531*** (0.00752)	-0.0396*** (0.0135)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{High Risk}$		-0.0273*** (0.00699)								-0.0225* (0.0115)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{High Debt}$			0.00437 (0.00743)							-0.0271* (0.0155)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{High Fin Dev}$				0.0166** (0.00830)						0.0194** (0.00958)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{High FX Debt}$					-0.0210*** (0.00747)					-0.00186 (0.0144)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{High ST Debt}$						0.0144** (0.00562)				-0.000964 (0.00887)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{Own Country}$							0.0696** (0.0308)			0.00736 (0.0346)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{Large Weight}$								0.0196** (0.00820)		-0.00508 (0.0176)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{High Bid-Ask Spread}$									0.0000992 (0.00546)	0.00431 (0.00510)
$(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth} \times \text{Core DM}$										0.0391* (0.0203)
N	166227	163235	166227	136170	136314	148016	166227	166227	152921	108200
Fund-Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
R^2	0.967	0.967	0.967	0.968	0.966	0.967	0.967	0.968	0.966	0.967

This table presents the results of ordinary least square regressions at the monthly frequency of log portfolio weights on different variables. ω_{ijt-1} is the log of the lagged portfolio weights. $(r_{jt} - r_{it})$ is the difference between country net returns and fund net returns. $(\lambda_{jt} - \bar{\lambda}_{i,k \neq j,t})^{Orth}$ is the difference between country's j orthogonalized sovereign default risk and the average orthogonalized sovereign risk in other countries in the portfolio. Sovereign risk is the probability of a credit event in the next five years. Interaction terms capture heterogenous responses. Dummy variables "High Risk", "High Debt", "High Fin Development", "High FX Debt", "High ST Debt", "Own Country Debt", "Large Weight", "High Bid-Ask Spread", and "Core DM" are defined in Section 4.1. Estimations include a combination of fixed effects. Standard errors are in parentheses and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.