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ABSTRACT

We hypothesize that nonlinearities can arise in international investment factors because of a pecking order in barriers. When direct barriers are severe, improvements in governance factors such as rule of law and expropriation risk can increase investment. Only when severe barriers are ameliorated can factors such as firm-specific information, transaction costs and hedging motives become more important. Evidence from unconditional quantile regressions indicate that investment factors vary across the distribution and also provide support for a pecking order hypothesis. Specifically, while access to basic information is important everywhere, governance and familiarity matter where barriers are high, roles for information and hedging motives become more apparent where barriers are moderate, and where there are no barriers small improvements in governance have little effect on investment. Considering all of our results, support is broadest for roles for familiarity and (where barriers are severe) governance, also evident for information and hedging motives, and more limited for transaction costs. Our results can also help reconcile a number of findings in the literature by highlighting that datasets which focus on different points of the barriers (investment) distribution can naturally lead to different results. Going forward, as the literature focuses on specialized datasets and granularity / asset demand systems, analysis should incorporate nonlinearities inherent in cross-border barriers and investment.

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1. Introduction

There is growing recognition of nonlinearities in factors that drive cross-border investment. Nonlinearities naturally arise in models of information acquisition (van Nieuwerburgh and Veldkamp, 2009; De Marco, Macchiavelli and Valchev, 2022). These nonlinearities suggest that in the quest to understand what drives international investment, some theories that hold for very low level of investment – which makes up a material portion of the distribution of investment – should not hold when investment is already very high.

However, even as the importance of nonlinearities is becoming more apparent, much of the existing empirical work on international portfolio investment is through a decidedly linear lens.[1] For example, many studies show that investors exhibit *on average* substantial home bias in their tendency to invest abroad (see, among many others, French and Poterba, 1991; Lewis, 1999; Karolyi and Stulz, 2003; Ahearne et al., 2004; Chan et al., 2005; Bekaert and Wang, 2009), and that *on average* different factors can help us understand this.

The underlying investment data support a focus on nonlinearities. The distribution of annual relative investment weights – the weight of the destination market in the investor country's portfolio relative to the destination's weight in the world portfolio – is very positively skewed and has large tails (Figure 1).[2] Relative investment weight's mean value of 0.33 – average bilateral investment at just 33% of the destination's weight in the world portfolio – provides little information about the distribution. As Figure 1 shows, roughly one-third of the observations are "outliers"; the most frequent investment is zero (the tall red bar), but some countries (the short green bars) invest much more than the world CAPM benchmark of 1, the point at which the

[1] The literature's new focus on asset demand systems (e.g., Koijen and Yogo 2020) is also through a linear lens, as instruments are constructed in a non-linear way but the estimated demand curves tend to be log linear. The portfolio literature focused on *returns* has incorporated nonlinearities (e.g., Christoffersen et al. (2012)).
[2] More details on our underlying relative weight measure are in Section 3.1.

proportion of investor country holdings in the investment destination country equals the destination country weight in the world market portfolio. Focusing on the average of such a distribution delivers an incomplete view of the determinants of cross-border investment.

This paper estimates how nonlinearities matter in the context of international investment. We propose that nonlinearities arise from a pecking order of barriers that limit cross-border investment, a framing that helps shed light on where (and why) different investment theories hold across the distribution. The pecking order view recognizes that direct barriers can render other barriers immaterial. For example, if no investment is allowed between two countries, alleviating information costs should not impact investment levels. As direct barriers are reduced, barriers such as lack of familiarity, information costs and other governance issues might come into play. That is, the pecking order view recognizes that the effects of a particular barrier are unlikely to be linear across the distribution.[3]

A complication is that, as Bekaert and Harvey (2003, pg. 8) note, barriers while important are not well measured: "[o]nce we leave the pristine world of theory, it soon becomes clear that the degree of market integration is very difficult to measure." Measures of explicit *de jure* restrictions exist, but none adequately capture the intensity of restrictions; even the best (e.g., Fernández et al., 2016) rely on aggregating binary indicators of whether restrictions exist, not how restrictive the measures might be. Moreover, no measure captures indirect barriers to cross-border investment, nor does any measure capture the bilateral nature of restrictions (if, for example, restrictions vary across country pairs).

We work around the fact that many investment barriers are unobservable, or at least not well measured, by recognizing that barriers can be inferred through other observable relationships.

[3] Even if the reader does not find the pecking order hypothesis informative, that there might be substantial nonlinearities in factors' effects on international investment seems undeniable.

For example, Bekaert and Harvey (1995) measure the degree of integration using equity return data. Bekaert et al. (2002) note that market integration is an all-encompassing event that should change the return-generating process and examine "breaks" in data to infer when changes in restrictions occurred. Bekaert et al. (2011) propose a valuation-based measure of world equity market segmentation.

In our setting, we posit that realized investment levels are reflective of the intensity of bilateral investment restrictions. Specifically, throughout this paper we posit the following: Country pairs for which bilateral investment is zero or near zero likely have severe (possibly unobservable) bilateral investment restrictions, whereas country pairs with exceedingly high bilateral investment have no bilateral restrictions.

While barriers are not easily measured, many reasonable measures of barriers—some direct, others proxies—have been shown to impact cross-border investment.[4] These barriers range from legal restrictions that bar foreign investment, such as capital controls, to indirect barriers such as lack of information and lack of familiarity. And between direct and indirect barriers, perhaps along a continuum, are a host of other barriers such as transaction costs, governance issues/expropriation risk, and exchange rate risk / volatility. Nonlinearities can arise as the returns to mitigating barriers evolve across the distribution. The pecking order hypothesis is one way to think about the nonlinear effects of barriers across the distribution.

To test various investment theories while taking into account a pecking order of barriers, we cannot use a linear estimator, such as standard OLS, that would yield estimates of marginal effects at average investment. Instead, we use *unconditional* quantile regressions (UQRs), which

[4] Studies referred to in the next two sentences include Bekaert and Harvey (1995), Edison and Warnock (2004), Kang and Stulz (1997), Ahearne et al. (2004), Van Nieuwerburgh and Veldkamp (2009), Andrade and Chhaochharia (2010), Karolyi et al. (2020), Chan et al. (2005), Bekaert and Wang (2009), Glassman and Riddick (2001), Dahlquist et al. (2003), Giannetti and Siminov (2006), Kho et al. (2009), Ammer et al. (2012), Fidora et al. (2006), and Cooper et al. (2012).

are well suited to uncover nonlinearities and appropriate for a heavily skewed, fat-tailed distribution. Traditional QRs are conditional, yielding conditional effects that are by construction dependent on the observed covariates; see the seminal Koenker and Basset (1978) and recent applications to GDP forecasts (Adrian et al., 2019) and capital flows forecasts (Gelos et al., 2022). In contrast, our focus is on relations across the entire (unconditional) distribution of cross-border investment and, hence, requires an unconditional approach.[5] UQRs, which characterize the marginal effects across the distribution of investment independent of other variables, allow us to describe the relation of covariates and investment at different points of the investment distribution.

Specifically, we estimate how determinants affect the contribution of an observation to a specific investment quantile, such as very low investment at the 30th quantile or very high investment at the 95th quantile, by applying the Firpo et al. (2009) method of running a least squares regression of a recentered influence function at a range of investment quantiles. Focusing on the effects at various quantiles rather than average effects, we explore the determinants of bilateral investment pairs in regressions that include proxies for information, familiarity, diversification motives, transaction costs, and governance. Rather than reduce the effect of outliers on coefficient estimates of various factors on average investment, UQRs can reveal nonlinearities in the effects of international investment factors.

To identify nonlinearities in cross-border investment, we construct a broad global dataset of bilateral equity investment from 39 source countries into 39 destination countries across 17 years from 2001 to 2017. Three empirical facts are immediate from the dataset. First, the most common investment level for country investor-destination pairs in our sample is zero investment.[6] For

[5] We are indebted to a referee for making this point.

[6] That there are many zeros in datasets of international investment has been noted by many, including Ferreira and Matos (2008) and Leuz et al. (2009). De Marco et al. (2022) examine this 'scarceness' in international portfolios both theoretically and empirically. Research using the asset demand systems approach of Koijen and Yogo (2020) is confronting the prevalence of zeros. Estimating demand systems under the presence of zero market shares is a well-

example, the 2010 cross-border equity investment from Mexico to the Netherlands is zero. Second, most country pair observations have investment levels far below an international CAPM benchmark. For example, the 2010 cross-border equity investment from Canada, Japan, and the U.S. to all destination countries was below the benchmark. Third, some country pairs reflect levels of international investment that are extremely high. For example, the 2016 cross-border equity investment from Australia to New Zealand was 3.8 times higher than the share implied by the international CAPM, as New Zealand was 0.55% of Australian investors' equity portfolios but only 0.14% of the world market. The heterogeneity in investment levels revealed by these three facts – and, importantly, that the investment distribution has substantial (positive) skewness and kurtosis – suggests that regressions of average effects are ill-suited for the analysis of international portfolios when the unobservable pecking order of barriers to international investment creates nonlinear effects. By examining effects across the entire distribution, we provide a more complete picture: Some investment determinants that are significant in OLS regressions *do not* affect investment at high or low levels of investment, whereas some variables that are not significant in OLS regressions *do* have significant effects at other points of the investment distribution.

Our analysis can be used to test various theories of drivers of international investment. At a high level, our results can be interpreted as providing ample support for familiarity, governance and information roles, less for hedging motives/costs, and near zero for transaction costs. But there are nuances. For example, information proxies are important on average and throughout much of the distribution, but not at extremely high levels of investment. This suggests that information is important, but where there are no barriers, more information is not associated with more

known problem in the IO literature; see for example the recent Gandhi et al. (2023). Ways of getting around the zeros problem include dropping the zeros market shares in order to estimate the demand system with 2SLS (Jiang et al forthcoming) or using GMM to include the zeros (Koijen and Yogo 2020). Gandhi et al. makes the point that around zero the demand curve estimate is likely biased with either fix. Zeros continue to be an issue in the international portfolio allocation literature.

investment. Hedging costs, as measured by real exchange rate volatility, do not matter for moderate investments levels, but at high investment levels other barriers are low enough that hedging concerns like variation in real exchange rate volatility impact investment. And rule of law matters most where barriers are extreme; at low levels of investment, stronger rule of law is associated with more investment, but at high levels of investment variation in rule of law does not matter.[7]

Our UQR results, coupled with the heterogeneity inherent in specific portfolio datasets, can help shed light on differences in past findings. On the roles of information and familiarity, Bekaert and Wang (2009) conclude that their results are "more subtle" than Chan et al. (2005) because they do not find consistent effects for variables associated with bilateral trade, which is insignificant in the preferred specification of Bekaert and Wang (2009) but positive and significant in Chan et al. (2005). The Bekaert and Wang (2009) dataset is broad like ours—many zeros, some very high investment levels, most observations indicating substantial underweighting vis-à-vis the world CAPM benchmark—whereas the Chan et al. (2005) dataset is more focused on moderate and high investment levels. Our results show that bilateral trade does not matter for investment levels that are low (where other barriers are severe) or very high (where more trade does not alleviate any remaining barriers) and so are insignificant on average in a dataset like Bekaert and Wang's. Our UQR approach shows that the effects of bilateral trade are similar to other information and familiarity variables, significant at moderate investment levels but insignificant at higher (or very low) levels where returns to information are lower.

As a second example on the role of governance, Dahlquist et al. (2003) conclude that, "for a given supply of shares, U.S. investors do not invest less in a country because minority shareholders are less well protected or because laws are not enforced" (p. 104). In contrast, in a

[7] In Section 5.2, we also present results using probit (of zero versus positive investment) and ordered probit (zero, low, medium and high) regressions. Those results are qualitatively similar to but less nuanced than our UQR results.

firm-level study of Swedish firms, Giannetti and Simonov (2006) find that foreign investors are less likely to invest in a Swedish firm if its controlling shareholders have greater incentives to expropriate outside investors. We find that the effects of investor protections against self-dealing in investor markets are near zero or even negative at low investment (high barriers) levels but tend to increase at higher investment levels; governance matters more at the right side of the distribution. The contrasting results in the existing literature can be explained as follows. The Dahlquist et al. (2003) dataset is of U.S. investors in 50 foreign countries that include some (Zimbabwe, Venezuela, and others) with substantial direct barriers, whereas the Giannetti and Simonov (2006) sample includes firms (Swedish) for which there are no investment barriers. In a dataset of no investment barriers (Giannetti and Simonov, 2006), information and firm-level governance issues can drive differences in investment levels, while in one in which direct barriers to investment vary substantially (Dahlquist et al., 2003) information and governance issues might be trumped by variation in direct barriers.

Our analysis should influence future work. The focus of van Nieuwerburgh and Veldkamp (2009), De Marco et al. (2022) and Valchev (2017) on a nonlinearity in one particular factor – information acquisition – should be broadened. We take a step in that direction, focusing on nonlinearities inherent in a world with heterogeneous investors and a pecking order of barriers. The next wave of progress on understanding international portfolio allocation should focus on nonlinearities more generally. Our analysis should also help inform future researchers to interpret results derived from a particular portion of the investment distribution. As the empirical literature progresses, emphasis has been on datasets that feature micro datasets (e.g., Bekaert et al., 2015; Maggiori et al., 2020) that necessarily use a particular slice of the investment distribution; a recognition that results supporting various theories depend on the particular slice of the distribution should help link micro and macro evidence. Relatedly, reliance on a specific dataset might mask

the effect of important nonlinearities in factors that drive international investment. Finally, while the focus on international investment research has shifted to the granular approach of Koijen and Yogo (2020), such analysis is of averages. While that approach is useful for understanding effects across asset classes globally, future progress should incorporate the nonlinearities inherent in international investment, nonlinearities that likely arise because we cannot model the direct and indirect bilateral barriers to international investment.[8]

The paper proceeds as follows. Section 2 motivates the pecking order of barriers. Section 3 presents our investment data. Section 4 presents our framework, including explanatory variables. Section 5 assesses the determinants of global equity investment on average and across the distribution. Section 6 concludes.

2. The Pecking Order of Cross-border Investment Barriers

A standard world CAPM-based model of international portfolio allocation with country-specific proportional investment costs, such as the Cooper and Kaplanis (1986) extension of Black (1974) and Stulz (1981), can illustrate the practical complexities of a pecking order in barriers to international investment. Under usual world CAPM assumptions, the i^{th} investor's optimization problem is to choose x_i, the allocation of her wealth among risky securities in n countries, to maximize expected returns net of costs, or:

$$\max (x_i' R - x_i' c_i) \tag{1}$$

subject to

$$x_i' V x_i = v \text{ and } x_i' I = 1 \tag{2}$$

[8] Our finding that some variables matter on average and others are significant suggests that one should be cautious when eliminating variables based on the statistical significance of average effects. There are good reasons to eliminate variables – as the literature has grown so has the number of variables readers expect to see – but we caution that variables insignificant on average may well be quite important at other points in the distribution.

where

x_i is a column vector, the n^{th} element of which, x_{in}, is the proportion of individual i's wealth invested in securities in country n

R is a column vector of pre-cost expected returns

c_i is a column vector, the n^{th} element of which, c_{in}, is the cost to investor i of holding securities in country n

v is a constant

V is the variance/covariance matrix of the gross (pre-cost) returns of the securities

I is a unity column vector

For simplicity, assume that the covariance matrix, V, is diagonal with all variances equal to s^2. Impose the world capital market clearing condition, $\sum W_i x_i = M$, where W_i is the proportion of world wealth owned by country i and M is a column vector, the i^{th} element of which, M_i, is the proportion of world market capitalization in country i's market. Then the solution to this problem simplifies to

$$hs^2(x_{in} - M_n) = -c_{in} + b_n + a_i - d, \quad (3)$$

where:

$a_i = z'c_i$ (weighted average marginal cost for investor i)

$b_n = \sum M_j c_{jn}$ (world weighted average cost in country n)

$d = z' \sum M_i c_i$ (world weighted average cost)

and h is the Lagrange multiplier on the constraint $x_i' V x_i = v$.

In the case with no costs to investing, c_i is a zero vector and the right-hand side of (3) is zero. Hence $x_{in} = M_n$; that is, investor i allocates her wealth across countries according to market capitalizations.

In the more general case with non-zero and non-uniform costs, a logic similar to that of multilateral resistance in the gravity theory holds: if the actual cost to investor i of investing in country n (c_{in}) is high relative to investor i's average cost to investing (a_i) or relative to all investors' costs to investing in country n (b_n), then the right-hand side of (3) is likely negative and investor i will underweight country n in her portfolio. The higher are costs in a particular foreign market, the more severely underweighted that country will be in the investor's portfolios. Moreover, since investors do not face such costs in their home market, equation (3) predicts an overweighting of domestic stocks—the equity home bias—when costs exist in other countries.

We highlight two important and related issues subsumed by these costs. The first issue is that c_{in} represents costs that are both explicit, which may or may not be measurable, and implicit (and unmeasurable). Moreover, c_{in} is country pair specific. For the empiricist, there is no available measure of cross-border barriers that is country pair specific and adequately captures indirect barriers. The second issue is that more generally the country-specific costs allow for significant heterogeneity in barriers, so that some costs can dominate others for certain country pairs, reflecting that, in practice there can be a pecking order in costs (and benefits) of cross-border investment.[9] Direct barriers, when severe enough, can render all other barriers immaterial. For example, if no investment is allowed between two countries, alleviating information costs should have no impact on investment levels. As direct barriers are reduced, barriers such as information costs and governance issues come into play. And when all of those types of barriers are low, then

[9] Mondria and Wu (2010) for example model the interaction between the implicit barrier of information acquisition and the explicit barrier of financial liberalization.

factors like diversification benefits might matter. In general, barriers range from legal restrictions that bar foreign investment, such as capital controls, to indirect barriers such as lack of information and familiarity. And between direct and indirect barriers, perhaps along a continuum, are a host of other barriers such as transaction costs, governance issues/expropriation risk, and exchange rate risk. As the returns to mitigating these barriers evolve across the distribution, nonlinearities in the effects on international investment arise, lending support for different theories of investment holding at different points in the distribution. Our endeavor in this paper is to test for the existence of a pecking order of barriers that can inform our understanding of determinants of cross-border investment through the entire distribution of holdings.[10]

3. International Investment through the Distribution

In this section we define relative weight, our preferred measure of cross-border investment. We then discuss its distributional properties across various country pairs.

3.1 The Relative Weight Measure

To operationalize the model, our dependent variable is the ratio of a country's equities weight in country *i*'s portfolio to its equities' weight in the world float portfolio, which we call relative weight and denote by $RWF_{i,j}$, where the *F* is for float-based.[11,12] Specifically, the relative weight of destination country *j* in investor country *i*'s float-adjusted equity portfolio is:

[10] The pecking order as stated is a hypothesis that, if evidence supports, might prompt the development of a full-blown theoretical model.
[11] All weights in this paper are float-based. At times, for readability, we omit that modifier.
[12] In the language of Chan et al. (2005) and Cooper et al. (2012), our relative weight measure is one of foreign bias.

$$RWF_{i,j} = \frac{H_{i,j}/H_{i,world}}{F_j/F_{world}}, \quad (4)$$

where F_j is the float (market capitalization less insider ownership) in country j, F_{world} is world float, $H_{i,j}$ is investor country i's holdings of j's equities, and $H_{i,world}$ is investor country i's float-adjusted holdings of all equities. When i holds no j equities, $RWF_{i,j}$ is zero. If the weight of j in i's portfolio is identical to j's weight in the world float portfolio, $RWF_{i,j}$ equals one. When $RWF_{i,j}$ is greater than one, j's equities are overweight in i's portfolio; that is, the share of j equities in i's portfolio exceeds j's weight in world float.

To form $RWF_{i,j}$ requires a dataset of bilateral holdings. We use the broadest available, the IMF's Coordinated Portfolio Investment Survey (CPIS) dataset. We obtain the dollar-denominated amount of foreign equity investment from the CPIS for the years 2001 to 2017. In the CPIS, there are more than 60 source (i.e. investor) countries; we add source countries to our sample as they become available in the CPIS dataset. Like most international investment datasets, the CPIS has a financial center bias that at the very least renders data vis-à-vis financial centers meaningless for the purpose of analyzing international investment. Thus, as is often done in the literature, we omit Ireland and Luxembourg due to the particularly strong financial center bias for these countries.[13]

We limit our working sample to country pairs that have data for our standard but extensive set of explanatory variables, which are discussed in Section 4.2. With that constraint, the working

[13] The bilateral CPIS data have been used in Bekaert and Wang (2009) and Lane and Milesi-Ferretti (2008), among many others. CPIS data are subject to a geographical bias in part because, even when reporting countries follow best practices, if investors' holdings are with foreign custodians (e.g., an Italian purchasing a US bond fund through a Luxembourg-based mutual fund) the CPIS – and most other datasets – will have noise. On this, see Coppola et al. (2021), which provides adjustments to alleviate the effect of tax havens in the CPIS dataset. In robustness tests discussed in Section 5.4, we apply the Coppola et al. (2021) adjustment, which greatly reduces the sample as it collapses the euro area into one unit.

sample consists of 39 investor countries and 39 destination countries for at most 17 years (2001 to 2017), or 20,396 year and home-host market pair observations.[14]

3.2 What the Data Show

International investment varies substantially across investor country and investment destination pairs. Table 1 shows the time-series average of relative investment weight in percent for our working sample. Figure 2 shows for the full annual panel the cumulative frequency of RWF, which ranges from 0 to 3.81 (the winsorized 99th percentile). More than 90% of the observations fall below – many fall far below – the world CAPM benchmark of 1, the point at which the proportion of investor country holdings in the investment destination country equals the destination country weight in the world market portfolio. For the full sample, the median relative investment weight is only 0.0395, meaning that the weight of *j* in *i*'s portfolio is less than 3.95% of the benchmark weight, implying that most international investments are quite low. In contrast, some country investment pairs have substantial amounts of investment. The mean relative investment weight is 0.33. The large difference in mean and median relative weight in Figure 2 suggests the distribution of international investment is essentially a distribution of "outliers."

By far the most common RWF outcome for investor country/investment destination pairs in our full sample is zero investment (5,560 observations), as seen by the first 27% of all observations in Figure 2 (red circle). The group of zero-investment pairs include, for example, Mexico-to-Netherlands [2010], New Zealand-to-Israel [2002], and Philippines-to-Japan [2009]. Another 4,638 observations have relative weight between 0 and 0.0395, shown by the dotted red line. These include such country pairs as Italy-to-Argentina [2013] and Singapore-to-South Africa

[14] Summary graphs and tables of $RWF_{i,j}$ for the dataset unconstrained by the availability of data for explanatory variables, which includes 46 investor countries and 47 destination countries, are in an online appendix.

[2001]. The solid blue line shows that about 43% of the sample displays moderate amounts of investment with relative weight above 0.0395 but below 1, and includes country pairs like Italy-to-Canada [2003] and United States-to-Greece [2014]. Even this moderate investment subsample, with mean relative weight of 0.304 and median 0.224, shows wide variation similar to the entire sample. Finally, although most country pairs show very low to moderate investment, the remaining 7% of the sample, shown in the dashed green line, has relative weight greater than 1. The cumulative frequency increases quickly, illustrating investment well above the threshold of 1 to levels that are three, four, five times the destination weight in the market portfolio, levels that can be characterized as overinvestment relative to an world CAPM benchmark. These include country pairs such as Germany-France [2016], Australia-New Zealand [2016], and Austria-Germany [2013]. Rather than clustering just above 1, the frequency at which relative weight exceeds 1 increases steadily. The dark green square shows the relative weight of 3.81 at the 99^{th} percentile for illustrative purposes only. The relative weight continues to increase beyond this point, with a mean value of 2.67 for this subsample.

The shape of the distribution illustrates that there is broad variation across country pair investment level. With such wide variation in cross-border investment across country pairs, few country-pairs can be considered "average." The inference obtained from applying the standard empirical approach of identifying average effects then may not satisfactorily explain what drives investment across most of the sample pairs and may not adequately account for important nonlinearities in factors associated with a pecking order of barriers. Thus, when testing theories of international investment, it is critical to decide whether to minimize the effects of the outliers or to try to explain them. We argue that for this distribution it is economically important to explain the outliers. The sample pairs on the far right tail are likely to have economically meaningful effects

on asset pricing and capital-raising. The pairs on the far left can have an economically meaningful effect on access (or barriers) to global financial markets.

As a first step, we delve deeper into what country-destination pairs drive this distribution. Some country-pairs exhibit the extremes seen in the distribution in Figure 2 and Table 1. As investor (i.e., source) countries, Argentina, Mexico, Pakistan, Philippines, Thailand, and Turkey are examples of source countries that have close to zero investments on average. For destination (i.e., host) countries, over one-third of the investor countries, including other neighboring South American countries, have zero investment in Colombia, and an additional three countries have relative weight ratios of below 0.05. In contrast, almost all investor countries have positive relative weight in Australia, Germany, the Netherlands, Switzerland, the U.K., and the U.S. At the other end of the distribution, 170 of the 2100 country pairs shown in Table 1 are on average over 100% of the benchmark weight, such as New Zealand's investment in Australia and Finland's investment in Sweden. The most common investment destination countries with above-benchmark average investment weights are Austria, Finland, and the Netherlands, and the most common investor (source) countries with above-benchmark average relative weights are Belgium, Denmark, the Netherlands, and Norway. Very high investment, however, is not limited to European investor or destination countries. In fact, most countries in our sample have at least one destination country pair that they overweight on average. The only investor countries that don't have at least one destination country that maintains holdings above 100% of the benchmark weight are Canada, Egypt, Indonesia, India, Israel, Japan, Korea, Mexico, Pakistan, the Philippines, Turkey, and the U.S. In a similar vein, most destination countries are overweighted on average with at least one investor country—the exceptions are Canada, Israel, Japan, Pakistan, South Africa, and the U.S.

3.3 Features of the Relative Weight Measure

Researchers have many options for investment measures. We note that our relative weight measure has three desirable features. First, it is consistent with the theory of optimal investment weights discussed in Section 2.[15] Second, it is based on float, not market capitalization. Dahlquist et al. (2003) argue that shares held by insiders, which are not available to dispersed portfolio shareholders, should be omitted from portfolio analysis. While no exact measure of shares held by controlling shareholders is available both across a range of countries and through time, we follow Kho et al. (2009) and many others and create a country-level measure of insider ownership built from the firm-level closely-held field in Worldscope.[16] Subtracting the measure of insider ownership (*IO*) from market capitalization (*MC*) provides a measure of the float (*F*). Table 2, which shows summary statistics on market capitalization and float for our 2001 to 2017 sample period, highlights the importance of the float-adjustment. Argentina, for example, constitutes 0.1% of the world market portfolio but only 0.048% of the world float portfolio (implying that the world CAPM allocation to Argentina should be 0.048%).

A third desirable feature of the relative weight measure is that it is free of issues that can confound empirical analysis. For example, consider another standard investment measure consistent with theory: the simple difference of investment share and market (float) share, $H_{j,i}$ / $H_{j,world} - F_i$ / F_{world}, which we will refer to as a linear raw deviation (LRD) measure. Figure 3 shows

[15] The world CAPM holds only under restrictive assumptions, but the primary goal of our dependent variable is a reasonable measure of global investment.

[16] Note that we are not claiming that the Worldscope closely-held field is perfect since it is a measure based on numerical cutoffs that cannot truly discern who has controlling interest and who does not. Moreover, reporting requirements and their enforcement varies across the world, and the coverage of Worldscope has changed over time. That said, the Worldscope closely held variable is available over time and for a large number of countries, and potentially includes insiders who are not controlling shareholders but might be part of the controlling coalition. Some studies painstakingly gather information on the holdings by controlling shareholders (e.g., Claessens et al. 2000; Faccio and Lang 2002; and Lins 2003), which should provide a truer measures of insider holdings. Unfortunately, such datasets are typically as of a point in time. To mitigate the effect of outliers in the more readily available Worldscope data, we use a smoothed measure of closely held shares; if the change in the market value weighted aggregate country-level closely held measure is greater than 1.5 standard deviations, then country-level closely held is set to the average of the previous year, the current year, and the next year.

the distribution of this LRD, with any observation that has zero RWF having a large black circle, any observation that has very low RWF (between 0 and 0.0395) having a small red circle, any with moderate RWF (between 0.0395 and 1) having a blue dot, and high RWF (greater than 1) being the green line. One issue is that for very similar RWFs – that is, observations for which the investor country has the same 'bias' vis-à-vis the recipient country – the LRD can vary greatly. Another issue, pointed out by Bekaert and Wang (2009) and Ammer et al. (2012), is that the LRD can be biased by size in a way that can bias inference on explanatory variables of interest. In our sample this size bias appears in two ways. In Figure 3, note that for any bilateral investment pair with zero holdings the LRD is zero minus recipient country size, so there is a direct connection between country size and a LRD for a large portion of the sample. We can also see the influence of recipient-country size on the LRD in Figure 4, which contains observations for a representative year (2012). Recipient country size has a strong and significant negative correlation with LRD (Panel A) but not with relative weight (Panel B). In practice, this means that when using a LRD, or any size-biased measure, explanatory variables that are related to size might erroneously show statistical significance. Relative weight, which is not related to size, does not have this feature.

4. Assessing Global Portfolios: The Framework and Explanatory Variables

Like many studies, our empirical framework can be used to test various hypotheses on the drivers of international investment. But we first need an estimation strategy that reveals whether there exists a pecking order of barriers that yields nonlinearities and can shed light on where the distribution various investment theories hold. And, moreover, we need an estimation strategy that is appropriate for a dependent variable like RWF that is non-normal with substantial positive

skewness and excess kurtosis. In this section we discuss our empirical framework and explanatory variables.

4.1 The Unconditional Quantile Regression Framework

A standard way to assess the variation in cross-border equity investment is to use an OLS estimator and regress bilateral relative weight on bilateral and unilateral variables:

$$RWF_{i,j,t} = \gamma_1 X_{i,j,t} + \gamma_2 X_{i,t} + \gamma_3 X_{j,t} + \theta_t + \varepsilon_{i,j,t}, \quad (5)$$

where $RWF_{i,j,t}$ is the relative weight of destination country j in investor country i's float-adjusted equity portfolio as in Eq. (4), $X_{i,j,t}$ is a matrix of bilateral investment determinants, $X_{i,t}$ is a matrix of investor country i characteristics, $X_{j,t}$ is a matrix of destination country j characteristics, θ_t are year fixed effects, and $\varepsilon_{i,j,t}$ is an error term.

However, the heterogeneity in unobserved bilateral investment barriers means that estimators such as OLS that are designed to capture average effects might be misleading and fail to capture nonlinearities. We focus instead on Quantile Regression (QR) estimators, which are designed to estimate unobserved heterogeneity and are more robust to outliers than least squares estimates, meaning they are preferred whenever fat tails are a concern.[17] We use unconditional QRs (UQRs) – see Firpo et al. (2009) – rather than the traditional conditional QRs, as UQRs allow us to obtain a family of slopes across the distribution of our dependent variable. That is, in the present context UQRs can be used to assess the extent of heterogeneity in the investment response to various barriers to international investment.

[17] On QRs, see Koenker and Basset (1978) and Koenker (2005). QR is not the only way to characterize determinants when the distribution has outliers. One could winsorize, but the distribution in Figure 1 suggests the observations in the tails are not necessarily "problematic." We could also take logs, but taking logs of relative weight (our theory implied measure) is still right skewed with fat tails. QR allows us to describe affects across the distribution where some barriers might be more important than others, driving nonlinearities in factors.

More specifically, Firpo et al. (2009) suggests using an OLS estimator on a transformed dependent variable, the Recentered Influence Function (IF). The IF produces an estimate of how much a given statistic – for example, the 50th percentile of relative investment – changes after a small change in the distribution from including or excluding an observation. Recentering, by adding the IF to the statistic of interest, then shows how much the 50th percentile changes from a small change in the distribution. The quantile coefficient estimates the expected marginal change at a specified quantile of the dependent variable produced by a change in an independent variable using the entire unconditional distribution rather than just a sub-sample.[18] Following this same logic, we can estimate the quantile coefficient at any percentile level. We use QRs to characterize the relations across the distribution of investment, allowing us to describe the relation of covariates and investment at different points of the distribution rather than just focusing on the conditional mean.

4.2 Explanatory Variables

We organize our set of explanatory variables around a broad range of theories implied by the literature in which international investment depends on information barriers, familiarity barriers, hedging motives, transactions costs, and governance. Organization is similar across the literature but details can differ. We base our groupings on Bekaert and Wang (2009), Coeurdacier and Rey (2013) and the Cooper et al. (2012) survey, with some deviations (for example, we include a cross-listing variable). Other groupings are possible. Also, wherever possible we use bilateral variables, but also follow Bekaert and Wang (2009) and include a large set of destination- and

[18] The original Koenker and Basset (1978) framework, and papers that employ it such as Adrian et al. (2019) on GDP growth forecasts and Gelos et al (2022) on capital flows forecasts, estimates a conditional QR that yields coefficients that describe changes in the dependent variable from the distribution *conditional* on the covariates. Here we use unconditional QRs following Firpo et al. (2009) and applied, for example, in Killewald and Bearak (2014) and Borah and Basu (2013), which allows us to draw conclusions about the effect of say information on relative weight when all investment barriers are low. Estimation with conditional QR does not allow for a conclusion about effects on the entire distribution despite language that suggests otherwise.

investor-country unilateral variables; as in that paper, the coefficient estimates for some unilateral variables are difficult to interpret.[19]

The literature suggests, for example, that lower barriers to information (Ahearne et al. (2004), Bekaert and Wang (2009), Valchev (2017)) and lower barriers to familiarity (Chan et al. (2005), Bekaert and Wang (2009)) increase relative investment. As proxies for information barriers, we use the proportion of destination country market capitalization available in the investor country market through cross-listing (described in detail in the next subsection), internet users in a country, and a dummy variable that equals 1 when two countries share an official language. Previous evidence (Froot et al., 1992; Bohn and Tesar, 1996; Brennan and Cao, 1997) suggests market returns reflect information and affect investor behavior. Similar to Chan et al. (2005) and Bekaert and Wang (2009), we include measures of past returns. To proxy for familiarity with the investment opportunity set, we use bilateral and unilateral trade, log of distance between major cities, and dummy variables that equal 1 when two countries have ever had a colonial link or have contiguous borders. With respect to hedging motives, we note that real exchange rate volatility leads to less investment due to hedging difficulty (Fidora et al., 2006; Bekaert and Wang (2009)) and greater diversification benefits leads to increase international investment. For hedging and diversification proxies we use real exchange rate volatility, stock index return correlations, and stock return annual volatility as measures of diversification opportunities (Bekaert and Wang, 2009; Coeurdacier and Gruibaud, 2011). Third, lower trading costs leads to increases in international investment. To proxy for transaction costs, we include a dummy variable that equals 1 when two countries use the same currency, financial sector size (scaled by GDP), equity capital

[19] In unreported tests that include country fixed effects, results are largely similar to what we report below, suggesting that the exhaustive list of proposed investment determinants drawn from the existing literature capture important country level characteristics that affect global investment.

controls from Fernandez et al. (2016), and turnover (annual trading volume to GDP). We also include three governance variables as determinants consistent with Chan et al. (2005) and Bekaert and Wang (2009): shareholder protections as proxied by the Djankov et al. (2008) anti-self-dealing index; institutional quality as proxied by the La Porta et al. (1998) rule of law index; and a measure of low investment risk from the International Country Risk Guide (ICRG).[20] Finally, the extent to which investors favor own-country investment may impact global allocations, so we include a measure of domestic bias similar to Chan et al. (2005).[21]

Table 3 shows variable definitions and summary statistics for the explanatory variables organized around the main theories.

4.3 The Global Matrix of Cross-listings

We follow the literature (for example, Chan et al., 2005; Lane and Milesi-Feretti, 2008; Bekaert and Wang, 2009; Cooper et al., 2012) in our choice of proxies for cross-border barriers. A potentially important determinant missing from these studies is the proportion of destination country market capitalization available in the investor country market through cross-listing. In the U.S. setting, much work has noted that U.S. investment in foreign stocks tends to be higher in stocks that cross-list on a U.S. exchange, suggesting cross-listing is an important determinant (Ahearne et al. 2004; Bradshaw et al. 2004; Edison and Warnock 2004; Aggarwal et al., 2005; Kho et al., 2009; Ammer et al., 2012). Moreover, while the theoretical literature has proposed an

[20] The ICRG variable that we refer to as Low Investment Risk is based on "Investment Profile" risk defined as "an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components." The risk rating assigned is the sum of three subcomponents – Contract Viability/Expropriation, Profits Repatriation, and Payment Delays – each with a maximum score of 4 points (Very Low Risk) and a minimum score of 0 points (Very High Risk).

[21] In Appendix Table A1 we repeat our analysis using the normalized foreign bias measure from Bekaert and Wang (2009) that controls for the bias in the dependent variable. Results are similar to those of Table 5, though keep in mind that coefficient signs change because for that measure increasing investment is analogous to reducing bias.

important role for information in international investment, measuring information with internet users (Bekaert and Wang, 2009; Cotter et al., 2019; and Valchev, 2017) might not completely capture the type of information important to investors and cannot capture bilateral variation. Cross-listing might play a more sophisticated role by enabling foreign investors to correctly interpret publicly available information, as in the differences of opinion model in Dumas et al. (2017).

The most substantial obstacle to addressing the appropriate role of cross-listing in a global study is that it requires a global panel dataset of cross-listing. For this we updated the Sarkissian and Schill (2012, 2016) annual dataset of 2,838 listings on foreign stock exchanges (i.e., not OTC listings). Data is available from 1985 (the start date of Worldscope market and accounting data) to 2017, based on surveys of world stock exchanges as of the end of 1998, 2003, 2006, 2012, and 2018. Surveys were completed for all country exchanges indicated as having foreign listings by the World Federation of Exchanges, except for corporate tax havens (such as the Cayman Islands, Bermuda, etc.) and exchanges outside main boards of country stock exchanges. Exchange research departments or exchange websites were consulted for a summary of all foreign companies, excluding investment funds and trusts, listed on their exchange. In all but the 1998 survey, the history of all foreign companies that were once listed but had since delisted their shares was also requested. Listings of foreign shares were received for all exchanges. Delistings data are less complete. In some cases, listing and delisting histories in each survey year were only partial or unavailable.[22] See Sarkissian and Schill (2016) for more details. For stocks listed in the United States, we supplement data from CRSP and Compustat following Ammer et al. (2012).

Using the survey data, we construct the proportion of home country market capitalization listed in investor country host markets using market value data from Datastream. Table 4 shows

[22] For the U.S., incomplete delisted history was complemented with ADR delist codes from CRSP, following the procedure of Chaplinsky and Ramchand (2012).

the average (computed using at most 17 annual observations from 2001 to 2017) proportion of equity listed in foreign markets for all pairs of home (listed down the first column) and host (listed across the top row) markets. The United States and United Kingdom are the largest hosts of foreign equities. More than 40% of the home market capitalization of Argentina, Canada, Finland, Israel, Netherlands, Spain, and the United Kingdom is cross-listed in the United States; more than 30% of the home market capitalization of Egypt, Finland, Greece, Netherlands, and South Korea is cross-listed in the United Kingdom. Germany, Switzerland, and Netherlands also host many foreign firms, and some country pairs are noticeable, with substantial cross-listings of Austrian equities in Germany, of Australian equities in New Zealand and vice versa, and of Netherlands equity in Switzerland.[23]

5. The Results: Using QRs to Test Investment Theories

In this section we first present our main results, comparing OLS and UQRs and comparing UQR results across the quantiles. We then present those same results in two different ways: from the perspective of investment theories (pecking order and more traditional ones) and with a focus on nonlinearities. Those discussions are intentionally repetitive; we include them in case some readers might find framing the results from those perspectives useful. Finally, we show how our results can shed light on some conflicting findings in the existing literature; are robust to adjusting for location bias; and compare with conditional QRs.

5.1 Main Results: Investment Drivers across the Quantiles

[23] Indonesia is the only country in our sample that hosts no foreign firms.

The standard and familiar presentation of OLS results is in a table with coefficient estimates and standard errors, p-values or t-stats. There is no standard presentation for QR results. We implement two ways. The first is tabular (Table 5) and includes results for OLS and a few select quantiles: 30^{th}, 50^{th}, 70^{th}, 92^{nd} (corresponding to a relative weight of one) and 95^{th} quantiles. The second approach, through graphs (Fig. 5), is more comprehensive for QR results but can be difficult to read. It shows from many quantile regressions coefficient estimates (the focus or center point of each circle) with 95% confidence bounds (the vertical lines, which are sometimes so small that they are hidden behind the circles). For comparison purposes, we also include OLS results in each graph: the solid horizontal line is the coefficient estimate from the OLS regression, and the dashed horizontal lines are the associated 95% confidence bounds (with standard errors calculated clustering at the destination-country pair). In Figure 5, Panels A and B plot coefficient estimates for the proxy variables for information and familiarity barriers, respectively. Panel C plots coefficient estimates for the variables for hedging motives. Panels D and E plot coefficient estimates for the transaction costs and governance variables, respectively. In our discussion of results, we will refer to both the graphs and the table.

5.1.1 A Comparison of OLS and UQR Estimates

A number of variables have insignificant OLS estimates, and so would tend to be de-emphasized or discarded, but are significant for some sections of the distribution. We mention a few.

- Destination rule of law is insignificant in OLS. But UQRs show that rule of law is positive and significant at low investment levels. Where barriers are substantial, a small improvement in rule of law is associated with more investment. A similar pattern is apparent in destination Low Investment Risk: insignificant on average (OLS), but in countries with low

investment / high barriers the alleviation of some investment risk is associated with more investment.

- The cross-listing OLS estimate is positive but insignificant, but UQR estimates reveal that for moderate investment levels – all but the outer tails of the distribution – more cross-listings between two countries are associated with more investment. Only where barriers are severe (left portion of distribution) or non-existent (right portion) is cross-listing insignificant.

- The bilateral trade OLS estimate is positive but insignificant. But UQR estimates reveal that at the left part of the distribution, where investment is low (and, presumably, barriers are high), more trade between two countries is associated with more investment.

For some variables, coefficient estimates are significant using OLS but insignificant at some portion of the distribution.

- Common currency is positive and significant in OLS and all but the lowest quantiles, indicating that high barriers reduce the positive effect of a common currency.

- Financial sector size, whether investor or destination country, is negative and significant using OLS. An interpretation suggested by Bekaert and Wang (2009): Countries with larger financial sectors invest relatively less abroad (because they have ample opportunities at home) and they receive less relative investment (because they have invested much in their local markets). UQR estimates at high investment levels support that interpretation. But at lower investment levels, UQRs are less supportive of this, as the coefficients are no longer negative and significant.

In fact, rare in Table 5 and Figure 5 is a variable that has similar sign and significance in OLS and across the distribution. There are only two variables that have the expected sign and are

statistically significant on average (i.e., in the OLS regression) and through the entire distribution: investor internet and distance.

Overall, comparing OLS and UQR estimates suggests caution when interpreting results that use linear estimators. Some investment determinants that are significant in OLS regressions – that is, are significant on average in the working sample –might not affect investment at high or low levels of investment. And some variables that are not significant in OLS regressions might have significant effects at other points of the investment distribution.

5.1.2 UQR Estimates through the Distribution

First, an obvious point: That effects are nonlinear through the distribution is readily apparent in Figure 5 (and Table 5). UQR coefficients tend to vary across the distribution of investment from very low levels of investment (e.g., quantiles 30 to 40) to moderate levels of investment (quantiles 60 to 80) to very high levels of investment (quantiles 80 to 100).[24] A linear estimator would not be able to capture such nonlinearities.

Second, a careful examination of factors at different investment (and, hence, barriers) quantiles can help shed light on various theories.

At low investment (high barriers), for example at the 30th to 50th quantiles (50th is still low with investment only 3.95% of the benchmark weight), there is ample evidence that governance and familiarity matter. As noted above, the coefficients on the governance variables rule of law and low investment risk are positive and significant at low investment levels. Where barriers are substantial, better rule of law and lower investment risk are associated with more investment. Familiarity also matters for countries with low investment / high barriers. At that part of the

[24] The increasing magnitude of UQR coefficients for investor country internet users (Fig.5, Panel A), for example, indicates that the marginal effect of increasing investor internet is higher at higher levels of relative weight. In other words, those country pairs with a lot of investment have even more investment with a greater number of investor country internet users.

distribution, country pairs that have more bilateral trade, are geographically close or have colonial ties have more investment. Evidence is less prevalent for information variables (source countries with more internet penetration invest more abroad), minimal for transaction costs (at low, but not the lowest, investment quantiles, countries that share a common currency invest more in each other), and nearly non-existent for proxies for hedging motives.

At mid-level investment (moderate barriers), results at the 70th quantile are supportive of roles for information and hedging motives. For information, in addition to source country internet (which is significant across the entire distribution), more cross-listings and a common language are associated with higher investment. For hedging motives, RER volatility is now negative and highly significant, and for transaction costs a common currency remains significant. For the two theories that have most support at low levels of investment, at mid-level investment there is still ample support for familiarity – bilateral trade, distance and colonial ties are all significant with plausible signs – but a bit less so for governance variables (low investment risk is no longer significant).

At high investment (low or non-existent barriers), results at the 92nd and 95th quantiles indicate that information still matters but not as much as in the moderate barriers portion of the distribution. Similarly, familiarity is still important but a bit less so (bilateral trade and colonial ties are no longer significant). Governance, important where there is low investment / high barriers, is not important at high investment levels; no destination governance variable is significant at the 92nd or 95th quantiles.[25]

[25] A few general things to note about the UQR results. One, the various R^2 values indicate that our extensive set of explanatory variables explain less variation in relative weight at the far right of the distribution. Two, consistent with Bekaert and Wang (2009), with an extensive set of explanatory variables that include many unilateral source and destination measures, numerous coefficient estimates have the "wrong" sign. We do not focus on these but mention one here: When the coefficient on destination capital controls is significant, it is positive, suggesting that stricter capital controls are associated with *more* investment. We do not opine on intuition for this, but note that investment barriers are difficult to measure.

5.2 Results that Shed Light on Various Investment Theories

The results across the quantiles are consistent with the general statement that there are nonlinearities in factors' effects – coefficients vary across the distribution, indicating that some barriers matter more than others at different points along the distribution – as well as the more specific statement that the results appear to support the pecking order hypothesis. Where there are high barriers (low investment), governance, especially rule of law and investment risk (which includes expropriation risk), and familiarity matter, but most other main determinants do not. When barriers are severe, improving rule of law and reducing investment risk can lead to more investment, but improving along other dimensions (information, transaction costs, proxies for hedging motive) do not. At the middle of the distribution with moderate barriers familiarity is still important, governance becomes a bit less important, and there is more evidence for roles for information and hedging motives. Where there are no barriers / high investment, there is some evidence for information, familiarity, and transaction costs, but not much for governance (only rule of law is significant, and only at the 10% level). That factors' importance levels change across the distribution is undeniably true. The stronger statement that the evidence is consistent with a pecking order hypothesis also finds some support.

Summarizing results from the perspective of traditional investment theories, we find ample evidence of roles for familiarity, basic access to information (i.e., source country internet users is significant across the distribution) and, where barriers are high, hard governance indicators such as rule of law and investment (e.g., expropriation) risk. Additional information variables (cross-listing and common language) become important in the middle of the distribution. For hedging motives, RER volatility matters most in the middle and right side of the distribution. Among the traditional theories, transaction costs probably receive the least support, with only common

currency being the correct sign and consistently significant (for all but the far left portion of the distribution), and capital controls being incorrectly signed.

More specific results by investment theory: For familiarity, the evidence indicates that geographic proximity matters. Distance and a common border impact investment on average and across much of the distribution. An exception is at the left of the distribution: When barriers are high, a common border is not associated with higher investment. For governance, evidence is strongest where barriers are substantial and for "hard" governance variables such as rule of law and investment (e.g., expropriation) risk. For hedging motives, the correlation puzzle is apparent along much of the distribution. On average, correlation is negatively related to investment but with a near-zero t-stat. In contrast, at many points in the distribution, and particularly moderate investment levels between the 65th and 90th quantiles (displayed in Figure 5, Panel C), a higher correlation is associated with more investment, counter to a hedging motive. The one proxy for hedging motives that does matter is RER volatility, as its coefficient is negative on average and at high investment levels where other barriers are low enough that hedging concerns begin to impact investment. Supportive of a role for transaction costs is that a common currency is associated with more investment at and above median investment, but it is not significant at lower levels of investment where information likely dominates. Sharing a common currency is associated with a 41% increase in relative weight at the median and an 85% increase in relative weight at the 70th quantile. Other proxies for transaction costs are either insignificant or have the wrong sign (for example, destination capital controls). Overall, other than common currency, evidence of a role for transaction costs is thin.

Among the information variables, only one is significant across the entire distribution: source country internet penetration, which is a proxy for access to basic information. Some information variables are not actionable at the firm or country level; for example, for moderate

barriers a common language is associated with more bilateral investment, but countries generally would not choose a language to attract more investors. Others are actionable; more cross-listing is associated with more investment at the middle of the distribution (not the far right, where countries are already so similar that additional cross-listing becomes less relevant, or far left, where direct barriers are substantial). The coefficient estimates indicate that to increase relative investment weight by 10% at the 70th percentile, the increase in the proportion of market capitalization listed in the investor country is about 15%. But a similar increase at the 90th quantile of cross-border equity investment, the increase in the proportion of market capitalization cross-listed is only 6%.

Without QR results, we would not be able to empirically establish the existence of a pecking order of barriers. QR estimates marginal effects of investment determinants conditional on relative weight at the 30th quantile, for example, where barriers to investment are likely quite high.[26] In contrast to exploring the intensive margin of investment, Table 6 depicts nonlinearities in results slightly differently by showing the extensive margin of investment. Table 6 Column (1) shows results from a probit regression in which the dependent variable is zero for relative weight of zero and one for any positive relative weight. Column (2) is an ordered probit in which positive relative weight is split into low, medium and high. Basically, these tests show the probability of landing at a certain place in the distribution, but not the marginal effect of these variables at that point in the distribution. Qualitatively, results are similar to those in the Table 5 and Figure 5 OLS and QR regressions. There is still ample evidence of roles for familiarity and governance. Information gets more support, as cross-list is significant in both columns. For hedging motives, the correlation puzzle is still prominent, as is evidence that RER volatility matters. There is still little evidence that transaction costs matter. Overall, the results from probit and ordered probit regressions are

[26] Estimating OLS regressions for subsamples of relative investment weight based on investment tiers introduces selection bias (Heckman 1979) and cannot yield appropriate evidence of a pecking order.

qualitatively similar to our OLS and QR results and are suggestive of nonlinearities, although the ordered probit cannot capture the changing marginal effects of the determinants as the relative investment weight increases and therefore the nonlinearities.

5.3 Results that Shed Additional Light on Nonlinearities

Cross-listing on a U.S. exchange can mitigate information asymmetries and increase U.S. investment in foreign stocks (Ahearne et al., 2004; Bradshaw et al., 2004; Edison and Warnock 2004; Aggarwal et al., 2005; Kho et al., 2009; Ammer et al. 2012). In our global dataset of investment, we find cross-listing (Figure 5, Panel A) has a marginally insignificant effect on investment for the average country-destination pair. The least squares estimate, however, masks differences across the distribution. In the QRs, cross-listing in the investor country market has a positive and statistically significant effect for all of the higher levels of RWR until the 95th percentile, and the effect increases at higher investment levels. The results suggest that cross-listing is effective at mitigating barriers, especially those that are more meaningful for moderate to high investment.[27]

Source-country internet has been a proxy for information in several studies (e.g, Bekaert and Wang (2009)). Figure 5 Panel A shows that (i) it is indeed positive and significant in OLS regressions and (ii) consistent with the Valchev (2017) model of non-linearity its effect is near zero at low levels of investment (high barriers), increases substantially along intermediate levels and then moderates at the far right (when, as in Valchev (2017), decreasing returns to information might kick in). Sharing a similar language facilitates information sharing. Like source-country internet,

[27] Cross-listing is a variable for which causality plausibly goes both ways, as it can influence and be influenced by cross-border investment. In unreported tests we instrument for cross-listing using the method proposed by Lee (2007) or, because quantile IV estimation is influenced by zeros, the censored quantile instrumental variables technique of Chernozhukov et al. (2015). Our results are robust to instrumental variables estimation, suggesting cross-listing influences investment.

the coefficient on the common language indicator is positive and significant on average, with an increasing effect at moderate levels of investments. A similar pattern holds in past returns (another proxy for information following the model of Brennan and Cao (1997)). Overall, the QR results in Figure 5 Panel A provide nuance to the long-standing information story, nuance that is consistent with recent theory.

5.4 Results that Shed Light on Conflicting Findings

The effects of some variables across quantiles coupled with a sense of the likely nature of various datasets helps resolve some conflicting results in the existing literature. As a starting point, the findings of Bekaert and Wang (2009) conflict with those of Chan et al. (2005) with respect to the effect of information and familiarity barriers. Bilateral trade, for example, is insignificant in the preferred specification of Bekaert and Wang (2009) but positive and significant in Chan et al. (2005). Bekaert and Wang (2009) conclude that their results are "more subtle" than Chan et al. (2005). The Bekaert and Wang (2009) dataset uses a broader sample (similar to ours) with wide variation in cross-border holdings—many pairs with zeros, some pairs with very high investment levels, and most pairs indicating substantial underweighting vis-à-vis the world CAPM benchmark. Whereas the Chan et al. (2005) dataset has country pairs that are much more concentrated in higher investment percentiles and correspond more closely to the right side of the distribution in our Figure 1. To examine this discrepancy, we show that for bilateral trade (Figure 5 Panel B), the traditional regression coefficient is insignificant with a broad data set like ours or Bekaert and Wang's, but is significant for country pairs with moderate levels of investment, consistent with the pecking order theory.

Another example concerns a proxy for real risks investors might want to hedge: real exchange rate (RER) volatility. In the model of Fidora et al. (2007), RER volatility is the main

source of discrepancies between home and foreign portfolios; the greater the volatility of RERs, the lower should be the weight on foreign securities. Coeurdacier and Guibaud (2011), in a different setup, have a similar prediction. The notion that RER volatility affects portfolio choice can also work through the Cooper and Kaplanis model as it would affect the variance of returns. Empirically, Fidora et al. find ample evidence of a negative effect of RER volatility on foreign holdings, although Cooper et al. (2012) note that the evidence is not robust to different measures of foreign bias. Our analysis sheds light on this: We find the RER volatility matters on average (i.e., in OLS regressions) but is only significant at high investment levels where other barriers are low enough that hedging concerns like variation in RER volatility begin to have an impact.

A third example addresses governance variables. Dahlquist et al. (2003) conclude that, "for a given supply of shares, U.S. investors do not invest less in a country because minority shareholders are less well protected or because laws are not enforced" (p. 104). In contrast, in a firm-level study of Swedish firms, Giannetti and Simonov (2006) find that foreign investors are less likely to invest in a Swedish firm if its controlling shareholders have greater incentives to expropriate outside investors. The Dahlquist et al. (2003) dataset is of U.S. investors in 50 foreign countries that include some (Zimbabwe, Venezuela, and others) with substantial direct barriers, whereas the Giannetti and Simonov (2006) sample includes firms (Swedish) for which there are no investment barriers. In a dataset of no investment barriers (Giannetti and Simonov, 2006), one might expect information and governance issues to drive differences in investment levels, while in one in which direct barriers to investment vary substantially (Dahlquist et al., 2003) information and governance issues might be trumped by variation in direct barriers. Figure 5 Panel F shows evidence somewhat consistent with this view. While coefficients are mostly insignificant, the effects of investor protections against self-dealing in destination markets are near zero or even negative at low investment (high barriers) levels but tend to increase at higher investment levels.

5.5 Robustness to Adjusting for Location Bias in Portfolio Holdings Data

The UQR approach we apply is especially useful when outliers in a dataset such as global equity investment can affect results. There are, however, other known issues with CPIS data mentioned in section 3.1, much of them having to do with the use of third country financial intermediaries. Coppola et al. (2021) adjust the data for the effects of these tax havens to restate the holdings based on the nationality of the issuer and investor. Applying their adjustment greatly reduces the sample size – we lose over half of the observations – largely because it collapses the Euro Area into one entity. Nonetheless, we repeat our analysis on this more limited sample. The relative investment weight using restated holdings remains remarkably similar across the distribution, with the exception that extremely high levels of investment are not nearly as extremely high. UQR regression results in Table 7 show that our main takeaway of nonlinearities still holds. But, of course, because of the nature of the limitations of the Coppola et al. sample, some specific results change. Most notably, the coefficient on whether two countries share a border is no longer statistically significant as we lose many neighboring countries. The coefficient on investor country shareholder protection is now positive and significant across the distribution.

5.6 Brief Comparison of Conditional and Unconditional QR Results

Our focus has been on UQR because we are interested in how coefficient estimates vary across the unconditional distribution of investment (and, hence, by assumption, of unobserved barriers). But CQR estimates that are conditioned on all covariates are also interesting. Here, following the Powell (2020) application of CQR and UQR to the question of whether permanent or temporary job placement affect earnings, we present in Table 8 CQRs estimates that can be compared with the UQR estimates from Table 5.

The first observation from a comparison of Tables 8 and 5 is that UQR and CQR results, while not identical, are broadly similar. Many (but not all) variable/quantile estimates that are significantly positive or negative in Table 5 are also in Table 8. One example: Source country internet users is positive and significant at all quantiles presented in both tables.

The next observation is that some differences between the two sets of estimates are interesting and informative. We mention here a few but not all.

- At low investment (high barriers)
    - More cross-listings are not unconditionally associated with more investment (UQR estimate at 30th percentile is insignificant), but conditional on other covariates they are (CQR estimate is positive and significant). One interpretation is that it takes more than a cross-listing in isolation to increase investment where there are substantial barriers.
    - Source and destination financial sector size are anomalously *positive* and significant in UQRs, but that anomalous result is not apparent when conditioning on other covariates.
- At high investment (low barriers),
    - Countries that share a common language have much more investment unconditionally (UQR coefficients at 92nd and 95th are large, positive and significant), but such strong evidence is not apparent in CQRs. This suggests that countries with a common language have other characteristics, such as substantial bilateral trade, that are associated with increased investment. A similar theme is apparent with destination returns volatility: large, positive and significant at 92nd and 95th in UQR but not in CQR.

- The effects of some variables vary across the distribution. For example, in UQRs, source-country investor protection is negative and significant at low investment levels, and positive and significant at higher investment levels. That is, unconditionally, strong home country investor protections are associated with less investment in high barriers countries (the left side of the distribution) but more investment in countries with low barriers (the right side). But conditional on other covariates (i.e. in CQRs), source investor protection is insignificant everywhere but the lowest investment level (where it is still negative).

Overall, the comparison of CQR and UQR results provides additional insight that can add clarity and nuance to our main UQR results.

6. Conclusion

In this paper, we contribute to the literature on cross-border investment by highlighting two important characteristics of cross-border investment: the distribution of bilateral equity investment varies more than OLS estimators would suggest and barriers to cross-border investment are difficult to precisely measure. We show that these two characteristics have important implications for empirical tests in this literature, as the theories that find support depend highly on a particular dataset. While almost half of cross-border positions are moderate investment positions consistent with moderate but surmountable investment barriers, the distribution of relative investment weight is quite broad. At the extremes investment ranges from a large group of country pairs with effectively no investment to amounts that far exceed expected investment benchmarks. This broad distribution suggests the average investor country destination market pair is not a good basis for testing theories of cross-border investment. Using unconditional quantile regressions, we find that

the effect of investment drivers varies considerably across investment quantiles; many variables change significance or even signs across quantiles. We suggest that a pecking order of barriers can give rise to nonlinearities in factors that drive international investment.

Our analysis has important implications for research on international investment. On the empirical side, datasets used in this field are almost by necessity specialized, focusing on a particular slice of the investment distribution and subsequently masking important nonlinearities. Our results highlight that some theories are more likely to find empirical support at certain parts of the distribution, so in a sense the choice of a dataset will drive many results. For theorists, our evidence might expand models exploring the nonlinearities of effects that vary through the investment distribution.

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Table 1. Relative Weight by Country

This table shows the time-series average (for at most 17 observations from 2001 to 2017) of bilateral float-adjusted relative weight in percent for our working sample of 39 investor/home markets (columns) and 39 destination/host markets (rows). In this table, 100 means that the weights of the destination market in the investor-country portfolio and in the world float portfolio are identical. Asterisks (*) denote investor-destination pairs with insufficient data. Relative weight is constructed using data from IMF CPIS, World Bank, and ThomsonReuters Worldscope.

Table 1 (continued)

Destination \ Investor	ARGENTINA	AUSTRALIA	AUSTRIA	BELGIUM	BRAZIL	CANADA	CHILE	COLOMBIA	DENMARK	EGYPT	FINLAND	FRANCE	GERMANY	GREECE	HONG KONG	INDIA	INDONESIA	ISRAEL	ITALY	JAPAN
ARGENTINA		1.5	9.1	9.5	251	6.0	250	0	221	0	0	12	4.7	0	0	0	0	0	36	1.0
AUSTRALIA	2.8		16	5.5	0.10	29	3.1	0	23	0	11	8.4	14	0	8.4	0.33	1.5	1.1	8.4	29
AUSTRIA	0.59	14		86	0.71	30	3.7	0	157	0	100	101	431	5.1	1.1	0	0	43	194	17
BELGIUM	0.05	19	82		21	23	6.3	0.03	53	4.2	44	256	89	20	1.7	0.07	0.01	3.7	27	14
BRAZIL	194	14	16	12		34	130	12	79	0	7.3	26	19	1	0	0.09	<0.01	0.89	23	12
CANADA	0.86	14	17	7.7	0.62		4.7	4.7	14	0	2.9	5.4	9.9	5.4	4.3	0.03	<0.01	1.6	3.8	14
CHILE	32	10	4.0	4.2	20	18		*	21	0	0	8.5	3.0	0	0	0.16	0	0.17	6.1	3.2
COLOMBIA	0.16	3.9	1.7	2.3	6.0	7.0	100		6.9	0	0	6.2	1.4	0	0	0	0	0	0.67	2.9
DENMARK	0.01	17	45	29	0.71	32	0.71	0		0	243	38	50	3.2	1.3	0.25	0	2.1	12	18
EGYPT	0	2.1	3.7	2.5	0.03	7.9	1.7	0	31		0	30	4.2	371	0	0.05	0	0	2.9	2.4
FINLAND	15	19	121	132	0.48	31	0.65	<0.01	216	0		144	194	9.4	2.3	0	0.01	3.2	53	22
FRANCE	2.8	22	123	325	2.6	38	5.6	0.28	77	5.3	93		176	24	2.9	0.03	<0.01	43	168	24
GERMANY	2.5	26	660	134	2.0	34	22	0.43	125	2.5	91	236		20	4.2	0.03	0.05	38	78	23
GREECE	0.18	10	75	73	0.03	22	1.4	0	54	0	92	82	60		1	0	0	13	36	15
HONG KONG	<0.01	22	13	5.4	0.06	17	3.8	0.13	33	0.17	14	14	8.4	1		0.45	32	5.4	5.8	17
INDIA	0.86	20	23	5.2	0.02	17	5.1	0	54	0.02	27	22	5.7	0	6.2		76	0	4.9	10
INDONESIA	<0.01	18	41	11	<0.01	26	161	0	67	0	11	24	19	0	14	2.2		0	46	21
ISRAEL	<0.01	14	21	14	4.9	33	2.3	0	78	0	10	13	16	2.0	0	0.01	0		13	7.8
ITALY	2.8	16	82	73	1.6	26	0.87	0	65	13	44	199	125	8.3	2.7	0	<0.01	7.1		17
JAPAN	2.3	24	19	8.6	0.06	27	1.3	0.13	46	0.56	13	29	17	0	7.2	0.03	0.48	3.0	13	
KOREA	0.36	23	17	6.7	<0.01	30	8.3	0	57	0.05	15	23	15	0	17	0.44	0.13	0.07	12	10
MALAYSIA	0	13	17	5.3	0.02	14	5.5	0	43	3.5	16	11	6.3	0	28	0.19	1.0	0.03	7.3	9.7
MEXICO	78	11	12	5.3	1.8	50	53	3.0	104	0	3.3	18	11	0	0	0.16	0	1.7	12	5.0
NETHERLANDS	6.6	*	164	224	5.8	46	11	0.03	109	0.92	116	245	193	18	2.6	0.08	1.2	18	91	23
NEWZEALAND	0	556	12	3.4	<0.01	41	42	0	28	0	0	10	12	0	6.0	0.41	<0.01	0.58	23	18
NORWAY	0.16	19	77	54	0.93	38	7.6	0	293	0	316	46	85	17	1.6	0.19	0	12	15	17
PAKISTAN	0	1.2	0.93	0.02	0	2.2	0.05	0	14	0	0	1	0	0	1.6	0	0	*	0.06	0.10
PERU	6.7	2.8	4.3	0.92	5.0	7.6	256	81	10	0	1.2	2.4	2.0	0	0	0	0	0	4.2	1.3
PHILIPPINES	0	11	29	5.6	<0.01	22	13	0	90	0	5.7	21	13	0	28	0.22	0.91	4.0	7.9	18
PORTUGAL	0.59	16	43	80	120	31	0.76	0	48	0	43	172	78	21	1.6	0	0	1.1	67	15
SINGAPORE	<0.01	40	30	7.9	0.24	41	16	0	43	2.6	42	15	21	0	85	0.83	47	1.7	13	29
SOUTH AFRICA	<0.01	11	9.2	6.3	0.34	*	1.7	0	23	0	6.0	8.8	7.6	12	0	0.23	<0.01	0.37	4.9	3.1
SPAIN	92	12	41	59	21	19	7.4	3.9	48	0	31	133	90	4.5	1	<0.01	<0.01	2.2	32	13
SWEDEN	1.5	17	41	23	0.39	22	8.4	0.74	402	0	716	30	44	4.0	1.1	0.03	0	1.5	15	17
SWITZERLAND	1.4	19	138	47	5.4	36	6.1	0.10	114	4.4	61	79	116	14	2.7	0.31	0.02	9.0	42	23
THAILAND	0	20	36	15	0.05	24	11	0	81	0.59	38	11	24	1	77	1.8	17	1.1	16	15
TURKEY	0	20	179	17	0.01	22	7.0	<0.01	83	2.6	0	27	33	118	0	0.70	0	4.1	28	9.0
U.K.	4.1	42	71	39	1.1	42	17	0.14	100	2.3	92	72	63	40	67	0.13	0.03	17	28	27
U.S.A.	84	33	23	12	3.6	44	40	29	38	0.21	28	14	17	8.5	3.5	0.18	0.79	54	9	22

Table 1 (continued)

Destination \ Investor	KOREA	MALAYSIA	MEXICO	NETHERLANDS	NEW ZEALAND	NORWAY	PAKISTAN	PERU	PHILIPPINES	PORTUGAL	SINGAPORE	SOUTH AFRICA	SPAIN	SWEDEN	SWITZERLAND	THAILAND	TURKEY	U.K	U.S.A
ARGENTINA	1.9	0	0	7.8	0	16	0	0	0	0	6.9	1.5	20	11	6.9	0	0.02	43	21
AUSTRALIA	12	17	0	69	854	64	0	1.1	0.19	12	78	2.7	0.14	28	20	42	0.05	70	29
AUSTRIA	7.0	0	0	98	3.6	199	0.91	0	0	71	38	1.5	58	60	200	0.04	0.14	94	37
BELGIUM	6.4	0	0	140	2.1	140	0	2.0	0.14	109	13	5.5	43	19	43	0.45	0.45	47	30
BRAZIL	25	0	3.6	78	1.5	71	0	2.3	0.19	782	6.7	1.2	26	16	16	0.04	0.02	60	56
CANADA	4.3	0	0	24	19	38	0	4.2	<0.01	14	11	2.1	1.1	7.7	18	0.31	0.18	4.0	42
CHILE	4.9	0	0	44	0	36	0	609	0	0	2.3	0.08	19	8.0	7.6	0.29	0	22	22
COLOMBIA	3.8	<0.01	0	19	0	19	0	166	0	0	0.50	0	1.1	*	4.5	0.03	0	8	27
DENMARK	11	4.7	0	92	8.2	455	0	*	0	71	19	3.8	1.8	162	26	<0.01	0.02	72	38
EGYPT	3.9	1.4	0	18	0	55	0	0	0	9.8	0.38	22	<0.01	4.2	3.5	1.1	0	9.7	19
FINLAND	2.4	0	0	121	5.6	310	0	*	0	91	21	1.1	36	726	52	0.01	0.11	129	51
FRANCE	7.3	1	1	116	13	145	0.15	11	0.06	210	23	2.7	114	60	69	2.4	0.15	78	40
GERMANY	7.9	1	1	125	23	166	0.05	15	4.2	280	25	7.3	64	65	133	0.99	4.5	100	41
GREECE	2.3	2.1	0	38	1	152	0	0	0.44	14	13	4.4	4.8	50	26	0.90	7.9	99	36
HONG KONG	25	37	0	54	8.1	31	0.04	1.4	1.4	4.8	168	0.49	3.0	17	9.1	9.8	0.26	53	18
INDIA	23	2.5	0	34	1.4	32	0	0	0.34	3.9	219	0.88	30	8.4	5.5	1.7	0.04	39	27
INDONESIA	20	153	0	73	2.5	37	0	0.24	0.06	6.3	391	0.23	2.5	19	18	122	0	110	43
ISRAEL	4.7	0	0	48	1.3	51	*	*	0	1.7	16	0.73	0.52	8.5	25	3.5	0.16	35	79
ITALY	4.7	0	0	89	3.5	124	0	0	0	214	25	1.4	56	37	36	4.1	0.03	73	26
JAPAN	9.0	1.6	0	48	38	72	0	1.6	0.11	21	58	1.3	4.2	29	19	0.99	0.01	57	32
KOREA		12	0	55	3.4	76	0	0.16	0.11	3.2	204	0.41	1.3	20	15	0.52	0	77	35
MALAYSIA	12		0	41	3.7	38	0	0.53	0.08	0.72	899	0.31	0	9.7	9.7	19	0.08	52	18
MEXICO	8.7	0		64	1.1	60	0	27	0.07	1.1	19	1.0	27	20	26	0.02	<0.01	86	78
NETHERLANDS	8.7	0	5.0		12	173	0	11	3.8	288	18	1.8	73	59	85	0.53	1.5	132	62
NEW ZEALAND	7.2	1.9	0	32		70	0	3.7	0.09	0	71	1.8	0.11	28	11	0.06	0.05	51	31
NORWAY	7.9	0	0	118	9.3		0	0	0	26	18	1.3	10	426	37	<0.01	0.05	118	44
PAKISTAN	1.3	0	0	8.4	0	1		0	0	0	2.4	0	0	2.2	0.26	0	0.79	9.8	6.5
PERU	2.4	0	0	8.9	0	8.8	0		0	0	0.61	0.37	2.3	8.0	3.6	0	0	21	8.8
PHILIPPINES	11	57	0	56	0	36	0	0		1.2	584	0.16	3.1	13	13	16	0	79	46
PORTUGAL	3.0	0	1.0	120	1	184	0	0	0		32	0.75	409	31	22	<0.01	0.19	98	25
SINGAPORE	16	500	<0.01	98	18	82	0	1.5	12	1.7		4.7	0.30	37	20	56	<0.01	110	47
SOUTH AFRICA	3.9	1.3	0	32	1	30	0	0.24	0.02	78	5.7		0.66	6.6	10	0.01	<0.01	26	21
SPAIN	4.9	0	4.4	79	4.4	90	0	8.52	0.03	1581	23	0.86		27	24	0.07	0.04	49	23
SWEDEN	2.4	0	0	92	9.3	348	0.11	*	0	31	33	1.9	6.3		29	0	0.05	65	25
SWITZERLAND	7.8	0	1	100	13	151	0.15	12	0.93	46	20	3.3	20	99		0.46	0.47	75	55
THAILAND	12	47	0	73	4.7	40	0	0.46	7.8	0.47	802	0.45	0.12	12	14		<0.01	92	29
TURKEY	15	0	0	74	1	128	0	0	0.73	5.6	8.9	1.3	11	74	26	<0.01		102	49
U.K.	9.3	8.1	1.3	134	72	161	0.47	*	1.4	208	73	164	23	81	39	0.61	0.30		46
U.S.A.	11	10	6.2	66	44	55	0.02	51	2.9	37	37	6.4	4.3	30	20	3.2	0.75	28	

Table 2. Weight in the World Market Portfolio

This table shows, for 2001 – 2017, the average market capitalization (cap) in country j (MC_j) scaled by the world market cap (MC_{world}), as well as float-adjusted market cap in country j (F_j) scaled by the float-adjusted world market cap (F_{world}), which is the denominator of float-adjusted relative weight. Data are expressed in percent.

	World Market Portfolio	Float-Adjusted World Market Portfolio
ARGENTINA	0.102	0.048
AUSTRALIA	2.237	2.275
AUSTRIA	0.225	0.145
BELGIUM	0.611	0.553
BRAZIL	1.654	1.198
CANADA	3.457	3.946
CHILE	0.399	0.178
COLOMBIA	0.264	0.149
DENMARK	0.414	0.344
EGYPT	0.144	0.129
FINLAND	0.458	0.512
FRANCE	4.024	3.504
GERMANY	3.080	2.771
GREECE	0.229	0.152
HONG KONG	4.120	2.673
INDIA	2.205	1.411
INDONESIA	0.486	0.352
ISRAEL	0.322	0.257
ITALY	1.561	1.430
JAPAN	8.290	7.975
KOREA	1.747	1.659
MALAYSIA	0.626	0.393
MEXICO	0.682	0.499
NETHERLANDS	1.418	1.440
NEW ZEALAND	0.098	0.083
NORWAY	0.429	0.291
PAKISTAN	0.095	0.090
PERU	0.139	0.107
PHILIPPINES	0.241	0.118
PORTUGAL	0.161	0.112
SINGAPORE	0.928	0.659
SOUTH AFRICA	1.394	1.192
SPAIN	2.176	1.932
SWEDEN	0.989	1.054
SWITZERLAND	2.365	2.692
THAILAND	0.454	0.310
TURKEY	0.366	0.173
U.K.	6.921	7.462
U.S.A.	39.815	45.464

Table 3. Summary Statistics and Data Description

This table reports the mean and standard deviation for variables on the foreign investment weight and investment determinants used in the foreign investment regressions. The sample size is 39 source countries by 39 destination countries for at most 17 annual points in time (2001-2017). Any variable that is bilateral is so denoted in the Variable column; one bilateral variable (cross-list) is also directional.

				Investment Level		
			Full Sample (N=20,396)	Very Low (N=10,198)	Moderate (N=8,713)	Very High (N = 1,485)
	Variable	Definition and Source	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.
Information	Cross-list (directional)	Proportion of market capitalization of the destination country listed in the home country Source: Author survey	0.017 0.076	0.000 0.008	0.028 0.094	0.068 0.151
	Internet	Number of internet users per 100 people Source: World Bank	54.529 26.969	41.061 25.787	68.059 20.531	67.642 21.412
	Common Language	Dummy variable that equals 1 when two countries share a similar official language Source: CIA World Factbook	0.109 0.312	0.086 0.280	0.114 0.318	0.247 0.431
	Annual Returns	Past year and current year market returns Source: MSCI	0.032 0.130	0.041 0.147	0.025 0.108	0.021 0.122
Familiarity	Bilateral Trade	Ratio of total bilateral trade (Imports + Exports) between the holder country and destination country relative to the holder country's total imports and exports Source: Direction of Trade Statistics (DOT) from IMF	0.019 0.042	0.011 0.025	0.022 0.047	0.060 0.067
	Distance (bilateral)	Distance in kilometers between most populated cities of two countries Source: Mayer and Zignago (2011)	8.723 0.943	9.056 0.623	8.601 0.935	7.147 1.048
	Contiguity (bilateral)	Dummy variable that equals 1 when two countries are contiguous Source: Mayer and Zignago (2011)	0.043 0.202	0.012 0.107	0.032 0.176	0.319 0.466
	Colonial Link (bilateral)	Dummy variable that equals 1 when two countries have ever had a colonial link Source: Mayer and Zignago (2011)	0.036 0.186	0.022 0.148	0.049 0.216	0.052 0.222
	Unilateral Trade	Ratio of sum of import and export to GDP Source: World Bank	0.876 0.775	0.834 0.795	0.896 0.731	1.042 0.854

Table 3 (continued)

Hedging motives	Correlation (bilateral)	Correlation of past year daily market returns of holder country and destination country. Source: Datastream market indices	0.379 0.240	0.294 0.201	0.434 0.235	0.635 0.240
	RER Volatility (bilateral)	Standard deviation of monthly real exchange rate changes during the past 12 months. Source: Authors' calculations, IMF	0.019 0.119	0.020 0.111	0.019 0.133	0.013 0.069
	Return Volatility	Volatility of current year market returns Source: MSCI	0.015 0.012	0.017 0.015	0.014 0.007	0.015 0.009
Transaction costs	Common Currency (bilateral)	Dummy variable that equals 1 when two countries use a common currency. Source: de Sousa (2012)	0.065 0.247	0.007 0.084	0.081 0.273	0.372 0.483
	Financial Sector Size	Stock market capitalization plus public and private bonds plus private credit scaled by GDP Source: World Bank Global Financial Development	2.267 1.858	2.056 2.107	2.538 1.608	2.135 0.989
	Capital Controls	Index for average restrictions on cross-border equity transactions ranging from 0 (no restrictions) to 1. Source: Fernandez et al. (2016)	0.320 0.362	0.493 0.386	0.148 0.229	0.139 0.231
	Turnover	Ratio of annual total traded volume to market capitalization Source: Datastream	0.346 3.328	0.594 4.635	0.098 0.798	0.098 0.216
Governance	Investor Protection	Index based on the number of obstacles a controlling shareholder must overcome to complete a (hypothetical) self-dealing transaction successfully. Ranges from 0 (poor protection) to 1. Source: Djankov et al. (2008)	0.532 0.239	0.556 0.244	0.509 0.230	0.491 0.244
	Rule of Law	Rule of law index from zero to 10, with lower scores for less tradition for law and order. Source: La Porta et al. (1998)	7.394 2.449	5.901 2.221	8.855 1.656	9.073 1.326
	Low Investment Risk	Investment risk factor score (0 very high to 12 very low) Source: International Country Risk Guide	10.049 1.898	9.137 1.889	10.956 1.401	10.997 1.424
Domestic bias	Domestic bias	Weight of home market in investor country portfolio relative to weight of home country in world portfolio Source: IMF CPIS	268.637 657.156	460.936 750.720	92.767 350.254	-20.060 907.324

Table 4. Summary Statistics for Cross-Listings

This table reports the average percent of equity listed in foreign markets for all pairs of home (listed down the first column) and host (listed across the first row) markets. The sample size is 39 source countries by 39 destination countries for at most 17 annual points in time (2001-2017). Asterisks (*) denote investor/destination pairs with insufficient data.

Home \ Host	ARGENTINA	AUSTRALIA	AUSTRIA	BELGIUM	BRAZIL	CANADA	CHILE	COLOMBIA	DENMARK	EGYPT	FINLAND	FRANCE	GERMANY	GREECE	HONG KONG	INDIA	INDONESIA	ISRAEL	ITALY
ARGENTINA		0	0	0	34	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0
AUSTRALIA	0		0	0	0	1.3	0	0	0	0	0	0.74	9.1	0	0	0	0	0	0
AUSTRIA	0	0		0	0	0	0	0	0	0	0	3.5	20	0	0	0	0	0	0
BELGIUM	0	0	0		0	0	0	0	0	0	0	3.7	8.0	0	0	0	0	0	2.4
BRAZIL	5.7	0	0	0		0	0	0	0	0	0	3.2	0	0	2.3	0	0	0	0
CANADA	0	0.13	0	2.9	0.05		0.13	0.0001	0	0	0	0.82	0.03	0	2.2	0	0	0.01	0.12
CHILE	0	0	0	0	1.0	0		*	0	0	0	0	0	0	0	0	0	0	0
COLOMBIA	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
DENMARK	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
EGYPT	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
FINLAND	0	0	0	0	0	0	0	0	0	0		19	36	0	0	0	0	0	16
FRANCE	0	0	0	12	0	0.001	0	0	0	0	0		5.7	0	0	0	0	0	25
GERMANY	0	0	6.7	0.10	0	0	0	0	0	0	0	4.7		0	0.003	0	0	0	36
GREECE	0	2.6	0	0	0	0	0	0	9.2	0	0	0	0		0	0	0	0	0
HONG KONG	0	0.01	0	0	0	0.001	0	0	0	0	0	0	0	0		0	0	0	0
INDIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
INDONESIA	0	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
ISRAEL	0	0	0	0.04	0	0	0	0	0	0	0	0	0.06	0	0	0	0		0
ITALY	0	0	0	2.3	0	0	0	0	0	0	0	1.4	8.0	0	0.71	0	0	0	
JAPAN	0	0	0.40	0.12	0	0.72	0	0	0	0	0	1.8	9.0	0	0.21	0	0	0	0
KOREA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MALAYSIA	0	0.0004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NETHERLANDS	0	44	4.5	12	0	0	0	0	0	0	0	10	55	0	0	0	0	0.10	19
NEW ZEALAND	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORWAY	0	0	0	0	0	0	0	0	0.46	0	0	0	5.3	0	0	0	0	0	0
PAKISTAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	0
PERU	0	0	0	0	0	0	2.2	0	0	0	0	0	0	0	0	0	0	0	0
PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	6.8	0	0	0	0	0	0
SINGAPORE	0	6.2	0	0	0	0.0002	0	0	0	0	0	0	0.003	0	0.16	0	0	0	0
SOUTH AFRICA	0	0.40	0	5.1	0	*	0	0	0	0	0	0.50	1.6	0	0	0	0	0	0
SPAIN	18	0	0	0	6.6	0	0	8.1	0	0	0	6.5	20	0	0	0	0	0	9.5
SWEDEN	0	0	0	2.3	0	0.58	0	0	7.4	0	4.5	0.68	9.6	0	0	0	0	0	0
SWITZERLAND	0	0	0.49	9.1	0.08	0.01	0	0	0	0	0	7.5	20	0	0	0	0	0	0.15
THAILAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TURKEY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U.K.	0	0.33	0.01	0.05	0	7.6	0	0	0.17	0	0	9.5	10	0	0.36	0.69	0	0.001	0
U.S.A.	0	0.32	0.32	4.1	2E-05	2.6	9.9	0	0	0	0.002	6.4	12	0	0.03	0	0	0.02	0

Table 4 (continued)

Home \ Host	JAPAN	KOREA	MALAYSIA	MEXICO	NETHERL.	N.ZEALAND	NORWAY	PAKISTAN	PERU	PHILIPPINES	PORTUGAL	SINGAPORE	SOUTH AFRICA	SPAIN	SWEDEN	SWITZER.	THAILAND	TURKEY	U.K.	U.S.A
ARGENTINA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.57	0	0	0.98	59
AUSTRALIA	4.7	0	0	0	0	30	0	0	0	0	0	0.15	0.97	0	0	9.0	0	0	20	26
AUSTRIA	0	0	0	0	0.03	0	0	0	0	0	0	0	0	0	0	0.03	0	0.26	0	5.2
BELGIUM	0	0	0	0	7.7	0	0.01	0	0	0	0	0	0	0	*	1.5	0	0	0	14
BRAZIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	35
CANADA	4.0	0	0	0	2.9	0.02	0.01	0	0	0	0	0.0004	0.03	0	0.03	8.4	0	0	20	50
CHILE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.9	22
COLOMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.9
DENMARK	0	0	0	0	0	0	0.09	0	*	0	0	0	0	0	0.12	4.8	0	0	17	19
EGYPT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0
FINLAND	0	0	0	0	33	0	0	0	*	0	0	0	0	0	18	0	0	0	34	42
FRANCE	3.5	0	0	0	18	0	0	0	0	0	0	0	0	0.80	1.7	4.7	0	0	12	25
GERMANY	7.7	0	0	0	23	0	0	0	0	0	0	1.6	0	6.1	0.73	38	0	0	24	28
GREECE	0	0	0	0	0	0	0.71	0	0	0	0	0	0	0	0	0	0	0	64	25
HONG KONG	0.48	0	0	0	0	0	0.01	0	0	0	0	6.6	0	0	0	0	0	0	0.59	9.6
INDIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.7	4.6
INDONESIA	0	0	0	0	0	0	0	0	0	0	0	0.22	0	0	0	0	0	0	9.5	8.3
ISRAEL	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0	0.15	0	0	6.7	43
ITALY	0	0	0	0	17	0	0	0	*	0	0	0	0	0.48	0	0.03	0	0	0	31
JAPAN		<0.01	0	0	3.1	0	0	0	0	0	0	0.79	0	0	0	2.3	0	0	18	15
KOREA	2.6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	17
MALAYSIA	1.4	0		0	0	0	0	0	0	0	0	4.4	0	0	0	0	0	0	3.4	0
MEXICO	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
NETHERLANDS	2.8	0	0	0		0	0	0	0	0	0	9.6	0	1.8	0.61	59	0	0	58	59
NEW ZEALAND	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	12
NORWAY	0	0	0	0	4.4	0		0	0	0	0	0.06	0	0	4.8	8.7	0	0	3.8	34
PAKISTAN	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
PERU	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	20
PHILIPPINES	0	0	0	0	0	0	0	0	0		0	0.07	0	0	0	0	0	0	0	0.002
PORTUGAL	0	0	0	0	7.1	0	0	0	0	0		0	0	0	0	0	0	0	9.6	27
SINGAPORE	0	0	0	0	0	0	0.01	0	0	0	0		0	0	0	0	0	0	0.02	0.89
SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0		0	0	1.6	0	0	20	11
SPAIN	6.5	0	0	0	13	0	0	0	0	0	1.3	0	0		0	16	0	0	23	65
SWEDEN	1.7	0	0	0	0.004	0	0.41	0	*	0	0	6.8	0	0		7.3	0	0	9.6	19
SWITZERLAND	6.7	0	0	0	3.0	0	0	0	0	0	0	0.22	0	0	4.6		0	0	20	32
THAILAND	0	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	0		0	0	0
TURKEY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		20	7.7
U.K.	9.2	0	0	0.27	0.94	0.88	0.06	0	*	0	0	5.7	1.4	0	2.3	6.0	0	0		44
U.S.A.	7.1	0	0	0.20	11	0.0003	0.05	0	0	0	0	0	0.002	0	0.03	12	0	0	19	

Table 5. Determinants across the Foreign Investment Distribution

This table presents the results from OLS and unconditional quantile regressions of relative weight. OLS results are in column (1); Quantile regression results are in columns (2-6). The sample size is 39 source countries by 39 destination countries for at most 17 annual points in time (2001-2017). Variable definitions are reported in Table 3. Standard errors clustered at the country-destination level are shown in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

			Unconditional Quantile Regressions				
		OLS	30	50	70	92	95
Information	Cross-list	0.675	-0.009	0.067***	0.654***	1.570*	1.577
		(0.480)	(0.009)	(0.019)	(0.112)	(0.823)	(1.779)
	Investor Internet	0.004***	0.001***	0.001***	0.004***	0.013***	0.016***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.002)	(0.004)
	Destination Internet	0.003**	-0.000	0.000	0.000	0.006*	0.012**
		(0.001)	(0.000)	(0.000)	(0.001)	(0.003)	(0.006)
	Common Language	0.308***	0.002	0.016**	0.112***	0.461***	1.080***
		(0.108)	(0.004)	(0.007)	(0.033)	(0.177)	(0.405)
	Investor Returns	-0.349	-0.000	0.022**	0.106***	0.088	-0.337
		(0.220)	(0.006)	(0.009)	(0.037)	(0.202)	(0.414)
	Investor Returns Lag 1 Year	-0.359**	-0.018***	0.014**	0.116***	0.227	-0.028
		(0.170)	(0.005)	(0.007)	(0.030)	(0.164)	(0.319)
	Destination Returns	-0.277	0.006	-0.004	-0.011	-0.072	-0.328
		(0.181)	(0.006)	(0.009)	(0.039)	(0.217)	(0.493)
	Destination Returns Lag 1 Year	-0.150	0.001	-0.005	-0.001	0.096	-0.062
		(0.148)	(0.005)	(0.007)	(0.036)	(0.181)	(0.448)
Familiarity	Bilateral Trade	3.133	0.159***	0.188**	0.565**	1.612	4.985
		(2.063)	(0.052)	(0.073)	(0.283)	(2.759)	(6.183)
	Distance	-0.196***	-0.008***	-0.025***	-0.157***	-0.659***	-0.972***
		(0.041)	(0.002)	(0.002)	(0.011)	(0.090)	(0.184)
	Contiguity	0.694***	-0.014**	-0.021**	-0.038	1.849***	4.619***
		(0.240)	(0.007)	(0.011)	(0.047)	(0.482)	(1.163)
	Colonial Link	0.168	0.020***	0.036***	0.161**	0.134	0.042
		(0.175)	(0.005)	(0.009)	(0.066)	(0.308)	(0.515)
	Investor Unilateral Trade	0.155***	-0.006***	-0.008***	-0.010	0.222**	0.512**
		(0.060)	(0.002)	(0.003)	(0.016)	(0.089)	(0.200)
	Destination Unilateral Trade	0.058**	-0.001	0.002	0.020	0.142**	0.264**
		(0.024)	(0.002)	(0.003)	(0.015)	(0.061)	(0.106)
Hedging motives	Correlation	-0.063	0.021***	0.006	0.155***	0.549***	0.560
		(0.102)	(0.006)	(0.008)	(0.042)	(0.173)	(0.344)
	RER volatility	-0.092**	-0.009**	-0.005	-0.078***	-0.216***	-0.265*
		(0.036)	(0.004)	(0.006)	(0.017)	(0.063)	(0.135)
	Investor Return Volatility	4.346***	-0.012	-0.062	0.333	6.340***	15.082***
		(1.459)	(0.080)	(0.098)	(0.425)	(2.176)	(4.685)
	Destination Return Volatility	4.923***	0.173*	0.549***	3.095***	8.446***	15.145***
		(1.627)	(0.095)	(0.134)	(0.595)	(2.808)	(5.167)

Table 5 (continued)

Transaction costs	Common Currency	0.415***	-0.000	0.016***	0.176***	1.361***	2.101***
		(0.159)	(0.004)	(0.006)	(0.036)	(0.339)	(0.703)
	Investor Financial Sector Size	-0.078***	0.006***	-0.001	-0.023***	-0.123***	-0.228***
		(0.019)	(0.001)	(0.001)	(0.006)	(0.029)	(0.063)
	Destination Financial Sector Size	-0.027***	0.003***	0.002	-0.005	-0.077***	-0.146***
		(0.010)	(0.001)	(0.001)	(0.006)	(0.023)	(0.044)
	Investor Capital Controls	0.108**	-0.001	-0.012**	0.043*	0.335***	0.462**
		(0.047)	(0.005)	(0.006)	(0.024)	(0.113)	(0.228)
	Dest. Cap. Controls	0.167**	0.003	0.025***	0.078***	0.349***	0.540**
		(0.073)	(0.004)	(0.006)	(0.028)	(0.125)	(0.245)
	Investor Turnover	-0.004**	-0.001***	-0.001***	-0.004***	-0.012***	-0.021***
		(0.002)	(0.000)	(0.000)	(0.001)	(0.004)	(0.007)
	Destination Turnover	-0.006***	-0.000*	-0.000	-0.002	-0.020***	-0.029***
		(0.002)	(0.000)	(0.000)	(0.002)	(0.005)	(0.009)
Governance	Investor Protection	0.209**	-0.022***	-0.035***	0.093**	0.322*	0.579*
		(0.100)	(0.006)	(0.010)	(0.044)	(0.187)	(0.340)
	Destination Investor Protection	0.084	-0.003	0.006	-0.030	-0.092	-0.027
		(0.118)	(0.006)	(0.008)	(0.039)	(0.205)	(0.414)
	Investor Rule of Law	0.006	0.005***	0.015***	0.047***	0.009	-0.007
		(0.009)	(0.001)	(0.001)	(0.005)	(0.020)	(0.037)
	Destination Rule of Law	0.008	0.003***	0.004***	0.021***	0.026	0.011
		(0.012)	(0.001)	(0.001)	(0.006)	(0.027)	(0.055)
	Investor Low Investment Risk	0.002	0.001	0.006***	0.019***	0.011	0.050
		(0.010)	(0.001)	(0.001)	(0.005)	(0.022)	(0.043)
	Destination Low Investment Risk	-0.024	0.002**	0.003**	0.003	-0.035	-0.054
		(0.015)	(0.001)	(0.001)	(0.005)	(0.024)	(0.048)
Domestic bias	Domestic Bias	-0.000**	-0.000***	-0.000	0.000	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Obs.	20,396	20,396	20,396	20,396	20,396	20,396
	R^2	0.192	0.373	0.503	0.438	0.318	0.254

Table 6. The Extensive Margin of Foreign Investment Determinants

This table presents the results from probit and ordered probit regressions of relative weight. In column (1), the dependent variable is 0 for a relative weight equal to zero and 1 for a relative weight above 0. In column (2), the dependent variable is 0 for a relative investment weight equal to 0, 1 for a "low" positive relative investment weight, 2 for a "moderate" relative investment weight, and 3 for "very high" relative investment weight.

		(1) Probit	(2) Ordered Probit
		Any Investment	Investment Tiers
Information	Cross-list	4.343**	0.883**
		(1.871)	(0.376)
	Investor Internet	0.018***	0.017***
		(0.002)	(0.001)
	Destination Internet	-0.000	0.002
		(0.002)	(0.002)
	Common Language	0.089	0.306***
		(0.116)	(0.105)
	Investor Returns	0.445**	0.210
		(0.175)	(0.141)
	Investor Returns Lag 1 Year	-0.201	-0.039
		(0.151)	(0.117)
	Destination Returns	0.122	-0.053
		(0.155)	(0.132)
	Destination Returns Lag 1 Year	0.023	-0.042
		(0.135)	(0.113)
Familiarity	Bilateral Trade	22.919***	3.579**
		(4.363)	(1.812)
	Distance	-0.321***	-0.446***
		(0.056)	(0.040)
	Contiguity	-0.087	0.263
		(0.243)	(0.198)
	Colonial Link	0.289*	0.497***
		(0.171)	(0.157)
	Investor Unilateral Trade	-0.193***	-0.080
		(0.045)	(0.049)
	Destination Unilateral Trade	-0.046	0.032
		(0.052)	(0.037)
Hedging motives	Correlation	0.810***	0.490***
		(0.149)	(0.114)
	RER volatility	-0.327***	-0.223***
		(0.085)	(0.083)
	Investor Return Volatility	1.425	2.474
		(2.142)	(1.992)
	Destination Return Volatility	4.718**	9.388***
		(2.250)	(2.132)

Table 6 (continued)

Transaction costs	Common Currency	-0.237	0.468***
		(0.220)	(0.124)
	Investor Financial Sector Size	0.243***	0.033*
		(0.043)	(0.017)
	Destination Financial Sector Size	0.085***	0.034**
		(0.024)	(0.015)
	Investor Capital Controls	0.283***	0.132
		(0.103)	(0.081)
	Destination Capital Controls	0.080	0.337***
		(0.110)	(0.090)
	Investor Turnover	-0.014***	-0.018***
		(0.005)	(0.004)
	Destination Turnover	-0.014***	-0.013***
		(0.005)	(0.005)
Governance	Investor Protection	-1.130***	-0.371***
		(0.181)	(0.130)
	Destination Investor Protection	-0.158	-0.022
		(0.152)	(0.118)
	Investor Rule of Law	0.145***	0.168***
		(0.019)	(0.016)
	Destination Rule of Law	0.093***	0.077***
		(0.021)	(0.020)
	Investor Low Investment Risk	-0.031	0.035**
		(0.021)	(0.017)
	Destination Low Investment Risk	0.054**	0.034*
		(0.021)	(0.018)
Domestic bias	Domestic Bias	-0.000***	-0.000***
		(0.000)	(0.000)
	Obs.	20,396	20,396

Table 7. Restated Foreign Investment Holdings Distribution

This table presents the results from OLS and unconditional quantile regressions of relative weight constructed using the restated holdings from Coppola, Maggiori, Neiman, and Schreger (2021). OLS results are in column (1); Quantile regression results are in columns (2-6). The sample size is 28 source countries by 38 destination countries for at most 17 annual points in time (2001-2017). Variable definitions are reported in Table 3. Standard errors clustered at the country-destination level are shown in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

			Unconditional Quantile Regressions				
		OLS	30	50	70	92	95
Information	Cross-list	1.032**	-0.008	0.030*	0.556***	3.741***	2.930**
		(0.438)	(0.009)	(0.016)	(0.124)	(0.820)	(1.308)
	Investor Internet	0.003***	0.001***	0.001***	0.003***	0.009***	0.007***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.002)	(0.003)
	Destination Internet	0.002*	0.000	0.000	0.000	0.003	0.008**
		(0.001)	(0.000)	(0.000)	(0.001)	(0.003)	(0.004)
	Common Language	0.150**	-0.000	0.008	0.063**	0.297*	0.497**
		(0.073)	(0.004)	(0.005)	(0.031)	(0.153)	(0.219)
	Investor Returns	-0.096	-0.031***	-0.026***	-0.102**	-0.403**	-0.537**
		(0.068)	(0.007)	(0.008)	(0.043)	(0.203)	(0.268)
	Investor Returns Lag 1 Year	-0.073	-0.017***	-0.014**	-0.003	-0.187	-0.174
		(0.047)	(0.006)	(0.007)	(0.034)	(0.149)	(0.198)
	Destination Returns	0.054	0.004	0.007	0.062	0.424	0.460
		(0.084)	(0.007)	(0.009)	(0.050)	(0.265)	(0.344)
	Destination Returns Lag 1 Year	0.113*	0.012**	0.013	0.102**	0.528**	0.423
		(0.068)	(0.006)	(0.008)	(0.046)	(0.207)	(0.297)
Familiarity	Bilateral Trade	0.852	0.125***	0.161***	0.528	1.715	1.632
		(1.159)	(0.046)	(0.062)	(0.341)	(1.708)	(2.629)
	Distance	-0.180***	-0.002	-0.008***	-0.091***	-0.669***	-0.818***
		(0.029)	(0.002)	(0.002)	(0.014)	(0.082)	(0.123)
	Contiguity	0.200	-0.009	-0.011	-0.066	-0.117	-0.203
		(0.329)	(0.008)	(0.011)	(0.063)	(0.514)	(0.735)
	Colonial Link	0.161	0.017***	0.031***	0.185***	0.040	-0.003
		(0.192)	(0.005)	(0.006)	(0.059)	(0.341)	(0.417)
	Investor Unilateral Trade	0.064*	-0.004**	-0.006**	-0.029*	0.135	0.256*
		(0.036)	(0.002)	(0.003)	(0.017)	(0.090)	(0.145)
	Destination Unilateral Trade	0.041*	0.004**	0.008***	0.063***	0.182**	0.201**
		(0.022)	(0.002)	(0.002)	(0.016)	(0.075)	(0.096)
Hedging motives	Correlation	0.214***	0.039***	0.026***	0.074	0.920***	0.925***
		(0.062)	(0.005)	(0.007)	(0.045)	(0.188)	(0.248)
	RER volatility	-0.070	-0.006	0.002	0.053	-0.330*	-0.721***
		(0.055)	(0.007)	(0.007)	(0.034)	(0.198)	(0.210)
	Investor Return Volatility	3.118***	0.226**	0.242***	0.968*	10.546***	12.346***
		(1.093)	(0.094)	(0.093)	(0.504)	(2.416)	(3.127)
	Destination Return Volatility	3.274**	0.273**	0.328**	1.569**	5.941	9.568*
		(1.586)	(0.106)	(0.140)	(0.694)	(3.878)	(4.980)

Table 7 (continued)

Transaction costs	Common Currency	2.688***	-0.007	0.012	0.167**	2.702***	5.927***
		(0.859)	(0.013)	(0.014)	(0.073)	(0.567)	(0.827)
	Investor Financial Sector Size	-0.045***	0.002***	0.001	-0.015**	-0.109***	-0.139***
		(0.013)	(0.001)	(0.001)	(0.007)	(0.031)	(0.049)
	Destination Financial Sector Size	-0.027***	0.001	-0.001	-0.017***	-0.101***	-0.108***
		(0.007)	(0.001)	(0.001)	(0.006)	(0.025)	(0.032)
	Investor Capital Controls	0.037	0.005	-0.016***	-0.043	0.199	0.197
		(0.033)	(0.005)	(0.006)	(0.027)	(0.122)	(0.144)
	Destination Capital Controls	0.137***	0.004	0.013**	0.076**	0.288**	0.476***
		(0.047)	(0.005)	(0.006)	(0.032)	(0.141)	(0.176)
	Investor Turnover	-0.650**	-0.156***	-0.176***	-0.445***	-0.663	-1.046
		(0.258)	(0.015)	(0.017)	(0.108)	(0.670)	(0.875)
	Destination Turnover	-0.013	-0.004	0.000	-0.008	-0.051	0.002
		(0.035)	(0.004)	(0.005)	(0.025)	(0.145)	(0.203)
Governance	Investor Protection	0.162*	0.050***	0.026***	0.054	0.547***	0.529**
		(0.083)	(0.006)	(0.008)	(0.046)	(0.181)	(0.234)
	Destination Investor Protection	0.082	-0.000	-0.003	0.018	0.119	0.044
		(0.071)	(0.005)	(0.007)	(0.039)	(0.184)	(0.245)
	Investor Rule of Law	0.034***	0.003***	0.006***	0.056***	0.075***	0.080***
		(0.006)	(0.001)	(0.001)	(0.005)	(0.023)	(0.028)
	Destination Rule of Law	0.023***	0.004***	0.004***	0.029***	0.051*	0.039
		(0.008)	(0.001)	(0.001)	(0.006)	(0.031)	(0.041)
	Investor Low Investment Risk	0.017**	-0.001	0.001	0.023***	0.018	0.026
		(0.008)	(0.001)	(0.001)	(0.006)	(0.026)	(0.035)
	Destination Low Investment Risk	-0.011	-0.002**	-0.001	-0.003	-0.043	-0.063*
		(0.011)	(0.001)	(0.001)	(0.006)	(0.027)	(0.036)
Domestic bias	Domestic Bias	0.000	0.000	-0.000	-0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Obs.	9,113	9,113	9,113	9,113	9,113	9,113
	R^2	0.314	0.426	0.495	0.464	0.296	0.239

Table 8. Conditional QR Effects across the Foreign Investment Distribution

This table presents the results from OLS and Conditional quantile regressions of relative weight. OLS results are in column (1); Quantile regression results are in columns (2-6). The sample size is 39 source countries by 39 destination countries for at most 17 annual points in time (2001-2017). Variable definitions are reported in Table 3. Standard errors clustered at the country-destination level are shown in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

			Conditional Quantile Regressions				
		OLS	30	50	70	92	95
Information	Cross-list	0.675	0.685***	0.736***	0.922***	1.044***	1.809***
		(0.480)	(0.132)	(0.184)	(0.279)	(0.398)	(0.574)
	Investor Internet	0.004***	0.001***	0.002***	0.003***	0.004***	0.005***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
	Destination Internet	0.003**	0.000**	0.000*	0.000*	0.001	-0.000
		(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
	Common Language	0.308***	0.015**	0.033***	0.063***	0.203	0.436
		(0.108)	(0.007)	(0.010)	(0.016)	(0.166)	(0.285)
	Investor Returns	-0.349	0.027***	0.038***	0.064***	0.070	-0.004
		(0.220)	(0.007)	(0.008)	(0.017)	(0.069)	(0.093)
	Investor Returns Lag 1 Year	-0.359**	0.023***	0.040***	0.051***	0.028	0.005
		(0.170)	(0.005)	(0.007)	(0.015)	(0.043)	(0.069)
	Destination Returns	-0.277	-0.002	-0.004	-0.022	0.090	0.056
		(0.181)	(0.008)	(0.012)	(0.022)	(0.087)	(0.145)
	Destination Returns Lag 1 Year	-0.150	0.006	0.012	0.013	0.033	0.005
		(0.148)	(0.006)	(0.009)	(0.017)	(0.056)	(0.100)
Familiarity	Bilateral Trade	3.133	0.173	0.498	1.372**	6.656***	8.611*
		(2.063)	(0.126)	(0.352)	(0.580)	(2.239)	(4.697)
	Distance	-0.196***	-0.031***	-0.057***	-0.103***	-0.283***	-0.371***
		(0.041)	(0.005)	(0.007)	(0.011)	(0.045)	(0.053)
	Contiguity	0.694***	0.266**	0.477	0.996***	2.601***	3.143***
		(0.240)	(0.112)	(0.307)	(0.287)	(0.389)	(0.429)
	Colonial Link	0.168	-0.005	0.007	0.095	0.403*	0.391
		(0.175)	(0.012)	(0.037)	(0.064)	(0.238)	(0.368)
	Investor Unilateral Trade	0.155***	-0.009***	-0.018***	0.009	0.131**	0.190***
		(0.060)	(0.004)	(0.006)	(0.008)	(0.053)	(0.047)
	Destination Unilateral Trade	0.058**	0.002	0.006	0.017**	0.046**	0.040
		(0.024)	(0.002)	(0.004)	(0.007)	(0.022)	(0.026)
Hedging motives	Correlation	-0.063	0.023***	0.039***	0.052***	0.103	0.142*
		(0.102)	(0.009)	(0.013)	(0.019)	(0.067)	(0.081)
	RER volatility	-0.092**	-0.012***	-0.019***	-0.025***	-0.051	-0.036
		(0.036)	(0.004)	(0.004)	(0.007)	(0.044)	(0.038)
	Investor Return Volatility	4.346***	0.074	0.123	0.158	0.920	1.355
		(1.459)	(0.069)	(0.104)	(0.202)	(0.977)	(1.280)
	Destination Return Volatility	4.923***	0.434***	0.689***	1.151***	1.167	1.716
		(1.627)	(0.122)	(0.187)	(0.321)	(1.011)	(1.871)

Table 8 (continued)

Transaction costs	Common Currency	0.415***	0.310***	0.437***	0.508***	0.532***	0.646
		(0.159)	(0.090)	(0.065)	(0.071)	(0.180)	(0.492)
	Investor Financial Sector Size	-0.078***	-0.000	-0.004**	-0.021***	-0.068***	-0.089***
		(0.019)	(0.001)	(0.002)	(0.003)	(0.015)	(0.014)
	Destination Financial Sector Size	-0.027***	0.000	-0.002	-0.005*	-0.018**	-0.017*
		(0.010)	(0.001)	(0.002)	(0.003)	(0.008)	(0.010)
	Investor Capital Controls	0.108**	0.012***	0.016**	0.001	0.012	0.030
		(0.047)	(0.005)	(0.007)	(0.011)	(0.027)	(0.044)
	Dest. Cap. Controls	0.167**	0.019***	0.021**	0.035***	0.104***	0.137***
		(0.073)	(0.005)	(0.009)	(0.013)	(0.038)	(0.047)
	Investor Turnover	-0.004**	-0.001***	-0.001	-0.002***	-0.005***	-0.006***
		(0.002)	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)
	Destination Turnover	-0.006***	-0.000	-0.001	-0.001*	-0.003**	-0.005***
		(0.002)	(0.000)	(0.000)	(0.001)	(0.001)	(0.002)
Governance	Investor Protection	0.209**	-0.016*	0.008	0.053**	0.113	0.123
		(0.100)	(0.009)	(0.014)	(0.023)	(0.081)	(0.089)
	Destination Investor Protection	0.084	-0.003	-0.006	-0.007	0.046	0.141*
		(0.118)	(0.006)	(0.010)	(0.017)	(0.053)	(0.076)
	Investor Rule of Law	0.006	0.008***	0.013***	0.013***	0.020***	0.022**
		(0.009)	(0.001)	(0.002)	(0.003)	(0.005)	(0.010)
	Destination Rule of Law	0.008	0.003***	0.004***	0.004	-0.007	-0.005
		(0.012)	(0.001)	(0.002)	(0.003)	(0.008)	(0.007)
	Investor Low Investment Risk	0.002	0.005***	0.009***	0.010***	0.017***	0.018**
		(0.010)	(0.001)	(0.001)	(0.002)	(0.006)	(0.008)
	Destination Low Investment Risk	-0.024	0.002**	0.001	-0.001	-0.008	-0.008
		(0.015)	(0.001)	(0.002)	(0.002)	(0.007)	(0.009)
Domestic bias	Domestic Bias	-0.000**	0.000**	0.000***	0.000	-0.000*	-0.000**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Obs.	20,396	20,396	20,396	20,396	20,396	20,396
	R^2	0.192	0.132	0.143	0.155	0.157	0.159

Figure 1. The Distribution of Cross Border Investment

The figure shows the distribution of annual investment weights (the percentage of equity wealth from home country *i* invested in destination country *j* scaled by the float-adjusted percentage of destination country *j* market capitalization in the world market portfolio) for each of the 20,396 country pairs (39 home countries and 39 host countries across sample years 2001 to 2018). For the full working sample, mean and standard deviation of relative investment weight are 0.33 and 1.26, respectively, and the skewness and kurtosis are 24 and 972, respectively. The red bar shows the sample for relative weight equal to 0 (27% of observations), while the purple bar shows the sample for relative weight between 0 and less than the median 0.0395 (23 % of observations). The blue bars show the sample for relative weight between 0.0395 and 1; this moderate investment group comprises 43% of observations. The green bars show the distribution for relative weight greater than 1; these very high investment levels make up 7% of observations. For illustrative purposes only, the figure shows the distribution with float-adjusted relative weight only up to 4. The tall green bar shows 1% of country pair observations exceed a relative investment weight of 4.

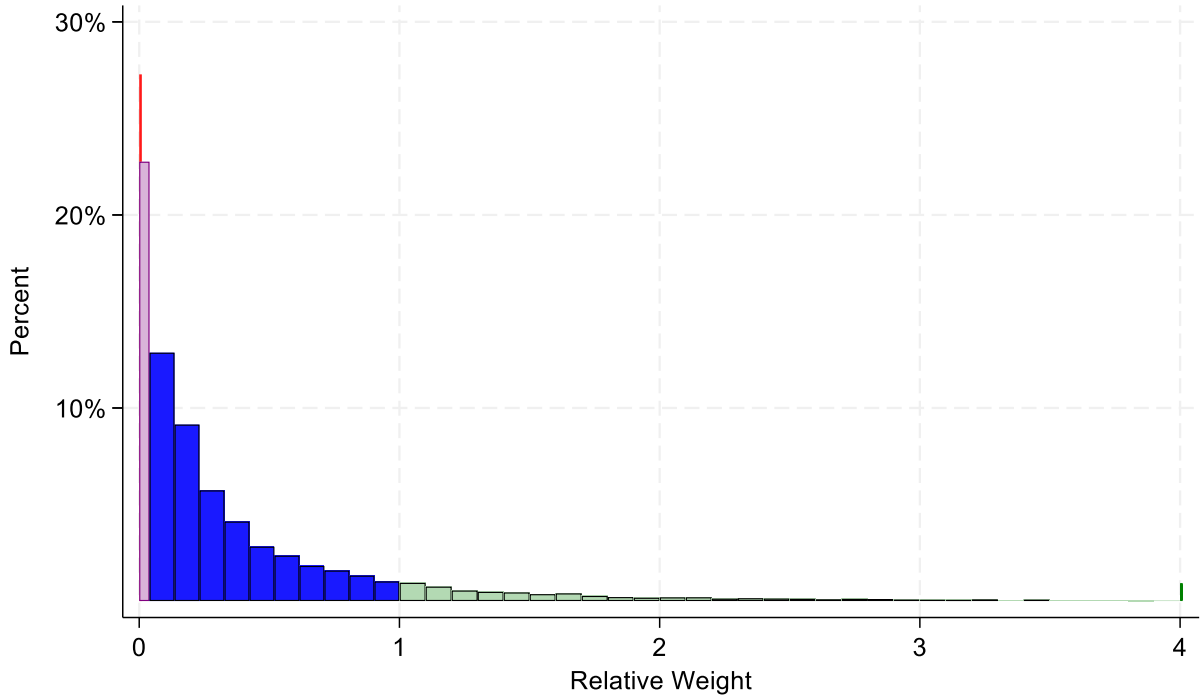


Figure 2. The Frequency of Relative Weight

The figure shows the cumulative frequency of float-adjusted relative weight using the 39-by-39 matrix of holdings. For the full working sample of 20,396 observations, mean and standard deviation of relative weight are 0.33 and 1.26. The red circle shows the sample for relative weight equal to 0 (5,560 observations), while the dotted red line shows the sample for relative weight between 0 and less than the median 0.0395 (4,638 observations); combined these two very low investment levels have 10,198 observations with mean and standard deviation of 0.005 and 0.009. The solid blue line shows the sample for relative weight between 0.0395 and 1; this moderate investment group has 8,713 observations with mean and standard deviation of 0.304 and 0.239. The dashed green line shows the frequency for relative weight greater than 1; for these very high investment levels there are 1,485 observations with mean and standard deviation of 2.67 and 3.90. The figure shows the cumulative frequency with float-adjusted relative weight winsorized at the 99th percentile value of 3.81.

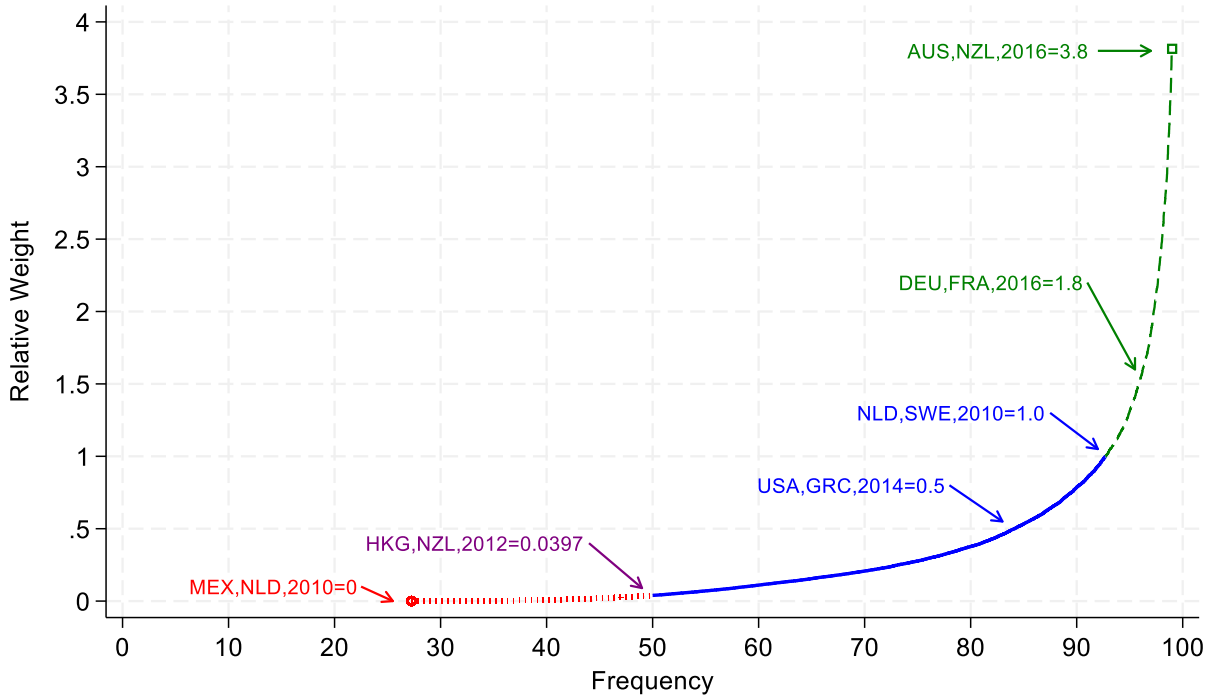


Figure 3. The Frequency of Linear Raw Deviation

The figure shows the cumulative frequency of float-adjusted linear raw deviation using the 39-by-39 matrix of holdings. For the full working sample of 20,396 observations, mean and standard deviation of linear raw deviation are - 0.018 and 0.064. The figure shows the cumulative frequency with float-adjusted raw linear deviation winsorized at 1st percentile value of -0.401 and the 99th percentile value of 0.026. The large black circles show corresponding relative weight of zero. The small red circles show corresponding "very low" relative investment weight between 0 and 0.0395. The small blue dots show corresponding "moderate" relative investment weight between 0.0395 and 1. The green line shows the frequency for very high relative weight greater than 1.

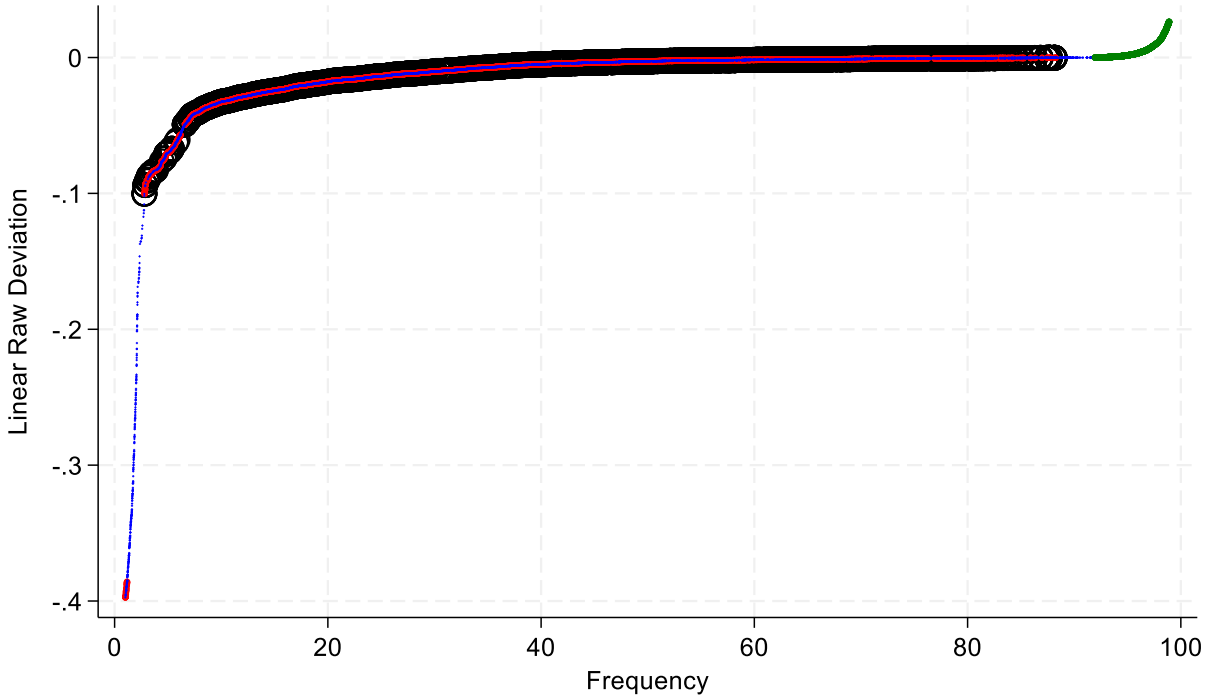
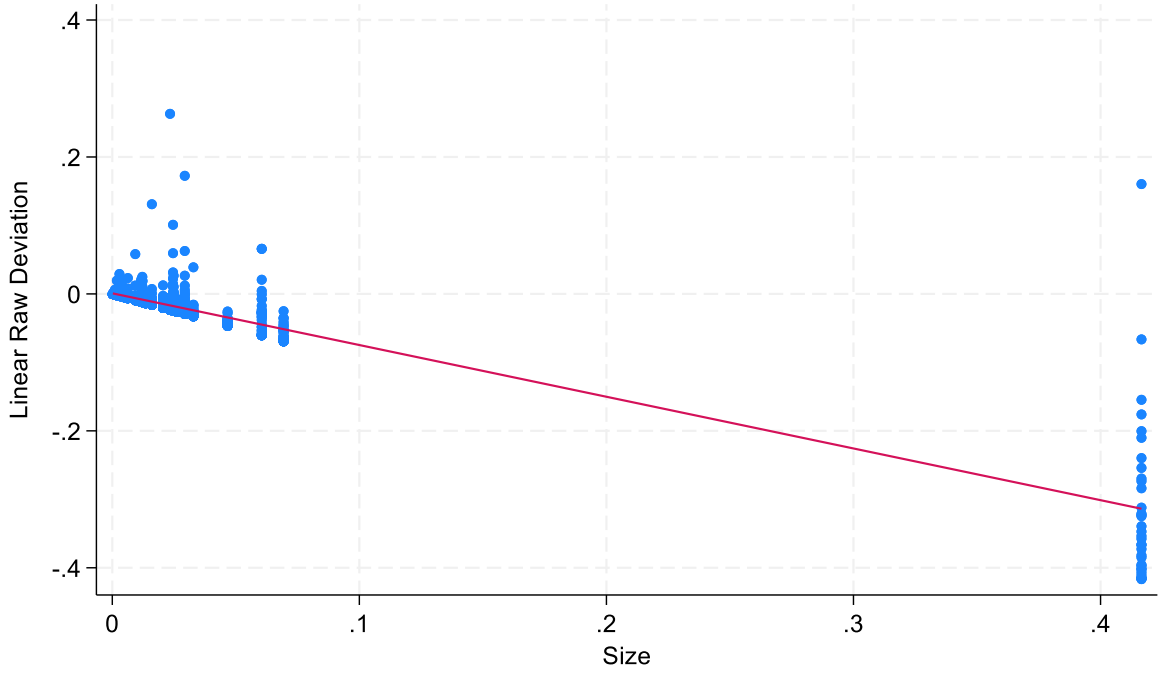


Figure 4. Country Size and Measures of Global Equity Investment
The figures show the relation between float-adjusted country size (measured as share of the world float portfolio) and two measures of global equity investment in 2012. The first two graphs use size-biased measures of international investment. Panel A shows a float-adjusted linear raw *difference* measure of home bias. The graph in Panel B is the non-size-biased float-adjusted *ratio* relative investment weight.

Panel A. Linear Raw Deviation



Panel B. Relative Weight

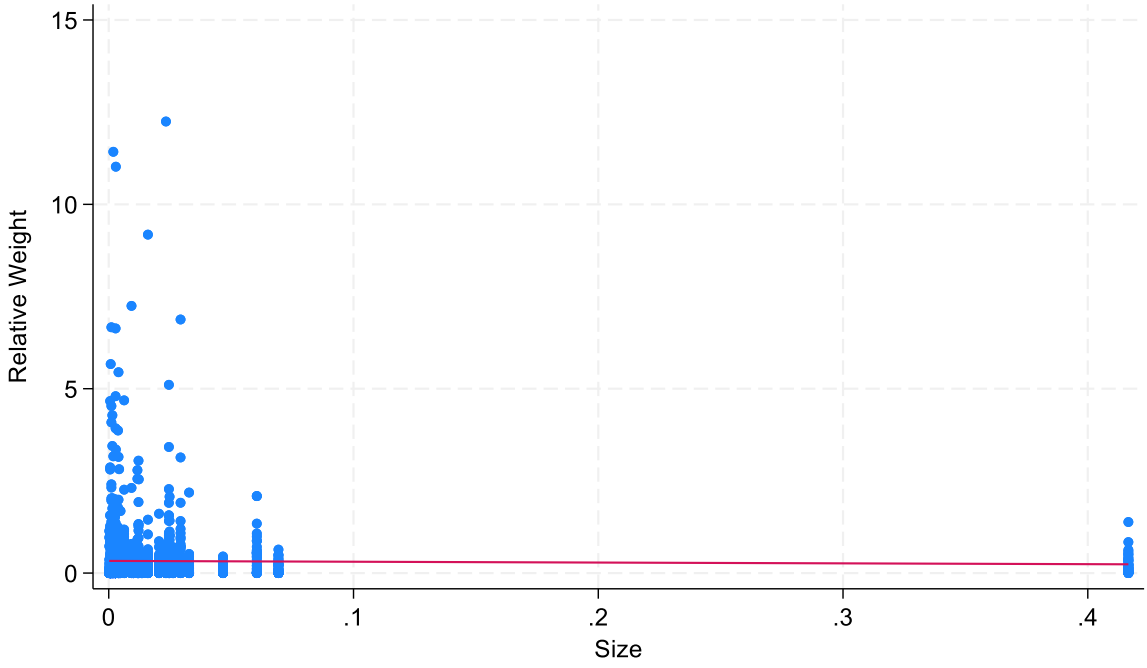


Figure 5. Determinants of Relative Investment Weight

The figure shows results from a regression of float-adjusted relative investment weight on proposed determinants. Each subplot shows coefficient estimates from a quantile regression and 95% confidence bounds for the 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 92, and 95 quantiles. . Quantile coefficient estimates at the 50 and 92 quantile are shown in dark green. The solid horizontal line in each subplot shows the coefficient estimate from a full sample OLS regression, and the dashed line shows the associated 95% confidence bound. All standard errors are clustered at the investor-destination country pair. Panel A shows results for variables for information barriers. Panel B shows results for the proxy variables for familiarity barriers. Panel C shows results for hedging motives. Panel D shows results for transaction cost variables. Panel E shows results for governance determinants.

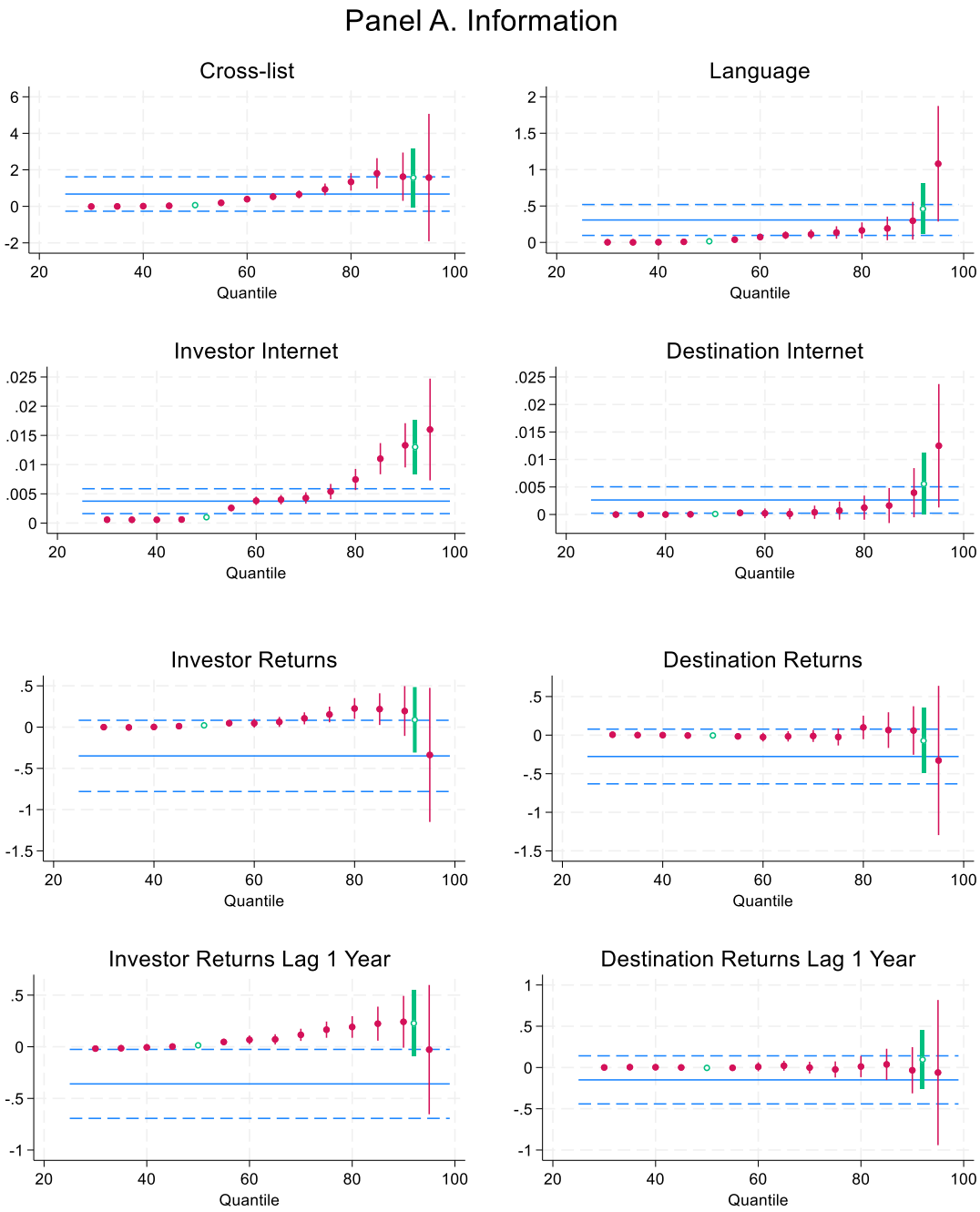


Figure 5 (continued)

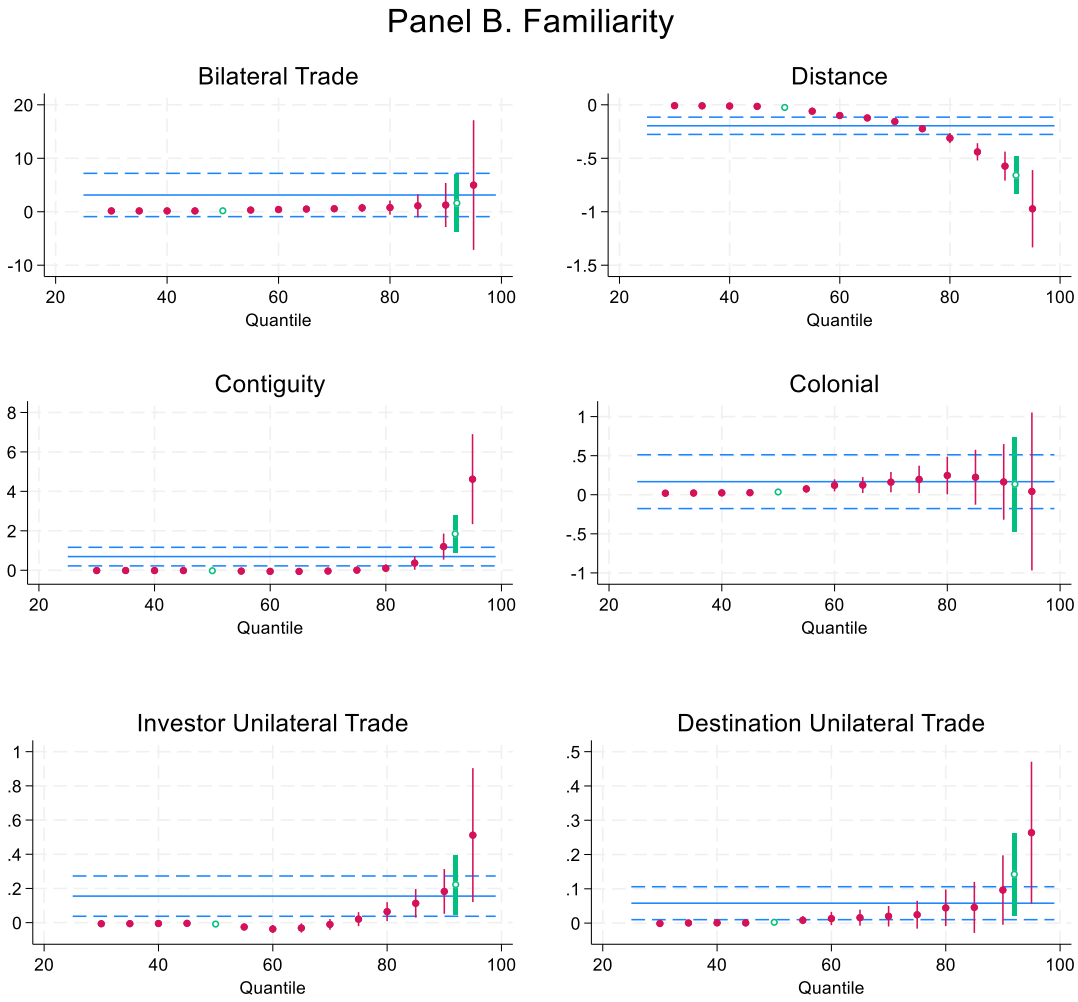


Figure 5 (continued)

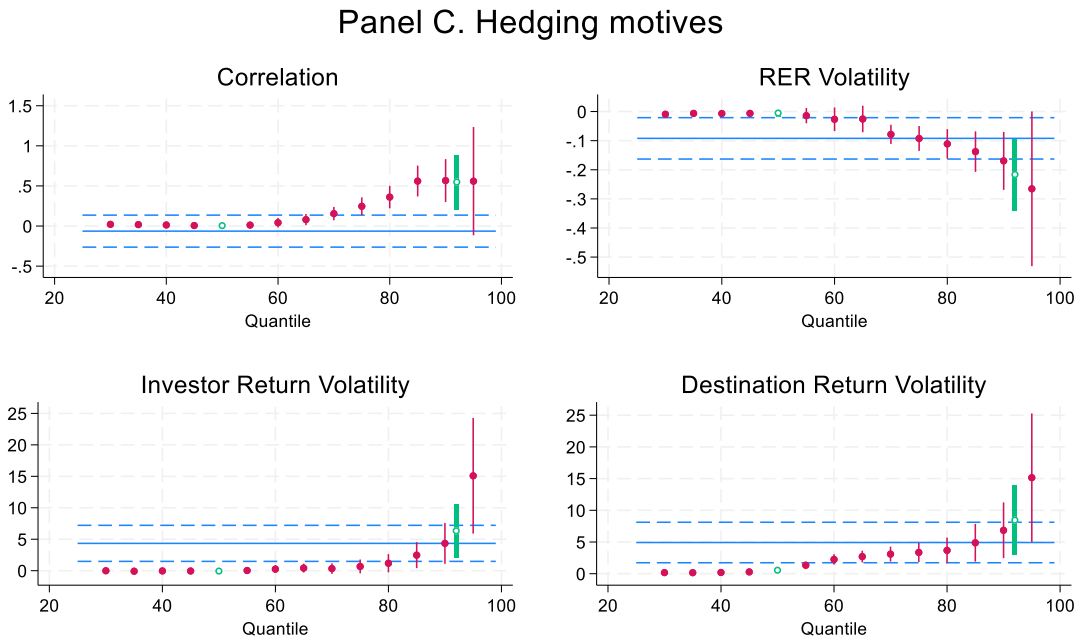


Figure 5 (continued)

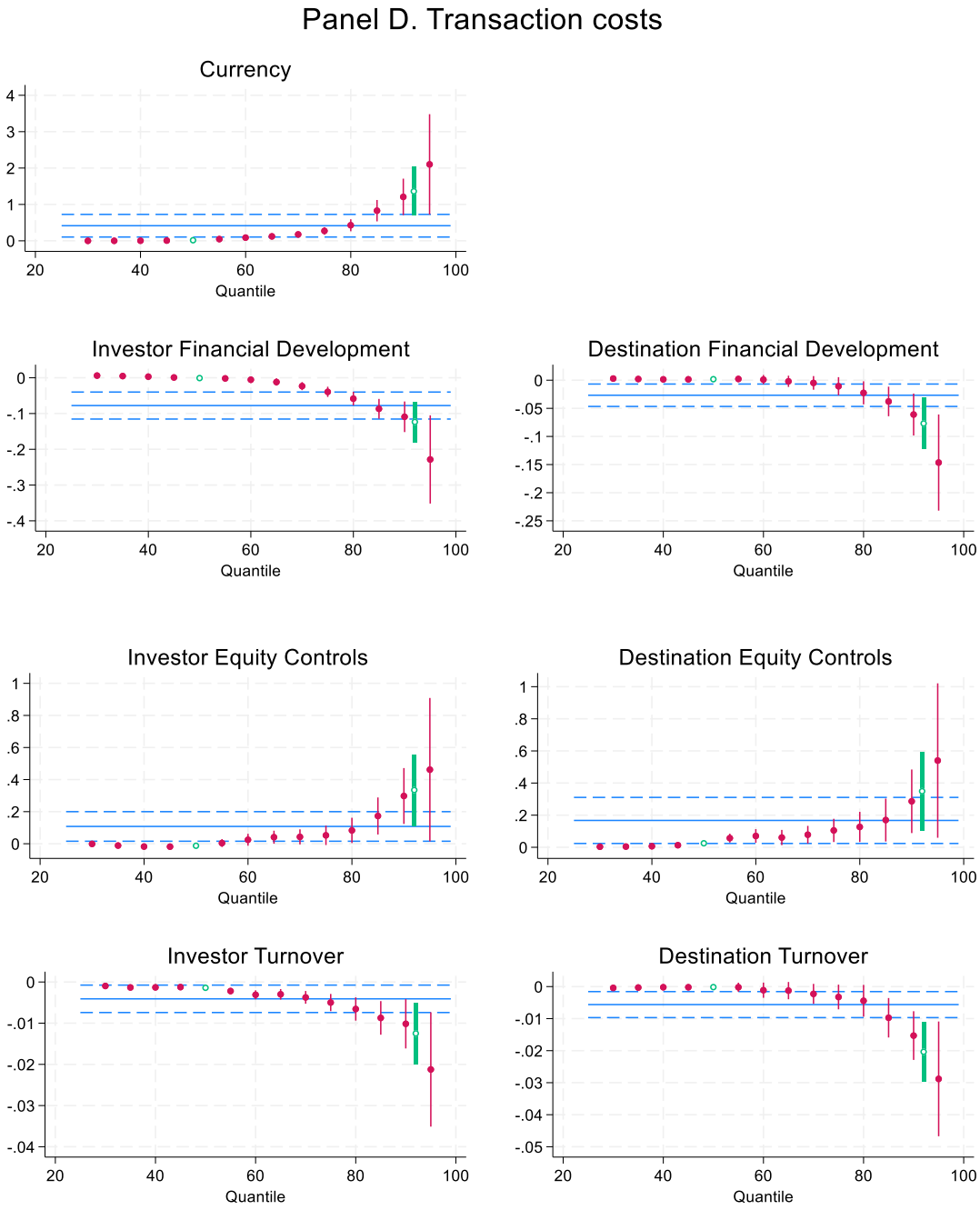
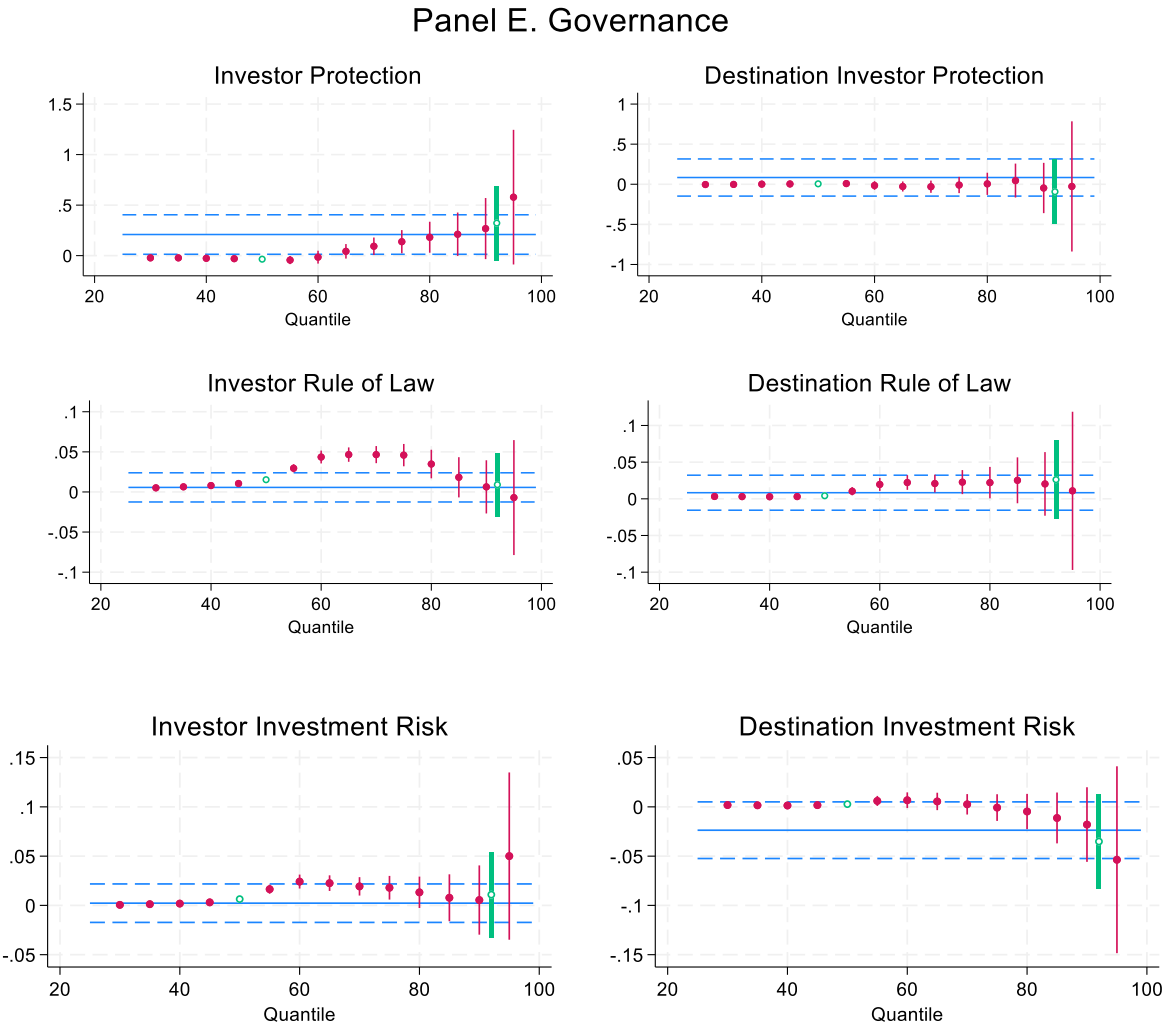


Figure 5 (continued)



Appendix Table A1. Normalized Relative Investment Weight

This table presents the results from OLS and quantile regressions of relative weight constructed using the normalized relative weight from Bekaert and Wang (2009). OLS results are in column (1); Quantile regression results are in columns (2-6). The sample size is roughly 39 source countries by 39 destination countries for 17 annual points in time (2001-2017). Variable definitions are reported in Table 3. Standard errors clustered at the country-destination level are shown in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

			Quantile Regressions				
		OLS	30	50	70	92	95
Information	Cross-list	-0.392***	-0.655***	-0.067***	0.011	0.014	0.014
		(0.081)	(0.112)	(0.019)	(0.009)	(0.009)	(0.009)
	Investor Internet	-0.003***	-0.004***	-0.001***	-0.001***	-0.001***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Destination Internet	-0.001	-0.000	-0.000	0.000	0.000	0.000
		(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Common Language	-0.063***	-0.113***	-0.016**	-0.001	-0.000	-0.000
		(0.019)	(0.033)	(0.007)	(0.004)	(0.004)	(0.004)
	Investor Returns	-0.053**	-0.102***	-0.022***	-0.005	-0.012**	-0.012**
		(0.021)	(0.036)	(0.008)	(0.006)	(0.006)	(0.006)
	Investor Returns Lag 1 Year	-0.067***	-0.110***	-0.015**	0.008*	0.004	0.004
		(0.016)	(0.029)	(0.007)	(0.005)	(0.005)	(0.005)
	Destination Returns	-0.003	0.012	0.004	-0.007	-0.006	-0.006
		(0.023)	(0.039)	(0.009)	(0.006)	(0.006)	(0.006)
	Destination Returns Lag 1 Year	-0.002	0.001	0.005	-0.001	-0.002	-0.002
		(0.019)	(0.036)	(0.007)	(0.005)	(0.005)	(0.005)
Familiarity	Bilateral Trade	-0.425	-0.567**	-0.188**	-0.156***	-0.153***	-0.153***
		(0.292)	(0.283)	(0.073)	(0.052)	(0.050)	(0.050)
	Distance	0.109***	0.157***	0.025***	0.008***	0.007***	0.007***
		(0.009)	(0.011)	(0.002)	(0.002)	(0.002)	(0.002)
	Contiguity	-0.083**	0.038	0.021**	0.014**	0.015**	0.015**
		(0.038)	(0.047)	(0.011)	(0.007)	(0.006)	(0.006)
	Colonial Link	-0.079**	-0.160**	-0.036***	-0.021***	-0.020***	-0.020***
		(0.040)	(0.067)	(0.009)	(0.005)	(0.005)	(0.005)
	Investor Unilateral Trade	-0.012	0.010	0.008***	0.008***	0.008***	0.008***
		(0.010)	(0.016)	(0.003)	(0.002)	(0.002)	(0.002)
	Destination Unilateral Trade	-0.015*	-0.020	-0.002	0.001	0.002	0.002
		(0.008)	(0.015)	(0.003)	(0.002)	(0.002)	(0.002)
Hedging motives	Correlation	-0.113***	-0.152***	-0.007	-0.027***	-0.029***	-0.029***
		(0.021)	(0.042)	(0.008)	(0.006)	(0.006)	(0.006)
	RER volatility	0.038***	0.079***	0.005	0.009**	0.011***	0.011***
		(0.008)	(0.017)	(0.006)	(0.004)	(0.004)	(0.004)
	Investor Return Volatility	-0.537**	-0.359	0.066	0.048	-0.022	-0.022
		(0.251)	(0.422)	(0.097)	(0.079)	(0.084)	(0.084)
	Destination Return Volatility	-1.630***	-3.098***	-0.549***	-0.174*	-0.183*	-0.183*
		(0.339)	(0.595)	(0.134)	(0.096)	(0.095)	(0.095)

Appendix Table A1 (continued)

Transaction costs	Common Currency	-0.174***	-0.176***	-0.016***	-0.001	-0.001	-0.001
		(0.029)	(0.036)	(0.006)	(0.004)	(0.004)	(0.004)
	Investor Financial Sector Size	0.017***	0.024***	0.001	-0.007***	-0.008***	-0.008***
		(0.003)	(0.006)	(0.001)	(0.001)	(0.001)	(0.001)
	Destination Financial Sector Size	0.007**	0.005	-0.002	-0.003***	-0.004***	-0.004***
		(0.003)	(0.006)	(0.001)	(0.001)	(0.001)	(0.001)
	Investor Capital Controls	-0.035***	-0.042*	0.012**	-0.000	-0.009**	-0.009**
		(0.013)	(0.024)	(0.006)	(0.005)	(0.004)	(0.004)
	Destination Capital Controls	-0.055***	-0.078***	-0.025***	-0.003	-0.004	-0.004
		(0.016)	(0.028)	(0.006)	(0.004)	(0.004)	(0.004)
	Investor Turnover	0.003***	0.004***	0.001***	0.001***	0.000**	0.000**
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
	Destination Turnover	0.002***	0.002	0.000	0.000*	0.000*	0.000*
		(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Governance	Investor Protection	-0.037	-0.093**	0.035***	0.021***	0.023***	0.023***
		(0.024)	(0.044)	(0.009)	(0.006)	(0.006)	(0.006)
	Destination Investor Protection	0.001	0.030	-0.006	0.002	0.002	0.002
		(0.023)	(0.039)	(0.008)	(0.006)	(0.006)	(0.006)
	Investor Rule of Law	-0.019***	-0.046***	-0.015***	-0.006***	-0.006***	-0.006***
		(0.003)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
	Destination Rule of Law	-0.009***	-0.021***	-0.004***	-0.003***	-0.003***	-0.003***
		(0.004)	(0.006)	(0.001)	(0.001)	(0.001)	(0.001)
	Investor Low Investment Risk	-0.009***	-0.019***	-0.007***	-0.001*	-0.000	-0.000
		(0.003)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
	Destination Low Investment Risk	0.000	-0.003	-0.003**	-0.002**	-0.002**	-0.002**
		(0.003)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
	Obs.	20,396	20,396	20,396	20,396	20,396	20,396
	R^2	0.546	0.438	0.503	0.365	0.336	0.336