Is local bias a cross-border phenomenon? Evidence from individual investors' international asset allocation

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Abstract

Extant literature consistently documents that investors tilt their domestic equity portfolios towards regionally close stocks (*local bias*). We hypothesize that individual investors' local bias is not limited to the domestic sphere but instead also determines their international investment decisions. Our results confirm the presence of a cross-border local bias. Specifically, we show (i) that the stockholdings of individual investors living within regional proximity to a foreign country display a significantly lower *foreign investment bias* towards investment opportunities in that country and (ii) that this drop in foreign investment bias levels is disproportionately driven by investments in regionally close neighbor-country companies. The impact of cross-border local bias on investors' bilateral foreign equity investments is economically significant and holds even after controlling for previously identified explanations of international asset allocation.

Keywords: *Local bias, foreign investment bias, portfolio diversification, individual investor behavior, household finance*

JEL-Classification: *G01, G11, G14*

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1. Introduction and related research

International portfolio diversification allows investors to yield a risk-return trade-off which is superior to what a portfolio of domestic assets offers. Yet, despite these undisputed benefits and an increasingly easier access to financial markets worldwide (Baele and Inghelbrecht, 2009), investors do not exploit cross-border diversification opportunities as extensively as one would expect in light of the fundamental tenets of portfolio theory. Empirical evidence documents that in reality, investors' equity holdings deviate significantly from what would be an optimal portfolio composition and presents three stylized facts regarding the geography of investment. First, investors tend to allocate a disproportionately large fraction of their equity investments to domestic stocks, leading to the well-researched *home bias*.[1] Second, their already trivial cross-border assets are concentrated in only a handful of host-country markets. This lack of diversification with regard to the international component of the portfolio, i.e. the extent to which investors underweight or overweight foreign markets, is referred to as the *foreign investment bias*. Third, investors tend to tilt their domestic portfolios towards local stocks—an investment anomaly which has been dubbed *local bias* in the literature. The goal of this study is to investigate whether the local bias phenomenon extends beyond domestic borders, i.e. whether investors' international equity allocation is also affected by their propensity to overweight regionally close companies in their stock portfolios.

1.1. International equity allocation and the role of geography

On an international scale, the geographical distance between home and host country has proved particularly powerful in explaining foreign investment bias. Aviat and Coeurdacier (2007, p.47) illustrate this strong link by stating that "if the distance between two countries doubles, bilateral asset holdings are almost divided by two, [although] (...) geography should not shape asset trade in a globalized world". The puzzling impact of physical proximity is substantial and persists even after controlling for a number of coun-

[1] See Lewis (1999) and Karolyi and Stulz (2003) for surveys of the voluminous literature on the equity home bias puzzle.

try-level[2] and firm-level[3] determinants that have also been shown to affect international equity allocation.

In recent contributions, the relation between individual investor characteristics and the choice of foreign equity has come to the fore.[4] Karlsson and Nordén (2007) study the selection of mutual funds by Swedish pension-plan beneficiaries and find that socio-economic variables such as age, education, marital status, and gender partially explain the extent to which individual investors allocate funds to foreign investment opportunities. Their analysis suggests that older, unmarried, and less sophisticated male investors have a higher likelihood of being home-biased and thus underinvested in foreign stocks. In a similar study, Goetzman and Kumar (2008) find that U.S. individual investors who hold relatively better diversified domestic stock portfolios are also more likely to hold foreign stocks in general. Behavioral traits have also been found to impact peoples' propensity to invest abroad. Bailey et al. (2008) argue that individual investors not only underuse but also misuse foreign equities. Their research implies that investors who display behavioral biases are less likely

[2] Several studies highlight the predictive power of country-level economic geography variables on bilateral equity allocation. These include bilateral informational links (Chan et al., 2005; Aviat and Coeurdacier, 2007; Lane and Milesi-Ferretti, 2008; Diyarbakirlioglu, 2011), institutional similarities (Berkel, 2007) and cultural ties (Beugelsdijk and Frijns, 2010; Anderson et al., 2011) between home and host country. Stock market development, size, and openness as well as the level of investor protection also influence a country's ability to attract foreign funds (Portes and Rey, 2005; Bekaert and Wang, 2009). Finally, a source-country investor's familiarity with the target country has been shown to affect the extent of her stockholdings in that country (Bhattacharya and Groznik, 2008). Interestingly, none of these studies find evidence for a substantial exploitation of diversification benefits when investing abroad. See section 3.3 for details on the above-mentioned country-level variables.

[3] Foreign investors prefer large firms with less financial risk and transparent accounting policies (Kang and Stulz, 1997; Aggarwal et al., 2005) as well as a cross-listing on the home market (Ahearne et al., 2004) or a physical presence in the home country (Ke et al., 2010). Likewise, they allocate less funds to closely-held foreign companies with poor investor protection (Dahlquist et al., 2003; Leuz et al., 2009) and reduced global visibility in terms of analyst coverage and index membership (Ferreira and Matos, 2008). Recently, Kang et al. (2010) argue that the over- and underweighting of foreign securities likely arises from valuation differences between domestic and foreign investors.

[4] Note, however, that these analyses are not concerned with explaining the determinants of bilateral foreign investment but instead aggregate investors' non-domestic stockholdings to a single foreign equity position.

to invest in foreign equities and tend to offset the benefits of international portfolio diversification with their faulty investment decisions. Graham et al. (2009) document that individual investors who—arguably overconfidentially—perceive themselves as knowledgeable have more internationally diversified portfolios; however, Abreu et al. (2011) challenge this overconfidence explanation only recently. Their findings provide evidence in support of a learning process, in which the experience that individual investors acquire on the domestic market is a key determinant of their foreign market involvement.

A major caveat of the above-mentioned studies, however, lies in the fact that they focus on national borders when addressing the impact of geographical distance on an investor's decision to allocate funds to foreign markets. Typically, the straight-line distance between the capitals of home and host country is the only coarse proxy to capture location-related differences in foreign equity investments at the country level. The oversimplification underlying this approach is that, within a given country, all investors are assumed to exhibit identical investment patterns, regardless of their individual geographic location. Thus, the literature trying to explain the foreign investment bias neglects the findings of the local bias literature, which documents that individual investors systematically tilt their stock portfolios towards locally headquartered companies and thus shows that an investor's location proves a significant determinant of her equity allocation decision.

1.2. Domestic stockholdings and the role of regional proximity

Local bias has been shown to be a robust phenomenon across different markets and for individual and institutional investors alike.[5] However, evidence of local bias is limited to the domestic component of investors' equity portfolios so far. This appears to be an undue

[5] Ivkovic and Weisbenner (2005) and Seasholes and Zhu (2010) find that local stocks are overrepresented in the equity portfolios of U.S. discount brokerage clients. Grinblatt and Keloharju (2001) provide qualitatively similar evidence for private households in Finland. Massa and Simonov (2006) and Bodnaruk (2009) document that Swedish individual investors overweight firms with geographically close premises, while Seasholes et al. (2011) and Baltzer et al. (2012) document a local equity preference among Chinese and German retail investors, respectively. Coval and Moskowitz (1999) and Baik et al. (2010) show that, while less pronounced in magnitude, local bias is also observed among U.S. fund managers.

reduction, since Coval and Moskowitz (1999, p. 2048), in their seminal on local bias, hypothesize that a substantial portion of the lacking international portfolio diversification can be explained by local overinvestment and highlight the need to investigate "the importance of distance in international portfolio choice relative to that of national boundaries, assessing how much of the home bias phenomenon can truly be considered an international puzzle". To the best of our knowledge, no research has yet been done on how investor locality impacts portfolio choice in a cross-country setting.

1.3. A cross-country perspective on local bias

The present study fills this gap and asks if local bias is a truly national phenomenon or if it can help explaining empirically observable patterns of cross-border investments among individuals and thus affects international portfolio allocation as well.

Finding answers to this question is relevant because the impact of local bias has been shown to be strong enough to affect stock market efficiency. Pirinsky and Wang (2006) find that the price formation in equity markets has a significant geographic component linked to the trading patterns of local individuals, a result which has only recently been confirmed by Korniotis and Kumar (2012) and Liao et al. (2012). Similarly, Shive (2012) finds that the investment decisions of local residents contribute disproportionately to stock liquidity and price discovery, while Hong et al. (2008) show that, in the presence of locally biased investors, the valuation of a company domiciled in a given region is negatively related to the density of corporate headquarters in that region. Finally, Loughran and Schultz (2004) and Jacobs and Weber (2012) show that a preference for local equity among investors also has a significant impact on firm-level turnover. Taken together, this evidence implies that local investors have a hand in the valuation of stocks; thus, extending the local bias research to a cross-border setting adds to improve our understanding of the market impact of geography.

Our results provide strong evidence in support of the notion that individual investors' equity local bias is not limited to the domestic sphere but instead extends beyond national borders. Analyzing a rich data set covering the equity investments which German individ-

ual investors hold in each of Germany's nine neighbor countries, we reveal two novel patterns in international equity allocation related to the investor's place of residence. First, we find that the portfolio holdings of individual investors living within regional proximity to a foreign country display a significantly lower foreign investment bias towards investment opportunities in that country. Second, our results show that, on aggregate, this sharp drop in foreign investment bias levels is disproportionately driven by holdings in regionally close neighbor-country companies. Together, these results indicate the presence of a cross-border local bias among individual investors. The impact of cross-border local bias on investors' bilateral foreign equity investments is economically relevant and persists over and above existing determinants of the foreign investment bias.

The remainder of this study is organized as follows. Section 2 describes our dataset. Section 3 develops the measure which we use to capture cross-border local bias and provides univariate evidence. In section 4, we present regression results controlling for extant explanations of the foreign investment bias. Section 5 concludes.

2. Data and summary statistics

We draw on the stockholdings of German individual investors, because Germany pro-vides us with a unique setting to study the nature of cross-country investor locality for a number of reasons. First, Germany is surrounded by nine neighbor countries—i.e. regionally close foreign investment opportunities from the perspective of domestic in-vestors—and thus has the third highest number of bordering states in the world.[6] Second, Germany's neighbors are fairly diverse in terms of language, currency, national culture, and several other dimensions previously shown to influence how much investment national markets receive as host countries. Third, Germany is the largest economy in the European Union and has a long track record of individuals being invested in equity.

The data for this study are collected from several sources. We obtain our holdings data from the mandatory quarterly filings of German commercial banks to the Securities Holdings Statistics (henceforth SecuStat), a centralized register of security ownership main-

[6] Russia and China are the only countries with more neighboring states.

tained by the Deutsche Bundesbank.[7] We extract from these filings the aggregate quarterly shareholdings pertaining to regional banks' retail customers for the five-year period between December 2005 and December 2010 on a security-by-security basis. Next, we confine our sample to shares issued by companies headquartered in either Germany or one of its nine neighboring countries, i.e. Austria, Belgium, the Czech Republic, Denmark, France, Luxembourg, the Netherlands, Poland, and Switzerland. The resulting stock universe comprises shareholdings in 2,593 different companies—1,484 of which are located in the bordering states of Germany—and effectively represents the total available market capitalization in the ten countries.

To capture potential cross-country investor locality, we need to locate both the sampled individual investors and the firms they are invested in. To ensure the inter-country comparability of the regional entities we study, we refer to the NUTS (Nomenclature of territorial units for statistics) classification developed by the European statistical office and recommended for socio-economic analyses in the European Union (EU). The NUTS classification scheme provides a coherent territorial breakdown by subdividing the economic territory of the EU into regions at three different levels (NUTS 1, 2 and 3, respectively, moving from larger to smaller territorial units). We choose the most disaggregated entity (NUTS 3 level) for our analysis, which in our case extends over an average surface of 2,940 square kilometers or roughly 54 by 54 kilometers.

[Please insert Table 1 about here.]

As shown in Table 1, investor and firm locations included in our study spread over 740 different NUTS 3 regions.[8] 15.4%, i.e. 62 out of 404 German regions have a common border with one of its neighbors, while, for the latter, the average fraction of regions contiguous to Germany is slightly smaller (13.7% or 46 out of 336 regions). In order to pinpoint the sampled firms' location, we assign them to the respective NUTS 3 region in which they are

[7] For a technical documentation of the SecuStat filings, see Amann et al. (2012).

[8] Altogether, the 27 EU member states break down into 97 NUTS 1 regions, 271 NUTS 2 regions and 1,303 NUTS 3 regions.

headquartered. To locate the investors under review, we further narrow our sample to SecuStat filings of savings and cooperative banks, whose focus has traditionally been on providing access to banking services for the local population.[9] This particularity enables us to delimit the banks' geographic business spheres. In the case of savings banks, an institute's outreach is typically confined to the NUTS 3 region in which it is seated. Analogously, cooperative banks are also regionally bounded since they have a mandate to promote their (predominantly local) clients, and we thus define a cooperative bank's headquarters as the geographic center of its business district.[10] While we do not know the exact location of each individual investor, we can be reasonably certain that customers of a given savings or cooperative bank reside nearby the respective institution: a virtually identical portfolio of products and services within the respective banking pillars does not provide incentives for a customer to choose a remote institution when there is a local one available. Consequently, we conjecture that the holdings which a savings or cooperative bank reports, stem from local customers.

The investor base associated with each of the reporting banks is then matched to the NUTS 3 region in which they are seated. Throughout the paper, we will refer to corresponding aggregations of individual investors' stockholdings at the NUTS 3 level as *representative portfolios*.[11]

In a second step, this regional mapping is repeated for all non-German firms in the sample, i.e. 1,484 companies headquartered in a total of 336 NUTS 3 regions across the nine different neighbor countries of Germany.

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[9] See Wengler (2006), p. 286. Note that our final data set covers nearly 94% of all German commercial banks (1,715 out of 1,830 independent reporting entities during the period under review).

[10] This approach follows Conrad et al. (2009), p. 398.

[11] Our analysis of aggregated portfolios is consistent with the approach of Seasholes and Zhu (2010) who note that studying investor-level portfolios inflates the impact of small stock positions and thus may bias overall results.

3. Methodology and univariate evidence

3.1. Foreign investment bias

Our dependent variable, the foreign investment bias score, is computed as a given representative portfolio's deviation from optimal equity allocation as imposed by asset pricing theory. CAPM-efficient international asset allocation requires optimal investment weights be given by the market value of a particular country relative to the global market capitalization, i.e. the aggregate value of all markets. Hence, the deviation of actual holdings in a given country from its optimal weight in the world market portfolio reflects the degree of bias towards this country. This can be formalized by denoting $\mathrm{w}_{i,j}^{act}$ as the average weight of host country j in a given representative portfolio i over the sample period, i.e.

$$\mathrm{w}_{i,j}^{act} = \frac{\mathrm{MV}_{i,j}^{act}}{\sum \mathrm{MV}_{i,j}^{act}} \tag{1}$$

where $\mathrm{MV}_{i,j}^{act}$ is the amount of money which portfolio i invests in country j and $\sum \mathrm{MV}_{i,j}^{act}$ equals the total value of portfolio i. Similarly, each country j is assigned a CAPM-efficient weight, w_{j}^{BM}, which corresponds to the average float-adjusted market value of country j relative to the average worldwide free float market capitalization during the period under review[12]:

$$\mathrm{w}_{j}^{BM} = \frac{\mathrm{MV}_{j}^{BM}}{\sum \mathrm{MV}_{j}^{BM}} \tag{2}$$

From these weights, we compute the normalized foreign investment bias measure (FIB) introduced by Bekaert and Wang (2009) and defined as:

[12] A company's total market capitalization typically contains stock which is not freely tradable due to controlling shareholders and as such does not represent an actual investment opportunity for individual shareholders (see, for instance, Dahlquist et al., 2003). We use the free float market capitalization of the sampled companies to exclude the holdings of controlling shareholders when constructing our benchmark portfolios. The necessary data is obtained from Datastream.

$$\begin{aligned} \text{FIB}_{i,j} &= \frac{\text{w}_j^{BM} - \text{w}_{i,j}^{act}}{\text{w}_j^{BM}} \qquad \text{if} \qquad \text{w}_{i,j}^{act} < \text{w}_j^{BM} \;\; \text{(overinvestment)} \\ \text{FIB}_{i,j} &= -\left(\frac{\text{w}_{i,j}^{act} - \text{w}_j^{BM}}{1 - \text{w}_j^{BM}} \right) \qquad \text{if} \qquad \text{w}_{i,j}^{act} > \text{w}_j^{BM} \;\; \text{(underinvestment)} \end{aligned} \tag{3}$$

This measure varies between −1 (total portfolio value allocated to country *j*) and 1 (no investment at all in country *j*).

Like investors in most other countries, Germans display a large home bias, i.e. are substantially overinvested in domestic stock. Since the portfolio allocation to foreign markets is obviously affected by the bulk of home-country stockholdings, we also calculate the home bias for each representative portfolio *i*, formalized as

$$\text{HB}_i = \frac{\text{w}_{i,j}^{act} - \text{w}_j^{BM}}{1 - \text{w}_j^{BM}} \tag{4}$$

to control for preferences towards domestic equity when analyzing investors' neighbor-country asset allocation. Thus, each of the 404 representative portfolios under review features a home bias score, HB, and nine different bilateral FIB scores towards each of the neighbor countries.

[Please insert Table 2 about here.]

As can be seen in Panel A of Table 2, we observe a strong variation of home bias levels across the different domestic NUTS 3 regions (the interquartile range spreads from 0.783 to 0.844), which in turn points to pronounced differences in foreign investment. Panel B of Table 2 provides summary statistics of the bilateral FIB levels for the nine bordering states. On aggregate, we document clear underinvestment reflected in large positive FIB scores. However, inter-country variation is quite substantial: with a mean FIB of 0.060, average asset allocation in Dutch firms is close to being CAPM-efficient, while, on the other hand, Polish, Belgian, and Danish stocks are heavily underweighted in the average representative portfolio (FIB scores of 0.945, 0.882, and 0.851, respectively). Median FIB values corroborate this picture and rule out simple outlier effects.

Bilateral investment at the country level also varies considerably across the different representative portfolios under review. While a number of portfolios display roughly optimal country weights or even overinvest in bordering states, other portfolios by contrast do not have any holdings in some of the neighbor countries.

3.2. Measuring cross-border local bias

3.2.1. Investor location and foreign equity investment

In order to test if local bias extends beyond national borders, we organize our sampled representative portfolios along two dimensions, i.e. their regional location and their bilateral FIB score towards each of the nine bordering states. Our aim is to test for systematic differences in inter-country asset allocation (reflected in differing FIB scores) conditional on which combination of investor location and bilateral FIB levels we study.

Regarding their geographical proximity to a cross-border investment opportunity, we first distinguish between representative portfolios located in a NUTS 3 region sharing a common border with any of the nine neighbor states (henceforth *border regions*) and the remainder of regions (henceforth *non-border regions*). Next, we further dissect the group of border regions depending on which of the nine countries they neighbor.[13] For each subgroup of border regions adjacent to one specific country (henceforth *neighbor regions*, for which the indicator variable $\text{COMMONBORDER}_{i,j}$ takes the value of 1), we then take the average bilateral FIB score towards that country and compare it to the identical FIB score obtained for the remaining regions, i.e. non-border regions and the rest of the border regions, which together we will refer to as *non-neighbor regions* in the following. Note that both the pool of neighbor regions and their respective control group, the corresponding non-neighbor regions, differ conditional on which of the nine countries is being analyzed, while the group of border regions and non-border regions features the same composition throughout.

To spell out how we test for investor locality in a cross-country setting, consider the following example: Among the 62 border regions of Germany, we take the 13 border regions

[13] Note that each of the border regions has one unambiguous neighbor country assigned to it.

contiguous to Austria and obtain the average bilateral FIB score towards Austria for the representative portfolios located in these 13 regions. Next, we calculate the average FIB score towards Austria among the representative portfolios located in the remaining 391 domestic regions, i.e. the 342 non-border regions and the 49 border regions which do not share a common border with Austria.

We hypothesize that regional proximity drives cross-country equity investment, i.e. that an investor has significantly more holdings in firms headquartered in the one bordering state which is closest to her place of residence as compared to her bilateral investments in the other eight neighbor countries of Germany. A concentration of foreign holdings in the geographically closest neighbor country would provide a first indication of a local dimension to international portfolio selection.

An alternative story why investors living in border regions might have a propensity for neighbor-country equity is that they might have an affinity for investing in Germany's bordering states *per se*, i.e. regardless of their geographic distance from the investor's location. If so, a given representative portfolio would exhibit significantly lower FIB levels towards all of the neighbor countries which then cannot be ascribed to the portfolio's regional proximity to the investment opportunity but instead is unrelated to investor locality. In order to rule out this explanation, we revisit the neighbor regions' representative portfolios. This time, however, we obtain the average over the bilateral FIB scores towards the remaining eight countries surrounding Germany and not contiguous to the neighbor regions under review. Again, we compare these FIB levels to the corresponding scores obtained for the control group of regions. Carrying forward the above example, we reconsider the 13 border regions contiguous to Austria but now obtain the average bilateral foreign investment bias towards Germany's eight bordering states *not* adjacent to Austria. Similarly, these FIB scores are then compared to the corresponding values obtained for the representative portfolios located in the remaining 391 regions.

Table 3 presents the results of a univariate analysis of the relation between intra-country investor location and foreign stockholdings.

[Please insert Table 3 about here.]

For all of Germany's bordering states except the Czech Republic and Poland, we document an economically and statistically meaningful drop in bilateral FIB levels towards the adjacent country when comparing neighbor regions with their non-neighbor counterparts.

In case of Austria, for instance, Table 3 reads as follows: a significant reduction in home bias indicates that overall foreign investment is considerably higher for investors living on the border to Austria as compared to investors residing in non-border regions. When analyzing which host countries actually receive these additional funds, we observe a disproportional increase of stockholdings in firms headquartered in Austria. This manifests in a strongly significant decline in the average bilateral FIB score towards Austria, which drops by 87% to 0.050, i.e. from substantial underinvestment in Austrian equity to a nearly CAPM-efficient portfolio weight. By contrast, investors' FIB scores towards the remaining eight foreign markets contiguous to Germany ('FIB(other)') turn out to be virtually unaffected by their geographic location: at −0.047, the difference between the two groups of regions is economically and statistically immaterial.

3.2.2. Company location and foreign equity investment

Yet, from the previously conducted tests, we cannot tell whether the portfolio bias identified for investors residing in neighbor regions stems from a universal affinity with companies headquartered anywhere in the respective neighbor country or is indeed driven by a cross-border local bias. In order to isolate the impact of local bias, we follow the conventional approach in the literature and classify investment opportunities according to their geographic distance from the investor's place of residence. By definition, investors in non-border regions cannot be living regionally close to any of the foreign companies in our sample; thus we focus on the cross-country stockholdings of investors located in border regions in the following. Our aim is to examine whether the observed drop in investors' FIB levels towards their direct neighbor is driven by overinvestment in companies throughout the country or instead stems from disproportionally large holdings in those neighbor-country companies which are seated closest to the investor's location. We conjecture that the latter

investment behavior serves as evidence of local bias in the sampled investors' cross-country equity allocation.

In order to capture potential cross-border investor locality, we construct an additional variable, which we denote as $\text{LOCALRATIO}_{i,j}$. To this end, we first derive a benchmark portfolio weight for each company, which we compute as its free float market capitalization relative to the total float-adjusted market value of the country in which the company has its premises.[14] Next, we obtain the actual weight of every foreign company in each representative portfolio *i*. Utilizing the geographic location of the firms, we then sum up the actual and model weights, respectively, for the subsample of companies headquartered in NUTS 3 regions with a border to Germany. The difference between the actual and the benchmark share of investments held in the foreign border regions of a given neighbor country yields our additional proxy of investor locality. This measure represents the extent to which a given representative portfolio holds stocks of regionally close companies seated in their direct neighbor country in excess of what should be invested if they held the market portfolio. $\text{LOCALRATIO}_{i,j}$ takes values in $(-1;1)$, where negative levels indicate underinvestment in locally close neighbor-country firms and vice versa. As described above, we are interested in whether the reduced FIB scores of investors living in neighbor regions can be ascribed to excess holdings in regionally close companies. To this end, we consider $\text{LOCALRATIO}_{i,j}$ whenever $\text{COMMONBORDER}_{i,j}$ takes 1. Summary statistics for the corresponding interaction term, $\text{COMMONBORDER}_{i,j}$*$\text{LOCALRATIO}_{i,j}$, are reported in Table 4.[15]

[Please insert Table 4 about here.]

On average, investors in neighbor regions on the border to Switzerland and the Netherlands appear to be strongly biased towards regionally close neighbor-country companies (mean values of $\text{COMMONBORDER}_{i,j}$*$\text{LOCALRATIO}_{i,j}$ amounting to 0.182 and 0.165,

[14] The necessary data is obtained from Datastream.

[15] Values of $\text{LOCALRATIO}_{i,j}$ are unavailable for two countries in our sample: Luxembourg is a single territorial entity which cannot be further disaggregated and Belgium does not feature any sampled firms headquartered in border regions.

respectively). While less pronounced in magnitude, this also holds true for Austria and Denmark. Investors close to France, by contrast, are on average underinvested in locally proximate French equity. One explanation for this could be that France is one of Europe's most unevenly industrialized countries, where as much as 55.7% of listed firms are concentrated in the Paris metropolitan area.

3.3. Other explanatory variables

Prior research documents that equity investments in foreign markets do not only depend on geographical proximity, but are also affected by several other host country characteristics which can be grouped into five broad categories. Specifically, other concepts of distance—i.e. investors' cultural, informational, and institutional proximity to the target country—may drive their propensity to invest abroad. Likewise, people might underweight foreign investments due to a lack of familiarity. Finally, theory suggests that bilateral asset allocation should be determined by the gains from diversifying away financial risk, thus foreign investments might also depend on the country-specific diversification benefits materialized through a given foreign investment. This study's aim is to test whether cross-border local bias can explain variation in bilateral FIB levels beyond that for which previously identified channels account. To control for these alternative explanations, we include the following set of variables in our regression analysis.

3.3.1. Informational proximity

Bilateral equity holdings have been shown to be strongly influenced by the amount of bilateral trade in goods between two countries (see, for instance, Chan et al., 2005, Aviat and Coeurdacier, 2007, and Lane and Milesi-Ferretti, 2008). This observation is explained with the notion that the extent to which trading partners will have to share and exchange information adds to removing a great deal of informational asymmetries between investors in the two countries. Recently, Diyarbakirlioglu (2011) explicitly tests whether the effect of trade on portfolio holdings may truly be ascribed to an information-based channel and corroborates the suitability of bilateral trade as an information variable. In light of these studies, we measure informational proximity between Germany and a given bordering state as

the logarithm of cumulated bilateral imports and exports, averaged over the period under review (BILATTRADE_j). We collect the required data from the IMF Direction of Trade Statistics. Intuitively, we expect higher values of BILATTRADE_j to predict lower bilateral FIB scores and vice versa.

3.3.2. Familiarity

Another reason for investors' tendency to eschew foreign stocks might be that familiarity at least partly governs their investment decisions. Large FIB levels could simply reflect a sense of unfamiliarity with non-domestic stocks, which investors might systematically perceive as being riskier than home-country equity (see, for instance, Goetzman and Kumar, 2008). Bhattacharya and Groznik (2008) present a sound proxy for investor familiarity in international asset allocation. They show that the size of the foreign-born community from a given country living in the U.S. is positively related to U.S. investments in that country, even after controlling for several informational determinants also likely to influence bilateral investments. Following their approach, we therefore measure familiarity using the percentage of the population with a foreign citizenship residing in the NUTS 3 region in which a given representative portfolio is located.[16] Thus, a higher percentage of foreign residents (captured by FOREIGNPOP_i) is associated with lower FIB scores.

3.3.3. Institutional proximity

We collect several proxies for institutional distance as proposed by the law and finance literature and conventionally applied in related studies explaining foreign investment bias. However, these proxies turn out to be highly correlated with the remaining controls.[17] For our regression analysis, we draw on the findings of Lane and Milesi-Ferretti (2008) and, recently, Bekaert et al. (2012) who document that member states of the European Mone-

[16] This proxy is used in Morse and Shive (2011). Owing to data limitations, we too are unable to distinguish different nationalities among the foreign-born population.

[17] Specifically, we drop a proxy of shareholder protection, i.e. the sampled countries' respective score on an 'antidirector rights index', and a dummy indicating common legal origin, both of which have been introduced by La Porta et al. (1997, 1998) and are widely used as measures for the institutional distance between home and host country. We also employ updated values of the antidirector rights index as provided in Spamann (2010) but also discard them due to multicollinearity issues.

tary Union (EMU) feature higher bilateral equity investment—an effect which they ascribe to institutional market integration. Thus, to capture potential institutional similarities likely to obscure the impact of regional proximity on foreign investment, we employ an indicator variable which takes 1 if a neighbor state of Germany has adopted the Euro (COMMONCURR_j). Straightforwardly, EMU membership of the respective target country is associated with higher cross-border investment flows from Germany into that country.

3.3.4. Cultural proximity

In recent contributions, Beugelsdijk and Frijns (2010) and Anderson et al. (2011) show that cultural differences between home and host country negatively influence bilateral investment positions. Following the test design of Beugelsdijk and Frijns (2010), we capture the cultural proximity between Germany and each of its bordering states using updated values of numerical scores on four country-specific cultural dimensions developed by Hofstede (1980), which we obtain from Tang and Koveos (2008). We expect bilateral FIB scores to be positively related to the cultural distance between Germany and the respective bordering state (CULTDIST_j).

3.3.5. Diversification potential

Finally, even though there is little empirical evidence supporting the notion that foreign equity holdings are primarily driven by the gains from diversification (see, for instance, Portes and Rey, 2005, and Lane and Milesi-Ferretti, 2008), portfolio theory states that international diversification of stockholdings reduces risk at no loss in expected return. Given that the benefits of diversification vary by country, a foreign country's attractiveness as a target should depend on its diversification potential relative to the investor's home market. To capture a given neighbor country's diversification potential, we include the average bilateral correlation between home and host country returns over the period under review. Correlations are calculated using the monthly returns on the respective national MSCI market indices over a two year rolling window; the necessary data is obtained from Datastream. Since a higher correlation reduces the diversification potential between two markets, we would expect a negative relation between average bilateral market

comovement (MKTCOMOVE_j) and FIB scores if investment is driven by diversification motives.

Summary statistics and correlations between the different explanatory variables are reported in Table 4.

3.4. Regression model

To begin our inquiry into the determinants of the foreign investment bias, we set up a baseline model which takes the following form:

$$\begin{aligned} \text{FIB}_{i,j} = {} & \beta_1 \,\text{HB}_i + \beta_2 \,\text{CULTDIST}_j + \beta_3 \,\text{FOREIGNPOP}_i \\ & + \beta_4 \,\text{BILATTRADE}_j + \beta_5 \,\text{COMMONCURR}_j \\ & + \beta_6 \,\text{MKTCOMOVE}_j + \varepsilon_{i,j} \end{aligned} \tag{5}$$

where HB_i controls for the level of the home bias of a given representative portfolio i and the remaining variables capture the standard explanations for the foreign invest-ment bias as mentioned in section 3.3.

In order to quantify the impact of regional proximity in explaining cross-border equity allocation, we proceed in three steps. First, by adding the dummy variable BORDERREGION_i, we control for the possibility that investors living in border regions display an indeterminate affinity with Germany's bordering states *per se*, i.e. regardless of how distant they are from the investor's location. Next, we examine the effect of investor proximity on foreign equity investment by focusing on FIB levels of border-region portfolios towards their direct neighbor country, which are explained whenever the indicator variable $\text{COMMONBORDER}_{i,j}$ takes 1. Finally, we also include the geographic location of the neighbor-country investments to gauge a cross-border preference for local equity. As described in section 3.2, we do so by interacting $\text{COMMONBORDER}_{i,j}$ with our measure of regionally close cross-border investment, $\text{LOCALRATIO}_{i,j}$. Hence, the full specification can be formalized as:

$$\begin{aligned} \mathrm{FIB}_{i,j} = & \alpha_1 \,\mathrm{BORDERREGION}_i + \alpha_2 \,\mathrm{COMMONBORDER}_{i,j} \\ & + \alpha_3 \,\mathrm{COMMONBORDER}_{i,j} * \mathrm{LOCALRATIO}_{i,j} \\ & + \mathrm{X}_{i,j}\beta + \varepsilon_{i,j} \end{aligned} \tag{6}$$

where $\mathrm{X}_{i,j}$ denotes the set of standard explanatory variables included in Eq. (5).

We estimate Eq. (5) and Eq. (6) using a linear model; however, we need to control for the fact that a number of representative portfolios in our sample feature zero holdings in one or more neighbor states. Ignoring these non-allocations might result in a sample selection bias (Heckman, 1979). In order to circumvent this pitfall, we draw on a Tobit specification, where all bilateral FIB scores resulting from zero observations are censored on the right.[18]

4. Estimation results

4.1. Main results

Recall that, since values of $\mathrm{LOCALRATIO}_{i,j}$ are unavailable for Belgium and Luxembourg, these two countries do not enter the full model as specified in Eq. (6). To make our results more easily comparable across the different specifications, we leave out Belgium and Luxembourg in the other regressions, too.[19] Thus, all estimations reported in Table 5 include 2,828 observations (i.e. 404 representative portfolios multiplied by 7 neighbor countries), 127 of which have an FIB score of 1 (i.e. represent zero holdings) and hence are right-censored. Standard errors are clustered by NUTS 3 region.

[Please insert Table 5 about here.]

Regression (1) of Table 5 reports the results of the basic breakdown ignoring the effect of regional proximity. As expected, a given portfolio's home bias positively impacts its FIB score vis-à-vis the seven neighbor countries. The remaining control variables are also in line with our expectations and all turn out statistically significant. Unexpectedly, however, the

[18] This approach follows Beugelsdijk and Frijns (2010). Later sensitivity analysis in section 4.2, however, confirms that our results prove robust to OLS estimation.

[19] In untabulated results, we replicate regression (1) to (3) of Table 5 for all nine countries in the sample and obtain broadly unchanged results.

base results also suggest that individuals allocate money to foreign markets based on diversification motives. This is at odds with what other studies document for individuals (Bailey et al., 2008) and arguably more sophisticated institutional investors (see, for instance, Chan et al., 2005, and Beugelsdijk and Frijns, 2010). Yet, at roughly 0.8, average return comovement among the national stock markets in our sample is fairly high, so that potential diversification benefits should be limited in economic terms.

Next, we add the dummy variable BORDERREGION$_i$ which splits the sample into border regions and non-border regions, respectively. As can be seen from regression (2), the coefficient on BORDERREGION$_i$ turns out statistically insignificant. This implies that, on aggregate, the percentage of shareholdings allocated to the nine bordering states of Germany does not systematically differ between investors living in border regions versus non-border regions. Thus, this result corroborates the univariate evidence presented in Table 3, rejecting the idea that investors living in border regions display a bias towards Germany's bordering states *per se*, i.e. regardless of their physical distance from the investor's home (in which case a reduction in FIB scores could not be ascribed to regional proximity).

In regression (3), we move to a country-specific analysis and include the indicator variable COMMONBORDER$_{i,j}$ in order to focus on explaining FIB scores of border-region investors towards their immediate neighbor country. Now, we observe substantial differences in equity allocation. Our regression results clearly confirm an investor preference for shares of companies headquartered in their direct neighbor country. COMMONBORDER$_{i,j}$ is highly significant in explaining the foreign investment bias and—as expected—bears a negative sign. Thus, again in line with our univariate evidence, border-region investors display significantly lower FIB levels towards the one neighbor state with which they share a common border.

Ultimately, however, we are interested in whether the sharp drop in FIB levels of a given representative portfolio towards its direct neighbor country can indeed be ascribed to disproportionately large investments in regionally close neighbor-country companies. Regression (4) of Table 5 presents the main result of this study: after controlling for previously identified determinants of foreign investment bias, the coefficient on our measure for

cross-border local bias shows the expected negative sign and turns out statistically significant. This result provides evidence in support of our hypothesis that individual investors' local bias is not limited to the domestic sphere but instead extends beyond national borders. Note that this effect is not only statistically relevant, but matters in economic terms, too. Adjusting the Tobit conditional estimation to an unconditional marginal effect, we can compute that an increase in $\text{LOCALRATIO}_{i,j}$ by one percentage point reduces the average FIB score of a given neighbor-region representative portfolio by as much as 0.036. Note that, across the different regression equations, the coefficients of the basic breakdown are virtually unchanged and always significant. Thus, our variable measuring the effect of cross-border local bias actually introduces a dimension of the foreign investment bias which is not yet captured by standard explanations.

Taken together, our main regressions results confirm the presence of a cross-border local bias and emphasize the role of regional proximity between investor and investment opportunity for explaining international asset allocation decisions. This relevance of regional proximity persists even after controlling for existing explanations for the foreign investment bias.

4.2. Robustness analysis

In this section, we test the validity of our main results by examining whether they are robust (i) to changing market conditions, (ii) to altering the aggregation level of the portfolios under review, (iii) to an inclusion of additional variables, and, finally, (iv) to the choice of an alternative estimation method.

4.2.1. Cross-border local bias and the market cycle

Covering the five years from December 2005 to December 2010, our period under review includes extreme market cycles. Across the ten countries in our sample, continued GDP growth between the last quarter of 2005 and the second quarter of 2008 is followed by four consecutive quarters of severe economic decline, with average annualized GDP plummeting by 9% in the last quarter of 2008 and again 7.5% in the subsequent three months. From mid-2009 onwards, the crisis period eventually makes way for moderate GDP growth until

the end of the sample period. These heavy fluctuations are accompanied by unprecedented stock market volatility: accumulated equity market capitalization in the EU 27 crashes by more than 40% in 2008, while it rises at annualized rates of up to 18% in the other four years.[20] Moreover, individual investors were hit hard by the 2008-2009 financial crisis (see, for instance, Hoffmann et al., 2013) and thus, we are interested in whether their cross-border locality proves robust to different market environments. To this end, we split our sample period in two roughly equal parts, i.e. the eleven quarters before and the nine quarters after the bankruptcy of Lehman Brothers on September 15, 2008—an event which individual investors associate particularly strongly with the outbreak of the financial crisis—and re-estimate Eq. (6) for either subperiod.

[Please insert Table 6 about here.]

Panel A of Table 6 reports the relevant coefficients and confirms our main results. As compared to the full period ('Baseline specification'), both the statistical and the economic significance of the coefficient on cross-border local bias, $\text{COMMONBORDER}_{i,j}$*$\text{LOCALRATIO}_{i,j}$, remain virtually unchanged for the second half of the sample period between end-2008 and end-2010. For the time prior to the financial crisis, the impact of cross-border local bias turns out even stronger in magnitude. Likewise, the general tendency to concentrate foreign stockholdings in the regionally closest neighbor country is also largely unaffected by changing market conditions: as compared to the total sample, the coefficient on $\text{COMMONBORDER}_{i,j}$ changes only marginally from −0.189 to −0.184 (to −0.193) for the subperiod preceding (following) the Lehman collapse. In sum, these results document that the impact of individuals' cross-border local bias on their foreign investment decisions proves robust to changing market regimes.

4.2.2. Bank-level aggregation of investor portfolios

Second, we aim to check whether our results are driven by the aggregation level of the representative portfolios which we construct to capture investor locality. As described in sec-

[20] All cited data is collected from Datastream.

tion 2, we draw on the NUTS classification provided for socio-economic analyses in the EU to pinpoint the location of individual investors in our sample. To this end, we assign the investor base of each of the reporting banks to the respective NUTS 3 region in which they are headquartered. This territorial breakdown is chosen in order to guarantee cross-country coherence of the regional entities we analyze. However, our sample comprises 1,727 reporting banks (i.e. 1,282 cooperative banks and 445 savings banks) located in 404 domestic NUTS 3 regions; thus, a given representative portfolio aggregates the filings of several different institutes. Two problems might arise from this aggregation level. First, bank branch density varies across Germany.[21] Thus, per territorial unit, our regional grid aggregates the filings of a different number of banks, depending on how many institutes are seated in a given NUTS 3 region. Second, while Germany's regional banks have similar business models, pooling the filings of savings banks and cooperative banks could disguise potential bank type-specific differences in clients' investment behavior which might be of relevance for investor locality. We address these issues by re-estimating Eq. (6) using a bank-level aggregation of investor portfolios and replicate our analysis for the subsample of cooperative banks and savings banks, respectively.

The corresponding results are reported in Panel B of Table 6. Interestingly, the statistical significance of the coefficient capturing the effect of cross-border local bias further improves for the full sample ('All') when moving from NUTS 3-level to bank-level aggregation. Yet, the magnitude of the effect slightly decreases, as is reflected in a change of the corresponding coefficient from −0.646 to −0.546. At the same time, the overall tendency to hold a disproportionately large fraction of foreign equity in the regionally adjacent country is also reduced, albeit remains highly significant at the 1%-level. Looking at the coefficients for the different bank types, the increase in statistical significance of cross-border local bias seems to be predominantly driven by the subsample of cooperative banks. Nevertheless,

[21] Baltzer et al. (2012) provide distributional properties of the reporting institutes sampled in this study and find that banks are less densely distributed in Eastern Germany, mainly owing to the lower presence of cooperative banks. Note, however, that each of the 404 NUTS 3 regions under review features at least one savings bank and one cooperative bank.

results for savings banks deviate only marginally from the NUTS 3-level findings and retain their statistical significance. Taken together, we note that our main results prove robust to a less extensive aggregation of the investor portfolios under review and are qualitatively unaffected by the type of reporting bank.

4.2.3. Additional variables

In the third robustness test, we seek to mitigate the likelihood that our analysis suffers from an omission of other relevant variables. It is conceivable, for instance, that the effect of regional proximity is confounded by previously unconsidered differences in the economic history of the bordering states. Specifically, Poland and the Czech Republic used to belong to the former Soviet Union and have only adopted a Western-style financial market infrastructure after 1989. While both countries stand out as successful examples for the transition from a centrally planned economy to a primarily market-based economy, this entails that investors living on the border to the two states are surrounded by relatively new regionally close foreign investment opportunities which they might feel less informed about or less familiar with. The univariate evidence presented in Table 3 supports this conjecture: Poland and the Czech Republic are the only countries where we do not observe a significant reduction in FIB scores for the respective groups of neighbor-region residents.

Thus, we re-estimate Eq. (6) excluding Poland and the Czech Republic and expect to see more pronounced regional proximity effects. In fact, Table 6, Panel C, reports qualitatively unaffected coefficients for both the regional adjacency bias and the cross-border local bias. Unexpectedly, however, the two effects decrease in magnitude. At the same time, the number of right-censored observations drops from 127 to 21, indicating that Poland and the Czech Republic account for the vast majority of non-allocation issues in the sample. Hence, to make sure that our results are not driven by the estimation model we employ (i.e. by the way we treat the zero observations) we perform a second set of robustness tests in which we replicate the analysis using a standard OLS framework.

4.2.4. Alternative regression specification

As described above, a number of representative portfolios in our sample do not allocate any money to one or more neighbor states, leading to right-censoring in our data set. By choosing a Tobit specification, we are able to include the zeros; however, this brings up the question as to what extent the non-allocation observations potentially drive our results. To ensure that our results are robust to model selection, we perform two additional OLS regressions that exclude and include the zero observations, respectively.

Panel D of Table 6 reports the corresponding results. As compared to the Tobit specification, the magnitude of reduction in FIB scores for investors located in neighbor regions increases marginally when estimating an OLS model which ignores the zero observations. By contrast, the coefficient capturing the impact of cross-border local bias changes from -0.648 to -0.543. Thus, including the zeros slightly overstates the magnitude of cross-border local bias. However, both effects maintain their respective signs as well as significance levels and we note that results remain qualitatively unaffected by the choice of the regression model. Finally, estimating a plain OLS specification including the zero observations yields a set of coefficients that is virtually identical to those obtained from the Tobit output. Thus, we conclude that or main results prove robust to model choice, as well.

5. Conclusion

This paper bridges the literature on the foreign investment bias and the local bias by providing a location-based explanation for the foreign investment bias. We argue that an investor's propensity to overweight regionally close stocks extends beyond domestic borders. To test this hypothesis, we draw on a rich data set which covers German individual investors' stockholdings in firms headquartered in each of Germany's nine neighbor countries.

Our results reveal that an individual investor's international equity allocation is determined by her intra-country place of residence in two ways. First, we show that the stockholdings of individual investors living within local proximity to a foreign country generally display a significantly lower foreign investment bias towards investment opportunities in

that country. Second, we find that, on aggregate, this drop in FIB levels is disproportionately driven by holdings in regionally close neighbor-country companies. Taken together, these results provide evidence in support of the presence of a cross-border local bias among individual investors. The impact of cross-border local bias on investors' bilateral foreign equity allocation proves economically significant and holds even after controlling for previously identified explanations of the foreign investment bias. We conclude that individual investors' equity local bias is not limited to the domestic sphere but instead extends beyond national borders.

Our findings complement the research of Bailey et al. (2008) and Graham et al. (2009) who show that individuals make international investment decisions which are at least partly driven by behavioral heuristics. Given that the benefits of international portfolio diversification are likely to be reduced or even erased by strong behavioral biases, one promising avenue for further research could be to measure the performance of foreign investment decisions which are distorted by cross-border local bias in order to find out if an indiscriminate implementation of policymakers' standard recommendation to invest abroad might eventually turn out to be costly rather than beneficial for locally biased individual investors.

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Table 1

Summary statistics of sampled regions and companies

Country	Regions					Companies	
	N	Domestic regions contiguous to neighbor country (N=62 out of 404)		Neighbor-country regions contiguous to Germany (N=46 out of 336)		N	Neighbor-country companies (%)
		N	%	N	%		
DE	404					1,109	
AT	35	13	3.23	9	25.7	113	7.61
BE	44	3	0.75	3	6.82	93	6.27
CH	26	4	1.00	6	23.1	429	28.9
CZ	14	15	3.73	5	35.7	14	0.94
DK	11	3	0.75	4	36.4	86	5.80
FR	100	10	2.49	3	3.00	403	27.2
LU	n.a.	3	0.75	n.a.	n.a.	50	3.37
NL	40	7	1.74	10	25.0	217	14.6
PL	66	4	1.00	6	9.09	79	5.32
All	740	62	15.4	46	20.6	2,593	100

This table provides descriptive statistics regarding the regional grid of sampled investors and firms, respectively. Based on their place of residence, investors are assigned to domestic (German) NUTS 3 regions. The sampled companies, i.e. the universe of their foreign investment opportunities, are matched with a non-domestic NUTS 3 region according to the geographic location of their corporate headquarters in one of Germany's nine bordering states, i.e. Austria (AT), Belgium (BE), Switzerland (CH), the Czech Republic (CZ), Denmark (DK), France (FR), Luxembourg (LU), the Netherlands (NL), and Poland (PL).

Table 2

Home bias and foreign investment bias across representative portfolios

Country	N	Mean	Std.-Dev.	Minimum	25th	Median	75th	Maximum
Panel A: Home bias								
DE	404	0.8132	0.0486	0.5174	0.7833	0.8140	0.8444	0.9652
Panel B: Bilateral foreign investment bias								
AT	404	0.3651	0.2461	–0.0184	0.1759	0.3652	0.5238	1.0000
BE	404	0.8821	0.1129	0.1733	0.8576	0.9151	0.9431	1.0000
CH	404	0.5136	0.2277	–0.0353	0.3828	0.5398	0.6814	0.9966
CZ	404	0.5609	0.3595	–0.0591	0.2196	0.6336	0.8905	1.0000
DK	404	0.8508	0.1507	0.0177	0.8198	0.8867	0.9402	1.0000
FR	404	0.6928	0.1495	–0.0446	0.6395	0.7151	0.7804	0.9856
LU	404	0.3164	0.2059	–0.0076	0.1727	0.2992	0.4329	1.0000
NL	404	0.0599	0.1245	–0.0323	-0.0070	0.0067	0.0702	0.6878
PL	404	0.9450	0.0935	0.0420	0.9351	0.9715	0.9924	1.0000

This table reports distribution characteristics of individual investors' home bias levels (Panel A) and bilateral foreign investment bias levels (Panel B) for the 404 representative portfolios under review. Home bias levels are calculated according to Eq. (4); foreign investment bias scores are organized by neighbor country and calculated according to Eq. (3). Values reflect averages over the period under review (2005Q4 through 2010Q4; 21 quarters).

Table 3

Home bias and foreign investment bias by intra-country investor location

Neighbor Country	Portfolio Bias	Region Type			Diff.	t-stat.
		COMMONBORDER$_{i,j}$		Non-border region		
		1	0			
Austria						
	HB	0.7714		0.8174	–0.0460 ***	–3.38
	FIB(AT)	0.0496	0.3755		–0.3259 ***	–4.83
	FIB(other)	0.5571	0.6042		–0.0471	–1.37
Belgium						
	HB	0.7863		0.8174	–0.0311	–1.11
	FIB(BE)	0.6316	0.8840		–0.2524 ***	–3.93
	FIB(other)	0.5460	0.5380		0.0080	0.11
Switzerland						
	HB	0.7529		0.8174	–0.0644 ***	–2.67
	FIB(CH)	0.0857	0.5179		–0.4321 ***	–3.84
	FIB(other)	0.5262	0.5847		–0.0585	–0.93
Czech Republic						
	HB	0.8120		0.8174	–0.0054	–0.43
	FIB(CZ)	0.4898	0.5636		–0.0738	–0.78
	FIB(other)	0.5887	0.5778		0.0108	0.34
Denmark						
	HB	0.7940		0.8174	–0.0233	–0.84
	FIB(DK)	0.2071	0.8556		–0.6485 ***	–7.99
	FIB(other)	0.5659	0.5418		0.0241	0.34
France						
	HB	0.7916		0.8174	–0.0258 *	–1.66
	FIB(FR)	0.5794	0.6957		–0.1163 ***	–2.47
	FIB(other)	0.5352	0.5624		–0.0272	–0.67
Luxembourg						
	HB	0.7577		0.8174	–0.0596 **	–2.14
	FIB(LU)	–0.0057	0.3189		–0.3245 ***	–2.74
	FIB(other)	0.6250	0.6086		0.0163	0.23

(continued on next page)

Table 3

Home bias and foreign investment bias by intra-country investor location–*ctd.*

Neighbor Country	Portfolio Bias	Region Type			Diff.	t-stat.
		COMMONBORDER$_{i,j}$		Non-border region		
		1	0			
Netherlands						
	HB	0.7926		0.8174	–0.0248 *	–1.89
	FIB(NL)	–0.0098	0.0783		–0.0881 **	–2.21
	FIB(other)	0.6120	0.6413		–0.0293	–0.71
Poland						
	HB	0.7877		0.8174	–0.0296	–1.22
	FIB(PL)	0.9722	0.9447		0.0274	0.58
	FIB(other)	0.6151	0.5293		0.0857	1.43
All						
	HB	0.7902		0.8174	–0.0271 ***	–13.70
	FIB(*country*)	0.3298	0.6080		–0.2782 ***	–6.48
	FIB(other)	0.6011		0.6092	–0.0080	–0.53

This table presents home bias and bilateral foreign investment bias scores organized by neighbor country and type of domestic NUTS 3 region in which a given representative portfolio is located. Values reflect averages over the period under review (2005Q4 through 2010Q4; 21 quarters). Region types are differentiated as described in section 3.2. Home bias levels are compared for representative portfolios located in neighbor regions versus non-border regions. Bilateral foreign investment bias scores are compared for representative portfolios located in neighbor regions versus non-neighbor regions and by bordering state. 'FIB(*country*)' denotes the average bilateral foreign investment bias score towards *country* for a given pool of neighbor regions of *country*; 'FIB(other)' captures the mean bilateral foreign investment bias scores towards the remaining eight countries not contiguous to the respective pool of neighbor regions. Differences obtained for the comparisons and corresponding t-statistics are reported in the two rightmost columns; ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 4

Explanatory variables

Panel A: Summary statistics by neighbor country

	AT	BE	CH	CZ	DK	FR	LU	NL	PL
Cross-border local bias									
$\text{COMMONBORDER}_{i,j}$ *$\text{LOCALRATIO}_{i,j}$	0.0271	n.a	0.1815	–0.0007	0.0732	–0.0339	n.a	0.1646	–0.0020
Control variables									
CULTDIST_j	2.365	2.828	0.777	4.132	2.043	2.190	2.335	2.893	4.158
FOREIGNPOP_i					7.241				
BILATTRADE_j	10.25	10.43	10.02	9.76	9.10	10.83	7.96	10.85	9.91
COMMONCURR_j	1	1	0	0	0	1	1	1	0
MKTCOMOVE_j	0.7904	0.7758	0.8318	0.6939	0.7195	0.9343	0.8063	0.8273	0.6842

Panel B: Correlations

	$\text{COM~ATIO}_{i,j}$	CULTDIST_j	FOR~NPOP_i	BIL~RADE_j	COM~CURR_j	MKT~MOVE_j
$\text{COMMONBORDER}_{i,j}$ *$\text{LOCALRATIO}_{i,j}$	1					
CULTDIST_j	–0.0298	1				
FOREIGNPOP_i	0.0259	0.0000	1			
BILATTRADE_j	0.0190	0.0641	0.0000	1		
COMMONCURR_j	0.0152	–0.1280	0.0000	0.2120	1	
MKTCOMOVE_j	0.0085	–0.6095	0.0000	0.3565	0.6322	1

This table presents basic characteristics of the explanatory variables employed in the regression analysis. Panel A provides summary statistics; values are organized by neighbor country and reflect averages over the period under review (2005Q4 through 2010Q4; 21 quarters). Cross-border local bias is computed as described in section 3.2; the remainder of explanatory variables is described in section 3.3. Panel B tabulates pairwise correlations.

Table 5

Main regression results

		Regressions with $FIB_{i,j}$ as the dependent variable			
	predicted sign	(1)	(2)	(3)	(4)
$BORDERREGION_i$	n.a.		–0.0077	0.0198	0.0196
			(0.0151)	(0.0145)	(0.0145)
$COMMONBORDER_{i,j}$	–			–0.2136 ***	–0.1890 ***
				(0.0431)	(0.0506)
$COMMONBORDER_{i,j}$ *$LOCALRATIO_{i,j}$	–				–0.6464 **
					(0.2987)
HB_i	+	1.6429 ***	1.6345 ***	1.6386 ***	1.6339 ***
		(0.1689)	(0.1749)	(0.1749)	(0.1748)
$CULTDIST_j$	+	0.2472 ***	0.2472 ***	0.2485 ***	0.2473 ***
		(0.0068)	(0.0068)	(0.0068)	(0.0068)
$FOREIGNPOP_i$	–	–0.0100 ***	–0.0101 ***	–0.0101 ***	–0.0100 ***
		(0.0011)	(0.0011)	(0.0011)	(0.0011)
$BILATTRADE_j$	–	–0.5112 ***	–0.5102 ***	–0.5119 ***	–0.5095 ***
		(0.0185)	(0.0191)	(0.0192)	(0.0192)
$COMMONCURR_j$	–	–0.4008 ***	–0.4016 ***	–0.3990 ***	–0.3984 ***
		(0.0168)	(0.0174)	(0.0174)	(0.0174)
$MKTCOMOVE_j$	+/–	5.0992 ***	5.0979 ***	5.1106 ***	5.0879 ***
		(0.1111)	(0.1113)	(0.1117)	(0.1116)
Region fixed effects		Yes	Yes	Yes	Yes
N (# right-censored		2,828	2,828	2,828	2,828
observations)		(127)	(127)	(127)	(127)
Chi-squared		4,169.73 ***	3,605.44 ***	3,257.72 ***	2,895.43 ***
Log pseudolikelihood		–413.89	–413.74	–402.57	–397.49

This table presents our main regression results. We estimate a right-censored Tobit model as specified in section 3.4 with the bilateral foreign investment bias score, $FIB_{i,j}$ (see Eq. (3)), as the dependent variable. See sections 3.2 and 3.3 for variable definitions. In regression (1), $FIB_{i,j}$ is regressed on a baseline model capturing existing explanations of foreign investment bias and controlling for home bias. Next, we add indicator variables to differentiate the sampled investors according to whether they live in a border region (regression (2)) and, more specifically, share a common border with the one neighbor country for which the bilateral foreign investment bias score is being explained (regression (3)). Regression (4) represents the full specification including our measure of cross-country local bias. Robust standard errors (clustered by NUTS 3 region) are reported below the coefficients in parentheses. *** and ** indicate statistical significance at the 1% and 5% level, respectively.

Table 6

Robustness analysis

	N	$COMMONBORDER_{i,j}$	$COMMONBORDER_{i,j}$ *$LOCALRATIO_{i,j}$
Baseline specification	2,828	–0.1890 ***	–0.6464 **
	(127)	(0.0506)	(0.2987)
Panel A: Cross-border local bias and the market cycle			
2005Q4 – 2008Q2	2,828	–0.1840 ***	–0.9310 ***
	(162)	(0.0513)	(0.3172)
2008Q4 – 2010Q4	2,828	–0.1930 ***	–0.6131 **
	(236)	(0.0558)	(0.2788)
Panel B: Bank-level aggregation of investor portfolios			
All	12,089	–0.1365 ***	–0.5458 ***
	(2,154)	(0.0241)	(0.1697)
Cooperative banks	8,974	–0.1089 ***	–0.5488 ***
	(1,911)	(0.0269)	(0.1885)
Savings banks	3,115	–0.2182 ***	–0.4931 **
	(243)	(0.0495)	(0.2384)
Panel C: Additional variables			
Excluding CZ, PL	2,020	–0.1358 ***	–0.5128 **
	(21)	(0.0406)	(0.2196)
Panel D: Alternative estimation procedures			
OLS, zeros excluded	2,701	–0.1932 ***	–0.5428 **
		(0.0472)	(0.1928)
OLS	2,828	–0.1728 ***	–0.6555 **
		(0.0476)	(0.2873)

This table reports the results of several robustness checks testing the validity of the main results presented in Table 5. The dependent variable is the bilateral foreign investment bias score, $FIB_{i,j}$, as derived in Eq. (3). The rows describe the different changes to the basic breakdown; the columns show the results of the changes on our variables of interest. Panel A runs the Tobit model specified in Eq. (6) for different subperiods, Panel B re-estimates Eq. (6) using a different aggregation level of investors' portfolios, Panel C includes additional variables, and Panel D replicates the analysis using alternative estimation procedures. Robust standard errors (clustered by NUTS 3 region and bank (Panel B), respectively) are reported below the coefficients in parentheses. *** and ** indicate statistical significance at the 1% and 5% level, respectively.