Suboptimal international equity portfolio diversification and stock market development

Abstract This paper examines whether the widely reported phenomena of home and foreign biases (i.e. suboptimal international equity portfolio diversification) hold any ramifications for the development of stock markets. The results, analysed using macro- and micro-level data, support the view that stock markets that are characterised by a higher degree of home bias are associated with lower levels of development. On the other hand, markets where foreign investors show a higher degree of allocation preference, relative to the prescribed benchmark (foreign bias), are found to be more developed. The results, which are robust to the use of shock based identification strategy, indicate that policy measures that promote optimal international equity portfolio diversification could be crucial in developing the depth and breadth of domestic stock markets.

Keywords International equity portfolio diversification · Stock market development · Equity home bias · Equity foreign bias · Shock based identification strategy

JEL classification F3 · G11 · G14

1 Introduction

Despite the benefits of international portfolio diversifications (see Grubel 1968; De Roon et al. 2001; Chiou and Lee 2013; Yu et al. 2017), it is well established that investors do not exploit such opportunities but sub-optimally allocate funds across countries (see Cooper at al. 2012)[1]. This sub-optimality in international equity portfolio diversification (SIEPD) encompasses the phenomena of both home and foreign biases[2] relative to the prediction of the International Capital Asset Pricing Model[3] (also see Wu & Gau, 2017 and Broihanne et al, 2016). The primary focus of the existing literature on international equity portfolio diversification has been to explain the phenomena of home and foreign biases.[4] However, the possible implications of such suboptimal diversification (i.e. home and foreign biases) have remained largely unexplored. This study contributes by investigating whether the widely reported home and foreign biases have ramifications for the development of stock markets. With respect to economic justifications, SIEPD is likely to influence the development of stock markets through two complementary channels.

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The first channel through which SIEPD may affect the development of stock markets stresses the implications of restricted outbound investments by domestic investors relative to the benchmark, i.e. the effect of home bias. Bekaert and Harvey (2003) and Lau et al. (2010) argue that relatively higher domestic portfolio investments, i.e. higher degree of home bias, keep the domestic cost of capital higher as risks are largely shared only among domestic investors and local investors are not diversified enough to reduce the country-specific risk.

[1] For time varying diversification effects see Chiou and Lee (2013) and for benefits from developing markets; perspective see Chiou & Boasson (2015).
[2] Home bias indicates that local investors hold a significantly higher percentage of domestic securities in their portfolios relative to the theoretical prescription of the International Capital Asset Pricing Model (ICAPM) benchmark. Correspondingly, foreign bias relates to the tendency of foreign investors to over or under weight foreign markets compared to the ICAPM benchmark. For further details on the differences between home and foreign bias, see Chan et al. (2005).
[3] See Cooper and Kaplanis (1986) for a detailed discussion on how the ICAPM is used to derive the value based international portfolio allocation.
[4] See Kwabi et al., (2018) for recent evidence and Cooper et al. (2012) for an extensive review.

Higher cost of capital deters real investments and retards the growth of stock markets with fewer security issuances, a concentrated industrial base, and inefficient pricing. In a nutshell, higher domestic portfolio investments, i.e. sub-optimally lower international allocations, dissuade development of the stock markets while optimal international allocations promote such development.

The second channel through which SIEPD influences stock market development is through the effect of financial globalization, which is defined as the degree of trading by foreign investors in the domestic markets (see Stulz 2005). Financial globalization is also directly related to the varying level of foreign bias manifested by foreign investors, i.e. higher financial globalization implies a higher degree of foreign bias and thus, greater preference of foreign investors to hold host market's equities (see Lau et al. 2010). Errunza (2001) documents that with increased investments in the host market, foreign portfolio investors demand prompt and quality information, a higher degree of minority shareholder protection, and adequate and timely regulations that govern market and trading activities. The participation of foreign investors infuses confidence among the local investors to trade nationally and internationally, driving up the level of competition in domestic markets. With the increased presence of foreign investors, the trading activities of domestic investors also grow, helping the market to become more liquid, cost-effective and price efficient. Furthermore, foreign investors also provide significant lobbying power for the development of new institutions and services, encourage the adaptation of contemporary trading technology, and pressurize the authorities into training the local workforce. These demands help in the deepening of the financial markets.

Offering similar arguments, Henry (2000) claims that foreign investors are able to compel local firms to produce more timely and accurate forecasts than local analysts. This helps in enhancing the pricing efficiency of the market because foreign investors may compel the management to disclose price-sensitive information in a timely manner, mitigating the

possibility of insider trading and information uncertainty faced by liquidity traders. Stulz (1999) also posits that with greater firm disclosure, induced by growing foreign investors and foreign listing of domestic firms, market makers and investors (domestic and foreign) who do not have access to inside information, worry less about being exploited by insiders when they trade. Such assurances increase the number and diversity of investors and market markers leading to greater liquidity and lower bid-ask spread. Thus, ceteris paribus, countries that can attract higher levels of foreign portfolio investments (suggesting lower home and higher foreign biases) should experience a positive impact on the development of the domestic stock market (see Errunza, 2001).

The above reasoning suggests that optimal international diversification by domestic and foreign investors should have a positive effect on the development of local stock markets. However, Bekaert and Harvey (2003) note that despite the removal of explicit barriers leading to formal liberalization of equity markets, the observed gains are not as high as expected. The inadequate benefits have been attributed to the presence of implicit or indirect barriers[5] to international investments, both in developed and, relatively more so, in emerging markets. These implicit hurdles deter potential investors from optimally diversifying their portfolios, leading to home and foreign biases (see Bekaert and Wang 2010). For example, Mishra (2011) finds that real exchange rate volatility influences equity home bias in Australia. A recent work by Wu and Gau (2017) suggests that poor quality information amongst domestic investors increases equity home bias.

The prevalence of home bias inhibits financial globalization and increases cost of capital as risk sharing between domestic and foreign investors is inhibited, which impedes the reduction of country systematic risk (see Kim et al. 2015 and Lau et al. 2010). Higher home

[5] Examples of such barriers include weak investor protection, poor accounting standards, higher trading costs, and lower market liquidity etc. (see Bekaert and Harvey 2003).

bias, i.e. lower financial globalization, also retards the development of factor productivity, including financial deepening[6] of the capital market. Although there have been studies on the implications of SIEPD on cost of capital, we extend the literature by investigating whether variations observed in home and foreign biases can, in part, explain the heterogeneous development of stock markets around the world.

We investigate the relation between SIEPD and stock market development using standard measures of home and foreign biases and four different proxies of stock market development. Two key findings emerge from a battery of empirical estimations, including the use of an exogenous shock provided by the 2007 global financial crises as an identification strategy. First, stock markets that are characterised by lower home bias are larger, more diversified, liquid, and have relatively lower transaction costs. The results of shock based analysis suggest that a one percentage point reduction in home bias (i.e. higher degree of international diversification), on average, increases the size of the local stock market (relative to the size of the economy) by nearly 0.2%. Similarly, a one percentage point reduction in home bias leads to an increase in turnover (market liquidity) by at least 0.2% and a decrease in average trading cost by 0.2%.[7] The evidence further shows that a higher degree of foreign bias (i.e. the tendency to favour some stock markets relative to others by foreign investors) leads to larger, more diversified, liquid, and cost-effective stock markets.

Second, the results suggest that the evidence of suboptimal international portfolio diversification is not only observed in aggregated macro-level data used in existing literature

[6] The McKinsey Global Institute (2013) reports that the interplay between financial deepening and financial globalization is still an uncharted domain in the academic literature. The report notes that foreign investors provide capital, expertise and competition, which could spur financial deepening of the local market, particularly in countries with weaker financial development. It argues that the presence of foreign investors enhances the domestic market, beyond the metric of mere size, by not only infusing the much needed capital for investment and growth but also by promoting competition, raising the bar of corporate governance and transparency, and bringing the domestic firms to the international financial markets.

[7] These economic magnitudes are the first estimates available in the literature. As with any observation-based regression study that generates significant challenge of establishing credible causality (including quasi-experimental designs), these estimates are also subject to empirical assumptions and limited to our data set and sample period. Therefore, they should be viewed as indicators of the relation and used with due caution.

(e.g. Chan et al. 2005; Bekaert and Wang 2010), but is also prevalent in the micro-level global equity funds whose primary objective is to undertake optimal global diversification. This suggests that suboptimal international diversification is prevalent, even among the most sophisticated global fund managers.

This paper contributes to two strands of literature. First, despite several studies offering explanations of the various risk exposures of international investments (Phengpis and Swanson 2011; Clark and Kassimatis 2013) that potentially lead to home and foreign biases (see Mishra 2011; Cooper et al. 2012), there is a paucity of studies that examine the consequences of home and foreign biases. The only study that is remotely related to ours is that of Lau et al. (2010), who demonstrate the implications of SIEPD on cost of capital. We extend this strand of literature by investigating the ramifications of home and foreign biases on the development of stock markets.[8] Second, this study also adds to the debate on the beneficial effects of international financial integration on factor productivity. For example, Bekaert et al. (2011) argue that the collateral benefits of financial integration on factor productivity, through increased international portfolio investments, may be more pivotal for the long-term economic welfare than the expected short-term growth spurt. Thus, we take this debate a step forward by providing evidence consistent with the economic justification that optimal diversification of equity portfolios, which supports greater global financial integration of the market, promotes the development of stock markets.

The remainder of the paper is structured as follows. Section 2 describes the data and the construction of home and foreign bias measures. Section 3 includes the discussion on empirical results and section 4 offers some concluding remarks.

[8] Our study also differs from those observing changes in market development measures post financial liberalization. Instead of investigating the changes post liberalization we investigate the implications of home and foreign bias puzzles on stock market development.

2 Data

To test the implications of home and foreign biases on the development of domestic stock markets, three proxies of home and foreign bias (i.e. measures of IEPD) and four proxies of stock market development are used. Drawing on the literature, we also include a number of control variables that could potentially explain the cross-sectional and temporal variations in stock market development.

2.1 Measures of home and foreign bias

The home and foreign bias measures are based on the simple Markowitz portfolio model in international settings, as used extensively in the literature (Cooper and Kaplanis 1986; Ahearne et al. 2004; Chan et al. 2005). Accordingly, we employ three data sets to generate a measure of home bias and two measures of foreign bias in international equity portfolio diversification. First, we use the standard aggregate country level cross-country equity portfolio holding (in USD millions) obtained from the Coordinated Portfolio Investment Survey (CPIS) of the International Monetary Fund (IMF). The CPIS has data on stocks of cross-border holdings of equities for 76 participating countries.[9] We use the annual cross-country portfolio holdings for the period of 2001-2014 to construct proxy measures of equity home bias (*CPIS_HB*) and equity foreign bias (*CPIS_FB*), as described in sections 2.1.1 and 2.1.2. Dictated by the availability of data, we use 44 out of the 45 countries included in the highly investable Morgan Stanley Capital International (MSCI) All Country Index.[10]

Second, we use fund level, country allocation data from Emerging Portfolio Fund Research (EPFR*)* to measure the global fund's foreign bias (*GF_FB*).[11] *EPFR* avails asset

[9] A detailed description of this data set can be found in Bekaert and Wang (2010).
[10] The total investments of source and host countries comprise over 95% of the total assets and liabilities holdings respectively reported by CPIS.
[11] The EPFR is used by existing researchers to address a number of different issues (see Gelos and Wei 2005; Jotikasthira et al. 2012).

allocation data trading in traditional and alternative funds domiciled globally. The aim of the country allocations for the global funds is to provide a complete and comprehensive picture of fund managers' allocations driving global markets. For each year, we use the average of 12 months' country allocations of 122 global equity funds, domiciled across nine countries. The total size of all the funds is approximately US$120 billion. Since these are purely global funds, we expect the foreign bias to be minimal compared to the CPIS aggregate data, which include various (undisclosed) funds' types. To maintain consistency with the CPIS data, the sample period of EPFR data is also 2001-2014.[12] Finally, for the construction of the ICAPM benchmark allocation, we use the country level equity market capitalization of S&P/IFC obtained from the World Development Indicator (WDI) of the World Bank.

2.1.1 Equity home bias

Equity home bias implies the degree to which domestic investors overweight their domestic portfolio investments relative to the prescription of the ICAPM benchmark. Following the literature (see Cooper and Kaplanis 1986; Ahearne et al. 2004 and Chan et al. 2005) we define equity home bias (EHB_{jt})[13] as:

$$EHB_{jt} = \log\left(\frac{w_{jjt}}{w^{*}_{jt}}\right) \tag{1}$$

where w_{jjt}, as defined in equation (2), shows domestic investors' allocations in their home equity market of country *j* (i.e. investors based in country *j* investing in their country *j*) at time *t*.

$$w_{jjt} = \frac{h_{jjt}}{GPH_{jt}} \tag{2}$$

[12] Further, since the funds are domiciled in nine countries, we are unable to construct a robust measure of home bias, which is restricted by the smaller number of observations for our empirical analysis (90 observations only).
[13] A zero EHB_{jt} would indicate that investors have no bias towards their home market, while positive values show the presence of home bias.

where h_{jjt} is the stockholdings of domestic investors (based in country *j*) in their home market *j* and GPH_{jt} is the global holdings of domestic investors at time *t* across all 44 countries, including the home market. It is worth noting that CPIS only reports the bilateral foreign equity portfolio holdings with no investments in domestic markets for each host country *j*. Following the existing literature (Fidora et al. 2007), domestic portfolio holdings (h_{jjt}) is:

$$h_{jjt} = cap_{jt} - \sum_{i=1}^{43} FPH_{ijt,\ i\neq j} \quad (3)$$

where cap_{jt} is the market capitalization of equities issued in country *j (*obtained from the WDI) and $FPH_{ijt,\ i\neq j}$ is the holdings of all equities of country *j* by foreign investors domiciled in country *i (*obtained from CPIS*)*. The GPH_{jt} is thus measured as:

$$GPH_{jt} = h_{jjt} + \sum_{k=1}^{43} FPH_{jit,\ j\neq i} \quad (4)$$

where FPH_{jit} is the holdings of foreign securities (*i*) by investors domiciled in country *j* at time *t*. Finally, the term w_{jt}^{*}, of equation (1), as defined in equation (5), is the ICAPM world benchmark allocation for country *j* at time *t*, which is the same for all investors in all countries (see Cooper and Kaplanis 1986 and Chan et al. 2005 for the modelling of benchmark allocation).

$$w_{jt}^{*} = \frac{cap_{jt}}{\sum_{j=1}^{44} cap_{jt}} \quad (5)$$

As EHB_{jt} is constructed using CPIS data, we denote this variable by *CPIS_HB* in our analysis.

2.1.2 Equity Foreign bias

Relative to the ICAPM prediction, equity foreign bias implies a disproportionate allocation of funds of investors domiciled in country *i* to the securities of (foreign) countries *j*. Following Chan et al. (2005) we compute equity foreign bias (EFB_{ijt}) as in equation (6):

$$EFB_{ijt} = \log\left(\frac{w_{ijt}}{w^*_{jt}}\right) \quad (6)$$

where w_{ijt} is the allocation of country *i*'s investors in equities of firms based in country *j* at time *t.* It is defined as:

$$w_{ijt} = \frac{h_{ijt}}{\sum_{j=1}^{43} h_{ijt}} \quad (7)$$

where h_{ijt} denotes country *i*'s investors' holdings of equities in a foreign country *j* at time *t.* w^*_{jt} , as defined in equation (5), is the ICAPM benchmark allocation for investing in country *j* for time *t*.

For each pair of countries (i.e. *i & j*) equity foreign bias could be either positive, where foreign investors (in country *i*) overweight another equity market (*j*) more than that suggested by the implied global weight (w^*_{jt}), or negative, where foreign investors underweight their investment away from the implied global weight.[14] For regression analysis we take the average equity foreign bias ($AEFB_{jt}$) exhibited by all source countries' investors (*i=1…..n*) for country *j* for each period *t* as shown in equation (8):

$$AEFB_{jt} = \frac{\sum_{j=1}^{n} EFB_{ijt}}{n} \quad (8)$$

The measures of foreign bias based on CPIS-IMF and EPFR Global Funds' data are denoted as $CPIS\_FB$ and GF_FB respectively. The number of source countries, i.e. *n*, for *CPIS_FB* is 43 (i.e. the same as the host countries, excluding the country for which foreign bias is measured, $i \neq j$) and the *n* for the *GF_FB,* i.e. the number of funds exhibiting foreign bias for each country, is 121, excluding the fund if its country of domicile is the same as the country of allocation, i.e. $i \neq j$.

[14] Note, on aggregate the foreign bias should be negative for each country (*j*) which exhibits home bias. However, given the fact that CPIS does not report the holding for all countries in the world, on average, the foreign bias could be positive or negative. Such figures are also reported in the existing literature (see Chan et al. 2005).

2.2 Stock market development measures

We employ four measures of stock market development that are commonly used in the literature (see Levine and Zervos 1996; Chan et al. 2005). The measures are: (a) market capitalization to gross domestic product (GDP) ratio, (b) equity value traded to GDP ratio, (c) turnover ratio (value traded to market capitalization), and (d) a direct measure of transactions costs. The first measure "market capitalization as a percentage of GDP" *(MGDP)* reflects the size and importance of the stock market relative to the economy and is widely used as a proxy of stock market development. Levine and Zervos (1996) document that developed stock markets are not only bigger in size but are also better at mobilizing capital and diversifying risk. Both market capitalization and GDP of the sample countries are obtained from the WDI of the World Bank.

The second measure of stock market development is "trading volume as a percentage of GDP" *(TRGDP)*. This is also known as the value traded ratio. Trading volume is the total value of stocks traded during the year. *TRGDP* reflects the depth of market activity, i.e. market liquidity relative to the economy. It complements the *MGDP* measure as bigger markets may not necessarily be the most active markets. The data on trading volume were also sourced from the WDI of the World Bank.

The third measure of stock market development is "turnover ratio" *(TURN)* which is defined as the ratio of total value of stocks traded to market capitalization. Whilst *TRGDP* reflects market liquidity relative to the size of the economy, *TURN* reflects the significance of market liquidity relative to the size of the stock market. Further, turnover ratios are also shown to be inversely related to the cost of equity trading, i.e. higher turnover leads to lower trading costs. Bekaert and Hodrick (2009) document that market turnover not only indicates liquidity but also measures the rate at which information arrives in the market that instigates trades.

Consequently, the turnover ratio indicates the sophistication of market microstructure and market liquidity, trading costs, and efficiency.

Both measures of liquidity (*TRGDP* and *TURN*) are the developments in market microstructure and are indirect measures of transaction costs. Thus, we also incorporate a direct measure of transaction costs (*TRCOST*). The latter reflects the depth of market liquidity more directly, showing how costly it is to undertake trade in a particular market. Following Chan et al. (2005), we use a composite measure of market level transaction costs (in basis points) incorporating three different sub-components of costs related to an average equity trade.[15] These country level, annual trading costs figures are estimated and maintained by Elkins/McSherry (E/M) and are reported in the yearly global stock market fact book of Standard and Poor's (S&P). E/M analyses the global trading costs for 150 global institutions (pension funds, investment managers, banks and brokers) providing estimates of the country level transaction cost for international investors. E/M's estimates of market level transaction cost, based on an average transaction in USD, are generated by aggregating three sub-components: commissions, fees and market impact. Commissions consist of costs incurred by investors for accessing brokerage research facilities and services. Investors also pay fees for accessing extra services including settlement costs. The S&P global stock market fact book (2007) defines market impact as the difference between the price at which a trade is executed and the average of stocks' high, low, opening and closing prices during the trade. It is the average cost of trade *versus* the average price and is measured as the change in price per share divided by the volume of trade.

[15] These are the only aggregate country level proxies for average transaction cost measures sourced from the literature and are available for country level studies in the panel data framework.

2.3 Control variables

To isolate the implications of home and foreign biases on stock market development, we control for the possible effects of several other factors that are known to influence the development of stock markets. Earlier studies[16] show that market development is associated with the degree of foreign direct investments, domestic savings, banks' credit to the private sector, exchange rate exposure, expected inflation, interest rate, historical stock market performance, degree of trade openness, market capitalization, rule of law, legal origin, financial policy risk, and corruption. In the equations, all time varying control variables, discussed below, enter with a one-year lag.

Foreign investors are more likely to make direct investments in countries where stock markets are subject to lower controls and exhibit higher liquidity (see Claessens et al. 2006). Therefore, annual foreign direct investment *(FDIS)* proxies the effect of the stock of foreign direct investments on the stock market development of a country. We measure *FDIS* as year-end stock of foreign direct investments scaled by GDP.[17] Domestic savings (*Sav*) is the mobilization of domestic financial resources on investments leading to the development of stock markets. We measure *Sav* as the natural logarithm of the country's gross domestic savings (as a % of GDP). Commercial banks' credit to the private sector (*PCred*)[18] reflects the development of the credit market (see Bekaert et al. 2005 which further influences the development of the stock market. We calculate *PCred* as the log of domestic credit to the private sector, as a percentage of GDP. The data are obtained from the WDI.

Boyd et al. (2001), among others, demonstrate that macroeconomic stability is positively related to the development of the stock market. We include three variables to control the degree

[16] See, for instance, Claessens et al. (2006).
[17] Foreign direct investments exclude equity portfolio investment.
[18] Credits to the private sector include commercial banks' short- and long-term loans, purchase of non-equity securities, trade credits and other accounts receivable that establish a claim for repayment provided to the private sector.

of macroeconomic stability: real interest rate (*Int*), inflation rate (*Infl*) and exchange rate exposure (*Exch*). Data on real interest rate and inflation are obtained from the WDI. Following Lau et al. (2010), we construct the exchange rate risk exposure for each country as a three year moving average covariance of the monthly stock market index return with the monthly change of the domestic currency with respect to the US dollar. Countries with a stable exchange rate are expected to attract more foreign equity investment which will contribute to the development of stock markets. The exchange rates are sourced from Thompson Reuters.

We further use the preceding year's market return (*Retn*) to control for the effects of momentum in stock returns. Given the evidence on the success of momentum trading strategies to generate excess returns, investors are likely to invest in markets when recent returns are higher, leading to further development of the stock market. We expect a positive relation between *Retn* and stock market development. Further, studies suggest that trade openness (*TOPNs*) affects market development as it can contribute to financial integration (see Bekaert and Harvey 2000). To control for its effect, we measure the degree of trade openness by the natural logarithm of a country's exports and imports scaled by GDP. The data are obtained from WDI.

Claessens et al. (2006) suggest that developed countries with high incomes tend to have deeper stock markets. Accordingly, we employ GDP Per Capita (*GDPPC*) to incorporate the effects of income on stock market development (see Wong et al., 2013). GDP per capita is obtained from the WDI. Earlier studies (e.g. Fama and French 1992) suggest that *MKTCap* has a positive impact on stock market development. We employ *MKTCap* by including the natural logarithm of one year lagged year-end market capitalization to control for the potential price effect on stock market development. *GDPPC* and *MKTCap* are sourced from WDI.

We employ three measures to control the effects of institutional quality (see La Porta et al. 1998) on stock market development. The first measure is the rule of law (*R_Law*) index

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ranging from 0 (highest potential risk) to 6 (lowest potential risk). This is obtained from the International Country Risk Guide (ICRG). Second, we use a dummy variable to proxy the common law (*Legal_O*) countries. The third measure we employ is ICRG's corruption (*Cor*) index (0 indicating the highest risk of corruption and 6 being the lowest).

Finally, we also employ the financial policy risk index (*FinRisk*) of the ICRG to proxy a country's ability to meet its debt liability. The *FinRisk* index, which ranges from 0-50, is constructed using five potential sources of financial risk components: foreign debt as a % of GDP, exchange rate stability, foreign debt as a % of total export and services, current account as a % of exports and services, and international liquidity. All broad country risk measures used in this study are the annual average based on the monthly ratings (see ICRG, 2012 for further details of the method of creating *FinRisk*).

3 Empirical results

This section starts with a brief discussion of the summary statistics of alternative measures of stock market development and the proxies of home and foreign biases. Subsequently, the results of multivariate analyses that account for the effects of several control factors are discussed.

3.1 The sample features

Table 1 presents key features of the four measures of stock market development (columns 2-5) and the three measures of SIEPD, i.e. home and foreign biases (columns 6-8). The statistics are reported at country level (panel A), by groups of countries based on their level of economic development (emerging *versus* developed markets,[19] panel B), and the average of the top and bottom ten countries against the measure of home bias (*CPIS_HB,* panel C).

[19] We use the Morgan Stanley Capital Investment classification to identify emerging and developed markets.

…….....Insert Table 1 about here.....

Among the 44 sample countries, 21 are emerging and 23 are developed markets (Table 1, panel A). Not surprisingly, the top 10 countries ranked by stock market capitalization to GDP ratio *(MGDP)* are developed (Hong Kong, Switzerland, Sweden, United Kingdom, United States, Australia, Canada, Japan, France and Finland). On the other hand, the bottom 10 positions are mostly held by emerging markets (Romania, Bulgaria, Hungary, Czech Republic, Poland, Mexico, Turkey, Philippines, Indonesia and Argentina). A similar picture emerges when we compare the top and bottom ten countries by *TRGDP* and *TURN*.[20] The top ten nations with the lowest transaction costs (*TRCOST*) are developed markets (Japan, United States, France, Germany, Switzerland, Belgium, Netherlands, Sweden, Italy and Norway) and those with the highest transaction costs are emerging markets (Philippines, Romania, Peru, South Africa, Egypt, Argentina, Indonesia, Bulgaria, India and Czech Republic). The ranking of countries by all four measures of stock market development convincingly supports the view that developed markets are larger, diversified, liquid and have lower transaction costs.

Columns 5-7 of Table 1 (panel B) provide the analysis of the three different measures of SIEPD – a measure of home bias (*CPIS_HB)* and two measures of foreign bias *(CPIS_FB* and *GF_FB*). As in the case of stock market development, the top ten countries that exhibit least home bias (i.e. *CPIS_HB*) are primarily the developed ones (United States, Japan, United Kingdom, Germany, Netherlands, France, Canada, Ireland, Italy and Hong Kong). The bottom ten positions (i.e. highest home bias) are predominantly occupied by emerging markets (Bulgaria, Romania, Peru, Egypt, Hungary, Indonesia, Argentina, Czech Republic, Malaysia and Philippines). Similarly, the top ten positions in foreign bias (*CPIS_FB*) are occupied by the developed countries, primarily European, possibly caused by being members of the same

[20] The top ten countries ranked by *TRGDP* are Hong Kong, United States, Switzerland, United Kingdom, South Korea, Spain, Netherlands, Sweden, Spain, and Finland while the bottom ten countries are Romania, Argentina, Peru, Bulgaria, Mexico, Philippines, Poland, Czech Republic, Indonesia and Chile.

economic union where cross-country investment is more easily attainable. The *GF_FB* measure of foreign bias also presents a similar picture with developed markets being more favoured by international investors compared to emerging markets.

The above patterns of home and foreign biases are consistent with the evidence reported by earlier studies (e.g. Chan et al. 2005; Bekaert and Wang 2010). However, most of the existing studies that infer phenomena of suboptimal international diversification are based on macro-level data. The evidence from micro-level data (i.e. *GF_FB* in col 8) suggests that such suboptimal investment characteristics are also prevalent in the micro-level global equity funds whose primary objective is to undertake global diversification optimally. This signifies that the manifestation of suboptimal international diversification is also ubiquitous, even among the most sophisticated global fund managers. Overall, the individual country level analysis indicates that countries with a higher stock market development are also associated with a lower degree of home bias and a higher degree of foreign bias.

To further examine the above evidence of initial country level analysis, we split the sample countries into developed and emerging markets and compare the SIEPD and stock market development measures. The evidence from *CPIS_HB* (Panel B) shows that the level of home bias in developed countries (3.32) is much lower than that in emerging nations (6.04). Similarly, both measures of foreign bias suggest a much higher bias in developed markets (*CPIS_FB* = 0.37 and *GF_FB* = -0.09) compared to those in emerging markets (*CPIS_FB* = -1.64 and *GF_FB* = -2.15). All four measures of stock market development (*MGDP* = 168.13, *TRGDP* = 191.72, *TURN* = 160.56 and *TRCOST* = 26.31) reveal evidence of higher level stock market development in developed countries compared to emerging countries (*MGDP* = 27.52, *TRGDP* = 9.12, *TURN* = 22.70 and *TRCOST* = 67.80).

Panel C of Table 1 reveals a similar picture of home (*CPIS_HB*) and foreign biases (*CPIS_FB* and *GF_FB)* among the top/bottom nations. The average level of home bias of the

ten countries with the least home bias is only 2.29 while it is 7.15 for the ten countries with the highest home bias. Similarly, there is a substantial difference in the average foreign biases of the two (top and bottom) groups of ten countries (*CPIS_FB:* 0.72 vs. -2.77, and *GF_FB:* 0.28 vs. -2.78). These statistics, combined with the measures of IEPD biases and stock market development, show that the top ten countries reflect a much higher level of stock market development compared to the bottom ten emerging markets.

The analysis of summary statistics on stock market development and home and foreign biases in IEPD imparts strong signals that countries with lower home bias are favoured more by foreign investors and thus seem to have more developed stock markets. This also suggests that countries where domestic (foreign) investors exhibit lower (higher) home biases (i.e. foreign bias) experience more developed stock markets, which offers support to our initial prediction that nations with higher home bias and lower foreign bias are associated with lower stock market development.

Univariate analysis by the control variables[21] shows that, on average, the stock markets of developed countries, relative to those of emerging markets, experience lower levels of exchange rate volatility, real interest rate, inflation, and corruption. On the other hand, developed nations are associated with higher openness in trade, higher *FDIS*, market capitalization, per capita GDP, and banks' credit to private sector relative to GDP.

3.2 Multivariate analysis

The univariate analysis discussed above provides clear indication of a negative (positive) relation between home bias (foreign bias) and stock market development. The reliability of the observed relation, however, cannot be established without controlling for the effects of other factors that are known to help/hinder the development of stock markets. Using multivariate

[21] For the sake brevity, the table is not reported but can be obtained from the authors on request.

regression analysis, this section further examines whether the cross-sectional and temporal differences in home and foreign biases can explain the variations in the development of stock markets after accounting for the effects of other factors. Throughout the analysis we employ panel regressions with country and year fixed effects and the standard errors are double clustered at country and year level (Petersen 2009). We address the issue of endogeneity by exploiting an exogenous shock accorded by the 2007 global financial crises.

3.2.1 Home bias and stock market development

To examine the possible implications of home bias on stock market development, we regressed a measure of stock market development against a set of explanatory variables including the measure of home bias (equation 9) in an OLS framework. We estimate four different specifications of equation (9) whereby in each specification the dependent variable is an alternative measure of stock market development (SMD_{jt}) for country *j* in year *t*. They are *MGDP*, *TRGDP*, *TURN* and *TRCOST*, as defined and discussed in section 2. The key explanatory variable of interest in all four specifications is home bias ($CPIS\_HB_{jt-1}$) of country *j* in year *t-1*. A one period lagged measure of home bias is applied to mitigate the possibility of endogeneity arising from reverse causation.[22] All specifications include the control variables discussed in section 2 and capture country fixed effects (α_j) and year fixed effects (δ_t). The results are reported in Table 2.

$$SMD_{jt} = a + \beta_1 CPIS\_HB_{jt-1} + \boldsymbol{\beta_2} Controls_{jt} + \alpha_j + \delta_t + \epsilon_{jt} \quad (9)$$

The coefficients of the equity home bias (*CPIS_HB*) in models 1 to 3 (Table 2), bear the expected and statistically significant negative sign, in relation to the three stock market development measures (*MGDP*, *TRGDP* and *TURN* respectively). The estimates support the view that home bias in investors' equity portfolios leads to a lower development of local stock

[22] We address the issue of endogeneity later, in section 3.3.

markets. The positive and significant coefficient of *CPIS_HB* on *TRCOST* (model 4) confirms that markets with higher home biases are associated with higher transactions costs (i.e. lower stock market development). The estimates further suggest that, on average, a one percentage point increase in home bias reduces the size of the stock market by 0.293% of GDP (model 1), market liquidity by 0.688% (model 2), and turnover by 0.424% (model 3) while it leads to an increase in transactions cost by 0.166% (model 4).[23] Overall, the estimates support the view that equity home bias is detrimental to the development of stock markets and lends empirical support to the theoretical conjecture implied by Errunza (2001) and Lau et al. (2010), as discussed in the introduction section of this paper.

Overinvestment in the domestic stock market may lead to a high possibility of expropriation of shareholders' wealth by insiders and government, whereby large corporate insiders develop close ties and connive with the state to expropriate minorities (Firth et al. 2008). Such a perceived environment is likely to reduce the confidence and participation level of the domestic investors, thus inhibiting the financial deepening of the domestic capital market.

…….....Insert Table 2 about here.....

3.2.2 Foreign bias and stock market development

To examine the impact of foreign bias on stock market development, we estimate four specifications of equation (10). In each of the four specifications (models 1-4), the dependent variable is one of the four measures of stock market development (SMD_{jt}) for country *j* in year *t* (i.e. *MGDP*, *TRGDP*, *TURN* and *TRCOST*). The key explanatory variable of interest is the foreign bias ($CPIS\_FB_{jt-1}$) of country j in year t-1. All specifications include the control

[23] Naturally, as with any empirical investigation using non-experimental data, these estimates are subject to empirical assumptions and limited to our data set and sample period.

variables discussed in section 2, country fixed effects (α_j) and the year fixed effects (δ_t). The results are reported in Table 3.

$$SMD_{jt} = a + \beta_1 CPIS\_FB_{jt-1} + \beta_2 Controls_{jt} + \alpha_j + \delta_t + \epsilon_{jt} \quad (10)$$

The positive and statistically significant coefficients of foreign bias (*CPIS_FB*) on three measures of stock market development (*MGDP, TRGDP, TURN*), reported in models 1-3, provide convincing evidence that higher foreign bias leads to more developed stock markets. Similarly, the observed significant and negative coefficient of foreign bias (*CPIS_FB*) on transactions cost (*TRCOST*) (model 4) implies that foreign investors' participation in a stock market helps in reducing transaction costs. Overall, these estimates suggest that countries that are able to attract more funds from foreign investors, relative to the prescribed benchmark, (i.e. higher foreign bias), benefit from improved local stock markets.

…….....Insert Table 3 about here.....

3.2.3 Fund level foreign bias and stock market development

We further investigate whether equity foreign bias (*GF_FB*), measured by cross-country allocations of global funds (i.e. using fund level data), has a similar influence on the development of stock markets in host countries. Similarly to Equation (10), Equation (11) is estimated using four different measures of stock market development (SMD_{jt}) and the results are reported in models 1 to 4 of Table 4. The key explanatory variable of interest is the global fund-based foreign bias (GF_FB_{jt-1}) measure for country *j* and in year *t-1*. All specifications include control variables, discussed in section 2, country fixed effects (α_j) and year fixed effects (δ_t).

$$SMD_{jt} = a + \beta_1 GF\_FB_{jt-1} + \boldsymbol{\beta_2} Controls_{jt} + \alpha_j + \delta_t + \epsilon_{jt} \quad (11)$$

The significant positive coefficients of foreign bias (*GF_FB*) on the first three measures of stock market development (i.e. *MGDP, TRGDP* and *TURN*), reported in models 1 to 3,

confirm that favourable foreign bias has a significant positive effect on the development of the host stock market. Similarly, the significant negative coefficient of *GF_FB* on *TRCOST* (model 4) supports the view that the participation of foreign investors can lead to lower transactions costs.

Overall, the evidence from the analysis of fund level foreign bias supports our earlier findings that foreign equity portfolio investors contribute to enhancing the competition, market size, and liquidity of host stock markets. These results are consistent with the prediction of studies which argue that higher participation of foreign investors improves stock market liquidity (see Bekaert et al. 2007; Henry 2000; Gul et al. (2010)).

…….....Insert Table 4 about here.....

3.2.4 The roles of control variables

The control variables that generally enter the regressions with theoretically consistent and statistically significant coefficients are the *FDIS*, growth of private sector credit (*PCred*), recent stock market returns (*Ret*), market capitalization (*MKTCap*), law and order (*R_Law*) and legal origin (*Legal_O*). As expected, a higher stock of foreign direct investment has a positive and significant influence on the development of local stock markets. Similarly, the growth in private sector credit (*PCred*) also supports the development of equity markets. The estimates also show that the development of the stock market is positively associated with the recent stock returns (*Ret*). As the stock markets (*MKTCap*) grow bigger they further drive the competition, diversity and liquidity of the markets and help promote the stock market. Finally, both measures of investor protection (*R_Law* and *Legal_O*) carry expected signs and show that the quality of legal institutions is imperative in the development of stock markets, and that countries with common law-based legal traditions are associated with higher stock market development.

3.3 Robustness check

The evidence presented so far offers compelling evidence that equity portfolio investors' allocations, relative to the theoretical yardstick, are related to the development of stock markets. In this section, we undertake additional estimations to ensure that the results are robust to alternative specifications. One of the formidable concerns in this type of analysis is the issue of endogeneity arising from reverse causality[24] and other possible alternative explanations. Given the nature of our investigation, we do not have access to a feasible natural experiment. We instead address the issue by exploiting the 2007 global financial crises shock. We take advantage of the exogenous variation in SIEPD (i.e. home and foreign biases) caused by the global financial crises to isolate the effects of SIEPD on stock market development. The exogenous shock created by the 2007 global financial crises led to severe stress in several financial markets, particularly for those of the developed countries. However, some markets were more severely affected than others.

We classify the countries that were severely affected by the global financial crises using stock market development measure (market capitalization scaled by GDP, i.e. MGDP).[25] We compute five years' average of MGDP of pre- and post-2007 global financial crises. We then take the change between the after and before average MGDP figures of each country and sort this new variable (i.e. change in post-2007 five year average) from the lowest to the highest figure. Based on this change we take the first half of our sample countries with lowest change (i.e. highest decline in MGDP averages) as the countries most affected by the 2007 global financial crises (i.e. our treatment group called MAFC). The other 50% is taken as proxy of the least affected countries by the global financial crises (i.e. our control group called LAFC).

Figures 1 and 2 depict the average CPIS-based home and foreign biases of the MAFC

[24] Literature notes that stock market development itself could drive home and foreign bias (see Chan et al. 2005).
[25] We are grateful to the anonymous reviewer who suggested the use of the development measure in the classification of the countries.

and LAFC countries. The figures reveal that home bias in the MAFC countries has significantly increased since the 2007 period compared to that in LAFC countries. In fact, the gap in home biases of MAFC and LAFC countries increased remarkably after 2007. Similarly, after 2007, foreign bias drastically decreased in the MAFC countries compared to a marginal change for the LAFC countries. Thus the evidence shows that home and foreign biases of the MAFC and LAFC countries were differentially and exogenously affected by the global financial crises.

…….....Insert Figure 1 about here.....

…….....Insert Figure 2 about here.....

The divergence in the trend of home and foreign biases depicted in Figures 1 and 2 provides us with an ideal set-up to investigate whether the differential changes have any causal effect on the level of stock market development in MAFC relative to LAFC countries. We use empirical logic similar to the difference in differences (DiD) approach exploited in natural experiments.

To gain the shock based identification, we create a dummy (G_t) that takes the value of one for the MAFC countries (treated group) and zero for the LAFC countries (the control group). Similarly, we create a post-crisis year dummy ($Post_{crisis}$) from 2008 onwards. Subsequently, we create an interactive variable $\left(G_t \times Post_{crisis} \times SIEPD_{jt}\right)$ by interacting the SIEPD variables (i.e. home and foreign bias measures) with the ($G_t \times Post_{crisis}$) dummy as reported in equation (12).

$$SMD_{jt} = a + \beta_1 G_t + \beta_2 Post_{crisis} + \beta_3\left(G_t \times Post_{crisis} \times SIEPD_{jt}\right) + \beta_4 Controls_{jt} + \epsilon_{jt} \qquad (12)$$

where SMD_{jt} is one of the measures of stock market development. A statistically significant β_3 with expected sign (i.e. negative in the case of *MGDP*, *TRGDP*, *TURN* and positive in the case of *TRCOST*) should indicate that changes in stock market development of MAFC and LAFC countries are affected differently by the global financial crises that led to a significant rise (fall)

in home bias (foreign bias) measures. Once again, four specifications of equation (12) are estimated. In each specification the dependent variable is one of the four measures of stock market development. We present the results of the empirical estimations in Table 5.

…….....Insert Table 5 about here.....

Table 5 presents the results. The DiD estimator is the coefficient ($G_t \times Post_{crisis} \times SIEPD_{jt}$). First, the coefficients on *CPIS_HB* are mainly negative and statistically significant at the 1% level with nontrivial economic magnitude, suggesting that on average countries that were severely affected by the 2007 global financial crises and that experienced a higher degree of equity home bias had a greater decline in their stock market development measures. In terms of economic effect, the specification using *CPIS_HB* shows that on average, one percentage increase in home bias leads to a of 0.21%, 0.38% and 0.19% in the *MGDP*, *TRGDP* and *TRUN* measures respectively while the *TRCOST* increases by 0.23%. Second, as a robustness check, we run the same regression on *CPIS_FB* and *GF_FB*. The coefficients are positive and statistically significant. The results point to higher stock market development in those countries that were least affected by the 2007 financial crises relative to those most affected. In a nutshell, these findings provide a credible indication that suboptimal international portfolio investments do matter for the development of stock markets.

4 Conclusion

Despite the theoretical advantages of the international equity portfolio diversifications, empirical literature shows that portfolio investors do not optimally diversify their investments internationally. Consequently, such suboptimal diversification in the home market generates home bias and in the foreign market breeds foreign bias. Theoretical conjectures suggest that the presence of such biases in investors' diversifications should affect the development of stock markets in home/host countries. Drawing on robust economic rationale, we examine whether

the observed cross-country differences in equity portfolio investors' home and foreign biases have varying impacts on the development of stock markets.

We test our proposition by constructing standard measures of home and foreign biases using two sets of comprehensive data covering 44 countries that span the period from 2001 to 2014. Using four alternative measures of country level stock market development, the evidence from extensive analysis, including the use of shock based exogenous variations using the 2007 global financial crises, suggests that a higher degree of home bias adversely affects the development of the domestic stock market. On the other hand, greater foreign bias (i.e. the tendency to favour a particular foreign country relative to the benchmark) has a positive influence on the development of host countries' stock markets.

Our findings suggest that countries, particularly emerging markets that are keen to develop the depth and breadth of their local stock markets, should implement policy measures that encourage domestic investors to diversify internationally and help attract foreign investors to the domestic markets to reap the benefits of optimal equity portfolio diversification.

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Table 1: **Summary statistics of the dependent and key explanatory variables**

This table reports the average (over the sample period) of the four different measures of stock market development (SMD_{jt}) i.e. *MGDP*, *TRGDP*, *TURN* and *TRCOST* and the three measures of home and foreign biases i.e. for *CPIS_HB*, *CPIS_FB*, and *GF_FB*. *MGDP* is market capitalization as a percentage of GDP; *TRGDP* is stock value traded as a percentage of GDP; *TURN* is value of stock traded as a percentage of stock market capitalization; *TRCOST* is the measure of average transaction cost in bps; *CPIS_HB* is equity home bias calculated as the log share of domestic investors' allocations in their country's stock market capitalization to the country's world equity market benchmark weight; *CPIS_FB* is equity foreign bias for country *j* and is computed as the log of ratio of the allocations of investors in country *i* into equities of country *j* to the world equity market benchmark of country *j*. *GF_FB* is foreign bias measured using cross-country allocations of global equity funds. Panel A reports the statistics for individual countries. Panel B provides a comparative picture of the average for the emerging and developed markets using the Morgan Stanley Capital Investment classification. Finally, Panel C presents the measure for two groups of countries based on the top and bottom ten countries ranked against the CPIS-based home bias measure (*CPIS_HB).*

Panel A

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8
Country	MGDP (% of GDP)	TRGDP (% of GDP)	TURN (% of MKTCap)	TRCOST (Basis points)	CPIS_HB	CPIS_FB	GF_FB
Argentina	33.52	2.89	10.24	67.98	6.62	-0.53	-2.36
Australia	119.48	98.97	87.47	31.31	3.44	-0.19	-0.44
Austria	50.58	21.37	42.82	30.47	4.18	0.89	-0.48
Belgium	63.43	31.29	49.35	28.16	3.32	0.74	-0.49
Brazil	59.26	30.36	53.74	43.06	5.34	-2.37	-1.22
Bulgaria	19.57	3.54	17.07	60.21	9.59	-2.11	-2.56
Canada	116.26	88.64	79.53	30.28	2.81	-0.07	-0.64
Chile	79.83	17.85	17.12	NA	5.33	-0.24	-2.88
China	79.38	94.72	137.19	46.58	3.15	-2.13	-1.37
Czech Republic	26.47	15.08	58.49	56.37	6.41	0.09	-1.96
Denmark	63.91	52.54	83.93	32.04	4.22	0.46	-0.43
Egypt	57.25	24.87	40.94	68.15	7.27	-1.02	-3.28
Finland	91.53	120.91	120.33	37.72	4.15	0.34	0.26
France	99.86	83.76	103.64	24.74	2.62	0.44	0.13
Germany	45.28	65.91	142.91	25.65	2.19	0.55	0.08
Greece	48.16	24.45	51.48	54.34	4.72	0.18	-0.85
Hong Kong	447.63	433.48	92.26	39.22	2.87	0.17	0.87
Hungary	24.02	20.14	84.06	51.24	6.98	-0.44	-1.75
India	75.95	67.12	108.74	59.06	4.76	-4.79	-2.42
Indonesia	32.33	16.62	57.05	65.32	6.95	-1.31	-2.18
Ireland	40.84	23.79	53.58	31.24	2.84	1.53	-0.35
Israel	89.22	50.55	60.86	37.36	4.68	-0.28	-0.27
Italy	34.21	49.33	134.78	29.15	2.84	0.58	-0.06
Japan	110.15	109.18	118.08	19.38	1.77	0.21	-0.14
Korea	78.99	153.26	218.71	55.05	4.56	-0.72	-0.26
Malaysia	75.23	42.37	32.89	51.21	6.21	-1.06	-2.73
Mexico	30.44	8.21	28.42	35.71	5.35	-1.93	-1.24
Netherlands	88.11	136.09	148.56	28.45	2.31	0.66	0.2
New Zealand	35.75	22.14	47.55	34.58	5.77	0.18	0.84

Norway	56.86	67.49	119.96	30.21	3.87	0.74	-0.14
Peru	52.42	3.24	6.75	71.24	7.63	-0.63	-2.32
Philippines	31.46	9.81	20.71	88.02	6.26	-3.81	-1.61
Poland	30.24	11.97	40.41	NA	5.97	-0.71	-3.27
Portugal	39.75	27.51	66.38	31.83	5.28	0.68	-0.14
Romania	17.04	2.03	12.49	73.12	7.64	-2.17	-1.68
Russia	63.82	38.19	64.42	NA	4.9	-3.46	-3.16
South Africa	77.87	106.14	49.47	68.54	4.78	-0.48	-2.65
Spain	87.52	138.12	161.68	46.82	3.09	0.04	-0.43
Sweden	223.47	126.97	123.61	28.6	3.75	0.27	0.09
Switzerland	226.62	231.98	102.91	27.1	3.11	0.33	0.13
Thailand	62.65	51.16	92.84	53.14	5.83	-0.96	-1.68
Turkey	30.61	41.35	148.67	51.1	5.44	-3.64	-2.53
United Kingdom	125.53	191.93	155.17	50.02	2.03	0.35	0.26
United States	120.98	275.32	234.39	21.73	0.65	-0.07	-0.13

Panel B: Averages of variables of interest by the level of development of sample countries

	MGDP	TRGDP	TURN	TRCOST	CPIS_HB	CPIS_FB	GF_FB
Developed	105.43	107.46	103.52	32.62	3.32	0.37	-0.09
Emerging	50.20	36.32	61.92	61.24	6.04	-1.64	-2.15
Difference	55.23	71.14	41.60	-28.62	-2.72	-1.27	-2.24

Panel C: Averages of variables of interest of the top 10 and bottom 10 countries

	MGDP	TRGDP	TURN	TRCOST	CPIS_HB	CPIS_FB	GF_FB
Top10	168.13	191.72	160.56	26.31	2.29	0.72	0.28
Bottom10	27.52	9.12	22.70	67.80	7.15	-2.77	-2.78
Difference	140.61	182.60	137.86	41.44	-4.86	-2.05	-2.50

Table 2: Equity home bias and stock market development

This table reports the estimates of four different regression specifications of the following general equation (9).

$$SMD_{jt} = a + \beta_1 CPIS_{HB_{jt-1}} + \boldsymbol{\beta_2} Controls + \alpha_j + \delta_t + \epsilon_{jt} \qquad (9)$$

The dependent variables in each of the four specifications are the four different measures of stock market development (SMD_{jt}) which are *MGDP*, *TRGDP*, *TURN* and *TRCOST* as defined in the notes to Table 1. The key explanatory variable, *CPIS_HB*, is also defined in the notes to Table 1. The control variables in all four specifications are *FDIS* (year-end stock of direct investment scale by GDP); *Sav* (gross domestic savings as a percentage of GDP); *PCred* (domestic credit to the private financial sector scaled by GDP); *Int* (annual real interest rate); *Exch* (three year moving average covariance of the monthly stock market index return with the monthly depreciation of the domestic currency with respect to the US dollar); *Infl* (one year lagged rate of inflation based on the consumer price index)*; Retn_1* (average *MSCI* monthly index return over the past year); *TOPNS* (degree of trade openness measured as the ratio of a country's annual exports plus imports divided by *GDP*)*; GDPPC* (GDP Per Capita); *MKTCap* (log of country market capitalization); *R_Law* (law and order index of a country); *Legal_O*, a dummy variable that takes a value of 1 for common law countries and 0 otherwise; *FinRisk* (financial risk); *Cor* (corruption level prevailing in the country). α_j denotes country fixed effects and δ_t is year fixed effects. The *t*-statistics, reported in parentheses, are based on standard errors double clustered at the country and year levels. For tractable interpretation, all the coefficients are reported as partial elasticity and the statistical significance is reported against 10% (*), 5% (**) and 1% (***) significance levels.

	Model (1) MGDP	Model (2) TRGDP	Model (3) TURN	Model (4) TRCOST
CPIS_HB	-0.293***	-0.688***	-0.424***	0.166***
	(-3.23)	(-3.31)	(-4.28)	(4.81)
FDIS	0.486***	0.226***	0.686***	-0.135***
	(2.94)	(3.87)	(3.12)	(-3.38)
Sav	0.675**	0.603	0.146	-0.187
	(2.12)	(1.48)	(0.55)	(-0.93)
PCred	0.797***	0.675**	0.593***	-0.144
	(2.88)	(2.19)	(2.79)	(-1.23)
Int	-0.634***	-0.567	-0.167***	0.397*
	(-3.25)	(-1.48)	(-2.78)	(1.84)
Exch	-0.296***	-0.221*	-0.132	0.156
	(-3.42)	(-1.87)	(-1.04)	(0.44)
Infl	-0.148	-0.856	-1.012	0.183
	(-0.61)	(-0.94)	(-0.66)	(0.58)
Retn_1	0.309**	0.215***	0.254***	-0.433***
	(2.21)	(3.08)	(3.57)	(-2.93)
TOPNS	0.368***	0.570***	0.279***	-0.186
	(4.94)	(5.86)	(2.98)	(-0.41)
GDPPC	0.364**	0.492**	0.283	-0.350**
	(2.11)	(2.38)	(1.32)	(-2.13)
MKTCap	0.678***	0.133***	0.480**	-0.426**
	(4.93)	(5.26)	(2.58)	(-2.43)
R_Law	0.465**	0.181***	0.149***	-0.537***
	(2.69)	(7.65)	(5.63)	(-4.29)
Legal_O	0.283***	0.214***	0.253	-0.211***
	(3.31)	(2.83)	(0.67)	(-3.02)
FinRisk	-0.148	-0.321	0.282	-0.324
	(-0.74)	(-0.78)	(-0.69)	(0.83)
Cor	-0.187	-0.356	-0.358	0.249**
	(-1.24)	(-0.42)	(-0.42)	(2.31)
Constant	4.415***	3.587***	3.612***	2.517***
	(6.78)	(3.82)	(4.18)	(5.96)
Number of Observations	589	589	589	562
Adj. R-squared	0.63	0.72	0.50	0.60
Country effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 3: Equity foreign bias (CPIS) and stock market development

This table reports the estimates of four different regression specifications of the following general equation (10).

$$SMD_{jt} = a + \beta_1 CPIS\_FB_{jt-1} + \boldsymbol{\beta_2} Controls + \alpha_j + \delta_t + \epsilon_{jt} \quad (10)$$

The dependent variables in each of the four specifications are the four different measures of stock market development (SMD_{jt}), i.e. *MGDP*, *TRGDP*, *TURN* and *TRCOST* respectively, as defined in the notes to Table 1. The key explanatory variable, *CPIS_FB*, is also defined in the notes to Table 1. All the control variables are defined in the notes to Table 2. α_j denotes country fixed effects and δ_t is year fixed effects. The *t*-statistics, reported in parentheses, are based on standard errors double clustered at the country and year levels. For tractable interpretation, all the coefficients are reported as partial elasticity and the statistical significance is reported against 10% (*), 5% (**) and 1% (***) significance levels.

	Model (1) MGDP	Model (2) TRGDP	Model (3) TURN	Model (4) TRCOST
CPIS_FB	0.122***	0.266***	0.134***	-0.125***
	(4.18)	(4.87)	(3.28)	(-3.18)
FDIS	0.180***	0.125***	0.137***	-0.170**
	(2.95)	(2.92)	(4.69)	(-2.34)
Sav	0.878**	0.131**	0.340	-0.753
	(2.43)	(1.93)	(0.94)	(-0.42)
PCred	0.762***	0.158***	0.586**	-0.257**
	(3.27)	(3.42)	(2.33)	(-2.26)
Int	-0.475	-0.181**	-0.227***	0.573**
	(-1.51)	(-2.18)	(-3.14)	(2.48)
Exch	-0.268**	-0.173	-0.475	0.584
	(-2.38)	(-0.73)	(-0.52)	(1.08)
Infl	-0.317	-0.215*	-0.193*	0.430
	(-0.44)	(-1.78)	(-1.71)	(0.81)
Retn	0.176*	0.224**	0.292***	-0.362***
	(1.74)	(2.33)	(2.74)	(-2.98)
TOPNS	0.383	0.302**	0.236**	-0.253***
	(0.52)	(2.16)	(2.48)	(-5.18)
GDPPC	0.393*	0.527	0.24	0.276*
	(1.81)	(1.48)	(0.88)	(1.68)
MKTCap	0.790***	0.164***	0.667***	-0.167**
	(3.72)	(3.66)	(3.22)	(-2.25)
R_Law	0.134***	0.429***	0.302***	-0.642***
	(4.23)	(8.23)	(8.53)	(-5.15)
Legal_O	0.461***	0.572***	0.186***	-0.387***
	(4.70)	(3.46)	(3.40)	(-3.62)
FinRisk	-0.545	-0.134**	-0.552	0.531**
	(-1.52)	(-1.96)	(-0.78)	(2.28)
Cor	-0.326**	-0.423*	-0.210	0.259**
	(-1.95)	(-1.72)	(-0.108)	(2.57)
Constant	2.108**	-2.075*	0.353	3.564***
	(2.47)	(-1.82)	(0.67)	(7.97)
Number of Observations	589	589	589	562
Adj. R-squared	0.51	0.48	0.43	0.26
Country effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 4: **Foreign bias (global fund) and stock market development**

This table reports the estimates of four different regression specifications of the following general equation (11).

$$SMD_{jt} = a + \beta_1 GF\_FB_{jt-1} + \boldsymbol{\beta_2} Controls + \alpha_j + \delta_t + \epsilon_{jt} \qquad (11)$$

The dependent variables in each of the four specifications are the four different measures of stock market development (SMD_{jt}), i.e. *MGDP*, *TRGDP*, *TURN* and *TRCOST* respectively, as defined in the notes to Table 1. The key explanatory variable, *GF_FB*, is also defined in the notes to Table 1. All the control variables are defined in the notes to Table 2. α_j denotes country fixed effects and δ_t is year fixed effects. The *t*-statistics, reported in parentheses, are based on standard errors double clustered at the country and year levels. For tractable interpretation, all the coefficients are reported as partial elasticity and the statistical significance is reported against 10% (*), 5% (**) and 1% (***) significance levels.

	Model (1) MGDP	Model (2) TRGDP	Model (3) TURN	Model (4) TRCOST
GF_FB	0.115**	0.408***	0.334***	-0.127***
	(2.06)	(3.68)	(3.25)	(-4.16)
FDIS	0.183***	0.096**	0.108***	-0.138***
	(3.94)	(2.33)	(4.18)	(-2.83)
Sav	0.672*	0.842	0.332	0.514
	(1.69)	(1.30)	(0.77)	(0.32)**
PCred	0.784***	0.156***	0.545**	-2.204
	(3.55)	(3.48)	(2.37)	(-1.36)
Int	-0.147	-0.244***	-0.248***	0.114***
	(-0.48)	(-3.05)	(-3.72)	(3.88)
Exch	-0.213*	-0.153	-0.133	0.171
	(-1.96)	(-0.75)	(-0.94)	(0.36)
Infl	-0.533	-1.570	-1.123	0.367
	(-1.07)	(-1.29)	(-1.00)	(0.70)
Retn	0.491*	0.173*	0.246***	-0.548*
	(1.84)	(1.96)	(3.24)	(-1.77)
TOPNS	0.635	0.365	0.108	-0.172***
	(0.72)	(0.22)	(1.24)	(-2.68)
GDPPC	0.113	0.153	0.195	0.383**
	(0.58)	(0.66)	(0.89)	(2.20)
MKTCap	0.796***	0.171***	0.762***	-0.241**
	(3.78)	(4.58)	(3.71)	(-2.27)
R_Law	0.144***	0.335***	0.187***	-0.725***
	(6.52)	(9.12)	(6.83)	(-6.43)
Legal_O	0.367***	0.379**	0.137***	-0.156**
	(3.80)	(2.42)	(3.27)	(-2.23)
FinRisk	-0.124	-0.326	-0.135	-0.495
	(-0.57)	(-0.19)	(-0.29)	(-0.33)
Cor	-0.365**	-0.438*	-0.148	0.336***
	(-2.18)	(-1.76)	(-0.82)	(3.31)
Constant	1.906**	-2.145*	0.454	3.325***
	(2.23)	(-1.76)	(0.63)	(7.19)
Number of Observations	589	589	589	562
Adj. R-squared	0.45	0.48	0.37	0.56
Country effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

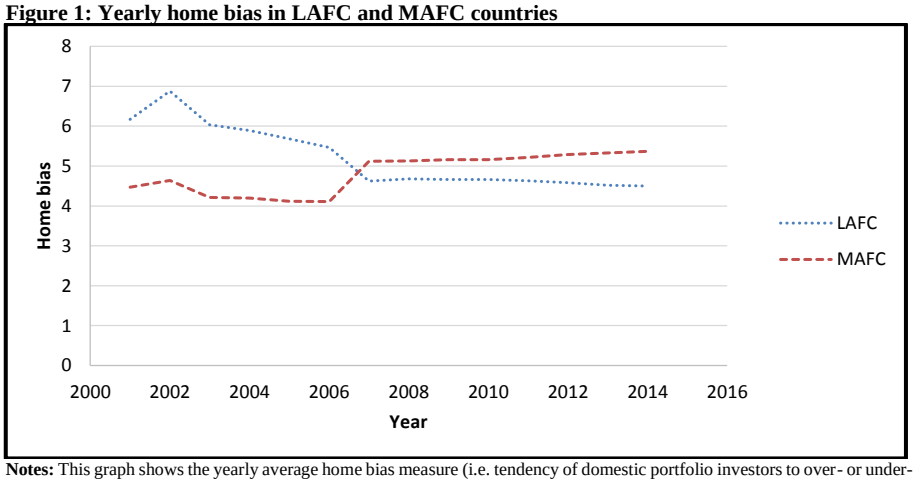
Table 5: Robustness checks

This table reports the estimates of four different specifications of general equation number 12 as reported in the text. The dependent variables in each of the two specifications are the measures of stock market development i.e. *MGDP*, *TRGDP*, *TURN* and *TRCOST* as defined in the notes to Table 1. The key explanatory variables are shock based interactive variable ($G_t \times Post_{crisis} \times SIEPD_{jt}$) generated using the recent 2007 global financial crises ($Post_{crisis}$) as the exogenous shock which affected the home and foreign biases measures ($SIEPD_{jt}$) of of the most severely affected countries G_t (treatment group) relative to the control group (least affected countries). We classify the treatment and control groups using the measure of market capitalization to GDP. The *t*-statistics, reported in parentheses, are based on standard errors double clustered at the country and year levels. For tractable interpretation, all the coefficients are reported as partial elasticity and the statistical significance is reported against 10% (*), 5% (**) and 1% (***) significance levels.

Shock Based Identification (equation 12, please see the text)

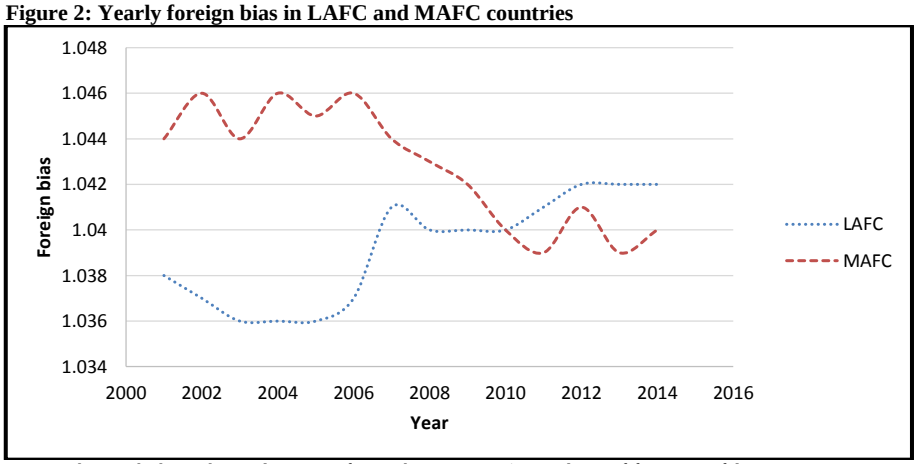
$G_t \times Post_{crisis} \times CPIS\_HB$	-0.213***	-0.379***	-0.193***	0.228***
	(-2.87)	(-3.56)	(-3.72)	(2.88)
$G_t \times Post_{crisis} \times CPIS\_FB$	0.262**	0.392***	0.317***	-0.690**
	(2.14)	(2.77)	(2.95)	(-2.03)
$G_t \times Post_{crisis} \times GF\_FB$	0.274***	0.406***	0.227***	-0.170***
	(2.83)	(2.78)	(3.51)	(3.46)
Controls including country and year fixed effects	Yes	Yes	Yes	Yes

Figure 1: Yearly home bias in LAFC and MAFC countries



Notes: This graph shows the yearly average home bias measure (i.e. tendency of domestic portfolio investors to over- or under-allocate their own domestic market relative to the ICAPM benchmark) for the MAFC and the LAFC countries. The objective is to gauge how the MAFC countries experienced an increase in their home bias proxy compared to LAFC countries during the 2007 global financial crises.

Figure 2: Yearly foreign bias in LAFC and MAFC countries



Notes: This graph shows the yearly average foreign bias measure (i.e. tendency of foreign portfolio investors to over- or under-allocate a non-resident country relative to the ICAPM benchmark) for the MAFC and the LAFC countries. The objective is to gauge how the MAFC countries suffered a decline in their foreign bias proxy compared to LAFC countries during the 2007 global financial crises. We rescale foreign bias to $1 - CPIS\_FB$ which now shows the absence of foreign bias if the value is one. Therefore, a value greater than one suggests higher foreign bias and a value less than one indicates a lower foreign bias.