

What attracts international investors to emerging markets?



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Background and acknowledgements

Nearly 70% of the members of the World Federation of Exchanges (WFE) are located in emerging or frontier markets. Supporting the growth and development of these markets is a core mandate of the WFE and takes a variety of forms, including the conducting of relevant research.

The WFE's Emerging Markets' Working Group (EMWG), consisting of WFE member exchanges, drives the research agenda, assists in the development of the research and provides critical review and input during the research and publication process. The WFE's Research team is responsible (either independently or in partnership with a third party) for conducting the research and producing the research output. Since the establishment of the EMWG in 2015, the WFE has published two emerging market-focused research reports – this is the third.

This research is only possible with the active participation of the members of the EMWG and the leadership provided by the relevant Chair and Vice-Chairs over the life of the EMWG. Specifically, we wish to acknowledge the contribution of:

- The exchanges who participated in this research. The full list is set out in Appendix 1;
- The current Chair and Vice-Chairs of the EMWG, namely: Mohamed Farid, Chairman, The Egyptian Exchange; Hector Orlando, Vice President of Bolsa de Comercio de Buenos Aires & Director of Bolsas y Mercados Argentinos (BYMA); and Dr. Pakorn Peetathawatchai, President, The Stock Exchange of Thailand;
- The previous Chair of the EMWG, Sunil Benimadhu, Chief Executive Officer, Stock Exchange of Mauritius;
- The research team at the WFE office, namely Siobhan Cleary, Dr. Stefano Alderighi, and Padmasai Varanasi.

1. Executive Summary

This report seeks to identify factors that attract international portfolio investment into emerging market equities.

Since the mid-1990s, net international portfolio equity inflows into emerging markets have grown dramatically, totalling over USD 955 billion over the 2000-2017 period (WFE elaboration on World Bank data). International investors are important for the growth and development of emerging market exchanges (and by extension, the surrounding economies). They provide additional capital to that which is locally available, serve to enhance liquidity, and promote greater competitiveness and adherence to standards of corporate conduct in the companies they invest in. Emerging market stock exchanges and policy makers are therefore concerned with the question of how to enhance international participation in their markets.

The report begins with a review of the relevant academic literature, as well as practitioners' perspectives, on factors that are most likely to drive foreign portfolio investment towards emerging markets. These include:

- Foreign (the source of the international funds) and domestic (the emerging market) market returns;
- Foreign and domestic market volatility;
- The correlation between foreign and domestic returns;
- Returns on major emerging market indices;
- The presence (or otherwise) of explicit barriers to investment such as capital controls and ownership restrictions as well as investment frictions such as higher transaction costs and investment-related taxes;
- The presence of factors that enhance the familiarity of the investment destination such as the use of English language, publication of financial information using internationally recognised standards and/or the inclusion of a market in the MSCI Emerging Markets Index;
- Factors indicating institutional quality, rule of law and adherence to corporate governance standards;
- The presence of market structure enhancements, such as the implementation of a colocation facility, securities lending and borrowing ability, and/or a central counterparty (CCP).

For purposes of the analysis, we collected monthly foreign buy and sell trade data (volume and value) from 20 emerging market exchanges for the January 2006 to April 2018 period. We used this data to build an econometric model that assesses the influence of a range of indicators on both investment inflows and outflows (the difference between buys and sells) and trading activity overall (regardless of whether this results in a net positive foreign inflow into the market or not).

Key findings:

We set out the key results below. Where we reference numbers, these must be interpreted as the correlations (and *not* the causal relations) between variables and initiatives on investment flows or trading activity on the *average* market over the 2006-2018 period. It should therefore be understood that applying an intervention in a particular market might not have the same influence as the one estimated through the regression model.¹

Investment inflows and outflows

- The greatest predictor of foreign inflows into emerging markets is emerging market equity returns. This positive relationship is seen both at the level of individual market returns (as measured by changes in the broad market index for a specific market) as well as at the emerging market level overall (as expressed by the returns of the MSCI Emerging Markets Index, though less strongly for the latter. A one-percentage point increase in domestic returns is associated with a USD 24.4 million increase in monthly inflows in the average market, while a one-percentage point increase in MSCI Emerging Markets Index returns is associated with a monthly inflow increase of USD 16.47 million in the average market;
- Corporate governance standards are also relevant for explaining inflows, with markets with higher corporate governance standards attracting more investment. Markets where a full set of well-established corporate governance requirements are present, show additional foreign inflows as high as USD 756 million over the sample period;
- Factors such as market capitalisation or market liquidity do not seem to be related to investment inflows, although we observe higher inflows in markets with more listed companies;
- Slightly less significant from a statistical point of view, but still relevant, are a country's inclusion in the MSCI Index, the use of IFRS reporting, and encouraging English-language disclosure of market announcements and financial results, all of which are positively associated with foreign inflows. For example, recommending disclosure in English is found to have a positive influence on inflows, bringing in just under USD 150 million in the average market over the sample period;
- Market structure features, in contrast to the factors mentioned above, have little influence on inflows. The only market structure feature found to be positively associated with international investment is the introduction of securities lending and borrowing (SLB);
- On the negative side, emerging market volatility is associated with investment outflows (or decreased levels of inflows);
- Additionally, the presence of restrictions on capital inflows and the presence of stamp duties and (less significantly) capital gains taxes are also negatively associated with foreign investment inflows. For example, a market introducing restrictions on capital inflows sees a reduction in inflows equal to USD 302 million over the sample period.

¹ See section 5.2 in the report on how to correctly interpret these findings.

Trading activity

- Higher correlation between emerging and foreign market returns is negatively related with foreign trading activity (both value and number of trades): a one-percentage point increase in the correlation with US (UK) returns is associated with a 0.18% (0.1%) decrease in the value of foreign trades and 0.18% (0.24%) decrease in the number of foreign trades. Higher foreign returns and volatility are also negatively correlated with foreign trading activity (value of trading) while there does not appear to be any relationship between domestic returns and trading;
- Market characteristics, however, are more relevant for trading activity than for investment flows. Larger and more liquid markets are associated with higher levels of foreign trading activity (both value traded and number of trades). For example, a one-percentage point increase in turnover velocity is associated with a 1.3% increase in the value of foreign trading, and a 0.84% increase in the number of foreign trades;
- Markets that offer greater exposure to foreign companies (either through direct listings or through the listing of depository receipts) also show higher levels of foreign trading activity. We find however that an increase in the number of ETFs is associated with reductions in foreign trading;
- Reducing trading fees (as represented by the introduction of negotiable trading fees) is associated with an increase in foreign trading activity (both value and volume), while introducing dividend and capital gains taxes is associated with a reduction in trading activity;
- The introduction of market structure enhancements, namely the ability to short-sell, and engage in securities lending and borrowing, are all associated with increased trading activity;

2. Introduction

Foreign investors play an important role in the development of emerging economies' public equity markets.² Many emerging and frontier economies have relatively limited domestic resources to sustain the growth and development of domestic public companies.³ Even in markets with sizable domestic savings, domestic capital might fail to reach the local public equity market because of the lack of an equity investment culture and the absence of a sufficiently developed institutional investor base.⁴ This reduces the listings proposition for domestic private firms and may depress secondary market trading. Emerging economies often need foreign inflows to support domestic public firms and foster the ongoing development of local equity exchanges.⁵ International investors provide the domestic economy with additional capital and allow domestic investors to share their risk with a more differentiated pool of participants.⁶ International investors also supply liquidity to the secondary market⁷, fostering its growth especially when domestic investors are relatively less active. Once a market develops, foreign investors play an important role in balancing domestic retail and institutional participation⁸, helping reduce market volatility and improve price discovery in the long run.⁹

Additional benefits of international participation are the following:

- International investors help the domestic market align to international standards and adopt stricter corporate governance requirements, by demanding better information, higher levels of investor protection and adherence to higher standards of corporate governance;¹⁰
- International participation helps reduce the cost of capital, because in an open market, local securities are priced with reference to global (as opposed to strictly local) risk factors;¹¹
- Domestic firms with broader foreign ownership are more profitable and efficient than firms with more limited or no international participation, suggesting that foreign ownership spurs competitiveness and stimulates companies to achieve higher standards.¹²

² See Errunza (2001).

³ In many emerging markets, the amount of domestic savings in comparison with the population is insufficient to sustain domestic investment, as one can conclude by looking at World Bank data. In these countries, international capital is likely to play an important role in the growth and development of the local economy.

⁴ The point was well made by Andrew Sheng (2005) in his keynote speech at the IOSCO 2005 Emerging Markets Regional Training Seminar. Emerging markets do not necessarily lack domestic savings: as of end of 2017, for example, a few emerging countries in our sample had domestic savings comparable to, and in some cases even higher than, countries like Italy, France, South Korea or the United Kingdom. These are generally very populous countries with fast growing economies, such as: India (USD 770 billion), Russia (USD 467 billion) and Brazil (USD 339 billion) (Source: World Bank). Yet, in many emerging economies domestic resources might not be appropriately funnelled towards public equity markets because of local market frictions or the lack of an equity investment culture.

⁵ See the WFE and OW report on attracting liquidity to emerging market economies: <https://www.world-exchanges.org/home/index.php/files/18/Studies---Reports/362/Liquidity-in-Emerging-Market-Exchanges---WFE---OW-report.pdf>. See also Harrison et al. (2004)

⁶ See Errunza (2001, Section 3).

⁷ See Bekaert et al. (2007) and Levine and Zervos (1998).

⁸ See also Alderighi (2017), downloadable at: <https://www.world-exchanges.org/home/index.php/files/42/Other-Research/490/A-note-on-how-to-enhance-liquidity-in-emerging-markets-by-levering-on-trading-participants.pdf> and Oliver Wyman and WFE (2016).

⁹ The seminal model of Merton (1987) predicts that, in a market with incomplete information, widening the investor base induces higher levels of risk sharing. It can be shown that this helps reduce stock market volatility. See also Wang (2007).

¹⁰ See Aggarwal et al. (2011), who find that foreign institutional ownership are promoters of good corporate governance practices in countries with worse institutions and lower corporate governance standards.

¹¹ Global risk is expected to be lower than in a fully segmented market with no international diversification: see Han Kim and Singal (2000) and references therein.

¹² Ferreira and Matos (2008) find that firms with higher foreign institutional ownership have higher expected profitability, better return on assets (ROA), higher net profit margin (NPM) and reduced capital expenditure.

Case Study 1

The impact of foreign participation on emerging markets: the case of Colombia

With a market capitalisation of USD 141.07 billion as at April 2018, Bolsa de Valores de Colombia (bvc) is the fourth largest cash equity market in Latin America. The Colombian capital market is characterised by a highly concentrated local institutional investor base: four main pension funds control almost all of the local assets of the Colombian pension sector, with the two biggest accounting for nearly 80% of the total AUM (they manage over USD 85 billion). This results in:

- **Low liquidity**
- **Concentrated holdings:** the Colombian pension funds are typically risk averse and mostly invest in blue-chip stocks, neglecting smaller companies
- **Herding behaviour of pension funds,** resulting in companies choosing to stay private

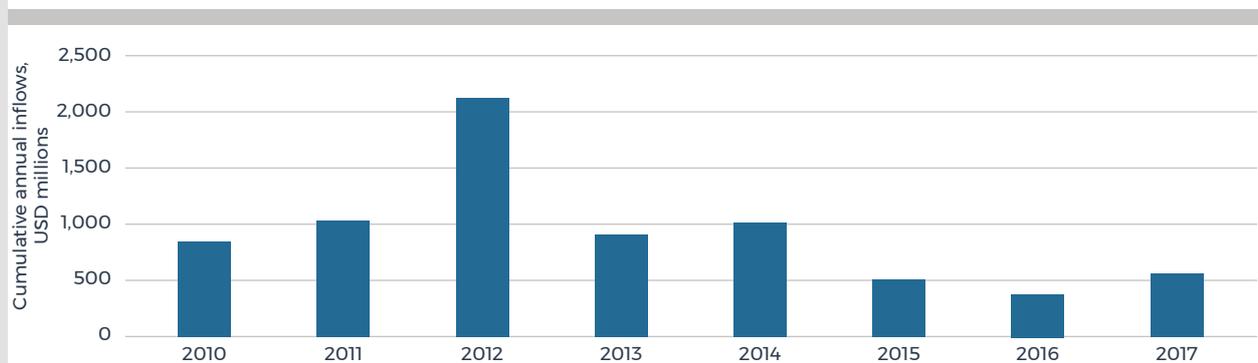
International participation is important for the Colombian market, as it allows the market to: diversify the investor base, dilute concentration, and enhance competition among institutional investors. This in turn generates greater liquidity and makes the market more attractive for issuers.

Over the past decade, several developments have helped attract foreign investors to the Colombian market, namely:

- In 2010 the Colombian regulator relaxed the requirement that foreign asset managers investing in Colombia have to set up a deposit with the central bank;¹³
- In June 2011, ratings agency Fitch upgraded Colombia from stable to positive investment grade;¹⁴
- Reduction in 2013 of the withholding (capital gains) tax rate for non-residents from 33% to 14%, for transactions on fixed income instruments. Transactions on equities are exempt from capital gains taxes;
- In 2012, Colombia was included in the MSCI Emerging Markets Index. bvc notes however their concern with MSCI's recent consultation to reduce the weight of stocks with non-voting shares for the purpose of their index calculation (MSCI, 2018) as on their market there is a significant number of companies listed with non-voting shares.

¹³ Foreign portfolio investors had to set up a deposit before the central bank, amounting to 50% of the investment. The deposit was fully refundable after six months. Source: bvc.

¹⁴ "Fitch upgrades Colombia rating to investment grade" (Reuters, 22 June 2011): <https://uk.reuters.com/article/colombiaupgrade-fitch/fitch-upgrades-colombia-rating-to-investment-grade-idUKWNA167720110622>

Figure 1: Annual portfolio equity flows to bvc

Source: WFE estimation on bvc data.

Currently, most of the foreign investment in Colombia comes from North America and Europe. According to bvc, foreign institutions in the past focused more on oil companies, but in recent years participation spread across liquid stocks in the financial, commodities and retail sector. The exchange believes international participation has had a positive impact on the market in terms of increased volumes and liquidity, as international investors trade more actively than domestic institutions.

Most emerging markets have undergone a process of liberalisation and integration over the last 30 years. Bekaert, Harvey, & Lumsdaine (2002) estimate that emerging markets started this process between the end of the 1980s and the first half of the 1990s.¹⁵ Edison & Warnock (2003), looking at the intensity of capital controls, similarly show that most emerging markets attained greater openness over the 1990-2000 period. As a result of these liberalisations, portfolio flows into emerging markets increased substantially from the second half of the 1990s until the start of the Global Financial Crisis.¹⁶ After a slowdown during the crisis period, foreign inflows to emerging markets surged again (Forbes and Warnock, 2012) reaching stable and sizable levels as at end 2017.¹⁷ These portfolio flows have accounted for a significant fraction of emerging markets' GDP and capital accounts since the crisis (Ahmed and Zlate, 2014; own calculation using World Bank data).

This research uses a unique proprietary database with information on foreign institutional participation and trading from a sample of emerging market exchanges¹⁸ to investigate the determinants of foreign portfolio equity investment and trading in emerging markets.

We look first at how push (foreign market returns and volatility, and the correlation between foreign and local market returns) and pull factors (domestic market returns and volatility) affect foreign inflows. We then study what levers and interventions, conditional on push and pull factors, are most strongly associated with inflows into emerging equity markets. We then go on to examine the relationship between these factors and trading activity overall, regardless of whether the trading results in inflows or outflows. We estimate linear regression models that control for market and time fixed effects as well as for a rich set of control variables.

¹⁵ See Campbell Harvey's page for more details: <http://people.duke.edu/~charvey/Research/indexr.htm>

¹⁶ Ghosh, Qureshi, Kim, & Zalduendo (2014) document a sharp increase in portfolio inflows to emerging economies between 2000 and the financial crisis, capping nearly 8% of EME's aggregate GDP in 2006.

¹⁷ The exception is 2011, as evident from World Bank data and pointed out in Yang (2016). For an illustration of these trends see Ahmed & Zlate (2014) and James et al. (2014).

¹⁸ We use the term 'emerging markets' loosely to indicate any market that is classified as advanced by either FTSE or MSCI. This categorisation includes advanced emerging, emerging and frontier markets.

Our database contains monthly information for 20 geographically diverse emerging and frontier market exchanges over the 2006-2018 period and is a representative sample of emerging and frontier markets worldwide. Therefore, our estimations are generalisable to the population of emerging and frontier markets. The rest of the report is structured as follows: Section 3 is a review of the academic literature. Section 4 describes the database used for the empirical estimations. Section 5 describes the empirical model. Section 6 reports the main findings. Section 7 concludes the report.

Case Study 2

The impact of foreign participation on emerging markets: insights from other exchanges

Many exchanges commented on the positive effect of international participation on their markets. They began by noting that international investors can facilitate market development by providing capital. International investors may also serve to counterbalance local investor activity (institutional and/or retail) and enhance price stability. We provide examples of these from WFE member exchanges:

As a result of strict capital controls, **Bolsas y Mercados Argentinos (BYMA)** had almost no international participation between 2011 and 2015 (see also Case Study 5). After capital controls were relaxed at the end of 2015, however, international asset managers started investing more and more into Argentinian public companies. To date, international participation is estimated to be roughly 24% of their market capitalisation (source: BYMA). BYMA believes that attracting more international investors would benefit their exchange, because of the relatively slow development of Argentina's local capital market. Contributing with additional funds and better technology, international investors would be more efficient than local investors and therefore have the incentive to trade more, thus providing liquidity to the market, making it deeper and facilitating price discovery.

Borsa Istanbul is a very liquid EMEA market, where turnover velocity routinely exceeds 200% (see WFE Monthly reports). These volumes are mostly attributable to local individual investors, who account for roughly 70% of the market's activity. While they provide liquidity, local individuals also tend to adopt a short-term investment approach that at times induces volatility. In Borsa Istanbul's opinion, foreign investors work as an important counterbalance to local individuals. While foreign ownership of stocks listed on Borsa Istanbul is as high as 60-65% of their market capitalisation, foreign investors contribute only 20-25% of the trading activity, suggesting that these investors are mostly buy-and-hold participants adopting a long-term investment strategy. Borsa Istanbul believes these international participants are beneficial for price stability.

The Stock Exchange of Thailand (SET) is a highly liquid Asian-Pacific market. While retail investors are important contributors to this liquidity,¹⁹ SET reports that foreign investors play an important role in the investment and trading composition of their market. Over the 2010-2018 period, foreign institutions accounted for roughly 30% of trading activity (with the remaining 70% split between retail investors (50%) and local institutions (20%)) and over 30% of shareholding. SET believes that this balance allows them to maintain high liquidity without being overly reliant on foreign investors and remain resilient amid volatile fund flows.

¹⁹ See for example: Wang (2007), Richards (2005), Alderighi (2018), WFE (2017).

3. Literature Review

In this section, we review the literature to identify what previous research has found to be the most relevant determinants of cross-border portfolio equity flows.

3.1. Push and pull factors

Research on cross border equity flows has typically studied whether these are determined by the performance of the source (foreign) market ('push factors') or by the performance of the destination (domestic) market ('pull factors').²⁰ Ghosh et al. (2014) suggest that both push and pull factors are likely to influence equity inflows at the same time, as push factors shift the supply of funds while pull factors shift their demand. Several contributions study the determinants of cross-border capital flows with a specific focus on equity inflows into emerging economies (Brennan and Cao, 1997; Edison and Warnock, 2008; Froot et al., 2001; Griffin et al., 2004; Richards, 2005). These therefore lie at the core of our identification of relevant push and pull factors.

3.1.1. Push factors

Returns from foreign countries are among the most important push factors (Griffin et al., 2004; Richards, 2005) though the relation between foreign returns and cross-border inflows is controversial. While on one hand higher foreign returns may encourage foreign participants to invest in their own country, on the other hand higher returns provide foreign investors with more spare resources to invest abroad (what the literature calls 'wealth effects': see Brennan and Cao (1997); Edison and Warnock (2008, page 2021)). To identify foreign returns (as controlling for returns from any possible country in the world is not possible), the literature has focused on the countries/regions that have historically been the largest source of outbound investment: usually the US and Western Europe.²¹ In some studies, US and European returns have been shown to be positively correlated with inflows, thus supporting the wealth effect interpretation (Aron et al., 2010; Bohn and Tesar, 1996; Griffin et al., 2004; Richards, 2005). Other studies meanwhile find no such relationship (Brennan and Cao, 1997).²²

Volatility of foreign markets is also regarded as a relevant push factor, and one that is expected to be negatively correlated with inflows, as international investors typically prefer to invest in advanced economies in times of higher uncertainty (Ghosh et al., 2014). As with returns, it is not possible to control for market volatility from every country in the world. Aron et al. (2010) and Ghosh et al. (2014) therefore use US market volatility (either the VIX index or volatility calculated on the S&P 500 returns) in their regression specifications, arguing that US market volatility is a globally applicable measure of investors' uncertainty.²³ As expected, these contributions find a negative relationship between levels of the VIX index and inflows (Aron et al., 2010; Ghosh et al., 2014).

Another potentially relevant push factor is the correlation between foreign and domestic returns. Coeurdacier and Guibaud (2011) find that international investors tend to invest more in countries in which returns are negatively correlated with their own countries' returns, i.e. they exploit hedging opportunities at an international level (see also Portes and Rey (2005). Levy and Levy (2014) note however that the increasing integration of financial markets hampers these very same opportunities, as returns tend to show increasingly high positive correlations at an international level.

²⁰ Note that for the rest of the report, we will use the term 'foreign' to identify the country where the foreign investor resides, and we will use the term 'domestic' to identify the destination country of investments.

²¹ According to Leuz et al. (2009), half of the foreign portfolio investment worldwide can be attributed to US investors alone. The IMF estimated that the US accounted for 30.2% of foreign investment in equity and investment funds worldwide as of June 2017. They also estimated that the European Economic Area accounted for 40.8% of foreign investment in equity and investment funds worldwide, with the UK alone representing 7.7% and Germany 4.3% as of June 2017 (Source: IMF Coordinated Portfolio Investment Survey).

²² Edison and Warnock (2008) find instead that higher US interest rates and above-trend US economic activity are negatively related with inflows.

²³ For more information on the CBOE VIX index please refer to: <http://www.cboe.com/vix>

3.1.2. Pull factors

The academic literature regards domestic returns as the most relevant pull factor. Bohn and Tesar (1996) find that net purchases of equities by US investors are positively related with the expected domestic excess of returns in 12 out of 22 countries in their sample. They attribute this finding to return-chasing behaviour. The theoretical formulations of Brennan and Cao (1997) and Griffin et al. (2004) predict that domestic returns should attract foreign inflows, and find empirical support for this prediction. Likewise, Richards (2005) finds that domestic returns attract more foreign inflows.

Other than Edison and Warnock (2008), the literature has somewhat neglected domestic uncertainty/volatility as a relevant pull factor, despite the fact that the theoretical specifications of some of the cited contributions predict a negative relation between net purchases and domestic volatility (see for example Bohn and Tesar, 1996; Griffin et al., 2004).

Finally, many investors implement passive investment strategies and track well recognised indices, such as the MSCI and/or FTSE Russell Emerging Markets and Frontier Markets Indices. To the extent that the rates of return on these indices influence international investors' sentiment, their performance should be considered as a relevant pull factor (Richards, 2005).

3.2. Levers and interventions

In addition to push and pull factors, the literature also investigates whether other characteristics influence cross-border equity inflows. To identify these characteristics, we borrow from the related literatures on the home-bias²⁴ (Ahearne et al., 2004; Chan et al., 2005; Dahlquist et al., 2003; Eichler, 2012; Kang, 1997; Lau et al., 2010; Levy and Levy, 2014) and on cross-border capital inflows (Ahmed et al., 2005; Ahmed, 2017; Aron et al., 2010; Forbes and Warnock, 2012; Ghosh et al., 2014, among others).

The International Capital Asset Pricing Model (ICAPM) predicts that investors should hold the world portfolio (Ahearne et al., 2004). The evidence, however, is that investors tilt their portfolios towards stocks found in their home market (the so-called home-bias: see cited literature in footnote 24).

3.2.1. Explicit barriers to investment and market frictions

During the 1990s, explicit barriers to investment (capital controls, ownership restrictions for foreign investors) were regarded as the main determinants of the home-bias. Following the liberalisation process many emerging markets went through during the mid-1990s, the home-bias was expected to reduce. As the home-bias persisted, economists started looking for the cause of the phenomenon elsewhere (Ahearne et al., 2004; Levy and Levy, 2014). Levy and Levy (2013) for example show that the correlation between foreign and domestic returns can explain the persistence of the home-bias despite the generalised fall of explicit barriers to foreign inflows.

In addition, despite moves towards liberalisation and integration, international financial markets are far from being perfectly integrated, and one still finds explicit barriers to investment in emerging economies.²⁵ These are expected, when present, to hamper capital inflows (OMFIF and Barclays, 2017) and exacerbate the home-bias (Ahearne et al., 2004).

²⁴ The home-bias is the well-documented tendency of domestic investors to attribute excessive weight to domestic stocks in their portfolios. This empirical regularity is at odds with the predictions of the International Capital Asset Pricing Model, according to which investors should in fact hold the world portfolio (Lintner, 1965; Sharpe, 1964). Explicit barriers to investment and trading and information asymmetries are typically used to explain the home-bias. For a comprehensive summary of the debate see the excellent literature review in Ahearne et al. (2004).

²⁵ In our sample, seven exchanges from six countries declared they have had explicit ownership restrictions for foreign investors over the sample period, and six exchanges from five countries have had capital inflow restrictions. From a case study interview it emerged that Bolsa de Comercio de Buenos Aires did not have any international participation between 2011 and 2015, because of strict capital controls imposed by the Argentinian government during that period. China is perhaps the most relevant example of a large emerging economy that imposes barriers on foreign participation and trading, with the presence (for example) of different share classes for foreign investors. On China, see Ding et al. (2013); Wei et al. (2005).

The literature also finds that local market frictions, such as higher transaction costs or higher taxes, reduce equity inflows (Chan et al., 2005).

3.2.2. Information costs

The literature agrees that explicit barriers to investment alone are not enough to fully explain the home-bias (Ahearne et al., 2004). Building upon the theoretical framework proposed by Merton (1987), the literature postulates that foreign investment would also be hampered by the indirect barrier represented by information costs. That is, foreign investors would tilt their portfolios towards stocks in their home market as they lack awareness, familiarity and information on securities abroad, and obtaining such information is costly (Ahearne et al., 2004; Kang, 1997; Portes and Rey, 2005).

Portes and Rey (2005) find that distance is an important (negative) determinant of portfolio equity investment between countries. They attribute the negative correlation between distance and cross-border investment to information asymmetry: that is, foreign investors would know less about (and therefore invest less in) distant markets or securities. Coeurdacier and Guibaud (2011) also find that greater distance hampers cross-border equity investment but that the presence of a common language and a similar legal system are positively correlated with equity inflows.

3.2.3. Institutional quality, rule of law and corporate governance standards

In addition to strict information/familiarity considerations, researchers have examined factors relating to corporate governance and institutional quality. Research suggests that foreign asset managers prefer to invest in countries characterised by higher corporate governance standards, higher institutional quality and stricter rule of law (OMFIF and Barclays, 2017). For example, Dahlquist et al. (2003) find that US investors tend to invest less in countries characterised by a higher expropriation risk index. Leuz et al. (2009) show that US investors tend to invest less in tightly held firms (such as family owned and managed businesses), but only in countries with low securities regulation, low disclosure requirements and where the legal system is not Anglo-Saxon (common law). On the same lines, Eichler (2012) finds that US investors do not necessarily invest more in countries with higher de jure disclosure standards but weight more countries where corporate disclosure is applied de facto, emphasising how it is the enforcement rather than the mere presence of a rule to attract international investors.

3.2.4. Market structure and post-trade infrastructure

The literature agrees that market structure features serve to enhance market and/or stock liquidity and improve price discovery. These include: market-making (Biais et al., 2016; Charitou and Panayides, 2009), direct market access (Oliver Wyman and WFE, 2016), securities lending and borrowing (Dreff, 2010) and colocation (Brogaard et al., 2015). However, there does not appear to be much research however on the links between market structure and the attractiveness of a market to international investors. As these features benefit foreign and local investors, we believe they might have a role in attracting foreign inflows.

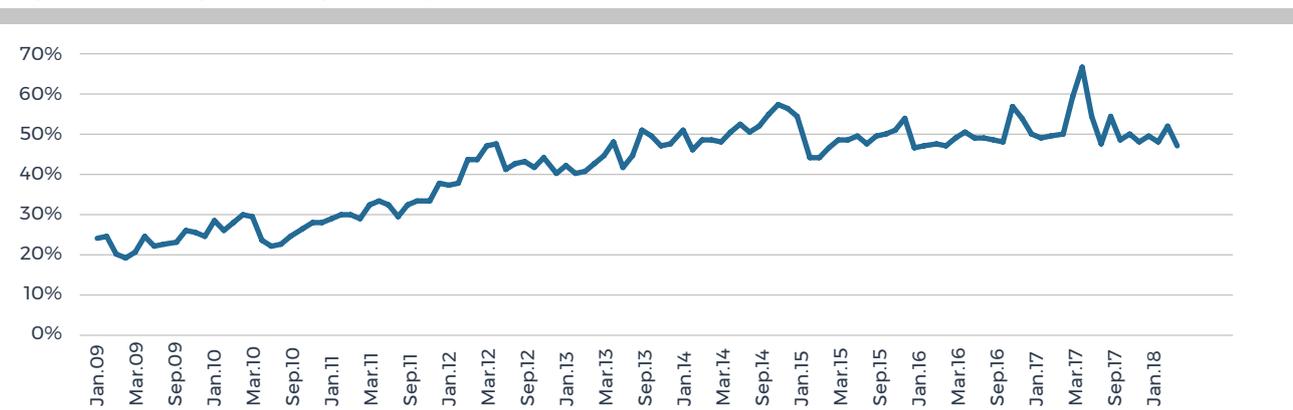
Similarly, as the introduction of a CCP in principle mitigates counterparty risk (Cont and Kokholm, 2014; Duffie and Zhu, 2011; Loon and Zhong, 2014) foreign investors might be tempted to invest more in markets where a CCP is present.

Case Study 3

Aligning market offerings to international standards (1): the case of the Moscow Exchange

The **Moscow Exchange (MOEX)** is the biggest exchange in Eastern Europe with a market capitalisation of more than USD 623 billion as at December 2017. Foreign trading is an important driver of activity on MOEX, with the share of value traded attributable to international investors averaging 41% but growing steadily over the 2009-2018 period roughly 25% to nearly 50%.

Figure 2: Foreign trading activity (as a share of value traded) on MOEX



Source: MOEX

Over recent years, MOEX has directed its efforts in aligning both its trade and post-trade infrastructures with international standards to enhance the attractiveness of the market for international investors. Their initiatives include:

- **Post-trade infrastructure development:** until the early 2010s, the Russian post-trade infrastructure wasn't aligned with international standards. The Russian market for example did not have a central security depository, which made the ownership transfer of securities more uncertain than in markets where a CSD was present. The relative lack of trust between counterparties in the Russian market upheld the existing order with 'T+0' settlement cycle on MOEX, in the sense that all transactions had to be pre-funded in order to be completed. This had negative consequences on secondary market liquidity, and especially on foreign trading. The Russian securities market regulator jointly with MOEX decided to reform the Russian post-trade infrastructure, introducing in 2012-2013:
 - A central security depository (CSD) (on the base of the depository which was a part of MOEX Group);
 - A central counterparty clearing house (CCP) for all market segments (on the base of the clearing house which was a part of MOEX Group);
 - A real-time delivery versus payment system in foreign currency;
 - A T+2 settlement cycle.

- **Trade infrastructure development:** over the same period, MOEX also restructured its trade infrastructure system, introducing features such as:
 - Direct Market Access (DMA) and Sponsored Market Access (SMA);
 - Co-location services;
 - A competitive fee structure;
 - Closing and opening auction processes aligned with international standards;
 - New circuit breakers rules.

Before 2012, when MOEX started to reform its infrastructure, a large share of the foreign trading in Russian public companies was concentrated in London, where the largest Russian firms are cross-listed (nearly 50% of the trading used to take place in London). Foreign investors did not trust the Russian market infrastructure enough and used to trade in London despite incurring higher transaction costs than on MOEX (as per feedback MOEX received from buy-side investors). The reforms made the Russian infrastructure as convenient as on other global exchanges and helped foreign investors feel more secure when executing trades, which finally stimulated liquidity on the Russian market. The situation reversed, and now most of the foreign trading in Russian public companies takes place on MOEX (MOEX share vs London increased to 65% in August 2018). International investors own ~70% of the Russian free-float. From the geographical perspective, most foreign funds in Russia come from US (more than 50% share in global funds holdings in equities), followed by a 20% each from UK and the rest of Europe. Asian investors account for a relatively small share of holdings of the Russian equities. Foreign HFTs and algorithmic-traders are a growing proportion of the market, accounting for nearly 50% of total trading in 2018.

4. Research Approach

4.1. Database description

Analyses are performed on a proprietary longitudinal database collected from exchange members of the World Federation of Exchanges (WFE) during the first half of 2018.²⁶ During May 2018, the authors submitted a data-entry template to all WFE emerging market members.²⁷ The form required exchanges to submit monthly data on foreign trading activity (value of foreign trading and number of foreign trades, split by buy and sells), the number of ETFs and depository receipts listed on the market in each month as well as qualitative information on policies, interventions and characteristics likely to influence foreign participation and trading (based on our review of the literature). The quantitative data collected represents the actual amount of trading and/or listed financial products in a given month. The qualitative information exchanges were required to provide related to:

- Capital controls and other restrictions to foreign investors (for example, ownership restrictions);
- Corporate governance requirements for listed companies;
- Presence of dividend and capital gains taxes and stamp duties;
- Whether the market requires or recommends disclosure in English language;
- Whether listed companies have to adhere to IFRS accounting standards;
- Market structure characteristics (presence of Market Making, DMA, SLB, Short-selling, Colocation);
- Presence of a CCP.

We collected monthly data from 20 emerging markets, covering the period from January 2006 to April 2018.²⁸

This database was merged with a database containing WFE monthly market level indicators as well as market-level and macroeconomic indicators collected from a variety of sources (see Appendix 2 for greater detail). The resulting database contains more than 2,000 observations.

²⁶ Established in 1961, the World Federation of Exchanges is a global industry association that represents more than 200 exchanges and clearinghouses around the world. Membership is acquired through an application process and a formal evaluation of whether the market (or clearinghouse) meets minimum criteria of regulation, transparency and economic relevance.

²⁷ The activity of the WFE is organised around thematic working groups, composed of member exchanges who voluntarily decide to take part in them. One of the working groups is centered around emerging markets (the Emerging Markets Working Group, EMWG). The data template was submitted to EMWG representatives, as well as to emerging market exchanges not belonging to the EMWG.

²⁸ As not all markets provided data for the whole sample period, our database is an unbalanced panel.

4.2. The empirical model

4.2.1. The model specification for inflows

The relevance of the determinants identified in the literature review section is tested using regression analyses on (restrictions to) the following linear model:

Equation 1: The model specification for inflows

$$E[\text{Equity inflows}_{it} | X] = \beta_0 + \beta_1 \text{Macroeconomic Indicators and Market Characteristics}_{it} + \beta_2 \text{Push Factors}_{it} + \beta_3 \text{Pull Factors}_{it} + \beta_4 \text{Explicit Barriers to Foreign Investment}_{it} + \beta_5 \text{Familiarity Factors}_{it} + \beta_6 \text{Corporate Governance and Institutional Quality}_{it} + \beta_7 \text{Market Structure Characteristics}_{it} + \beta_8 \text{Market Dummies} + \beta_9 \text{Year Dummies} + \beta_{10} \text{Month Dummies} \quad (1)$$

For each of the factors and levers described in Section 3, we provide a brief description of their empirical counterparts.

4.2.1.1. Dependent variables: equity inflows

Stock exchanges submitted data on the monthly value of buys and sells performed by international investors. We follow Griffin et al. (2004) and calculate equity inflows as value of foreign buys minus value of foreign sells. We follow Dahlquist and Robertsson (2001) and identify foreign trading as buys and sells performed by a foreign investor.²⁹ We perform our analyses using unscaled inflows (differently from Griffin et al. (2004) and Froot et al. (2001) who scale inflows by market capitalisation). We however perform the same analyses using scaled inflows as a robustness check, finding comparable results.³⁰ Formally:

Equation 2: Dependent variable

$$\text{Inflow}_{it} = \text{Foreign Buy}_{it} - \text{Foreign Sell}_{it} \quad (2)$$

²⁹ As pointed out in several contributions (see for example Choe et al., 2005; Griffin et al., 2004), a limitation of foreign trading and ownership data is that a domestic investor trading through a foreign institution would be recorded as a foreign trade. As submitting exchanges require traders to flag whether the investor is foreign, we believe this problem does not affect our data.

³⁰ Given the purpose of our study, we believe that levels of foreign inflows would work better than the share of foreign inflows over market capitalisation as many of the considered policy levers and determinants would impact market capitalisation as well (and therefore the denominator of the dependent variable). This would make the marginal effect of the regressors on the dependent variable tricky to interpret without a structural specification: stock market returns would for example positively influence both capital inflows, but also market capitalisation through domestic and foreign trading activity. See footnote 7 in Griffin et al. (2004) for a short discussion.

4.2.1.2. Push factors

We follow the cited literature (Aron et al., 2010; Griffin et al., 2004; Richards, 2005) and use US and European returns as our main push factors. We calculate returns as the log differences of the end-of-month values of the Dow Jones, S&P500, DAX, FTSE100 and CAC40 indices.

To capture international uncertainty, we include in the specification end of month values of the VIX index, following Aron et al. (2010) and Ghosh et al. (2014).

We introduce the correlation between domestic and foreign returns in our model. We follow Portes and Rey (2005) and calculate the correlation between foreign and local returns as the rolling correlation of end of month returns over the past 12-month period. We calculate correlation scores between domestic returns and returns on the foreign indices mentioned above (Dow Jones, S&P500, DAX, FTSE100 and CAC40), thus obtaining five different variables. To make sure that the indicator works as it should, we test the documented regularity that correlation of market returns increases during periods of market turmoil/instability (see Chesnay and Jondeau, 2001; Knif et al., 2005, and related literature). We find that our estimated correlations are positively correlated with both domestic and US/international volatility as measured by the VIX index, and that these correlations are statistically significant at the 0.1% level. We report the correlation matrix in Table A1 in the Statistical Appendix.

4.2.1.3. Pull factors

We calculate monthly domestic returns as the log difference of the end-of-month prices on domestic exchanges' broad market indices.

We calculate daily volatility as the standard deviation of the returns on the broad market index calculated over the previous 22 trading days. Monthly volatility is the average of the daily volatilities for the month, multiplied by the square root of 22.³¹ In the Statistical Appendix we show how the measure we adopted is highly correlated with volatility measures implemented by some of the submitting exchanges, supporting the robustness of our calculation (Figures A1 and A2).

Finally, we calculate returns on the MSCI Emerging Markets and Frontier Indices and on the FTSE Emerging Market Index as the log differences of end-of-month values (Richards, 2005).

4.2.1.4. Explicit barriers to investment

While it is clear that explicit barriers to investment raise transaction costs for foreign investors thus lowering their returns (Edison and Warnock, 2008; Griffin et al., 2004; Stulz, 1981), in practice identifying these barriers (or a relaxation of such barriers) is more challenging. As mentioned in Bekaert et al. (2002), the market liberalisation process is very complex, and entails intertwined reforms and policies that affect both financial markets and the real economy, and in turn have an impact on macroeconomic conditions by and large (Bekaert et al., 2005).

To control for explicit barriers to investment, we created "rule based measures" (Edison and Warnock, 2003), focusing our attention on levers that are either commonly mentioned in the academic literature and/or for policy purposes. More specifically, in addition to surveying the literature (Bekaert et al., 2002; Chan et al., 2005; Edison and Warnock, 2008; OMFIF and Barclays, 2017) we used the IMF ARE-

³¹ The methodology mirrors that of the volatility measure adopted by Borsa Istanbul: <http://www.borsaistanbul.com/en/data/data/equity-market-data/index-data/volatility>

AER reports (IMF, 2016) and the methodology used by S&P to calculate the Investment Weight Factor (IWF) for inclusion into IFCI indices (S&P Dow Jones Indices, 2018) to identify what are commonly regarded as a barriers to foreign investment. We identified the following broad categories:

- General ownership restrictions to foreign investors (either individual or collective);
- Sectorial ownership restrictions to foreign participation (either individual or collective);
- Presence of different classes of shares for foreign investors;
- Capital inflow restrictions; and
- Capital repatriation restrictions.

We then asked stock exchanges to indicate whether, during the January 2006–April 2018 period, any of the above barriers were in place, and if so, to provide a brief description and indicate for what period. Recognising the importance of local market frictions, such as taxes (Chan et al., 2005), we also asked exchanges to report whether during the sample period they had capital gain taxes, dividend taxes and stamp duties. After reviewing the data submissions, we codified the information submitted by exchanges and created a binary indicator for each of the above levers.

4.2.1.5. Information costs

As regards information asymmetries, based on the literature, we worked on the assumption that reducing informational barriers should attract portfolio inflows. Again, with reference to the literature and exploratory dialogues with exchange representatives, we identified the following levers:

- Recommended/compulsory disclosure in English language (the literature generally controls for common language: see Chan et al. (2005); Coeurdacier and Guibaud (2011); Portes and Rey (2005); and
- Adherence of listed companies to IFRS accounting standards (Ahearne et al., 2004, OMFIF and Barclays, 2017).

We then asked stock exchanges to indicate whether, during the January 2006–April 2018 period, any of the above was in place, and if so to provide a brief description and indicate for what period. After reviewing the data submissions, we codified the information submitted by exchanges and created a binary indicator for each of them.

We also introduced an indicator of whether a country/market is included in the MSCI Emerging Markets or Frontier Markets Index in our model (see, Leuz et al. (2009) who control for the company's inclusion in the MSCI World Index). Inclusion in a well-recognised index is a signal that a country/market complies with certain minimum standards in terms of corporate governance, institutional quality, rule of law. Inclusion in an index therefore *de facto* lowers information costs for investors. We received information on whether and when a country was introduced in the respective indices directly from MSCI.

4.2.1.6. Institutional quality, rule of law and corporate governance standards

In Section 3 we highlighted the literature that suggests international investors prefer markets with high corporate governance standards, levels of investors protection and certainty of law enforcement (Dahlquist et al., 2003; Eichler, 2012). These characteristics are typically difficult to measure. In particular, corporate governance requirements are liable to be different across jurisdictions, therefore a direct comparison between different countries is challenging. Referencing Aggarwal et al. (2009) and Aggarwal et al. (2011) we used what they identified as the most studied corporate governance requirements among academics and policymakers, namely:

- If there is a single class of common shares;
- If the CEO and Chairman positions have to be held by different people;
- If the board has a minimum size;
- If the board is comprised of a minimum share of independent directors;
- If the audit committee is comprised of a minimum share of independent members; and
- If the audit committee is ratified annually.³²

We then asked stock exchanges to indicate whether, during the January 2006-April 2018 period, any of the above corporate governance practices was in place, and if so, to provide a brief description and indicate for what period. After reviewing the data submissions, we codified the information submitted by exchanges and created a binary indicator for each. We then created a corporate governance index by summing the indicators. The higher the value of the index, the greater the number of concomitant corporate governance practices in place in the market.

We also downloaded measures of institutional quality, investor protection and regulatory effectiveness from the World Economic Forum Global Competitiveness Report and the World Bank Governance Indicators (see Appendix 2).

³² Aggarwal et al. (2009) and Aggarwal et al. (2011) consider forbidding or limiting the presence of staggered boards as another relevant corporate governance requirement. As most stock exchanges in our sample were not familiar with this practice (which we understand is a US one), we decided to omit it from our data collection and analysis.

4.2.1.7. Market structure and post-trade infrastructure

As mentioned, we believe that a comprehensive empirical model investigating the determinants of cross-border equity inflows should also investigate the impact of market structure and post-trade infrastructure features. Based on the literature and industry experience, we identified the following key characteristics:

- Direct Market Access (DMA);
- Securities Lending and Borrowing (SLB);
- The ability to short-sell;
- Colocation;
- Market making; and
- The presence of a CCP.

We then asked stock exchanges to indicate whether, during the January 2006-April 2018 period, any of the above features were present in their market, and if so, to provide a brief description and indicate for what period. After reviewing the data submissions, we codified the information submitted by exchanges and created a binary indicator for each of them.

4.2.1.8. Control variables: market and macroeconomic factors

As noted in Chan et al. (2005), both economic and stock market development are likely to be important determinants of international participation. We therefore include macroeconomic indicators and stock market characteristics in our model as control variables.

We introduce several macroeconomic factors in our specification, namely: real interest rates, exchange rate risk, GDP, domestic savings/GDP, domestic debt/GDP, exports/GDP. For the source and a brief description of these variables, see Appendix 2.

We also control for several stock market characteristics, namely: market capitalisation, number of foreign and domestic listed companies, number of listed ETFs, number of listed depository receipts. These indicators were either submitted by the exchanges themselves or taken from WFE monthly reports. For a brief description of these variables, see Appendix 2.

4.2.2. The model specification for trading activity

This report also examines the determinants of foreign trading activity. As discussed in Section 2, foreign trading can contribute positively to emerging market exchanges through the provision of liquidity and improved price discovery regardless of its direction (whether buy or sell).

To investigate this issue, we run additional econometric models using the following specification:

Equation 3: The model specification for trading activity

$$E[\text{Trading activity}_{it} | X] = \beta_0 + \beta_1 \text{Push Factors}_{it} + \beta_2 \text{Pull Factors}_{it} + \beta_3 \text{Stock Market Characteristics}_{it} + \beta_4 \text{Market Structure Characteristics}_{it} + \beta_5 \text{Market Frictions}_{it} + \beta_6 \text{Market Dummies} + \beta_7 \text{Year Dummies} + \beta_8 \text{Month Dummies} \quad (3)$$

As dependent variables, we use measures of trading activity, namely:

- The logarithm of foreign value traded
- The logarithm of foreign number of trades

As there is no research discussing the determinants of foreign trading activity specifically, we rely on the literature reviewed in Section 3 to inform what should sit on the right-hand-side of our empirical model. In the model specification, however, we introduce a slightly different set of indicators from the one used to study the determinants of inflows. This is based on discussions with market practitioners who note that trading may be driven by different factors than investing. Working on the assumption that trading is more short-term in nature than investment, the model excludes corporate governance and information/familiarity factors and includes variables that serve as a proxy for reduced transaction fees.

4.2.3. The estimation technique

To study the determinants of cross-border flows and foreign trading activity we estimate a cross-market longitudinal regression model. More in detail, we estimate a fixed-effect regression model to limit the problem of omitted variable bias. Such a model allows us to take account of all possible characteristics that are exchange-specific, but time invariant (such as distance from international markets, legal system, language), thus improving the precision of the estimators. To assess whether fixed-effect estimator is appropriate for the data, we performed several sanity checks. The results of these tests confirm that we can safely apply fixed-effect regression models to our data. We report more detail on these tests in Section B of the Statistical Appendix.

4.2.4. Qualitative analyses

In addition to the reported quantitative analyses, the authors also performed qualitative analyses to provide additional nuance and insight to the quantitative results. We conducted seven case study interviews with stock exchange representatives which are included in this report.³³

³³ We also conducted several interviews with buy-side investors, the results of which are reported in a separate report written in collaboration with EBRD and expected to be published towards the end of 2018.

5. Results and Discussion of Findings

5.1. Summary statistics

Table 1 provides descriptive statistics for the markets in our sample.

The mean market capitalisation of the exchanges in our sample is USD 380 billion, however there is wide variance within the sample, with the smallest exchange having a market capitalisation of USD 2.63 billion and the largest a market capitalisation of USD 2,404 billion. The median market capitalisation of the sample is USD 118.50 billion. Similarly, while the mean number of listed domestic companies is 564, the number ranges from 29 companies (minimum) to 5,985 companies (maximum). The median is 269 companies. Foreign listed companies are much less numerous (mean: nine companies; minimum: 0 companies; maximum: 87 companies; median: one company). While we acknowledge that means we cannot fully describe the breadth of our market range, we note that our sample is statistically representative of the population of emerging and frontier markets.³⁴ Therefore, our econometric results can be generalised to the population of emerging markets worldwide.

Table 1: Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)
	Mean	Std. dev	Median	Min	Max
Market capitalisation (USD billion)	380.82	471.96	130.46	2.63	2,404.84
# foreign listed companies	8.57	17.47	1.00	0.00	87.00
# domestic listed companies	564.82	982.17	275.00	29.00	5,985.00
Inflows (USD million)					
<i>Monthly</i>	70.10	836.91	6.27	-6,507.64	12,990.09
<i>Quarterly</i>	205.96	1,636.67	22.45	-11,306.73	13,640.99
<i>Semi-annual</i>	400.86	2,598.17	70.95	-12,443.43	15,568.90
<i>Annual</i>	800.82	4,226.63	177.74	-19,110.53	23,784.42
Value of for. trades (% tot)	31%	20%	26%	1%	94%
Num. of for. trades (% tot)	15%	16%	9%	0%	63%
Observations	2248				

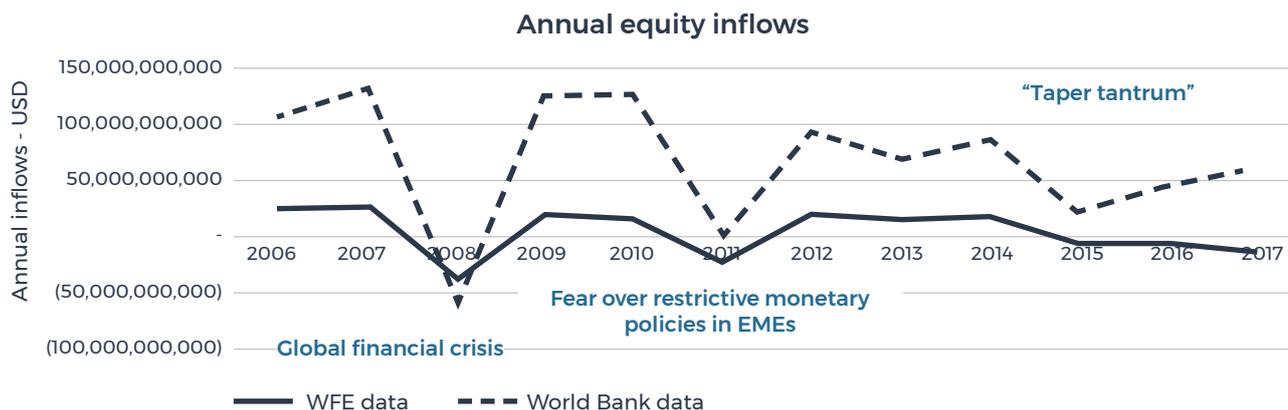
³⁴ We assessed whether the December 2017 sample means of four different indicators (market capitalisation, number of listed companies, value of EOB trades and number of EOB trades) are statistically different from their respective population means (as represented by all emerging and frontier markets that report data to the WFE database), and found that the sample means are not statistically distinguishable from the population means at standard confidence levels. This suggests that our sample is representative of the population of emerging and frontier exchanges.

As evident from Figure 3, and the data below, while emerging markets have experienced increased foreign inflows, these are highly variable.

According to our estimations:

- Mean monthly inflows into the markets in our sample were USD 70.10 million, ranging from an outflow of USD 6.5 billion (minimum) to an inflow of nearly USD 13 billion (maximum);
- Mean quarterly inflows were USD 205.96 million (minimum: USD -11 billion; maximum: USD 13 billion);
- Semi-annual inflows were USD 400.86 million (minimum: USD -13 billion; maximum: USD 15 billion), and
- Annual inflows were USD 800.82 million (minimum: USD -19 billion; maximum: USD 23 billion).

Figure 3: Annual inflows, 2006 - 2017



Note: The WFE graph includes data from all submitting exchanges though data for the full set of exchanges is only available after 2009. Figure 3 also includes World Bank data which is a more comprehensive dataset. In the graph, we highlight key events that have impacted the direction of overall portfolio flows into or out of emerging markets. These include the global financial crisis, negative sentiment over expected restrictive monetary policies in emerging markets³⁵ and the gradual tightening of US long-term rates (the so-called “taper tantrum”).³⁶

Our data also shows that foreign trading activity is an important proportion of the total market activity, although again with large variations across the sample: foreign trades accounted for 31% of value traded on average, ranging from as little as 1% to as much as 94%. Similarly, foreign trades accounted for 15% of the number of trades on average, ranging from almost zero to as much as 63%.

³⁵ See “Emerging markets: \$13 billion exodus” (CNN Money, 15 February 2011): https://money.cnn.com/2011/02/15/markets/emerging_market_outflows/index.htm

³⁶ Cerutti et al. (2015); Yang (2016). See also “Not a Happy Anniversary: EM’s Taper Tantrum Began 5 Years Ago” (Bloomberg, 22 May 2018): <https://www.bloomberg.com/news/articles/2018-05-22/not-a-happy-anniversary-em-s-taper-tantrum-began-5-years-ago>.

5.2. Interpretation of the findings

Correlation, but not causality: While our analyses suggest a direction (as natural in an econometric model) they do not imply causation. The numbers reported should therefore be interpreted as correlations. Our model cannot rule out the possibility of reverse causality: for example, while corporate governance standards may indeed attract inflows, higher foreign participation is in turn demonstrated to enhance corporate governance practices. Results should be read, interpreted and understood keeping this in mind.

Long-run average influence: The coefficients we estimated should be interpreted as the long-run influence of an indicator (say, domestic returns) or intervention (say, adopting IFRS standards) on average monthly inflows (per exchange, over the sample period). It should therefore be kept in mind that:

- The coefficients do not represent the immediate influence of an indicator or intervention on inflows or trading. The coefficients represent the cumulative influence of an indicator or intervention over time;
- The coefficients are average influences, calculated using data from 20 different exchanges with very different market characteristics. It should therefore be considered that applying an intervention in an individual market might not have the same influence as the one calculated through the regression model, as it represents the influence on the ‘average market’.

5.3. Discussion of the findings - investment flows

5.3.1. Are cross-border flows pushed or pulled?

We begin by analysing whether push or pull factors are more important i.e. whether cross-border equity inflows depend on foreign (‘pushed’) or local market performance (‘pulled’). Results are displayed in Table C2 in the Statistical Appendix. To study which factors are more relevant, we compare a baseline model including only macroeconomic indicators and market characteristics (Column (1)) to models where we respectively add push and pull factors to this baseline set of independent variables (Columns (2) and (3)). We then add both push and pull factors at the same time (Column (4)) and draw conclusions on the whole set of results.

We conclude that, based on the statistical properties of the models, pull factors, taken together, are relatively more important than push factors in explaining equity inflows.³⁷

On the pull side, we find that domestic returns have a statistically significant positive influence (at the 5% level) on monthly inflows. A one-percentage point increase in domestic returns is associated with a USD 24.4 million increase in monthly inflows, almost 35% of the average monthly inflows in the sample. Domestic volatility also has a statistically significant negative influence on monthly inflows, though only at the 10% level. A one-percent decrease in domestic volatility is associated with an increase in inflows equal to USD 9.5 million, 13.5% of the average monthly inflows in the sample. This result suggests that foreign capital tends to withdraw from emerging markets during periods of higher domestic market turmoil, consistent with the idea of a ‘flight to safety’.

We also find that returns on the MSCI EM Index are a significant predictor of monthly inflows (at the 10% level only, but throughout all specifications), even when controlling for domestic returns. It is possible that this result is driven by the rise of passive investment strategies which would not differentiate between specific emerging markets but would consider them as part of the whole. The influence of MSCI EM returns is sizable: a one-percentage point increase in returns is associated with an inflow increase of USD 16.47 million, roughly 23.3% of the average monthly inflow in the sample.

³⁷ While the adjusted R-squared of these regressions is not particularly high (around 12% for the model including both push- and pull-factors), these numbers are in line with the existing literature (Chan et al., 2005; Edison and Warnock, 2008). In addition, the goodness of fit increases dramatically when using quarterly or annual inflows as a dependent variable. When estimating the specification of Table 2, column (6) using annual inflows, the adjusted R-squared jumps to 30%. This suggests that push and pull factors better explain longer rather than shorter-run inflows (see also estimations in Edison and Warnock, 2008). This applies to the results discussed in 5.3.2. as well.

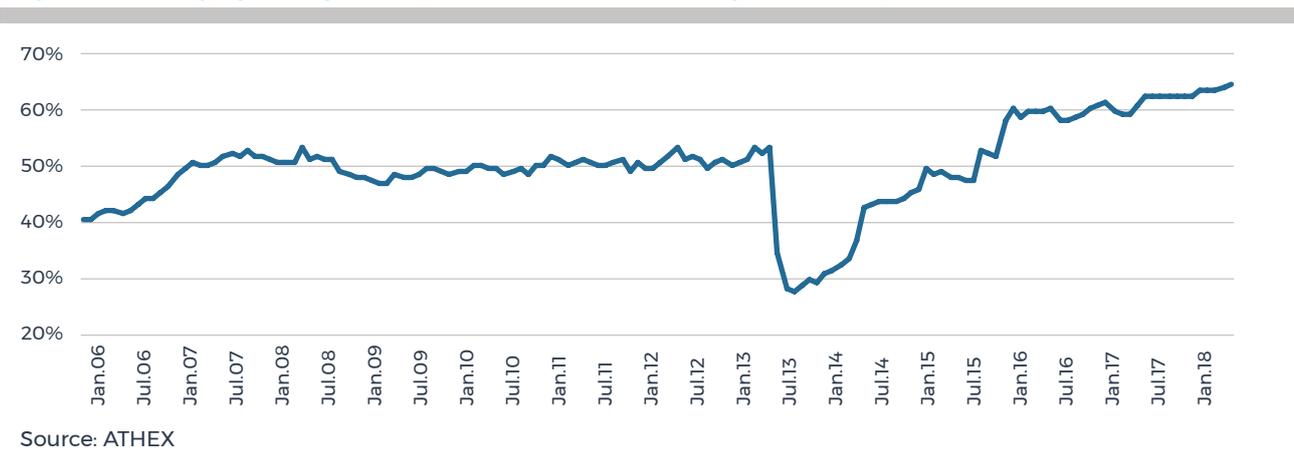
Case Study 4

Big fish in a small pond: the case of Athens Stock Exchange

Our quantitative analyses show that international investors look at the performance of emerging market indices (such as the MSCI and the FTSE indices) when investing in emerging markets potentially driven by the rise of passive investment strategies. This case study focuses on an episode related to this finding: MSCI downgrading Greece to the status of emerging market in 2013. The case study examines how international investors react to the inclusion of a particular market in a widely recognised emerging market index, and how ‘downgrading’ in fact created new opportunities for the Hellenic exchange.

The **Athens Stock Exchange (ATHEX)** is a medium-sized European market, with 200 listed companies and a market capitalisation of roughly USD 56 billion as at April 2018. Foreign participation is an important component of ATHEX, with the share of market capitalisation held by foreign investors averaging around 50% over the 2006-2018 period and foreign trading accounting for roughly 61% of value traded over the 2006-2018 period.

Figure 4: Foreign participation (as a share of market capitalisation) on ATHEX ³⁸



In July 2013, MSCI reclassified Greece as an Emerging Market from its previous categorisation as a Developed Market. This exposed Greece to a different class of investors, with a higher risk appetite and a shorter investment horizon than the ones the country was exposed to before 2013. ATHEX believes it may have benefitted from the downgrade. While total pool of funds invested in emerging markets is lower than that invested in developed markets, Greece accounts for a larger proportion of the EM Index than it did respective Developed Market indices. As a European Union member, Greece is also considered a relatively safer and more stable market than other emerging economies. In addition, as Greece is part of the eurozone, investors face much lower exchange rate risk than they do in other emerging markets. Thus, despite the significant drop-off in foreign participation, ATHEX has managed to increase the level of foreign market participation by more than 10% above the pre-crisis period.

³⁸ Foreign participation as a share of total market capitalisation declined in the middle of 2013 (at the height of the Greek financial crisis) because a domestic entity, the Hellenic Financial Stability Fund (HFSF), injected EUR 25.5 billion Capital worth of capital to recapitalise four listed Greek banks of systemic importance. As they bought shares from foreign investors, international participation abruptly dropped. In the subsequent months the share of market capitalisation of the HFSF gradually declined, and the situation slowly converged back to normal. Foreign investors held nearly 65% of ATHEX stock market as at April 2018. Source: ATHEX.

When looking at push factors, we note that returns on the FTSE100 and on the S&P500 indices have a positive and significant influence on equity inflows, although the influence of the S&P500 returns has low statistical significance. This suggests that investors in these indices tend to invest more in emerging economies when their UK and US returns are more favourable (the so-called 'wealth effect'), although the significance of US returns fades away in Column (4). A one-percentage point increase in returns on the FTSE100 index is associated with an inflow increase of USD 18.41 million, roughly 25.8% of the average monthly inflow in the sample. As regards other push factors, we note however that neither the correlation between local and foreign returns, nor US/global uncertainty (as proxied by the VIX index) have a significant influence on inflows, though the sign of the coefficients is consistent overall with our expectations. Thus, while foreign returns are relevant for emerging market inflows, push factors as a whole are of limited relevance in explaining equity inflows in our sample.³⁹

The relation between inflows and macroeconomic factors is as predicted, though not at a level of statistical significance. Debt over GDP, real interest rate and exports over GDP are negatively correlated with inflows. This latter result is consistent with the fact that positive capital inflows imply a negative trade balance from an accounting perspective. On the positive side, GDP growth and larger domestic savings over GDP are associated with higher inflows. We believe the lack of significance might be due to statistical reasons rather than to the actual lack of a relation.⁴⁰

Similarly, market characteristics also behave as predicted, but only the coefficient of domestic listed companies is statistically different from zero. A larger pool of domestic companies is associated with larger inflows, suggesting that international investors value local diversification opportunities. Ten additional companies listed on the market are associated with additional monthly inflows of USD 5.6 million.

5.3.2. What levers do exchanges/policy-makers have?

We move on to analyse what levers are associated with higher foreign equity inflows. The results are displayed in Table C3 in the Statistical Appendix. To study which factors are more relevant we compare a baseline model including only pull and push factors, macroeconomic characteristics and market features (Table C2, Column (4)) to models where we respectively add specific sets of levers to this baseline set of regressors (Table C3, Columns (1) to (4)).

To start with, studying the statistical properties of the models allows us to conclude that explicit barriers to investment (Column (1)) and corporate governance standards (Column (3)) are the most important factors influencing cross-border flows.

³⁹ The fact that push factors, taken together, are relatively unimportant in explaining inflows is in contrast with the literature. We believe this result might be due to the increasing international breadth of important local indices, such as the FTSE100 or the S&P500. These indices nowadays are a looser indication of the performance of local economies, as they in fact give exposure to a wider range of countries, including emerging markets themselves. In addition, they are also held and traded by both local and international investors, thus returns on these indices in fact benefit both. We therefore argue that the relevance of push factors as determinants of inflows is somewhat trickier to estimate than in the past, and perhaps not well-captured by the returns or volatility of these indices. Future research should assess more in detail both the levels of international exposure given by large local indices and the international spread of those who invest in them. The concept of 'push factors' and the estimation of its relevance should be revised in the light of such an assessment.

⁴⁰ The lack of statistical significance can be perhaps attributed to the nature of our data: most of these indicators are observed at a quarterly (GDP) or annual frequency (savings, exports, debt), and therefore show low within-group variation. This notoriously inflates the standard errors of the within-group estimator (Allison, 2010), in turn potentially leading to a lack of statistical significance.

On explicit barriers to investment, the presence of restrictions on capital inflows has a sizable and statistically strong negative long-run influence on monthly inflows. A country introducing such measures sees a reduction in inflows equal to USD 302 million over the sample period. Similarly, the presence of stamp duties is negatively correlated with inflows: a country introducing stamp duties on financial securities sees a reduction in monthly inflows equal to USD 158 million over the January 2006-April 2018 period. The correlation is significant at the 1% level. The presence of capital gains taxes also matters: a country introducing capital gains taxes sees a reduction in monthly inflows equal to USD 317 million over the sample period (the coefficient is significant at the 10% level).

On the positive side, better corporate governance practices are correlated with higher foreign inflows. Markets introducing a high number of concomitant requirements (five or six) manage to attract the highest inflows in the long run: introducing five requirements is associated with a long-run equity inflow of almost USD 600 million (significant at the 5% level); introducing the full set of considered requirements is found to attract foreign inflows as high as USD 756 million in the long-run (significant at the 1% level).

While less significant from a statistical point of view, we also find that reducing information costs is found to have a sizable long-run influence on inflows. Adhering to IFRS standards is associated with a statistically significant increase in inflows (at the 10% level) of USD 183 million. Inclusion in the MSCI Emerging Market Index is associated with an inflow of roughly USD 350 million over the sample period (the coefficient is statistically significant at the 10% level). Recommending or requiring disclosure in English is also found to have a positive influence, bringing in just under USD 150 million over the sample period (the relation is significant at the 10% level).

Finally, we find, contrary to our expectations, that market structure and post-trade infrastructure features, have little or no influence on international participation. The only exception is SLB.⁴¹ The introduction of SLB is associated with an increase in foreign inflows of USD 182.5 billion. The coefficient is however significant at the 10% level only.

⁴¹ This result is supported by conversations with buy-side investors.

Case Study 5

Explicit barriers to investment do matter: the case of Bolsas y Mercados Argentinos

Bolsas y Mercados Argentinos (BYMA) is a medium-sized Latin American exchange with a market capitalisation of USD 93 billion as of April 2018. In November 2011 the Argentinian administration introduced very strict capital and currency controls, essentially preventing the purchase of US dollars and the repatriation foreign capitals.⁴² In December 2015 the new administration relaxed these controls.⁴³ As a result of these restrictions, foreign participation on BYMA was essentially non-existent between 2011 and 2015 but started to increase again after the capital controls were scrapped. By the end of the second quarter of 2016 foreign participation was already 14% of their market capitalisation (Source: BYMA).

In addition to removing capital controls, Argentina and BYMA have also engaged in the following interventions aimed at reducing explicit costs for foreign participants:

- Argentina eliminated capital gains tax for foreign investors in July 2017 with the intention of attracting foreign investors;⁴⁴
- The Argentinian Regulator has gradually improved the process to open accounts for international investors by making it swifter and requesting less stringent information.

BYMA estimated foreign participation was at 24% of the market capitalisation as at end June 2018 (Source BYMA). Foreign participants are predominantly hedge and mutual funds, mostly from Brazil, Chile, UK and the US. The market is looking forward to attracting more international participants, as they strongly believe this would have a positive influence on their market.

⁴² See "Argentina tightens dollar exchange controls" (BBC News, 1 November 2011) <https://www.bbc.com/news/world-latin-america-15532101> and "Unfree exchange" (The Economist, 1 November 2011) <https://www.economist.com/blogs/americasview/2011/11/argentina%E2%80%99s-currency-controls>

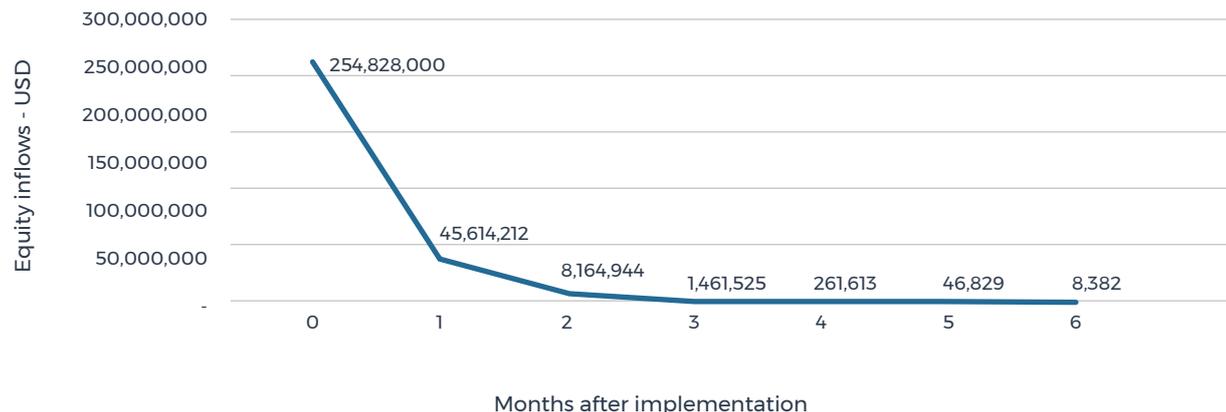
⁴³ See "President Mauricio Macri lifts Argentina's capital controls" (Financial Times, 15 December 2015): <https://www.ft.com/content/556d51b4-a447-11e5-873f-68411a84f346>

⁴⁴ See "Argentina suspends capital gains tax for foreigners ahead of reforms" (Reuters, 20 July 2017): <https://www.reuters.com/article/us-argentina-markets-tax/argentina-suspends-capital-gains-tax-for-foreigners-ahead-of-reforms-idUSKBN1A52SZ>

5.3.3. How long are the initiatives effective?

We also wish to examine how long after implementation the relevant factors continue to be effective. Additional analyses allow us to conclude that the effectiveness of the policies decays after four to five months. Figure 5 graphically illustrates the result of our estimation.⁴⁵

Figure 5: Influence of being included in the MSCI EM Index



Note: elaboration based on the estimation of a DPD model (specification of Table 3, column (4)).

We also estimate the models in Table C3 using quarterly, semi-annual and annual inflows as dependent variables. Consistently, we find that the interventions have some statistical significance in relation to quarterly inflows, but not semi-annual and annual inflows.

⁴⁵ As mentioned above, the coefficients reported in Tables 2 and 3 represent the long-run influence of the regressors on cross-border equity inflows. Especially with respect to the levers and interventions coefficients, it would be interesting to understand for how long these policies are effective. To make a rough assessment, one can firstly compare the coefficients in Table C2 and C3 with the Summary Statistics reported in Table 1: inclusion in the MSCI Emerging Markets Index is for example estimated to attract foreign inflows for roughly USD 250 million, more than the average quarterly inflows, but less than the average semi-annual inflows. Therefore, one might expect this policy to be effective for a period of four to five months. To more carefully quantify how long interventions remain effective after implementation, we estimate a Dynamic Panel Data econometric model. We estimate that the effectiveness of the policies decays after four to five months, consistently with our initial assessment.

Case Study 6

Enhancement of corporate governance standards: insights from several exchanges

Our research shows that markets introducing strict corporate governance requirements manage to attract greater inflows in the long-run. This finding is in line with the experience of emerging exchanges, often engaged in aligning their corporate governance requirements to international best practices. Better corporate governance standards create a more favourable environment for investors, in particular (but not limited to) international ones. Below we report some recent initiatives:

- **BYMA** is enhancing its corporate governance standards. To this extent, they are developing a new segment (similar to the Novo Mercado in Brazil) limited to companies which voluntarily apply additional and stricter corporate governance requirements. BYMA is going to launch this segment over the course of 2018. The exchange believes companies listed on the new segment will attract higher levels of international participation;
- **Borsa Istanbul**, one of the founding members of the Sustainable Stock Exchanges Initiative, reformed the corporate governance requirements for companies listed on its market in January 2014 with prescriptions related to leadership, board composition, auditing and disclosure. The exchange also launched the BIST Sustainability Index to provide a platform for companies to be benchmarked for their performance on Environmental, Social & Governance (ESG) metrics. These initiatives were implemented to promote fair, transparent and sustainable practises in Turkey as well to appeal to international institutional investors who increasingly choose to invest in companies that demonstrate greater commitment to ESG best practice;
- **MOEX**: as part of the alignment towards international standards (see Case Study 5), MOEX reformed its listing requirements and corporate governance standards in 2014-2016, following best international practices (the new corporate governance code was developed by joint working group with OECD). These interventions were received favourably by international investors;
- Historically many companies in **Nigeria** were characterised by a relative lack of transparency in their governance, operations and finances. As a step towards improving investor trust and raising the competitiveness of the Nigerian capital market, the **Nigerian Stock Exchange** launched a comprehensive Corporate Governance Rating System (CGRS) in November 2014. The initiative presents a consolidated assessment of the quality of corporate governance of all the companies listed on the exchange. After a pilot period in 2014 and 2015, the CGRS was rolled out to all listed companies in 2016. Performance on the CGRS was identified as one of the key criteria for a company to be listed on NSE's premium board, the segment for companies that meet the Exchange's most stringent listing standards on market capitalisation, liquidity and corporate governance. To track the performance of companies that are CGRS certified, the exchange also launched a **Corporate Governance Index**. It is attribute-weighted such that a stock's weight in the index considers the score it obtained in the CGRS. The exchange reported that they received positive feedback from international investors on the increased reporting transparency and the adoption of IFRS accounting standards.

5.3.4. Robustness checks

To make sure that the results are not driven by the particular sample we use, we check that our results hold when estimating on different subsamples, using different dependent variables or using different regressors. In particular, we estimate our models:

- Using inflows weighted by the lag of market capitalisation as a dependent variable;
- Excluding three markets for which international investors would face more limited exchange rate risk: the Athens Stock Exchange (as Greece is in the eurozone), Dubai Financial Market (as the UAE currency is pegged to the USD) and Amman Stock Exchange (as the Jordanian currency is also pegged to the USD);
- Excluding large buys and sells;
- Excluding the financial crisis;
- Using the returns from the FTSE index rather than the MSCI indices.

In all cases, the models convey the same results, confirming that our findings are robust.

5.4. Discussion of the findings – trading activity

While the main purpose of this report is to study the determinants of cross-border equity inflows, we also explore the determinants of foreign trading activity overall. The results of the estimation are displayed in Table C3 in the statistical appendix.⁴⁶

Our findings show, as postulated in Section 4, that foreign trading activity is influenced by different factors than foreign investment.⁴⁷ This may be attributable to the fact that different market participants adopt different strategies for generating returns. Simplistically, for some, trading is almost an end in itself, with returns generated through short-term price movements and exploitation of price differentials. For others, trading is a means of accessing a desired investment exposure, which will by its nature, be longer-term in outlook. The key findings are summarised below:

- Unlike for investment inflows, we find that neither contemporaneous domestic returns, nor domestic volatility influence foreign trading activity;
- Foreign market performance, meanwhile, has an important negative influence on international trading activity. Higher US and UK returns are negatively correlated with foreign trading activity: a one-percentage point increase in US (UK) returns is associated with a 0.64% (0.85%) decrease in the value of foreign trades;

⁴⁶ Given the logarithmic nature of the dependent variable, regression coefficients of binary indicators (such as the presence of market structure characteristics) are calculated following the literature (Giles, 1982; Halvorsen and Palmquist, 1980; Kennedy, 1981) as $e^{\beta}/e^{(0.5\text{var}(\beta))} - 1$. We follow Kennedy (1981) in interpreting $100 * [e^{\beta}/e^{0.5\text{var}(\beta)} - 1]$ as the percentage change in the dependent variable associated with discrete change in the binary indicator. The regression coefficients of continuous variables are interpreted as semi-elasticities if the variable is in levels (such as returns, inflation and unemployment), and as elasticities if the variable is in logarithms (such as per capita GDP).

⁴⁷ These results must be interpreted cautiously. As noted, there is little to no academic literature on foreign trading and the empirical model was constructed largely to examine investment behaviour, rather than trading per se. We nonetheless believe the findings support what exchange operators themselves experience and it is therefore worthy of inclusion on that basis.

- We also find that a higher correlation between domestic and foreign returns dampens trading activity. This may be due to the fact that higher correlations reduce arbitrage opportunities thus reducing the attractiveness of foreign trading. A one-percentage point increase in the correlation with US (UK) returns is associated with a 0.18% (0.1%) decrease in the value of foreign trades and 0.18% (0.24%) decrease in the number of foreign trades;
- Foreign market volatility (as opposed to domestic volatility, for investment flows) also hampers trading activity. A one percentage point increase in monthly US (UK) volatility is associated with a 2.4% (2.4%) decrease in foreign trading;
- Our model also suggests that foreign trading is more sensitive to market characteristics than foreign investment flows:
 - More liquid markets are positively associated with more foreign trading activity: a one-percentage point increase in turnover velocity is associated with a 1.3% increase in the value of foreign trading, and a 0.84% increase in the number of foreign trades;
 - Likewise, foreign trading activity tends to increase when markets are more highly-capitalised: a USD 100 billion increase in market capitalisation is associated with a 10% increase in the value of foreign trading, and a 3.8% increase in the number of foreign trades;
 - Markets with more foreign listed companies also see more foreign trading activity. This may be because a larger number of international companies is suggestive of a more open and favourable trading environment for international investors. We find that an additional foreign listing is associated with an increase in the value of foreign trading by roughly 2%. On the same lines, we find that the number of listed Depository Receipts (DRs) is positively correlated with the number of foreign trades: an additional DR is associated with an increase in the number of trades by 0.7%;
 - Finally, we find that the number of listed ETFs is negatively correlated with the value of foreign trading, suggesting perhaps a degree of substitutability between stock and ETF trading.
- When considering levers and interventions stock exchanges and/or policy-makers have direct control over, we firstly find that markets with negotiable fee structures (a proxy for reduced transaction fees) attract higher levels of trading activity.⁴⁸ Moving from non-negotiable to fully negotiable fees is found to increase the value of foreign trading by more than 160% and the number of foreign trades by 98%. We also find that markets that introduce dividend taxes see a reduction in the value of foreign trades by 56% and in the number of foreign trades by 49%, while markets that introduce capital gains taxes see a reduction in the number of trades of more than 21%;
- Turning to market structure characteristics, we find that the presence of SLB is associated with higher trading activity: a market introducing SLB sees a 73% increase the value of foreign trades. Along similar lines, introducing short-selling is associated with a 35% increase in the number of foreign trades.

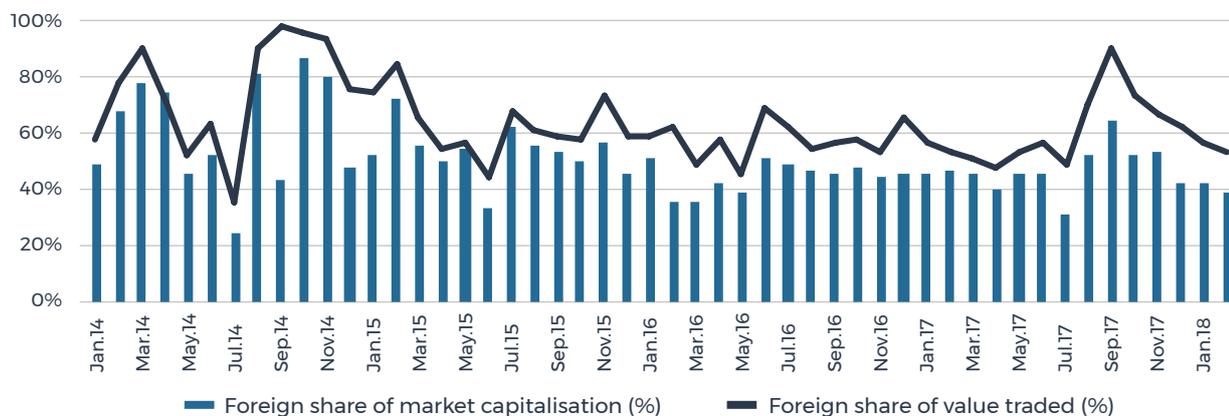
⁴⁸ This result is consistent with previous WFE research (Alderighi, 2018; WFE, 2017).

Case Study 7

Aligning market offering to international standards (2): the case of the Nigerian Stock Exchange

The Nigerian Stock Exchange (NSE) is an important market on the African continent. With a market capitalisation of more than USD 40 billion as at April 2018 it is the second biggest exchange in sub-Saharan Africa (after the JSE). Foreign investors held on average 50% of the listed market capitalisation over the 2013-2018 period and accounted for roughly 55% of value traded as at February 2018.

Figure 6: Foreign participation and trading on NSE.



Source: NSE, WFE Monthly reports

In the last 10 years, NSE has enhanced its market environment. The rationale has been to facilitate active participation by both domestic and foreign investors. Key initiatives by the exchange include:

- Introduction of DMA/DSA in October 2014, with the objective of making market access easier and less costly;
- Introduction of Market Making in September 2012 to add stock market liquidity for the benefit of all investors;
- The introduction of a data collocation facility (August 2015), to help members upgrade their operating standards at minimum cost;
- The reform of the market microstructure in July 2018 including the introduction of a closing auction, opening of both auctions (opening and closing) to all market participants, depth, introduction of an imbalance session to address imbalances at the open and close auctions, changes to limits on upward and downward price movements among others. The rationale was to improve market participation,⁴⁹ further support competitive pricing, reduced spreads, and best execution. The exchange stated that they received positive feedback and several questions from foreign investors on the new microstructure, particularly the auctions.

Over the years foreign participation (% of market cap and value traded) has fluctuated from as low as 20% to as high as nearly 90%, depending on macroeconomic conditions as well as on the currency and interest rate environment. The market attracts a mix of foreign investors who invest in both equity and fixed income products and contribute to trading activity with different investment strategies.

⁴⁹ <https://www.nse.com.ng:8443/investors-site/becoming-an-investor/FAQs/FAQs-%20Changes%20to%20Market%20Structure.pdf>

6. Conclusion

This research demonstrates that foreign investment and trading in emerging markets depends on a variety of factors: local returns and volatility, the presence or otherwise of explicit barriers to investment and local market frictions, the presence of corporate governance requirements, reduction in information barriers for investors, and certain market structure features. Markets (both stock exchanges and local regulators and policymakers) have varying degrees of control over these factors.

While some fall outside the control of the local market there are nonetheless several things that exchanges and policy-makers can do to enhance the attractiveness of their jurisdiction to foreign investors and traders.

International investors care about corporate governance

We find a strong positive relationship between the adoption of broad corporate governance requirements and cross-border inflows, suggesting that emerging markets wishing to attract foreign capital should prioritise the adoption of high corporate governance standards. We provide several examples of where exchanges in the WFE membership have done this, in the report.

Reducing investment frictions – explicit and implicit – makes investment more attractive...

We find that both capital controls and the presence of capital gains and dividends taxes depress international equity inflows. While being cognisant of other market stability and tax collection priorities, policy-makers wishing to increase international investment in their markets should explore the reduction or elimination of these barriers to investment.

Similarly, exchanges and/or policy-makers may seek to reduce information barriers to investing in their markets by requiring companies to report in accordance with IFRS standards, and encouraging reporting in English (though these results, while statistically significant, were not very strong).

...and also enhances trading

Our results suggest exchanges have a bit more room to encourage foreign trading activity, than investment. Markets that allow clients to negotiate their fees with brokers (suggestive of markets with lower transaction costs) attract higher levels of foreign trading. Similarly, the presence of dividends taxes and capital gain taxes, reduce foreign trading activity. This suggests that reducing or minimising costs of transacting in the market will enhance the attractiveness of the market to foreign investors.

Making it easier to take directional positions makes foreign trading easier

We find that the introduction of market structure features, such as the ability to engage in short-selling and the availability of securities lending and borrowing (also relevant for investment) are associated with increased foreign trading activity.

Overall, markets need to encourage a diversity of investors

As noted in the introduction, and reiterated in many of the case studies, foreign investment and trading are important for the development of emerging markets. However, as demonstrated in this research, portfolio flows can be volatile and many of the factors determining the direction of those flows are beyond the control of the emerging market jurisdiction. Thus, while it is certainly important for exchanges and policy-makers to implement measures to encourage foreign activity in the market (both trading and investment) the ultimate objective is to find a suitable balance between different investor groups (foreign, domestic, institutional, retail etc).

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Appendix 1

List of submitting exchanges (in alphabetical order):

Stock Exchange	Country
Amman Stock Exchange	Jordan
Athens Stock Exchange	Greece
B3 SA Brasil Bolsa Balcao	Brazil
Bolsa de Valores de Colombia	Colombia
Bolsas y Mercados Argentinos	Argentina
Bombay Stock Exchange Limited	India
Borsa Istanbul	Turkey
Bursa Malaysia	Malaysia
Colombo Stock Exchange	Sri Lanka
Dubai Financial Market	United Arab Emirates
Johannesburg Stock Exchange	South Africa
Kazakhstan Stock Exchange	Kazakhstan
Moscow Exchange	Russian Federation
Nairobi Securities Exchange	Kenya
National Stock Exchange of India Limited	India
Nigerian Stock Exchange	Nigeria
Stock Exchange of Mauritius	Mauritius
Taipei Exchange	Taiwan
Taiwan Stock Exchange	Taiwan
The Egyptian Exchange	Egypt
The Stock Exchange of Thailand	Thailand

The aggregate market capitalization of these markets was USD 10.4 trillion as at December 2017 and accounted for 43% of the market capitalisation of emerging and frontier markets. Source: MSCI, FTSE Russell (for the categorisation), WFE monthly reports (for market capitalisation).

Appendix 2

List of indicators

Indicators obtained from WFE monthly reports:

- Market capitalisation (monthly, current USD millions)
- Value of share trading (monthly, current USD millions)
- Number of trades in shares (monthly, thousands)
- Turnover velocity (monthly, percentage)
- Number of domestic listed companies (monthly, full number)
- Number of foreign listed companies (monthly, full number)
- Number of listed ETFs (monthly, full number)

Indicators obtained from external sources:

- MSCI Index, FTSE EM Index (daily, full number): Thomson Reuters
- Broad market index (daily, full number): Thomson Reuters
- Blue-chip Index (daily, full number): Thomson Reuters
- Exchange rates, local currency against USD, EUR, GBP (daily, full number): Thomson Reuters
- CPI (monthly): Thomson Reuters Datastream TRICE
- Policy interest rate (monthly): Thomson Reuters Datastream TRICE, IMF
- Political stability (annual, 0-100 scale): World Bank Governance Indicators
- Control of corruption (annual, 0-100 scale): World Bank Worldwide Governance Indicators
- Regulatory quality (annual, 0-100 scale): World Bank Worldwide Governance Indicators
- Sound of local equity market regulation (annual, 1-7 scale): World Economic Forum Global Competitiveness Report
- Debt over GDP (annual, percentage): World Economic Forum Global Competitiveness Report
- Domestic savings over GDP (annual, percentage): World Economic Forum Global Competitiveness Report
- Exports over GDP (annual, percentage): World Economic Forum Global Competitiveness Report
- GDP (annual, billion current PPP USD): World Economic Forum Global Competitiveness Report
- Strength of investors' protection (annual, 1-7 scale): World Economic Forum Global Competitiveness Report
- Strength of audit and disclosure reports (annual, 1-7 scale): World Economic Forum Global Competitiveness Report

Statistical Appendix

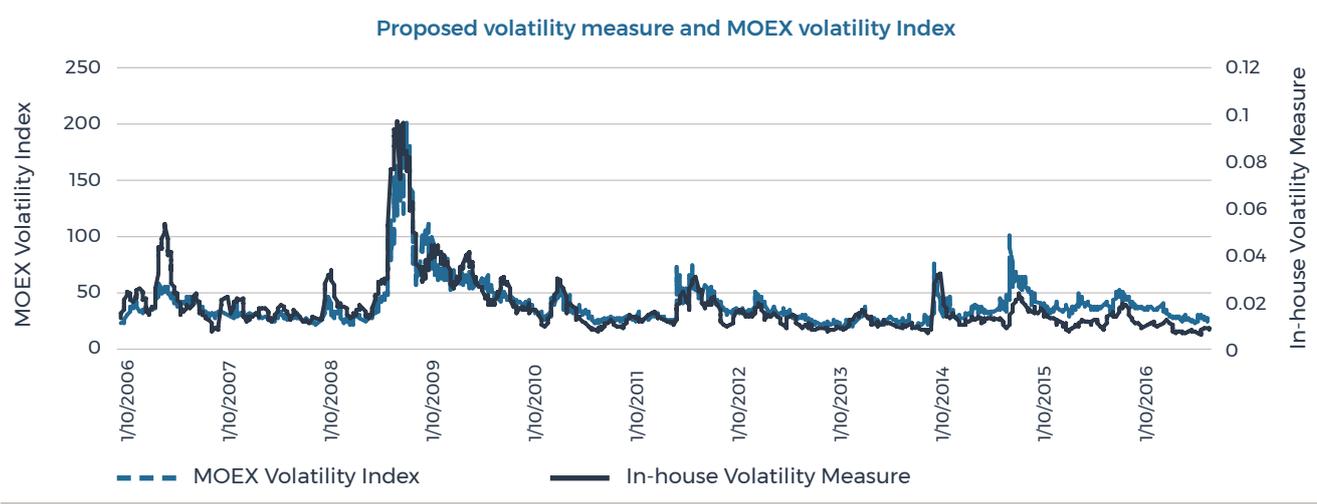
A. Sanity checks for constructed variables

Table A1: correlation between returns correlation and market instability (boldfaced)

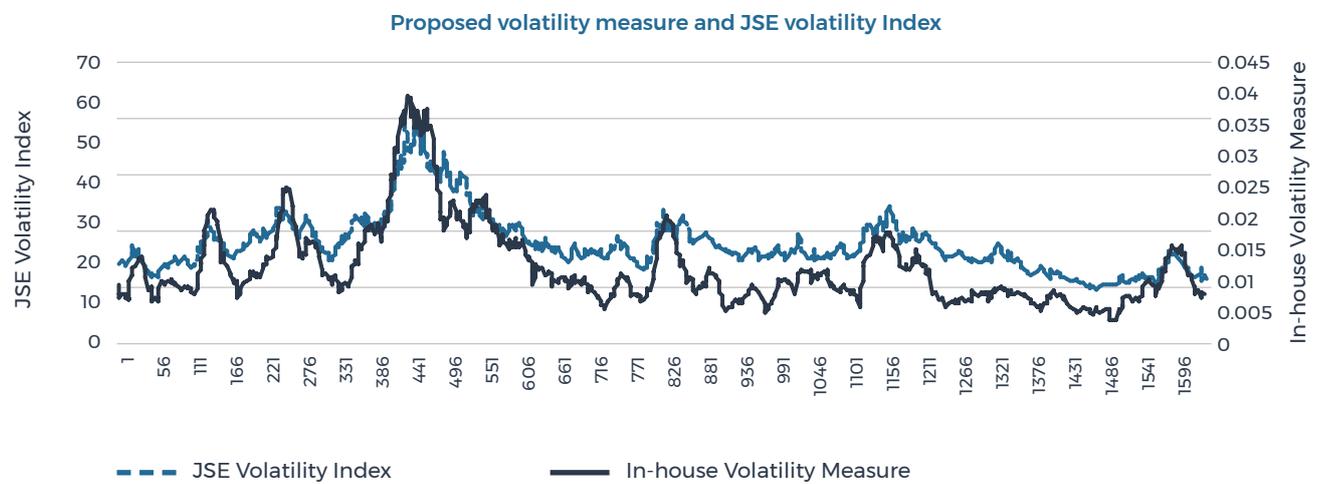
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Correlation domestic/foreign returns:	CAC40	FTSE100	DAX	Dow Jones	S&P 500	VIX	Domestic volatility
Correlation domestic/foreign returns:							
CAC40	1						
FTSE100	0.820***	1					
DAX	0.916***	0.792***	1				
Dow Jones	0.748***	0.724***	0.745***	1			
S&P500	0.785***	0.754***	0.791***	0.968***	1		
VIX	0.310***	0.300***	0.268***	0.286***	0.287***	1	
Domestic volatility	0.211***	0.206***	0.184***	0.162***	0.176***	0.320***	1

* p < 0.05, ** p < 0.01, *** p < 0.001

Figure A1: time series plot of the in-house volatility measure and the MOEX Volatility Index



Note. Correlation between the two measures: 86.82%

Figure A2: time series plot of the in-house volatility measure and the JSE Volatility Index

Note. Correlation between the two measures: 89.15%

B. Sanity checks for the application of fixed-effect regression models

We study the determinants of cross-border flows by running a cross-market longitudinal regression model. Given the nature of our data, we believe that the most suitable technique for such estimation would be within-group regression. Indeed, unobserved heterogeneity is very likely to be correlated with the explanatory variables, thus leading to omitted variable bias (Wooldridge, 2010) including models with dynamics and/or individual heterogeneity. In addition to general estimation frameworks (particularly methods of moments and maximum likelihood and making both the pooled OLS and the GLS estimators ('random effect') unsuitable for this kind of study. To verify this, we compare and contrast pooled, random-effects and fixed-effects regression results to show that pooled OLS coefficients would be characterised by a high degree of bias. We perform a Hausman test to show that unobservable heterogeneity is correlated with the regressors, therefore making the random-effect estimator inconsistent. Under the Hausman test's null hypothesis, unobservable heterogeneity is uncorrelated with the regressors, a situation in which the random effect model would be preferred over the fixed effect one on the ground of efficiency. We reject the null hypothesis at the 1% level, concluding that the random effect model is not an appropriate technique,

Rejecting the null hypothesis in the Hausman test does not make the fixed-effect estimator valid. Consistency of the within-group estimator relies indeed on the so-called *strict exogeneity* assumption, that requires regressors to be orthogonal to "all past, current, and future innovations" (Mayer, 2016). Although this bias is generally negligible in 'large T' samples (as the one used for this paper), the problem cannot be simply overlooked on this ground, as failure to reject the strict exogeneity hypothesis might invalidate inference even in the presence of consistency (Alvarez and Arellano, 2003; Mayer, 2016). Wooldridge (2010) proposes a simple test for the strict exogeneity assumption, based on an auxiliary regression containing the first leads of a subset of the explanatory variables. Although we are aware of the presence of newer (and perhaps more sophisticated) strict exogeneity tests (Mayer, 2016; Su et al., 2016), we use Wooldridge's test because it is straightforward to implement and widely accepted. Table B1 contains the test results.

Table B1: Wooldridge's tests of strict exogeneity

P-values of F-tests on the coefficients of the leaded regressors

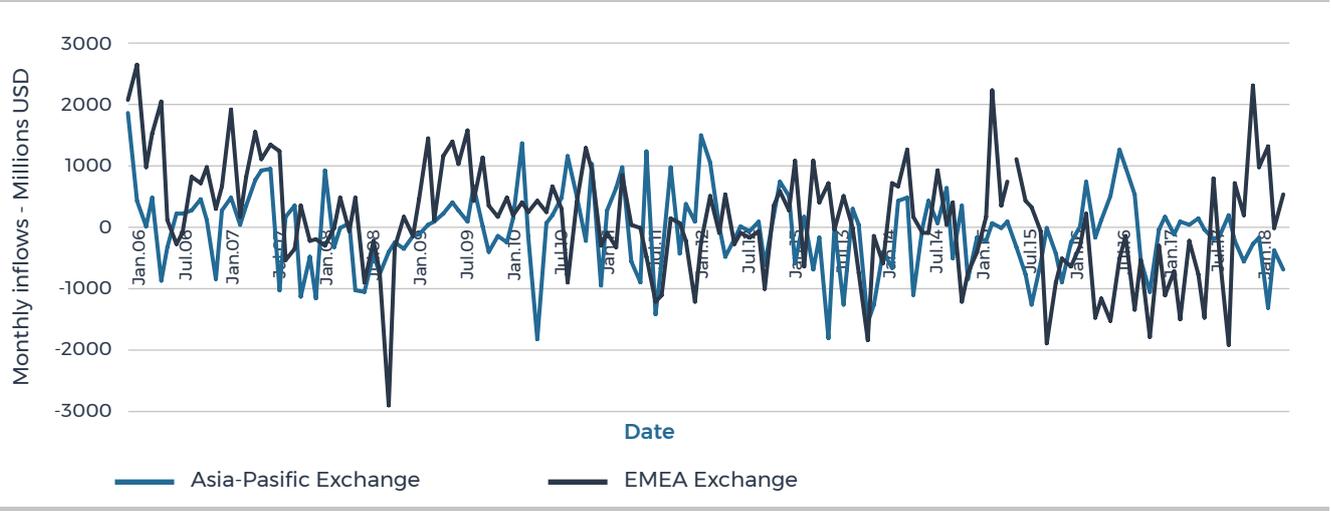
Dependent variable	(1) Monthly inflow
Subsample 1 (3 random regressors)	0.48
Subsample 2 (7 random regressors)	0.46
Subsample 3 (5 random regressors)	0.92
Subsample 4 (6 random regressors)	0.18

The baseline specification for the tests is that of Table 1, Column (6).

We also note that the coefficients of the lead regressors are not *individually* significant in all specifications. We conclude that strict exogeneity is not an issue in our estimations.

The use of a 'large T panel' with relatively fewer cross sectional units (as typical of macro-panel data) lead researchers to apply problems that are typically related to time-series analysis (such as non-stationarity and cointegration) to the context of longitudinal data (Baltagi and Kao, 2000). In particular, concerns might arise that cross-border flows are characterized by unit roots. Preliminary analyses of individual time series allow to (visually) conjecture that this would not be a source of concern in our database. Patterns suggesting stationarity like the one shown in Figure B1 below are common across almost all stock exchanges in the sample.

Figure B1: Time series plot of monthly inflows for two exchanges in our sample



Estimation of AR(p) models on the individual time series hints that the processes are largely stationary, and that autocorrelation should not go, on average, far beyond the 3rd order. Consistently, we perform GLS augmented Dickey-Fuller tests (Elliott et al., 1996) for each market, setting five as a maximum number of lags, and in a vast majority of exchanges we are able to reject the presence of a unit root for both variables.

We finally implement a Fisher test to detect the presence of a unit root in panel data (Maddala and Wu, 1999). We choose this test because it can be used in presence of unbalanced panels, and because research has demonstrated it is more powerful than other well-established procedures, such as the IPS test (Baltagi and Kao, 2000; Im et al., 2003). We use the demeaning procedure introduced by Levin et al. (Levin et al., 2002) to control for possible correlation across cross-sectional units. We set the number of lags to three consistently with the results described above, but the result below are robust to changes in the number of lags. We are able to reject the null hypothesis that all panels have a unit root for the dependent variable. The null is rejected at the 1% level.

C. Main results

Table C1: Are cross border equity flows pushed or pulled?

Fixed-effect estimator (within-groups linear regression)

	(1)	(2)	(3)	(4)
Domestic returns	-	2427.407 ^{***} (817.776)	-	2437.225 ^{***} (813.592)
Domestic volatility	-	-4467.699 [*] (2261.749)	-	-4455.271 [*] (2336.809)
EM Returns (MSCI)	-	1993.835 [*] (1128.232)	-	1687.473 [*] (934.568)
FM Returns (MSCI)	-	310.040 (584.351)	-	324.376 (566.003)
Foreign returns				
<i>CAC40</i>	-	-	-653.227 (760.304)	-582.468 (801.890)
<i>FTSE100</i>	-	-	3885.827 ^{**} (1658.991)	1811.835 ^{**} (845.140)
<i>Dow Jones</i>	-	-	1384.443 [*] (747.153)	-641.200 (898.797)
Correlation domestic/ foreign returns				
<i>CAC40</i>	-	-	-74.338 (71.249)	14.863 (71.785)
<i>FTSE100</i>	-	-	-112.057 (124.817)	-76.655 (71.570)
<i>Dow Jones</i>	-	-	2.175 (75.824)	-121.874 (117.689)
VIX	-	-	-2.966 (3.733)	-0.997 (4.045)
Constant	-408.646 (389.268)	-349.982 (363.020)	-212.121 (378.489)	-211.488 (361.168)
Macroeconomic Indicators	Yes	Yes	Yes	Yes
Market characteristics	Yes	Yes	Yes	Yes
Seasonality	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
R-square (within)	0.057	0.135	0.095	0.139
R-square (between)	0.002	0.023	0.022	0.035
Adjusted R-square	0.041	0.119	0.076	0.120
Number of markets	20	20	20	20
Average T	112.400	112.400	112.400	112.400
Observations	2248	2248	2248	2248

Heteroscedasticity-robust clustered standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Macroeconomic factors include: nominal GDP growth, debt/GDP, exports/GDP, domestic savings/GDP, real interest rate, standard deviation of exchange rates against local currency (USD, EUR, GBP). Market characteristics include: number of foreign listed companies, number of domestic listed companies, number of ETFs, number of depository receipts, market capitalization (second-order polynomial).

Table C2: Levers and interventions

Fixed-effect estimator (within-groups linear regression)

	(1) Explicit barriers to investment	(2) Corporate governance	(3) Information costs	(4) Market infrastructure features
Ownership restrictions - foreign investors	-41.143 (69.610)	-	-	-
Capital inflow restrictions	-302.605*** (91.172)	-	-	-
Capital gain tax present	-317.179* (155.281)	-	-	-
Dividend tax present	25.187 (107.385)	-	-	-
Stamp duty present	-158.373*** (54.435)	-	-	-
Strength Investors' protection	-	23.255 (74.832)	-	-
Strength audit reports	-	-119.143 (93.481)	-	-
Efficacy of corporate boards	-	60.510 (118.867)	-	-
Corporate governance requirements in place:				
<i>One</i>	-	518.920** (208.113)	-	-
<i>Two</i>	-	531.135*** (160.821)	-	-
<i>Three</i>	-	492.998** (199.264)	-	-
<i>Four</i>	-	417.349 (248.876)	-	-
<i>Five</i>	-	599.693** (226.392)	-	-
<i>Six</i>	-	756.187*** (255.379)	-	-
Disclosure in English:				
<i>Compulsory</i>	-	-	90.740 (79.827)	-
<i>Recommended</i>	-	-	148.511* (80.538)	-

Table C2: Levers and interventions (continued)

	(1) Explicit barriers to investment	(2) Corporate governance	(3) Information costs	(4) Market infrastructure features
Inclusion MSCI Index:				
<i>Emerging</i>	-	-	349.340 [*] (195.400)	-
<i>Frontier</i>	-	-	261.927 (186.511)	-
Adherence to IFRS standards	-	-	183.622 [*] (91.321)	-
Co-location present	-	-	-	-60.440 (195.221)
Short-selling present	-	-	-	171.282 (129.461)
SLB present	-	-	-	182.499 [*] (103.873)
Market making present	-	-	-	-57.959 (70.052)
DMA present	-	-	-	234.725 (198.987)
CCP present	-	-	-	-14.026 (158.311)
Real time DVP system present	-	-	-	89.411 (140.978)
Constant	-97.701 (383.356)	-1021.224 (898.322)	-692.944 [*] (362.485)	-603.895 [*] (319.267)
Seasonality	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
Macroeconomic Indicators	Yes	Yes	Yes	Yes
Market characteristics	Yes	Yes	Yes	Yes
Pull factors	Yes	Yes	Yes	Yes
Push factors	Yes	Yes	Yes	Yes
R-square (within)	0.145	0.148	0.143	0.146
R-square (between)	0.107	0.008	0.008	0.002
Adjusted R-square	0.124	0.125	0.122	0.124
Number of markets	20	20	20	20
Average T	112.400	112.400	112.400	112.400
Observations	2248	2248	2248	2248

Heteroscedasticity-robust clustered standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Macroeconomic factors include: nominal GDP growth, debt/GDP, exports/GDP, domestic savings/GDP, real interest rate, standard deviation of exchange rates against local currency (USD, EUR, GBP). Market characteristics include: number of foreign listed companies, number of domestic listed companies, number of ETFs, number of depository receipts, market capitalization (second-order polynomial). Pull factors include: domestic returns, domestic volatility. Push factors include: foreign returns (FTSE100, CAC40, Dow Jones), foreign volatility (VIX Index), correlation between domestic and foreign returns (FTSE100, CAC40, Dow Jones).

Table C3: The determinants of trading activity

Fixed-effect estimator (within-groups linear regression)

	(1)	(2)	(3)	(4)
	Foreign Value Traded	Number of Foreign Trades	Foreign Value Traded	Number of Foreign Trades
Market capitalization (t-1)	0.001*** (0.000)	0.000 [·] (0.000)	0.001*** (0.000)	0.000 [·] (0.000)
Turnover velocity (t-1)	1.347*** (0.306)	0.836*** (0.197)	1.344*** (0.311)	0.845*** (0.201)
Number foreign listed companies	0.019** (0.007)	0.010 (0.008)	0.018** (0.007)	0.009 (0.007)
Number domestic listed companies	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Number ETFs	-0.014** (0.006)	-0.002 (0.006)	-0.014** (0.006)	-0.002 (0.006)
Number DRs	-0.001 (0.002)	0.007*** (0.002)	-0.001 (0.002)	0.007*** (0.002)
Domestic returns	-0.065 (0.293)	0.016 (0.326)	-0.047 (0.283)	0.009 (0.312)
Domestic volatility	0.061 (0.389)	0.216 (0.229)	0.064 (0.397)	0.198 (0.234)
Foreign returns - S&P500	-0.640** (0.256)	-0.479 (0.299)	-	-
Correlation domestic/foreign returns: S&P500	-0.181** (0.070)	-0.178** (0.064)	-	-
Volatility S&P500	-2.470*** (0.497)	-0.355 (0.403)	-	-
Foreign returns - FTSE100	-	-	-0.855** (0.373)	-0.444 [·] (0.252)
Correlation domestic/foreign returns: FTSE100	-	-	-0.100 (0.063)	-0.244** (0.085)
Volatility FTSE100	-	-	-2.467*** (2.900)	-0.722 (1.750)
Partially negotiable fees	0.472** (0.211)	0.029 (0.13)	0.468* (0.215)	0.025 (0.133)
Fully negotiable fees	1.735*** (0.306)	0.746** (0.283)	1.627*** (0.307)	0.980** (0.279)
Capital gain tax present	-0.129 (0.126)	-0.227* (0.109)	-0.188 (0.129)	-0.210** (0.103)

Table C3: The determinants of trading activity (continued)

	(1)	(2)	(3)	(4)
	Foreign Value Traded	Number of Foreign Trades	Foreign Value Traded	Number of Foreign Trades
Dividend tax present	-0.566*** (0.167)	-0.484*** (0.156)	-0.567*** (0.182)	-0.496*** (0.174)
Stamp duty present	-0.240 (0.17)	-0.009 (0.133)	-0.236 (0.197)	0.026 (0.154)
Co-location present	-0.335 (0.193)	0.172 (0.174)	-0.329 (0.194)	0.166 (0.176)
Short-selling present	-0.164 (0.136)	0.359* (0.185)	-0.120 (0.124)	0.426** (0.166)
SLB present	0.743** (0.207)	0.407 (0.225)	0.731** (0.211)	0.399 (0.224)
Market making present	0.157 (0.094)	0.133 (0.16)	0.147 (0.095)	0.123 (0.148)
DMA present	-0.102 (0.124)	0.141 (0.172)	-0.093 (0.126)	0.143 (0.163)
CCP present	-0.319 (0.26)	0.102 (0.465)	-0.311 (0.256)	0.115 (0.463)
Constant	19.149*** (0.910)	10.086*** (0.588)	20.148*** (0.786)	10.107*** (0.583)
Seasonality	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
R-square (within)	0.407	0.551	0.403	0.554
R-square (between)	0.215	0.342	0.242	0.358
Adjusted R-square	0.393	0.541	0.389	0.544
Number of markets	17	17	17	17
Average T	117.647	117.647	117.647	117.647
Observations	2000	2000	2000	2000

Heteroscedasticity-robust clustered standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. Note that three exchanges did not submit "number of trades" data. We restrict both samples to have comparable numbers of observations.

What attracts international investors to
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