This is a repository copy of *A strategic perspective of cross-listing by emerging market firms: Evidence from Indonesia, Mexico, Poland and South Africa*.

White Rose Research Online URL for this paper:
http://eprints.whiterose.ac.uk/99029/

Version: Accepted Version

Article:
Temouri, Y., Driffield, N. and Bhaumik, S.K. orcid.org/0000-0002-4459-3659 (2016) A strategic perspective of cross-listing by emerging market firms: Evidence from Indonesia, Mexico, Poland and South Africa. Journal of International Management, 22 (3). pp. 265-279. ISSN 1075-4253

https://doi.org/10.1016/j.intman.2016.04.003

Reuse
Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk/

A strategic perspective of cross-listing by emerging market firms: Evidence from Indonesia, Mexico, Poland and South Africa

Yama Temouri[1], Nigel Driffield[2] and Sumon Kumar Bhaumik[3]

[1]Aston Business School, Aston University, Birmingham B4 7ET

[2]Warwick Business School, Warwick University, Coventry, CV4 7AL

[3]Sheffield University Management School, University of Sheffield, Sheffield S10 1FL

ABSTRACT

This paper develops an approach to the analysis of cross-listing that brings together the financial and non-financial benefits of the phenomenon. We employ the real options framework, which offers a detailed characterisation of the strategic issues associated with cross-listing, in the context of internationalisation of emerging market firms. The associated hypotheses are tested using firm-level data from four large emerging market economies with different profiles in terms of institutional quality and financial development. This allows us to extend the existing literature by isolating the relative importance of institutional quality and financial development for the benefits of cross-listing.

Keywords: Real options, Cross-listing, Investor protection, Corporate governance, Emerging market economies

1. Introduction

Why do firms decide to cross-list? The theoretical model posited by Chemmanur and Fulghieri (2006) shows that if there are two types of firms, one of which is more advanced and hence with lower information costs, and has to signal this, cross-listing can be an important signalling mechanism. It can reduce the importance of country-specific institutional quality at home (specifically, with respect to formal institutions such as investor protection) and enable firms to overcome limitations of country-level institutions by leveraging their firm-level governance quality (Doidge et al., 2007).[1] This has specific implications for firms based in emerging market economies that generally have both capital market imperfections and weak investor protection, and may be associated with adverse selection in developed and global capital markets (Herrmann et al., 2015).

The international finance approach to this question focuses narrowly on cost of capital advantages (Stulz, 1999), that may then be reflected in higher firm valuation (Karolyi, 1998). The limited engagement of the international business (IB) literature with the cross-listing phenomenon focuses on the advantages associated with "bonding" with institutions in a different context, especially where firms from relatively weak institutional contexts decide to cross-list in relatively strong institutional contexts (Peng et al., 2009). To the best of our knowledge, there have been no attempts to incorporate the international finance and IB approaches to cross-listing by carefully distinguishing between the signalling and bonding attributes of the phenomenon.

We argue that the real options framework is able to anchor the motivation and ability of firms to attain and retain a cross-listing, and also facilitate a clear distinction between signalling

[1] Unsurprisingly, in this literature, there is a lot of emphasis on the cross-listing of foreign firms on the US stock market, indicating the strong signalling effect associated with a US listing by non-US firms (see for example Alexander et al. (1988), and the literature which follows their work). Pagano et al. (2001), for example, find that European firms seek larger and more liquid markets, with better investor protection and institutional quality, and hence their attraction for cross-listing in the US.

and bonding. It is now well understood that the real options framework,[2] offers invaluable insights into how firms "design operational solutions to market frictions" (Mahoney and Qian, 2013; pp. 1024), where market frictions include factors such as informational opacity and institutional weakness. The first and main contribution of this paper, therefore, is to develop a strategic and integrated narrative concerning the motivations and ability to cross-list, and benefits associated with signalling and bonding by leveraging this framework.

This narrative provides the basis for our hypotheses which we test using firm level data from four emerging market economies that are large and economically important. Indonesia, Mexico and South Africa are part of the BRICS and MINT groups of countries, while Poland is a major former socialist economy at the heart of new Europe. These countries are representative geographically, and illustrative of the development paths of their region. At the same time, they offer significantly different dimensions of governance.

Our choice of countries also extends our analysis to encompass the literature on emerging market firms and the development of emerging market multinational enterprises (EMNEs), reflecting our second contribution. Initial work in this area explained the existence of EMNEs by "country specific advantages" (CSAs) such as economies of scale on account of large domestic markets (Ramamurti and Singh, 2009). More recently, it has been argued that in order to internationalise, emerging market firms may need complementary firm specific advantages (FSAs), in the form of higher profitability and internal financial resources (Bhaumik et al., 2010; Bhaumik et al., 2015a, 2015b). However, with very few exceptions (Stulz, 1999; Peng and Su, 2014), little has been said about the rationale for capital market based internationalisation via cross-listing, and how this form of internationalisation can help in turn the internationalisation of

[2] Real options theory highlights the strategic aspects of taking managerial decisions under uncertainty (Dixit and Pindyck, 1994; Trigeorgis, 1996).

emerging market firms. We therefore explore how cross-listing can amplify the combinations of FSA and CSA available to emerging market firms.

Finally, the real options framework speaks to the well documented corporate governance challenges faced by emerging markets firms. In the face of certain institutional and financial voids, successful firms in emerging markets develop certain internal capital and labour market solutions that have adverse implications for governance quality within firms (Khanna and Palepu, 2000a; Young et al., 2008; Globerman, Peng and Shapiro, 2011). This has been recognised in the IB literature (Bhaumik et al., 2010), and our paper further integrates corporate governance of emerging market firms into the narrative concerning their internationalisation.

This paper proceeds as follows. First, we review the literature on cross-listing and derive our hypotheses using the real options framework. Next, we explain our multistage empirical research design and describe our data sample and variables. We then present our results. This is followed by a conclusion where we discuss the implications of our findings with regards to advancing the literature on cross-listing by emerging market firms and outline limitations of this paper which may offer avenues for future research.

2. Literature review on cross-listing

Much of the literature on cross-listing is focused on market reactions (Karolyi, 1998). It focuses on firms from various countries that seek to obtain cross-listing in New York, and generally finds a positive relationship between cross-listing and share prices, both in the short and long term (Lang et al., 2006; Roosenboom and Van Dijk, 2009; Miller, 1999). Capital market based globalisation can reduce the cost of capital because of greater ability of international investors to diversify away non-systematic risk (Stulz, 1999). Furthermore, cross-listing provides more information to the firm, in part generated through comment from external

analysts (Herrmann et al., 2015), and in part through the market view to its opportunities (Foucault and Gehrig, 2008). This, in turn, enables them to make better investment decisions.

However, there is also a recognition about the signalling effects of cross-listing, and the benefits associated with the change in perception about a firm's corporate governance quality that cross-listing may trigger (Doidge et al., 2007; Abdallah and Goergen, 2008; Peng and Su, 2014). Specifically, if informationally opaque firms are generally not well governed then it becomes difficult for a single firm to prove that it is better governed than its competitors. This can result in adverse selection problems for investors (Akerlof, 1970), and consequently market failures that shut even relatively well governed firms out of the capital market. Signalling in this context is an act that can change the perception of the investors about the governance quality of the company, as they can distinguish between "good" and "bad" firms (Spence, 1973).

The more recent literature on cross-listing has extended the discussion about signalling – which is largely a response to problems of informational asymmetry or opacity – to encompass the related issue of institutional legitimacy. Bell et al. (2012) and Peng and Su (2014) argue that cross-listing may pave the way for greater legitimacy for emerging market firms, more by way of "reputation bonding based on informal institutions" than by way of the formal institutions. This perspective is consistent with the argument that a number of emerging market firms desire to "escape" weak institutions in their home country, and engage with more robust ones, in order to establish a credible risk-return trade off and potentially seek lower cost sources of finance (Cuervo-Cazurra and Ramamurti, 2014). It is also consistent with the analysis by Doidge et al. (2007) who argue that country level protection of investors is crucial to ambitious firms, and that of Coffee (2002) who argues that by cross-listing in the US foreign firms "partially compensate for weak protection of minority investors under their own jurisdictions' laws" (pp. 1757). Much

less discussed in the literature are the longer term benefits of bonding such as amelioration of liability of foreignness (LOF) (Zaheer, 1995). Subsequently, this facilitates deeper or greater internationalisation, including strategic partnerships with and technology transfer from firms in relatively developed institutional settings, as trust between the partners is facilitated by bonding.

Overall, therefore, the literature has moved primarily in three different directions. First, and most commonly, it has focussed on the impact of cross-listing, in particular on firm value and on the cost of capital of cross-listed firms. The second strand of the literature is about the importance of the signalling effect of cross-listing, focussing on the corporate governance quality of the cross-listed firms. Third, there has been an attempt to explore the implications of cross-listing for the ability of firms to embed themselves in the better institutional environment of the countries where they decide to cross-list. It is evident from this literature that cross-listing has strong strategic elements, and can enable a firm's management to use it to create value for a firm both in the short run, by reducing its cost of capital, and also in the long run, by giving it greater legitimacy to investors who are concerned about corporate governance quality and (potential) stakeholders in other (generally better) institutional contexts. This is a similar argument to the one made by Siegel (2009) in the analysis of strategic alliances by Mexican firms with US firms. Building on earlier literature – see, for example, Siegel (2005) – this line of argument is that bonding needs to be considered in a wider context, with the need for a greater understanding between a firm's bonding strategy, and its governance. In turn this widens the discussion from the literature which merely focuses on financial performance, and seeks to examine the importance of bonding using a wider set of dimensions. However, an integrated theory about this strategic aspect of cross-listing is missing in the literature and, as we have discussed in the

previous section, contributing towards the development of a unified framework for discussion of cross-listing from a strategic standpoint is perhaps the most important contribution of this paper.

3. Hypotheses Development

An emerging market firm's decision about cross-listing is shaped by the trade-off between the cost of revealing more about the firm to external agents and the signalling benefits associated with such exposure. The costs may be greater for firms that are informationally opaque, but the benefits can be high if they are able to signal their governance quality. Once the decision to become (and remain) cross-listed is made, there are some immediate and visible benefits in the form of greater access to (perhaps cheaper) capital from deeper capital markets. There are also potential gains from bonding with a better institutional context, such as the amelioration of LOF of its overseas operations, and strategic partnerships with and technology transfer from overseas firms. Unsurprisingly, the benefits of bonding might be less for emerging market firms that already have somewhat strong institutions.

A unified framework about cross-listing should, in other words, be able to explain the choice to become (and remain) cross-listed on the basis of anticipated net benefits, and be able to demonstrate *ex post* benefits associated with cross-listing. Since benefits of cross-listing may be anticipated but costs incurred to facilitate cross-listing are immediate, the theory should also take into account the ability of firms to bear this *ex ante* cost. Also, the decision to cross-list is strategic and hence a unifying discussion about cross-listing should proceed from a strategic perspective. We seek to develop such an approach using the real options framework (Bowman and Hurry, 1993; Klingebiel and Adner, 2015) as the centre piece for this strategy-based discussion. We propose that the real options analysis of cross-listing, within the context of IB,

ties together the different strands of the literature in order to take account of the various strategic decisions involved in cross-listing. Our framework is highlighted in Figure 1.

(Insert Figure 1)

Following Bowman and Hurry (1993), the interpretation of Figure 1 is as follows. Firms strategize about internationalisation which is dependent on both the ability and the motivation to internationalise. As we argue later in the paper, motivation depends on the firm's informational opacity and, correspondingly, corporate governance quality. Its ability to internationalise depends, at least in part, on firm specific advantages (FSAs) such as financial resources (Bhaumik et al., 2010). The cross-listing literature discussed above highlights the fact that cross-listing itself can be achieved with little commitment of resources by the firm. However, as we discuss later in the paper, for some firms the *ex-ante* cost of the requisite restructuring of governance can be high or even prohibitive. Once the firm is cross-listed, it can benefit directly through lower cost of (or greater access to) capital (Stulz, 1999), and indirectly by bonding with a developed institutional context (Bell et al. 2012; Peng and Su, 2014). Greater access to lower cost of capital, in turn, increases the ability of a firm to internationalise.

In the longer run, the cross-listed firm can deepen its internationalisation by leveraging its bonding, i.e., exercise the so-called "call" option. Building on Siegel (2009), bonding is expected to give a cross-listed firm greater legitimacy with respect to its congruence with corporate governance and other institutions in another (generally, more developed) context, and thereby ease its LOF. However, should the benefits of bonding prove to be insignificant or smaller than

bonding effects of alternative mechanisms such as strategic alliances (Siegel, 2005, 2009),[3] the firm may choose to not deepen its exposure to the host country further but continue to enjoy benefits such as lower cost of capital. Finally, if prospects of further internationalisation are weak and the gains from lower cost of capital are not significant relative to the cost of being transparent then it can exercise the "put" option and delist from the overseas capital market.

Cross-listing is, in the words of Bowman and Hurry (1993), the "real option". It may also be considered, as argued by Banalieva and Robertson (2010), a distinct form of entry reflecting increasing commitment (but short of a full FDI-based commitment) to the host country, and local partners. Firms from weak institutional environments that are uncertain about their ability to internationalise through FDI use this relatively low cost option (with the caveat discussed above) to gain access to global capital markets and to bond with stronger institutional contexts, in anticipation of (albeit with no obligation to) greater internationalisation. Figure 1 therefore illustrates the full characterisation of a strategy associated with internationalisation, with cross-listing as an intermediate step. It not only pulls together the literatures related to signalling, cost of capital and bonding, but also explicates the corporate governance aspect of cross-listing by way of the relationship between informational opacity of a firm and its motivation to cross-list.

We first explore the issue of motivation of firms to cross-list. As such, cross-listing requires firms to be more transparent and demonstrate good corporate governance and the cost of (re-)organising themselves in this manner is likely to be high for firms that are opaque and not well governed. The cost is likely to be fairly high for informationally opaque firms with and weak governance structures that are ubiquitous in emerging market economies (Khanna and

[3] Using a set of Mexican firms, Siegel (2005) explores the use of American Depository Receipts (ADRs) as a bonding mechanism, but concludes that these are not as effective as other forms, for example strategic alliances (Siegel, 2009).

Palepu, 2000b; Claessens and Fan, 2002; Gibson, 2003). This informational opacity is often manifested in lack of clarity about the ownership structures of these firms (Bebchuk et al., 2000), and is believed to result in expropriation of minority shareholders by majority shareholders (Claessens et al., 1999). The IB literature has discussed the implications of such opacity for internationalisation through financial markets and outward FDI (Bhaumik and Driffield, 2011; Chung et al., 2015).

However, precisely because firms that are informationally opaque are known to have high agency costs, such that they are more likely than other firms to be associated with adverse selection, cross-listing and the associated signals can benefit these firms more than others. In the emerging market context, for example, where ownership concentration is ubiquitous (Bhaumik and Selarka, 2012, and references therein), business groups and firms affiliated to them are considered to be particularly opaque (Khanna and Palepu, 2000b; Claessens and Fan, 2002).[4] In part, this is on account of their ability to control firms through a maze of cross-holding of shares and cross-membership of company boards (Bebchuk et al., 2000), and, in part, this is on account of their ability to move assets and earnings across firms using mechanisms such as tunnelling (Bhaumik and Gregoriou, 2010). Firms from emerging market economies, where the institutional weaknesses at the country-level, especially with respect to investor protection, considerably increase the benefits associated with cross-listing, it is likely that relatively opaque firms will have greater incentive to cross-list. This leads to the following hypothesis:

Hypothesis 1a. Informational opacity of a firm is positively related to the likelihood of its cross-listing.

[4] The term "Business Group" has particular connotations in terms of emerging market economies, relating not just to cross holdings, but to use of internal capital and labour markets. This is distinct from the use of the term within the context of the global value chains literature; see for example Altomonte and Rungi (2013) who use the term in the context of hierarchies between parents and affiliates.

However, an opaque firm has other ways to signal its quality, in particular, because governance quality (managers and entrenched controlling shareholders working in the interests of the firm rather than for their own private benefits) and firm capabilities/performance are generally positively correlated (Klapper and Love, 2004, Cuervo-Cazzura and Dau, 2009). Hence, firms with higher profitability and cash flow have less need to signal good governance through cross listing, as they are able to signal performance directly. This leads to the following hypothesis.

Hypothesis 1b. The motivation for cross listing in the presence of informational opacity is weaker when a firm is able to signal good governance quality through its financial capacity.

Financial capacity not only permits informationally opaque firms to signal their governance quality, they directly affect a firm's ability to cross-list. As noted by Bhaumik et al. (2010) and references therein, firms in weak institutional settings often develop governance structures and mechanisms for dispute settlement that are informal, often aligned through family relationships and dominant entrepreneurs. Cross-listing in developed countries however requires that these firms have established internal structures to process strategic decisions transparently, and the capacity to deal with strategic, legal and regulatory issues across international boundaries. For many of these firms, the associated cost of restructuring may be high or even prohibitive; see, for example, a discussion about restructuring needs of family firms in Bhaumik and Dimova (2014). Specifically, as demonstrated by Bhaumik et al. (2010), emerging market firms that are large and profitable, with large cash flows, have greater capability to internationalise, perhaps because they have greater ability to bear any cost of reorganisation and restructuring that is necessary to be attractive to investors in a different (generally better) institutional context. This is consistent with findings that suggest that a firm's resources have an

impact on their cross-listing (Pagano et al., 2002; Bailey et al., 2006). This leads to the following hypothesis:

Hypothesis 2. There is a positive relationship between a firm's financial capacity and its likelihood of cross-listing.

We now turn to the directly observable (or tangible) benefits from cross-listing that result from signalling. To recapitulate, signalling theory suggests that such signalling can lead to "separating equilibria" whereby investors are able to distinguish between well governed and poorly governed firms. Once a firm is able to signal its governance quality in some way – through cross-listing, for example – they are rewarded by the capital market. Doidge et al. (2007), for example, argue that controlling shareholders of cross-listed firms have lower incentive to consume private benefits associated with their position. Evidence from the corporate governance literature supports the narrative about the relationship between signalling (better) governance quality and cost of capital (see Healy and Palepu, 2001). The signalling benefits of cross-listing were discussed early by Stulz (1998). The subsequent literature on information benefits of cross-listing – e.g., Fernandes and Ferreira (2008); Bailey et al. (2006), and Sami and Zhou (2008) – is also consistent with this signalling-cost of capital relationship, even though it suggests that the impact of cross-listing on the cost of capital may differ by choice of overseas exchange (Hail and Leuz, 2009). This signalling effect is reinforced by *ex post* actual monitoring in more reliable (or multiple) regulatory jurisdictions. These advantages are supplemented by the portfolio effect, whereby the lower expected risk-adjusted returns of global investors reduce the cost of capital of these cross-listed firms.

Our main proposition is that cross listing improves a firm's ability to access external capital, and reduces its cost of capital. In turn, the beneficial signalling effect is higher for *ex ante* informationally opaque firms. Cross listing communicates the firm's willingness to submit itself to scrutiny, and therefore signals superior governance quality compared with its peers. One can make similar arguments concerning the ability of an emerging market firm to attract foreign investment. We argue therefore however that the beneficial effects of cross listing and attracting foreign investment are multiplicative. Firstly, the signalling effect associated with both events is greater, in that they both demonstrate the ability to overcome the liability of foreignness in international capital markets. Secondly, incumbent foreign ownership may further ameliorate financial constraints by attracting more overseas investors who are wary about investing within the domestic domain of the cross-listed firm but are more willing to invest in it within the context of cross-listing that have stronger (or at least more familiar) institutions. Further, if foreign ownership is perceived to be correlated with phenomena such as technology transfer (Driffield et al., 2014) there are positive implications for future performance that can also lead to even greater access to capital from overseas shareholders. This leads to the following hypotheses:

Hypothesis 3a. Cross-listed firms will experience reduced financial constraints compared with their non-cross-listed counterparts.

Hypothesis 3b. The positive relationship between cross-listing and reduction in financial constraints will be stronger for informationally opaque firms.

Hypothesis 3c. The positive relationship between cross-listing and reduction in financial constraints will be stronger for firms with foreign ownership.

Our final hypothesis concerns the more intangible benefits from cross-listing, namely, bonding. Bonding with a stronger overseas institutional context, can confer on the firm institutional legitimacy. This, in turn, can result in greater access to capital in the short run, and carries with it benefits such as amelioration of LOF and access to advanced technology in the longer run. The longer run advantages of bonding are difficult to model empirically because there is little *a priori* theory about how long it takes for bonding to generate the full benefits such as amelioration of LOF. However, it is possible to argue that the *ex post* benefits associated with LOF-reducing institutional legitimacy is likely to be less for firms for which there is *ex ante* similarity between institutional environments of home country and country of cross-listing.

Implicit in the bonding discussion is the argument that these gains are likely to be significant only if the institutional distance between the home country of the firm and the country of cross-listing is significant. For example, Hail and Leuz's (2009) conclusion that (largely) European firms gain significantly by cross-listing at US exchanges but do not gain commensurately at the London exchange suggests that perhaps institutional distance matters. In a similar vein, Herrmann et al. (2015) argue that the benefits of cross-listing in the US are not uniform across countries, but dependent on the perceived improvement in governance quality from investing in the US. Alternatively, if the home country corporate governance institutions (e.g., investor protection) are good, the extent of "bonding" benefit resulting from cross-listing can be expected to be low. Reese and Weisbach (2002), for example, argue that the increase in equity offerings following a cross-listing is larger for firms whose country of origin is less effective in protecting minority shareholders' interests. We, therefore, have the following hypothesis:

Hypothesis 4. Firms from home countries with good institutional quality will benefit less from cross-listing's impact on access to capital than those from countries with poor institutional quality.

4. Data

It is evident from the discussion in Section 3 that the analysis requires a mix of firms that are cross-listed and those that are not, and that firm level characteristics (e.g., informational opacity and profitability) would have to be matched with country level indicators of institutional quality, allowing for a degree of variation at the country level as well as the firm level. We, therefore, focus on four emerging market economies – Poland, Mexico, Indonesia and South Africa – that are large and important members of the emerging market club, and yet are different from China and India that are much discussed and whose firms enjoy special benefits because of factors such as their size.

Table 1 shows the definitions of all firm- and country-level indicators used in our analysis. Information on cross-listing and other key firm-level variables come from the commercially available dataset ORBIS. This dataset provides detailed information on company profiles, including profit and loss accounts, balance sheets and other financials. These are all converted into US dollar equivalents for the sake of comparability across countries and deflated using GDP deflators from the World Bank's World Development indicators to take account of inflation. Annual country-level indices come from the World Bank's World Development Indicators and the World Bank 'Doing Business' database.

(Insert Table 1)

One has to be mindful about the possibility that emerging market firms that decide to cross-list may *ex ante* be different from firms that do not. This induces the classic "self-selection" problem that must be controlled for in the analysis. The literature advocates several solutions to this problem. More sophisticated techniques (currently employed in the corporate finance literature) involve the use of matching techniques to overcome the self-selection problem (Kai and Prabhala, 2007). Specifically, we use the Mahalanobis matching technique. Conceptually, this involves identifying a "treatment" group – in this case, emerging market firms that have cross-listed – and matching those with untreated firms that are similar to the treated firms, based on a given set of criteria as specified in the "distance function". We use the following dimensions to match emerging market firms with cross-listing to their non-cross-listed emerging market counterparts: employment (to proxy firm size), firm age, 2-digit industry and home country of the emerging market firms. It is important to note that "matching" does not mean that the treated and non-treated firms will be (nearly) identical to each other, especially if the matching is done along multiple dimensions. They merely lie within some pre-determined distance of each other, i.e., they are roughly similar along some combination of those dimensions.

After accounting for missing data for relevant variables, we have an unbalanced panel of 602 emerging market firms from Indonesia, Poland, Mexico and South Africa, covering the time period of 2006-2013; of these, 191 are cross-listed at overseas exchanges. Table 2 shows the distribution of firms across the four countries, and the extent of capital market development and investor protection in the aforementioned four countries. Table 3 shows the distribution of emerging market firms by their industry affiliation.[5]

[5] In keeping with much of the literature in this area, financial institutions and utility companies are omitted from the sample.

(Insert Table 2)

(Insert Table 3)

5. Research methodology

5.1 Drivers of cross-listing

Our empirical exercise on the basis of Figure 1 means that for hypotheses 1(a), 1(b) and 2 we effectively discuss the determinants of cross-listing. Some of these determinants capture the motivation of a firm (especially those from emerging market economies) to internationalise (and thereby hold a real option with respect to greater internationalisation in the future). Some others capture the ability of the firm to internationalise and indeed bear any cost associated with cross-listing itself. We have argued that motivation depends on the informational opacity of firms and mitigating factors such as firm performance and foreign ownership.

In keeping with similar analyses in the cross-listing literature discussed above, we start with a probit model to explain the probability of a firm obtaining a cross listing:

$$\Pr(CL)_{it} = \beta_0 + \beta_1 \text{Business Group}_{i,t-1} + \beta_2 (\text{Business Group} \times \text{ROA})_{i,t-1}$$

$$+ \beta_3 (\text{Business Group} \times \text{CFTA})_{i,t-1} + \beta_4 \text{ROA}_{i,t-1} + \beta_5 \text{CFTA}_{i-t-1}$$

$$+ \beta_6 \text{Firm size}_{i,t-1} + \beta_7 \text{Firm age}_{i-t-1} + \beta_8 \text{LTDTA}_{i,t-1} + \beta_9 \text{IATA}_{i,t-1} +$$

$$\beta_{10} \text{Foreign Ownership}_{i,t-1} + e_{it} \qquad (1)$$

where *Pr*(*CL*) is the probability of being cross-listed in a given year, *Business Group* is a dummy variable where the firm has membership of informationally opaque business groups, offering a direct test to hypothesis 1a. We have two measures to proxy for a firm's financial capacity: ROA

or return on assets as a measure of profitability, and *CFTA* as the ratio of cash flow to total assets. Taken together, these variables capture variation in the financial capacity of firms and offer a test of hypothesis 2. Testing of hypothesis 1b is facilitated by the interaction between the business group dummy and the two aforementioned financial measures. A number of stylised control variables are also used in the firm level analysis, including *IATA* which is the ratio of intangible to total assets and reflects FSAs (Braunerhjelm, 1996; Bhaumik et al., 2010); *Foreign ownership* which is a dummy equalling 1 when the share of foreign ownership is at least 50 per cent in the firm and zero otherwise; a firm's age and size; and leverage (*LTDTA*). Finally, e_{it} is the *iid* error term. We also control for industry, country and year effects using dummy control variables. The explanatory variables are lagged by one period to address potential endogeneity problems. Note also, with *Pr*(*CL*) as the dependent variable in the analysis, we are not discussing the single act or decision to cross-list but rather the continual strategic decision to remain cross-listed during a given year, or not. We estimate the probit model using pooled data and report the marginal effects.

Given that we are using multiple measures of a firm's ability to internationalise and, correspondingly, multiple measures of factors that can mitigate the relationship between the informational opacity of a firm and the likelihood of remaining cross-listed in a given year, it is possible that not all the regression coefficients associated with Hypothesis 1b and Hypothesis 2 will be statistically significant. Among the control variables, *IATA* is expected to have a positive impact on any form of internationalisation. However, since emerging market firms often do not have significant FSAs and given that cross-listing may itself be a way to enhance FSA *ex post* through strategic partnerships and technology transfer, statistical significance of this variable is not guaranteed. Given that foreign investment in an emerging market company (and

correspondingly foreign ownership of shares) enhances their ability to internationalise (Khanna and Palepu, 2000a; Bhaumik et al., 2010), we expect this control variable to have a positive impact on the likelihood of cross-listing as well. Firm size can be expected to have a positive impact on the likelihood of being cross-listed in a given year as well – larger firms are more likely to internationalise, but the impact of firm age on this likelihood is not as clear. On the one hand, older firms have significant operational experience but, on the other hand, they may be too optimised for one institutional and regulatory context to venture into a new context. We also include leverage as a control, though the impact of leverage on the likelihood of cross-listing is also ambiguous. While leverage is known to affect firm behaviour and is therefore a stylized control variable in firm-level analysis, there is little theory about the precise way in which it can affect the likelihood of cross-listing.

5.2 Gains from cross listing

We now proceed to Hypotheses 3(a)-(c) and Hypothesis 4; the former are about the effects of signalling while the latter is about bonding. In the IB literature much of the discussion about the potential benefits of cross-listing concerns greater access to capital and lower cost of capital for cross-listed firms. In other words, where firms experience financial constraints on account of frictions that inhibit unfettered access to the capital market, cross-listing can help ameliorate the extent of financial constraints experienced by a firm. We, therefore, draw on the discussion about financial constraints of firms to empirically examine Hypotheses 3(a)-(c) and 4.

The impact of signalling is easy to comprehend: cross-listing should reduce a firm's financial constraints and firms with certain characteristics would benefit more than others. The operationalisation of Hypothesis 4, about bonding, requires further explanation. Recapitulate that

while most of the benefits of bonding are experienced in the long run, the discussion of which lies outside the scope of this paper, we focus on a specific aspect of bonding, namely, benefits from bonding are lower if the home country of the cross-listed firms have relatively strong institutions (and hence are similar to those in the country of cross-listing). This benefit of bonding should be reflected in the short term benefits of cross-listing, specifically, with respect to access to capital. As such, if the home country of the cross-listed firm has strong institutional quality, then its benefits from bonding (i.e., access to capital) will be less. Hence, we test Hypotheses 3(a)-(c) and Hypothesis 4 using the same empirical framework, that of a firm's financial constraint; with Hypotheses 3(a)-(c) linked to variables that capture a firm's informational opacity and Hypothesis 4 linked to the institutional quality of the home countries of the cross-listed firms.

The finance literature on financial constraints of firms is largely based on the seminal work of Fazzari et al. (1988). One of the challenges of discussing a firm's financial constraints is that it implies an excess demand for capital (at least, capital that is priced at a level that is acceptable to a firm) and yet we only observe the actual amount of capital at a firm's disposal, not the firm's capital needs relative to the amount to which it has access. In the literature on financial constraints, this problem is finessed as follows: A firm's investment decisions should ideally depend on factors such as its current sales and, more importantly, Tobin's q which is a stylised measure of a firm's future prospects. If the firm has unfettered access to the capital market then this investment level should be independent of its internal financial resources. However, if the firm experiences financial constraints – it is argued – this investment level would also depend on its internal financial resources and in the literature the stylised measure of

internal financial resources is its cash flows. As such, the greater the cash flow sensitivity of a firm's investment, the greater is its financial constraints.

The advantage of this approach is its simplicity; it involves the estimation of simple cross-section or panel fixed effects regression models whereby the regression specification is given by:

$$ln\left(\frac{I_{it}}{K_{it}}\right) = \delta_0 + \delta_1 lnQ_{i,t} + \delta_2 ln\left(\frac{SALE_{i,t}}{K_{i,t-1}}\right) + \delta_3 ln\left(\frac{SALE_{i,t-1}}{K_{i,t-2}}\right) + \delta_4 CF + \Phi'Z + \theta_t + \mu_i + e_{it} \quad (2)$$

where *I* is investment (i.e., annual change in capital stock), *K* is capital stock (i.e., fixed assets) of the firm, *ln Q* is log of Tobin's *q*, *S* is sales, *CF* is cash flow, *Z* is a vector of other firm characteristics such as firm size and firm age, θ and μ are time and firm fixed effects, and *e* is the *iid* error term. The focus then is on the coefficient of the cash flow variable, δ_4. However, as with any cross-section or panel data regression model, estimates of equation (2) give us the cash flow sensitivity of the average firm, i.e., a view about the financial constraint of the average firm, which is not particularly satisfactory.

In recent extensions of the Fazzari et al. (1988) methodology, therefore, Wang (2003) and Bhaumik et al. (2012) have proposed an alternative empirical approach which involves first estimating firm-specific measures of financial constraints and subsequently, regressing this measure of financial constraints on factors that can enhance or reduce it. The conceptual basis of their argument is as follows: if a firm operates in a perfect capital market and has unfettered access to capital then, as mentioned above, it's investment would depend only on factors such as Tobin's *q* and sales levels. However, de facto, on account of factors such as informational asymmetry between investors and firms, the aforementioned firm does not operate in perfect capital market and hence its actual level of investment is less than this optimal level. Let us call

the gap between the optimal and actual level of investment "inefficiency".[6] Hypotheses 3(a)-(c) and 4 can be addressed within this setting, once this firm-specific measure of inefficiency is estimated. If cross-listing reduces financial constraints, it should also reduce this inefficiency, implicitly bringing the firm's observed actual investment to its unobserved optimal investment level. Similarly, if benefits of bonding are less for firms from countries with high institutional quality, this inefficiency and home country institutional quality of firms should be positively correlated.

The challenge, of course, is to estimate this inefficiency level and Wang (2003) and Bhaumik et al. (2012) propose a solution involving the use of stochastic frontier models (Kumbhakar and Lovell, 2000). This approach involves estimating the equation that estimates the optimum level of investment that is associated with firm *i*'s Tobin's *q* and sales levels:

$$ln\left(\frac{I_{it}}{K_{it}}\right)^{SF} = \delta_0 + \delta_1 lnQ_{i,t} + \delta_2 ln\left(\frac{SALE_{i,t}}{K_{i,t-1}}\right) + \delta_3 ln\left(\frac{SALE_{i,t-1}}{K_{i,t-2}}\right) + \theta_t + \mu_i + e_{it} \quad (3)$$

and estimating the aforementioned inefficiency (*u*) as deviation of observed investment from this optimum:

$$\left(\frac{I_{it}}{K_{i,t-1}}\right) = \left(\frac{I_{it}}{K_{i,t-1}}\right)^{SF} - u(Z_t, w_t) \quad (4)$$

Thereafter, this inefficiency is regressed on the variables in which we are interested.

In our case, this second regression equation is given by:

$$u_{it} = \pi_0 + \pi_1 CL_{i,t-1} + \pi_2 (CL \times Business\ group)_{i,t-1} + \pi_3 (CL \times Foreign\ ownership)_{i,t-1} + \pi_4 (CL \times Investor\ protection)_{i,t-1} + \pi_5 Firm\ age_{i,t-1} + \pi_5 Assets + \pi_5\ Cash\ flow_{i,t-1} + \pi_5 Market\ cap\ to\ GDP_{i,t-1} \quad (5)$$

[6] In our framework, this inefficiency can be zero at best, when a firm does not experience any capital market friction, or positive. The distribution of this inefficiency, therefore, is half-normal.

where *u* is the measure of a firm's financial constraints, *CL* is a dummy variable that takes the value 1 if a firm is cross-listed, such that we expect the coefficient to be negative in line with Hypothesis 3a, Business group is the familiar binary indicator of a firm's informational opacity, which when interacted with cross-listing we expect to have a negative effect in line with Hypothesis 3b. *Foreign ownership* is also a binary indicator of foreign shareholding in a firm, which when interacted with cross-listing provides a direct test of Hypothesis 3c. *Investor protection* is a measure of the quality of the home institutions of a firm – we specifically choose investor protection that is most relevant in the context of stock market listing. Our control variables are firm age, total assets of a firm and cash flow; these are stylised in the literature (see Bhaumik et al., 2012). We have additionally controlled for the state of capital market development in the home country of the firms, using the stylized measure of the ratio of market capitatisation in the home country to its GDP, because it has implications for a firm's financial constraints.

Note that since equation (5) explains *in*efficiency; the greater the deviation of a firm's investment from the optimum, i.e., the greater the financial constraints of the firms, the greater is the inefficiency. In other words, a firm's financial constraints are reduced if inefficiency is lower, i.e., if an estimated regression coefficient is negative. By the same token, a positive regression coefficient indicates that inefficiency, and hence financial constraint, is increasing.

5.3 Summary statistics and correlation

The summary statistics and the correlation matrix are reported in Table 4. It can be seen that multicollinearity is not a problem for our set of independent variables for both the probit and stochastic frontier models. Most of the correlations between explanatory variables are weak, and VIF calculations are all below 2.5 and thus do not suggest multicollinearity problems.

(Insert Table 4)

6. Results

The first stage of our analysis explores the firm level characteristics associated with cross-listing, using the matching algorithm to allow for the selection process as described in the previous section. Table 5 presents the estimations of the probit analysis across four models. Model 1 tests hypothesis 1a, which captures the impact of cross-listing for a firm belonging to a business group. Model 2 tests hypothesis 2, which isolates the impact of firm performance, cash flow and intangible to total assets on cross-listing. Model 3 brings together the variables relevant for both hypotheses 1a and 2 and, finally, Model 4 introduces to the specification the interactions between the aforementioned variables that are the basis for hypothesis 1b.

Hypothesis 1a. Focusing first on the motivation to cross list, the results provide strong support for the first hypothesis, Firstly, firms that are informationally opaque are more likely to cross list, offering support for Hypothesis 1(a). The coefficient on the business group dummy is positive and significant, with indicates that business group firms are between 7 and 21 percent more likely to remain cross-listed in a given year than other firms, *ceteris paribus*.

Hypothesis 2. Model 2 in table 5 suggests that the likelihood of being cross-listed in any given year increases with a firm's performance/financial capacity (specifically, profitability and cash flow) that have implications for a firm's ability to bear the cost of necessary restructuring. We, therefore, have strong support for Hypothesis 2.

Hypothesis 1b. Moving on to the interactions between business groups and financial performance (model 4), we also have support for Hypothesis 1b; impact of the business group dummy on the likelihood of attaining cross listing decreases with the ROA and cash flow of the

firm. In other words, if firms can signal their governance quality by other means, their motivation to cross-list declines.

(Insert Table 5)

Recapitulate that Hypotheses 3(a)-(c) and 4 are examined using the stochastic frontier framework whose results are reported in Table 6. The coefficient estimates for the frontier indicate that a firm's investment (to capital ratio) increases with its future prospects as captured by Tobin's *q*, while lagged sales (to capital ratio) have mixed impact on this investment. This is consistent with the literature on financial constraints that forms the basis for this empirical exercise; see Bhaumik et al. (2012). As explained using equations (3) and (4), the stochastic frontier model enables us to generate firm-specific measures of inefficiency that is a proxy for a firm's financial constraint. Hypotheses 3(a)-(c) and 4 are related to this inefficiency equation (Equation 5). In Table 6, we first introduce the variables related to hypotheses 3(a)-(c) in the inefficiency equation (Model 1), and thereafter, we introduce the variables related to hypothesis 4 (Model 2). Finally, we add the control variables to the specification for the inefficiency equation (Model 3). It is evident that the estimates are robust across these specifications.

Hypotheses 3(a)-3(c). The regression coefficients for the inefficiency equation suggest that inefficiency is lower for cross-listed firms, and that this inefficiency decreases even further for business group affiliated firms and those with incumbent foreign shareholders. Lower inefficiency, of course, is associated with lower financial constraints and indirectly, therefore, with access to cheaper and more abundant capital. In other words, the signalling effect of cross-listing reduces financial constraints, and this effect is stronger for *ex ante* informationally opaque business group affiliated firms, and firms that already have foreign shareholders who can help

attract even more overseas investment upon cross-listing. We, therefore, have strong support for our signalling related hypotheses.

***Hypothesis 4*.** Finally, we discuss our hypothesis about bonding. The relevant regression coefficient reported in Table 6 suggests that for cross-listed companies the benefit in terms of lower financial constraints is progressively offset with increase in the quality of investor protection (and, by extension, institutional quality). Indeed, for an average value of 6 for investor protection for a country-year, well over half the beneficial impact of cross-listing (in terms of inefficiency reduction and hence lower financial constraint) is offset. We, therefore, have support for our bonding related hypothesis as well. However, as we have mentioned earlier, in our analysis we have abstracted for long term advantages of bonding that are reflected not so much in lower financial constraints (and greater access to cheaper capital) but in reduced LOF, greater scope for strategic partnerships with overseas firms, and technology transfer from developed country firms.

(Insert Table 6)

Robustness checks

With regards to the results reported in Table 5, the pseudo R-square values associated with the models exceed 0.40, which is fairly good for this type of data and empirical analysis. The results are qualitatively (i.e., in terms of sign and statistical significance) unaffected by the introduction of new variables into the specification, and are robust to controls for observed and unobserved firm characteristics and time related factors. Likelihood ratio tests, not reported in the paper, suggest that the specification that includes the control variables dominate those that do not. We are particularly encouraged by the robustness of hypotheses 1a and 1b to the inclusion of

LTDTA (or leverage) in the specification because it nets out, to a large extent, the internal capital market aspect of business groups that aids access to capital, such that the business group dummy reflects, as such, opacity and governance quality. We also experimented with interactions between the business group dummy, and measures of FSAs, intangible assets and foreign ownership. These however were insignificant, while the model is robust to their inclusion. They are therefore omitted.

Similarly, the results reported in Table 6 are robust to incremental expansion of the specification for the inefficiency equation. Note also that we estimate the frontier and inefficiency equations jointly which addresses a major inconsistency that plagues models in which these equations are estimated in two stages (Coelli, 1995). Specifically, if the model is estimated in stages then inefficiency effects are assumed to be *iid* while in the second stage they are assumed to be determined by firm-specific factors such that they are not *iid* by definition. We have followed Kumbhakar et al. (1991), and the subsequent extension of their model to panel data by Battese and Coelli (1995), in modelling inefficiency (or market friction) explicitly as a function of firm-specific variables. Note further that the functional form of the frontier equation is consistent with the stylised literature on financial constraints (Wang, 2003; Bhaumik et al., 2012).[7] Our model therefore is well specified from an econometric point of view and this adds to our confidence about our model estimates.

7. Conclusion

This paper shows that firm-level indicators and the country-specific institutions explain why certain emerging market firms cross-list. We demonstrate that cross-listing is beneficial,

[7] At this point in the estimation process, if one were estimating productivity, there would be a need to explore alternative functional forms to test whether returns to scale restrictions in the "production function" were valid (Coelli, 1995). With our specification and dependent variable this is not a concern.

particularly for emerging market firms who are located in countries with lower levels of investor protection, and those that are perceived to be informationally opaque. Our findings contribute to the wider IB literature, by combining insights drawn from the IB and finance literatures and applying it to four emerging economies.

Our results contribute to the current debate on how emerging market firms can internationalise, and in particular overcome LOF, that are particularly acute for firms from countries with weak institutions. Firstly, we argue that LOF applies in capital markets as well as in goods markets, and that cross-listing can be an important solution to this for firms from emerging markets. Here, the signalling hypothesis dominates. In order for firms to fully exploit their FSAs in new markets, finance is required, with both debt and equity finance being more readily available in more developed markets, and at lower cost. For such firms, we show that FSAs are important in explaining their internationalisation and in particular in explaining their cross-listing activities.

Secondly, our results extend this argument, and link the analysis of cross-listing to the burgeoning literature on EMNEs. Initially, our findings lend support to the recent edited volume of Cuervo-Cazurra and Ramamurti (2014), and other recent literature on EMNEs (Williamson, 2014, Bhaumik et al., 2015a, b), which highlight the heterogeneity that exists within emerging market firms, particularly in terms of their ability to generate FSAs. As such, the argument expressed by Cuervo-Cazurra and Ramamurti (2014) that EMNEs are to a degree "escaping" the weak institutional environment in their home country, can also be applied to capital market conditions, and cross-listing is an important tool for doing this. However, we can extend this argument to the other main constraint faced by emerging market firms, which is access to technology. Whether it is through partnering with established country firms, seeking investment

from abroad, or seeking technology agreements with more advanced firms, bonding assures the partner of good governance practices including the protection of intellectual property. As such, bonding can play an important role in the long term development and internationalisation of emerging market firms.

Limitations and further avenues of research

Our findings suggest a number of avenues for further research into cross-listing, and the integration of analysis of capital markets within IB research. Firstly, while we have shown that the advantages of cross-listing are a combination of signalling (access to finance) and the intangible benefits associated with bonding, further research should consider the relative importance of cross-listing for firms seeking debt and those seeking equity, and the importance of this in facilitating internationalisation by emerging market firms.

An unanswered question however concerns the role that cross-listing might play in the internationalisation of the firm more generally. Does cross-listing for example lead to firms engaging in higher levels of exporting or FDI as bonding potentially reduces a firms' LOF? Equally, as we have shown that FSAs are important in explaining cross-listing, and its benefits, does cross-listing offer an additional location advantage, and in turn amplify the returns to further internationalisation through FDI?

It should also however be noted that, in contrast to some of the finance based literature above, we have focussed deliberately on emerging market firms, rather than say a full set of firms who have chosen to cross list in a given location. This has some inherent advantages, in that we do not combine firms from countries with highly developed institutions and capital markets (for example Germany or the UK) with firms from developing countries. The theory and literature discussed above would suggest that the benefits of cross listing will be greater for

emerging market firms than for say UK firms, such that previous work may have understated the average benefit. However, at the same time, the limitations of focussing on emerging markets should be recognised in terms of exploring the benefits of cross listing per se.

References

Abdallah, W., Goergen, M. (2008). Does corporate control determine the cross-listing location? *Journal of Corporate Finance*, 14, 183-199.

Akerlof, G.A. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, 84(3): 488-500.

Alexander, G.J., Eun, C.S., Janakiramanan, S. (1988). International listings and stock returns: Some empirical evidence. *Journal of Financial and Quantitative Analysis*, 23, 135-151.

Altomonte, C., Rungi, A. (2013). Business groups as hierarchies of firms: Determinants of vertical integration and performance. ECB Working Paper No. 1554. Available at: http://ssrn.com/abstract=2269638.

Bailey, W., Karolyi, G.A., Salva, C. (2006). The economic consequences of increased disclosure: Evidence from international cross-listings. *Journal of Financial Economics*, 81, 175-213.

Banalieva, E.R., Robertson, C.J. (2010). Performance, diversity, and multiplicity of foreign cross-listing portfolios, *International Business Review*, 19(6), 531-547.

Battese, G.E., Coelli, T.J. (1995). A model for technical inefficiency effects in a stochastic frontier production function for panel data. *Empirical Economics*, 20, 325-332.

Bebchuk, L.A., Kraakman, R., Triantis, G.G. (2000) Stock Pyramids, Cross-Ownership, and Dual Class Equity: The Mechanisms and Agency Costs of Separating Control from Cash-Flow Rights, In: Morck, R.K. (eds.) Concentrated Corporate Ownership, 295-318, NBER.

Bell, R.G., Filatotchev, I., Rasheed, A.A. (2012). The liability of foreignness in capital markets: Sources and remedies. *Journal of International Business Studies*, 43, 107–122.

Bhaumik, S.K., Dimova, R. (2014). *How Family Firms Differ: Structure, Strategy, Governance and Performance*, Palgrave.

Bhaumik, S.K., Das, P.K., Kumbhakar, S.C. (2012). A stochastic frontier approach to modelling financial constraints in firms: An application to India. *Journal of Banking and Finance*, 36 1311-1319.

Bhaumik, S., Driffield, N., Pal, S. (2010). Does ownership structure of emerging market firms affect their outward FDI? The case of Indian automotive and pharmaceutical sectors. *Journal of International Business Studies*, 41, 437–450.

Bhaumik, S., Driffield, N. (2011) Direction of outward FDI of EMNEs: Evidence from the Indian pharmaceutical sector. *Thunderbird Review of IB*, 53(5), 615-628.

Bhaumik, S. K., Driffield, N., Zhou, Y. (2015a). Country specific advantage, firm specific advantage and multinationality – Sources of competitive advantage in emerging markets: Evidence from the electronics industry in China. *International Business Review*, forthcoming.

Bhaumik, S. K., Driffield, N., Zhou, Y. (2015b). Sources of competitiveness and multinationality: Emerging market firms in the electronics industry. In: Tiyanhi, L., Banalieva, E., Devenney, T.M., Pedersen, T. (eds.) *Advances in International Management, Vol. 28: Emerging Economies and Multinational Enterprises*, Emerald (forthcoming).

Bhaumik, S.K., Gregoriou, A. (2010). Family ownership, tunnelling and earnings management: A review of the literature. *Journal of Economic Surveys*, 24(4), 705-730.

Bhaumik, S.K., Selarka, E. (2012). Does Ownership Concentration Improve M&A Outcomes in Emerging Markets? Evidence from India. *Journal of Corporate Finance*, 18(4) 717-726.

Bowman, E. H., Hurry, D. (1993). Strategy through the option lens: An integrated view of resource investments and the incremental-choice process. *Academy of Management Review*, 18(4), 760-782.

Braunerhjelm, P. (1996). The relation between firm-specific intangibles and exports. Economic Letters, 53, 213-219.

Chemmanur, T.J., Fulghieri, P. (2006). Competition and cooperation among exchanges: A theory of cross-listing and endogenous listing standards. *Journal of Financial Economics*, 82, 455-489.

Chung, J., Cho, H., Kim, W. (2015). Is cross-listing a commitment mechanism?: The choice of destinations and family ownership. *Corporate Governance: An International Review*, 23(4): 307-330.

Claessens, S., Djankov, S., Fan, J., Lang, L. (1999). Expropriation of minority shareholders in East Asia, Policy Research Working Paper, The World Bank, Washington D.C., Downloadable from http://dx.doi.org/10.1596/1813-9450-2088.

Claessens, S., Fan, J.P. (2002). Corporate governance in Asia: A survey. *International Review of Finance*, 3(2), 71-103.

Coelli, T.J. (1995). Recent developments in frontier modelling and efficiency measurement. *Australian Journal of Agricultural Economics*, 39, 219-245.

Coffee Jr, J.C. (2002). Racing towards the top? The impact of cross-listings and stock market competition on international corporate governance. *Columbia Law Review*, 102, 1757-1831.

Cuervo-Cazzura, A., & Dau, L. A. (2009). Pro-market reforms and firm profitability in developing countries. *Academy of Management Journal, 52*, 1348–1368.

Cuervo-Cazurra, A., Ramamurti, R. (2014) *Understanding Multinationals from Emerging Markets*, Cambridge: Cambridge University Press.

Dixit, A., Pindyck, R. (1994). *Investment under Uncertainty*. Princeton, NJ: Princeton University Press.

Doidge, C., Karolyi, G. A., Stulz, R. M. (2007). Why do countries matter so much for corporate governance? *Journal of Financial Economics*, 86, 1-39.

Driffield, N., Mickiewicz, T., Temouri, Y. (2014) Institutions and Equity Structure of Foreign Affiliates. *Corporate Governance: An International Review*, 22(3), 216-229.

Fazzari, S.M., Hubbard, R.G., Petersen, B.C. (1988). Financial constraints and corporate investment, *Brookings Papers on Economic Activity*, No. 1, 141-206.

Fernandes, N., Ferreira, M.A. (2008). Does international cross-listing improve the information environment. *Journal of Financial Economics*, 88, 216-244.

Foucault, T., Gehrig, T. (2008). Stock price informativeness, cross-listings, and investment decisions, *Journal of Financial Economics*, 88(1), 146-168.

Gibson, M.S. (2003). Is corporate governance ineffective in emerging markets? *Journal of Financial and Quantitative Analysis*, 38, 231-250.

Globerman, S., Peng, M.W., Shapiro, D. (2011). Corporate governance and Asian companies. *Asia Pacific Journal of Management*, 28, 1-14.

Hail, L., Leuz, C. (2009). Cost of capital effects and changes in growth expectations around US cross-listings. *Journal of Financial Economics*, 93, 428-454.

Healy, P. M., Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1), 405-440.

Herrmann, D., Kang, T., Yoo, Y. K. (2015). The impact of cross-listing in the United States on the precision of public and private information. *Journal of International Business Studies*, 46, 87-103.

Kai, L., Prabhala, N.R. (2007). Self-selection models in corporate finance, In: Ziemba, W.T. (ed.) *Handbook of Empirical Corporate Finance*, 1, 37-86.

Karolyi, G.A. (1998). Why do companies list shares abroad? A survey of the evidence and its managerial implications. *Financial Markets, Institutions and Instruments*, 7, 1-60.

Khanna, T., Palepu, K. (2000a). The future of business groups in emerging markets: Long-run evidence from Chile. *Academy of Management Journal*, *43*(3), 268-285.

Khanna, T., Palepu, K. (2000b). Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *The Journal of Finance*, *55*(2), 867-891.

Klapper, L. F., Love, I. (2004). Corporate governance, investor protection, and performance in emerging markets. *Journal of Corporate Finance*, 10(5), 703-728.

Klingebiel, R., Adner, R. (2015). Real options logic revisited: The performance effects of alternative resource allocation regimes. *Academy of Management Journal*, 58(1), 221-241.

Kumbhakar, S.C., Ghosh, S.C., McGuckin, J.T. (1991). A generalised production frontier approach for estimating determinants of efficiency in US dairy firms. *Journal of Business and Economic Statistics*, 9, 279-286.

Kumbhakar, S.C., Lovell, C.A.K (2000) Stochastic Frontier Analysis, Cambridge University Press.

Lang, M., Raedy, J.S., Wilson, W. (2006). Earnings management and cross-listing: Are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics*, 42, 255-283.

Mahoney, J. T., Qian, L. (2013). Market frictions as building blocks of an organizational economics approach to strategic management. *Strategic Management Journal*, *34*(9), 1019-1041.

Meyer, K. E., Wright, M., Pruthi, S. (2009). Research notes and commentaries managing knowledge in foreign entry strategies: A resource-based analysis. *Strategic Management Journal*, 30(6), 557-574.

Miller, D.P. (1999). The market reaction to international cross-listings: Evidence from depositary receipts, *Journal of Financial Economics*, 51, 103-123.

Pagano, M., Randl, O., Röell, A. A., Zechner, J. (2001). What makes stock exchanges succeed? Evidence from cross-listing decisions. *European Economic* Review, 45(4-6), 770-782.

Pagano, M., Röell, A. A., Zechner, J. (2002). The geography of equity listing: why do companies list abroad? *Journal of Finance*, 57(6), 2651-2694.

Peng, M.W., Sun, S.L., Pinkham, B., Chen, H. (2009). The institution-based view as a third leg for a strategy tripod. *Academy of Management Perspectives*, 23, 63–81.

Peng, M.W., Su, W. (2014). Cross-listing and the scope of the firm. *Journal of World Business*, 49(1), 42-50.

Ramamurti, R., Singh, J.V. (eds.) (2009). *Emerging Multinationals in Emerging Markets*. Cambridge: Cambridge University Press.

Reese, W.A., Weisbach, M. (2002). Protection of minority shareholder interests, cross-listings in the United States, and subsequent equity offerings. *Journal of Financial Economics*, 66, 65–104.

Roosenboom, P., Van Dijk, M.A. (2009). The market reaction to cross-listings: Does the destination market matter? *Journal of Banking and Finance*, 33, 1898-1908.

Rugman, A.M., Nguyen Q.T.K. (2014). Modern international business theory and emerging market multinational companies, In: Cuervo-Cazurra, A., Ramamurti, R. (eds.). *Understanding Multinationals from Emerging Markets*, Cambridge: Cambridge University Press, 53-81.

Sami, H., Zhou, H. (2008). The economic consequences of increased disclosure: Evidence from cross-listings of Chinese firms. *Journal of International Financial Management and Accounting*, 19, 1-27.

Siegel, J. (2005). Can foreign firms bond themselves effectively by renting US securities laws? *Journal of Financial Economics*, *75*(2), 319-359.

Siegel, J. (2009). Is there a better commitment mechanism than cross-listings for emerging-economy firms: Evidence from Mexico. *Journal of International Business Studies*, 40(7), 1171-1191.

Spence, A.M. (1973). Job market signalling, *Quarterly Journal of Economics*, 87, 355-374.

Stulz, R. M. (1999). Globalization, corporate finance, and the cost of capital. *Journal of Applied Corporate Finance*, 12, 8-25.

Trigeorgis, L. (1996). *Real Options: Managerial Flexibility and Strategy in Resource Allocation*. Cambridge, MA: MIT Press.

Wang H.J. (2003). A stochastic frontier analysis of financing constraints on investment: The case of financial liberalization in Taiwan, *Journal of Business and Economic Statistics*, 21: 406-419.

Williamson, P.J. (2014). The global expansion of EMNCs: Paradoxes and directions for future research. In: Cuervo-Cazurra, A., Ramamurti, R. (eds.). Understanding Multinationals from Emerging Markets. Cambridge: Cambridge University Press, 155-169.

Young, M. N., Peng, M. W., Ahlstrom, D., Bruton, G. D., Jiang, Y. (2008). Corporate governance in emerging economies: A review of the principal–principal perspective, *Journal of Management Studies*, 45(1), 196–220.

Zaheer, S. (1995). Overcoming the liability of foreignness. *Academy of Management Journal*, *38*(2), 341-363.

Figure 1. Opportunities and benefits of cross-listing

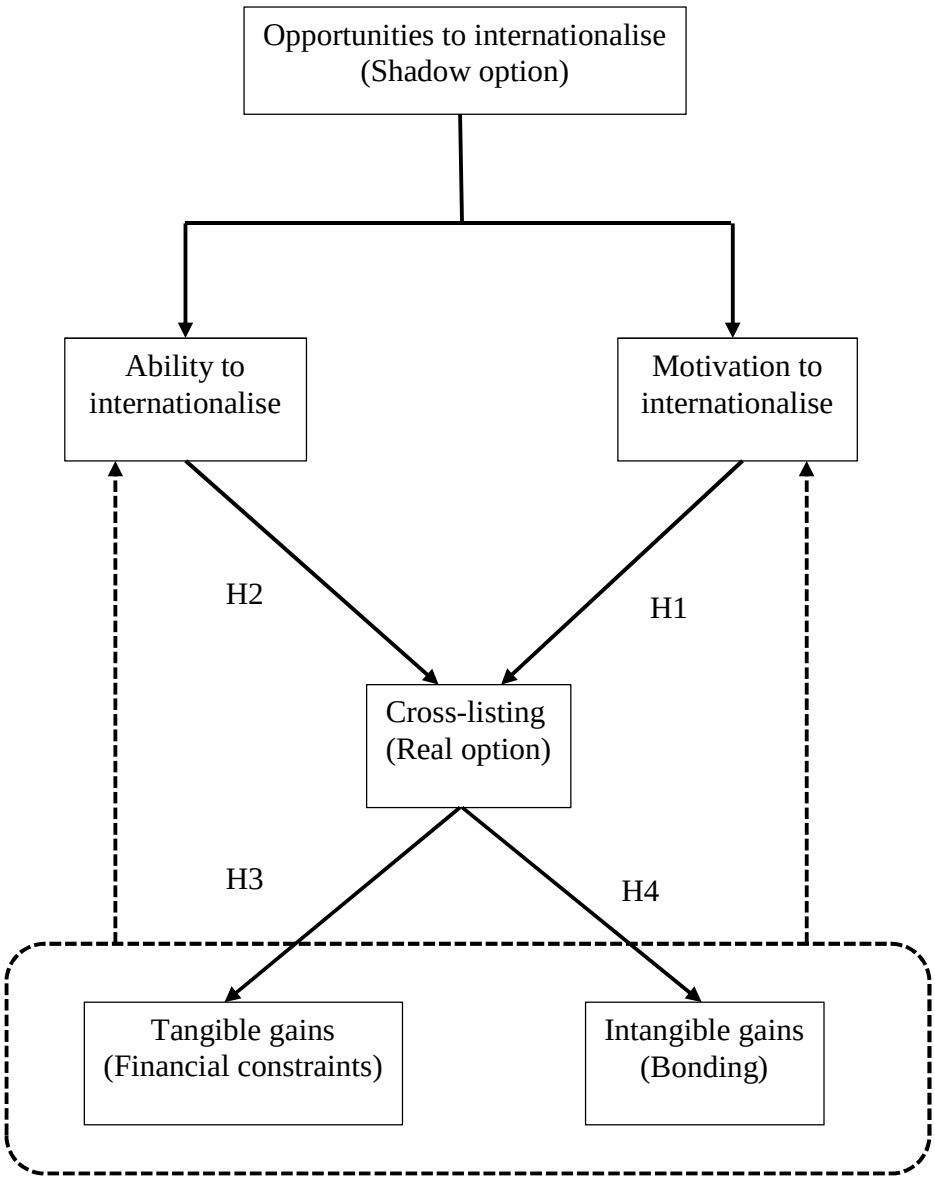

Table 1. Variable definition

Variable name	Variable description
Dependent variables	
Cross-listing	This is a dummy variable equalling 1 if an emerging market firm lists stock in at least one foreign stock market outside its home market and zero if it does not.
Investment to capital ratio	A firm's ratio of annual investment to its capital stock, where capital is defined as the stock of fixed assets and investment is defined as the annual change in the fixed assets.
Independent variables	
Business group	This is a dummy variable equalling 1 if the firm belongs to a business group and zero if it does not.
ROA	A firm's return on assets drawn from the balance sheet account.
CFTA	A firm's annual level of cash flow over total assets
Foreign ownership	This is a dummy equalling 1 if the share of foreign ownership is at least 50% in the emerging market firm and zero if it is not.
Investor protection	This is an index from the World Bank's Doing Business database. It shows, for each country, the strength of investor protection as the average of the extent of disclosure index (i.e. transparency of transactions), the extent of director liability index (i.e. liability for self-dealing) and the ease of shareholder suits index (i.e. shareholders' ability to sue officers and directors for misconduct). The index ranges from 0-10 with higher values indicating more investor protection. For more details about the methodology used for this indicator, visit http://www. doingbusiness.org/methodologysurveys/.
Tobin-Q	Ratio of a firm's market value to book value
Sales to capital ratio	Ratio of sales to capital
Control variables	
Firm size	The natural logarithm of total number of full time employees of the firm.
Firm age	The age of a firm calculated since year of when the company has been incorporated.
LTDTA	A firm's annual level of long term debt over total assets
IATA	All intangible assets over total assets. Intangible assets include formation expenses, research expenses, goodwill, development expenses and all other expenses with a long term effect. Total assets are defined as fixed assets plus current fixed assets. Both items are drawn from the balance sheet account.
Assets	A firm's annual level of total assets
Cash flow	A firm's annual level of cash flow
Market cap to GDP	A countries' annual market capitalisation of listed firms to GDP (Source: World Bank's World Development Indicators)

Table 2. Distribution of Emerging Market Firms across countries and cross-listings, 2006-2013

Country	Investor Protection	Market cap of listed firms to GDP	Ease of accessing local equity market [a]	Total Number of firms	Number of firms that cross-list	Number of firms that cross-list in major exchanges [b]	Number of firms that cross-list in other developed market exchanges [c]
	Mean (Std. dev.)	Mean (Std. dev.)	Mean (Std. dev.)				
Indonesia	5.75 (0.31)	40.23 (11.11)	4.93 (0.66)	219	81	49	79
Mexico	5.71 (0.76)	36.53 (7.62)	3.79 (0.63)	33	17	16	15
Poland	5.96 (0.11)	34.55 (10.69)	4.10 (0.51)	235	13	12	9
South Africa	8.00 (0.00)	208.10 (62.30)	5.46 (0.51)	115	80	39	76
Total				602	191	116	179

Note: [a] This is an index measuring ease of accessing a local equity market, taken from the Global Competitiveness Report, prepared by World Economic Forum (WEF).
[b] Major exchanges are New York, London, Frankfurt, Zurich, Hong Kong and Singapore.
[c] Other developed markets are defined as all other exchanges in developed countries.

Table 3. Industry Distribution of EMNs across countries and cross-listings

Sector	Indonesia		Mexico		Poland		South Africa	
	Non cross-listing firms	Cross-listing firms	Non cross-listing firms	Cross-listing firms	Non cross-listing firms	Cross-listing firms	Non cross-listing firms	Cross-listing firms
Agriculture	2	7	0	0	1	0	2	2
Mining	6	13	0	2	1	1	2	6
Manufacturing	79	28	8	5	72	5	11	36
Construction	4	1	0	2	24	1	0	5
Wholesale/Retail	8	9	1	5	49	2	4	11
Transportation	12	4	0	0	7	0	1	5
Accommodation	6	1	1	1	3	0	1	1
Information Technology	9	8	3	1	26	3	8	6
Real Estate	8	6	0	0	5	1	0	1
Professional Services	2	2	1	0	23	0	2	0
Administrative Services	2	1	1	0	5	0	2	5
Educational Services	0	0	0	0	2	0	0	0
Health Services	0	1	0	0	3	0	0	1
Arts sector	0	0	1	1	1	0	2	1
Total	138	81	16	17	222	13	35	80

Table 4. Descriptive statistics and correlation matrix

Variable	Mean [a]	Std. dev. [a]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) ROA	3.84	14.13	1												
(2) Firm size	4420.38	14268.56	0.08***	1											
(3) Firm age	22.51	23.55	0.11***	0.18***	1										
(4) Intangible to Total Assets	0.05	0.12	0.09***	0.06***	-0.06***	1									
(5) Cash flow to Total Assets	0.11	0.13	0.08***	0.01	0.00	-0.03**	1								
(6) Long term debt	0.12	0.21	-0.10***	0.04***	-0.06***	-0.04***	0.10***	1							
(7) Tobin-Q	1.12	1.25	0.25***	0.09***	0.07***	0.02	0.02	0.11***	1						
(8) Sales to capital	1.13	1.00	0.10***	0.00	0.06***	0.01	-0.03*	-0.15***	0.07***	1					
(9) Cross-listing	0.33	0.47	0.16***	0.33***	0.22***	0.02	0.03**	0.09***	0.16***	-0.06***	1				
(10) Investor protection	6.21	0.82	0.11***	0.26***	0.24***	0.17***	0.06***	0.01	0.05***	-0.01	0.30***	1			
(11) Business Group	0.13	0.34	0.02	0.02	0.06***	-0.03**	-0.02	-.04***	0.05***	0.00	0.02*	0.08***	1		
(12) Foreign ownership dummy	0.10	0.30	0.01	-0.04**	-0.04***	-0.06***	0.00	-0.01	-0.05***	-0.05***	0.00	-0.10***	-0.10***	1	
(13) Market-cap-to-GDP	62.34	63.77	0.14***	0.24***	0.22***	0.12***	0.06***	0.03*	0.11***	-0.01	0.33***	0.88***	-0.08***	-0.08***	1

Note: The mean and standard deviation is shown for the matched sample of firms.

Table 5. Determinants of cross-listing

Dependent variable =1 for cross-listed firms; =0 otherwise	Model (1)	Model (2)	Model (3)	Model (4)
Hypotheses 1a (motivation to cross list)				
Business Group (t-1)	0.079**		0.072**	0.227***
	(0.040)		(0.040)	(0.059)
Hypotheses 2 (ability to cross list)				
ROA (t-1)		0.005***	0.004***	0.006***
		(0.001)	(0.001)	(0.001)
CFTA (t-1)		0.304***	0.302***	0.428***
		(0.102)	(0.102)	(0.106)
Hypotheses 1b (enhanced motivation)				
ROA (t-1) * Business Group (t-1)				-0.005*
				(0.003)
CFTA (t-1) * Business Group (t-1)				-1.029***
				(0.301)
Control variables				
Log Firm size (t-1)	0.129***	0.126***	0.124***	0.122***
	(0.008)	(0.008)	(0.008)	(0.008)
Firm age (t-1)	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
LTDTA (t-1)	0.131***	0.205***	0.199***	0.184***
	(0.049)	(0.053)	(0.052)	(0.053)
IATA (t-1)	0.271**	0.363***	0.372***	0.389***
	(0.136)	(0.135)	(0.134)	(0.134)
Foreign Ownership (t-1)				-0.002***
				(0.001)
Wald chi-square	803.610	892.200	900.190	873.930
Prob > chi2	0.000	0.000	0.000	0.000
Pseudo R2	0.453	0.460	0.461	0.469
Log pseudolikelihood	- 828.987	-812.874	-811.013	-799.498
Industry, Year and Country dummies	Yes	Yes	Yes	Yes
Observations	2,339	2,316	2,316	2,316

Notes: Coefficients are marginal effects. Standard errors are in parenthesis. All explanatory variables are lagged one year to pre-empt potential endogeneity issues. Monetary values are deflated using GDP deflators. ***, **, * indicate significance at 1%, 5% and 10% levels, respectively.

Table 6. Impact of foreign listing on capital market frictions

Frontier model			
Dependent variable: Investment to capital ratio			
	Model 1	**Model 2**	**Model 3**
Log Tobin's *q*	0.041***	0.041***	0.041***
	(0.009)	(0.009)	(0.000)
Log sales/capital[-1]	-0.154***	- 0.146***	- 0.183***
	(0.002)	(0.012)	(0.000)
Log sales[-1]/capital[-2]	0.059***	0.050***	0.097***
	(0.010)	(0.010)	(0.000)
Inefficiency equation			
Dependent variable: Inefficiency generated from frontier model			
Hypothesis 3			
Cross-listing	-0.879***	- 3.311***	- 2.894***
	(0.051)	(0.238)	(0.332)
Cross-listing * Business Group	-1.079***	- 0.669***	- 0.540***
	(0.102)	(0.113)	(0.116)
Cross-listing * Foreign Ownership	-0.584***	- 0.505***	- 0.896***
	(0.116)	(0.122)	(0.128)
Hypothesis 4			
Cross-listing * Investor Protection		0.325***	0.359***
		(0.033)	(0.049)
Control variables			
Firm age			-0.003**
			(0.001)
Log assets			-0.185***
			(0.017)
Cash flow			1.32e-08
			(3.63e-08)
Market cap to GDP			-0.002***
			(0.001)
Observations	3,474	3,232	2,937

Note: Following Bhaumik et al. (2012), the frontier model and the inefficiency equation are estimated jointly using the maximum likelihood method.
*** and ** indicates significance at the 1% and 5% level, respectively.