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Location Decisions and the Liability of Foreignness: Spillover Effects Between Factor Market and Capital Market Strategies

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ABSTRACT

In this paper we build on the liability of foreignness concept and the institutional perspective to show how an equity listing and subsidiary formations in the host market are interlinked. Using a matched sample of foreign equity-listed and domestic equity-listed European firms on EU-regulated capital markets, we find that (1) the number of prior host-market subsidiary formations increases the probability of a host-market equity listing, and (2) a prior host-market equity listing increases the number of host-market subsidiary formations. Hence, we identify spillover effects between factor market and capital market strategies. However, the extent of these spillover effects depends on institutional characteristics of the host market, where companies on smaller markets gain higher spillover effects. We contribute to international management and finance research by providing factor market strategies as a valuable source to overcome capital market liabilities of foreignness and capital market strategies as a valuable source to overcome factor market liabilities of foreignness.

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1. Introduction

Although internationalization into foreign factor markets and capital markets may entail important benefits for companies (Buckley and Casson, 1976; Dunning, 1988; Karolyi, 2006; Pagano et al., 2002), such expansion may be accompanied by competitive disadvantages relative to local companies (Denk et al., 2012; Zaheer, 1995). When entering a particular host market, foreign companies typically suffer from additional tacit and social costs of doing business abroad (Bell et al., 2012; Eden and Miller, 2004; Hymer, 1976), referred to as the liability of foreignness (LOF). Hence, being foreign often comes with a competitive disadvantage in terms of unfamiliarity, relational and discrimination hazards compared to domestic firms (Denk et al., 2012; Zaheer, 1995). Literature provides evidence that the LOF concept is relevant in both factor markets and capital markets (Bell et al., 2012), differentiating a factor market liability of foreignness (FMLOF) and a capital market liability of foreignness (CMLOF).

Research on multinational enterprises' (MNEs) foreign location strategy has identified a number of mechanisms to overcome the FMLOF and CMLOF (Jiang et al., 2014; Zaheer, 1995). A central finding of this literature is the importance of prior experience and market knowledge to mitigate the degree of FMLOF (Peterson and Pedersen, 2002). However, also visibility and fruitful network ties within the host-market business environment are understood to be an effective means to overcome FMLOF (Asmussen, 2009; Blass and Yafeh, 2001). Just recently, scholars have started to transfer the LOF approach to the field of

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international finance and capital markets research (Bell et al., 2012), including mechanisms for overcoming CMLOF. Bell et al. (2012) focus on the “legitimacy deficit” of foreign equity-listed companies and suggest bonding, signaling, organizational isomorphism, and endorsements by reputable third parties to reduce the CMLOF. However, these studies focused either solely on factor markets or capital markets, whereas potential spillover effects between factor market and capital market location strategies have been neglected so far. The few existing studies combining factor market activities and capital market activities disregard the bilateral context of the LOF and focused on foreign market expansion as a whole (e.g. Pagano et al., 2002; Saudagaran, 1988).

Therefore, we integrate strategies to overcome FMLOF and CMLOF with the idea that factor market and capital market decisions are interlinked. To explain the spillover effects between factor market and capital market strategies, we argue in line with prior LOF literature that the extent of LOF depends on experience, market knowledge and visibility in the host market. The relevance of prior experience and market knowledge as a means to overcome or mitigate the degree of LOF has long been discussed in the literature (Davidson, 1980; Peterson and Pedersen, 2002), as knowledge and experience reduce the risks of unfamiliarity hazards and relational hazards. Furthermore, a foreign firm's visibility relates to the degree to which stakeholders in a particular location, including investors, consumers, suppliers, competitors or the general public, are able to observe a firm's activities in the host market (Puck et al., 2013). This visibility of a firm's activities to local stakeholders will influence the LOF, because it reduces the risks of relational hazards and discrimination hazards. Applying these lines of reasoning to the idea that factor markets and capital markets are interlinked, we argue that prior factor market strategies increase experience and knowledge of the host capital market as well as a foreign firm's visibility among local investors, consequently reducing CMLOF. The other way round, capital market strategies increase experience and knowledge of as well as visibility within the host factor market, consequently reducing FMLOF. Thus, we argue that host-market internationalization strategies, being factor market or capital market strategies, help to overcome the FMLOF and CMLOF. We examine the spillover effects between factor market and capital market strategies, by linking host-market equity listings, defined as initial public offerings (IPOs) or secondary public offerings in the host country, to the number of subsidiaries in the host country. The spillover effect is supposed to work in both directions, where (1) MNEs benefit from prior host-market subsidiary formations when listing on the respective capital market, and (2) MNEs benefit from a prior host-market equity listing when founding subsidiaries in the respective factor market. Furthermore, research on the role of institutional context suggests that the success of specific strategies that firms employ to mitigate LOF costs may be a function of the relevant institutional characteristics of the host market (Bell et al., 2012). Host-market size is an important institutional characteristic in this case, as market size influences the complexity of learning about the market: the larger the market, the harder it will be for a firm to completely understand and learn its rules. Additionally, market size influences the visibility of foreign firms: the smaller the market, the easier it is for firms to become visible in a foreign environment. Therefore, we rely on the institutional perspective to provide the host-market size as an important boundary condition to the spillover effects between factor market and capital market location strategies.

By following the claim of Bell et al. (2012) to investigate the interactions between FMLOF and CMLOF, our study makes the following important interdisciplinary contributions to theory in the fields of finance and international management. First, we contribute to finance and international management literature that links factor market to capital market strategies (e.g. Pagano et al., 2002; Saudagaran, 1988). Showing that capital market and factor market location decisions are interlinked, we extend the existing literature by focusing on host-market spillover effects. Specifically, we add prior experience and market knowledge of as well as visibility within the host factor market as valuable sources to overcome or limit the degree of CMLOF and vice versa. Thus, we add to prior research on factors to overcome unfamiliarity, relational and discrimination hazards and consequently the LOF. Second, showing that prior subsidiary formations increase the probability of a host-market equity listing, we are among the first to provide strategies to overcome or limit CMLOF. In that respect, we also contribute to finance literature explaining the foreign equity listing location decision of companies (e.g. Karolyi, 2006; Pagano et al., 2002). Third, we show that a prior host-market equity listing increases the number of host-market subsidiary formations. We extend international management literature on strategies to overcome or limit FMLOF, by adding capital market strategies as an additional mechanism. Fourth, applying an institutional perspective and providing host-market size as a conditional determinant on the spillover effects between factor market and capital market location decisions, we find that institutional characteristics, together with firm-specific characteristics, matter for overcoming LOF. Thus, the institutional perspective ties in with the LOF concept by providing an important boundary condition to the spillover effects between factor market and capital market location strategies.

We conduct an empirical analysis with publicly available data of European companies incorporated in and listed on the 13 largest stock markets within the European Union (EU). Although the exclusive use of relatively developed countries within the EU may reduce institutional differences among countries, we argue that the resulting conservatism paired with the common regulation, ensuring consistent accounting and publication rules to provide comparability and availability of company data, outweigh the disadvantages of the sample country selection. Based on the sample countries, we use propensity scores to match foreign equity-listed with domestic equity-listed companies from the same country of incorporation and subsequently run regression analyses explaining the relationship between host-market equity listings and host-market subsidiary formations.

The outline of the paper is as follows. First, we introduce the main theory and develop our hypotheses. Next, we provide a description of the data and methodology, followed by the empirical results. Finally, we discuss our results and provide possible implications and limitations for further research.

2. Theory and hypotheses

2.1. Theoretical background

International management research provided a number of explanations for international production and foreign direct investments (e.g. Buckley and Casson, 1976; Dunning, 1988), where location advantages explain why foreign firms choose to supply their markets from a foreign base, rather than from a domestic base (Dunning, 2000). However, research on internationalization strategies and market entry barriers has confirmed that foreign subsidiaries typically suffer from the LOF (Hymer, 1976; Lu and Beamish, 2001; Miller and Richards, 2002). LOF is defined as all additional costs a foreign firm incurs that a local firm would not incur. Hence, being foreign often comes with disadvantages in terms of costs and information deficiencies compared to domestic firms (Hymer, 1976; Zaheer, 1995). The decision to enter a foreign market consequently rests upon a systematic analysis of the benefits of internationalization and the LOF (Hymer, 1976; Rugman and Verbeke, 2004).

The LOF may arise from unfamiliarity hazards, relational hazards, and discrimination hazards (Denk et al., 2012). Unfamiliarity hazards are incurred through incorrect market assessment, insufficient and erroneous information, and inadequate knowledge of the host country's culture, norms, values, and business practices (Caves, 1971; Eden and Miller, 2004; Peterson and Pedersen, 2002). Relational hazards arise because of higher internal organizational costs, where interactions within the company, such as the management of employees abroad, become more demanding (Eden and Miller, 2004). Moreover, relational hazards occur in external interactions within the buyer-supplier-competitor network because of a lack of embeddedness in local networks and a lack of trust (Eden and Miller, 2004). Finally, costs from discrimination hazards arise when the foreign company is treated in an unfavorable way by local stakeholders or by the home government (Denk et al., 2012). Among other possibilities, these costs might reflect consumer ethnocentricity in the host country (Balabanis et al., 2001) or political hazards (Henisz and Williamson, 1999). While initial studies have focused on the competitive disadvantage for MNE subunits (Zaheer, 1995), Bell et al. (2012) expanded the LOF research beyond the factor market domain and identify liabilities faced by firms seeking resources in foreign capital markets. Foreign equity-listed companies tend to be at a disadvantage compared to domestic equity-listed companies, since they experience difficulties in making themselves known to local investors (Bruner et al., 2004), display insufficient relational ties (Ghoshal and Bartlett, 1990) and suffer from investors' home bias (French and Poterba, 1991), raising the costs of capital of foreign companies and consequently cause high market-entry barriers.

From the existing findings, we derive two mechanisms that help firms to overcome LOF. First, a central finding in the literature is the importance of prior experience and market knowledge to overcome or mitigate the degree of LOF by reducing unfamiliarity and relational hazards (Davidson, 1980; Peterson and Pedersen, 2002). MNEs will gradually acquire knowledge about a foreign country's market dynamics and culture as its market experience in the host country increases (Chang, 1995). Accumulated knowledge about a country's institutional environment also adds to a firm's ability to manage policy uncertainty (Delios and Henisz, 2003), thereby again reducing unfamiliarity and relational hazards. Second, visibility affects the number of actors in the overall business environment that are aware of the firm (Puck et al., 2013), reducing the risk of both relational and discrimination hazards. Firms that are visible to the relevant set of actors are better known, making the development of new ties to local stakeholders less costly. Furthermore, visibility reduces the risk of discrimination in a foreign market, as the probability of negative consequences for the discriminating stakeholders increase. Therefore, the degree of LOF will also depend on a firm's visibility to relevant actors in the host environment. To derive our hypotheses on the spillover effects between factor market and capital market strategies, we consequently base our reasoning on both experience and knowledge as well as visibility.

2.2. Hypotheses

When investors perceive that the risks and costs of acquiring and holding equities issued by foreign firms are sufficiently higher than they are for local securities, they will choose to keep their focus on local firms (Bell et al., 2012; Bruner et al., 2004). One source of CMLOF may arise from information deficiencies (unfamiliarity hazards), that stem from different disclosure requirements, corporate governance regulations, and corporate cultures (Bell et al., 2012). Managing subsidiaries in the host market is accompanied by experience with and knowledge about host market accounting systems, corporate governance rules and local business practices and conventions, which are required for investors to meaningfully evaluate foreign financial assets. Thus, prior factor market strategies facilitate the access of information for analysts and investors, increasing trading volume and liquidity. Hence, investors prefer firms they are familiar with, where such familiarity often arises from proximity (Bell et al., 2012). Grinblatt and Keloharju (2000) found that investors are more likely to hold, buy, and sell the stocks of firms that are located close to the investor, that communicate in the investor's native tongue, and have chief executives of the same cultural background. However, the degree of familiarity depends on the experience and market knowledge of the firm, where local management and employees of the subsidiary are closer to the investor, communicate in the investor's native tongue and share the same cultural background.

Besides unfamiliarity costs, one of the fundamental problems faced by foreign firms in international capital markets is a lack of legitimacy (relational and discrimination hazards), defined as a society's permission for the firm to do business (Dowling and Pfeffer, 1975). In the case of firms attempting to acquire resources in a host-country capital market, legitimacy would be the perception that the firm is similar to other host-country firms in that market (Bell et al., 2012). Specifically, companies that sell popular brands abroad may find it easier to place their shares in foreign markets, because local investors already trust them as consumers (Pagano et al., 2002). Hence, local subsidiary formations push the company to engage within the local

buyer–supplier–competitor network and enhance the visibility and name recognition in the host market. The increased visibility and name recognition influence the lack of embeddedness in local networks and limit the lack of legitimacy among local investors. Furthermore, through an increased integration into the local factor market, also political discrimination hazards, such as more restrictive listing regulations for foreign companies, may be reduced. As a consequence, prior host-market subsidiary formations may limit CMLOF through reducing the unfamiliarity, relational and discrimination hazards that are inherent to foreign equity listings.

Hypothesis 1. The higher the number of a firm's prior host-market subsidiary formations, the higher the probability of its host-market equity listing.

Insufficient host market knowledge and a lack of embeddedness are amongst the most important drivers of FMLOF (Eden and Miller, 2004; Peterson and Pedersen, 2002). Learning based on prior experience is acknowledged as an important firm capability to overcome the FMLOF (Barkema et al., 1996; Chang, 1995). As a firm repeatedly engages in internationalization activities, its ability to efficiently manage internationalization improves, because the firm is able to infer insights from previous outcomes and adjust its actions accordingly (Levitt and March, 1988). Thus, prior experience and market knowledge reduce the costs of unfamiliarity. Based on these findings, we argue that listing a firm's shares on the host-country capital market may also provide important experience with and market knowledge about host institutions and business practices. MNEs already acquire experience and knowledge about the host-markets legal and regulatory frameworks, such as accounting standards or corporate governance rules and regulations. Furthermore, the collaboration with local service providers, such as underwriters or audit firms, may entail cultural experience and increase the understanding of the general business environment.

Pagano et al. (2002) show that a foreign equity listing can raise consumer demand and improve relationships with suppliers and employees. Thus, being listed on the host capital market may enhance a firm's recognition and reputation within the host factor market (Siegel, 2009). This visibility among local networks, including customers, suppliers, competitors, employees or potential alliance and acquisition partners may be a potential source to reduce FMLOF. Local stakeholders may already know the firm's products, performance and business strategies. Moreover, prior visibility in the host capital market allows issuers to gain acceptance within the host-market environment and overcome relational and discrimination hazards that may exist. A host-market equity listing may provide a way to become similar to local firms, attracting more attention and obtaining more business opportunities in the host market as compared to firms from any third country not listed in that particular market. Hence, a host-market equity listing may reduce the lack of unfamiliarity, relational and discrimination hazards and reduce the FMLOF.

Hypothesis 2. Firms with a prior listing in a host equity market establish more host-market subsidiaries than their domestically listed peers.

The institutional perspective from the field of international business is guided by the assumption that not only firm or industry characteristics, but also the institutional context matters for host-market internationalization strategies (Bell et al., 2014; Meyer et al., 2009; Moore et al., 2012). The institutional perspective ties in with the LOF concept, because MNEs unfamiliar with the institutional environment in their host country are not able to mimic local firms, leading to increased legitimacy hazards (Eden and Miller, 2004; Peterson and Pedersen, 2002; Zaheer, 1995). However, institutional characteristics vary from one country to another, where formal rules and informal norms of conducting business differ among countries (North, 1990). The differences in institutional characteristics of the host market, therefore, influence the degree to which a firm is exposed to LOF and its possibilities to overcome LOF.

An important institutional characteristic that determines the effect of prior market experience and visibility may be host market size. Managing subsidiaries on a sizeable host factor market increases the complexity and amount of information MNEs need to acquire to gain familiarity with the host factor market environment. Because MNEs unfamiliar with the institutional environment in the host country further face increased legitimacy hazards among investors, host factor market size may be an important boundary condition on the success of factor market strategies to overcome or limit CMLOF. Hence, prior host factor market experience and knowledge may be a less successful source to overcome CMLOF on larger host factor markets than on relatively small host factor markets. Furthermore, firms that are more in the public eye are more likely to face relational and legitimacy benefits than firms the public does not know (Dowling and Pfeffer, 1975). Consequently, visibility and recognition among investors may not be uniform across countries, depending on the size of the host market. Because a large factor market reduces the visibility prior subsidiary formations attract, the effect of prior factor market strategies to overcome or limit CMLOF may be smaller the larger the host factor market.

Hypothesis 3a. The size of the host factor market negatively moderates the relationship between a firm's prior host-market subsidiary formations and the probability of a host-market equity listing.

Similarly, the host capital market size is supposed to limit the effect of prior capital market strategies on FMLOF. Being listed on a sizeable host capital market may increase the amount of information a potential customer, supplier or competitor needs to acquire. Moreover, the amount of visibility a foreign firm attracts within the host market may decrease with the number of companies listed on a particular exchange. As a consequence, prior capital market strategies to overcome or limit FMLOF are less valuable on sizeable markets.

Hypothesis 3b. The size of the host capital market negatively moderates the relationship between a firm's prior host-market equity listing and host-market subsidiary formations.

Fig. 1 provides an overview of our conceptual model, illustrating the spillover effects between factor market location strategies and capital market location strategies.

3. Method

3.1. Sample and estimation technique

We focus our analysis on European companies that are incorporated in and listed on the largest stock markets within the European Union. More specifically, we only consider countries which exceed a minimum market capitalization of USD 100 bn per year-end 2012 (see Table 1). These countries and its main stock exchanges are chosen because of the common regulation within the European Union, ensuring consistent accounting and publication rules that provide comparability and availability of company data, controlling for a potential reporting bias. We consider only EU-regulated markets, since disclosure requirements are higher than for exchange-regulated markets, allowing for comparable results between stock markets. Moreover, European stock exchanges have been quite successful in securing their position amongst the leading global stock markets (Pagano et al., 2002). They remain highly attractive for a large number of foreign companies, which are diverse in their industry, size and institutional background. On the contrary, a EU-based sample limits the degree of institutional differences and foreign market entry barriers. However, we think that choosing a conservative sample that controls for a potential reporting bias is beneficial in comparison to an inconsistent global sample.

The main data source for the empirical analysis is the Orbis (Bureau van Dijk) database, where we accessed the necessary subsidiaries data and firm-specific corporate and financial data. Additional economic data is sourced by the WorldBank database. Corporate, financial and economic data is based on the year-end 2014. In total, 7484 companies are listed on the largest EU-regulated stock markets in each of the sample countries. Firms listed on more than two stock exchanges (multiple listings) are also included, leading to a total number of 10,110 observations. In order to distinguish the number of subsidiaries before and after the IPO of the firm, we eliminated 3572 observations (2777 companies) with missing IPO-date data. Furthermore, following conventions of previous foreign listing research (e.g. Pagano et al., 2002; Saudagaran and Biddle, 1995), we eliminated 1531 observations (1173 companies) from the financial, insurance, real estate (2-digit NACE Code 64 to 68) and utility industries (2-digit NACE Code 32 to 35). This results in 5007 observations and 3534 companies, where 1557 are foreign equity-listed and 3450 are domestic equity-listed observations.

To test for the relationship between host-market equity listings and host-market subsidiary formations, we compare the subsidiary formations of foreign equity-listed companies with the subsidiary formations of domestic equity-listed companies from the same country of incorporation. Therefore, we create a matched sample of foreign equity listings and domestic equity listings from the same country of incorporation and assign the same host market to both sets of observations. To reduce potential sources of non-comparability (Chaplinsky and Ramchand, 2000), we further use propensity scores to select the subset of comparison units similar to the treatment units based on a set of observable covariates (Rosenbaum and Rubin, 1983). Larger and older firms tend to list abroad, as these companies are able to bear the high fixed-costs that are associated with foreign listings (Pagano et al., 2002). Furthermore, the timing of the initial listing seems to be crucial for the listing location decision, and firms from certain industries may choose to locate on specific stock markets, because of historical links or a follow-the-leader effect (Pagano et al., 2002). Therefore, we use firm size, firm age, listing period and high-tech sector affiliation (see Table 2) to determine the nearest domestic equity-listed neighbor (without replacement) of the foreign equity-listed companies. Due to missing data in the observable covariates, the number of observations is reduced to 3795 (2538 companies), where 1293 observations (963 companies) are foreign equity-listed. Finally, for some foreign equity-listed MNEs it was not possible to find a domestic equity-listed peer, where additional 325 foreign equity-listed observations sample out. After the matching process, the final sample comprises of 1936 observations (1748 companies) with 968 foreign equity-listed and 968 domestic equity-listed observations. Subsequently, we use a hierarchical probit regression to estimate the relationship between ex-ante host-market subsidiary formations and a foreign listing and a hierarchical poisson regression to estimate the relation between a foreign listing and ex-post host-market subsidiary formations.

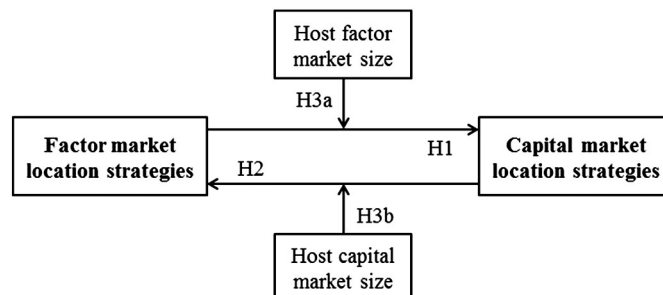


Fig. 1. Conceptual model of factor market to capital market spillover effects.

Table 1
Sample countries.

Country code	Country	Stock exchange	Market capitalization in bn USD ^a
AT	Austria	Vienna Stock Exchange	106
BE	Belgium	Euronext Brussels	300
DE	Germany	Boerse Frankfurt	1486
DK	Denmark	Nasdaq OMX Copenhagen	225
ES	Spain	Bolsa de Madrid	995
FI	Finland	Nasdaq OMX Helsinki	159
FR	France	Euronext Paris	1823
GB	Great Britain	London Stock Exchange	3019
IE	Ireland	Irish Stock Exchange	109
IT	Italy	Borsa Italiana	480
NE	Netherlands	Euronext Amsterdam	651
PL	Poland	Warsaw Stock Exchange	178
SE	Sweden	Nasdaq OMX Stockholm	561

^a Source: data.worldbank.org, 2015/03/15.

3.2. Variables and measurement

We measure *ex-ante host-market subsidiary formations* through the number of host-market subsidiaries founded before the IPO of the sample firm, where domestic equity-listed firms having been assigned to their matched treatment observation. Similarly, we measure *ex-post host-market subsidiary formations* through the number of host-market subsidiaries founded after the IPO, where domestic equity-listed firms having been assigned to their matched treatment observation. We only consider first-level subsidiaries of the sample companies, where a subsidiary was defined as a company of which more than 50% are directly or indirectly owned by a parent company. Furthermore, we only consider subsidiaries, where the date of incorporation is known, in order to classify the subsidiaries to the ex-ante or ex-post host-market subsidiary formations. Finally, we excluded all financial, insurance, real estate and utility subsidiaries (2-digit NACE Code 64 to 68 and 32 to 35) in order to focus on non-financial subsidiaries only. We ended up with a total number of 26,803 first-level subsidiaries that are fully owned by the 1748 sample companies.

The *foreign listing* dummy indicates if the company is foreign equity-listed (cross-listed or foreign-IPO-listed) or a matched domestic equity-listed peer. The dummy variable is coded 1 if the country of incorporation is different from the listing country and 0 otherwise. This implies that a multiple-listed company is considered repeatedly, according to the number of host markets. In order to explain the effect of host-market size on the relationships between a host-market listing and host-market subsidiary formations, we use the *host factor market size* and *host capital market size*. Whereas the host factor market size is measured by the logarithm of GDP (in USD bn), the host capital market size is measured by the logarithm of the number of listed firms per stock exchange.

We also include several control variables in the regression analyses (see Table 2). While testing for hypothesis 1 and 3a, we add the variables used within the matching process, in order to control for the remaining variance. Therefore, we control for *firm size*, *firm age*, *listing period* and *high-tech* sector affiliation. Furthermore, we also control for *firm internationalization*, measured by the percentage of 3rd country subsidiaries to total subsidiaries. To test for hypothesis 2 and 3b, we choose an extended set of control variables. First, *firm size* is expected to explain the ex-post host-market subsidiary formations of companies. Due to fewer

Table 2
Variable definitions.

Variables	Definitions
Foreign listing	Dummy variable that is equal to 1 if the company is listed on a foreign stock exchange and 0 otherwise
Ex-post host-market subsidiary formations	Number of host-market subsidiaries founded after the IPO (domestic-listed firms were assigned in order to their matched treatment observation)
Ex-ante host-market subsidiary formations	Number of host-market subsidiaries founded before the IPO (domestic-listed firms were assigned in order to their matched treatment observation)
Host factor market size	Logarithm of GDP in current bnUSD
Host capital market size	Logarithm of the number of firms per stock exchange
Firm size	Logarithm of the total assets per year end 2014 (in thousands USD)
Firm age	Logarithm of the age in years (base year 2015)
Listing period	Logarithm of the duration a company has been listed in years (base year 2015)
High-tech	Dummy variable that is equal to 1 if the industry is classified as “high-technology”, “medium-high-technology” or “high-tech knowledge-intensive services” and 0 otherwise
Firm internationalization	Percentage of the number of 3rd country subsidiaries to the number of total subsidiaries
Prior subsidiary formations	Dummy variable that is equal to 1 if the number of ex-ante host-market subsidiary formations is non-zero and 0 otherwise
Institutional distance	The absolute difference between two countries’ (home and host) institutional scores by Xu et al. (2004)
Foreign IPO	Dummy variable that is equal to 1 if the company has its main stock exchange abroad and 0 otherwise
Multiple listing	Dummy variable that is equal to 1 if the company has more than one cross-listing and 0 otherwise
Home-country dummies	Dummy variables that indicate the country of incorporation
Host-country dummies	Dummy variables that indicate the country of listing

structural and financial obstacles, larger companies are supposed to gain foothold in the respective host market more easily (Pagano et al., 2002; Claessens and Schmukler, 2007). Furthermore, *firm age* is also found to explain the degree of internationality (e.g. Dunning, 2000; Hasan et al., 2011) and may thus be related to the ex-post host-market subsidiary formations of MNEs. We also control for the *listing period*, as capital market experience may be associated with the intention to gain foothold in the host market. We use the *high-tech* dummy to control for R&D intensity and industry (Lane, 1998; Nachum, 2010). *Firm internationalization* is used to control for international product and labor market spillovers (Pagano et al., 2002) and the *prior subsidiary formations* dummy is used to control for the influence of prior factor market experience in the host market (Davidson, 1980). *Institutional distance* is used to control for differences in the LOF (Zaheer, 1995), and is measured as the absolute difference between two countries' average regulative and normative scores by Xu et al. (2004). We also control for different behaviors of cross-listed companies vis-à-vis foreign-IPOs and companies cross-listed on multiple stock exchanges. The *foreign-IPO* dummy variable is coded 1 if the country of incorporation is different from the country where the company's main exchange is located and 0 otherwise. The *multiple listing* dummy variable is coded 1 if the company is listed on more than two stock exchanges and 0 otherwise. Finally, we control for individual country effects in order to capture institutional and country-specific differences. We measure these variables by including *home-country dummies* and *host-country dummies*.

4. Results

Tables 3 and 4 show the descriptive statistics and the correlation matrix for both sets of regression measures. We do not find any problematic or surprising cross-correlations. Nevertheless, we calculated variance inflation factors (VIF), indicating a lack of multicollinearity.

To test for hypothesis 1, we use hierarchical probit regressions, where the dependent variable is the foreign listing dummy. The results in Table 5 support hypothesis 1 and indicate that ex-ante host-market subsidiary formations positively and significantly influence the foreign listing decision ($\beta = 0.1716, <0.01$). Hence, the number of prior host-market subsidiary formations explains the host-market listing decisions of MNEs. Model 3 shows the results for hypothesis 3a, where we postulate that the positive relationship between the number of host-market subsidiary formations and the probability of a host-market equity listing is higher for companies on smaller factor markets. The results support our hypothesis and indicate a negative and significant interaction effect of ex-ante host market subsidiary formations and host factor market size on the foreign listing dummy ($\beta = -0.4597, <0.05$). The addition significantly increases the explained variance ($\Delta R^2 = 0.0022, <0.05$).

To test for hypothesis 2, we use hierarchical poisson regression with the dependent variable being the number of host-market subsidiaries founded after the IPO, capturing ex-post host-market subsidiary formations. Model 1 includes only control variables (see Table 6). Firm size, listing period, firm internationalization, prior subsidiary formations and foreign IPO listings positively influence and institutional distance negatively influences the ex-post host-market subsidiary formations. Model 2 shows the results for hypothesis 2, and provides evidence that a foreign listing is associated with higher ex-post host-market subsidiary formations ($\beta = 0.2651, <0.05$). Hence, the results support our hypothesis that foreign equity-listed companies show higher ex-post host-market subsidiary formations than their domestic equity-listed peers. Model 3 shows the results for hypothesis 3b, where we postulate that the positive relationship between a foreign listing and host-market subsidiary formations is higher for companies that are foreign equity-listed on smaller capital markets. The results support our hypothesis and indicate a negative and significant interaction effect of the foreign listing dummy and host capital market size on ex-post host-market subsidiary formations ($\beta = -0.7025, <0.05$). The addition significantly increases the explained variance ($\Delta R^2 = 0.0025, <0.01$). The interaction effects are illustrated in Fig. 2.

To strengthen our results, we run a number of robustness checks. First, we drop multiple data entries from the same company to control for potential effect of heteroskedasticity in the regression analyses. Furthermore, we control for a potential bias through the types of subsidiaries, by excluding manufacturing and research subsidiaries in the construction of the ex-ante host-market subsidiary formations

Table 3
Correlation matrix and descriptive statistics for hypothesis 1 and 3a (n = 1936).

	1	2	3	4	5	6	7	8
1 Foreign listing	1							
2 Ex-ante host-market subsidiary formations	0.1221***	1						
3 Firm size	0.4590***	0.2209***	1					
4 Firm age	0.0914***	0.0821***	0.3027***	1				
5 Listing period	0.0687***	0.0165	0.2629***	0.5820***	1			
6 High-tech	0.0317	-0.0111	-0.1053***	-0.0014	0.0407*	1		
7 Firm internationalization	0.2348***	0.0912***	0.1909***	0.1832***	0.1526***	0.1168***	1	
8 Host factor market size	0.0000	-0.0873***	0.0044	-0.0142	0.0085	-0.0104	-0.0439*	1
Mean	0.500	0.435	12.356	3.266	2.412	0.398	37.120	8.095
S.D.	0.500	2.400	1.999	0.989	0.884	0.490	34.231	0.362
Min	0.000	0.000	4.415	0.000	0.000	0.000	0.000	5.525
Max	1.000	84.000	19.871	6.477	4.828	1.000	100.000	8.261

* p < 0.10.
** p < 0.05.
*** p < 0.01.

Table 4
Correlation matrix and descriptive statistics for hypothesis 2 and 3b (n = 1936).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Ex-post host-market subsidiary formations	1												
2 Foreign listing	0.1508***	1											
3 Firm size	0.2631***	0.4590***	1										
4 Firm age	0.1632***	0.0914***	0.3027***	1									
5 Listing period	0.1833***	0.0687***	0.2629***	0.5820***	1								
6 High-tech	-0.0060	0.0317	-0.1053***	-0.0014	0.0407*	1							
7 Firm internationalization	0.1239***	0.2348***	0.1909***	0.1832***	0.1526***	0.1168***	1						
8 Prior subsidiary formations	0.2161***	0.2130***	0.2522***	0.1379***	0.0722***	0.0984***	0.2460***	1					
9 Institutional distance	-0.0343	0.0000	0.0439*	0.0766***	-0.0331	0.0136	0.0055	-0.0507**	1				
10 Foreign IPO	0.0166	0.1096***	-0.0725***	-0.0678***	-0.0329	-0.0112	0.0333	0.0428*	0.0101	1			
11 Multiple listing	0.1607***	0.4828***	0.3976***	0.1557***	0.0748***	0.0578**	0.2554***	0.1806***	0.2018***	-0.0286	1		
12 Host factor market size	-0.0438*	0.0000	0.0044	-0.0142	0.0085	-0.0104	-0.0439*	-0.0318	-0.1664***	-0.1319***	-0.0766***	1	
13 Host capital market size	-0.0631***	0.0000	0.0209	0.1029***	0.0263	0.0309	0.0156	0.0250	-0.0157	-0.1695***	-0.0387*	0.7347***	1
Mean	0.357	0.500	12.356	3.266	2.412	0.398	37.120	0.194	0.307	0.012	0.189	8.095	7.189
S.D.	1.374	0.500	1.999	0.989	0.884	0.490	34.231	0.395	0.361	0.108	0.392	0.362	0.485
Min	0.000	0.000	4.415	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.000	5.525	3.555
Max	37.000	1.000	19.871	6.477	4.828	1.000	100.000	1.000	2.010	1.000	1.000	8.261	7.437

* p < 0.10.

** p < 0.05.

*** p < 0.01.

Table 5
Hierarchical probit regression results (n = 1936).

	Model 1	Model 2	Model 3
<i>Control variables</i>			
Firm size	0.3695*** (0.0197)	0.3548*** (0.0200)	0.3552*** (0.0200)
Firm age	-0.0903** (0.0407)	-0.0991** (0.0409)	-0.0977** (0.0410)
Listing period	-0.0862* (0.0441)	-0.0751* (0.0443)	-0.0768* (0.0443)
High-tech	0.2182*** (0.0654)	0.2053*** (0.0658)	0.2081*** (0.0659)
Firm internationalization	0.0068*** (0.0009)	0.0063*** (0.0009)	0.0064*** (0.0010)
Host factor market size	0.0015 (0.0867)	0.0241 (0.0881)	0.0993 (0.0953)
<i>Independent variable</i>			
H1: Ex-ante host-market subsidiary formations		0.1716*** (0.0504)	3.8922** (1.8450)
<i>2-way interaction term</i>			
H3a: Ex-ante host-market subsidiary formations × Host factor market size			-0.4597** (0.2267)
Chi ² -ratio	538.61***	554.64***	560.55***
Pseudo R ²	0.2007	0.2067	0.2089
Change in R ²	0.2007***	0.0060***	0.0022**

* p < 0.10.
** p < 0.05.
*** p < 0.01.

and ex-post host-market subsidiary formations variables. To control for a possible bias due to the matching process, we also use different settings calculating propensity scores. Furthermore, to consider the size of the different subsidiaries, we calculate the total value of ex-post (ex-ante) host-market assets as an alternative measure. To account for size and growth of the different companies, we use the ex-post (ex-ante) host-market subsidiaries ratio, calculated as the number of ex-post (ex-ante) host-market subsidiaries as a proportion of the total number of subsidiaries. We also run regressions by including further, removing existing and changing control variables. In particular, we add return on assets to control for firm performance. Furthermore, we include the 2-digit industry dummies, and exclude the home-country dummies and the host-country dummies in order to avoid correlations with other independent variables in the poisson regression. However, basic results stay similar after the implementation of the above robustness checks.

5. Discussion, implications and limitations

That MNEs have to combat LOF when crossing national borders to pursue business is widely acknowledged (Eden and Miller, 2004; Zaheer, 1995). As a consequence, the identification of mechanisms to overcome or limit the FMLOF and CMLOF is important to MNEs and international management and finance research. Based on the idea that factor market and capital market strategies are interlinked (e.g. Pagano et al., 2002; Saudagaran, 1988), we add prior factor market location strategies as a means to overcome or limit the CMLOF, and prior capital market location strategies as a means to overcome or limit the FMLOF. Specifically, we show

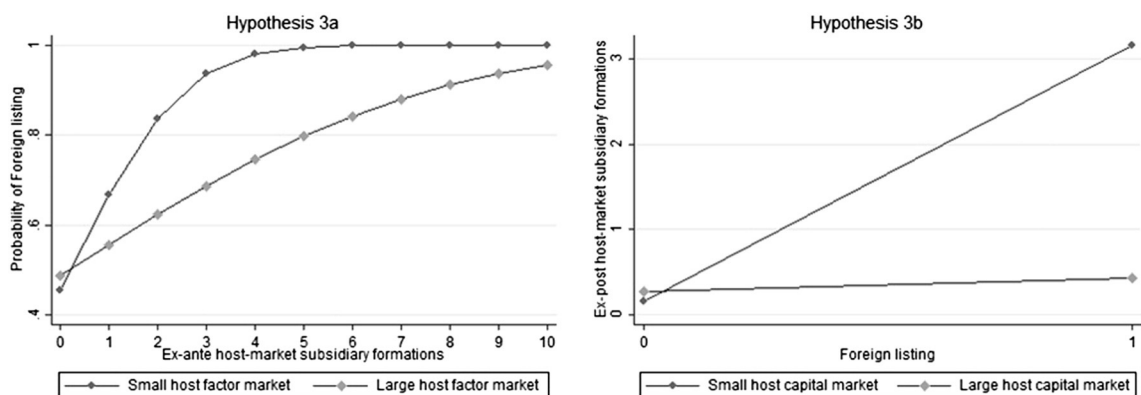


Fig. 2. Interaction effects.

Table 6

Hierarchical poisson regression results (n = 1936).

	Model 1	Model 2	Model 3
<i>Control variables</i>			
Firm size	0.3194*** (0.0261)	0.3008*** (0.0274)	0.2947*** (0.0276)
Firm age	−0.0007 (0.0592)	0.0037 (0.0593)	−0.0026 (0.0597)
Listing period	0.8403*** (0.0693)	0.8398*** (0.0691)	0.8630*** (0.0702)
High-tech	−0.1028 (0.0838)	−0.1061 (0.0838)	−0.1009 (0.0838)
Firm internationalization	0.0050*** (0.0015)	0.0046*** (0.0015)	0.0045*** (0.0015)
Prior subsidiary formations	0.9121*** (0.0883)	0.9064*** (0.0881)	0.9131*** (0.0878)
Institutional distance	−4.0822*** (1.3814)	−4.1597*** (1.3828)	−4.3767*** (1.3964)
Foreign IPO	0.8844*** (0.3174)	0.7562*** (0.3222)	0.6430*** (0.3317)
Multiple listing	0.1005 (0.1250)	−0.0022 (0.1326)	−0.0258 (0.1326)
Host factor market size	−2.3689 (2.3979)	−2.1599 (2.3990)	−2.0915 (2.4064)
Host capital market size	1.1569 (1.4624)	1.0146 (1.4628)	1.5591 (1.4909)
<i>Independent variable</i>			
H2: Foreign listing		0.2651** (0.1196)	5.3531** (2.2404)
<i>2-way interaction term</i>			
H3b: Foreign listing × Host capital market size			−0.7025** (0.3081)
Chi ² -ratio	1229.78***	1234.74***	1243.97***
Pseudo R ²	0.3251	0.3264	0.3289
Change in R ²	0.3251***	0.0013**	0.0025***

* p < 0.05.

** p < 0.05.

*** p < 0.01.

that the number of prior subsidiaries in the host country increases the probability of a host-market equity listing. However, the effect depends on the size of the host factor market, where smaller markets show a higher spillover effect. Furthermore, a prior host-market equity listing increases the number of subsidiaries in the host country, where the benefit is higher if the host capital market is rather small. Hence, we find that host-market size negatively moderates both spillover effects between equity listings and subsidiary formations in the host country.

Apart from the empirical and practical contributions we make for MNEs, our results provide important contributions to theory development in the field of international management and finance. First, answering the calls of Bell et al. (2012), we examine the interactions between FMLOF and CMLOF, by combining prior work from the field of finance with theory and conceptual work central to the field of international management. Specifically, we extend the existing literature that relates factor market to capital market decisions (e.g. Pagano et al., 2002; Saudagaran, 1988), and show that factor market and capital market location decisions are interlinked. Hence, we combine the idea that factor market and capital market strategies are interlinked with the LOF concept of international management. Second, we contribute to capital market location decision literature in the field of finance (Karolyi, 2006; Pagano et al., 2002), where a growing body of research suggests that there are information spillovers from factor markets to capital markets (Bell et al., 2012). For example, Frieder and Subrahmanyam (2005) show that individual investors prefer to invest in stocks with easily recognized products, and are less likely to sell shares of companies they frequent as customers. However, the interaction between factor and capital markets has been demonstrated in the international context as well, where firms choose to raise capital in countries that know their products (Sarkissian and Schill, 2004). Our results are closely related to that stream of literature and provide evidence that spillovers from factor markets to capital markets in a particular host country influence capital market location decisions. As an implication for future research we thus believe that the field of finance can benefit from integrating CMLOF to further aspects of financing decisions across borders. Third, we also make an important contribution to factor market location decision research (e.g. Buckley and Casson, 1976; Davidson, 1980; Dunning, 1988), identifying factors that overcome or limit FMLOF. A central finding within this literature stream is the importance of prior experience and market knowledge to overcome or mitigate the degree of FMLOF (Davidson, 1980; Peterson and Pedersen, 2002). Also international experience of top management teams, international scope of operations, industry, and fruitful network ties within the host-market business environment are understood to be effective means to overcome FMLOF (Asmussen, 2009; Blass and Yafeh, 2001). However, while prior

literature so far focuses on factor market capabilities to overcome FMLOF, our results provide evidence that capital market strategies may also be a way to overcome or limit FMLOF. This finding is also related to prior finance research arguing that a cross-listing can strengthen the competitive position of a firm in its industry and increase its foreign sales by enhancing the firm's brand recognition, and reputations with suppliers, employees, and customers (Pagano et al., 2002). Hence, the motives for issuing equity abroad may not be purely financial, where a foreign equity listing may also serve as a strategic tool to increase name recognition and legitimacy in the host factor market. Future case-based studies might shed light on the underlying mechanisms behind these strategies. Doing so might help to better understand the decision processes in firms that lead to such sequential entries. Fourth, recent research on the role of institutional context suggests that the success of specific strategies that firms employ to mitigate the LOF may be contingent on the institutional characteristics of the host market (Bell et al., 2012). By showing that the spillover effects between factor market and capital market strategies are more pronounced on smaller markets, our results point strongly towards the significance of country-level institutional factors for the success of specific strategies to overcome LOF. We argue that this is the case for two reasons. First, sufficient market knowledge is easier to accumulate in smaller markets. This reduces the risk of unfamiliarity hazards and relational hazards for the foreign firm. Second, foreign visibility in a host market decreases with increasing market size. Visibility, however, reduces the risk of relational hazards as well as discriminatory hazards. Therefore, we believe that research on location decisions and the LOF can benefit from investigating the conditional impact of institutional characteristics of the host country. Host market size may only be one possible institutional characteristic that influences the effect of factors to overcome LOF. Future studies may also integrate different formal and informal characteristics of the host country institutional environment.

Our analysis has a variety of limitations which may lead to some caution in our conclusions and also to avenues for future research. Although we are able to separate host-market subsidiary formations before and after the IPO, the lack of more precise historical subsidiary data limits our empirical study. We only consider subsidiaries that are owned by the listed parent company by year-end 2014. Furthermore, we are only able to separate host-market subsidiary formations with the help of the IPO date, which may not be equal to the cross-listing date of the firm. The focus of this study is on European companies only, where foreign equity-listed firms are primarily listed on the London Stock Exchange and the Boerse Frankfurt. While we believe that the diverse set of different companies in the sample countries provides important insights to the academic discourse, a European-based sample naturally impacts the generalizability of the results. Especially, the focus on developed countries and the concentration of foreign listings on the London Stock Exchange and the Deutsche Boerse limits data variation. Although we think that the selection of our sample countries provides several important benefits in terms of data quality and provides rather conservative results, our findings have to be interpreted carefully, since they may only be valid for a subset of firms. Therefore, further research should expand the scope of analysis by including other relevant stock markets, contributing to a better understanding of the relationship between the choice of the listing location and the degree of subsidiary formations in the host country. The degree of host-market subsidiary formations may be reflected in attitudinal and organizational variables too. Strategic orientation of management, staffing policy, corporate culture, relationships between headquarters and subsidiaries, the existence of joint-ventures and alliances in the host country, relations to governments and foreign trade associations or compliance with regional laws, regulations and business practices are only some of the vast set of additional possible explanatory variables that would allow to better capture a firm's degree of subsidiary formations in the host market. Finally, some foreign equity-listed firms show a higher number of host-market subsidiaries than home-market subsidiaries. As a consequence, we raise doubts about the appropriateness of the "foreignness" of firms that are listed on foreign equity markets, but actually display an extremely high degree of subsidiary formations in the host market. Future research may probe into this issue by looking at the development of host-market subsidiary formations and by showing how existing studies may be affected through these companies.

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