



Bachelor Thesis

LISTING DECISION OF FIRMS IN EMERGING MARKETS

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Abstract

Using a sample of firms from emerging European markets we research the effects of different variables on a firm's decision to go public and/or cross-list abroad. We find that: 1) profitability does not appear to influence any of the two decisions; 2) leverage is negatively related to the probability of going public; 3) companies with higher growth in sales are more likely to cross-list; 4) companies from countries with better macroeconomic conditions but worse shareholder protection have higher probability to list abroad. Our results show that there are notable differences between the determinants of listing in European emerging markets and other countries researched previously. Additionally, we present a practical management tool for modeling the listing decision developed on the basis of the results obtained.

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Introduction

According to a recent survey by Ernst & Young (FEAS, 2011) with 672 companies going public all over the world in the first half of 2011, the market was dominated by IPOs from emerging economies. Illustratively, in the second quarter of 2011, 67% of all IPOs were conducted in developing countries, as well as six out of the ten largest IPOs originated there. High IPO activity in developing countries and its enormous growth potential create a vast space for research and motivate us to fill the gap in the existing literature, which at the moment fails to concentrate on European developing economies when assessing specific factors as the determinants of companies' listing decisions.

Being a very complex, costly and time-consuming process, a public offering requires from a company that decided to list its shares a thorough analysis and consideration of various aspects. While in developed countries more information both from researchers and practitioners is available for companies that consider listing, companies in emerging markets face a more uncertain environment.

We believe that the recommendation to list cannot be generalized into one single suggestion for all companies: different characteristics of firms and external environments play a vital role in identifying the most beneficial option. The existing literature fails to look more specifically at these factors and their impact on the cost-benefit ratio of listing for companies from European emerging economies. Thus, the purpose of the current paper is to investigate the impact of these characteristics on firms' decisions concerning initial and subsequent listings and based on that produce guidelines which would serve as a practical tool for companies from developing countries that consider a possibility of going public. Hence, in order to conduct an investigation, we define the following research question: ***“How different characteristics of companies and environments in European emerging economies affect the decision of firms to list their shares”***.

A number of studies, discussed further in the literature review section, concentrate on investigating domestic and foreign listings, as well as benefits, valuation and cost of capital gains associated with them. However, to our best knowledge, none of them focuses specifically on firms from European emerging economies when performing a closer examination of certain firms' and markets' characteristics that are associated with positive examples of listing.

A few research papers exist that make an attempt to identify these characteristics; however, they either concentrate on firms incorporated in a particular market (Yafeh and

Blass (n.d.), Mayur and Kumar (2007), King and Zhang (2009)) or, in contrast, use broad mixed samples not differentiating between companies from countries with different development levels (Saudagaran (1988), Pagano et al. (2002)).

Summarizing, the current paper aims at adding to existing literature on the topic by looking specifically at companies from European emerging markets, which nowadays show a great IPO activity potential, and identifying certain characteristics that are related to a successful listing. In this study we aim at providing valuable insight on the issue from different perspectives. First, we present a broad and comprehensive literature survey on the topic of listing covering findings from different time periods and very distinctive markets. Next, it appears that a very limited number of studies on the drivers of listing exists due to the complications researchers face during the data gathering process; the fact was admitted by a number of researchers, e.g. Albornoz and Pope (2004) and Brav et al. (2006). Consequently, in order to perform our empirical analysis, we dedicate special attention to the data collection process, exploit a number of available sources, and, additionally, collect certain data manually. Finally, we go further in order to show the practical application for the results of our research; on the basis of our empirical findings, we produce a unique guiding tool which afterwards can be used by managers and help to reduce time and costs of the decision-making process, as well as enhance the quality of listing decisions.

Additionally, we believe that the current study can also be of interest for emerging countries' stock exchanges. For example, the IPO activity in the Nordic region, which incorporates also three emerging markets of the Baltics, has been declining for the last 2 years; illustratively, the number of deals in 2012 was more than two times lower than in 2011 or 2010 and the total deal value reduced by around 9 times (Experian, 2012); however, by providing tools for a cheaper and faster listing decision, the study can help to stimulate more companies to list. This, in turn, produces a positive effect on local capital markets. According to the findings of Hargis (2000) in his paper "International cross-listing and stock market development in emerging economies", even globalization and international listing improve domestic market's liquidity and diversification options.

The rest of the paper is organized as follows. Section 1 presents a comprehensive literature review discussing evidence on different types of listing from various perspectives, which leads to the development of the hypotheses tested in the current study. As our dataset is new, Section 2 describes data sources and collection procedures in detail. Next, in Section 3 we present the methodology used for the empirical tests. Further, Section 4 presents the description of the sample, and in Section 5 we show and discuss the findings obtained

through applying our multivariate methodology. The practical guiding tool derived from our empirical findings is presented in Section 6. Eventually, in Section 7 we present our concluding remarks on the research done.

1. Literature review and hypotheses

Being one of the most important decisions in a firm's operating life, a public offering has always attracted much attention of researchers. Different study approaches were employed in order to investigate the phenomenon and explain its motives and actual outcomes. However, in spite of the fact that there are numerous academic papers on the topic, only limited empirical evidence on what exactly determines the listing exists.

Brav et al. (2006) and Albornoz and Pope (2004) admit that it is difficult to empirically investigate the determinants of firms' decisions to go public due to data constraints. Ritter and Welch (2002) suggest that the difficulties in empirical tests of formal theories of IPO activity arise from the fact that researchers can only study sets of publicly listed firms, as for those companies which were eligible to go public, but chose not to do so, there is a general lack of data.

Nevertheless, this did not prevent some researchers from obtaining significant results and making reliable conclusions. The following subsections of the paper review both theoretical and empirical research on benefits, costs and determinants of Initial Public Offerings and cross-listings; based on these findings, hypotheses for the current study are developed.

1.1. Why companies go public

Going public implies sacrificing private benefits of control for the advantages of being a publicly traded firm. Therefore, the decision to conduct an IPO should be made only when the added value of being listed outweighs private benefits of control.

Most studies cite pecking order of financing when discussing decision to go public. According to this theory, companies first use internal financing, then turn to debt financing as long as it is sensible; and only then issue equity. Therefore, the most cited reason for going public is equity capital raising. However, as noted by Booth (2007), this cannot be the only reason, as many companies go public without raising any new capital; additionally, there are options to raise capital even without a public listing. Moreover, an IPO process itself is often too costly comparing to other capital raising options.

One of the most comprehensive and widely cited studies on the topic, as well as one of a few reliable empirical studies, is a paper by Pagano et al. (1998) “Why do companies go public?” This article provides an overview of main theories concerning the decision to go public. According to them, the benefits that companies may get through an Initial Public Offering include: overcoming borrowing constraints, diversification, liquidity, stock market monitoring, enlarged set of potential investors, increased bargaining power with banks, exploitation of mispricing and finding an optimal way to transfer control. Moreover, there is evidence that an IPO helps initial owners to cash out, even if this reason is not the one that appears in prospectuses (Roell, 1996).

Additionally, other widely recognized IPO advantages, consistent with Ritter and Welch (2002), Roell (1996) and Clementi (2002), include an objective valuation of a company, increased public awareness and reputational gains. A publicly listed firm also has opportunities for share participation schemes for management and employees, which enhance their loyalty and motivation.

However, according to Ritter and Welch (2002), nonfinancial reasons for going public have only a secondary role in the decision making process. The main motivation, according to the authors, remains raising of capital.

Brau and Fawcett (2006) research the relative importance of these theories in a survey of 336 CFOs and find that the primary motivation for conducting an IPO is business valuation. Capital raising does not appear to be among the most important reasons, as stated in most previous studies. Instead, somewhat surprisingly, one of the most important motives for going public, cited by CFOs is the creation of public shares for future acquisitions. Another significant IPO incentive according to the results of the survey is establishment of the market price of a firm, which is also linked to the future acquisition motive, sometimes serving as the first step for the latter one.

Overall, it appears that listing incentives differ significantly across companies which belong to various markets and time periods. Though, the researchers cannot agree on the relative importance of the motives, it is clear that there are numerous benefits companies may gain with a public listing, and they address varying demands of companies with very different characteristics and goals.

1.2. Why companies stay private

Despite all the benefits of going public, relatively few companies list their shares. Most of the firms remain privately owned, which suggests that this option also has some benefits compared to going public.

Brav et al. (2006) name the following reasons for remaining private: first, consistent with Booth (2007), financial costs of public listing – both registration and ongoing administrative costs – are very high, thus, most companies cannot afford public listing until a certain stage of their lifecycle; secondly, the common fact of IPO underpricing prevents some companies from going public. Additionally, public companies face increased information disclosure requirements comparing to their privately-owned peers. Finally, loss of private benefits of control is among the costs of an IPO or reasons to remain private.

Booth (2007) adds to the previous study by indicating indirect costs of an IPO, which include exposure to shareholder lawsuits and management distraction.

Brau and Fawcett (2006), who survey CFOs, find that control maintenance is the main motivation for staying private. Other big concerns of CFOs, which do not appear in other studies, are market and industry risks.

Consequently, all the above-mentioned factors confirm that before conducting an IPO companies must carry a thorough and time-consuming analysis weighting all the benefits and costs public listing may ensure for a specific company with its particular characteristics. Hence, investigation of the relationships between these characteristics and the decision to go public is of high importance.

1.3. Determinants of an IPO

Even though, as stated previously, empirical research on the topic is limited, there have been successful attempts to research determinants of an IPO. Some of the conclusions on how different variables affect the probability of listing are consistent and do not seem to carry any uncertainty; however, for a number of determinants studies appear to provide different evidence on the relationship depending on the market a paper is focused on, different proxies employed, and the time when research was carried out.

Again, the most reliable and cited paper on the topic is the one by Pagano et al. (1998), examining a sample of Italian companies. The authors' results indicate that the likelihood of conducting an IPO increases with an increase in a *company's size*. The fact that the size of a company is positively related to the probability of going public was also

documented by Chemmanur et al. (2010), Albornoz and Pope (2004) and Mayur and Kumar (2007). To our best knowledge, no study has showed size to be either insignificant or negatively related to the likelihood of an IPO, which is somewhat obvious: a company has to be of a relatively large size in order to be able to afford the costly procedure of public listing, as well as to be able to appreciate the benefits an IPO provides.

However, there are other variables of interest whose effects on the probability of listing show more controversy.

Clementi (2002) finds that operating performance or *profitability of a firm*, measured as Return on Assets, has a positive effect on the likelihood of an IPO, as it peaks in the fiscal year prior to the event. Two market-specific studies also find profitability to be positively related to the probability of conducting an IPO: Mayur and Kumar (2007) in a study of Indian companies use return on net worth as a proxy for a firm's profitability, and Boehmer and Ljungqvist (2004), who research German firms, use industry-adjusted return on sales. An interesting explanation many authors present is the fact that a company's management use "timing" in order to gain larger benefits from going public; namely, they specifically choose the time for listing when a company shows high profitability. When managers are aware that it is only a short-term phenomenon, they expect investors to perceive the firm as more valuable than it really is, and thus, overvalue the shares. Such an explanation confirms again that information asymmetries may significantly influence the listing decision.

However, there is also a contradicting finding: Albornoz and Pope (2004) report a negative effect of profitability, measured as return on assets, on the probability of listing in their study of firms going public in the UK. The authors explain it with the fact that profitable firms have more opportunities for internal financing, therefore, fewer incentives to seek financing in capital markets.

The noted controversy leads to the development of the first hypothesis of the current paper. As long as going public is a costly procedure, it is possible that only better performing companies in emerging markets can afford it, thus, we state that: ***"Profitability positively affects the probability of going public for a company from an emerging European country"***.

Another variable, *Sales growth*, shows firms' current and future investment needs, as well as changes in customer base. The growth is found to significantly positively influence a firm's probability of going public by Fischer (2000), who research German technology-based firms, and Brav et al. (2006), with a sample of UK firms. This firm characteristic does not appear to urge discussions among researchers about its impact on the decision to go public.

Boehmer and Ljungqvist (2004) prove this relationship using a more advanced approach, namely, by adjusting sales growth by industries. Chemmanur et al. (2010) also report that sales growth positively affects the probability of going public. Additionally, Qin et al. (2011) highlight that the median sales growth of companies that go public in their sample was over 9 times larger than the same value for the group of companies that stayed private.

Next, as noted by Fischer (2000), the probability of a firm to go public is positively affected by its proportion of intangible assets, a proxy for a company's *riskiness*. Mayur and Kumar (2007) also find riskiness measured in the same way as one of the most important determinants of an IPO. Riskiness is also found to positively affect the likelihood of a public listing in a study of US firms by Chemmanur et al. (2010). The authors use cash flow riskiness or capital intensity defined as a firm's capital stock over total employment as a proxy.

Such a relationship is mostly attributable to the diversification motive, which states that the riskier operations of a company are, the more reluctant its owner is to make large investments and risk with his/her own capital; thus, he/she may choose to reduce the share of ownership to diversify the risk.

In turn, Boehmer and Ljungqvist (2004), who study the IPO decision on a sample of German private firms, research the relationship between the probability of listing on a stock exchange and future uncertainty, calculated using a company's age and the volatility of daily stock returns of companies within an industry. Though, he reports positive relationship, the results are not significant even at 10% significance level suggesting that the diversification motive does not hold among German companies.

It should be noted that all of the abovementioned studies focus either on particular markets or on a specific industry, which could influence the results obtained. Consequently, the presented findings can be only partially applicable to different environments. Thus, we develop the second hypothesis stating that ***“Riskiness level is a significant determinant of the probability of a company from an emerging European market to go public, and the relationship is positive”***.

In turn, Helwege and Liang (2002) research riskiness as a determinant of going public proxied by *leverage*. They find a strong positive relationship between the level of leverage and the decision to go public. This finding supports the pecking order theory of financing, which predicts that companies prefer internal financing, and, if it is not available, they rather turn to bond markets leaving equity as the last option.

Fischer (2000) also finds that leverage positively affects the likelihood of conducting an IPO, which again is presented as supportive evidence for the motive of overcoming financial constraints: when a growing company needs funds to finance its growth, but cannot take more debt, it seeks for financing in equity markets.

However, consistent with the findings of Pagano et al. (1998), Mayur and Kumar (2007) state that Indian firms are not motivated by financing needs, as the coefficient before leverage is insignificant.

Moreover, Albornoz and Pope (2004) find a contradictory negative effect of leverage on the probability of going public in a study of firms listing in the UK. The authors suggest that this can be explained by the specifics of the market: firms going public in the UK may predominantly pursue other goals than satisfying financing needs and balancing capital structure. They suggest that increased visibility and liquidity incentives are more important for companies that decide to list on LSE.

As long as for companies from emerging markets debt-financing might be more available than equity issuance due to less developed local stock exchanges and equity markets, our third hypothesis states: ***“Leverage positively affects the probability of a company from an emerging European market to list on a stock exchange”***.

Additionally, there is some evidence that other firms' characteristics may affect the decision to go public. For example, Qin et al. (2011) test companies' credit ratings as a determinant of going public. Though the coefficients appeared to be insignificant, the authors note that the variable entered regressions with a consistent negative sign. Such a result is also considered to favor the pecking order theory, as it shows that companies which face greater barriers in bond markets, including higher cost of debt, are forced to turn to equity issue.

Existing studies on the determinants of IPO either concentrate on specific industries or control for industries. Consistent with Pagano et al. (1998), Brav et al. (2006) state that a firm is more likely to conduct an IPO when its investment opportunities are large, meaning, when *industry market to book* valuations are high. Such information is open on the market; thus, representatives of “hot” industries may be tempted to extract the benefits of high valuation by “timing” their IPOs. Additionally, as cited in Qin et al. (2011), a number of studies, namely, Benveniste et al., Subrahmanyam and Titman, Mello and Parsons and Van Bommel, suggest that companies from industries where information plays a vital role, such as the retail, transportation and service industries, are more probable to list in order to exploit the benefits of information externalities.

However, cost of debt, the industry to which a company belongs and other factors are mostly used as controls, which will also be done in the current paper.

1.4. Why companies cross-list

After a company conducts an Initial Public Offering, it may consider subsequent equity offerings abroad. The benefits companies get from foreign listing sometimes are not obvious; however, there is quite a broad set of literature that discusses the topic and sheds light on the motives for cross-listing.

As reported by Karolyi (1998), the cost of capital of UK cross-listed firms in the United States on average shrinks by 2.64% after the event of cross-listing. Karolyi (2006), Domowitz et al. (2001) and Karolyi and Gagnon (2010) also agree that cross-listed firms gain access to cheaper and larger pools of capital comparing to their domestically-listed peers due to a lower risk premium on market portfolio.

While most of the papers look at short-term effects of listing abroad, Foerster and Karolyi (2000) examine long-term effects. Though, the overall findings are not reassuring as in three years after the issue cross-listings appear to underperform local market benchmarks of comparable companies, the authors record a significant outperformance of the benchmarks for companies from countries with low accounting standards, which usually characterize emerging economies. Sarkissian and Schill (2012), in turn, document a significant reduction in cost of capital over five-to-ten year period after the listing.

Different theories were developed in order to explain the occurrence of cost of capital gains. At the early stage of cross-listing benefits' investigation researchers mostly focused on the *market segmentation* hypothesis, which states that there are international investment barriers, and, by listing abroad, a company becomes more accessible to global investors.

Lins et al. (2000) investigate an *access to external capital markets* as a motive for cross-listing. Differentiating between developed and emerging economies, the authors showed that for companies from the latter ones this is an important benefit of listing in the U.S. Specifically, the authors find that in contrast to companies from developed countries, the investment to cash flow sensitivity decreases significantly after companies from emerging economies go public. Moreover, a survey of companies' annual reports shows that companies from emerging markets mention access to external capital markets as a motive more often.

By Karolyi (2006) listing in a foreign market *broadens the shareholders base*, and allows *large institutional investors* from abroad, who add to effective monitoring of a company's activities, to invest in a company.

Investor recognition hypothesis developed by Merton (1987) is built on the assumption that investors buy only securities about which they know. Consequently, reaching a larger amount of potential investors due to cross-listing allows more investors to take small positions in the security eliminating additional premium for undiversified risk. This motive has been explored by a number of studies (Ahearne et al., 2004; Ammer et al.; 2004 Baker et al, 2002; Lang et al., 2002).

Fedulova and Kuzmyn (2008) research motivations of the Ukrainian companies going public abroad and find that primary determinants include *increased prestige* and *fundraising* for further development and growth. Other popular reasons covered in the paper include *signaling about a company's quality, improving liquidity, minimization of cost of capital* and *better bargaining power* with banks.

Cetorelli and Peristiani (2010) also name prestige as an important motive for companies to cross-list. The authors find evidence that the future valuation depends on *the prestige of a listing market*, i.e. listing on a market which had been more prestigious than the market of origin prior to the event leads to valuation gains. Moreover, valuation of a firm continues to respond to the listing market's prestige after the event. If the market develops, irrespective of its past performance, its firms' value increases.

Karolyi (2006) and Lang et al. (2002) also investigate the relationship between cross-listing and companies' information environment. Both papers provide evidence that information environment, namely, analyst coverage and forecast accuracy increase after listing abroad, and cross-listed companies experience higher valuations, which supports *visibility hypothesis* of cross-listing.

Baker et al. (2002) additionally cite increased firm's visibility in the eyes of its customers, suppliers, creditors and host governments as one of the motivations behind going public abroad.

Generally, when a company becomes more visible internationally, its shares are likely to increase in price, the effect known as a *price discovery*. (Karolyi, 2006; Claessens and Schmukler, 2007). However, the price effect does not seem to be permanent and is very likely to be dependent on many more factors than just international visibility.

Next common motive for cross-listing is *improved liquidity*. The motive is empirically investigated in a paper by You et al. (2011), where the authors use trading volume as a measure of liquidity and conclude that cross-listing is associated with increased stock liquidity. Notably, they also document this effect to be persistent in the long-run.

While most previous papers investigate cross-listing motives empirically, there are two important papers discussing reasons, costs and benefits of listing abroad written by Mittoo (1992) and Bancel and Mittoo (2001), who survey European and Canadian Managers of the U.S.-listed companies. The cited reasons for cross-listing are very similar across two samples of managers; however, the relative importance of reasons is perceived differently. “*Increased liquidity, prestige and image*” is the most important benefit of foreign listing by the European managers, while Canadian ones value “*Growth of shareholder base/appeal to foreign investors*” the highest.

However, a study by Houston and Jones (2002) suggests that these perceptions may have changed over time. When conducting a similar study to Mittoo (1992) 10 years later they obtain different results. Increased trading volume and greater analyst coverage, for example, gained importance as benefits of foreign listing. Moreover, new benefits for foreign listing were cited, such as *improved credit rating* and *ease of employee stock acquisition*.

A major shift of attention occurred in the late 90s when scholars started investigating governance motives of cross-listing related to investor protection, agency costs, etc. The relatively new *bonding hypothesis*, which largely explains valuation gains of cross-listed firms, was developed. The hypothesis states that a company bonds itself to a market with stronger investor protection, better disclosure requirements, etc., compared to its domestic market. Bonding lets a company signal respect to its investors, providing them with better protection and, consequently, higher stock returns (King and Segal, 2008).

O’connor and Phylaktis (2010) find that firms usually bond to exchanges of common law countries, namely the United States and the United Kingdom since these systems offer a better protection to investors. Largely as an effect of the legal bonding, corporate governance of a company improves as its minority shareholders become better protected against managerial private benefits of control and self-dealing (Karolyi, 2006; Coffee, 1999; Stulz 1999).

One more benefit of listing abroad is *reduced information asymmetry* between the issuing company and listing market’s investors, which results from the requirements of increased ongoing disclosure. Reduced information asymmetry is likely to reduce the probability of extraction of private benefits of control by a company’s management (Shleifer and Wolfenzon, 2002). However, Caglio et al. (2011) argue that only mature firms with a big share of foreign sales can overcome the problem of information asymmetry by listing abroad.

A significant relationship between the quality of corporate governance and firm valuation, recorded by Salva (2003), shows that companies from countries with poor investor

protection, accounting standards and concentrated ownership structure experience larger positive abnormal returns around the cross-listing announcement.

In contrast to many studies that investigate economic consequences of cross-listing, Miller and Lel (2006) examine a direct outcome of corporate governance: a company's ability to dismiss a poorly performing CEO. Supporting the bonding hypothesis, they document a stronger relationship between the CEO turnover and firms poor performance for companies that cross-list compared to those that do not. Additionally, they note that the effect is stronger for the companies coming from countries with low investor protection levels.

However, the bonding hypothesis became a target of much critique. Licht (2003) notes that there are cross-listing examples when companies issue shares in countries with less stringent requirements, which leads to a conclusion that some firms list abroad to "avoid" tighter scrutiny domestically. Further, supporting the previous finding, You et al. (2011) find no relationship between listing premiums and investor protection level of listing countries.

Karolyi (2012) attempts to answer the questions raised by the bonding hypothesis opponents. However, he admits that critics' arguments are robust and further research is needed to investigate whether foreign listing actually provides substantial improvements in corporate governance of firms.

1.5. Why companies choose not to cross-list

Despite all the potential benefits of foreign listing, relatively few companies decide to pursue this option. This creates a field for research of foreign listing barriers, which do not let most of the companies issue shares internationally.

The aforementioned survey-based study by Mittoo (1992) examines potential costs of cross-listing and concludes that 60 percent of the managers surveyed consider *compliance with higher reporting standards* to be the main cost associated with foreign listing. A big fraction of European managers cite *PR and road shows* as a major cost associated with foreign listing. *Legal fees* are also considered to prevent many companies from listing abroad. Overall, 60 percent of European managers and 61 percent of Canadian surveyed by Mittoo (1992) believe that costs of listing abroad outweigh the potential benefits.

The investigation of costs of foreign listing also appears in the research by Fedulova and Kuzmyn (2008). The authors study Ukrainian companies and determine *time consuming procedure* of foreign listing and the *requirements of foreign stock exchange* as the largest barriers to foreign listing. *Management time, investment bank fees* and *underpricing costs* are cited as the most significant costs associated with foreign listing.

1.6.Choice of a listing market

Overall, the decision to go public, including the choice of the listing market is a complex one, influenced by a variety macro and micro-specific factors.

Sarkissian and Schill (2012) study how preferences of foreign listing markets changed over years. In the beginning of the 20st century there were five options for listing abroad: Switzerland, the Netherlands, Belgium, France, and the United Kingdom. By 1990 the number of foreign exchange markets increased to 34. The largest host markets by number of foreign companies listed by 2009 have been the United States(1415), the United Kingdom(494), Luxembourg(285), France(208), Germany(193) and Switzerland(176). By the end of 20th century, more than 80% of all cross-listing activity concentrated in top-6 markets (the U.S., United Kingdom, Luxembourg, Canada, Italy and France). Claessens and Schmukler (2007) also find that the choice of a listing market is limited to a few well-developed markets.

Sarkissian and Schill (2012) also present a comprehensive study of overseas listing valuation gains and factors associated with them. They find that companies achieve larger cost of capital gains if they list on markets larger than their home markets, with additional disclosure requirements, better legal protection and more liquid. However, the largest gains appear to be associated with listing on those markets where a high proportion of a company's exports go.

A somewhat puzzling result was obtained when examining relationship between the cost of capital and the correlation between home and foreign equity markets. Obtained negative relationship contradicts to the hypothesis of diversification motive; however, the authors point that this outcome is consistent with a documented companies' tendency to list on more familiar and, thus, correlated markets.

O'connor and Phylaktis (2010) find that companies tend to list in countries with *better investor protection* and *disclosure requirements*. Sarkissian and Shill (2004) find proof for "*proximity preferences*", saying companies are more likely to list on either geographically, economically, industrially or culturally close markets. These preferences are also referred to as the *home market bias*. However, the same authors find no significant relationship between cultural familiarity, industrial structure similarity, geographic proximity and permanent cost of capital gains, when conducting a study eight years later (Sarkissian and Shill, 2012).

Additionally, Fedulova and Kuzmyn (2010) cite *level of liquidity* in a foreign exchange, *amount of funds* needed, *company's size* and *recommendations* from analysts as the most important factors influencing the choice of a listing market.

1.7.Determinants of listing abroad

Cross-listing is certainly a very complex process; companies that decide to list abroad have to consider all the evident and hidden benefits and costs before making the decision. However, understanding the determinants of the choice to cross-list can make the process less complex and time-consuming.

Saudagaran (1988) was one of the pioneers in the foreign listing patterns research field. With a sample of matched foreign listed and domestically listed companies covering 8 major financial markets he investigated the determinants of firms' decision to list abroad. The author documents that this decision is significantly positively influenced by the *relative size* of a company within its domestic market. Larger firms have more resources for the costly procedure and research; Claessens and Schmukler (2007) and Caglio et al. (2011) also find that the size of a firm, measured as total assets, is positively related to its probability of listing abroad.

Profitability and returns of firms are also among the most popular determinants of listing abroad. Yafeh and Blass (n.d.), who research Tel-Aviv companies which list domestically or in the US find that companies listing in the US have lower *profit margins* than local issuers prior to listing.

Another study by Claessens and Schmukler (2007) prove the relationship to be significant and positive specifically on a sample of firms from developing economies. In turn, by Caglio et al. (2011) greater ROA figure decreases the likelihood of a foreign listing for a firm, which is also consistent with the findings of Pagano et al. (2002) when they research European firms listing in the US.

The researchers provide very diverse evidence on the relationship; however, it might be expected that only the best-performing companies in emerging markets can afford international listing. Thus, we propose our fourth hypothesis: ***“Profitability positively affects the probability of cross-listing for a company from an emerging European country”***

By Saudagaran (1988) decision to list abroad is significantly positively influenced by foreign activities of a company: the *proportion of foreign sales*, which supports the visibility motive; and the *proportion of employees in foreign countries*. However, investment in foreign countries measured by the *proportion of foreign book assets* appears to be not a significant

determinant of listing abroad, which contradicts to the political motive discussed by the author stating that foreign listing provides the benefit of local support and recognition important for companies. However, the author admits that the absence of relationship may be caused by the flaws of the data used in the study. Foreign sales are also proven to positively affect the decision by Claessens and Schmukler (2007) and Caglio et al. (2011).

Growth, calculated as *sales growth*, is reported to significantly positively affect the decision to list abroad by various other researchers (Yafeh and Blass (n.d.), Claessens and Schmukler (2007) and Caglio et al. (2011)).

However, there is a contradicting finding by Pagano et al. (2002). When they turn to investigation of European companies' decisions to list elsewhere in Europe, it turns out that the figure on growth is an insignificant determinant of foreign listing.

Though the abovementioned study concentrates on European companies like the current paper, we do believe that there must be significant differences between samples that are comprised of observations from the Western Europe, i.e. developed countries, and European emerging markets. We argue that growing companies from emerging markets have fewer opportunities to raise capital locally than their peers from the developed countries; and thus, the following relationship must hold: ***“Sales growth positively affects the probability of a company from an emerging European country to cross-list”***.

King and Zhang (2009), who investigate Chinese companies, perform a multivariate analysis differentiating between the listing markets. Consequently, they find that determinants of listing decision depend on the choice of a host market. For example, Singapore listings suggest that smaller, higher-leveraged, more profitable, higher-growth, and non-high-tech companies are more likely to list in Singapore rather than domestically; while for Hong Kong strong evidence exists that the size of a company is positively related to its probability to list abroad.

The link between the *local stock market development* and cross-listing activity has become a topic for a plenty of academic papers. However, results of previous studies are somehow contradictory. Moel (2001) and Karolyi (2004) find a negative relationship, meaning that the better developed equity markets generally have fewer companies that cross-list. Claessens et al. (2006) test the results of Karolyi and report that companies from better developed equity market are more likely to cross-list in the nearest future, which is explained from the point of view of international investors, who are more likely to invest their funds in companies from more favorable domestic environments.

According to Claessens and Schmukler (2007) and Caglio et al. (2011), firms that are more likely to internationalize generally come from domestic environments with *better macroeconomic conditions* but *worse institutional environments*. The choice of the listing market seems to be largely attributed to overcoming home market's institutional disadvantages. This is also consistent with an argument by Doidge et al. (2008) that firms in countries with weak securities law benefit from bonding to a country with stronger securities law.

Korzak and Korzak (2011) review the abovementioned studies, run their own tests and conclude that the relationship between local stock market development and cross-listing activity changes at a certain level of market development. When the market is not developed enough, it cannot satisfy the needs of local companies and they tend to go abroad, but, with the growth of competitiveness of the market, more and more local firms decide to list domestically.

As long as emerging economies are generally more open and dependent on trade, which leads to a large amount of companies having business relationship with partners from other countries, our sixth hypothesis states: ***“There is a positive relationship between the level of the home country's trade openness and the probability of a company to cross-list”***.

Further, as long as emerging markets are mostly characterized with quite low shareholder protection and disclosure standards, foreign companies may be less willing to have business relationship with firms from such environments. Thus, we believe that, in accordance with the bonding hypothesis, companies from emerging markets may view cross-listing as an opportunity to improve and signal its level of corporate governance. Consequently, we hypothesize that ***“There is a positive relationship between the level of the home country's institutional development and the probability of a company to cross-list”***.

The proposed hypotheses will be tested on a sample of firms from European emerging economies with a number of tools which we present in subsequent sections.

2. Data

In order to be able to advise companies on the issue of listing, we are going to investigate previous listing cases. The motivation for choosing such an approach follows from the assumption that companies that list their shares conduct a thorough analysis of pros and cons of different types of listings and eventually choose the most beneficial option. We

believe that this is a reasonable assumption that largely reflects the reality and enables obtaining trustful results.

One of the biggest difficulties while dealing with companies from emerging markets is data collection. Due to less developed reporting standards, many pieces of information are missing, especially for years preceding 2004. Consequently, we set a constraint for the sample period which allows only companies that conducted an IPO between 2004 and 2012 to appear in the sample of the current study. We believe that such a time range that covers both a period of massive growth and drastic collapse gives an excellent opportunity to make widely applicable conclusions and compare companies' behavior in different economic environments. Additionally, we specified 11 countries of interest in Central and Eastern Europe that are classified as emerging or frontier by Dow Jones as of September 2011 (Dow Jones Indexes, 2011). Consequently, firms from the following countries are considered in this study: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

Another limitation we had to put on the data is exclusion of companies that first listed and then delisted their shares from a stock exchange during the period considered in this study due to unavailability of the information regarding the listing markets and years in the databases. However, we find such a limitation justified and believe it can even improve the reliability of the results. As we are going to develop our suggestions for potential public companies based on the relationships observed while studying the sample of past cases, it is reasonable to consider delisted companies as unsuccessful examples of going public, which should not be included in the sample and influence the results.

In order to compile the sample of listing cases with firm-level data, we turned to a number of recognized databases that provide such information; however, it appeared that none of them could provide a reasonably large and representative sample of companies from the selected emerging European countries. Hence, we were forced to use a number of sources and merge the data obtained from them in one large and comprehensive sample. Consequently, the data collection process is described thoroughly in this section.

In the beginning, the sample of companies that conducted different types of listings was obtained using Worldscope and Orbis professional databases; the sample contained firm-specific characteristics when available. The list of companies was examined and all the double entries for the same companies were removed. After manually comparing the data provided in the databases on a number of random companies with the data presented in publicly available annual reports of these companies, we established that the data from

Worldscope is more accurate. Thus, in a case of a double entry an observation from Worldscope was preserved.

Merging the data from the two sources enlarged the list of companies; however, the amount of missing data entries was still significant. Thus, as a next step, we turned to Amadeus, the database provided by Bureau van Dijk, which contains information on companies across Europe. The database provides reported financial statements for all available years for a specified company. Following the methodologies for variables' compilation used in the already existing sample, we were able to reduce the share of missing values significantly. Additionally, we examined the final sample, and, when only a few variables were missing for a particular observation, we turned to the company's annual reports for these data, if publicly available.

We do acknowledge that merging the data from different sources could introduce bias in the study; thus, all the possible measures were taken in order to mitigate such bias. First, we examined definitions of the variables used and verified that only variables compiled according to the same methodologies are included. Second, most of the firm-specific variables used in the current study are represented by relative values, e.g. leverage, sales growth etc., which also helps to reduce the bias.

The sample of listed companies consists of two types of listings: companies listed on a domestic exchange and cross-listed firms quoted both domestically and on a foreign exchange.

As long as the data on cross-listings in Orbis database contained only information about cross-listing markets, we manually collected the data on years of cross-listings from the webpages of respective stock exchanges.

In the end, applying all the limitations and eliminating influential outliers, we obtained a sample of 420 listed companies, including 283 observations on domestically listed companies and 137 cross-listings.

Figures 1 and 2 in Appendix A provide information on the domestic and listing markets represented in the sample, and both are dominated by Poland. Such a domination is not a coincidence, as the country has been one of the leaders in financial and economic development in the region over the past decade, and, according to the Federation of European Stock Exchanges, in 2012 the Warsaw Stock Exchange became the largest financial hub of the Central and Eastern Europe (Polish Press Agency, 2012). Moreover, according to Mason (2011), Poland was the major market for IPOs in Europe in 2008-2011, accounting for around 30% of all deals, which is even more than in the UK. Warsaw stock exchange is attractive not

only for domestic companies; it is also an appealing market for foreign listings, attracting companies from other European emerging economies. Currently, there are around 50 foreign companies listed in Warsaw (Experian, 2012). Another attractive destination market for companies in the sample is Germany. The country is reported to have one of the most secure and stable economies in Europe; it is also a large trade partner for many emerging European countries, which makes it an attractive cross-listing option for companies that decide to list their shares. The distribution of listings for the other sample countries is relatively even.

In this study we conduct an empirical test that relies on the comparison between companies that list their shares (go public) and the ones that do not (stay private). There were several million unlisted companies registered in the 11 sample countries during the sample period. In order to conduct the test and eliminate the effect of unlisted companies dominating the sample, we compiled a matching sample of not public companies using Orbis database. We use 1:1 matching where each case has one control observation, i.e. for each listed company in the sample an unlisted company which is incorporated in the same country with the observation year which corresponds to the IPO year of its matched listed company and minimally different book value of assets was selected. The firm-level data for both listed and unlisted companies were obtained for the year prior to an observation year (which is a year before an IPO for listed and a year before an IPO of a matched listed firm for unlisted firms). As a result, 283 unlisted companies were selected.

At last, the data on a number of country-specific variables were collected from the World Bank that publishes country-specific information within the Doing Business project.

3. Methodology

In order to perform the analysis, we will use a two-step approach: first, factors that determine companies' decisions to go public will be discovered and then we will focus on listed companies and investigate the determinants of their decision to cross-list.

We will attempt to answer the research question by studying probabilities of the outcomes of interest and the effects various firm- and country-specific factors have on them. Using different variations of logistic models is the most common approach employed by the researchers in order to analyze companies' decisions regarding listing. In their fundamental study of the determinants of going public Pagano et al. (1998) use a probit model; other similar studies, e.g. Saudagaran (1988), King et al. (2009), Mayur and Kumar (2007) and other also use either probit or logit models. Consequently, in the current study we will

employ a number of logistic regression modifications in order to test the hypotheses presented in the Section 2.

Based on the review of explanatory variables and methodologies used by previous researchers, we developed our own model, which incorporates factors that are of interest for companies' managers and takes into account data availability.

Using a similar methodology will provide an opportunity to make comparisons between the results obtained in this study, which specifically concentrates on European emerging markets and uses the latest data, with the general results presented by previous researchers a number of years ago. On the other hand, a new modification of the model allows obtaining new evidence on the issue of interest.

The general cross-section model used in the study is the following:

$$\ln\left(\frac{\pi(ListDec_i = 1)}{1 - \pi(ListDec_i = 1)}\right) = \alpha + \beta_1 Size_i + \beta_2 Profit_i + \beta_3 Risk_i + \beta_4 Leverage_i + \beta_5 Growth_i + \beta_6 DebtCost_i + \beta_7 Industry_i + \beta_8 EconDev_i + \beta_9 TradeOp_i + \beta_{10} Protect_i + \beta_{11} Year_i + \varepsilon_i$$

The dependent variable is a dummy which takes the following values:

$$ListDec_i = \begin{cases} 1, & \text{if a specified listing type took place for the } i - \text{th firm} \\ 0, & \text{otherwise} \end{cases}$$

Firm-level data is collected for all companies in the sample. We identified proxies for size, profitability, riskiness, leverage, growth and cost of debt of a firm in order to include them into the regression as explanatory variables.

- *Size_i* – We use a widely accepted measure of the size of a company: the book value of its total assets.
- *Profit_i* – In order to measure profitability of a company, two proxies were selected that were used in the previous literature and appeared to perform reasonably well. The first one is *Profit Margin* that is calculated as net profits divided by total revenue. The second proxy selected is Return on Assets (ROA), which is calculated as net profits divided by total assets.
- *Risk_i* – As a proxy for a company's riskiness we use *Intangible Assets Ratio*, i.e. intangible assets as a share of total assets. Tangible assets can be used when a company is in financial distress, they can also become a collateral for a bank loan;

thus, it is considered that a higher proportion of intangible assets makes a company more risky.

- *Leverage_i* - Leverage is calculated as market value of debt divided by total assets.
- *Growth_i* - The growth of a company is estimated as *Growth in Sales* in a year prior to an event of interest by the formula $g = \frac{Sales_{t-1} - Sales_{t-2}}{Sales_{t-2}}$, where t – the year of an event of interest.
- *DebtCost_i*- Due to the data availability constraints, we were forced to use the ratio of *Interest Expense to Total Liabilities*. Such a proxy does not specifically show what price a company pays for using an alternative method of financing – debt; nevertheless, it provides information on the cost of external capital and, thus, can be included in the model.
- *Industry_i* – We identified four main categories that are represented with dummy variables in the model. The four industries used in the study are: Manufacturing, Wholesale and Retail Trade, Professional Services and Other.

In the model we also use a number of country-specific variables that can influence the choice of a listing market, such as:

- *EconDev_i* - GDP per capita is used as a proxy for a country's well-being and economic development, as well as prevailing economic conditions.
- *TradeOp_i* – The values for trade openness of a home country were obtained using the data from the World Bank. We used the formula

$$\left(\frac{X}{GDP} + \frac{M}{GDP} \right) * 100\%,$$

where X and M denote a country's exports and imports, respectively. The values for shares of imports and exports are retrieved from the World Bank. This index shows how actively a country trades with foreign markets, its level of internationalization and integration in the global economy.

- *Protect_i* – In order to proxy for the institutional and regulatory environments in which companies operate, we selected two investor protection indexes. First, we use *LLSV Anti-Director Index*, which is widely recognized among researchers. Additionally, we use the updated LLSV index presented by Martynova and Ronneboog (2010). Table 1 in Appendix B presents the indexes selected and their values for the sample countries.

After conducting theoretical research, we intend to use its results for practical purposes, namely, to produce a grading system that would allow managers to easily identify the suggested option regarding listing for any company with its particular characteristics.

After running the regressions, we will obtain a number of coefficients which explain relationships between changes in explanatory variables and changes in probabilities of different listing options occurring. The obtained coefficients will be used to create a grading system which would allow assigning points according to the values of different factors.

In order to construct the system, each variable's distribution will be divided into four quartiles by frequency of values ([1% -25%], [25%-50%], [50%-75%], [75%-99%]); the minimum and maximum values of a variable in each quartile will define borders and, in such a way, form four value ranges for each variable. Each company belongs to one range for each variable, according to its characteristics; thus, knowing the parameters of a company makes it possible to identify to which range it belongs for every variable.

Next, each value range will be assigned a pre-defined number of points. The points will be provided and calculated as the coefficient of a variable times the value of a variable ($\beta_i X_i$). Coefficients will be obtained by running regressions; the value of a variable will be different for each quartile and equal to an average between the maximum and the minimum values of a group. Taking the average values and applying the result to the whole range is an evident simplification; however, as this grading system is intended for practical purposes, we attempted to make it as simple and user-friendly as possible and valid at the same time. The simplification is justified by the fact that managers are generally not interested in sophisticated methodologies behind, but rather seek for a fast and efficient decision-making tool. Yet, the detailed description of methodology and results is also available in the present paper for those who might be interested.

Points for variables represented by dummies in our regressions are calculated in a different way and serve as starting points in our grading table. The omitted dummy is assigned with points equal to a constant, which represents an intercept in the regression. Other dummies are assigned with points equal to the constant plus their coefficients obtained from the regression.

After identifying to which range of every variable a company belongs, total number of points should be calculated and added to the starting points.

According to the notation,

$$g(x) = \ln \left(\frac{\pi(x)}{1-\pi(x)} \right) = \beta_0 + \beta_i x,$$

in such a way logistic model is replicated. By applying transformation, we get the probability of an event taking place calculated as

$$\pi(x) = \frac{1}{1+e^{-(\beta_0+\beta_1x)}}.$$

By replicating the model for a company of interest we find the probability that an identical company in our sample chose to go public. If the probability is high, the company of interest is suggested to list its shares and vice versa.

4. Descriptive statistics

First, we address the question regarding the determinants of going public. As it was already mentioned in the data description section, a matched sample of not listed and listed companies was collected for this purpose. Matching companies by assets makes it impossible to investigate how the size of a company influences its decision whether to list its shares. However, this variable was broadly studied before (by Pagano et al. (1998), Chemmanur et al. (2010), Albornoz and Pope (2004) and Mayur and Kumar (2007)) and there is no disagreement between researchers that the size of a company positively influences the probability to go public; thus, the current study does not focus on it. Additionally, it is widely acknowledged that only large companies can actually afford listing their shares; hence, inclusion of small companies would introduce bias in the model. There is a greater probability that large companies have considered conducting an IPO, but declined the option; therefore, they can serve as good comparison objects for the listed companies in the sample.

Table 2 in Appendix C reports descriptive statistics for the firms' financial characteristics.

Inspecting the variables that represent companies' profitability gives mixed evidence on its influence over the decision to go public. Unlisted companies show a considerably larger mean profit margin; however, when looking at the median value, the difference becomes very little. This suggests that there are a number of unlisted companies with very high profit margins, which pulls the mean value up. In such a situation, it is more reasonable to look at the medians that suggest that unlisted companies are slightly more profitable than their listed counterparts. On the other hand, the mean value for ROA is slightly smaller for unlisted companies, which is also reflected by the median values. In such a way, it appears that companies that decide to list their shares are able to exploit their assets more efficiently

and get higher returns on them. Previous pieces of research also show mixed evidence on the difference between returns of privately and publicly owned firms. Mayur and Kumar (2007) document almost 8 times larger returns for IPO sample companies than privately owned ones. In contrast, Albornoz and Pope (2004) find that private companies on average have slightly lower profitability than those that go public. Consequently, it is difficult to make any statements regarding the relationship between the profitability of a company and its propensity to go public before conducting a multivariate analysis and identifying which of the proposed proxies serves as a better predictor.

Riskiness of companies expressed as a ratio of intangible assets to total assets also shows large differences between median and mean values. However, both show that listed companies tend to possess a larger share of intangibles. Apart from these statistics, a large difference in maximum values of this variable should be noted: while the maximum intangibles-to-assets ratio for unlisted companies is 15%, for listed companies this value is as large as 63%. It should also be noted that such an outcome does not come from one influential outlier, as statistical analysis shows that 5% of the values for listed companies are higher than 0.17 or, in other words, higher than the maximum ratio for unlisted companies. This finding is consistent with the sample statistics from both Mayur and Kumar (2007) and Fischer (2000), who used the same proxy for a company's riskiness; therefore, it should not raise doubts regarding the eligibility of the present study's sample for the research and lets us proceed with further investigation of the variable in the multivariate model.

Next, we turn our attention to the companies' leverage. Here the results are less controversial. Though for both listed and unlisted companies the range of values is quite wide, mean and median values appear to be almost the same. Not-surprisingly, the distribution of the variable is positively skewed with half of the total companies in the sample having their debt-assets ratio less than 50%. Also the results show that listed companies in the sample tend to have on average a smaller level of indebtedness one year prior the listing comparing to companies that do not go public. The observed distribution contradicts to the findings of Fischer (2000), who reports much higher leverage for IPO companies. However, Mayur and Kumar (2007) and Albornoz and Pope (2004) document the same statistics on the variable, i.e. the indebtedness of companies in the privately-owned sample is on average higher than the one of an IPO sample.

Growth in sales, consistent with Chemmanur et al. (2010), Albornoz and Pope (2004) and Boehmer and Ljungqvist (2004) appears to be higher for listed companies compared to unlisted ones in our sample; though, again, this difference becomes much smaller when we

look at the median values. The data on this variable is dispersed both for listed and unlisted companies, ranging from negative growth of 100% to more than tripled sales. However, it should be noted that no outliers are observed, and the data distribution appeared to be close to normal with a slight right skewness.

Average values for interest expense to total liabilities differ significantly for listed and unlisted companies. Firms which decide to list their shares appear to pay much more for their liabilities, which is consistent with the statistics reported by Pagano et al. (1998).

Figure 3 in Appendix C presents the composition of the sample by industries. It appears that manufacturing firms are split almost equally between those that go public and those that do not list their shares. However, there is evidence that wholesale and retail trade companies tend to stay private, while firms that provide professional services have a greater propensity to list their shares.

Further, we turn to investigation of the determinants of cross-listings, and for this purpose another sample is used. The sample consists of 137 observations of cross-listing events and 1905 observations for only domestically listed companies. The latter were obtained by collecting available yearly firm-specific data for companies that listed domestically in 2004-2011 for each year after which cross-listing was not conducted before the event of cross-listing, if it took place. We did not apply any matching techniques here in order to have a natural sample and be able to observe relationships between all the explanatory variables and the decision to cross-list.

Table 3 in Appendix D reports descriptive statistics for the firms' financial characteristics.

In contrast to the case of listed and not listed companies, both profitability measures appear to provide the same insight; i.e. that companies that cross-list their shares show on average higher profitability one year prior to an event. The mean value for profit margin, consistent with Yafeh and Blass (n.d.), is considerably larger for companies that cross-list; however, the median value shows a more modest difference. Additionally, it should be noted that the data on the variable for companies that do not cross-list is much more dispersed. However, this feature characterizes almost all the variables and is explained by a much larger number of only domestically listed companies in the sample, which, obviously, have different characteristics and operating results. Both mean and median values for ROA support the evidence, showing that companies that cross-list make a better use of their assets one year before, a finding consistent with Claessens and Schmukler (2007), but, at the same time, contradicting to Pagano et al. (2002). Another interesting feature revealed by the inspection

of variables is the difference between average values for the total firm-year data sample of domestically and cross-listed companies and the sample of listed companies discussed previously. The latter appears to show significantly lower profit margins. One of the potential explanations for this could be a proposition that listed companies start showing better operating results after conducting an IPO. However, the average value of ROA for these two groups of companies is very similar and, thus, does not support evidence from the data on profit margins, consistent with the paper by Pagano et al. (2002).

The statistics on the level of risk for firms provides mixed evidence. According to the mean values, less risky companies tend to cross-list their shares; on the other hand, the median value is lower for companies that do not cross-list. However, it must be noted that the difference between the values for companies in this sample is considerably smaller than the one observed when comparing listed and not listed companies.

The statistics for companies' indebtedness ratio is less controversial: it appears that, on average, companies that cross-list have a higher level of debt a year before the event. In contrast to the statistics of the first sample, which showed that less indebted companies tend to raise money through capital markets, in this sample it seems that firms tend to issue new shares already after utilizing debt-financing opportunities, consistent with capital-raising theories of foreign listing, discussed by Fedulova and Kuzmyn (2010), Sarkissian and Schill (2012), Karolyi (2006), Lins, et al. (2000).

In line with the statistics of the first sample, companies which show more prominent growth have a higher propensity to turn to capital markets. This is also consistent with conclusions of a number of researchers who study determinants of foreign listing: King and Zhang (2009), Yafeh and Blass (n.d.), Claessens and Schmukler (2007) and Caglio et al. (2011). Notably, while the mean and median values for cross-listed companies are small, but positive, for not cross-listed companies they are negative with the mean value being relatively large. Both minimum and maximum values for not cross-listed companies are smaller suggesting that the whole data distribution is located to the left from the distribution for cross-listed companies. Additionally, the data distribution for not cross-listed companies is negatively skewed; though, no influential outliers are observed. This might be explained by the inclusion of crisis period in the sample when many companies experienced a severe decline in turnover. Data inspection supports this statement, as it appeared that an absolute majority of observations with the growth in sales lower than -300% were reported for 2008. It should be noted that we do not observe negative skewness for cross-listed companies, which suggests that companies that decide to cross-list are of a better quality.

The mean and median values of interest expense on total liabilities for not cross-listed companies differ significantly, and the same is true for the sample of cross-listed companies. However, both show that companies which pay less for external debt capital have a higher propensity to cross-list next year, which contradicts to the traditional capital-financing motive of foreign listing. This insight is somewhat puzzling, as in the first sample it appeared that companies that have to pay more for their liabilities tend to turn to another source of financing, i.e. capital markets. One of the explanations could be that successful listed companies have higher bargaining power and are able to negotiate better financing conditions, and at the same time, these successful companies are more probable to cross-list to extract the benefits of their good image.

Descriptive statistics on market-specific variables, GDP per capita and Trade openness, support the proposition that companies from more developed and open domestic countries are more likely to cross-list discussed in the literature review part.

Statistics on protection indexes, in turn, produce mixed evidence. LLSV index shows that not cross-listed companies have a slightly better level of investor protection. In turn, the updated index, on average, is higher in domestic countries of companies that cross-list. Thus, only after including these variables in the model and identifying which performs better, we can make conclusions on the relationship.

The distribution of the data by industries is presented in figure 4 in Appendix D. It appears that, after “other industries”, professional services companies cross-list the most. Representatives of the manufacturing industry made almost the same number of cross-listings, while the number for wholesale and retail trade companies is considerably smaller. Not taking into account other industries, relative positions of industries according to the number of listings reflect the tendency observed in the first sample of listed and not listed companies.

After inspecting and discussing the variables, we turn to a multivariate analysis that is expected to provide more insightful and reliable results about the existence of relationships between firms’ and countries’ characteristics and their listing decisions.

5. Results and discussion

The multivariate analysis of companies’ listing decisions is divided into parts and employs different specifications of the regression presented in the methodological section.

Decision to make an IPO

First of all, we turn to the investigation of parameters that influence companies' decisions to list or not to list their shares on stock exchanges. As it was discussed earlier, we use a matched sample of public and private companies for this purpose. Practitioners suggest that there are a number of approaches that can be undertaken to handle matched pairs data. First and the most straightforward approach is a simple logit model. The inclusion of variables used for matching helps to control for them; even though their coefficients cannot produce significant results, this makes other variables' estimated coefficients less biased. However, most of the researchers argue that the pitfall of this approach is its inability to account for the matched nature of a sample. Consequently, practitioners suggest two main solutions for the problem. Hence, the second approach that can be applied for the matched data analysis is a modified logistic regression. It also implies running a simple logistic regression; however, in order to take matching into account, it is suggested to include dummy variables for each pair of observations. However, this model also has its pitfalls: when the degrees of freedom for the likelihood ratio chi-square is quite large relative to the number of observations, it is argued that the model might provide biased estimates for the variables' coefficients. The third option applicable for matched data is a conditional logistic regression. This type of logistic regression was specifically developed in order to deal with matched or stratified samples. Overall, these approaches can provide quite different results, and in order to reveal which model is the most suitable for a specific case, different measures of model fit must be applied.

In total, for an IPO decision research, we run 9 regressions using different methodologies and variables' compositions, and Table 4 in Appendix E presents the results obtained with them. As long as there were no correlations between any of the variables that would not allow including them in one model, in one of the specifications we include both proxies for profitability simultaneously. Additionally, the size variable is reported for all the models; though, due to matching, the coefficients are not significant and do not provide any evidence on the relationship.

The first two specifications reported are simple logit models where, apart from the presented variables, in the first case dummies for each country and observation year were included as controls, and in the second case, a dummy for each pair was included. The value for the Pseudo R-square appears to be considerably larger for the second specification; however, it is widely argued in the econometrics literature that this statistic should be treated

with caution when deciding on a model's goodness of fit, as in a logistic regression it does not mean what it means in OLS regression, i.e. the proportion of variance of the dependent variable explained by the predictors. Thus, throughout the study, we use measures of information, namely AIC and BIC, that are recognized as a robust way to compare the relative plausibility of different models. Using these measures leads to a contradicting conclusion about the more appropriate model specification, as a model with smaller values for Information Criteria is considered to be more appropriate.

We report only the models where profit margin is used as a proxy for profitability, as it appeared to have more predictive power over the dependent variable and improve the model fit. However, in both cases it appears to be not significant even at the 10% significance level. Thus, when applying the conditional logit methodology, we first look at the relationship between the profitability measures and listing decision separately. However, even when we isolate the effects of other variables, both ROA and profit margin do not appear to be significant predictors of the listing decision of a company in our sample. The same holds when all financial parameters are included in the model in specifications (5) and (6). Regarding the latter models, it should be noted that, according to both AIC and BIC, using conditional logistic regression improves the model fit remarkably compared to both specifications of a simple logistic regression.

Thus, we proceed with conditional logit model and develop it further by adding industry controls in specifications (7), (8) and (9). With the inclusion of additional variables the value for the Pseudo R-square increases suggesting improvements in the model; however, this effect might be misleading. Indeed, the value of BIC starts growing, which reflects the ability of information measures to penalize for including variables that do not significantly improve a model, unlike Pseudo R-square measure. On the other hand, AIC value starts decreasing with inclusion of industry controls. Thus, with the differences in model fit statistics being relatively small, it might be concluded that the three considered specifications are all valid for the analysis.

Overall, the results obtained with all the specifications are consistent. Leverage, growth in sales and the ratio of interest expense to total liabilities appear to be significant predictors of a company's decision to go public next year. Additionally, the level of risk shows up as a significant predictor in most of the models; though, its effect is less definite.

Next, we take a closer look at the variables of interest and discuss the results obtained for them. The first hypothesis proposed in the current paper stated that ***“Profitability positively affects the probability of going public for a company from an emerging***

European country”. However, in all of the regression specifications tested we document no significant relationship between profitability of firms and their decision to list on a stock exchange, i.e. this characteristic of a company does not appear to have predictive power over the listing decision. Though not significant, ROA enters all regressions with a small positive coefficient. In turn, profit margin appears in different specifications both with a positive and negative sign; however, all coefficients are very small, and the effect of changes in profit margin would be negligible, if the coefficients were significant.

At first sight such an outcome seems surprising, as most of the previous studies documented strong relationship between profitability and the decision to go public even using various proxies. However, such an outcome could be partially explained by the great diversity prevailing in developing economies, which leads to very different listing motives of companies in emerging markets. From one side, most companies from emerging markets that list their shares are of quite moderate size, if evaluating on a global scale. Consequently, it could be assumed that such companies mostly go public with a purpose to raise capital, as their profitability level is not sufficient to cover operating expenses and new investments. Often these companies choose secondary lists, as the costs associated with listing are smaller compared to main markets.

At the same time, largely observed inequality in emerging markets is expressed also by the existence of very large and highly profitable companies. These companies may not seek additional financing, but rather list in order to improve their image and exploit the benefits of higher visibility and greater liquidity, which is consistent with Fischer (2000) and Pagano et al. (1998), who showed that financing needs may not appear to be a significant motive for going public. Additionally, according to the proposition of Ritter (1991), companies can manipulate with the IPO timing in order to conduct listing specifically when profitability is high, even if they know it is a short-term phenomenon. The expectations in this case are that investors will be misled and the shares will be overvalued. This hypothesis is also supported by the findings of Myers et al. (1984), who report that managers tend to approve listing only if they perceive their company to be overvalued.

Consequently, these two types of companies, which pursue different motives and differ in financial parameters, could be balancing each other, and, as a result, profitability appears to be not a significant predictor of going public.

Next we move to the discussion of the results related to our second hypothesis, namely the proposition that *“Riskiness level is a significant determinant of the probability of a company from an emerging European market to go public, and the relationship is*

positive". Different models appear to provide mixed evidence regarding the level of riskiness of a company and its propensity to list. While in simple logistic regressions it shows up with a high level of significance, in conditional logit models it appears among significant predictors only in three specifications and only at the 10% significance level. Nevertheless, the estimated coefficient is consistently positive, suggesting that companies with higher intangibles share, or riskier companies, have a higher probability to list during one year than their less risky peers.

One of the explanations for a positive relationship can be found in findings of Pagano et al (1998), who point out that the owners of companies with high levels of risk have greater incentives to pursue diversification strategy and list their shares in order to divest from large involvements in companies that might produce big losses in case of financial distress. This proposition is also supported by Huyghebaert and Hulle (2005), who state that at a certain point the owners may not want to invest more of own wealth in the business, and thus, start looking for external financing opportunities. Also Albornoz and Pope (2004) suggest that with large investments in their companies, owners become overexposed to the risk, and one of the ways to mitigate it is by conducting an IPO.

Though, the observed positive relationship is consistent with a number of previous findings, other researchers got more uncontroversial results, e.g. Mayur and Kumar (2007) and Fischer (200) document highly significant relationship, and both were using the same proxy for riskiness as used in the current study. However, the difference between the results might be attributable to the fact that both studies concentrate on particular markets: India and Germany, respectively. While India is also in the list of emerging countries, it is not comparable to the countries in our sample due to its size, as well as institutional and political dissimilarities. Additionally, it is well-known that India serves as a hub for information service companies around the world; thus, it is not surprising that there are many companies with high proportion of intangibles. Further, taking into account remarkable development and expansion of the sector, it is not surprising that many its representatives conduct IPOs. In the case of Germany other barriers arise that make us doubt the results for this market are comparable to the ones got for emerging countries. Though, Germany is also a European country, its level of economic and financial development has been considerably higher than in emerging European countries; and according to McKinsey, high-tech sector has traditionally been one of the major drivers of the country's growth. Thus, it is not surprising that there is a high concentration of high-tech companies in the country, which could affect the results reported by Fischer (2000).

Overall, with the mixed evidence provided by the model and the barriers that do not allow to support observed in some specifications relationship with generalized conclusions from other papers, we refrain from making any irrevocable statements regarding the validity of the hypothesis statement.

Next we turn to the last hypothesis proposed for this part of the analysis, namely that ***“Leverage positively affects the probability of a company from an emerging European market to list on a stock exchange”***. The coefficient on the ratio of debt to assets appears to be significant at the 1% significance level in all model modifications, and consistently shows a negative relationship between the level of indebtedness and the probability of a company to go public.

Such an outcome is quite surprising: as it was discussed in the literature review section, most of the studies find leverage to be positively related to the probability of listing. The obtained result provides evidence that the pecking order theory, which states that companies favor internal financing, but being forced to turn to external markets, prefer debt over equity, does not necessarily hold in emerging markets. And it appears that the evidence documented in the literature can support such a conclusion, e.g. Seifert and Gonenc (2009) specifically focused on investigating whether the pecking order theory holds in emerging markets and showed that debt is not a primary source of external financing for companies from these markets, which contradicts to the theory.

Again, as in the discussion of profitability effects, we propose that a possible explanation for the observed relationship could be firms' incentives. Such a statement is consistent with Albornoz and Pope (2004), who also document negative relationship in their study of the UK market and explain it by other motives that firms' appear to pursue when conducting an IPO. However, these motives might not be the same for companies listing on LSE and on stock exchanges of emerging markets. Among the most valuable benefits of listing on LSE is a substantial increase in liquidity and visibility worldwide. In turn, one of the main motives for companies in emerging markets that list on a regional exchange can be showing the ability to comply with higher reporting standards and fall under stricter monitoring procedures, i.e. to signal its quality. This incentive is especially big for companies that have business partners in more developed countries, who might expect lower governance quality from firms in emerging countries. Moreover, a company's owners themselves may want to improve corporate governance in the company by the means of listing.

Another potential explanation could be that the cost of debt even for less levered companies is relatively high in emerging markets, therefore, debt financing is too expensive here.

Overall, though, the discussed explanations are only propositions that must be investigated in the future taking into account specificities of emerging markets, the existence of a negative relationship between debt level and probability to go public is established to hold for companies from emerging countries.

After examining the variables of interest, we also briefly discuss other results of the regression. Consistent with the previous studies, growth in sales enters all the models with a positive and statistically significant coefficient. The result gives additional support to the financing motive showing again that growing companies tend to turn to equity markets in order to obtain financing to continue their development.

The estimated coefficient for cost of liabilities also appears to be in-line with our expectations: the more costly it is for the company to get a new or maintain an old debt, the greater is the probability that it will turn to another source of capital that might appear cheaper. When looking at the propensity of companies from different industries to go public, it appears that wholesale and retail companies are less likely to list their shares comparing to professional service firms and this effect is significant at the 1% significance level. This finding contradicts to the propositions of Helwege and Packer (2001), who suggest that retail companies with large client base should have a larger propensity to list, as they can exploit the benefits of visibility and publicity. However, the authors did not find any significant relationship in their sample. The contradiction of the results could also be related to the fact that in this study wholesale and retail companies are merged; thus the former could mitigate the proposed effect. At the same time, manufacturing companies seem to list more readily; however, this relationship is not significant even at the 5% significance level.

Decision to cross-list

Next, we address the question related to the factors that determine the propensity of companies to cross-list their shares. As it was already mentioned in the descriptive statistics section, the sample for this kind of analysis is very uneven with observations for not cross-listed companies dominating the sample. This issue is addressed by the study of King and Zhang (2001), which is one of the most cited papers on the topic of rare events. In their paper the authors discuss a number of complex methodologies and corrections for rare event studies; however, the authors admit that employing this methodologies has its downsides.

They also mention the trade-off between the result improvements and application of time-consuming procedures, and, thus, state that the effects of the correction models are significant enough and should be applied for samples with the small number of observations and events constituting less than 5% of a sample. Consequently, as the collected sample has relatively large number of observations, the proportion of cross-listed companies is above the threshold and matching was not done in order to see how sample firms naturally differ in size. We will apply a simple logistic model for this analysis, and the results are presented in Table 5 in Appendix E.

First, we run two regressions using only firm-specific variables, i.e. the specifications as the ones presented in columns (7) and (8) in table 4 in Appendix E where we researched companies' decisions to go public. It should be noted that in this sample the correlation between two proxies for profitability is significantly larger and exceeds 70%; thus, no specification includes both variables simultaneously.

The two specifications using different performance measures appear to be roughly equal in terms of model fit; however, ROA enters the regression with a statistically significant coefficient, while profit margin does not appear to be a good predictor of a listing event again.

Though, the same variables are used in specifications (7)-(8) of table 4 and (1)-(2) of table 5, the difference between the models' fit statistics is prominent. As this part of analysis deals with firms' decisions to internationalize, inclusion of country-specific variables must add to the models' goodness of fit.

Specifications (3)-(6) provide results of regressions with different composition of proxies for profitability and the level of shareholder protection. Overall, it appears that using LLSV anti-director index improves the model, while different profitability measures do not influence the fit. Consequently, based on our judgment, we chose ROA out of performance measures and LLSV out of shareholder protection indexes to proceed with further specifications.

In the last two regressions we control for years. In specification (7) years are represented as dummy variables. In turn, in specification (8) we define only three dummies that correspond to three time periods: (2005-2006), (2007-2009) and (2010-2012). These periods can be characterized as prosperity, crisis and high uncertainty years. Though, both specifications considerably improve the values of information measures, the model with dummies for each year appears to perform much better. Nevertheless, the model with three

periods could become useful when compiling the grading table for listing suggestions, which is discussed further.

First we look at firm-specific variables. Our fourth hypothesis states *“Profitability positively affects the probability of cross-listing for a company from an emerging European country”*. Similar to our first sample when we investigated determinants of going public, both profitability measures appear to possess no predictive power over the event of listing. The coefficients for profit margin are negligible and vary in signs with different model specifications. ROA is more consistent, showing signs of a positive relationship; however, again, the coefficients are small and not determinative. In one of the specifications ROA appears with a statistically significant coefficient; however, the significance vanishes as we add country-specific variables suggesting that part of their effects was incorporated by ROA.

This contradicts to the findings of Caglio et al. (2011) who document that firms that are more likely to internationalize have lower return on assets than their domestically-listed peers; however, they admit that the significance of the variable may change from a regression to regression due to the fact that another variable, namely, sales growth, accounts for performance. We specifically check for correlations between sales growth and profitability measures in our sample, and they appear to be 0.078 and 0.099 for profit margin and ROA, respectively. Such correlation allows including variables in one model; nevertheless, we run additional regression where we don't include the variable sales growth. All the main specifications appear not to show significant differences in both the coefficients on profit measures and their significance levels. The absence of the effect suggests that ROA and profit margin do measure different things, as e.g. the growth in sales could be the effect of inflation, while profit margin largely mitigates its effect.

In turn, findings of Cetorelli and Peristiani (2010) support our results, as the authors also fail to document significant differences between ROA of cross-listed and not cross-listed firms. As in the case of IPO decision, this result provides evidence that companies that list their shares pursue very different motives: for some companies with not sufficient internal funds the primary goal appears to be capital raising, while more profitable companies are motivated by non-financial reasons such as broadening shareholder base and gaining more visibility, etc.

Insignificant coefficients before profitability measures may indicate that companies from the studied emerging markets do not use cross-listing for signaling their quality, even though Fedulova and Kuzmyn (2008) cite signaling as one of the reasons for Ukrainian firms going abroad. The reason why our results contradict to the ones by Fedulova and Kuzmyn

(2008) may be a better information environment in the EU. It is easier for investors to assess performance of a listed company from a EU-based emerging economy than from the Ukraine; therefore, there are fewer incentives for such companies to signal about their performance by cross-listing.

Next, we look at how the variable on growth in sales enters the regressions. The hypothesis we proposed is: ***“Sales growth positively affects the probability of a company from an emerging European country to cross-list”***. Sales growth appears as a statistically significant predictor of a cross-listing at the 1% significance level in all the regression modifications. Though the coefficients vary from model to model, they are consistently positive, which means that companies with higher growth in sales are more likely to cross-list their shares during a one year period. This result is similar to the one obtained in the first part and to the one reported by Claessens and Schmukler (2007) and Cetorelli and Peristiani (2010), who also find that firms that cross-list have significantly higher sales growth.

The obtained result supports a proposition that even within one region there are differences in listing motives, as the positive relationship documented for our emerging markets does not appear in the paper of Pagano et al. (2002), who study cross-listings of companies from the Western Europe. This can be intuitively explained with the fact that in order to continue growing a company has to expand and develop. However, the local market might be too small and underdeveloped, which limits a company's growth opportunities. This statement is especially relevant for emerging countries, as most of them are relatively small, and some companies just overgrow the market and need to search for new expansion destinations.

Other firm-specific variables also appear to produce interesting results. The level of risk is statistically significant also in this model; however, its effect became much smaller compared to the regression in the first part, and now it enters the regression with a negative sign. This means that companies with higher level of risk have a smaller propensity to cross-list their shares. In first part this relationship was mostly explained with owners willing to diversify their commitment to risky companies; consequently, after the owners already achieved the optimal diversification level, the motive loses its importance. Additionally, listing in a foreign country also bears risks itself, e.g. political, economic, exchange rate risks, etc. Thus, it is highly probable that a company which is already involved in a risky business would not want to expose itself to even higher level of risk.

The effect of leverage on the probability of listing abroad is different from the results obtained in the first part, when we looked at the effect of leverage on the probability of going

public. Here it appears that firms with higher level of debt tend to cross-list their shares. Combining both results, it appears that companies from emerging markets might have preferences towards domestic equity and debt markets: first they turn to local markets preferring equity over debt financing, then turn to debt financing, and only after all the domestic financing options are exerted they look for capital in foreign markets. This proposition lies on the assumption from the study by Lins, Strickland and Zenner (2000) that an access to foreign capital markets is the main reason for cross-listing.

Like in previous studies we also document a positive relationship between the size and the probability to cross-list with larger companies having greater incentives to attract foreign investors by accessing international capital markets and abilities to cope with high listing costs and expenses that may occur if the listing is not successful. Claessens and Schmukler (2007) mention that larger companies probably have less information asymmetry due to a more structured way of operations, which creates a larger market for their stock, thus, they have more incentives to list abroad in order to capture foreign demand. The result supports the findings of Doidge et al. (2009), Pagano et al. (2002), Claessens and Schmukler (2007) and Caglio et al (2011), who also show that larger companies are more likely to internationalize.

Next, we take a closer look at country-specific variables.

Our sixth hypothesis states: ***“There is a positive relationship between the level of the home country’s trade openness and the probability of a company to cross-list”***.

In our regression modifications trade openness appears to be positively related to the decision to cross-list at the 1% significance level. The more integrated a country is into the global economy; the higher is the probability that its companies will cross-list. This variable can serve as a rough proxy for the familiarity of foreign markets with the home country and vice versa. If a country trades a lot, there are many international partners for whom companies would like to become more visible. In general, emerging countries are mostly characterized as open economies and, thus, it is very important for companies from developing markets to be noticed abroad.

Additionally, as according to Claessens and Schmukler (2007) and Caglio et al. (2011) firms that are more likely to internationalize generally come from domestic environments with better macroeconomic conditions, the significant positive effect of the country’s trade openness to the cross-listing decision appears to contribute to the previous literature on the topic, as growth in a country’s trade volumes implies improvements in its overall macroeconomic environment.

Further, we hypothesized that *“There is a positive relationship between the level of the home country’s institutional development and the probability of a company to cross-list”*.

We have data on two shareholder protection rights’ measures and we check the effect of each of them on the probability of cross-listing separately. It appears that while the updated LLSV index is not a significant predictor of the probability of listing, original LLSV anti-director index shows a significant negative relationship meaning that companies from countries with worse protection tend to list on foreign markets. This supports the proposition found in previous literature (Moel, 2001; Karolyi, 2004) that companies list abroad in order to overcome disadvantages of domestic markets.

Indeed, considering that emerging markets are generally characterized by low shareholder protection levels, listing abroad and bonding itself to better information disclosure standards may be one of a few options for companies from developing countries to achieve better corporate governance. Pursuing this goal is also important for companies in order to signal their ability to comply with higher requirements, as this may attract a larger number of international business partners.

Another country-specific variable is GDP per capita, which measures the economic development of countries.

However, somewhat surprisingly, GDP per capita appears significant only in several regression specifications, and, even being significant it exerts only a minimal influence over the decision of companies to cross-list. This might be attributable to the fact that financial development of a market is more important than economic. Though, on the other hand, probably correlation between these two characteristics should be present. Another explanation for the insignificance of GDP per capita as a predictor of cross-listing activity in the present study would be the relative similarity of economies studied; therefore, small variance in the GDP per capita figure comparing to, e.g., Claessens and Schmukler (2007), who find that GDP per capita as a significant predictor of a firm’s listing abroad in a sample of firms from 111 different countries.

Cross-listing timing decision

While inspecting the data, we noticed that a considerable share of companies that cross-list do it in the same year when an IPO was conducted; while, there are other companies that wait for some time after listing domestically and before cross-listing abroad. Thus, we decided to run a number of additional regressions in order to research whether there

is a difference in the effects of the determinants of the decision to cross-list between companies which cross-list at the time of IPO and the ones that cross-list later. In order to do so, we take the sample of cross-listings and divide it in two parts: firms that did not cross-list at the time of IPO are denoted as 1, and those, which cross-listed the same year, as 0.

It appeared that approximately 35% of the sample consists of companies that cross-listed at the IPO year. Not taking into account the set of industries denoted as “other” in the current study, most of the “fast cross-listings” come from the manufacturing industry.

We conducted different regressions reported in table 6 in Appendix E. In this sample, interestingly, profit margin has statistically significant negative coefficients. This means that companies which are more profitable a year before an IPO are more probable to cross-list during the same year as an IPO. This result gives an interesting insight, as now we look at cross-listed companies, which are relatively large and might issue equity due to reasons other than capital rising. However, it appears that the evidence from our sample of emerging economies does support the hypothesis that companies tend to “time” their foreign listings when profitability is higher in order for their shares to be overvalued.

The effect of leverage on the probability of cross-listing later than IPO appears to be positive and significant in most regression modifications. This means that more indebted companies do not cross-list immediately after an IPO, but decide to wait for some time. This can be attributed to the fact that companies achieve their equity capital raising goals already by listing domestically; therefore, there is no need for them to seek for financing abroad.

Interest expense over total liabilities is significant in all models and predicts that the higher cost of debt is, the lower is the probability to cross-list later. It might be explained by the fact that companies cross-list in order to access equity financing from foreign markets when debt financing becomes too expensive.

Out of macroeconomic variables, whose effect was tested, only GDP per capita has a significant effect on the probability of listing later. It tells that companies from countries with larger GDP per capita, or better developed countries, are more likely to postpone their cross-listing decision, which is consistent with Caglio et al. (2011), who also research the timing of a foreign entry and conclude that companies list abroad in order to overcome macroeconomic disadvantages of a domestic market.

Other variables we tested do not appear to significantly influence the timing of a cross-listing decision for companies from our sample. The relationships observed provide evidence that companies that are more likely to cross-list in the year of IPO generally are more profitable, have lower leverage and face higher cost of debt than the ones which cross-

list later. Therefore, it appears that, against the pecking order theory, they exploit more options of equity capital raising: list both domestically and abroad instead of raising funds through bond markets.

After presenting the findings obtained in this study, we should also note that a number of factors could influence our results. First, merging data from different sources leads to a trade-off between the size of a sample and the level of accuracy. As discussed in the data section, we take a number of measures to mitigate the possible bias; however, it is possible that this does not eliminate it entirely. Additionally, as some data were hand-collected, there is a possibility of errors taking place. We should also note that omitted variable bias might be present in our study. Though, the authors used Information Criterion measures, which showed that with sequential inclusion of our variables, improvements in the models became very small, there is a small chance that our model does not include all predictors.

6. Practical application

The last section of our report is devoted to presenting a practical guiding tool developed based on the empirical results obtained, which would allow providing a quick and simple suggestion on whether a company should list its shares or not. We believe that the development of such a practical tool is of high importance, as most of the previous papers contain only theoretical discussions of results and lack presentations of their implication in the real world, which in the end is the ultimate goal of any research.

In order to obtain coefficients based on which the grading table is built, we use simple logit regressions, as with this methodology it is possible to estimate the intercept and compute probabilities for the sample, not for specified pairs, like in conditional logit regression. In the first sample case instead of including all dummies for years and countries, we use the variable GDP per capita. This measure is the same for one country for the same year (our control parameters); thus, by including GDP per capita, we get a similar effect of matching by years and domestic countries. The model fit statistics show that there is no big difference between using dummies or GDP per capita in terms of goodness-of-fit. Also, it should be noted that we don't include size or total assets in the table. As we matched our observations by this variable, the difference between the values for companies that go public and stay private is minimal, and thus, the coefficient on assets is negligible and close to 0.

For the second sample we use regression specification (8) from the table 5 in Appendix E. Here, instead of dummies for every year, we use dummies for 3 periods: prosperity (before 2007), economic downturn (2007-2009) and high volatility and uncertainty time (2010-2012). Such a division allows the grading system to be more straightforward and illustrative. We do acknowledge that there are certain caveats in such classification, as the years of different economic development stages slightly differ from country to country. However, the effect of different economic conditions' dynamics is taken into account by the variable GDP per capita, and the proposed periods reflect just general conditions perceived to prevail the European economy at the time of observation; thus, they are more easily identifiable, simplifying the use of the grading tool for managers.

Appendix F presents the developed guiding system ready for practical use. The system consists of two separate tables: the first table is developed for private companies that consider public listing, and the second one can be addressed both by public companies that consider cross-listing and private companies that are advised to go public and consider cross-listing in the same year. Apart from the tables, the system includes clear and concise user guidelines, which makes it possible to get listing suggestions for all kinds of users with minimum effort.

Additionally, we illustrate the application of the tool by modeling hypothetical listing decisions of 10 Latvian companies in Appendix G.

7. Concluding remarks

In this study we attempted to investigate the determinants of a firm's decisions to go public and cross-list in a foreign market. In spite of the fact that at the moment developing countries show high IPO activity and are considered to have large growth potential, it appeared that the existing literature fails to provide evidence on the determinants of listing decision that could be applicable to companies from European emerging countries. This paper shows that the relationships between a number of determinants and the listing decision are different for developed and emerging markets.

We identify three main aspects in which our research is unique and which determine our contribution to the research on the issue. First, we present a broad literature survey that discusses the listing issue from different perspectives and presents a comprehensive overview of the knowledge about public offerings accumulated up to this moment. Next, we collect a new broad data sample from a number of different sources and use it for our empirical

analysis. Finally, we systemize the obtained evidence in the guiding table, which presents practical application of our results and provides an opportunity to get simple and fast suggestions regarding listing for managers of different companies with their particular characteristics.

In our empirical analysis we document a number of unexpected conclusions. We find that for companies from European emerging markets the level of profitability does not appear to influence the decision to go public or cross-list. Such an outcome contradicts to the previous findings, which shows that emerging markets are very distinctive. We explain this with a great diversity that prevails developing markets, which leads to the fact that companies may list seeking for different benefits depending on their level of profitability. We find another relationship that contradicts to most of the previous research when examining the effect of leverage on the decision to go public. Companies with lower level of indebtedness appear to have a higher probability to list. This finding suggests that the pecking order theory of financing does not hold in European emerging markets, and firms that go public are not motivated by financial needs, but rather other incentives, e.g. signaling the quality. Our analysis provides mixed evidence on the relationship between a company's riskiness and its probability to go public, in such a way the diversification motive for listing does not find adequate support in European emerging markets.

Further, we find that, in contrast to companies from developed markets of Western Europe, studied by Pagano et al. (2002), firms in emerging European countries show a higher propensity to cross-list when their sales growth is higher. Operating in relatively small economies, these companies are more likely to outgrow their markets and seek for further expansion opportunities abroad.

We also look at the relationship between the environments in which countries operate and their probability to cross-list. Greater global integration of an economy tends to facilitate international listings, as companies may seek for higher level of visibility in partner-countries. Also we find that companies from countries with worse shareholder protection are more likely to list abroad, which provides additional support for the relatively new bonding hypothesis.

Finally, we conduct additional tests and document that more profitable companies with lower level of indebtedness that face higher cost of debt are more probable to cross-list in the same year when an IPO was conducted.

Our results provide a number of valuable insights on the issue of listing for companies from European emerging markets. However, it should be noted that there are some factors

which could influence our results. First, merging data from different sources leads to a trade-off between the size of a sample and the level of accuracy. As discussed in the paper, we take a number of measures to mitigate the possible bias; however, it is possible that this does not eliminate it entirely. Further, we build our practical guiding table on the basis of a number of simplifications; thus, we highlight the fact that it provides only suggestions regarding listing, and the results should not be treated as definitive and irrevocable; every company has its own distinctive features that must be taken into account on an individual basis.

Making its contribution to the existing literature on public offerings, this study raises a number of issues that must be investigated further. First, our analysis does not provide definite evidence on the relationship between riskiness and the probability to go public, which contradicts to most previous studies. Thus, further research is required in order to understand whether diversification hypothesis of going public holds in European emerging countries. Additionally, in our study we only touch the issue of timing when considering cross-listing cases; while a deeper investigation of this issue in European emerging countries could complement the current study in its attempt to shed light on the issue of listing in the region.

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Appendices

Appendix A

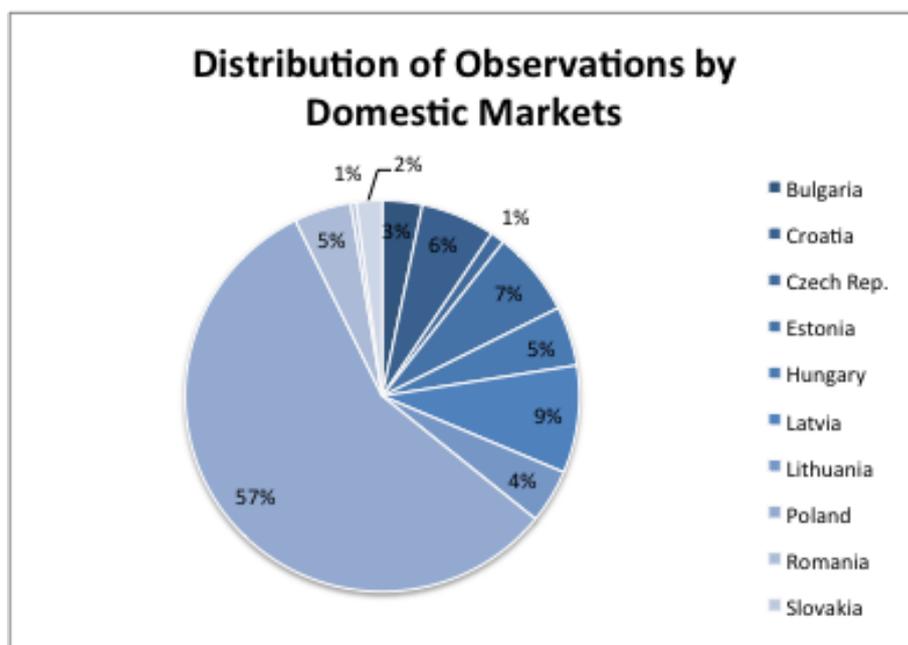


Figure 1. Distribution of observations by domestic markets. Created by the authors.

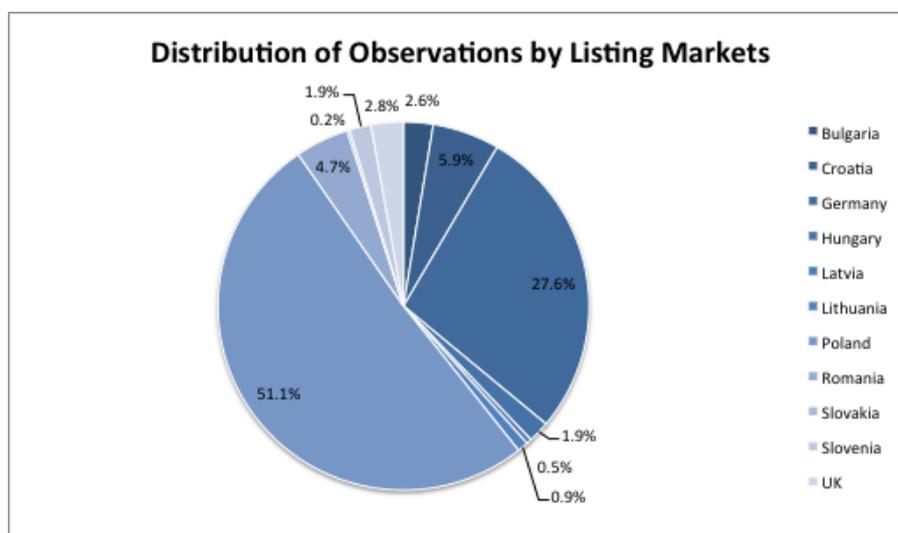


Figure 2. Distribution of observations by listing markets. Created by the authors.

Appendix B

Table 1
Shareholder protection indexes

	LLSV	Updated LLSV
Bulgaria	3	18
Croatia	4	23
Czech Republic	3	13
Estonia	2	19
Hungary	2	15
Latvia	2	17
Lithuania	3	24
Poland	2	15
Romania	2	19
Slovakia	2	10
Slovenia	4	16

Appendix C

Table 2. Descriptive statistics for the 1:1 matched sample of listed and not listed companies.

	mean	sd	median	min	max
<u>Not listed</u>					
Ln (Total Assets)	16.9377	2.0067	17.1261	10.1146	21.9576
Profit Margin (%)	5.9474	26.6387	3.7600	-88.2300	99.8600
Intangible to Total Assets	0.0062	0.0167	0.0007	0.0000	0.1507
Debt to Total Assets	0.5500	0.3682	0.5361	0.0010	2.8266
Sales Growth	0.1344	0.5925	0.0913	-1.0088	3.2796
Interest expense to total liabilities (%)	0.0679	0.1487	0.0330	0.0000	1.6601
ROA (%)	3.7228	16.2584	2.9000	-75.0300	66.3100
<u>Listed</u>					
Ln(Total Assets)	16.9197	2.0884	17.1292	9.2859	23.3170
Profit Margin (%)	3.8786	23.5281	3.3600	-98.8200	91.9900
Intangible to Total Assets	0.0304	0.0796	0.0025	0.0000	0.6324
Debt to Total Assets	0.4233	0.2932	0.4090	0.0003	2.6650
Sales Growth	0.2103	0.5954	0.1116	-0.9435	3.7291
Interest expense to total liabilities (%)	0.7246	0.5663	0.7044	0.0007	3.2436
ROA (%)	3.9058	11.7344	3.1600	-59.4000	65.8300
<u>Total</u>					
Ln(Total Assets)	16.9287	2.0462	17.1277	9.2859	23.3170
Profit Margin (%)	4.9130	25.1306	3.4450	-98.8200	99.8600
Intangible to Total Assets	0.0183	0.0587	0.0014	0.0000	0.6324
Debt to Total Assets	0.4867	0.3386	0.4559	0.0003	2.8266
Sales Growth	0.1724	0.5947	0.1039	-1.0088	3.7291
Interest expense to total liabilities (%)	0.3963	0.5283	0.0748	0.0000	3.2436
ROA (%)	3.8143	14.1657	2.9750	-75.0300	66.3100
<i>N</i>	566				

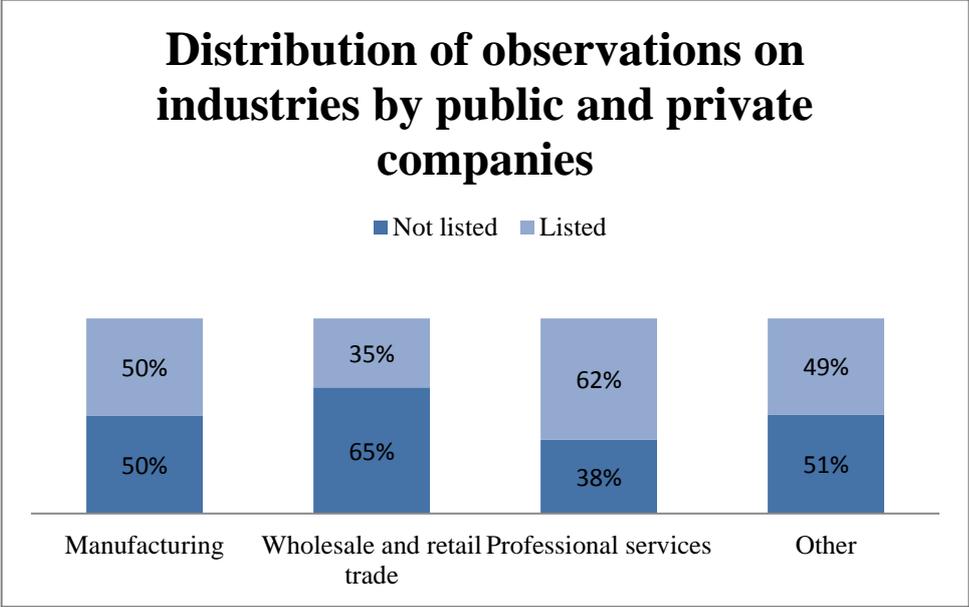


Figure 3. Distribution of observations on industries by public and private companies. Created by the authors

Appendix D

Table 3. Descriptive statistics for the sample of cross-listed and not cross-listed companies.

	mean	sd	median	min	max
<u>Not cross-listed</u>					
Ln(Total Assets)	17.2581	1.9726	17.4274	7.6283	23.6204
Profit Margin (%)	4.6883	20.0694	4.3000	-98.2500	97.5900
Intangible to Total Assets	0.0545	0.1180	0.0026	0.0000	0.8894
Debt to Total Assets	0.3600	0.2882	0.3738	0.0000	1.7787
Sales Growth	-0.2758	0.7882	-0.0927	-4.9465	1.0000
Interest expense to total liabilities (%)	0.3342	3.1571	0.0548	0.0000	67.9221
ROA (%)	3.7103	12.9883	3.9300	-98.2500	107.0100
GDP pc	11554.12	3303.207	12303	3481	27015
Trade openness	90.5969	22.3208	85	51	180
LLSV	2.4016	0.7575	2	2	4
Updated LLSV	16.6987	2.9472	15	10	24
<u>Cross-listed</u>					
Ln(Total Assets)	19.1604	2.6021	18.9916	13.8277	24.5400
Profit Margin (%)	7.5640	16.0172	5.5050	-37.2700	56.0000
Intangible to Total Assets	0.0393	0.0679	0.0073	0.0000	0.2296
Debt to Total Assets	0.4586	0.2478	0.4482	0.0005	1.0032
Sales Growth	0.0438	0.3451	0.0027	-0.8105	1.5478
Interest expense to total liabilities (%)	0.2073	0.6980	0.0324	0.0000	5.9986
ROA (%)	4.5513	11.1674	4.8100	-25.4400	32.3499
GDP pc	12377.37	2637.601	11889.5	6403	27015
Trade openness	113.5423	32.8354	89	77	177
LLSV	2.1761	0.4504	2	2	4
Updated LLSV	17.2183	2.7005	17	13	24
<u>Total</u>					
Ln(Total Assets)	17.3894	2.0784	17.4992	7.6283	24.5400
Profit Margin (%)	4.8868	19.8264	4.4500	-98.2500	97.5900
Intangible to Total Assets	0.0535	0.1154	0.0031	0.0000	0.8894
Debt to Total Assets	0.3664	0.2867	0.3795	0.0000	1.7787
Sales Growth	-0.2556	0.7717	-0.0832	-4.9465	1.5478
Interest expense to total liabilities (%)	0.3263	3.0623	0.0533	0.0000	67.9221
ROA (%)	3.7664	12.8740	3.9600	-98.2500	107.0100
GDP pc	11610.95	3267.762	12303	3481	27015
Trade openness	92.1809	23.9082	85	51	180
LLSV	2.3860	0.7425	2	2	4
Updated LLSV	16.7346	2.9332	15	10	24
<i>N</i>	2042				

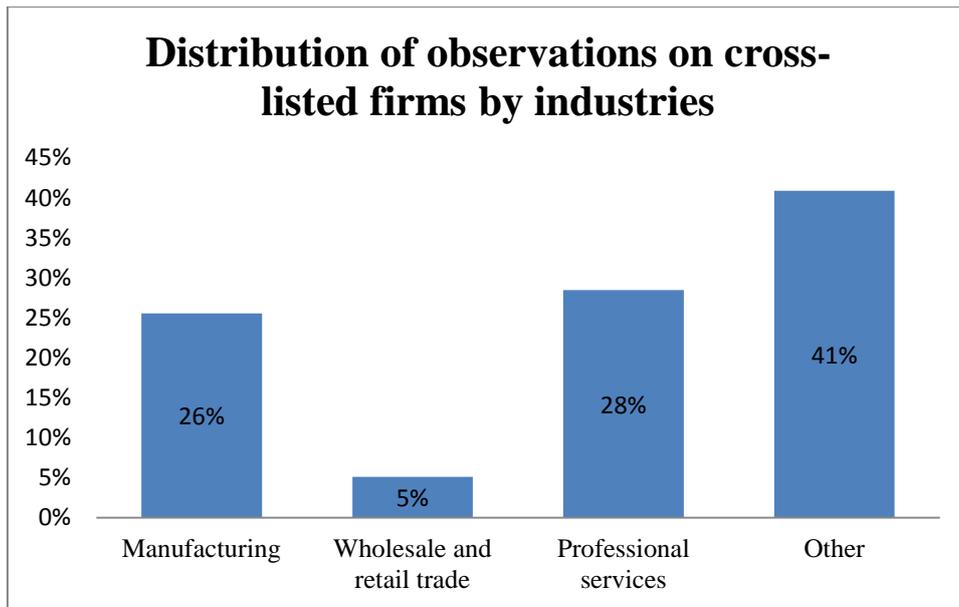


Figure 4. Distribution of observations on cross-listed firms by industries. Created by the authors.

Appendix E

Table 4. Results. Listed/not listed

The table presents results of logistic (logit) and conditional logistic (clogit) regressions. The dependent variable equals one if a firm has a public listing and zero if a firm is privately owned. Robust standard errors corrected for heteroskedasticity are presented in parentheses. ***, **, * denote that a coefficient is significant at the 1%, 5%, and 10% levels, respectively. The economic relevance of the coefficients can be computed as the effect of a one unit change of independent variables on the percentage change of the odd ratio of the probability of a foreign listing, which is $(e^{\beta}-1)*100$.

	Logit (1)	Logit (2)	Clogit (3)	Clogit (4)	Clogit (5)	Clogit (6)	Clogit (7)	Clogit (8)	Clogit (9)
Total assets	1.12e ⁻¹⁰ (1.11e ⁻¹¹)	1.25e ⁻⁹ (2.65e ⁻⁹)	2.33e ⁻⁹ (2.39e ⁻⁹)	2.44e ⁻⁹ (2.34e ⁻⁹)	3.69e ⁻¹⁰ (9.74e ⁻¹⁰)	3.69e ⁻¹⁰ (9.66e ⁻¹⁰)	6.27e ⁻¹⁰ (1.88e ⁻⁹)	8.25e ⁻¹⁰ (2.43 ⁻⁹)	6.41e ⁻¹⁰ (1.95e ⁻⁹)
Profit margin	0.0038 (0.0059)	-0.0131 (0.0147)	-0.0025 (0.0035)		0.0020 (0.0098)		-0.0066 (0.0102)		-0.0103 (0.0124)
Intangibles/TA	18.9162*** (4.6298)	24.5283** (10.7572)			13.3259* (7.5694)	13.3860* (7.4797)	12.2642 (7.6065)	12.3870 (7.6880)	12.5544* (7.5850)
Debt/TA	-1.7373*** (0.4701)	-6.3783*** (1.1154)			-2.5982*** (0.6932)	-2.5902*** (0.6855)	-3.1891*** (0.7887)	-3.1053*** (0.7685)	- 3.2284** *
Sales growth	0.6344*** (0.2238)	2.4140*** (0.6880)			1.1506** (0.4569)	1.1419** (0.4582)	1.2070** (0.4864)	1.1543** (0.4927)	1.1907** (0.4932)
Interest expense to total liabilities	7.5624*** (7.5624)	17.2630*** (2.2447)			8.0194*** (1.3881)	8.0365*** (1.39954)	8.6315*** (1.5873)	8.6413*** (1.5838)	8.6755** *
Return on assets				0.0011 (0.0060)		0.0059 (0.0161)		0.0013 (0.0154)	0.0103 (0.0194)
Manufacturing (industry)	-0.1352 (0.4347)	-2.0889** (0.9272)					-1.0444 (0.6556)	-1.0352 (0.6489)	-1.0683 (0.6570)
Trade (industry)	-0.9879** (0.4347)	-5.0418*** (1.2834)					-2.5209*** (0.9078)	-2.3321*** (0.8537)	- 2.5423** *
Other (industry)	-0.2218 (0.3716)	-2.4991** (1.0296)					-1.2496* (0.7281)	-1.2645* (0.7322)	-1.2977* (0.7326)
Observations	566	566	566	566	566	566	566	566	566
LR Chi ²		630.51	4.99	4.52	305.05	305.15	315.25	314.85	315.54
Prob> Chi2		0.0000	0.0824	0.1042	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R ²	0.5514	0.8036	0.0127	0.0115	0.7776	0.7778	0.8036	0.8025	0.8043
AIC	397.968	720.135			99.268	99.176	95.067	95.472	96.778
BIC	497.756	1947.957			125.299	125.208	134.115	134.519	140.164

Table 5. Results. Domestically listed/Cross-listed

The table presents results of logistic regression. The dependent variable equals one if a firm is cross-listed and zero otherwise Robust standard errors corrected for heteroskedasticity are presented in parentheses. ***, **, * denote that a coefficient is significant at the 1%, 5%, and 10% levels, respectively. The economic relevance of the coefficients can be computed as the effect of a one unit change of independent variables on the percentage change of the odd ratio of the probability of a foreign listing, which is $(e^{\beta}-1)*100$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Total assets)	0.4418*** (0.0614)	0.4434*** (0.0615)	0.5541*** (0.0785)	0.4999*** (0.0780)	0.5639*** (0.0788)	0.5037*** (0.0792)	0.5795*** (0.0885)	0.5744*** (0.0837)
Profit margin	0.0061 (0.0044)				-0.0045 (0.0056)	0.0006 (0.0046)		
Intangibles/TA	-2.8244*** (1.0335)	-2.9304*** (1.0324)	-5.7873*** (1.3462)	-4.0483*** (1.1685)	-5.7952*** (1.3462)	-3.9454*** (1.1479)	-6.6963*** (1.9408)	-6.4226*** (1.6910)
Debt/TA	1.0764*** (0.3428)	1.1981*** (0.3682)	1.4494*** (0.5139)	1.9279*** (0.4193)	1.3751*** (0.4705)	1.8416*** (0.3925)	1.1308 (0.7569)	1.2633** (0.5548)
Sales growth	1.2460*** (0.2580)	1.2502*** (0.2545)	0.9660*** (0.2095)	1.0444*** (0.2109)	0.9605*** (0.2077)	1.0401*** (0.2121)	0.6667* (0.3513)	1.1731*** (0.2850)
Interest expense to total liabilities	0.0063 (0.0175)	0.0075 (0.0181)	0.02252 (0.0174)	-0.0004 (0.0177)	0.0251 (0.0180)	0.0011 (0.0173)	0.0325* (0.0167)	0.0529*** (0.0181)
Return on assets		0.0194** (0.0106)	0.0014 (0.0095)	0.0093 (0.0106)			0.0011 (0.0126)	0.0010 (0.0116)
GDP pc			-0.00002 (0.00003)	-0.0001*** (0.0000)	-0.00002 (0.00003)	-0.0001*** (0.0000)	-0.0002** (0.0001)	-0.00003 (0.0000)
Trade Openness			0.0342*** (0.0035)	0.0309*** (0.0033)	0.0344*** (0.0036)	0.0313*** (0.0034)	0.0554*** (0.0067)	0.0473*** (0.0052)
LLSV			-1.2873*** (0.2111)		-1.2994*** (0.2067)		-1.6012*** (0.3541)	-1.3574*** (0.2363)
Updated LLSV				0.0095 (0.0261)		0.0099 (0.0270)		
2005-2006								-3.2455*** (0.4638)
2007-2009								-2.5522*** (0.3695)
Manufacturing (industry)	-0.3956** (0.2088)	-0.4152** (0.2054)	-0.2153 (0.2223)	-0.2422 (0.2011)	-0.2422 (0.2280)	-0.2462 (0.2156)	0.6916** (0.3313)	-0.5016** (0.2371)
Trade (industry)	-1.0677*** (0.3944)	-1.1028*** (0.3864)	-0.8706** (0.3838)	-0.6745* (0.3974)	-0.8860** (0.3899)	-0.6736* (0.4046)	-0.0965 (0.4670)	-1.2052*** (0.3872)
Other (industry)	0.9067*** (0.1882)	0.8882*** (0.1867)	0.7189*** (0.2081)	0.9001*** (0.1957)	0.7376*** (0.2107)	0.9202*** (0.1963)	3.6125*** (0.4478)	-0.6902** (0.3391)
Observations	2042	2042	2042	2042	2042	2042	2042	2042
Wald Chi ²	109.38	109.08	210.58	151.52	208.79	147.57	273.90	214.51
Prob> Chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R ²	0.1849	0.1875	0.3161	0.2666	0.3166	0.2658	0.5350	0.4237
AIC	795.484	792.993	676.704	723.742	749.253	724.568	482.441	578.275
BIC	851.701	849.209	749.786	796.824	676.171	797.650	594.875	662.600

Table 6. Results. Cross-listed at the year of IPO/Cross-listed later

The table presents results of logistic regression. The dependent variable equals one if a firm's cross-listing happens later than during one year after an IPO and zero otherwise. Robust standard errors corrected for heteroskedasticity are presented in parentheses. ***, **, * denote that a coefficient is significant at the 1%, 5%, and 10% levels, respectively. The economic relevance of the coefficients can be computed as the effect of a one unit change of independent variables on the percentage change of the odd ratio of the probability of a foreign listing, which is $(e^{\beta}-1)*100$.

	(1)	(2)	(4)	(5)	(6)
Ln(Total assets)	0.2333** (0.1054)	0.1689** (0.0824)	0.0226 (0.1420)	0.0529 (0.1340)	-0.4114** (0.1989)
Profit margin	-0.0687*** (0.0228)		-0.0508** (0.0202)	-0.0548*** (0.0204)	-0.0597** (0.0278)
Intangibles/TA	2.0027 (1.8883)	2.9295 (2.2146)	4.0222 (2.7665)	4.5254 (2.8686)	-1.3197 (2.8230)
Debt/TA	0.8630 (1.0088)	1.0589 (1.0756)	2.4153** (1.2658)	2.5707** (1.2361)	2.8476** (1.3987)
Sales growth	0.5298 (0.7259)	-0.2329 (0.8026)	0.6917 (0.9725)	0.4759 (1.0201)	1.8373 (1.4776)
Interest expense to total liabilities	-4.5883*** (1.4535)	-4.3863** (1.7302)	-6.3970*** (1.5366)	-6.5416*** (1.5917)	-3.2698* (1.9353)
Return on assets		-0.0284 (0.0247)			
GDPpc			0.0006*** (0.0002)	0.0006** (0.0002)	0.0003 (0.0005)
Trade Openness			-0.0209** (0.0113)	-0.0172 (0.0110)	-0.0804*** (0.5240)
LLSV			0.6945 (1.0045)		0.5240 (1.1776)
Updated LLSV				-0.0259 (0.1156)	
Year controls					Yes
Manufacturing (industry)	-0.4918 (1.2725)	-0.0305 (0.9336)	-0.5711 (1.0279)	-0.3187 (1.0363)	1.1675 (1.5807)
Professional activities (industry)	0.2129 (1.3209)	0.7068 (1.1241)	0.8419 (1.1872)	0.9088 (1.2245)	2.0956 (2.0722)
Other (industry)	-0.2954 (1.1875)	-0.1135 (0.9182)	-0.0369 (0.9646)	0.1017 (0.9812)	1.5903 (1.7660)
Observations	137	137	137	137	137
Wald Chi ²	31.37	25.79	51.10	47.73	54.21
Prob> Chi2	0.0003	0.0022	0.0000	0.0000	0.0000
Pseudo R ²	0.2169	0.1426	0.3629	0.3585	0.4793
AIC	159.920	173.184	139.836	140.611	131.028
BIC	189.120	202.384	177.795	178.571	186.507

Appendix F

The following practical tool is created to assist managers in their listing decision. The tool represents a table with ranges on different variables and number of points to be added or deducted if your company belongs to the range. First, a recommendation on whether to go public or remain private is produced, then, if the first recommendation is to go public, a recommendation on whether to cross-list is produced.

Decision 1. Go public or remain private?

First a company's starting points are identified according to the industry the company operates within:

Industry	Manufacturing	Trade	Professional activities	Other
Starting points	-0.44	-1.41	-0.43	-0.66

Next, points are added to or deducted from the starting points according to points assigned to the ranges of values on variables. For example, if a company's profit margin is between 3.46% and 10.17%, one should add 0.03 points to his/her starting points. Next, if a company's share of intangible assets is between 0.1% and 1%, 0.1 points are added to the amount of points it has after adding/deducting points for profit margin, etc. In the end you arrive at a recommendation whether to go public or not according to the logistic transformation of the total number of points collected.

<i>Variable</i>	<i>Value range</i>	<i>Points</i>
Profit margin	< 0.13%	-0.18
	0.13% - 3.45%	+0.01
	3.46% - 10.17%	+0.03
	> 10.17%	+0.23
Intangibles/TA	< 0.1%	0
	0.1% - 1%	+0.1
	> 1%	+2.79
D/TA	< 0.23	-0.21
	0.23 - 0.46	-0.61
	0.47 - 0.69	-1
	> 0.69	-1.96
Sales growth	< -12.4%	-0.33
	-12.4% - 10.4%	0
	10.41% - 32.5%	+0.13
	> 32.5%	+0.94
Interest expense/Total liabilities	< 0.02	+0.07
	0.02 - 0.07	+0.34
	0.071 - 0.7	+2.83
	> 0.7	+10.51
GDP per capita in USD	< 8958	-0.4
	8958 - 11229	-0.64
	11230 - 12303	-0.75
	> 12303	-1.14

After calculating the total number of points, perform a logistic transformation:

$$f(t) = \frac{1}{1 + e^{-t}}$$

where t is the total number of points and f(t) is the result for a company. For the sake of simplicity it may be assumed that $e=2.72$

- $f(t) < 0.25$ – strongly advised against going public
- $f(t) > 0.75$ – strongly advised to go public
- $f(t) 0.25 - 0.5$ – advised against going public
- $f(t) 0.5 - 0.75$ – advised to go public

Decision 2. Domestic listing only or cross-listing?

The table below presents starting positions depending on the global state of economy (prosperity, crisis or uncertain) and a company's industry (manufacturing, professional activities, trade or other). You should find your starting points in the table according to the current state of economy and the industry a company operates within.

	Manufacturing	Professional activities	Trade	Other
Boom	-16.47	-15.96	-16.48	-16.65
Crisis	-15.77	-15.27	-16.48	-15.96
Uncertain	-13.22	-12.72	-13.92	-13.41

After finding the starting point you should proceed with assigning points according to the value ranges a company belongs to. The table presents value ranges on common firm-specific and macro-specific variables, as well as the number of points assigned for each of the value ranges. For example, if the natural logarithm of a company's total asset figure is between 16.23 and 17.50, it should add 9.69 points to the amount of starting points it obtained; if its Return on assets is lower than 0.15%, 0.02 points should be deducted from the amount of points obtained after adding points for $\ln(\text{total assets})$ to the starting points, etc.

In the end the logistic transformation of the total number of points obtained will lead to a recommendation.

<i>Variable</i>	<i>Value range</i>	<i>Points</i>
Ln(Total assets)	< 16.23	+8.17
	16.23 – 17.50	+9.69
	17.51 – 18.74	+10.41
	>18.74	+11.9
ROA	<0.15%	-0.02
	0.15% - 3.96%	+0.002
	3.97% - 8.77%	+0.007
	> 8.77%	+0.02

<i>Variable</i>	<i>Value range</i>	<i>Points</i>
Intangibles/TA	< 0.002%	0
	0.002% - 0.3%	-0.01
	0.31% - 4.3%	-0.15
	> 4.3%	-1.93
D/TA	< 0.08	+0.05
	0.081 – 0.38	+0.29
	0.381 – 0.58	+0.6
	> 0.58	+1
Sales growth	< -0.36	-2.39
	(-0.359) – (-0.079)	-0.26
	(-0.079) – 0.10	+0.01
	> 0.11	+0.54
Interest expense/Total liabilities	< 2.65%	0
	2.66% - 5.33%	+0.002
	5.34% - 9.7%	+0.004
	> 9.71%	+0.09
LLSV	2	-2.71
	3	-4.07
	4	-5.43
Trade openness*	< 82	+3.14
	82.1 - 85	+3.95
	85.1 – 89	+4.11
	> 89.1	+6.19
* ((Imports+Exports)/GDP)*100%		
GDP per capita	< 10330	-0.21
	10331 – 12303	-0.33
	12304 – 13463	-0.37
	> 13464	-0.5351

After calculating the total number of points, you are asked to perform a logistic transformation:

$$f(t) = \frac{1}{1 + e^{-t}}$$

where t is the total number of points and f(t) is the result for the company. For the sake of simplicity it may be assumed that e=2.72

- f(t) < 0.25 – strongly advised against cross-listing
- f(t) 0.25 - 0.5 – advised against cross-listing
- f(t) 0.5 - 0.75 – advised to cross-list
- f(t) > 0.75 – strongly advised to cross-list

Appendix G

Practical illustration of the use of the tool by modeling the decision to go public

In order to illustrate the practical use of the tables of recommendations we randomly chose 10 Latvian companies which are not publicly listed and randomly assigned them years in a range from 2005-2012 for which the recommendation on whether to list would be modeled.

Table 7. 10 random Latvian unlisted companies.

Company	Assigned year	Industry	ROA	Intangibles/T A	D/TA	Sales growth	Interest expenses/ Total liabilities	GDP pc
ORLEN LATVIJA SIA	2008	Trade	5.85	0.00008	1.68	0.66	0.001	12638
STATOIL FUEL & RETAIL LATVIA SIA	2007	Trade	8.69	0.00373	0.51	0.75	0.038	8713
LUKOIL BALTIJA R SIA	2012	Trade	6.52	0.00375	0.58	0.21	0.067	12726
NESTE LATVIJA SIA	2005	Trade	2.03	0.00268	0.83	0.07	0.072	5950
LATTELECOM SIA	2012	Professional activities	10.13	0.03409	0.17	-0.04	0.005	12726
LATVIJAS MOBILAIS TELEFONS SIA	2011	Professional activities	29.07	0.11238	0.16	-0.19	0.017	10723
ITERA LATVIJA SIA	2012	Other	10.91	0.00298	0.30	0.44	0.105	12726
BOLDERAJA SIA	2010	Manufacturing	-5.95	0.00033	0.88	-0.01	0.030	11476
TELE2 SIA	2011	Professional activities	36.74	0.08054	0.15	-0.21	0.012	10723
TAMRO SIA	2010	Trade	6.38	0.00000	0.56	-0.01	0.014	11476

Table 8. Recommendations on whether to list for 10 random Latvian unlisted companies

Company	Starting points	Points for ROA	Points for intangibles	Points for D/TA	Points for sales growth	Points for interest expenses	Points for GDPpc	Total	Transformation, F(t)
ORLEN LATVIJA SIA	-1.41	0.01	0	-1.96	0.94	0.07	-1.14	-3.49	0.03
STATOIL FUEL & RETAIL LATVIA SIA	-1.41	0.01	0.1	-1	0.94	0.34	-0.4	-1.42	0.20
LUKOIL BALTIJA R SIA	-1.41	0.01	0.1	-1	0.13	0.34	-1.14	-2.97	0.05
NESTE LATVIJA SIA	-1.41	0.01	0.1	-1.96	0	2.83	-0.4	-0.83	0.30
LATTELECOM SIA	-0.43	0.23	2.79	-0.21	0	0.07	-1.14	1.31	0.79
LATVIJAS MOBILAIS TELEFONS SIA	-0.43	0.23	2.79	-0.21	-0.33	0.07	-0.64	1.48	0.81
ITERA LATVIJA SIA	-0.66	0.03	0.1	-0.61	0.94	2.83	-1.14	1.49	0.82
BOLDERAJA SIA	-0.44	-1.18	0	-1.96	0	0.34	-0.75	-3.99	0.02
TELE2 SIA	-0.43	0.23	2.79	-0.21	-0.33	0.07	-0.64	1.48	0.81
TAMRO SIA	-1.41	0.01	0	-1	0	0.07	-0.75	-3.08	0.04

Consequently, if, e.g., a company Orlen Latvija were considering going public in 2008, the tool would strongly advise the company not to do so, as its transformation of points is 0.03 (lower than 0.25).

However, if, e.g., Lattelecom company considered going public in 2012, the table would advise it to do so as its F(t) is 0.79, which is higher than 0.75.

The 4 companies which were advised to obtain a public listing can proceed with the next decision – whether to list domestically only or cross-list.

Practical illustration of the tool by modeling the second decision

Data on 4 companies, which were advised to go public, as well as the number of points assigned to each through this practical tool and their logistic transformation, is presented in the tables below.

Table 9. 4 Companies eligible for cross-listing

Company name	Assigned year	Industry	Ln(Total assets)	ROA	Intangibles /TA	D/TA	Sales growth	Interest exp/Total liab	GDP pc	Trade openness	LLSV
LATTELECOM SIA	2012	PROFESSIONAL ACTIVITIES	19.86	16.61	0.034	0.17	-0.04	0.005	12726	122	2
LATVIJAS MOBILAIS TELEFONS SIA	2011	PROFESSIONAL ACTIVITIES	19.29	27.5	0.112	0.16	-0.19	0.017	10723	109	2
ITERA LATVIJA SIA	2012	OTHER	18.86	7.55	0.003	0.30	0.44	0.105	12726	122	2
TELE2 SIA	2011	PROFESSIONAL ACTIVITIES	18.66	26.53	0.081	0.15	-0.21	0.012	10723	109	2

Table 10. Recommendations on whether to cross-list for 4 Latvian unlisted companies which were advised to list

Company name	Starting points	Points for ln(total assets)	Points for ROA	Points for intangibles	Points for D/TA	Points for Sales growth	Points for interest/liabilities	Points for GDPpc	Points for trade openness	Point for LLSV	Total	Transformation, t(f)
LATTELECOM SIA	-12.72	11.9	0.02	-0.15	0.29	0.01	0	-0.37	6.19	-2.71	2.46	0.92
LATVIJAS MOBILAIS TELEFONS SIA	-12.72	11.9	0.02	-1.93	0.29	-0.26	0	-0.33	6.19	-2.71	0.45	0.61
ITERA LATVIJA SIA	-13.41	11.9	0.02	-0.01	0.29	0.54	0.09	-0.37	6.19	-2.71	2.53	0.93
TELE2 SIA	-12.72	11.9	0.02	-1.93	0.29	-0.26	0	-0.33	6.19	-2.71	0.45	0.61

According to the practical tool developed, the recommendations for the four unlisted companies which were advised to list are the following: Lattelecom SIA and Itera Latvija SIA are strongly advised to cross-list as their logistic transformation of points is >0.75 ; Latvijas Mobilais Telefons SIA and TELE2 SIA are also advised to cross-list as their total number of points is >0.5 , though, it is lower than 0.75; therefore, the recommendation, which comes from a calculated probability of a successful listing, is not that strong.