

Additional cross-listing from the UK to the US: Motivations and effect on firm's performance

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Abstract

The aim of this paper is twofold. First, we try to understand the reasons that explain the decision made by companies with UK cross-listing to cross-list their shares in the US. Second, we study the impact of cross-listing on value creation. Our results shown that the motivations for such decision are related to the improvement of stock price informativeness and investor protection interests. Firms may also be motivated by reasons related to the global business strategy. However, the commitment to higher disclosure requirements and geographic proximity act negatively on the decision to cross-list. By applying a methodology taking into account the endogeneity of the cross-listing decision, we found results that support the positive effect of cross-listing on performance. The finding also revealed the existence of an indirect impact of the cross-listing decision through its determinants on performance.

Keywords: Cross-listing; Price informativeness; Performance

EFM classification codes : 330 ; 360 ; 210

1. Introduction

Since the 1980, a substantial number of firms have chosen to cross-list their shares in overseas markets. This phenomenon has attracted the interest of several researchers. So, an interesting scientific debate on the motivations and consequences of cross-listing emerged and which empirical confrontations have led to heterogeneous and ambiguous results.

Although the interest in the cross-listing subject dates from the nineteen eighties, the topic has seen a resurgence of interest; and a brief look at the recent studies (Esqueda, 2017; Esqueda and Jackson, 2015; Ghadhab, 2016; Ghadhab and Hellara, 2016 a, b; Wang and Zhou, 2015) is sufficient to understand the importance and magnitude of such a subject. This debate has recently taken on a new turn in light of an important cross-listing trend. This is essentially because a substantial number of firms are with multiple foreign listings. (Ghadhab, 2016; Ghadhab and Hellara, 2016 a, b; You et al. 2013). However, understanding this cross-listing trend is still limited and the motivations and benefits of listing abroad remain so as an open question since earlier literature has focused on dual-listed stocks and little works has been devoted to multiple-listed ones. Our study fits into this new framework and tries to contribute to the existing literature by addressing several issues.

In particular, Major American exchanges (the New York Stock Exchange (NYSE), the American Stock Exchange (Amex), and Nasdaq) and the London Stock Exchange (Main and alternative markets) collectively represent the most important foreign listing destinations in the world. It is now almost acknowledged in the literature that cross-listing in the US or in the UK, in addition to the local listing, comes with the most relevant benefits compared to other foreign destinations in the world (Dodd and Louca, 2012; Ghadhab and Hellara, 2016a, b; Roosenboom and Van Dijk, 2009; Sarkissian and Schill, 2009; Serra, 1999). Our first contribution in this paper is to try to come with sufficient answers to the following important and unanswered questions: why firms with UK cross-listing make the decision to list their shares in the US exchanges? And to what extent this decision of an additional cross-listing affects firm performance? More particularly, we ponder upon on the impact of additional cross-listing on the firm performance, and recheck this relationship in interaction with various factors related to the reasons supporting the cross-listing decision.

We expect that our results follow, to some extent, the great majority of previous researches, which show that firm value improves around cross-listing in the US. The methodology used by earlier literature is mainly based on an event study to compute and analyze price reaction around cross-listing.¹ In this paper we renew the analysis within the new framework of multiple-listed firms, by proposing an appropriate methodology considering the endogeneity effect of the cross-listing decision. In fact, it is only after assessment and control of the selection bias, as well as the taking into consideration of the endogeneity of this process that the net and real effect of cross-listing on performance may appear. The methodology proposed in our paper also allows us to investigate countries and firms' characteristics affecting the nature of the relationship existing between cross-listing and performance. These characteristics are related to the motivations of cross-listing.

To analyze possible determinants of the decision of an additional cross-listing, we refer to an abundance of prior literature showing that the decision to cross-list and therefore a possible performance gain post-cross-listing is related to several traditional considerations. Firms list their shares abroad to overcome market segmentation (Abdallah and Ioannidis, 2010; Miller, 1999; Sarkissian and Schill, 2009; You et al. 2013), to benefit from a better information environment (Amira and Muzere, 2011; Bailey et al. 2006; Lang et al. 2003; Lee and Valero, 2010), to enhance liquidity (Abdallah et al. 2011; Domowitz et al. 1998; Foerster and Karolyi, 1998; Silva and Chavez, 2008), and to better protect minority shareholders' interests (Doidge, 2004; Doidge et al. 2007; Doidge et al. 2009; Reese and Weisbach, 2002; You et al., 2013). Cross-listing may also be related to geographic and culture concerns as shown by Dodd et al. (2013) and Sarkissian and Shill (2004). Our second contribution in this paper is inspecting whether the improvement in stock price informativeness explains the decision made by firms to make an additional cross-listing in the US. To our knowledge, our paper is the first to provide a direct empirical evidence for this prediction.

This study aims to further contribute to the cross-listing literature by providing new evidence using a unique and comprehensive sample of 99 firms cross-listed in the US and the UK. Our main results are as follows. First, we found that firms have chosen the US markets as a foreign destination in addition to the UK cross-listing in order to benefit from better protection of minority shareholders' interests and an improvement in stock price

¹ See for example Bris et al. (2007), Foerster and Karolyi (1999), Lee (2003), Miller (1999), Mitto (2003), Roosenboom and Van Dijk (2009), Serra (1999).

informativeness. Companies may also make such a decision for reasons related to their global business strategy. However, the access to better informational environment and geographic proximity affects negatively the cross-listing decision. Regarding the effect on firm performance, the simultaneous estimation equation showed that the decision to cross-list in the US comes with better valuation. The effect of geographic proximity was found negative and significant in the cross-listing decision equation, allowing us to conclude that managers head for the US market as a dissimilar geographic country to overcome informational barriers and thus benefit from a better valuation. Our analysis also showed significant indirect effect of the price informativeness and global business strategy considerations on the firm performance, but with a positive sign. However, no indirect significant effect on firm value was found for legal and informational disclosure concerns.

This paper is organized as follows. In Section 2 we review the literature and present grounds for our testable hypothesis. Section 3 describes the data, the variables and the methodology. In Section 4, we discuss the empirical results. Finally, Section 5 concludes this paper.

2. Theories and hypotheses

In this section, we review the literature regarding the motivations of cross-listing. These explanations are related to market segmentation, legal and informational environment, geographic proximity, global business strategy and stock price informativeness. We also develop theoretical hypotheses to test if the decision of cross-listing affects firm performance. Obviously, the cited literature is used to develop theoretical hypothesis for our new analytical framework related to the decision to make a cross-listing in the US in addition to the UK cross-listing.

2.1 Motivations for cross-listing

2.1.1 Market segmentation hypothesis

The most extensively examined reason for cross-listing is the segmentation hypothesis. Undeniably, firms make a decision to list their shares abroad in order to overcome market segmentation. The theoretical models by Alexander et al.(1987), Errunza and Losq (1985) and Stapleton and Subrahmanyam (1977) suggest that, under partial or complete segmentation, domestic investors require a higher rate of returns on foreign security compared to their home

securities. By making a decision to cross-list, firms can overcome international investment barriers and make their stocks more accessible to investors. In turn, improved stock investability increases the shareholders base and risk sharing, thereby leading to a lower cost of capital.

Based on the arguments cited above, we have the following testable hypothesis:

H1: Overcoming market segmentation explains the decision made by a firm with a UK cross-listing to cross-list their shares in the US.

2.1.2 Legal bonding hypothesis

Another reason for cross-listing is the commitment to higher standards of investor protection in order to protect minority shareholders' interests. This is known as the bonding hypothesis originally put forward by Coffee (1999, 2002) and Stulz (1999) and empirically supported by Doidge (2004), Doidge et al. (2007) and Reese and Weisbach (2002), who show that cross-listing in the US enhances the degree of investor protection. The hypothesis suggests that the private benefit of control increases the risk to outsiders (i.e. minority investors) and subsequently the required return on the firm's equity. This prevents the insiders (the controlling shareholders/ managers) from raising the required capital and limits their ability to finance future growth opportunities. The insiders will decide to cross-list on foreign exchange with higher investor protection regulations, if the size of the increase in the public value of shares is relatively larger than the fall in the private benefit. This lowers the risk of expropriation by the insiders and increases the public value of the firm's shares, enabling the firms to issue equity at a lower cost of capital (Abdallah and Ioannidis, 2010). LaPorta et al. (1997, 1998) show that the US has the highest level of investor protection compared with other countries. Empirically, Pagano et al. (2001) and Reese and Weisbach (2002) find that firms from countries with weaker protection of shareholders interests choose to cross-list in the US. Huang et al. (2013), O'Connor (2006) and Doidge (2004) provide empirical evidence for the legal bonding hypothesis by showing that cross-listing in the US improves firms' governance quality appreciated through the independence of the audit committees and the board of directors, as well as the levels of private benefit of control.

Based on the arguments cited above, we have the following testable hypothesis:

H2: Improving the protection of minority shareholders explains the decision made by a firm with a UK cross-listing to cross-list their shares in the US.

2.1.3 Information disclosure hypothesis

Listing in a country with better accounting standards allows the company to commit itself to greater transparency, and thereby reducing the monitoring costs of its shareholders and their required rate of returns. Fuerst (1998) developed a theoretical model to explain the increasing number of listings by foreign firms on American exchanges in 1990 and show that corporate managers make a decision to cross-list in a country with better disclosure standards to disseminate more information about the firm's future prospects and quality. In addition, theoretical models of Amira and Muzere (2011), Chemmanur and Fulghieri (2006) and Huddart et al.(1999) suggest that firms choose to cross-list on the exchange with the strictest disclosure requirements in order to benefit more from cross-listing in terms of cost of capital and liquidity. Empirically, Lang et al. (2003) and Lee and Valero (2010) show that cross-listing is associated with an enhanced informational environment. The authors show that non US firms cross-listed in the US enjoy greater visibility and subsequently facilitate investor recognition. Finally, greater information disclosure after cross-listing leads to higher market valuation and improved stock's liquidity (Abdallah et al. 2011; Amira and Muzere, 2011;Bailey et al. 2006; Chemmanur and Fulghieri, 2006; Eaton et al. 2007; Fuerst, 1998; Lang et al. 2003;Lang et al. 2012; Roosenboom and Van Dijk, 2009)

Based on these theoretical and empirical arguments, we formulate the following hypothesis:

H3: Improving firm's information environment explains the decision made by a firm with a UK cross-listing to cross-list their shares in the US.

2.1.4 Proximity preference hypothesis

Dodd (2013) reports that familiarity with the firm's country of origin provides an informational advantage to investors who become more willing to trade. Firms anticipate this and choose to cross-list their shares in markets where investors have a significant amount of relevant information about them. Similarly, Dodd et al. (2013) outline that, as investors are more likely to invest in familiar firms and corporate managers tend to avoid possible conflicts with informational disparate investors and managers, firms are more likely to cross-list in countries similar to their home one in order to maximize the benefits from cross-listing in

terms of increase in shareholders base. Geographic proximity can be considered as a measure of stock's familiarity to foreign traders since it can affect information flow between foreign and local markets (Coval and Moskowitz, 1999; Pulatkonak and Sofianos, 1999; Sarkissian and Shill, 2004; Portes and Rey, 2005). Empirically, Sarkissian and Shill (2004) show that geographic proximity is the most important determinant of the decision to cross-list. The authors found out that companies going abroad tend to list preferably in neighboring markets. For example, firms from the Benelux countries (Belgium, the Netherlands, and Luxembourg) tend to cross-list in Benelux countries, Canadian and Latin American firms in the US, Irish firms in the UK, and New Zealand firms list heavily in Australia and vice versa. Such clustering in the choice of destination markets indicates a preference for familiarity in the cross-listing decision (Sarkissian and Shill, 2004).

Based on the arguments cited above, we have the following testable hypothesis:

H4: Geographic proximity consideration explains the decision made by a firm with a UK cross-listing to cross-list their shares in the US.

2.1.5 Global business strategy hypothesis

Earlier studies have shown that cross-listing is an integrated part of the firm's global business strategy. The company seeks, through listing its securities on foreign markets, to increase its foreign operations and to make investors aware of its global importance. They also want to increase its visibility and investors recognition, to engage in stock option plans for foreign employees as well as in mergers and acquisition operations, to provide better access to its products and to access external capital to finance their growth opportunities (Bancel and Mittoo, 2001, Mittoo, 2003, Pagano et al. 2002, Saudagaran, 1988). The company can achieve these benefits if it has an increasing degree of internationalization (Pagano et al., 2002). Based on a questionnaire sent to the corporate managers, Bancel and Mittoo (2001) find out that internationally-oriented firms with a significant degree of foreign operations are more likely to cross-list. According to the business strategy hypothesis, the decision to cross-list is related to the firm's specific factors such as industrial belonging which represent an important determinant of the cross-listing decision (Bancel and Mittoo, 2001; Fanto and Karmel, 1997; Dodd and Luca, 2012; Doidge et al. 2009; Mittoo, 2003; Pagano et al. 2001, 2002; Sarkissian and Shill, 2004). Sarkissian and Shill (2004) suggest that investors are likely to be familiar with firms that produce internationally traded goods.

Based on the arguments cited above, we have the following testable hypothesis:

H5: Global business strategy consideration explains the decision made by a firm with a UK cross-listing to cross-list their shares in the US.

2.1.6 Stock price informativeness hypothesis

Proving that the improvement in stock price informativeness is a direct motivation of cross-listing is an open question that was not analyzed by earlier theoretical or empirical literature.

Gul et al. (2010) report that efficient capital allocation could be better achieved when stock prices reflect accurately and timely all of the available firm-specific information. Theoretical predictions developed by Dow and Gorton (1997) and Subrahmanyam and Titman (1999) show that managers can learn information from stock prices that affect significantly investment decision (Morck et al., 1990), and more informative prices lead to more efficient investment decisions (Durnev et al., 2004). In other words, better stock price informativeness improves the ability of firms to generate and exploit growth opportunities through better use of resources, which leads to better investment decisions. Managers can be aware of that benefit and tend to cross-list their companies' shares in markets that provide more efficient stock prices. When returning to earlier literature, empirical evidences show that cross-listing in the US improves stock price informativeness. For instance, Ely and Salehizadeh (2001) find out, for a sample of dual-listed firms, that foreign market is the most important source of information pertinent to portfolio valuation. Fernandes and Ferreira(2008) find empirical evidence that cross-listing in the US improves stock price informativeness measured by firm specific stock return variation; i.e. the extent to which stock prices incorporate firm-specific information in an accurately and timely manner. The result was interpreted by the fact that the commitment to a higher level of disclosure standards attracts informed investors to trade on private information and so improves the stock price formation process. Similarly, Liu (2007) shows that cross-listing in the US results in more information being revealed, fed back and then impounded into local stock prices, thus creating a more efficient pricing process. In a similar line, several empirical evidences show that cross-listing in the US creates a more efficient price discovery process in that foreign market contributes significantly to price determination (Chen et al., 2013; Eun and Sabherwal, 2003; Frijns et al., 2010; Grammig et al., 2005; Korczak and Phylaktis, 2010; Lok and Kalev, 2006; Otsubo, 2014). Ghadhab and

Hellara (2016a) empirically show that cross-listing in the US is more beneficial than cross-listing in major European exchanges since American exchanges contribute more to price discovery of the firms listed abroad and consequently provide more efficient stock prices. In a latter search, Ghadhab and Hellara (2016b) provide empirical evidence by showing that the improvement in stock price informativeness around cross-listing in the American exchanges is the most responsible for valuation gain.

Based on the arguments cited above, we have the following testable hypothesis:

H6: Improving stock price informativeness explains the decision made by a firm with a UK cross-listing to cross-list their shares in the US.

2.2 Cross-listing and firm performance

The intuition behind this hypothesis is that the cross-listing decision, which can be related to different considerations discussed in section 2.1, affects the firm performance. Earlier empirical results have mainly concentrated on cross-listing in the US and generally showed that listing abroad improves firm value. Doukas and Switzer (2000), Errunza and Miller, (2000), Foerster and Karolyi, (1999), Hail and Leuz (2009) and Jayaraman et al. (1993) report a significant reduction in the cost of capital and positive stock price reaction around cross-listing that were explained by the overcoming of market segmentation. Doidge et al. (2004) show that non-US companies cross-listed in the US exhibit higher valuation compared to non cross-listed ones. Roosenboom and Van Dijk (2009) find out that better investor protection in the foreign market leads to positive price reaction after cross-listing in the US and the UK. Reese and Weisbach (2002) show that cross-listing is followed by greater subsequent equity issues for firms from countries with weaker investor protection. Amira and Muzere (2011), Chemmanur and Fulghieri (2006) and Fuerst (1998) assert that higher disclosure requirements following cross-listing lead to an increase in company's value. Empirically, Foerster and Karolyi (1999) show that positive price reaction around listing abroad is more important for firms cross-listed in the US, compared to the UK cross-listing. The difference in market reaction is associated, according to the authors, with the greater visibility that characterizes foreign companies listed in the US. Similarly, Eaton et al. (2007), Lang et al. (2003) and Roosenboom and VanDijk (2009) show that the improvement in a firm performance after cross-listing in the US is related to the commitment to higher disclosure requirements. Sarkissian and Schill (2009) and Ghadhab and Hellara (2016b) provide an empirical evidence

by displaying an improved firm value after cross-listing that can be explained by geographic proximity concerns. Ghadhab and Hellara (2016b) show empirically an improvement in firm performance that was mainly related to the improvement in price informativeness around cross-listing in the US. In fact, better stock price informativeness improves the ability of firms to generate and exploit growth opportunities through better use of resources, and therefore, cross-listing premium is more important (Ghadhab and Hellara, 2016b).

Therefore, we can assert that the cross-listing leads to value creation. In addition, some factors behind this decision may boost the intensity of the effect of cross-listing on firm value.

Based on the arguments cited above, we have the following testable hypothesis:

H7: The decision made by a firm with a UK cross-listing to cross-list their shares in the US leads to value creation.

H8: Value creation around cross-listing in the US is driven by some factors behind the decision to cross-list.

3. Data, variables and methods

3.1 Data

To construct our sample, we began by a large number of firms with US and UK cross-listing. US markets include NYSE, AMEX and NASDAQ; UK exchanges include MAIN and alternative markets, and the study period is from 1981 to 2013. Information about cross-listed firms can be found in Datastream, stock exchange web sites and bank of New York and J.P Morgan ADRs databases. All related listings for each stock are identified by the ISIN available in Datastream. Underlying ISINs for depository receipts are from the pre-mentioned ADRs databases. Both active and dead stocks are included in the sample in order to avoid survivorship bias and provide a complete chronology of cross-listing. To be included in the sample, a company must have an identifiable cross-listing date from Datastream. We also excluded preference stocks listing, Rule 144 as well as investment funds. Therefore, the sample only included the cross-listing of common shares and ADRs. Our final sample consisted of 99 firms, in which, 68 firms with UK cross-listing and have made an additional cross-listing in the US, and 31 firms with US cross-listing have made an additional cross-listing in the UK. Table A.1 in Appendix A describes the sample stocks.

3.2 Variables and methods

3.2.1 Cross-listing decision equation

The first step of our analysis is to investigate the reasons explaining the decision made by companies with UK cross-listing to cross-list their shares in the US as an additional foreign destination. The dependent and the explanatory variables are described as follows:

(a) Dependent variable:

For the cross-listing decision variable, we used a dummy variable, “**Cross-list**”, that takes the value of 1 if the company is with UK cross-listing and makes an additional cross-listing in the US, and 0 otherwise.

(b) Explanatory variables:

Main explanatory variables are related to the market segmentation, legal and informational environment, geographic proximity, global business strategy and stock price informativeness.

For the market segmentation hypothesis, and following Sarkissian and Schill (2004), we used an explanatory variable “**CRI**”, which is the correlation between the stock market returns of the home and foreign country. For legal considerations, we used the anti-director rights index of LaPorta et al. (1998), as a measure of the investor protection level. We also used the rule of law index from Djankov et al. (2008) and LaPorta et al. (1998) to take into account the degree of enforcement of the investor protection laws. Our explanatory variable is “**Legal**”, that is the difference in the level of investor protection between the foreign and home country.

We measured information disclosure with the accounting standards index of La Porta et al. (1998). Our explanatory variable is “**AS**”, which is the difference in the quality of the information environment between the foreign and home country. The effect of geographic proximity is analyzed using a dummy variable, “**Geography**” that equals 1 if the local and the foreign country are in the same time zone and 0 otherwise. Similarly to the work of Ghadhab (2016b), we considered 3 different time zones split by regions: the European and African region, the American region, the Australasia and Asian region. To test the business strategy hypothesis, we used the following proxies: 1/ “**Industry**”: Is a dummy variable equals 1 if the firm produces internationally traded goods and equals 0 otherwise. According to Sarkissian and Schill (2004), there are eight tradable industries: chemicals, consumer goods, electronics, manufacturing, health care, mining, oil and gas, and paper. There are also eight non-tradable industries: construction, financials, leisure, retail, support services, telecommunications, transportations and utilities. 2/ “**FS%TS**”: measures the amount of foreign sales as a percentage of total sales. The stock price informativeness hypothesis is

tested by using the country characteristics that are important in determining the price behavior of a market. The degree of financial development is considered as a factor for efficient capital allocation, and therefore is expected to affect positively the stock price informativeness (Wurgler, 2000; Fisman and Love, 2004). Total market capitalization and total number of listed stocks are used to proxy for the degree of financial development of an economy. Our first price informativeness proxies are so the following: 1/ **“LogCap”** is the logarithm of foreign market capitalization to local market capitalization; 2/ **“Listedcompany”** is the number of listed companies in the foreign market to the number of listed companies in the local market. Stock price informativeness hypothesis was also tested by using the degree of integration as the percentage of the market index return explained by the world market return and its own lagged return. To construct our explanatory variable, and similarly to Hsin and Tseng (2012), we have estimated the degree of the world market integration for market j with the following regression:

$$r_{jt} = \alpha + \beta_1 r_{wt} + \beta_2 r_{jt-1} + \varepsilon_{it} \quad (1)$$

Where, r_{jt} is the index return of market j on month t, r_{wt} is the world market index return on month t. The degree of world market integration at time t, is defined by R_j^2 , which is the percentage of variation in r_{jt} that is explained by the world market return upon its lagged return. Our third price informativeness proxy is defined by **“Integration”**, which is the ratio of the degree of world market integration for the foreign market to the degree of world market integration for the local market.

Saudagaran (1988) suggests that company size affects significantly the decision to cross-list. Empirically, Doidge et al (2009), Pagano et al (2002), and You et al (2013) show that firms with better quality are more likely to cross-list. We then control for firm size and quality. We use respectively the following variables: 1/ **“LogAssets”**: Is the natural logarithm of the total company assets. 2/ **“ROA”**: Is the Return on Assets ratio.

The estimated cross-listing decision equation is therefore as follows:

$$\begin{aligned} \text{Cross-list} = & a_0 + a_1 \text{CRI} + a_2 \text{Legal} + a_3 \text{AS} + a_4 \text{Geography} + a_5 \text{global business strategy} \\ & \text{proxy} + a_6 \text{price informativeness proxy} + a_7 \text{LogAssets} + a_8 \text{ROA} \end{aligned} \quad (2)$$

3.2.2 Joint Determination of Cross-listing decision and value creation

3.2.2.1 Model description

The second step of our analysis is to investigate the effect of the cross-listing decision on the firm value. To perform our investigation, we estimated a simultaneous equation related to value creation and cross-listing decision. We begin with the definition of our dependant and explanatory variables to subsequently describe our model. The dependent and the explanatory variables are as follows:

(a) Dependent variables:

We assessed the effect of cross-listing on firm value by computing the cumulative abnormal return, “**CAR**”, over the 20-months (-10, +10) period around the date of cross-listing. Abnormal returns are defined as market-adjusted returns estimated using a modified market model as follows:

$$AR_{it} = r_{it} - r_{mt} \quad (3)$$

Where AR_{it} are the abnormal returns of company i on month t , r_{it} is the return of company i on month t , r_{mt} is the local market return on month t . Company (markets) returns are computed using monthly stock prices (market index prices).² The cumulative abnormal returns (CARs) are the sum of the abnormal stock returns over the event window (-10, +10) as follows:

$$CAR_i = \sum_t AR_{it} \quad (4)$$

Where CAR_i is the cumulative abnormal return for firm i over the event window.

The second dependent variable is that related to the cross-listing decision, i.e the “**Cross-list**” variable which was defined in section 3.2.1.

(b) Explanatory variables:

All explanatory variables were defined in section 3.2.1. In addition to the “**LogAssets**” and “**ROA**” variables, we control for the effect of growth opportunities on value creation. In fact, as suggested by You et al. (2013), fast growing companies have access to external capital after cross-listing and therefore are likely to benefit from better valuation. The effect of a

² The methodology used to determine the abnormal return is similar to that employed by Dodd and Luca (2012). Market-adjusted returns are used in order to avoid loss of data since traditional event study methodology requires estimation of parameters for a long period, which must be independent of the event (Brown and Warner, 1985). Furthermore, Draper and Paudyal (2006) show that the abnormal return estimates for the event window are not sensitive to the choice of return benchmark.

company's growth opportunities on value creation is assessed through the Price to Earnings Ratio i.e. “**PER**” variable.³

Our model is therefore as follows:

$$CAR = b_0 + b_1 \text{ Cross-list} + b_2 \text{ LogAssets} + b_3 \text{ ROA} + b_4 \text{ PER} \quad (5)$$

$$\begin{aligned} \text{Cross-list} = c_0 + c_1 \text{ CRI} + c_2 \text{ Legal} + c_3 \text{ AS} + c_4 \text{ Geography} + c_5 \text{ global business strategy} \\ \text{proxy} + c_6 \text{ price informativeness proxy} + c_7 \text{ LogAssets} + c_8 \text{ ROA} \quad (6) \end{aligned}$$

The estimation of our system of simultaneous equations is complicated, since in the first equation the dependent variable is continuous (“**CAR**”), and in the other one it is discrete (“**Cross-list**”). Therefore, the problem lies in the fact that both endogenous variables are of different nature. That is why, we have used the method of estimating two-stage probit least squares (2SPLS), described in Madala (1983) for models with simultaneous equations, in which one of the endogenous variables is continuous, and the other is dichotomous. This model, which is an extension to the two-stage least squares, allows us to overcome the problems associated with endogeneity.

3.2.2.2 Model identification and endogeneity test

To be estimated, our model must satisfy the order and rank conditions.

(i) The order condition

The Cross-listing equation contains five restrictions, while the equation of performance contains two restrictions; hence we have:

The value equation: $2 > 2 - 1$

The Cross-listing equation: $6 > 2 - 1$

Our model, therefore, fulfills the order condition. Thus, we can certify that our model is over-identified. Nevertheless, the order condition is a necessary condition, but not a sufficient one, hence our resort to check the rank condition.

³ Table A.2 in Appendix A presents definitions and data sources for all of the explanatory and dependant variables. Table A.3 in appendix A reports descriptive statistics.

(ii) The rank condition

This condition states that at least one of the variable missing from the first equation and present in the second one has a nonzero coefficient. In our case, one of the two equations is dichotomous, thus making the rank condition difficult to implement. Therefore, we have complied with Hackl *et al.* (2007) and, Arin – Ulubasoglu (2009) and proceed with the identification solely through the order condition.

(iii) The endogeneity test

The most renowned and simplest implementation of this test is that of Rivers and Vuong (1988). Thus, we were left with the following equation:

$$CAR = d_0 + d_1 \text{ Cross-list} + d_2 \text{ LogAssets} + d_3 \text{ ROA} + d_4 \text{ PER} + d_5 \text{ RES_ Cross-list} \quad (7)$$

RES_ Cross-list: Being the residue recovered from the Cross-listing equation estimation.

4. Results and discussion

4.1 Cross-listing motivations

In this section, we examine the reasons explaining the decision made by firms, with UK cross-listing, to make an additional cross-listing in the US. Results of the cross-listing decision equation are reported in table 1.

Regarding the segmentation hypothesis, results are not significant in all of the estimated models. We therefore reject hypothesis **H1**. This result is not congruent with Abdallah and Ioannidis (2010), Doukas and Switzer (2000) and Miller (1999), who associate the change in stock prices around cross-listing and the reduction in the cost of capital with a market segmentation consideration. Our result can be explained by the increased integration in world markets, and the fact that the overcoming of market segmentation does not constitute a motivation for cross-listing.

For legal consideration, results in all of the estimated models have shown that companies cross-list their shares in the US, in addition to the UK cross-listing, to benefit from a better legal environment in order to improve the protection of the minority shareholders' interests. This result, which is in line with the majority of earlier empirical evidence on cross-listing in the US (Doidge, 2004; Doidge et al., 2007; Reese and Weisbach, 2002, etc) leads us to accept hypothesis **H2**.

Table 1: Cross-listing decision equation estimation

Hypothesis		Models					
		1	2	3	4	5	6
<i>Segmentation</i>	<i>CRI</i>	-0.11 (-0.9)	-0.13 (-1.1)	-0.1 (-0.4)	-0.07 (-0.59)	-0.13 (-1.3)	-0.18 (-1.51)
<i>Bonding</i>	<i>Legal</i>	0.012 (4.21)***	0.01 (3.4)***	0.01 (3.3)***	0.01 (3.22)***	0.01 (2.87)***	0.01 (2.67)**
<i>Information disclosure</i>	<i>AS</i>	-0.03 (-6.7)***	-0.02 (-5.01)***	-0.04 (-5.2)***	-0.03 (-5.3)***	-0.02 (-3.32)***	-0.02 (-3.72)***
<i>Proximity preference</i>	<i>Geography</i>	-0.57 (-7.9)***	-0.64 (-8.66)***	-0.55 (-5.4)***	-0.59 (-7.87)***	-0.43 (-2.57)**	-0.46 (-2.75)***
<i>Global business strategy</i>	<i>Industry</i>	0.06 (0.96)		0.1 (2.05)**		-0.04 (-0.48)	
	<i>FS%TS</i>		0.01 (2.51)**		0.01 (1.35)		0.01 (2.53)**
	<i>LogCap</i>	-0.06 (-1.13)	-0.03 (-0.5)				
<i>Price informativeness</i>	<i>ListedCompany</i>			0.01 (1.99)*	0.01 (1.97)*		
	<i>Integration</i>					0.01 (2.1)**	0.01 (1.99)*
<i>Control variables</i>	<i>LogAssets</i>	0.04 (1.14)	0.06 (1.79)*	0.02 (0.5)	0.03 (0.99)	0.05 (0.92)	0.06 (1.1)
	<i>ROA</i>	0.01 (3.1)***	0.01 (3.1)***	0.01 (3.3)***	0.01 (3.1)***	0.01 (1.76)*	0.01 (1.1)
	<i>Constant</i>	0.82 (3.51)***	0.56 (2.24)**	0.82 (4.35)***	0.68 (3.38)***	0.64 (2.73)***	0.49 (2.01)**
	<i>R square</i>	0.7	0.71	0.72	0.72	0.58	0.64
	<i>N</i>	99	99	99	99	99	99

This table provides regression results related to the cross-listing decision equation estimation. The dependant variable, “Cross-list”, is a dummy variable that takes the value of 1 if the firm is cross-listed in the UK and make an additional cross-listing in the US, and takes the value of 0 if the firm is cross-listed in the US and makes an additional cross-listing in the UK. Explanatory variables are defined in table A.2 in appendix A. “***”, “**”, and “*” denote significance at respectively 1%, 5% and 10%. t-statistics are in parentheses below the corresponding robust parameter estimates. N is the number of observations.

However, the results reported in table 1 lead us to reject hypothesis **H3** related to information disclosure considerations. This is in line with Pagano et al. (2001) and Saudagaran and Biddle (1995) who have empirically shown that firms are less likely to be cross-listed in markets with more stringent accounting standards than their local markets. We can conclude that companies’ managers are not attracted by the commitment to higher information disclosure standard in the US since they are subject to the UK disclosure requirements which are considered among the best in the world. However, they list their companies’ shares in American exchanges as an additional cross-listing to signal to investors their ability to protect their interests and therefore broaden the shareholders base, raise capital and finance their growth opportunities in better conditions. For geographic proximity considerations, table 1 shows significant results in all models but with negative signs. The effect of geographic proximity variable is also robust to the change in the proxy related to global business strategy and price informativeness hypothesis. This result is not in line with our predictions set in hypothesis **H4**, and can be interpreted as follows. In fact, UK and US are not located in the same geographic zone. In that case, and according to geographic proximity hypothesis,

American investors are less likely to trade a company 'stocks either in the UK or in the firm's home country. Therefore, firms from a dissimilar geographic country choose the US markets as a second foreign destination in addition to the UK exchanges in order to overcome a source of information barriers and expand the foreign shareholders base. And this agrees with Sarkissian and Shill (2004) who assert that non neighboring markets produce uncorrelated market returns.⁴

Regarding the global business strategy hypothesis, coefficients related to the **“Industry”** and **“FS%TS”** variables take positive and significant values in models 3 and 6, respectively, when we change for the proxy of price informativeness hypothesis. Hypothesis **H5** can therefore be accepted. We also found empirical support for the price informativeness hypothesis. In fact, table 1 show positive and significant effect for the variables **“Listed company”** and **“Integration”**. We therefore conclude that firms with UK cross-listing make an additional cross-listing in the US to benefit from a better efficiency. In other words, managers cross-list their company' shares in the US to improve stock price informativeness, thus make better investment decisions. This result is in line with that found by Ghadhab and Hellara (2016a, b) supporting the superior efficiency of the US prices for cross-listed stocks.

Regarding the control variables, we did not find any significant effect for the **“LogAssets”** variable. However, table 1 shows that companies with better quality are more likely to make an additional cross-listing in the US.

4.2 Cross-listing and firm performance

Before estimating our system of simultaneous equations, we conducted an endogeneity test. For global business strategy and price informativeness proxy, we chose respectively **“FS%TS”** and **“Integration”** variables since they have given more significant results in the cross-listing decision equation estimation.⁵

⁴ Culture proximity can also be considered as a measure of stock's familiarity to foreign traders since culture distance impedes information flow and significantly explains and determines the home bias and capital allocation (Aggarwal et al., 2012; Anderson et al., 2011; Beugelsdijk and Frijns, 2010; Grinblatt and Keloharju, 2001). Empirically, Dodd et al. (2013) and Sarkissian and Shill (2004) show that culture plays a significant role in the cross-listing decision. For robustness reasons, we tried to test if culture proximity considerations affect the cross-listing decision, however no significant results were revealed.

⁵ We had also repeated the analysis using **“Industry”** and **“ListedCompany”** variables as a proxy for respectively global business strategy and price informativeness but it didn't find significant results.

The results obtained and reported in table 2 allow us to confirm the endogeneity of Cross-listing since the coefficient of *RES_ Cross-list* was highly significant. Consequently, the choice of using the instrumental variables method, namely the probit two-stage least squares, is justified.

Table 2 : Endogeneity test

Variables	CAR
Cross-list	0.139
LogAssets	-0.147**
ROA	0.004
PER	1.178*
Res_ Cross-list	0.294***
Constant	0.311***
N	99
R square	0.831
This table provides the endogeneity test. All variables are defined in table A.2 in appendix A. “ Res_ Cross-list ” is the residue recovered from the cross-listing equation estimation. “***”, “**” and “*” denote significance at respectively 1%, 5% and 10%. N is the number of observations.	

Table 3 reports the estimation results of the simultaneous equations. We found a significant and positive effect of the cross-listing decision variable on the “**CAR**”. This means that companies, which choose to cross-list on the US in addition to the UK foreign destination, benefit from a better valuation. Hypothesis **H7** can therefore be accepted, and our results are in line with Doukas and Switzer (2000), Ghadhab and Hellara (2016b), Foerster and Karolyi (1999), Roosenboom and Van Dijk (2009) and Sarkissian and Schill (2009).⁶

The results have shown a highly significant and negative effect of “**Geography**” variable on the “**CAR**”, but as an explanatory variable in the cross-listing decision equation. Such a result reinforces the one found in the cross-listing decision equation, according to which geographical proximity has a negative effect on such a decision. Thus, it is appropriate to find a negative sign during simultaneous estimation. This means that managers choose to cross-list in a dissimilar geographic country in order to overcome informational barriers, which lead to better valuation.

⁶To insure the robustness, we had repeated the analysis for different event periods (-60, +60) and (-30,+30), yet it didn’t result in any significantly different results compared to the preliminary ones. The same case happened when we had tried the market to book ratio as a firm value proxy.

Table 2: Simultaneous equation estimation		
	Dependant variable : cross-list	Dependent variable: CAR
<i>Cross-list</i>		0.25 (2.01)**
<i>CRI</i>	-1.23 (-0.47)	
<i>Legal</i>	0.05 (1.3)	
<i>AS</i>	-0.2 (-1.3)	
<i>Geography</i>	-5.2 (-3.5)***	
<i>FS%TS</i>	0.07 (2.7)***	
<i>Integration</i>	4.9 (2.64)***	
<i>LogAssets</i>	0.45 (1.2)	-0.16 (-3.75)***
<i>ROA</i>	0.5 (1.3)	0.55 (2.42)**
<i>PER</i>		0.2 (2.2)**
<i>Constant</i>	-1.3 (-2.33)**	0.2 (0.5)
<i>R square</i>	0.76	0.5
<i>N</i>	99	99
This table provides simultaneous equation estimation. The dependant and the Explanatory variables are defined in table A.2 in appendix A. “***”, “**”, and “*” denote significance at respectively 1%, 5% and 10%. t-statistics are in parentheses below the corresponding robust parameter estimates. N is the number of observations		

Regarding the “**Integration**” variable, we found a highly positive and significant coefficient in the cross-listing decision equation. We can therefore conclude that firms can benefit from better valuation when they choose to cross-list for reasons related to price informativeness concerns. This is in line with Ghadhab and Hellara (2016b) who explain positive price reaction after listing abroad by the improvement in stock price informativeness around cross-listing. The same conclusion may be drawn for the “**FS%TS**” variable as a proxy for global business strategy concerns.

Although the “**Legal**” and “**AS**” variables were found to be strongly related to the cross-listing decision (table 1), their impact was found to be insignificant in the simultaneous estimation of the two equations. Thus, we can draw the conclusion that these two variables have no indirect effect on value creation around listing abroad, although they significantly affect the decision of cross-listing.

Therefore, we can conclude that value creation after an additional cross-listing in the US is driven by geographic proximity, price informativeness and global business strategy concerns

which represent major factors behind the decision to cross-list. Hypothesis **H8** can therefore be accepted.

The “**LogAssets**” variable, however, has a negative and highly significant effect on value creation. It acts directly seeing that its effect on the decision of cross-listing is not significant. We have also reported a direct effect of the “**ROA**” variable, but with a positive sign. Thus, smaller firms and those with higher quality benefit more from cross-listing in terms of value creation. Results reported in table 3 show that firms with high growth opportunities exhibit higher valuation gain around cross-listing in the US.

5. Conclusion

This paper contributes to the existing literature on cross-listing in several ways. First, we propose a new analytical framework by trying to understand the motivations and valuation effect of the decision made by companies with UK cross-listing to list their shares in the US as a second foreign destination. Second, we renew the analysis by proposing an appropriate methodology that takes into account the endogeneity effect of the cross-listing decision on the nature of the relationship existing between cross-listing and value creation. Finally, we provide the first direct empirical evidence about the effect of the stock price informativeness concerns on the decision to cross-list. Using a comprehensive sample of 99 firms with UK and US cross-listing, we found the following results. Non US companies with UK cross-listing move to the US market to benefit from a better legal environment, better stock price informativeness and increase their degree of internationalization. However, the access to better information disclosure requirements affects negatively such decision. For geographic proximity considerations, our results show a significant and negative effect on the cross-listing decision. Companies from a dissimilar geographic country cross-list their shares in the US markets in order to render their share accessible for American investors and consequently expand the foreign shareholders base in the US. Our analysis, which was based on the estimation of simultaneous equation related to the decision to cross-list and firm value, have shown that an additional cross-listing in the US leads to higher valuation. It also revealed that the improvement in stock price informativeness and the fact that companies are export-oriented affect positively and indirectly the firm performance around cross-listing. Moreover, a negative and indirect effect of geographic proximity was reported, which strengthens the one found in the cross-listing decision equation. In other words, companies choose to cross-list in dissimilar geographic country and therefore exhibit higher valuation gain. However, the

qualities of the legal and informational environments in the US market have no indirect effect on value creation, although they significantly control the decision of an additional cross-listing in the US.

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Appendix A

Table A.1: Sample description

		Additional cross-listing	
		US	UK
1	Argentina	0	1
2	Australia	2	1
3	Austria	2	0
4	Belgium	2	0
5	Canada	1	0
6	China	4	1
7	Denmark	2	0
8	Finland	0	1
9	France	11	3
10	Germany	7	2
11	Greece	1	0
12	India	1	1
13	Indonesia	0	1
14	Ireland	9	2
15	Italia	2	2
16	Japan	5	3
17	Korea	1	2
18	Luxembourg	2	0
19	Netherlands	2	2
20	South Africa	1	0
21	Spain	3	3
22	Sweden	3	1
23	Switzerland	7	2
24	Taiwan	0	2
25	Turkey	0	1
Total		68	31

Table A.2: Dependant and Explanatory variables

Variable	Definition	Data source
Dependant variables:		
<i>Cross-list</i>	A dummy variable that takes the value of 1 if the company is with UK cross-listing and make an additional cross-listing in the US, and 0 otherwise	Dataset
<i>CAR</i>	The cumulative abnormal returns is the sum of the abnormal stock returns over the event window	Monthly stock and index prices are from Datastream
Explanatory variables:		
<i>CRI</i>	Is the correlation between the stock market returns of the home and foreign countries over 3 year preceding cross-listing event.	Index prices are from Datastream
<i>Legal</i>	Is the difference in the level of investor protection between the foreign and the home country. The level of investor protection is measured by rule of law* the anti-director rights index.	The anti-director rights index is from LaPorta et al. (1998) and the rule of law index is from LaPorta et al. (1998) and Djankov et al. (2008).
<i>AS</i>	Is the difference in the quality of information environment between the foreign and the home country. the quality of information environment is measured by the accounting standards index.	the accounting standards index is from La Porta et al.(1998)
<i>Geography</i>	Dummy variable equals 1 if the home and foreign markets are in the same time zone and 0 otherwise.	
<i>Industry</i>	Is a dummy variable equals 1 if the firms produce internationally traded goods and equals 0 otherwise.	Dataset
<i>FS%TS</i>	Measure the amount of foreign sales as a percentage of total sales for the year preceding cross-listing event.	Datastream
<i>LogCap</i>	Is the logarithm of foreign market capitalization to local market capitalization for the year preceding cross-listing event.	Datastream
<i>Listedcompany</i>	Is the number of listed company in the foreign market to the number of listed company in the local market for the year preceding cross-listing event.	World federation of exchange website
<i>Integration</i>	Is the ratio of the degree of world market integration for the foreign market to the degree of world market integration for the local market over 3 year preceding cross-listing event.	Index prices are from Datastream
<i>LogAssets</i>	The logarithm of the total company assets for the year preceding cross-listing event.	Datastream
<i>ROA</i>	Is the Return on Assets ratio for the year preceding cross-listing event.	Datastream
<i>PER</i>	Is the Price to Earning Ratio for the year preceding cross-listing event.	Datastream

Table A.3: Descriptive statistics of the dependent and the explanatory variables

	Mean	Median	Max	Min	SD
<u>Dependant variables</u>					
Cross-list	0.68	1	1	0	0.46
CAR	1.07	1.04	1.75	-1.1	0.47
<u>Explanatory variables</u>					
CRI	0.62	0.69	0.94	-0.14	0.24
Legal	22	20	50	1.15	11.2
AS	6.4	7	33	1	7.5
Geography	0.21	0.12	1	0	0.41
Industry	0.29	0.09	1	0	0.45
FS%TS	50.1	53.2	100	0	31
Logcap	2.3	2.3	6.2	1.07	0.51
Listedcompany	22.4	7.3	154.4	0.43	31.9
Integration	9.31	0.76	268	0.32	38.3
LogAssets	4.2	4.3	5.9	1.1	1.1
ROA	5.2	5.3	44.1	-61	9.7
PER	44.7	16.7	2238	-52.6	227.8