CROSS LISTING OF REAL ESTATE INVESTMENT TRUSTS (REITs)

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Abstract

Purpose: This paper examines the common stock price reaction and the changes to the risk exposure of the cross listing for REITs.

Design/methodology/approach: The paper adopts the event study methodology to assess the abnormal returns. Pre- and post- cross listing changes in the risk exposure for the domestic and foreign markets are examined, via a modified two-factor international asset pricing model. A comparison is made for two broad cross listings, namely the depositary receipts and the dual ordinary listings, to examine the impacts from institutional differences.

Findings: Cross-listed REITs generally experience positive and significant abnormal returns throughout the event window, implying significant superior returns associated with the cross listing for REITs. On systematic risks, REITs exhibit significant decline in their domestic market beta coefficients after the cross listing. However, the foreign market beta coefficients do not yield conclusive evidence when compared across the sample.

Research limitations/implications: Results are consistent with prudential asset allocation for potential diversification gains from the cross listing, as the reduction from the domestic market beta is more significant than changes in the foreign market beta.

Practical implications: The results and findings should incentivise REIT managers to explore viable cross listing.

Social implications: Such cross listing for REITs should enhance risk diversification**.**

Originality/value: This is a pioneer study on cross-listing of REITs. It provides a basis for investment decision-making, and could provoke further research and discussion.

Key words: Cross-listing, REITs, Event Study Methodology, Asia, US and Europe, International Asset Pricing Model.

Introduction

The real estate investment trust (REIT) sector has witnessed rapid growth and heightened interest in the developed and emerging countries. According to information at REIT.com (downloaded on 27/04/2016), the FTSE EPRA/NAREIT Global Real Estate Index included 487 in 38 countries worldwide as of 30th September 2015. Equity REITs accounted for 79% of the $1.2 trillion ($948 billion) Developed Markets Index equity market capitalisation as of 30th September 2015. This shows a 66.9% growth in the market capitalisation of $568 billion reported by Ernst and Young (2010). Furthermore rapid globalization in the financial markets as a result of the deregulation of the markets fuelled cross-listing of securities (Gagnon and Karolyi, 2011). Proliferation of cross-listings has resulted in intense competition among the major securities markets to attract and retain listings to provide investors with a wider range of investment products. Although research findings are somewhat mixed, there appears to be a general consensus among most researchers that cross-listing enables companies and investors worldwide to connect seamlessly across geographical boundaries and time zones, and helps to raise capital at a relatively lower cost (Dodd, 2013) by breaching the barriers posed by market segmentation (Stapleton & Subrahmanyam, 1977) and providing diversification benefits.

Given the benefits of cross-listing, and REITs being characteristically capital intensive and heavily reliant on leverage, one would have expected REITs markets to have warmed up to cross-listing. The sluggish attitude of the REIT market towards cross-listing could be due to uncertainties about the probability of translating the benefits of cross-listing to the REIT market which could be a function of lack of research on the issue as none of the extant literature relates to REITs which is a distinct asset class. Therefore given the robust growth of the REIT sector and cross-listing becoming readily accessible worldwide, it may be timely to explore the potential benefits of cross-listing to REITs to provide a basis for REITs fund managers and investors in making informed investment decisions; and for governments in regulating capital flows. A secondary motive is to provoke research and debate among real estate academics and practitioners. Thus the paper applies the literature on cross-listing to examine the market's reaction to cross-listed REITs. This will be done by answering the following questions:

"Does cross-listing lead to superior returns for REITs in general?"
"Does cross-listing lower REITs' domestic markets' risk?"
"Does cross-listing lower REITs' foreign markets' risk?"

These questions are explored and empirically analysed and discussed to ascertain their implications for REITs fund managers and investors. Furthermore the impact of the two main cross-listing vehicles, depository receipts (DRs) and dual ordinary listings (DOLs), are compared to ascertain their relative performances in relation to the three questions that the paper sets out to answer. The paper is organised as follows. The next (second) section provides an overview of cross-listing. This is followed by literature review (section three) while the fourth section deals with data collection and the empirical methodologies adopted for the study. The fifth section is a discussion of the results and findings while the last section provides concluding remarks.

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Overview of Cross Listing

The cross-listing concept has been in existence for more than a century (Sarkissian and Schill, 2010) although its popularity increased exponentially only in recent decades. Cross listing involves at least two markets, with a debut primary listing typically in the country of incorporation (often referred to as the home/local market). This type of cross listing is often called dual ordinary listing (DOL). An example of a DOL REIT is the Singapore listed Fortune REIT, which chose to dual-list on the Hong Kong Stock Exchange (SEHK). Table 1 provides a list of REITs that were concurrently listed on two exchanges at the time of the research

Table 1. List of REITs Concurrently Listed on More Than One Stock Exchange

	First Listing		Dual Listing	
1. Associated Estates Realty Corporation	New York Stock Exchange	11-Nov-1993	NASDAQ	5-Jun-2008
2. Fortune Real Estate Investment Trust	Singapore Stock Exchange	12-Aug-2003	Hong Kong Stock Exchange	20-Apr-2010
3. Intercapital Property Development REIT	Bulgaria Stock Exchange	5-Nov-2005	Warsaw Stock Exchange	11-Aug-2010

4. Montea SCA	Euronext Brussels	17-Oct-2006	Euronext Paris	2-Jan-2007
5. Unibail-Rodamco SE (merger)	Euronext Paris	22-Jun-2007	Euronext Amsterdam	22-Jun-2007

(Source: Authors' compilation, 2012; 2016)

Note: This list excludes REITs concurrently listed prior to their conversion to REITs (in cases where REIT legislation was introduced later).

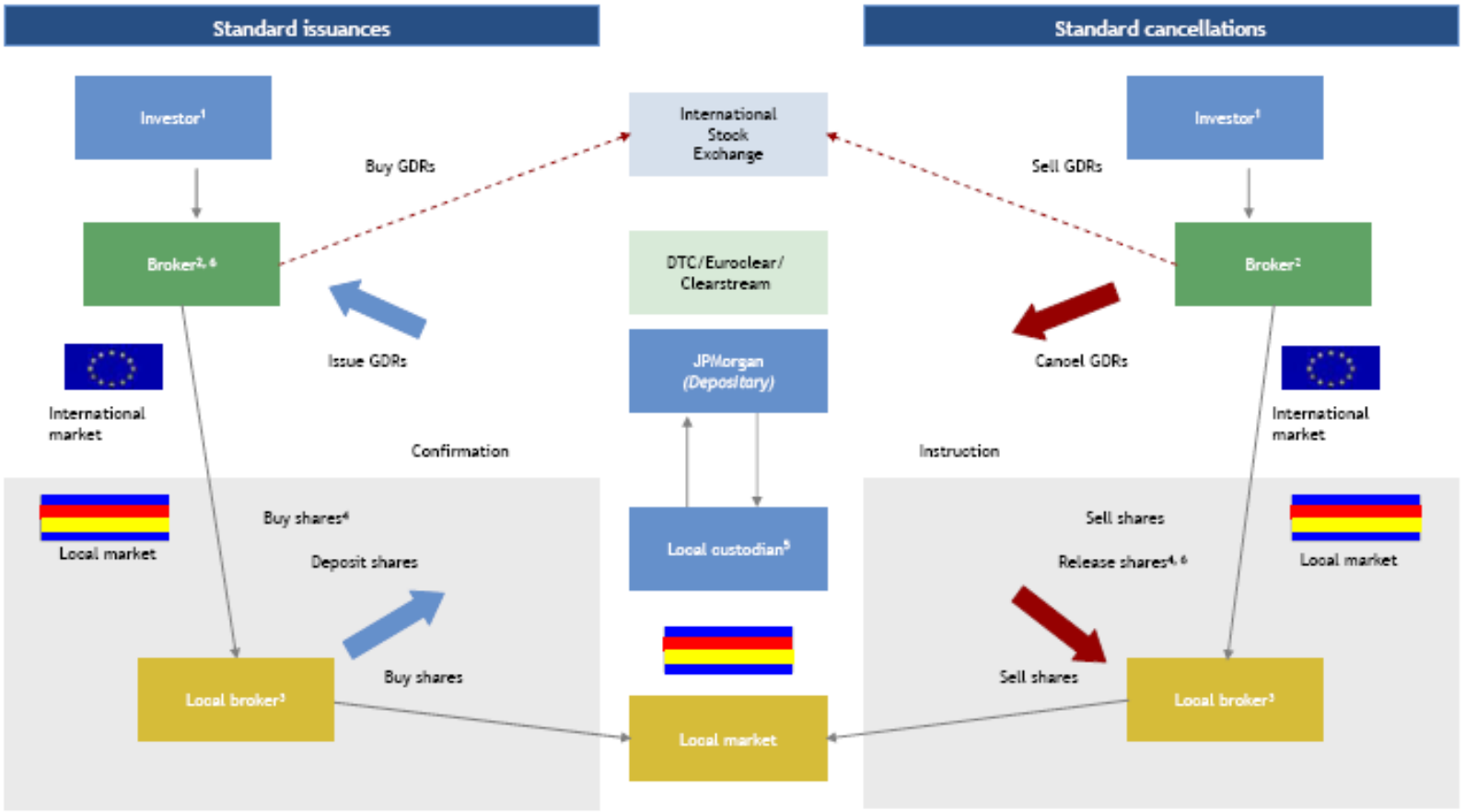
Cross listing has benefits (see literature review), and costs which vary with the Exchange on which the second listing takes place (see LSE, 2016; SEC, 2012; Cormick, 2016). Companies bear the initial listing costs related to the listing requirements of the Exchange for the second listing. The more reputable the Exchange for the second listing is, the more stringent the listing requirements – disclosure and transparency, governance, regulatory, filing of all the documentations at the appropriate time, registration, compliance, etc. – are to result in a relatively higher initial listing costs. However, the valuation enhancement effects of cross listing have been found to be directly related to the reputation/prestige of the Exchange on which the stocks are cross-listed **(**Cetorelli and Peristiani, 2015**).** Furthermore, flotation cost (for the services of the sponsor and advisers) and the cost of admission to the Exchange (admission fee) are incurred by the company. Since these costs can be recouped, in the short term, only through proceeds from the sale of shares on the second Exchange (as well as other benefits of cross-listing discussed in the literature review), managers capitalize on the "window of opportunity" effect to dual list. In other words, REIT managers tend to take advantage of good market conditions ("window of opportunity") to cross-list during periods of exceptional performance (Sarkissian and Schill, 2009; Fadl, 2010) to facilitate attractive pricing of the stock to ensure a successful launch of the shares. Thus investors who subscribe to dual listed REIT IPO stocks may purchase the stocks at a relatively higher price to provide the company with "enough" sale proceeds to recoup the initial listing costs and, in addition, make a decent profit. Furthermore annual service and compliance costs are incurred which must be out-weighed by the valuation enhancement benefits attendant to dual listing (see literature review).

A depositary receipt (DR), another form of cross listing, is an indirect ownership of shares through a negotiable instrument issued by a depositary institution. Each DR is

represented by a specific number of underlying shares (dependent on the DR ratio) held by a local custodian (in the issuer's home Securities Exchange market) of the Depository Institution in the US or the Global Market. Figure 1 shows an example of the sequence of events involving a DR transaction. DRs were originally introduced to enable investors acquire foreign companies' shares without the costs of complex transactional barriers and high fees involving cross-border transactions. They are categorized as the American Depositary Receipts (ADRs) when listed on US securities exchange or the Global Depositary Receipts (GDRs) when listed outside the US, predominantly in Europe, especially on the London Stock Exchange (LSE).

They can be publicly offered or privately placed. The distinguishing features of the different types of ADRS: Level I, Level II, Level III and Rule 144A, and the GDRs are presented in Table 2. To date, there are 7 REITs with DRs as listed in Table 3. ADRs and GDRs, like DOLs, must be registered with the regulatory authorities of the Securities Exchanges on which the DRs are listed. Thus the company issuing the DRs (the issuer) incurs listing costs similar to those incurred by a company involved in DOL (see LSE, 2016; and SEC, 2012). Furthermore the ADR/GDR Depository Bank may be authorised under the deposit agreement relating to the DRs to charge a fee, Custody/Depository Service fee, to compensate for inventorying the foreign shares and performing registration, compliance, dividend payments, communication and record keeping services. In addition, Depository Banks may charge a fee for foreign currency as dividends are first paid in the issuer's home currency. This implies that investors in DRs are exposed to currency risk. The issuer hopes to recoup its initial listing costs through "attractive" pricing of DRs launched in the "window of opportunity".

Figure 1. Example of a Depositary Receipt Transaction upon Issuance and Cancellation



(Source: J.P. Morgan, 2005; and Authors, 2012 & 2016)

Table 2. Key features of Depositary Receipts

	ADR				GDR
	Level I ADR	**Level II ADR**	**Level III ADR**	**Rule 144A ADR**	**GDR / Reg S**
Description	Unlisted	Listed in US	Offered & listed in US	Private placement to Qualified Institutional Buyers in US	Global private placement in two or more markets outside the issuer's home market
Trading	Quoted in over-the-counter (OTC) Pink Sheets and/or on OTC Bulletin Board	NYSE, Amex or Nasdaq	NYSE, Amex or Nasdaq	Quoted on PORTAL	Typically in London Stock Exchange and Luxembourg Stock Exchange. Others include Dubai and Singapore
Share issuance	Existing shares	Existing shares	New equity capital raised (Public offering)	New equity capital raised (Private offering)	New equity capital raised (Private offering)
Accounting disclosure	Home	US GAAP	US GAAP	Home	Dependent on international exchange selected
SEC Registration	Exempt	Full	Full	Exempt	-

(Source: Authors' compilation, 2012; 2016)

Table 3. List of REITs with Depositary Receipts

	Exchange	Country	Main Stock Listing Date	DR Effective Date	DR Termination Date
1. Westfield Group	OTC	Australia	5-Jul-2004	21-Nov-2006	On-going
2. Elarg Agricultural Opportunity Fund	Reg S	Bulgaria	15-Jun-2005	1-Mar-2007	Ongoing
3. Mercialys SA	OTC	France	12-Oct-2005	13-Aug-2009	9-Aug-2012
4. Unibail-Rodamco SE	OTC	France	22-Jun-2007		On-going
5. Property for Industry Limited	OTC	New Zealand	12-Dec-1994		On-going
6. EGS Gayrimenkul Yatirim Ortakligi AS	PORTAL	Turkey	18-Mar-1998	13-Mar-1998	10-Mar-2009

7. Primary Health Properties PLC	OTC	United Kingdom	5-Nov-1998	31-Mar-2008	On-going

(Source: Authors' compilation, 2012; 2016)

Note: This list excludes REITs whose DRs began prior to their conversion to REITs (in cases where REIT legislation was introduced later).

Dual listed companies (DLCs) are a third form of cross listing that involves a merger of two listed companies. DLCs differ from dual listing by having combined operations and cash flows while retaining distinctly separate shareholder registries and original identities – Their stocks are not fungible. Given the marked differences between DLCs and the other dual listings, DLCs are excluded from the study. To date, there are only 12 DLCs of which 6 have disbanded (Bedi & Tennant, 2002) and none of them are REITs.

The Related Literature

According to conventional wisdom, cross-listings have many associated benefits (Karolyi, 2006).Stapleton and Subrahmanyam (1977) suggest that cross-listing can circumvent market segmentation which results from market barriers that are mainly due to exchange rate risks and restrictions on foreign direct investments (Jithendranathan *et al*., 2000). This hypothesis posits that overcoming market barriers results in reduced cost of capital and increased firm value. Alexander *et al* (1987 and 1988) postulate and evidence that lower expected returns are expected from cross-listing if markets were previously segmented. Based on a sample of Canadian and non-Canadian firms that cross-listed in the US, the decline was less for the former firms. This led to the explanation that the magnitude of decline was associated with the degree of segmentation.

On broadening the investor base, Merton (1987) developed the investor recognition hypothesis by modifying Sharpe-Linter's Capital Asset Pricing Model (CAPM) assumption that investors hold identical information. Merton (1987) posits that investors prefer to invest in securities that they are familiar with otherwise they require higher expected returns to compensate for the increased idiosyncratic risk. All else being equal, a larger investor' base improves stocks liquidity to lower the investors' expected return and enhance security value. A similar outcome of lower expected returns is suggested by the liquidity hypothesis. Using bid-ask spreads as parameters, Amihud and

Mendelson (1986) postulate that because liquidity risk premiums are reduced upon cross-listing, the expected returns fall accordingly to facilitate share price enhancement.

Stulz (1999) and Coffee (1999, 2002) have suggested that gains from cross-listing are more likely to hail from better investor protection and corporate governance. Reese and Weisbach (2002) have showed that non-US firms raise more equity in their domestic common stock markets after cross-listing in the US, and experiences reduced cost of debt. Doidge *et al* (2004) affirm this finding after controlling for firm and country characteristics. Coffee (1999, 2002) demonstrates that managers are "bonded" to improve corporate governance and become less able to exploit private benefits after cross-listing. Minority investors are most protected especially if the cross-listed Exchange imposes tougher legal and regulatory requirements. He attributes the "bonding" effect to imposed regulations like disclosures, the enforcement powers of the regulatory body, more effective and lower-cost investor actions, such as class actions that may otherwise be unavailable.

Cantale (1996), Fuerst (1998) and Moel (1999) have suggested that by cross-listing in a more regulated market, the need to adhere to stricter disclosure requirements serves as a signal of higher quality to investors than for the non-cross-listed firms. Information asymmetry improves that could otherwise compel investors to demand higher returns to compensate for idiosyncratic risk. Recent literature postulates that cross-listing facilitates product market identification and aids in raising visibility within foreign markets (Pagano *et al*, 2002; Lins *et al*, 2005). It is because the companies concerned are mostly large and export-oriented, enabling them to increase sales by capitalising on their product market reputation. This ability helps to facilitate acquisitions financed with common stock known as acquisition currency (Burns, 2004).

Brown and Warner (1985) and Alexander *et al* (1988) have reiterated that common stock price reaction to cross listings could provide a basis to draw inferences with regard to capital market integration and segmentation. Based on an examination by Howe and Kelm (1987) of 165 US firm-listings on the Basel, Paris, and Frankfurt common stock market exchanges, they found negative abnormal returns prior to cross-listing and mixed non positive returns thereafter. Their findings suggest that cross listings be avoided if the aim is to maximise shareholder wealth. However, Lau *et al* (1994) enlarged their sample to include 10 major foreign common stock market Exchanges to observe insignificant pre-listing returns but significant post-listing returns.

With a doubling of the number of non-US firms cross-listing in the US between 1990 and 2003 (Karolyi, 2006), it is pertinent to focus on this area. Alexander *et al* (1988) record positive pre-listing returns throughout the sample. Jayaraman *et al* (1993) have showed abnormal returns on the listing day, implying that there was value in cross-listing. Miller (1999) observes a positive 1.15% average abnormal return during the 3 days surrounding the announcement date, based on 181 ADRs between 1985 and 1995. He concluded that the net benefits of cross-listing are from overcoming market barriers, after controlling for institutional and geographical differences in the DR structures. This finding is consistent with the market segmentation hypothesis. Foerster and Karolyi (1999) adopted the same methodology but used weekly data between 1976 and 1992. Pre-listing abnormal returns of 10% and an average 9% decline thereafter were observed. They suggest that the market segmentation hypothesis is inadequate and that strategic market timing may well be a possible explanation. A comparison of their event study results centred on the announcement and listing dates shows similar results, albeit with the latter showing greater statistical significance. Abdallah and Ioannidis (2010) extended their studies and had similar results. Thus, firms will cross-list in a period of good performance to capitalise on the overvaluation of the common share prices in their domestic markets. It explains the significant decline in abnormal returns (AR) after listing. The higher the pre cross-listing AR, the higher the subsequent decline in the post listing AR, a key observation that is consistent with that of initial public offerings (IPOs). In general, there has been no consensus on common stock price reactions to cross-listing. There are variations in not just the outcomes but in also the magnitude.

Progressing from the Capital Asset Pricing Model of Sharpe (1964) and Lintner (1965), Solnik (1974) introduced the International Asset Pricing Model (IAPM). However, the IAPM focused on a world market portfolio and neglected domestic market risks. Howe and Madura (1990) compared the risks before and after listing. They estimated a single-index model based on the domestic market, and a separate double-index model based on the domestic and foreign markets, before attempting to compare the betas of the domestic market from both models. The local market beta saw slight declines, none of which was significant even after further disaggregating the results to the origins of listing. Similarly, the differences between the foreign market betas were, on average, insignificantly different from zero. They conclude that cross-listings do not cause significant shifts in risk. Subsequent studies by Foerster and Karolyi (1999), Baker *et al* (2002) and by Abdallah and Ioannidis (2010) augmented Schipper and Thompson (1983)'s methodology in modifying the IAPM to estimate a two-factor model to capture both domestic and foreign market betas

Listing options have varying requirements, ranging from the lowest in private placements to the highest in common stock market exchange listings. It leads to varying levels of information availability and so cumulates into a “rank order” of impacts (Hail and Leuz, 2009). Such a rank order is discovered in cross-sectional analysis. Miller (1999) documented that abnormal returns were largest for those firms that listed on major US common stock market exchanges and were smallest for those firms that listed on the ‘Portal’. Doidge *et al* (2004) found that exchange listings have large, positive premiums (as proxied by Tobin’s Q) that were statistically significant. There was no significant premium for private placements. Capital-raising exchange listings were found to have a significantly higher premium than those without. Hail and Leuz (2009) observed that the reduction in the cost of capital is larger for exchange listings than those of private placements, and that the effects were sustained for many years thereafter. They explained that private placements experienced higher costs owing to information disparity arising from private communication among market makers. Doidge *et al* (2009) perceived the differences to be owing to barriers on the consumption of private benefits of control and they showed that the value of private benefits of control was lower for exchange listings, resulting in greater firm value. The findings are consistent with the bonding hypothesis, which posits that increased disclosure and monitoring, leads to a reduction of agency costs for controlling shareholders. In almost all aspects, rank order explains the varying impacts of cross listing.

On the whole, there is limited evidence with an international focus and there has been mixed results with little conclusive evidence on the effects of cross listing. The literature is focused on the US as the host country or on US firms listing overseas. There is also a dearth in the literature on the effects of cross listing for REITs.

Data and Methodology

Publicly listed REITs from several countries were obtained from Bloomberg online information system - Australia, Belgium, Bulgaria, Brazil, Canada, France, Germany, Greece, Hong Kong, Israel, Italy, Japan, Malaysia, Thailand, the Netherlands, New Zealand, Singapore, South Africa, South Korea, Taiwan, Turkey, the UK and US. REITs concurrently listed on more than one Securities Exchange were identified (see Table 1), and their cross-listing dates were double checked with annual reports.

To identify REITs with DRs, a full list of ADRs and GDRs was obtained from the directory of various official depositary institutions: JP Morgan Chase, Bank of New York Mellon, Citibank and Deutsche Bank. This was matched with the above list of all publicly listed

REITs to identify the REITs with DRs. Furthermore the International Securities Identification Number (ISIN) was used to ensure correct matching of DRs to REITs. The data set includes DRs that have terminated to avoid the problem of survivorship bias (see Table 3 for REITs with DRs).

We adopt the event study methodology of Brown and Warner (1985) to examine the behaviour of REIT security prices to cross-listing events through abnormal returns. This methodology tests for market efficiency through the evaluation of price adjustment before and after an event. Abnormal returns (ARs) for each REIT, Equation (1) are based on daily returns, Equation (2).

$$AR_{it} = R_{it} - NR_{it} \quad (1)$$

, where AR_{it} denotes the abnormal return for REIT i at day t, R_t is the observed or actual return for REIT i at day t, and NR_t is the normal return for REIT i at day t, which is calculated through the market model. Normal returns exist in the absence of significant events.

We adhere to the study by Abdallah and Ioannidis (2010) that uses 200 trading days of successive daily price data from day -300 to -101 as its estimation period, relative to day 0, the event/listing date. The listing date is selected instead of the annoucement date because it is invokes greater certainty. Foerster and Karolyi (1999) shows that there is greater statistical significance associated with the listing date. The event window (-100, +250) comprises 351 days in Figure 2.

Figure 2. Timeline of Event Study

(Source: Authors, 2016)

$$Daily\ Return = \frac{P_t - P_{t-1}}{P_{t-1}} \quad (2)$$

, where P_t is the closing price of a given day, and P_{t-1} is the closing price for the previous trading day. Daily prices are used as they increase the reliability of the tests and ensure greater robustness (Schotman and Zalewska, 2006; Abdallah and Ioannidis, 2010).

We also adopt the market model of Dyckman *et al* (1984), Equation (3), as it accounts for variations in the individual securities' returns associated with market-wide impacts, thereby reducing the variance in abnormal returns:

$$R_{it} = \alpha + \beta R_{mt} + \varepsilon_t \quad (3)$$

., were R_{it} is the residual of the market model for REIT i, returns, R_{mt} is the returns on the market portfolio for a given day, α and β are estimated parameters and ε_t is the disturbance term. ε_t is independent and has zero expectation.

Equation (4) measures the market's reaction to cross-listing REITs.

$$AR_{it} = R_{it} - (\hat{\alpha} + \hat{\beta} R_{mt}^{L}) \quad (4)$$

, where $\hat{\alpha}$ and $\hat{\beta}$ are ordinary least-square estimates. Positive ARs imply favourable market reaction towards REITs. The corresponding common stock market exchanges' benchmark indices of the domestic exchange listing are used for R_{mt}^{L},. The cumulative abnormal returns (CARs), Equation (5), denote the aggregation of ARs from the start to the end of the event window $(-100, \text{to} + 250)$:

$$CAR_{i,t} = AR_{t1} + \cdots + AR_{t2} = \sum_{t1}^{t2} AR_{i,t} \quad (5)$$

The CARs are averaged each day across all REITs to obtain the cumulative average abnormal returns (CAAR), Equation (6):

$$CAAR_t = \frac{\sum_{t=1}^{N} CAR_{it}}{N} \quad (6)$$

, where N denotes the number of REITs in the sample for each day during the event window (-100, +250). J-statistics by Campbell *et al* (1997) are estimated to enhance the robustness of the AR analysis:

$$J_{1,e} = \frac{\sum_{i=1}^{W} \sum_{k=1}^{Ki} \gamma_{eki}}{\sqrt{\sum_{i=1}^{W} \sum_{k=1}^{Kj} \sigma_{ei}^2}} \quad (7)$$

$$J_{2,e} = \frac{1}{\sqrt{N}} \sum_{i=1}^{W} \sum_{k=1}^{Ki} \frac{\gamma_{eki}}{\sigma_{eki}} \quad (8)$$

, where N denotes the number of days within the event window, γ denotes the AR estimate and σ denotes the standard error of the AR estimate, based on eq (4). The standard error is based on the estimation period of (-300, -101) days. Under the null hypothesis, the ARs ought to follow a zero-mean normal distribution. J1 and J2 will have an approximate standard normal distribution each, and are considered significant if each J exceeds 2.0 in absolute terms. The use of J-statistics is necessary as event studies test whether the event-induced AR is zero, and whether the model used to compute the expected returns is correct. J-statistics is said to be the omnibus test-statistic for model mis-specification. Furthermore the distribution of long-run AR is positively skewed, and a skewness-adjusted t-test, J-test, originally developed by Johnson (1978) is used to overcome the skewness bias (Kothari and Warner, 1997; Lyon et al., 1999).

Lastly, we follow the methodology of Foerster and Karolyi (1999), Baker *et al* (2002) and of Abdallah and Ioannidis (2010), to examine the returns and risk behaviour of the REIT sample through a cross-sectional, two-factor IAPM. This methodology takes account of the fact that the covariance risks of an IAPM, for example that of Solnik (1974), are only defined in terms of the global market portfolio. This ignores local market risks that may affect prices of interlisting stocks from markets that are not integrated (Foerster and Karolyi, 1999). Given that the paper is partly aimed at ascertaining the impact of cross-listing on both local and foreign market risks, it estimates a modified IAPM (Equation [9]) that captures both domestic and foreign market risks and their changes over time (see Foerster and Karolyi, 1999). The domestic market risk is computed relative to the local market index while the foreign market beta is based on the foreign market index. Thus, the paper follows Schipper and Thompson (1983) to pool the cross-section and time series of returns to estimate the two-factor IAPM, Equation (9), which revolves around the listing date (day 0) for the period of day (-250, +250):

$$R_{it} = \alpha_i^{PRE} + \beta_{iL}^{PRE} R_{mt}^{L} + \beta_{iF}^{PRE} R_{mt}^{F} + \alpha_i^{LIST} D_{it}^{LIST} + \alpha_i^{POST} D_{it}^{POST} + \beta_{iL}^{POST} R_{mt}^{L} D_{it}^{POST} + \beta_{iF}^{POST} R_{mt}^{F} D_{it}^{POST} + \varepsilon_{it} \quad (9)$$

, where PRE denotes the pre-listing period of (-250, -2) days, LIST denotes the listing period of (-1, +1) days, POST denotes the post-listing period of (+2, +250) days; R_{it} is the daily total return for REIT i at time t; $\alpha_i^{PRE}, \alpha_i^{LIST}, \alpha_i^{POST}$ are alphas coefficients denoting the abnormal returns; β_{iL}^{PRE}, β_{iL}^{POST} are the beta coefficients correlated to the domestic market index R_{mt}^{L}, i.e. domestic market risk; β_{iF}^{PRE}, β_{iF}^{POST} are the beta coefficients correlated to the foreign market index R_{mt}^{F}, i.e. the foreign market risk; $D_{it}^{LIST}$is a dummy variable, taking the value of one in the three days (-1, 0, +1) around the cross-listing date and zero otherwise; D_{it}^{POST} is a dummy variable, taking the value of one in the post-listing period (+2, +250) and zero otherwise. The event study methodology is linked to the IAPM parameters through the alpha coefficients of $\alpha_i^{PRE}, \alpha_i^{LIST}, \alpha_i^{POST}$, as captured by the abnormal returns in the former. Alpha coefficients capture the short-run and long-run abnormal performances. The benefits of cross listing are demonstrated by respective increases in α_i^{LIST} and α_i^{POST}as compared to the α_i^{PRE} to imply that cross-listing reduces domestic market risk. Similarly, β_{iF}^{POST}will be higher than β_{iF}^{PRE} to imply higher foreign market risk after cross listing owing to greater exposure to global market risk. Risk diversification improves as long as the reduction in domestic market beta (in absolute terms) is higher than the increase in foreign market beta. The paper duly utilizes

the two-tailed Wilcoxon signed-rank test and the t-distribution to check the robustness of the regression parameters.

Total returns (net of dividends) for REIT and market indices data are utilised and standardised on a single currency in US dollar terms to eliminate currency risk. The domestic market index is based on the benchmark index of the domestic common stock market exchange. For the foreign market index, the dual-exchange-listed REITs are based on the benchmark index of their second listing while the DRs use a standardised MSCI World Market Index as proxy, following the studies by Foerster and Karolyi (1999) and by Abdallah and Ioannidis (2010) that use a world index for the DRs. To assess the effects of cross listing, REITs that do not have a sufficient period of time between its first listing and its cross-listing, and that are identified earlier to be a 300-day period in the methodology, are eliminated. REITs with missing data for the period of (-300, +250) days relative to the cross-listing date (day 0) are also eliminated. Tables 4 and 5 present the final list to be examined.

Table 4. Final List of Dual Exchange-Listed REITs and Their Benchmark Indices

	First Listing[1]		Dual Listing[2]	
1. Associated Estates Realty Corporation[3]	New York Stock Exchange	NYSE Composite	NASDAQ	NASDAQ Composite
2. Fortune Real Estate Investment Trust	Singapore Stock Exchange	Straits Times Index	Hong Kong Stock Exchange	Hang Seng Index
3. Intercapital Property Development REIT	Bulgaria Stock Exchange	SOFIX	Warsaw Stock Exchange	WIG

[1] First listing may be interchangeably used with 'local' listing. Although Fortune Real Estate Investment Trust is Hong Kong-based, the Singapore Stock Exchange is still considered its local listing.
[2] Dual listing may be interchangeably used with 'foreign' listing. It denotes the second listing although Associated Estates Realty Corporation's listings are both in the same country, the 'foreign' listing refers to its second listing.
[3] While Associated Estates Realty Corporation's listings are in the same country, the second listing is considered its dual or 'foreign' listing. It is still included because of limited data and that the NYSE and NASDAQ are two separate major exchanges.

(Source: Authors, 2016)

Table 5. Final List of REITs with Depositary Receipts and Their Benchmark Indices[4]

	Trading Board	Country	Benchmark Index	Main Stock Listing Date	DR Effective Date
1. Westfield Group	OTC	Australia	ASX 200	5-Jul-2004	21-Nov-2006
2. Elarg Agricultural Land Opportunity Fund	Reg S	Bulgaria	SOFIX	15-Jun-2005	1-Mar-2007
3. Mercialys SA	OTC	France	CAC 40	12-Oct-2005	13-Aug-2009
4. Unibail-Rodamco SE	OTC	France	CAC 40	22-Jun-2007	15-Jan-2009
5. Property for Industry Limited	OTC	New Zealand	NZX 50	12-Dec-1994	24-Oct-2008
6. Primary Health Properties PLC	OTC	United Kingdom	FTSE 100	5-Nov-1998	31-Mar-2008

(Source: Authors, 2012; 2016)

Results and Findings – Whether Cross Listing Has Positive Valuation Effect

Table 6 presents the mean daily total returns for all the cross-listed REITs relative to the listing day (Day 0). Average daily returns for both the pre-cross-listing period (-250, -2) and the cross-listing period (-1, +1) are negative (-0.00002 and -0.00487 respectively) and statistically insignificant. The mean daily return for the post-cross listing period (+2, +250) is positive (0.0062) but remains statistically insignificant. The same trend is observed for REITs with depositary receipts but with a notable exception that the positive mean daily return (0.00129) for the post-cross-listing period is statistically significant at the 0.05 level of significance.

[4] Although some REITs may have been listed prior to being a REIT (REIT legislation being introduced later), they are included if the DR effective date is after REIT conversion.

Table 6. Daily Returns of Cross-listed REITs

	Pre-cross-listing (-250, -2)		Cross-listing (-1, +1)		Post-cross-listing (+2, +250)	
	N	Mean	n	Mean	n	Mean
All REITs	2241	-0.00002	27	-0.00487	2241	0.00062
Depositary Receipts	1494	-0.00036	18	-0.00577	1494	0.00129 **
Dual Ordinary Listings	747	0.00066	9	-0.00308	747	-0.00072

** indicates significance at 5% level (source: Authors, 2012; 2016).

The opposite trend applies to REITs with dual ordinary listings. The positive pre-cross-listing mean daily return (0.00066) changes to negative after cross-listing (Table 6 Row 3). Apart from being statistically insignificant, the trend for DOL REITs is similar to that of companies after their initial public offerings (Abdallah and Ioannidis, 2010). Nevertheless, there is a dip in the mean daily returns during the cross listing period and a rebound after the cross listing although the return is insignificant. A possible explanation may be that as there is hardly any precedent in REITs cross listing, market participants may adopt a wait-and-observe approach.

These initial findings are not surprising as there is hardly any difference between the pairs of related exchanges. Associated Estates Realty Corporation is listed on the NYSE and NASDAQ, both in the US. This hardly confers any of the benefits of cross-listing. Secondly, Miller (1999) finds that the return for exchange listing is significantly higher than for OTC listings. Thus cross-listing Associated Estates Realty Corporation securities on NASDAQ after first listing on NYSE is likely to have negative impact on the mean daily returns during the cross-listing and the post-cross-listing periods to result in the figures in Table 6. Similarly, Dodd and Loucas (2012) find no evidence that cross-listing in continental Europe has significant stock value-enhancement effect. Moreover Singapore and Hong Kong are the two giant exchanges in ASEAN. There is not much difference between them to provide stock value-enhancement through cross-listing – Significant valuation gains could have resulted if Hong Kong Exchange were more prestigious than Singapore Exchange (Cetorelli and Peristiani, 2015). Therefore the preliminary findings in Table 6 are consistent with the extant literature. However, there is a glimmer of hope in the seemingly discouraging overall results in Table 6 as DR provide a statistically significant positive mean daily post-cross-listing return (0.00129). In other words, while the overall (ALL REITs) cross-listed positive valuation effect is not statistically significant, cross-listing REITs through DRs have statistically significant

positive valuation effect to provide an attractive investment option for investors. However investors should shy away from DOLs given the negative valuation effect (Table 6) on stock values.

Do ARs and CARs Evidence Cross-listing Stock Value-enhancement Effect?

Table 7 presents the average daily abnormal returns (AR) and the cumulative average abnormal returns (CAR) for the event period of Day -100 to Day +250. The figures in Table 7, which are a measure of REIT stock price reaction to REIT cross-listing, have been categorized to distinguish between DR listings and DOL. The hypothesis being tested here is that cross-listing REITs does not have statistically significant REIT stock value-enhancement effect.

The results in Table 7, Column 2, show that the ARs for all the 9 cross-listed REITs are generally positive throughout the event window. However only five ARs are significant at the conventional levels of statistical significance. The highest statistically significant AR (+0.01511) was registered on Day -30, i.e. 30 days before the listing day (Day 0). The AR fell to +0.00116 on Day -1 but bounced back on the event day to +0.00566 albeit not statistically significant. The AR reached statistical significance on Days 25 (+0.01414), 109 (+0.01093) and 208 (+0.00334) after cross-listing (see Table 7, Column 2). This implies that investors would have been better off, on the basis of ARs, selling their investments on day 25 after the event day. It must be noted that the foregoing commentary on ALL REITs' ARs is based on statistical significance premised on the basic t-test (often found in event studies) which is not adjusted for the skewness. The results of the J-test, a skewness-adjusted t-test (see Johnson, 1978; Campbell et al., 1997; Lyon et al., 1999) are presented in Table 8. The J1 and J2 statistics for ALL REITs (Table 8) exceed 2.0 in absolute terms to imply that the corresponding ARs are significantly different from zero. Thus, the results reject the null hypothesis that cross-listing does not have stock value-enhancement effect to conclude that cross-listing REITs has statistically significant positive REIT stock performance effect. In simple terms, cross-listing leads to superior returns for REITs in general.

Positive ARs may well signal that the market is positively anticipating that the REITs perform better after cross listing. Furthermore the CARs for all cross-listed REITs (ALL REITs, column 4 of Table 7) are generally statistically significant at the conventional levels and follow an upward trend. The occurrence of positive CARs throughout the

event window is consistent with the study by Foerster and Karolyi (1999), implying a decrease in the cost of equity capital and an increase in the value of REIT stock.

A similar pattern for ARs and CARs is observed for REITs with depositary receipts and dual ordinary listings. In the former, the ARs are significant at the 1%, 5% and 10% levels on many occasions before and after the listing date. This is supported by the J1 and J2 statistics of 2.170 and 2.250 respectively in Table 8. The highest AR (0.02409) occurred 30 days after listing and is significant at the 5% level while the lowest AR (-0.00836) occurred 178 days after listing and is significant (1% level). There is evidence of positive CARs at the 5% and 10% levels after the listing date. This may signal that the market anticipates that REITs with depositary receipts perform better following the cross listing. Although the same pattern occurs for REITs with dual ordinary listings, none of the results are significant.

During the cross-listing period (-1, +1), the ARs from Table 7 are all positive although insignificant, implying that REITs' values should increase to reflect lower expected returns (Serra, 1999). Another trend between REITs with depositary receipts and those with dual ordinary listings is that the average ARs are larger for the latter (0.00128) than for the former (0.00104). As REITs with depositary receipts either trade on 'OTC' (over the counter) or on the 'Portal', the institutional differences can be examined with reference to the effects of market barriers on common stock prices. This is consistent with the findings of Miller (1999) that greater liquidity and broader shareholder base increase shareholder wealth.

From Figure 3, the CARs of REITs with dual ordinary listings diverge from the start and they record a much higher magnitude than REITs with depositary receipts, before eventually converging again towards day 250. This is possibly due to institutional differences between the two cross listing forms. More stringent requirements of dual ordinary listings may be seen as a commitment towards investor protection, supporting the bonding hypothesis. This is consistent with the findings of Doidge *et al* (2004) that the valuation premium is generally greater for the exchange listings than the Level 1 or Rule 144A ADRs, as per the rank order effect.

Table 7. Event Study Results of Cross-listed REITs

	All REITs				Depositary Receipts				Dual Ordinary Listings			
Day	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat
-100	0.00799	1.433	0.00799	1.433	0.01072	1.464	0.01072	1.464	0.00253	0.278	0.00253	0.278
-96	0.00604 ***	4.485	0.00239	0.136	0.00780 ***	5.108	-0.01255	-0.672	0.00253	2.665	0.03227	0.898
-70	0.00007	0.022	0.08762 **	2.612	0.00430 *	2.098	0.04787 *	2.196	-0.00840	-1.558	0.16714	2.091
-60	-0.00253	-0.639	0.08707 *	2.145	-0.00592	-1.139	0.03994	1.460	0.00425	0.985	0.18133	1.874
-50	-0.00040	-0.039	0.08959	1.403	0.00676	0.500	0.01946	0.400	-0.01473	-1.013	0.22986	1.537
-40	-0.00809	-0.596	0.10510	1.545	0.00438	0.289	0.04449	0.672	-0.03302	-1.355	0.22634	1.506
-30	0.01511 **	2.862	0.12182 *	1.876	0.01461 **	3.976	0.05947	0.973	0.01611	0.987	0.24654	1.733
-20	0.00661	1.619	0.14213 *	2.156	0.00394	0.965	0.06750	1.221	0.01196	1.225	0.29141	2.053
-10	0.00717	1.396	0.15160 *	2.093	0.00982	1.336	0.06368	1.048	0.00187	0.373	0.32745	2.243
-1	0.00116	0.123	0.18929 *	2.120	-0.00826	-0.909	0.08912	1.229	0.02000	1.015	0.38963	1.966
0	0.00566	0.986	0.19495 *	2.163	0.01135	1.510	0.10047	1.261	-0.00572	-1.472	0.38391	1.944
1	0.00301	0.284	0.19796 **	2.334	0.00696	0.445	0.10742	1.602	-0.00487	-0.524	0.37904	1.913
10	0.01221	1.737	0.19784 *	2.306	0.00902	1.115	0.10815	1.662	0.01857	1.212	0.37721	1.818
20	0.00736	1.429	0.21429 **	2.526	0.01023	1.361	0.13153	1.825	0.00161	0.501	0.37983	1.903
25	0.01414 **	2.771	0.23214 **	2.610	0.01276 **	3.432	0.14234 *	2.141	0.01690	1.096	0.41175	1.868
30	0.01350	1.281	0.25344 **	2.901	0.02409 **	2.829	0.17367 **	2.697	-0.00769	-0.306	0.41298	1.815
40	0.00392	0.595	0.27960 **	2.566	0.00621	0.619	0.18305 **	2.710	-0.00065	-0.400	0.47271	1.561
50	-0.00125	-0.271	0.30315 **	2.723	-0.00403	-0.610	0.20579 **	2.840	0.00429	1.071	0.49785	1.623
60	0.00967	0.840	0.25401 *	1.969	-0.00234	-0.510	0.20809 **	2.888	0.03369	1.038	0.34586	0.845
70	0.00242	0.291	0.24374	1.787	-0.00456	-0.488	0.20219 **	3.197	0.01637	1.042	0.32685	0.734
100	0.00135	0.232	0.26992 **	2.521	0.00478	0.902	0.20712	1.947	-0.00552	-0.364	0.39551	1.504
109	0.01093 ***	4.203	0.32417 **	2.437	0.01394 ***	4.396	0.25112	1.917	0.00492	2.520	0.47027	1.414
120	-0.00754	-0.830	0.34569 **	2.469	0.00306	0.340	0.28667 *	2.108	-0.02873	-1.818	0.46372	1.275

150	0.00150	0.309	0.40510 **	2.557	-0.00041	-0.075	0.30429	1.975	0.00530	0.481	0.60672	1.556
178	0.00025	0.038	0.38445 **	2.421	-0.00865 ***	-4.983	0.29714	1.953	0.01805	1.130	0.55907	1.380
200	0.00595	1.844	0.39027 **	2.337	0.00595	1.244	0.32661	1.863	0.00596	1.806	0.51759	1.260
208	0.00334 *	1.983	0.40369 **	2.378	0.0059 ***	4.908	0.35617	1.919	-0.00179	-0.670	0.49873	1.221
230	0.00120	0.241	0.40967 **	2.344	0.00321	0.432	0.37405	1.978	-0.00282	-0.952	0.48091	1.122
250	0.00281	0.395	0.39267 *	2.120	-0.00578	-0.804	0.36466	1.997	0.01999	1.772	0.44869	0.911
Mean	0.00112				0.00104				0.00128			

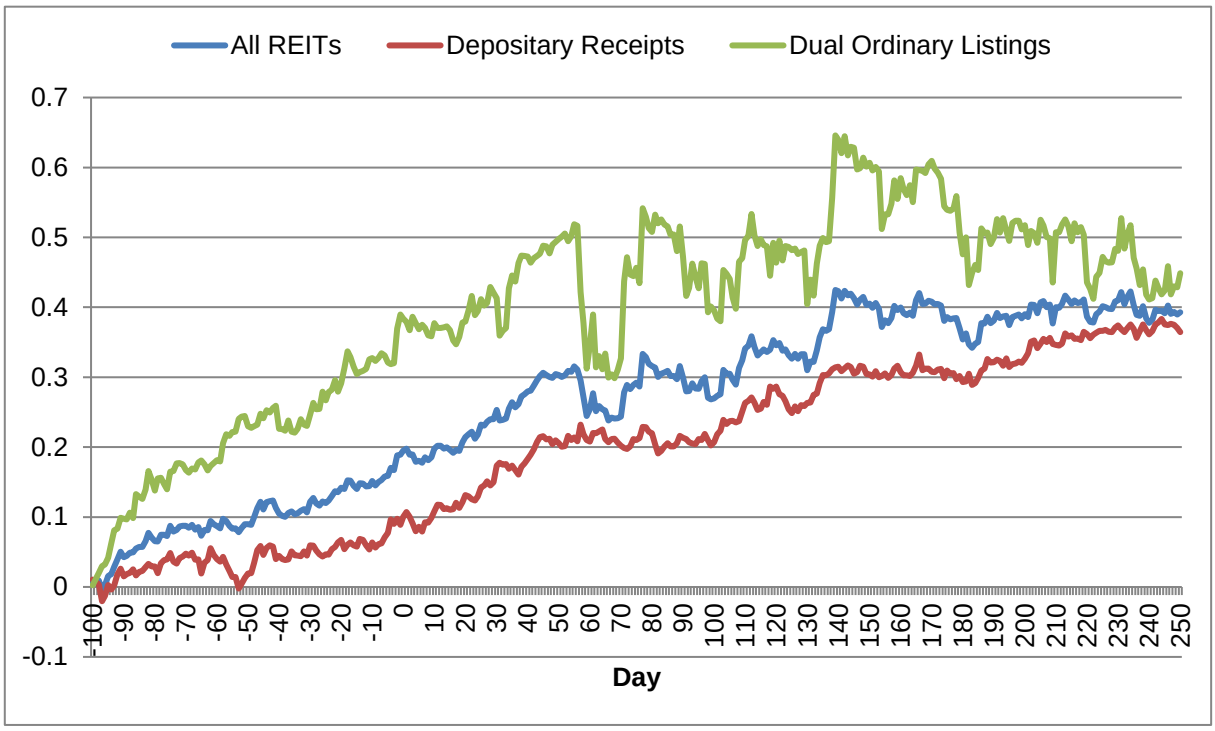
***, **, * indicates significance at 1%, 5% and 10% levels (source: authors, 2012; 2016).

Table 8. J-statistics of Event Study Results on Abnormal Returns

	All REITs	Depositary Receipts	Dual Ordinary Listings
J1 statistics	2.611	2.170	1.491
J2 statistics	2.804	2.250	1.675

(Source: Authors, 2012; 2016)

Figure 3. Cumulative Abnormal Returns of Cross-Listed REITs



(Source; Authors, 2012 & 2016)

In Figure 3, the CARs peak at around the 140th day after cross listing. While it begins to stagnate for all the cross-listed REITs, REITs with dual ordinary listings begin to see a decrease. It shows that there are more negative ARs subsequently. Table 9 presents the percentage of positive ARs during the event window. It is observed that the number of positive abnormal returns fall after the cross listing for all REITs. This is line with the literature that significant negative abnormal returns ought to occur in the long run to reflect lower expected returns (Serra, 1999). However, the decrease for those REITs with depositary receipts is less apparent.

Table 9. Percentage of Positive Abnormal Returns during the Event Window

% positive ARs	**All REITs**	**Depositary Receipts**	**Dual Ordinary Listings**
Day (-100, -2)	59.60%	57.58%	61.62%
Day (+2, +250)	55.02%	55.82%	49.40%

(Source: Authors, 2012; 2016)

Results of Cross-sectional Two-factor IAPM

Table 10 presents the alpha coefficients for the cross-sectional, two-factor IAPM analysis of the event window (-250, +250). α denotes the mean abnormal returns (ARs) and it is different from the event study's ARs as total returns are used for the IAPM. The extra factor of the dividends is to be considered herewith. This is relevant to the REITs because they are required to distribute almost all their earnings as dividends, depending on the domestic market regulations. The IAPM ARs are also based upon the dual market exposure, thereby reflective of REITs.

Table 10. Comparison of Alpha Coefficient Pre- and Post- Cross listing (t-statistic bracketed)

Category	α_i^{PRE}	α_i^{LIST}	α_i^{POST}	Δ α
All REITs	-0.00009	0.00013	0.00037	0.00046
	(-0.144)	(1.978)	(0.441)	(-0.334)
Depositary Receipts	-0.00018	0.00008	0.00099	0.00117
	(-0.340)	(0.015)	(1.290)	(-1.988)
Dual Ordinary	0.000234	0.00034	-0.00094	-0.00118
Listings	(0.167)	(-0.475)	(-0.475)	(1.776)

(Source; Authors, 2016)

The increased post-cross-listing mean AR from negative to positive for ALL REITs and DR REITs, though not statistically significant, show that cross-listing had positive valuation effect. Conversely, DOL REITs experienced a fall in AR after cross listing to replicate Lau *et al* (1994), Foerster and Karolyi (1999) and Abdallah and Ioannidis (2010). The result could be due to the "window of opportunity" effect as REIT managers usually take advantage of good market conditions to cross-list (Sarkissian and Schill, 2009; Fadl, 2010). In other words, managers might have ridden on the wave of good market sentiment, "window of opportunity" to cross list companies' shares to facilitate attractive pricing (high enough to recoup the cost of cross linsting and make profit but acceptable to the market) of their cross listed shares. This means that investors might have bought stocks at high prices that were not sustainable over the post-event window due to market sentiment returning to

the norm (i.e. due to mean reversion). Furthermore the decline in the alpha (AR) for DOL after cross-listing could be attributable to the fact that the shares were dual-listed on exchanges that may be less reputable than the exchanges on which they were first listed (Dodd, 2013; Cetorelli and Peristiani, 2015; Dodd et al., 2015). The IAPM results are consistent with those from the event study. It seems that while there are stronger abnormal returns for REITs with dual ordinary listings in the short run (see Figure 3), the benefits do not persist into the longer term. This is also observed in the change of the alpha coefficient.

Impact of Cross-listing On the Risk of REIT Local Market

Table 11 presents the domestic market beta coefficient, β_{iL}, based on the IAPM event window of (-250, +250). The beta coefficient is significant throughout all categories during the pre- cross listing period (-250, -2). This is considerably reduced after the cross listing albeit insignificant. The change in the beta coefficient, $\Delta\,\beta_{iL}$, is negative and significant for all REITs (-0.55977) and for REITs with depositary receipts (-0.54459). It implies a significant change in the domestic market beta coefficient and is consistent with the studies by Foerster and Karolyi (1999) and by Abdallah and Ioannidis (2010).

Table 11. Comparison of Local-market Beta Coefficient Pre- and Post- Cross Listing (t-statistic bracketed)

Category	β_{iL}^{PRE}	β_{iL}^{POST}	$\Delta\,\beta_{iL}$
All REITs	0.56123 ***	0.00145	-0.55977 **
	(12.879)	(0.023)	(3.057)
Depositary Receipts	0.58974 ***	0.04515	-0.54459 **
	(15.847)	(0.855)	(2.594)
Dual Ordinary Listings	0.35505 **	0.03336	-0.32169
	(2.466)	(0.173)	(1.349)

***, ** indicates significance at 1% and 5% level (source: authors, 2016)

Representing the REITs' volatility to the domestic common stock market, the reduction in the domestic market beta coefficient concurs with the market segmentation hypothesis. By overcoming market barriers, the risk can be diversified away.

Impact of Cross-listing on Foreign Market Risk

Table 12 presents the foreign market beta coefficients based on the IAPM event window of (-250, +250). Foreign market beta coefficients for all REITs before cross listing (1.0265) and after cross listing (0.19433) are significant at the 5% and 1% levels, indicating an almost double increase for the foreign market beta. Nevertheless, the $\Delta\ \beta_{iF}$ did not yield any significance from the paired-sample mean t-test. For REITs with depositary receipts, β_{iF}^{PRE} is significant at the 5% level before cross listing (0.10857) but becomes insignificant subsequently. For REITs with dual ordinary listings, β_{iF}^{POST} is significant after cross listing (0.42621) but insignificant prior to that. Regardless, the $\Delta\beta_{iF}$ varies across all categories and is insignificant throughout. This is in line with studies by Foerster and Karolyi (1999) and by Abdallah and Ioannidis (2010), which had mixed results and likewise did not yield significant changes to the foreign market risk.

Table 12. Comparison of Foreign Market Beta Coefficient Pre- and Post- Cross Listing (t-statistic bracketed).

Category	β_{iF}^{PRE}	β_{iF}^{POST}	$\Delta\ \beta_{iF}$
All REITs	0.10265 **	0.19433 ***	0.09168
	(1.978)	(2.609)	(-0.013)
Depositary Receipts	0.10857 **	-0.01846	-0.12703
	(2.118)	(-0.253)	(0.534)
Dual Ordinary Listings	0.16307	0.42621**	0.26313
	(1.410)	(2.481)	(-0.568)

***, ** indicates significance at 1% and 5% levels (source: authors, 2016)

According to the extant literature, diversification benefits occur only if the reduction in the domestic market beta is greater than the increase in the foreign market beta. A comparison of Tables 11 and 12 clearly reveals that the reductions in domestic market betas exceeds the increases in foreign market betas. Furthermore the differences

between pre- and post-listing foreign market betas are not statistically significant (Table 12) while those for the domestic market betas are predominantly significantly different from zero (Table 11). These results imply that cross-listing REITs can provide diversification benefits.

Conclusion

The results show that all the cross-listed REITs (ALL REITs) recorded positive post-cross-listing mean daily return that was statistically insignificant. However DR had positive valuation effect by posting a statistically significant post-cross-listing mean daily return while DOL had negative valuation effect by recording a statistically insignificant post-cross-listing mean daily return.

Furthermore it was found that the ARs and CARs for ALL REITs were statistically significant. This implies that, overall, investors made decent returns from the cross-listing. Similar results apply to DR but the results for DOL are statistically insignificant.

Similar pattern of results is observed for the impact of cross-listing on local market beta. ALL REITs and DR experienced statistically significant reductions, while DOL registered a statistically insignificant reduction, in the local market beta. However, the foreign market beta coefficient yields statistically insignificant mixed results in magnitude and direction across all categories. Given the overall decline/increase in the local/foreign markets betas (-0.55977/+0.09168), it may be concluded that cross-listing could reduce overall systematic risk to facilitate a decline in the cost of capital and enhance stock value. Furthermore, the impact on systematic risk implies that cross-listing REITs can reap diversification gains. The results of this pioneering study, which are consistent with the extant literature, may incentivise REIT managers to adopt cross-listing. As to whether they should consider DRs or DOLs, the former provides statistically significant superior results to DOL and thus, should be the more prudent choice.

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