The Return Effects of Shifting Tax Regimes
An International Examination of the REIT Effect

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Abstract

This paper contributes to the stream of literature, which assesses the stock performance effects of financial regulations by analyzing how the international introduction of the Real estate Investment Trusts (REIT) standard has influenced the return dynamics of listed real estate investment firms. Introducing a tax transparent REIT standard offers real estate investment firms a new trade-off between corporate tax advantages and reduced corporate flexibility regarding their dividend payout policy, capital structure and the span of their corporate activities. In this paper, we document that firms, which transit to a REIT standard experience a decrease in leverage, a mild jump in stock turnover levels, and an increase in dividend payouts. The mandatory payout of earnings as dividends appears to be changing the financial DNA of the firms in our sample, as the strong reliance on dividends alter the systematic risk of REITs.

JEL: G32, G34, L22

Keywords: financial regulation; REITs; stock performance

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1. Introduction

Over the last few decades, real estate investment firms have been listed on stock markets around the world, creating an asset category – public real estate – that matured into a total market capitalization that exceeds 1 trillion U.S. dollars, today. Since the turn of the millennium, this public real estate market has experienced a distinct shift in financial regulations. An increasing number of countries has adopted the REIT (Real Estate Investment Trust) standard, a real estate ownership structure with a tax treatment similar to that of mutual funds. A REIT is a pass-through entity, which distributes most of its earnings and capital gains to its shareholders. While it originated in the United States in the early 1960s, various countries in Europe and Asia have decided to adopt this standard in recent years. However, neither the motives behind nor the effects of introducing REIT standards have been subjects of academic research. It is often assumed that REIT standards reduce risk because they involve restrictions on dividend payout, firm activities, capital structure, and ownership distributions. Moreover, policymakers claim that the transparency of REIT regimes will attract more retail investors, and increase stock liquidity by attracting more capital flows. Whether REIT standards have had any of these effects on public real estate markets is the focal point of this paper.

There are various reasons for a government to adopt a REIT regime. The most important policy rationale, particularly among the early adopters such as the U.S. and the Netherlands, has been to create a level playing field for retail investors. Through a collective scheme, small retail investors can achieve the same diversification and risk reduction as larger players, at the same cost. This was considered to be of great (social) importance. The initial goal of the U.S. REIT Act was the same and also considered the fact that a part of the REIT market that was out of reach for private investors (properties requiring large investment volumes) would now become available for investment. The Treasury in the U.K. mentions that the REIT could remedy the limited access to commercial property investment for smaller scale investors; reducing capital needs, mitigating risk and reducing tax inefficiency. This policy rationale has, according to law-makers, a positive influence on the structure of the property market. According to Dutch parliament, the introduction of a tax transparent vehicle would also lead to improvement in exploitation of real estate due to professional parties (Report on lower house session #19, 1969). This is also mentioned in the U.K. consultation as being a concern, as owner-occupation could lead to inefficient asset management.

Almost all regimes, in particular those introduced in a later stage such as the Singapore, French, UK and German market cited the restoration or improvement of international competitiveness in the real estate market as being of pivotal importance. Improving capital allocation is undoubtedly an important motive; adopting a REIT standard makes a listed real estate market more attractive and transparent for (foreign) investors who want to invest in real estate in a particular geographic market. The consequential absence of corporate taxation attracts capital to REITs, increasing investments in real estate markets. A flourishing onshore quoted property sector boosted by REITs is more likely to invest more over the long term. This is especially important since the property sector is an important contributor to GDP in almost every country. These are also among the publicly cited reasons in many countries (e.g. Her Majesty's Revenue and Customs (HMRC) 2006). In some cases, it only pertains to a particular sector of the real estate market. Interestingly, the U.K. consultation mentions supporting investment in the

residential market, whereas in the Germany, residential investment was excluded. It also appears that other motives may be present. In France, for instance, companies paid an exit-tax when converting to the REIT status, and judging from the discussions on the introduction of the SIIC regime in the French senate, this contribution to the public budget appears to have been an influential factor in France. In 1960, the U.S. Congress passed the legislation enabling the creation of REITs, but most of today's U.S. REITs originated after the Tax Reform Act of 1986, which allowed REITs to own and actively manage their properties. The most recent major adaptation of U.S. REIT legislation, the 1999 REIT Modernization Act, also relaxed the dividend payout-requirement from 95 to 90 percent of earnings. By the end of 2012, the U.S. equity REIT market consisted of around 170 companies, which collectively represent a market capitalization of well over 400 billion U.S. dollars.

In Europe, the Netherlands was one of the first markets to adopt REIT legislation comparable to that of the U.S. The Dutch 'Fiscale Beleggings Instelling' (FBI) was introduced in 1969 and offers the same trade-off between the corporate tax exemption and a set of binding criteria regarding the dividend payout, capital structure, ownership of stocks, and the span of activities that firms can engage in. Besides the Netherlands, only Belgium, South-Africa and Canada adopted a REIT-standard before the nineties. However, in the aftermath of the Asian financial crisis and spurred by the heightened economic competition that was brought about by China's open door policy, Japan, Singapore and Hong Kong introduced REITs in 2001, 2002, and 2005 respectively, mostly as a tool to enhance the appeal of their markets. In Europe, France started a REIT standard, when introducing their Société d'Investissement Immobilier Côtée (SIIC) in 2003. This French REIT standard imposed conditions that were considered very liberal, especially with respect to shareholder restrictions and dividend payout policy. Eight French investment firms immediately adopted the SIIC status and many more followed rapidly, setting an example for other European markets like Germany and the U.K.

Although the introduction of a REIT-standard is typically succeeded by an increase in the number of listed investment vehicles and the necessary tax settlements, very little is known

about the effects this REIT status has on the stock performance of the firms involved. The trade-off between the corporate tax exemption and the set of governing REIT criteria should in theory result in a reduction in the systematic risk of public real estate returns, given that REIT criteria are designed to reduce the free cash flow and leverage effects of listed real estate investment firms. A formal test of this hypothesis, however, is still lacking. Obviously, it is of great importance to understand the effects that changes in tax legislation have on the financial DNA of the firms involved. Knowledge, which is important to all actors in this market; to policymakers who design legislation and need to understand the consequences, to fund managers who need to consider the corporate transition when the opportunity is offered, and to investors who may have to re-allocate their resources across markets.

In this paper, we investigate the effects of REIT criteria in France, Germany, Japan, Singapore, the U.K., and the U.S[1]. In each market, we incorporate the specific REIT standards and implementation. In France, Germany and the U.K., we track the performance and balance sheets of firms that were listed well before the REIT standard introduction. Here, the conversion is analyzed as an event study, with pre and post observations. In Japan and Singapore, the introduction of the REIT standard triggered a series of new listings, which does not allow us to benchmark with pre-REIT track records on a firm level. In the U.S., we find that REITs have been coexisting next to a set of Real Estate Operating Companies (REOCs). Besides the voluntary conversions of individual REOCs into a REIT, we also analyze the stock performance of these two listed markets over time. We document that REIT introductions lead to noticeable changes in firm characteristics. We also show that this change is associated with structural breaks in the corresponding firm's stock risk and return.

The paper proceeds as follows. First, we discuss the literature relevant for our investigation. Then, we present the sampled REIT standards and their effects on firm characteristics. We then

[1] A more detailed discussion of the local REIT legislation of each regime will follow when we discuss the markets in our sample.

present our empirical analysis of the transition effect for stock return and risks. The paper concludes with a summary of our main conclusions and the most relevant practical implications.

2. Literature Review

In this section, we discuss three strands of literature; the finance literature on the performance effects of changes in financial regulations (Section 2.1), the literature on REIT standards (Section 2.2) and, finally, the literature on the performance of REITs (Section 2.3). Lessons and insights from all three will be used in our research design, which we will present in the subsequent section.

2.1. Financial Regulations

Research on the performance effects of changes in financial regulations is scarce. There is little doubt that differences in regulatory standards are important as evidenced e.g. in the literature on law and finance (e.g. La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1998) and that regarding the impact of banking regulation (e.g. Barth, Caprio, and Levine, 2001). The lack of research on financial regulation and risk and return is presumably due to the difficulty involved in testing whether certain performance effects can be attributed directly to a regulatory standard. If, for instance, one witnesses the co-occurrence of a new legislation and a reduction in return volatility, how can one ascertain whether the latter occurred because of the former? This problem is undoubtedly pertinent in relation to traded securities, which are affected by a plethora of factors ranging from macroeconomic developments over technological changes to factors, which are idiosyncratic to the security in question. One means of circumventing this identification issue is to include an adequate set of control variables. An example is Avgouleas and Degiannakis (2008) who analyze the effects of the Financial Instruments Markets Directive (FIMD) on liquidity. The authors note that measures of liquidity such as trading volume generally increase over time, and any study, which compares pre- and post-regulation volume, is therefore likely to find a noticeable effect.

While papers on the effects of financial regulation are in scarce supply, there are some which discuss regime shifts due to changes in legislation or institutional setup. Regime shifts have, amongst other things, been studied in relation to IPO underpricing (Ljungqvist and Wilhelm 2003); asset pricing in emerging markets (Garcia and Ghysels 1998); bank capital adequacy requirements (Grullon, Michaely, and Swary 1997); and market structure and stock volatility (Stoll and Whaley 1990). There are also a number of studies, which analyze the effects of accounting regulation on stock price volatility (e.g. Bushee, Matsumoto, and Miller 2004). Perhaps the studies which most resemble this paper are those which investigate whether exchange listings affect performance. More specifically, these examine whether the parameters in models of expected returns change following an exchange listing of a stock; the general hypothesis is that betas, or systematic risk, should decline following such listings because market participants perceive listed stocks as less risky than their OTC counterparts. The empirical evidence, however, does not provide strong support for this hypothesis (Prakash, Parhhizgari, and Perrit 1989).

2.2. REIT standards

Within the context of listed real estate markets an analysis of changes in the financial regulations has been called for by several authors, but so far an empirical examination is still absent. Downs (1994) discusses the swift development of U.S. REIT markets, which he refers to as the 'REIT explosion'. He outlines reasons as for why REITs will gain importance as a source of financing for the underlying commercial real estate market, among which the cyclical unwillingness of traditional institutions to provide sufficient capital to real estate markets and the fact that REITs offer attractive means of owning properties that would appeal to large institutional investors to invest in. After this market view, Downs, Gyourko and Sinai (1999) were among the firsts to analyze the benefits of structuring a company as a REIT compared to a traditional corporation. Especially when shareholders have a tax-exempt status, the transition from a REIT to a traditional structure will damage their return and the value of the invested

real estate portfolio, which eventually would change the shareholder base of the listed real estate markets. Einhorn et al (2001) continue along these lines of research by focusing on the new tax rules that were introduced in 1999 and that enabled corporations to spin-off rental real estate into a REIT, providing corporations with lucrative tax opportunities. Brady and Conlin (2004) offer a discussion of the industry effects that are associated with the implementation of a REIT standard. They predominantly focus on the increasing scale-of-economies that can be reaped by larger REITs and on the increasing market power of REITs in the real estate market. According to Brady and Conlin (2004) a large and mature REIT market run by professional portfolio-managers will discipline the development of real estate returns and should even attenuate the boom and bust cycle in real estate.

All of the aforementioned real estate studies relate to the U.S. REIT market. Ooi et al (2006) were among the firsts to address the REIT issue outside the U.S. In line with the work of Downs (1994) they too find that the credit line that is offered by a mature REIT market to be one of the most important supply-side factors for the surge of REITs in Asia. At the other end of the market, among investors, REITs were considered as a viable alternative to risky stocks and low-yielding bonds. Ooi et al. (2007) also refer to the absence of a preferential tax treatment as one of the key reasons for the slow development of the listed real estate markets in Europe and Asia during the 1990's. Lin (2007) explains that after a prompt economic expansion during the 1980's Taiwan, Hong Kong, South Korea and Singapore build up a strong reputation as the renowned Newly Industrial Countries (NICs) or the four dragons. The combination of an economic downturn during the 1990's and the increased competition with the Chinese economy within the Asian region, inspired the NIC'-s to offer an impulse to their real estate markets, for example by introducing REITs.

2.3. REIT Performance

Numerous papers examine the risk and return characteristics of real estate as an asset class, and many of these focus particularly on REITs. Benjamin, Sirmans, and Zietz (2001) review the

literature and identify an impressive body of papers on risk and return, diversification benefits, and inflation hedging. They argue that REITs behave in part as stocks and in part as bonds in the sense that REIT risk premiums are correlated to those of both bonds and stocks.

Systematic risk is a frequent topic in the literature (Chan, Hendershott, and Sanders, 1990; Ling and Naranjo, 1998; Ling, Naranjo, and Ryngaert 2000; Allen, Madura and Springer, 2000). The general finding is that single-factor models are insufficient for explaining real estate returns, but there does not appear to be any consensus about which risk factors to include. Clayton and MacKinnon (2001) assess the correlations between REITS and other asset classes. They not only find that REIT returns are highly sensitive to both stocks (large- and small-cap) and bonds, but that these relationships are time-varying and indicate structural changes. Chui, Titman, and Wei (2003) assess the cross section of expected REIT returns and also note that there may be a momentum effect in REIT returns, a finding that has been confirmed by Derwall et al. (2009). A particularly interesting question for present purposes is whether REIT return and risk characteristics are stable over time; based on U.S. evidence the answer to this question appears to be negative. It appears that performance has changed as a response to changes in market structure. Among these changes, are changes in management style, ownership structure, legal environment, and information flows, according to Chui, Titman, and Wei (2003). Such strands of research have also been extended to include international evidence. Hoesli and Camilo (2007) analyze the exposure of securitized real estate to stock, bond and direct real estate factors. Interestingly, they note that further research "should attempt to analyze the impact of the institutional setup (and changes in the setup) of real estate securities across countries".

The effects of structural change in relation to events such as changes in legislation or market structure have, in fact, been studied specifically in REIT markets. Perhaps the earliest example of such a study is Khoo, Hartzell, and Hoesli (1993) who show a decline in equity REIT betas throughout the 1980s. Howe and Jain (2004), in an event study, estimate the wealth effect of the passage of the REIT Modernization Act, which relaxed constraints on REITs. The authors

show that the passage of the act is associated with both positive wealth effects and a decrease in systematic risk.

Still, the specific effects of legal REIT requirements such as dividend payout ratios have not been subject to much study; there are, however, sound theoretical arguments for expecting that these requirements are influential. As an example, there is evidence from the mainstream finance literature, which indicates that dividend payout ratios vary inversely with stock volatilities (Baskin 1989). A potential explanation is that high dividend yield stocks pay out earnings earlier than other stocks and therefore are less affected by changes in discount rates. In addition, a stock's value can be decomposed into the value of assets in place and future growth opportunities, the latter of which is likely to be more volatile than the former, and the value of high dividend stocks will mainly consist of their assets in place. Still, there is no agreement on the relation between dividend payout ratios and stock volatility. Allen and Rachim (1996), for instance, find no evidence of any relation in their analysis of Australian stocks. Finally, leverage is related to systematic risk, or betas, and if the introduction of a REIT standard leads to a decrease in leverage, a reduction in systematic risk is also to be expected.

Such considerations lead to the question of whether and why one might expect property companies with REIT status to be less risky than their non-REIT counterparts. An essential feature of basically all REIT standards is that they constrain management, e.g. by mandating that virtually all earnings be paid out as dividends. This clearly deprives managers of opportunities to expropriate shareholder funds by engaging in empire building activities (Jensen and Meckling 1976). As noted in the introduction, an important motive behind the creation of REIT standards is to attract additional capital to traded real estate markets. It is also well-known from the asset pricing literature (Pastor and Stambaugh 2003) that illiquid assets have an associated risk premium. The upshot is improvements in liquidity due to the introduction of REIT standard might lower the required returns of investors and thereby increase the inflow of capital to REITs.

3. REIT Standards and Firm Characteristics

While REIT markets share important institutional details across virtually all countries, there are also important differences. As an example, REITs are required to be exchange-listed in most countries, but not in the U.S. or Japan. The other key attributes that differ between REIT standards are the permitted activities, leverage limits, distribution and ownership structure. In most cases, REITs are meant to hold real estate for the purpose of generating property rental income. This is reflected in activity requirements. These can be quite liberal, as is the case in France, or very stringent (e.g. in Britain). Most standards will require the company to hold at least 75% of the portfolio in income generating real estate. Other operational activities are restricted and/or subject to taxation. This is particularly true for real estate development. To avoid unequal competition between (tax paying) developers and REITs, developments are either prohibited or only permitted within the context of the investment portfolio. In the U.S., development is only permitted through a so-called TRS (Taxable REIT Subsidiary).

In a number of REIT standards leverage ceilings have been imposed to protect individual investors from the volatility that leverage introduces. Even though the availability and pricing of debt finance often are the key determinants of the amount of leverage a company can take, the ceiling levels do impact the decisions of companies, particularly if real estate prices are falling. Singapore has the most stringent leverage ceiling, with a 35% debt to assets maximum.

All REIT standards require companies to distribute a significant portion of the earnings. As the REIT itself usually is not subjected to corporate taxation, passing through distribution is important to ensure taxation at the shareholder level. Among the six markets in this study, the required payout is in a tight range between 85-90% of (eligible) earnings. Finally, the ownership requirements of the REIT standards vary. The purpose of imposing ownership requirements is to safeguard liquidity, as well as to manage potential tax implications arising from the pass-through of earnings in the form of dividends. Some countries such as Japan also have strict requirements as for the minimum amount of shareholders – in Japan the figure is no less than 4,000 shareholders as compared to 100 shareholders in the U.S. In Britain and Germany, no

shareholder can hold more than 10% of the shares in the REIT. In Table 1, we summarize the most relevant requirements for the sample of markets discussed in this paper.

insert Table 1 around here

Both in seniority and size the U.S. REIT market dominates all others. Already in 1960 the U.S. adopted a REIT standard, which during the mid-nineties fuelled the development of this financial sector, which by the end of 2012 matured into a market with around 170 firms and a sum aggregate market value of 400 billion U.S. dollars. The other markets in our sample can be considered as late followers in the REIT adoption, with Japan introducing its REIT system in 2001 and the U.K. being the last to follow in 2007. The adoption rate varies across markets; in the U.K., for instance, almost exactly half of the listed real estate companies adopted the REIT standard at or soon after January 1st 2007 (REITA 2008). Whereas in a market like France, in contrast, the shift from non-REIT to REIT status has been gradual since the regime inception in 2003. Each year a number of firms, typically about ten, has since adopted the standard. However, it is worth noticing that the standard itself has undergone changes over time (and one therefore frequently encounters not only the term SIIC, but also SIIC2, SIIC3, and SIIC4). The Japanese REIT market differs still further: Unlike in the U.K., where we typically observe that publicly listed property companies adopt a REIT status, Japanese REITs tend to have this status from inception. That is, these companies do not exist as listed non-REIT property companies before becoming REITs. Another important distinction is the difference in management. Whereas the overwhelming majority of European and American REITs are managed internally, the Asian REITs are externally managed (i.e. through an external sponsor acting as the fund manager).

In our analysis, we study both the REITs and the non-REITs in each market empirically. Data on prices, volumes, and so forth for this study has been obtained from Datastream Advance and the CRSP Ziman Database. Balance sheet items on firm level are collected through Thomson's Worldscope and Reuters. The identification of REITs in different countries, however, has largely been done using information compiled by REIT associations such as REITA for the U.K. or ARES in Japan.

In Table 2, we present an overview of our sample of firms that made the switch to the REIT standard. Here, we find various noteworthy patterns. First, we document that the transition into a REIT is associated with an increase in dividend yields in five out of six markets. Only in Germany, we find no pervasive REIT effect on dividend yields, but this is likely due to sample limitations and a contemporaneous increase in stock prices, which reduces yields. This change in dividend yields obviously results directly from the REIT regulations that impose higher payout rates. Hence, we also examined other firm characteristics that are less directly linked to the regulative design of REITs, but are more in line with the policy motives of debt restrictions, the distribution of stockholdings, and stock liquidity. Regarding the debt ratios, we find a mild increase of debt in all markets. These increases ranged between a modest 0.02% in Japan to 8.69% in the U.K. It appears that the adoption of the REIT standard offers firms an easier access to leverage. Regarding stock ownership and stock trading, we document mixed results. For stock trading, we find an increase in turnover rates (daily trading volumes over the numbers of shares outstanding) in all markets. These increases are modest in France, and the U.K., but large and significant in Japan and Germany. Regarding the distribution of stock ownership, we find a decrease in the faction of closely held shares – the illiquid stocks in hands of insiders and blockholders – France and the U.S., but in the other four markets we report an increase in stock concentration. Especially in Germany it seems that converting into a REIT reduces the availability of stocks to some retail investors.

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insert Figure 1 and Table 2 around here

To better grasp these outcomes, we also performed a separate, not reported, analysis for the U.K. firms that have not adopted the REIT standard, and over the same time period these firms increased their leverage ratios. When comparing these two groups of firms, the REIT-adopters versus the non-REITs, we also discovered significant differences in the average firm size. In the U.K. the REIT standards was predominantly adopted by the largest real estate investment firm in the market. This difference might also be driving the results regarding the leverage ratios, given that small firms have less access to the equity market when in need for additional financing. Besides a reduction in leverage, Table 2 also shows an increase in dividend yields across the sample. Given that the dividend payout requirement is central to all REIT standards, this is only to be expected. After the firm turns into a REIT it starts paying out more of its profits as dividends, and the dividend yield increases. Finally, with respect to stock market liquidity, we also observe a mild increase in the turnover ratios around the date that firms adopt the REIT standard. Being a REIT increases the appeal of an investment firm to (foreign) investors, which might eventually result in more intensive trading. The results of Table 2 support this notion, since turnover ratios increased substantially.[2]

4. Stock Performance and Structural Breaks

Whether the introduction of REIT standards affects the properties of listed real estate companies is a multifaceted problem. Therefore, we empirically track a wide variety of both firm characteristics and stock performance indicators to document all changes that might be related to the changes in the associating tax laws. Given the nature of the REIT criteria, as presented in Table 1 and discussed in the previous section of this paper, we rationalize that an adoption of the REIT status typically requires a real estate investment firm to increase its dividend payout,

[2] For a more elaborate discussion on the international dynamics of liquidity ratios of listed we refer to Brounen et al. (2009).

reduce its debt ratio and increase the freefloat of its shares. Increase in dividend payouts and changes in debt levels should for different reasons reduce the systematic risk of a firm.

Assuming that financial markets are efficient, we assume that the stock returns generated after the transition into the REIT-status adjust to a new systematic risk exposure. In Figure 2, we plot the monthly total return indices of the REIT-converting firms (C) versus the firms that decide not to convert (NC) for each market. In Germany, Japan and the UK, it appears that converting firms returns have been more stable over time. This is true both before and after the REIT conversion, which raises the question whether this difference in risk is due to the REIT conversion at all.

insert Figure 2 around here

In order to test these hypotheses, we can specify a model of expected returns and then test for parameter constancy of that model around the REIT conversion moment. We start our analysis by simply relating the individual stock performance to that of the overall stock market. Such a (CAPM-inspired) model can be described via the following equation:

$$E(r_{i,t} - r_{f,t}) = \alpha_i + \beta_{1,i} E(r_{market,t} - r_{f,t}), \qquad (1)$$

where $r_{i,t}$ denotes the return to security i, $r_{market,t}$ the return to the stock market, and $r_{f,t}$ the risk-free rate. We use (1) as our benchmark model, but for purposes of ensuring robustness we also test more elaborate models, such as a two-factor model, which includes a real estate factor. For a motivation of this approach see for example Clayton and MacKinnon (2003), and Hoesli and Camilo (2007).[3] The two factor model that we estimated can be written as:

[3] In order to investigate skewness effects, models with quadratic terms akin to that suggested by Kraus and Litzenberg (1976) could be tested.

$$E(r_{i,t} - r_{f,t}) = \alpha_i + \beta_{1,i}E(r_{market,t} - r_{f,t}) + \beta_{2,i}E(r_{realestate,t} - r_{f,t}), \quad (2)$$

Where $r_{realestate,t}$ is the return on a real estate index. We chose for the indices provides by Global property research. It turned out that the real estate return indices have correlations with the total market indices ranging from 0.20 (Germany) to 0.88 (Singapore). Although this may indicate that for some countries multicollinearity may be an issue for the interpretation of the individual regression coefficients, the Chow break point test that we employ in this paper, is not affected by this as it is constructed from the sums of squared errors, which are not affected by multicollinearity. Estimation of equations (1) and (2) is performed by ordinary least squares (OLS), replacing the expected values $E(x)$ by their sample equivalents x, and adding an error term.[4]

There are various possible tests or procedures which may be employed to investigate structural change (parameter constancy) in linear regression models. The most well-known of these is undoubtedly the Chow test. Bleaney (1990) examines the relative power of various tests when the break data is known, and finds that the Chow test, which is designed to detect differences in coefficients for two subsets of the data, performs relatively better in terms of power than the CUSUM test. The Chow test, due to Chow (1960), involves partitioning the data into two subsamples 1 and 2 with n_1 and n_2 observations respectively (both n_1 and n_2 must, of course, each be larger than the k explanatory variables in the regression model). The partitioning of the dependent and independent variables can be written as:

$$y = [y_1, y_2]^T \text{ and } X = [X_1, X_2]^T \quad (3)$$

[4] So, for example equation (1) becomes: $r_{i,t} - r_{f,t} = \alpha_i + \beta_{1,i}(r_{market,t} - r_{f,t}) + \varepsilon_i$..

One can then write the following stacked regression model:

$$[y_1, y_2]^T = [X_1, X_2]^T\beta + [O, X_2]^T\gamma + u, \qquad u \sim \mathrm{N}(0, \sigma^2 I) \tag{4}$$

The null hypothesis of interest is being γ a zero vector, in which case the above is equivalent to the restricted model:

$$y = X\beta + u \tag{5}$$

The null hypothesis of k zero restrictions in (3) can then be tested using an F-test with (k, n_{1+} $n_2 - 2k$) degrees of freedom. The results of this exercise are reported in Table 3.

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insert Table 3 around here

The results in Panel A are mixed. Regarding the alpha of the firms in our sample, we hardly find any pervasive changes, especially not in the U.K. where most alpha's seem to have decreased after the REIT standard was adopted for the standard CAPM model. In case of adding a real estate factor to the model, most of the alphas have increased. This shows that the results are sensitive to the risk corrections applied.

Given that the set of requirements that associate the REIT standard across nations is designed to decrease risk (increase dividend payout, restrict use of debt) rather than to change the stock outperformance, we would expect to find more compelling results when examining the stability of the betas in our sample. Table 3 shows this is indeed the case. For almost all countries the betas have decreased after introduction of a REIT standard. This is especially the case after extending the model with the real estate factor included (Equation 2). It seems that if the REIT

standard changes the performance of listed real estate firms, it is most likely to be a risk effect. We also test the joint stability of the two parameters in a more formal statistical test, the Chow test, and find that at 95 percent confidence level a large number of significant structural breaks occurred for all countries, except Japan. Adding the real estate factor to the simple CAPM regressions (Eq. 2), leads to a higher percentage of significant break detections in the relation between REIT returns and their explanatory variables.

5. Conclusions and Implications

In this paper we examine if and how the set of financial regulations that associate the REIT standard, alter the financial DNA of listed real estate. Introducing a tax transparent REIT standard offers real estate investment firms a new trade-off between tax advantages and reduced corporate flexibility with respect to dividend payout policy, capital structure and the span of their activities. We track these firm characteristics during the transition into the REIT era, and assess the extent to which the set of REIT criteria is noticeable when analyzing the stock performance of the firms in our sample.

Our results show us that firms, which transit to a REIT standard, experience a mild jump in stock turnover levels and an increase in dividend payouts. We find statistical proof for a structural break in the risk and return of listed real estate firms during the conversion into a REIT in 46% of cases. In 58% of REIT conversions, we document a decrease in beta, and 63% of the cases alpha's increase significantly.

All this shows that the international introduction of REIT standards, has definitely changed the DNA of listed real estate. The design of the standard has effectively decreased the systemic risk of listed real estate firms, and increased the stock turnover in all markets. The increased stock liquidity, however, is not due to the capital flow from retail investors. This is one aim of regulators that has not been achieved.

This study opens a number of interesting alleys for further research. First and foremost, a more thorough analysis of asset pricing implications of the introduction of REIT standards is warranted. Is it the case that the cross section of REIT returns has undergone a significant shift around the announcement dates of the regime shift?

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Table 1| REIT Standard Details

Country	Listing required	Real estate assets	Development ceiling	Leverage ceiling	Earnings distribution minimum	Ownership structure	Conversion costs / exit tax
France	Yes	Financial leases <50%	20% of book value	None	85%	No shareholder may own >60%; 15% must be held by held by shareholders holding <2%	16.5% taxation on unrealized gains payable in four years.
Germany	Yes	75%	<25%	55% ???60% fixed	90%	No shareholder may own >10%, 25% float is required	Acquisitions between 2007 and 2009 are subject to taxation on 50% of capital gains if seller has held the asset for at least 5 years.
Japan	No	Qualified assets only	0%	None	90%	>1,000 shareholders; Top-10 shareholders must be <75%	Not applicable.
Singapore	Yes	75%	<10%, for investment portfolio only	35% but in case of published credit rating 60%	90%	25% of shares need to be held by at least 500 public unit holders, subject to size	Not applicable.
U.K.	Yes	75% (concentration rules apply)	Permitted on own account, subject to taxation if sold within 3 years.	Financing costs <1.25 times property profits	90%	No shareholder may own >10%	2% of market value of assets. Company may elect payment in four annual installments.
U.S.	No	75%	25% through taxable REIT subsidiary (TRS)	None	90%	>100 shareholders; top-5 shareholders must be <50%	All (un)realized gains before electing status must be distributed (corporate taxes apply) unless assets are held for ten years after conversion.

Table 2| Changing Firm Statistics

This table provides an overview of the dividend yield, debt ratios, stock turnover, and stock distribution of listed real estate investments vehicles before and after the transition to the REIT standard. The statistics are three year averages before and after the conversion date, which is specified for each firm individually. The standard errors are listed in smaller fonts below each average.

	France n=25	Germany n=3	Japan n=17	Singapore n=12	UK n=12	US n=3
Dividend yield						
Pre-REIT conversion	3,72%	2,66%	3,82%	2,65%	2,64%	6,28%
	2,1%	1,8%	2,9%	2,1%	1,7%	4,7%
Post-REIT conversion	4,56%	1,96%	3,58%	3,56%	7,33%	5,99%
	2,3%	1,2%	2,5%	2,6%	8,3%	5,2%
Difference	0,84%	-0,70%	-0,23%	0,91%	4,68%	-0,28%
	2,5%	-0,8%	1,1%	2,4%	8,2%	2,6%
Debt ratio						
Pre-REIT conversion	28,25%	11,63%	29,91%	31,78%	34,33%	47,16%
	19,8%	9,5%	9,9%	16,6%	15,2%	16,1%
Post-REIT conversion	33,48%	13,79%	29,94%	31,24%	43,03%	50,85%
	19,8%	6,2%	10,6%	19,1%	20,6%	13,5%
Difference	5,23%	2,16%	0,02%	-0,54%	8,69%	3,69%
	10,2%	7,4%	5,8%	16,4%	25,5%	10,8%
Volume turnover						
Pre-REIT conversion	1,75%	2,00%	6,32%	3,45%	3,13%	1,79%
	1,9%	1,8%	3,4%	3,2%	1,7%	1,1%
Post-REIT conversion	1,85%	3,74%	8,63%	4,22%	3,43%	3,52%
	2,5%	4,3%	4,6%	3,3%	2,7%	3,2%
Difference	0,10%	1,75%	2,31%	0,77%	0,43%	1,73%
	1,3%	3,8%	3,1%	2,7%	1,4%	2,8%
% closely held shares						
Pre-REIT conversion	54,32%	48,59%	29,75%	61,78%	29,97%	35,26%
	26,1%	33,8%	19,2%	20,6%	23,9%	35,1%
Post-REIT conversion	52,30%	67,79%	31,29%	69,89%	35,62%	24,92%
	25,1%	37,2%	19,9%	19,9%	23,6%	35,8%
Difference	-2,03%	19,20%	1,55%	8,11%	3,20%	-10,34%
	18,0%	22,3%	10,0%	14,7%	22,1%	22,7%

Table 3| Chow Test of CAPM Parameter Stability

This table provides results on the single-and two-factor market model parameters (see equations (1) and (2) in the text), and the output of the Chow-test that tests for a structural break in these parameters around the local introduction of REIT standards for 5 countries (Japan, UK, France, Germany, and Singapore). In each panel we present the results for individual firm regressions. Here we exhibit the alphas and beta's, both before and after the transition into the REIT standard. The Chow-tests indicate whether both alphas and betas have changed significantly during the regime shift.

Japan

	1-factor		2-factor	
	before	*after*	*before*	*After*
Alpha				
Mean	-0.007	0.006	-0.014	0.002
Stdev	0.026	0.004	0.025	0.005
Increased / total	5	10	7	10
Beta (market)				
Mean	1.180	1.311	0.354	0.237
Stdev	0.371	0.515	0.529	0.384
Decreased / total	4	10	5	10
Beta (EPRA)				
Mean			0.754	0.942
Stdev			0.531	0.416
Decreased / total			4	10
Chow-test				
p-value <0.05 / percentage	1	10%	3	30%

UK

	1-factor		2-factor	
	before	*after*	*before*	*After*
Alpha				
Mean	0.005	-0.017	0.004	-0.009
Stdev	0.008	0.020	0.009	0.020
Increased / total	1	53	39	53
Beta (market)				
Mean	0.654	1.146	0.341	0.382
Stdev	0.385	0.728	0.387	0.607
Decreased / total	9	53	42	53
Beta (EPRA)				
Mean			0.418	0.715
Stdev			0.494	0.571
Decreased / total			13	53
Chow-test				
p-value <0.05 / percentage	21	40%	23	43%

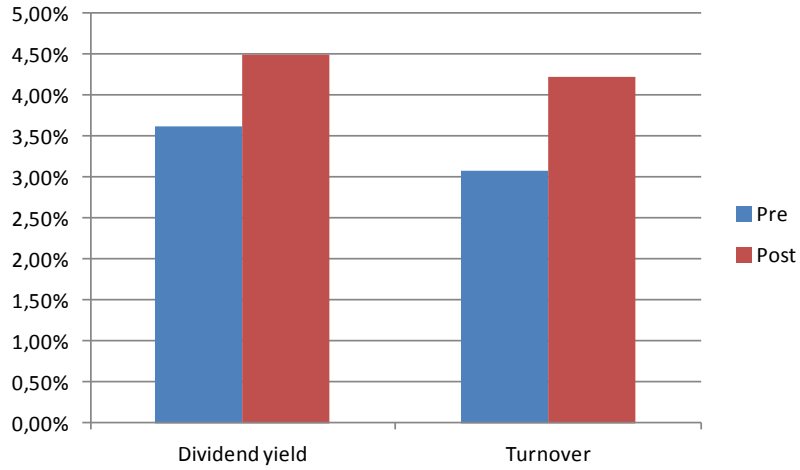
Table 3| Chow Test of CAPM Parameter Stability (continued)

France	1-factor		2-factor	
	before	*after*	*before*	*After*
Alpha				
Mean	0.003	0.003	-0.003	-0.002
Stdev	0.014	0.009	0.017	0.008
Increased / total	13	17	7	17
Beta (market)				
Mean	0.296	0.744	0.137	0.141
Stdev	0.391	0.371	0.576	0.290
Decreased / total	2	17	6	17
Beta (EPRA)				
Mean			0.799	0.745
Stdev			0.624	0.375
Decreased / total			7	17
Chow-test				
p-value <0.05 / percentage	11	65%	7	41%

Germany	1-factor		2-factor	
	before	*after*	*before*	*After*
Alpha				
Mean	0.000	-0.018	-0.001	-0.004
Stdev	0.017	0.020	0.018	0.017
Increased / total	3	13	6	13
Beta (market)				
Mean	0.677	0.843	0.645	0.282
Stdev	0.476	0.443	0.584	0.333
Decreased / total	5	13	9	13
Beta (EPRA)				
Mean			1.814	8.513
Stdev			6.982	4.731
Decreased / total			3	13
Chow-test				
p-value <0.05 / percentage	4	31%	6	46%

Singapore	1-factor		2-factor	
	before	*after*	*before*	*After*
Alpha				
Mean	-0.011	0.003	-0.008	0.001
Stdev	0.017	0.004	0.010	0.004
Increased / total	11	13	11	13
Beta (market)				
Mean	1.517	1.090	0.463	0.367
Stdev	0.248	0.312	0.423	0.392
Decreased / total	13	13	7	13
Beta (EPRA)				
Mean			0.729	0.692
Stdev			0.380	0.391
Decreased / total			8	13
Chow-test				
p-value <0.05 / percentage	8	62%	9	69%

Figure 1| Changing Firm Statistics



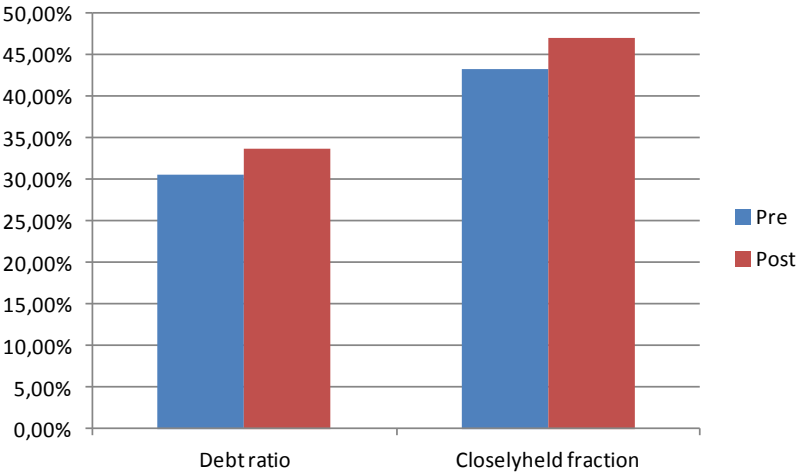


Figure 2| Stock Performance of REIT Converters (C) versus Non-Converters (NC)

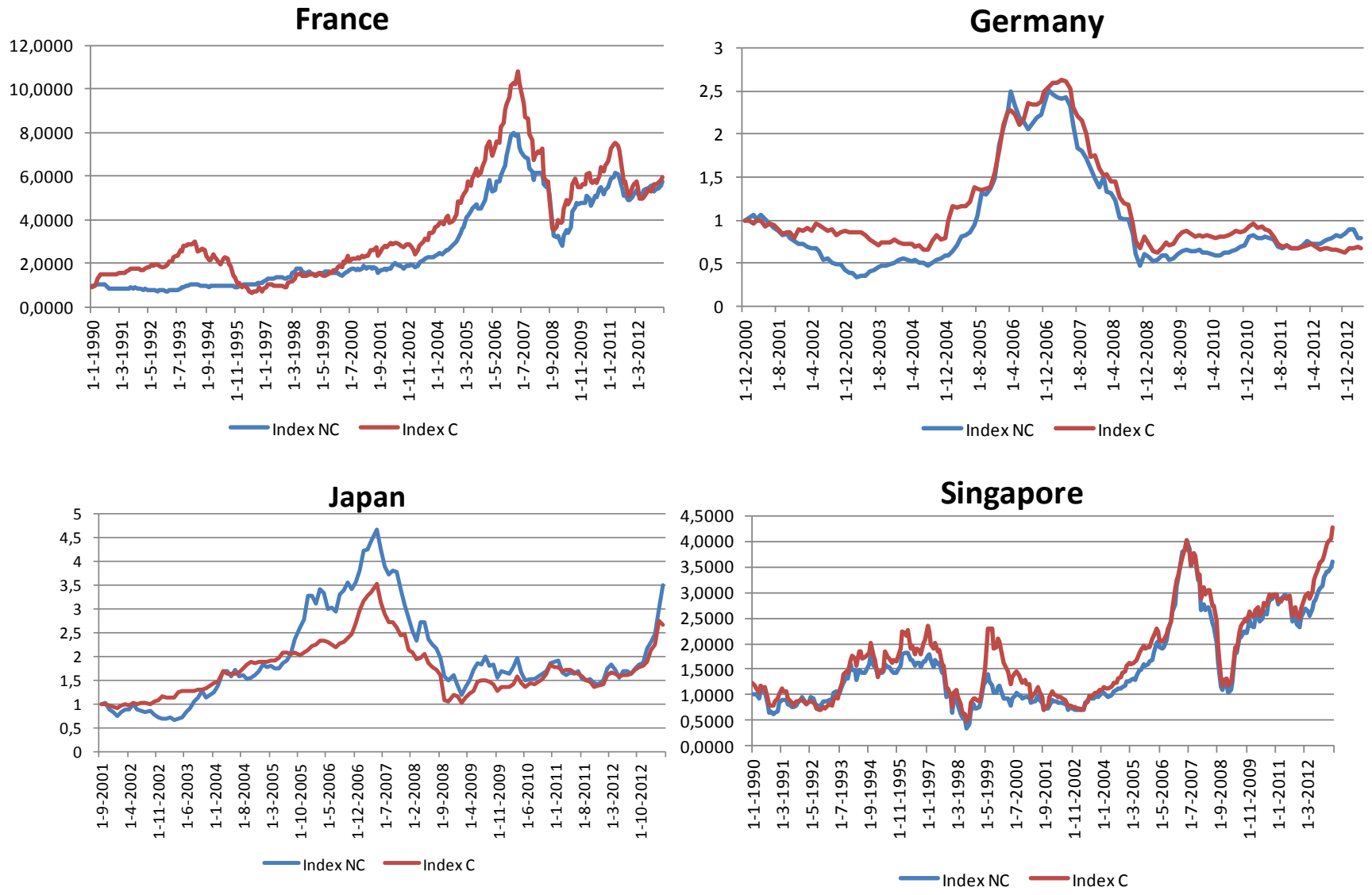


Figure 2| Stock Performance of REIT Converters versus Non-Converters (continued)