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Systematic Equity Return Patterns in Listed European Property Companies

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This study investigates systematic monthly return regularities in the listed equity returns of twelve European property companies. Significant monthly effects exist in all sampled countries with Germany as the single exception. Furthermore, the findings provide evidence of abnormally high December returns, or a December effect, in four international indices (FTSE EPRA/NAREIT international Europe, Euro-zone, Global, and North America) and five European countries (Finland, France, Netherlands, Norway, and the United Kingdom). With the exception of Switzerland, the well-documented January effect is absent from all European property company equity returns.

Keywords

Calendar anomalies; Seasonality; January effect; December effect; International real estate; Public property markets

1. Introduction

The arbitrage pricing theory (APT) recognizes that systematic return patterns will be exploited and should therefore not exist for extended time periods. Despite the theoretical appeal of the APT logic, day-of-the-week, holiday, December, January, and turn-of-the-year effects are documented examples of temporal return patterns called anomalies. However, consistent with the APT logic, many of these return patterns have not persisted over extended time periods.

Studies that investigate anomalies have initially focused on equity returns in the United States (US) with more recent attention on international and global equity markets. Recent studies have also been industry specific and include the study of real estate investments trusts (REITs) in the US and international property companies. Anomalous return behaviors have been found in US REIT returns, and to a lesser extent, international property company equity returns. The focus of this present study is European real estate returns from publicly traded stocks. Relative to US REITs, European listed property equity returns are relatively understudied.

With the exception of Germany, the present study finds that significant monthly effects and price irregularities exist in all sampled countries. Furthermore, the findings provide evidence of superior December returns in four international indices and five European countries (Finland, France, Netherlands, Norway, and the United Kingdom (UK)). The well-documented January effect is absent from all European property company equity returns with Switzerland as the single exception.

2. Literature

There is documentation of temporal return patterns in equity markets during certain time periods. Predominately, monthly returns in January have been found to be higher than the returns of other months. This phenomena has been coined *the January effect* (see Banz (1981), Reinganum (1983), Keim (1983), Pettengill (1986), Jones et al. (1987), and Haugen and Jorion (1996)). For example, Rozeff and Kinney (1976) find a January effect in monthly NYSE equity returns and other studies have found a January effect in international stock markets. In an examination of the major industrial countries, Gultekin and Gultekin (1983) provide evidence for a persistent January effect in 13 out of 17 capital markets. Asteriou and Kavetsos (2006) have investigated seasonal effects of eight transition economies in Europe. Their results show evidence of temporal return patterns, including the January effect, in most of these European equity markets.

In contrast, Fountas and Segredakis (2002) do not find any indication of a January effect in eighteen emerging stock markets. Moreover, calendar anomalies in developed stock markets disappear after discovery. For example, Mehdian and Perry (2002) have found that the January effect is statistically insignificant after 1987 in US equity markets and Moosa (2007) has found a diminishing January effect.

Colwell and Park (1990) have calculated average monthly REIT returns and find a January premium in both equity and mortgage REITs. They also notice that the January effect is much stronger in small capitalization REITs, which is consistent with the inverse relation between company size and January effect previously documented in the literature (see Banz (1981) and Reinganum (1983)).

Using daily REIT return data, Redman et al. (1996) document day-of-the-week (Friday premium), turn-of-the-month, and January effects in REITs. Similarly, Friday and Peterson (1997) observe a January effect in REITs regardless of the REIT size and classification (equity, mortgage, and hybrid) for the period of 1974 to 1993. However, Connors et al. (2002) do not find a January effect by using a value-weighted REIT index for a shorter time period from 1994 to 1999. They report significantly higher December returns compared to other months which could be called a December effect.

Over the past several decades, large institution investors have increased their portfolio allocations to real estate, primarily by investing in publically traded REITs. Lee and Lee (2003) provide evidence that January premiums decrease after increased institutional REIT investment. More recently, Hardin et al. (2005) confirm the conclusions of Connors et al. (2002) by showing that the January effect is statistically insignificant by using a value-weighted index for the period of 1994 to 2002. Overall, more recent empirical evidence has demonstrated that the January effect has disappeared from both US equity and US REIT returns, but initial evidence may now indicate a December influence. Along the same lines, Chan et al. (2005) use daily data to show that the Monday anomaly in REITs vanished in the late 1990s. They relate their findings to institutional investors who increased their investments in REITs during this period. Recently, Wiley and Zumpano (2009) have shown that the turn-of-the-month anomaly for US REITs did not diminish over time during the period of 1980 to 2004.

Fewer studies have investigated seasonal return anomalies in international real estate markets. Lenkkeri et al. (2006) study the day-of-the-week effect by using FTSE EPRA/NAREIT daily European securitized real estate indices for the period of 1990 to 2003. They find a Friday effect in eight of the eleven European countries. More recently, Brounen and Ben-Hamo (2009) have covered international property shares globally. They find Monday and Friday price premiums in all markets. They also document a May sell effect in ten of the eleven international property markets and suggest that the January effect is statistically insignificant in international property markets.

This present study extends the previous literature by investigating seasonal return patterns in European property company returns. No study has been found which investigates *monthly* return regularities in European property company returns. The results of our study will provide additional insights into listed European property equity returns and help to understand return patterns in international property markets. Based on early empirical findings in the equities markets in general,and US REIT returns,specifically,we expect to find return anomalies in publicly traded European property company returns. The results of this present study are important for both investors and academicians. An investor can construct a trading strategy which uses observed seasonalities in real estate equity returns to earn excess returns. Such calendar anomalies contradict the "efficient market hypothesis" which is still debatable between financial economists. We do not aim to explain or resolve these calendar anomalies. However, we will empirically test for return regularities in twelve European real estate company returns during the period of 1990 to 2007.

3. Method

An analysis is conducted using monthly data from FTSE EPRA/NAREIT Global Index [1] obtained from DataStream. These indices comprise value-weighted returns from the largest publically traded European real estate companies. The data covers twelve European countries during the period of January 1990 to December 2007. The countries are: Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, and the UK.[2] These twelve European property markets differ in terms of maturity and market size.

We follow the method used in Fountas and Segredakis (2002), and Asteriou and Kavetsos (2006). The model specification is ordinary least squares and test statistics are calculated using the Newey-West heteroskedasticity and autocorrelation adjustments to the standard errors. The following equation is used to test for real estate seasonal effects:

[1] In a guide to REIT indices, Frost et al. (2005) rate the major REIT indices according to their acceptance by investors, accuracy, completeness, transparency and liquidity and conclude that the FTSE EPRA/NAREIT is a premier global real estate index. For an overview of the FTSE EPRA/NAREIT index, the reader can refer to Bond et al. (2003), Yang et al. (2005), Lenkkeri et al. (2006), and Yunus and Swanson (2007).

[2] Please note that data for Denmark is available starting from January 1992 and data for Finland starts from January 1993.

$$R_t = a_1 D_{1t} + a_2 D_{2t} + \dots + a_{12} D_{12t} + \varepsilon_t$$
$$R_t = \sum_{i=1}^{12} a_i D_{it} + \varepsilon_t \tag{1}$$

where R_t is the real estate index return at time t, D_{it} is the seasonal dummy variable that equals 1 if the return at time t corresponds to month i, and 0 otherwise, and a_i is the average monthly return on month i.

We use the following regression equation to test for the January effect.

$$R_t = c + a_2 D_{2t} + a_3 D_{3t} + a_4 D_{4t} + a_5 D_{5t} + a_6 D_{6t} + a_7 D_{7t} + a_8 D_{8t} + a_9 D_{9t} + a_{10} D_{10t} + a_{11} D_{11t} + a_1 D_{12t} + \varepsilon_t \tag{2}$$

where the intercept c represents the average return for January and the coefficients a_i indicate the difference in returns between the return of January and month i. A negative value of the dummy coefficients in Equation (2) would indicate a January effect (higher monthly returns in January relative to other months of the year).

We use a similar regression equation to test for a December effect.

$$R_t = c + a_1 D_{1t} + a_2 D_{2t} + a_3 D_{3t} + a_4 D_{4t} + a_5 D_{5t} + a_6 D_{6t} + a_7 D_{7t} + a_8 D_{8t} + a_9 D_{9t} + a_{10} D_{10t} + a_{11} D_{11t} + \varepsilon_t \tag{3}$$

where the intercept c represents the average return for December and the coefficients a_i indicate the differences in returns between December and month i. A negative dummy coefficient in Equation (3) would indicate a December effect (higher monthly returns in December relative to other months of the year).

4. Results

Table 1 reports the results of the Equation 1 tests for monthly return anomalies of the European property indices. Significant monthly effects exist for all countries in our sample with the single exception of Germany. We find that five out of the twelve countries (Finland, France, Netherlands, Norway and the UK) have significant December return premiums. Another finding from Table 1 is that four countries (Belgium, Italy, Norway and Spain) have significant effects in May and four countries (France, Norway, Sweden and the UK) have significant negative effects that occur in June. Such significant seasonalities are viewed as evidence against weak-form market efficiency. Such anomalies also cast doubts to the "efficient market hypothesis" which suggests that security prices follow a random walk. In an efficient market, current prices should reflect all information and historical prices cannot be used to predict future returns.

66 Almudhaf and Hansz

Table 1 Tests for Monthly Calendar Seasonal Effects

This table reports the results from OLS regressions of the monthly returns of a country's EPRA/NAREIT index on the January to December dummy variables. The sample covers the period from January 1990 to December 2007. The *t*-statistics are calculated in accordance to the Newey-West adjusted standard errors.

Panel A

	Belgium		Denmark		Finland		France	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
D1	-0.010	0.312	0.019	0.525	0.048	0.344	0.003	0.775
D2	0.006	0.600	-0.013	0.673	0.060	0.183	0.022	**0.050**
D3	-0.007	0.470	-0.005	0.767	0.007	0.634	0.002	0.892
D4	0.008	0.320	0.048	**0.075**	0.003	0.868	0.001	0.964
D5	-0.023	**0.017**	0.023	0.233	0.032	0.207	0.011	0.265
D6	0.007	0.460	-0.008	0.827	-0.008	0.834	-0.020	**0.042**
D7	0.008	0.273	-0.007	0.790	-0.040	0.249	0.001	0.941
D8	-0.003	0.755	0.006	0.751	0.031	0.558	0.011	0.331
D9	0.007	0.560	-0.053	**0.085**	-0.024	0.352	0.002	0.889
D10	-0.006	0.457	-0.025	0.375	0.006	0.730	0.003	0.802
D11	0.010	0.242	-0.014	0.599	-0.031	0.257	0.020	**0.099**
D12	0.011	0.415	0.008	0.736	0.038	**0.065**	0.020	**0.063**
R^2	0.057		0.053		0.058		0.049	

(***Continued…***)

(***Table 1 Continued***)

Panel B

	Germany		Italy		Netherlands		Norway	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
D1	0.006	0.728	0.032	0.153	0.012	0.171	0.007	0.781
D2	-0.004	0.780	0.016	0.378	0.010	0.201	0.024	0.528
D3	-0.003	0.811	0.017	0.442	-0.009	0.425	0.017	0.241
D4	0.026	0.157	0.031	**0.085**	-0.007	0.307	0.002	0.941
D5	0.007	0.616	-0.035	**0.013**	0.003	0.755	0.026	0.089
D6	-0.004	0.795	-0.020	0.112	0.002	0.825	-0.033	**0.077**
D7	0.009	0.649	-0.017	0.235	-0.005	0.578	0.006	0.656
D8	0.008	0.338	-0.001	0.940	-0.004	0.594	-0.022	0.182
D9	-0.017	0.404	-0.017	0.363	-0.005	0.633	-0.022	0.167
D10	0.022	0.225	0.017	0.267	-0.003	0.729	0.001	0.957
D11	-0.012	0.451	0.019	0.352	0.004	0.716	-0.028	0.362
D12	0.006	0.624	0.006	0.769	0.024	**0.002**	0.032	**0.002**
R^2	0.032		0.074		0.055		0.060	

(***Continued…***)

(***Table 1 Continued***)

Panel C

	Spain		Sweden		Switzerland		UK	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
D1	0.006	0.678	0.007	0.783	0.024	**0.067**	0.000	0.980
D2	0.045	**0.022**	0.017	0.563	-0.003	0.636	0.001	0.937
D3	0.000	0.982	-0.021	0.249	0.022	**0.045**	-0.018	0.304
D4	0.021	0.229	-0.011	0.330	0.009	0.280	0.019	0.116
D5	0.030	**0.011**	-0.003	0.887	0.014	0.195	0.015	0.295
D6	-0.020	0.224	-0.028	**0.095**	0.001	0.945	-0.019	**0.039**
D7	-0.014	0.548	0.028	0.173	-0.012	0.176	0.003	0.818
D8	-0.019	0.343	-0.035	**0.044**	-0.006	0.618	0.008	0.494
D9	-0.007	0.744	-0.015	0.671	0.000	0.990	-0.001	0.918
D10	0.007	0.691	0.019	0.191	-0.001	0.927	0.001	0.908
D11	0.009	0.648	0.020	0.446	-0.002	0.876	0.003	0.820
D12	0.007	0.768	-0.005	0.750	0.001	0.965	0.021	**0.022**
R^2	0.054		0.046		0.053		0.049	

68 Almudhaf and Hansz

An anomaly is a fact that is inconsistent with the current paradigm (Kuhn, 1962). Empirical results are classified as anomalies when researchers cannot explain them within a paradigm. Would such calendar anomalies offer profitable opportunities to investors? Thaler (1987) suggests that low trading volume and high transaction costs tend to mitigate excess returns from trading strategies based on calendar anomalies. The presence of institutional investors could help in moving toward a better and efficient market (Chan et al., 2005; Wiley and Zumpano, 2009).

Table 2 presents the results from the Equation 2 tests of a January effect. The constant, which measures the average return in January, is positive in eleven out of twelve countries in our sample. However, it is not statistically significant for ten out of these eleven European countries. Interestingly, a January return premium significantly exists only in Switzerland where the constant is positive and significant. This finding is consistent with the Brounen and Ben-Hamo (2009) finding of no January effect in global property company returns (Austria, Australia, Canada, Hong Kong, and Singapore) and findings from Hardin et al. (2005) in which there is no evidence of a January effect in REITs value-weighted index.

Several possible explanations are raised by financial economists for this January phenomenon. Seyhun (1993) lists the following possible reasons: tax-loss selling, portfolio rebalancing and window dressing, omitted risk factors, seasonalities in the risk-return tradeoff, informed insider trading, and risk mismeasurement problems. In addition, Anderson et al. (2007) argue that investor psychological effects and irrationality contribute to the January effect.

Our findings of insignificant January returns are expected since we are using EPRA/NAREIT indices. These indices comprise value-weighted returns from the largest publically traded European real estate companies. Some financial economists view the January effect as a small firm effect and our findings are along the lines of those of Connors et al. (2002).

Table 3 shows the results from the Equation 3 tests for a December effect. A positive and significant December return premium is found in Finland, France, Netherlands, Norway and the UK. This is consistent with the Connors et al. (2002) findings on US REITs. Abnormal REIT returns in December might be due to a US tax law that requires REITs to pay out high dividends before the end of the year. Another possible explanation for a December effect, particularly in countries outside the US, is investor anticipation of a January effect that results in December arbitrage trading. Thaler (1987) expects that investors who wanted to exploit the January effect could decide to buy in December instead of January. Such an action could cause high returns in December. Hardin et al. (2005) suggest that excess dividend yields of REITs in December are behind the high returns that occur in December.

70 Almudhaf and Hansz

Table 2 Tests for the January Effect

This table reports the results from the following OLS regressions of monthly returns of a country's index:

$$R_t = c + a_2 D_{2t} + a_3 D_{3t} + \ldots + a_{11} D_{11t} + a_1 D_{12t} + \varepsilon_t .$$

where the intercept c represents the average return for January and the coefficients a_i indicate the difference in returns between the return of January and month i. The sample covers the period from January 1990 to December 2007. The t-statistics are calculated in accordance to the Newey-west standard errors.

Panel A

	Belgium		Denmark		Finland		France	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	-0.010	0.312	0.019	0.525	0.048	0.344	0.003	0.775
D2	0.016	0.303	-0.032	0.325	0.012	0.890	0.018	0.167
D3	0.003	0.841	-0.024	0.510	-0.041	0.448	-0.001	0.945
D4	0.018	0.129	0.028	0.527	-0.045	0.431	-0.003	0.868
D5	-0.013	0.342	0.004	0.905	-0.017	0.781	0.008	0.620
D6	0.017	0.214	-0.027	0.567	-0.056	0.374	-0.023	0.127
D7	0.018	0.142	-0.026	0.510	-0.088	0.153	-0.003	0.872
D8	0.007	0.635	-0.014	0.694	-0.018	0.810	0.008	0.624
D9	0.017	0.256	-0.072	0.088	-0.072	0.215	-0.001	0.950
D10	0.004	0.756	-0.044	0.300	-0.042	0.431	0.000	0.978
D11	0.020	0.082	-0.033	0.421	-0.079	0.181	0.017	0.325
D12	0.021	0.117	-0.011	0.779	-0.010	0.842	0.016	0.250
R^2	0.057		0.053		0.058		0.049	

(***Continued…***)

(***Table 2 Continued***)

Panel B

	Germany		Italy		Netherlands		Norway	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	0.006	0.728	0.032	0.153	0.012	0.171	0.007	0.781
D2	-0.010	0.650	-0.016	0.514	-0.002	0.834	0.017	0.679
D3	-0.009	0.627	-0.015	0.524	-0.021	0.129	0.010	0.705
D4	0.020	0.427	-0.002	0.960	-0.020	0.080	-0.005	0.865
D5	0.001	0.975	-0.067	0.015	-0.009	0.494	0.019	0.526
D6	-0.010	0.666	-0.053	0.043	-0.010	0.449	-0.040	0.195
D7	0.003	0.899	-0.049	0.065	-0.018	0.181	-0.001	0.985
D8	0.002	0.908	-0.033	0.239	-0.016	0.170	-0.029	0.327
D9	-0.023	0.387	-0.049	0.076	-0.017	0.227	-0.029	0.316
D10	0.016	0.524	-0.015	0.550	-0.016	0.252	-0.006	0.800
D11	-0.018	0.403	-0.013	0.677	-0.008	0.566	-0.035	0.366
D12	0.000	0.990	-0.026	0.346	0.012	0.317	0.026	0.340
R^2	0.032		0.074		0.055		0.060	

(***Continued…***)

(***Table 2 Continued***)

Panel C

	Spain		Sweden		Switzerland		UK	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	0.006	0.678	0.007	0.783	0.024	**0.067**	0.000	0.980
D2	0.039	0.076	0.010	0.813	-0.027	0.072	0.001	0.958
D3	-0.006	0.807	-0.028	0.388	-0.002	0.906	-0.018	0.375
D4	0.015	0.526	-0.017	0.490	-0.015	0.283	0.019	0.280
D5	0.024	0.211	-0.010	0.777	-0.010	0.578	0.014	0.449
D6	-0.026	0.239	-0.034	0.244	-0.023	0.153	-0.020	0.203
D7	-0.020	0.466	0.021	0.508	-0.036	0.023	0.003	0.876
D8	-0.025	0.314	-0.042	0.160	-0.030	0.096	0.008	0.653
D9	-0.013	0.612	-0.021	0.610	-0.024	0.145	-0.002	0.925
D10	0.000	0.984	0.012	0.691	-0.025	0.213	0.001	0.951
D11	0.003	0.885	0.014	0.755	-0.026	0.182	0.003	0.867
D12	0.001	0.982	-0.011	0.637	-0.023	0.260	0.020	0.177
R^2	0.054		0.046		0.053		0.049	

72 Almudhaf and Hansz

Table 3 Tests for the December Effect

This table reports the results from the following OLS regressions of monthly returns of a country's index:

$$R_t = c + a_1 D_{1t} + a_2 D_{2t} + \ldots + a_{10} D_{10t} + a_{11} D_{11t} + \varepsilon_t .$$

where the intercept c represents the average return for December and the coefficients a_i indicate the difference in returns between the return of December and month i. The sample covers the period from January 1990 to December 2007. The t-statistics are calculated in accordance to the Newey-West standard errors.

Panel A.

	Belgium		Denmark		Finland		France	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	0.011	0.415	0.008	0.736	0.038	**0.065**	0.020	**0.063**
D1	-0.021	0.117	0.011	0.779	0.010	0.842	-0.016	0.250
D2	-0.004	0.839	-0.021	0.577	0.022	0.672	0.002	0.892
D3	-0.018	0.290	-0.014	0.656	-0.031	0.226	-0.018	0.351
D4	-0.002	0.891	0.039	0.294	-0.035	0.224	-0.019	0.243
D5	-0.034	0.037	0.015	0.641	-0.006	0.842	-0.008	0.564
D6	-0.004	0.806	-0.017	0.711	-0.046	0.279	-0.039	0.006
D7	-0.002	0.884	-0.015	0.670	-0.078	0.054	-0.019	0.206
D8	-0.014	0.395	-0.003	0.922	-0.007	0.894	-0.008	0.585
D9	-0.004	0.822	-0.062	0.097	-0.062	0.059	-0.018	0.325
D10	-0.017	0.315	-0.034	0.379	-0.032	0.229	-0.017	0.260
D11	-0.001	0.953	-0.022	0.499	-0.069	0.024	0.000	0.993
R^2	0.057		0.053		0.058		0.049	

(***Continued…***)

74 Almudhaf and Hansz

(***Table 3 Continued***)

Panel B

	Germany		Italy		Netherlands		Norway	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	0.006	0.624	0.006	0.769	0.024	**0.002**	0.032	**0.002**
D1	0.000	0.990	0.026	0.346	-0.012	0.317	-0.026	0.340
D2	-0.010	0.607	0.011	0.676	-0.014	0.237	-0.008	0.840
D3	-0.009	0.611	0.011	0.674	-0.033	0.015	-0.015	0.387
D4	0.020	0.367	0.025	0.355	-0.032	0.004	-0.031	0.187
D5	0.001	0.959	-0.041	0.089	-0.021	0.089	-0.007	0.709
D6	-0.010	0.618	-0.026	0.261	-0.022	0.080	-0.066	0.002
D7	0.004	0.879	-0.023	0.344	-0.030	0.018	-0.026	0.133
D8	0.002	0.863	-0.007	0.790	-0.029	0.011	-0.055	0.006
D9	-0.023	0.346	-0.023	0.373	-0.030	0.027	-0.055	0.005
D10	0.016	0.436	0.011	0.616	-0.028	0.024	-0.032	0.037
D11	-0.018	0.294	0.013	0.599	-0.020	0.095	-0.060	0.040
R^2	0.032		0.074		0.055		0.060	

(***Continued…***)

(***Table 3 Continued***)

Panel C

	Spain		Sweden		Switzerland		UK	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	0.007	0.768	-0.005	0.750	0.001	0.965	0.021	**0.022**
D1	-0.001	0.982	0.011	0.637	0.023	0.260	-0.020	0.177
D2	0.038	0.229	0.021	0.529	-0.004	0.800	-0.020	0.197
D3	-0.006	0.849	-0.016	0.461	0.022	0.177	-0.039	0.046
D4	0.014	0.634	-0.006	0.733	0.008	0.593	-0.002	0.921
D5	0.023	0.370	0.002	0.950	0.014	0.416	-0.006	0.718
D6	-0.027	0.345	-0.023	0.295	0.000	0.995	-0.040	0.002
D7	-0.021	0.527	0.032	0.195	-0.013	0.415	-0.017	0.289
D8	-0.026	0.390	-0.031	0.162	-0.007	0.690	-0.013	0.376
D9	-0.014	0.626	-0.010	0.767	-0.001	0.964	-0.022	0.171
D10	0.000	0.997	0.023	0.253	-0.002	0.922	-0.019	0.125
D11	0.003	0.927	0.025	0.443	-0.003	0.874	-0.017	0.141
R^2	0.054		0.046		0.053		0.049	

Table 4 presents the results of the December effect in four additional FTSE EPRA/NAREIT international property indices: Europe, Euro zone, North America, and Global. We find that all four indices appear to have significant December effects. This supports the findings in Table 3 and the December effect in the European Property Company returns as evidenced by both of Europe and Euro zone indices as well as Finland, France, Netherlands, Norway and the UK. These results are a serious challenge to the efficiency of global property markets. This reduces the possibility that our results only exist in European countries during our sample period.

Table 4 Tests for the December Effect

This table reports the results from the following OLS regressions of monthly returns of the EPRA/NAREIT index:

$$R_t = c + a_1 D_{1t} + a_2 D_{2t} + \ldots + a_{10} D_{10t} + a_{11} D_{11t} + \varepsilon_t$$

where the intercept *c* represents the average return for December and the coefficients a_i indicate the difference in returns between the return of December and month *i*. The sample covers the period from January 1990 to December 2007. The t-statistics are calculated in accordance to the Newey-West adjusted standard errors.

	Europe		**Euro-Zone**		**North America**		**Global**	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
C	0.019	**0.017**	0.019	**0.023**	0.023	**0.023**	0.020	**0.046**
D1	-0.012	0.321	-0.008	0.445	-0.013	0.364	-0.013	0.309
D2	-0.010	0.437	-0.002	0.848	-0.021	0.108	-0.016	0.310
D3	-0.026	0.068	-0.021	0.151	-0.013	0.345	-0.030	0.071
D4	-0.011	0.339	-0.016	0.188	-0.021	0.214	-0.010	0.508
D5	-0.009	0.477	-0.013	0.258	-0.006	0.607	-0.003	0.851
D6	-0.034	0.003	-0.027	0.021	-0.017	0.205	-0.025	0.057
D7	-0.016	0.188	-0.023	0.070	-0.025	0.108	-0.021	0.154
D8	-0.018	0.144	-0.017	0.168	-0.025	0.076	-0.023	0.097
D9	-0.025	0.063	-0.022	0.100	-0.021	0.207	-0.023	0.161
D10	-0.017	0.091	-0.017	0.125	-0.038	0.003	-0.012	0.411
D11	-0.014	0.178	-0.009	0.418	-0.009	0.540	-0.019	0.195
R^2	0.044		0.041		0.054		0.037	

Alternative versions of Equations 2 and 3 are created by excluding statistically significant independent variables found in Equation 1 and presented in Table 1 from the model specification and replacing it with a constant. This is separately done for each statistically significant month. Table 5 shows the months in which monthly property returns are statistically different from zero. It also lists months where average returns significantly exceed or are significantly less than the significant months shown in column (1) of Table 5.

Table 5 Monthly Return Differences

This table shows the months in which monthly property EPRA/NAREIT returns are statistically different from zero. It also lists months where average returns significantly exceed or are significantly less than the significant months shown in column (1).The sample covers the period from January 1990 to December 2007.

Country	StatisticallySignificant Return Month	Months with Significantly Lower Returns than Column (1)	Months with Significantly Higher Returns than Column (1)
	(1)	(2)	(3)
Belgium	May	-	Feb, April, June, July, Sep, Nov, and Dec
Denmark	April	Mar, Sep, Oct	-
	September	-	Jan, April, May, Aug, Dec
Finland	December	July, Sep, Nov	-
France	February	June	-
	June	-	Feb, May, July, Aug, Nov, Dec
	November	June	-
	December	June	-
Germany	-	-	-
Italy	April	May, June, July, Sep	-
	May	-	Jan, Feb, March, April, Oct, Nov, Dec
Netherlands	December	Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov	-
Norway	May	June, Aug, Sep	-
	June	-	March, May, Dec
	December	June, Aug, Sep, Oct, Nov	-
Spain	February	Jan, Jun, Jul, Aug, Sep	-
	May	June, August	-
Sweden	June	-	July, Oct
	August	-	July, Oct, Nov
Swiss	January	Feb, July, Aug	-
	March	Feb, July, Aug	-
UK	June	-	Apr, May, Jul, Aug, Dec
	December	March, June	-

From Table 5, we can make the following observations:

- Germany is the only country with no significant seasonal effects,
- Switzerland is the only country with a January effect, abnormally high returns in January,
- abnormally negative June returns are found in France, Norway, Sweden and the UK, and
- abnormally high December returns are found in Finland, France, Netherlands, Norway, and the UK.

Overall, these results indicate the existence of a significant December effect in European publically traded property company returns. Our results have found little evidence with just one country to support a January effect. These findings are consistent with recent studies of US REITs (Connors et al. (2002) and Hardin et al. (2005)) In addition, our results are similar to Brounen and Ben-Hamo (2009) who include four European countries in their global sample (eleven countries internationally). However, our study differs from previous studies in both sampled countries and the sample period. We cover twelve European countries during the period of January 1990 to December 2007. On the other hand, Connors et al. (2002), and Hardin et al. (2005) only cover US REITs while Brounen and Ben-Hamo (2009) cover global real estate countries with only four European countries. Our study covers eight additional European countries and four international indices. Moreover, we utilize FTSE EPRA/NAREIT indices while Brounen and Ben-Hamo (2009) use the GPR General Quoted Index.

The results of our study and any calendar anomaly study could be the result of data mining and the anomaly is merely a statistical artifact. Replicating these studies in different markets from around the globe and using different time periods and methodologies will help in generalizing the results. Increased awareness of investors to such calendar anomalies could help in diminishing seasonalities over time. Arbitrageurs are going to attempt to time such calendar anomalies and exploit opportunities to gain excess return. Transaction costs tend to work against such profitable opportunities. Hardin et al. (2005) suggest that the results of calendar anomalies are sensitive to the index and measure used. This encourages researchers to extend our study into other value-weighted and equally-weighted international indices.

Several researchers have investigated calendar anomalies in a number of European stock markets with mixed results (Chen et al. (2007); Gu (2003); Ko (1998); Silvapulle (2004)). In one of the earliest studies, Gultekin and Gultekin (1983) cover the European stock markets of Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the UK. They find significant seasonal patterns in all of these European countries except for France and Italy. Similarly, Ko (1998) documents the existence of a January effect in Switzerland, Italy, Spain, Netherlands, Denmark, Sweden, Belgium and Norway. However, the more recent work of Gu (2003) shows that the January effect is disappearing in France, Germany and the UK. Along the same lines, Silvapulle (2004) finds that the January effect is insignificant in Germany and the UK. Silvapulle also shows that a significant December effect exists in France, Italy, and the UK, but not in Germany. More recently, Chen et al. (2007) provide empirical evidence for the existence of a significant January and April effect in the UK for the period 1956-2003. Differences in the results among these studies which cover different European stock markets could be due to using different equity indices during different time periods by applying different methods.

Table 6 Tests for Monthly Calendar Seasonal Effects in the Stock Market

This table reports the results from the OLS regressions of monthly returns of a country's MSCI index on January to December dummy variables. The sample covers the period from January 1990 to December 2007. The t-statistics are calculated in accordance to the Newey-West adjusted standard errors.

	Belgium		**Denmark**		**Finland**		**France**	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
D1	-0.005	0.743	0.020	**0.099**	0.019	0.410	0.002	0.796
D2	-0.007	0.542	-0.006	0.644	-0.011	0.665	0.007	0.632
D3	0.004	0.721	0.003	0.830	0.007	0.660	0.012	0.342
D4	0.017	0.178	0.012	0.332	0.037	0.232	0.026	**0.027**
D5	-0.003	0.738	0.015	0.192	-0.007	0.647	-0.002	0.806
D6	0.008	0.295	0.007	0.286	-0.008	0.705	-0.001	0.924
D7	0.003	0.799	0.015	0.201	-0.004	0.857	-0.007	0.602
D8	-0.007	0.567	-0.003	0.824	-0.018	0.475	-0.010	0.473
D9	-0.010	0.484	-0.006	0.694	0.004	0.850	-0.014	0.390
D10	0.019	**0.065**	0.014	0.225	0.062	**0.010**	0.023	**0.093**
D11	0.003	0.686	0.000	0.996	0.0350	**0.053**	0.011	0.139
D12	0.042	**0.000**	0.036	**0.000**	0.011	0.690	0.032	**0.002**
R^2	0.081		0.054		0.055		0.074	
	Germany		**Italy**		**Netherlands**		**Norway**	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
D1	0.014	**0.076**	0.025	**0.020**	-0.010	0.316	0.018	0.274
D2	0.001	0.945	-0.004	0.790	0.006	0.582	0.001	0.965
D3	-0.003	0.815	-0.005	0.802	0.006	0.583	0.011	0.403
D4	0.021	0.180	0.040	**0.020**	0.0282	**0.007**	0.025	**0.081**
D5	0.002	0.866	-0.007	0.597	0.002	0.834	0.014	0.276
D6	0.009	0.289	-0.010	0.333	0.006	0.351	-0.003	0.749
D7	-0.001	0.928	-0.006	0.591	-0.005	0.744	0.012	0.385
D8	-0.014	0.366	-0.016	0.295	-0.001	0.920	-0.019	0.435
D9	-0.029	0.134	-0.026	0.157	-0.013	0.409	-0.010	0.580
D10	0.027	**0.036**	0.013	0.364	0.0186	0.112	0.009	0.643
D11	0.021	**0.018**	0.008	0.563	0.010	0.262	-0.002	0.910
D12	0.031	**0.012**	0.040	**0.000**	0.037	**0.000**	0.033	**0.019**
R^2	0.084		0.103		0.081		0.042	

(*Continued…*)

(*Table 6 Continued*)

	Spain		Sweden		Switzerland		UK	
Variables	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
D1	0.014	0.271	0.022	0.131	0.000	0.978	-0.002	0.852
D2	0.015	0.249	0.010	0.600	-0.001	0.920	-0.004	0.706
D3	-0.009	0.451	-0.012	0.507	0.007	0.534	-0.002	0.873
D4	0.026	**0.041**	0.029	0.107	0.018	**0.036**	0.020	**0.067**
D5	0.009	0.374	0.019	0.176	0.025	**0.051**	0.006	0.631
D6	-0.005	0.698	-0.001	0.963	0.001	0.888	-0.002	0.759
D7	-0.014	0.333	0.000	0.976	0.002	0.843	0.000	0.973
D8	-0.007	0.730	-0.016	0.303	-0.012	0.364	0.005	0.596
D9	-0.024	0.244	-0.020	0.402	0.001	0.936	-0.009	0.423
D10	0.036	**0.068**	0.020	0.282	0.018	0.148	0.019	**0.064**
D11	0.026	**0.062**	0.027	0.138	0.015	**0.021**	0.009	0.334
D12	0.026	**0.025**	0.018	0.233	0.032	**0.000**	0.026	**0.000**
R^2	0.083		0.052		0.067		0.062	

Therefore, in order to better compare our previous results with regards to the property equity market with the results for the stock markets in general, we re-estimate Equation 1 by using MSCI indices for the same countries during the same time period from 1990 to 2007. The MSCI indices are value-weighted. From Table 6, we can see that there are strong seasonalities for all equity markets in our sample with the single exception of Sweden. We find that ten out of the twelve stock markets have a significant December return premium. Finland and Sweden are the only stock markets which do not exhibit a December effect. A January equity return premium significantly exists only in Denmark, Germany and Italy. Such results cast doubts on the market efficiency of the European general stock markets. Differences in our findings for the property equity market and the general stock market could indicate that REITs and large property companies are different than general listed stocks. This is along the same lines with previous research that documents the uniqueness and difference of REITs from equities in general (Wang et al. (1995); Ghosh et al. (1996); and Downs and Guner (1999)).

5. Conclusions

This present study has investigated systematic monthly return patterns or regularities in the listed equity of European property companies. This study extends the existing international real estate literature by covering twelve European countries for the period during 1990 to 2007. The findings are as follows.

Return regularities are found in eleven of twelve European country property market returns. The single exception is Germany with no significant monthly returns during the sample period. According to the APT, return regularities should not exist for extended time periods.

Despite these anomalous findings, the well-documented January effect is absent in all listed property company monthly returns with the exception of Switzerland. A common return regularity is a December effect, with abnormally high December returns in all four international indices (FTSE EPRA/NAREIT international Europe, Euro-zone, Global, and North America) and five European countries (Finland, France, Netherlands, Norway, and the UK). These findings are compared to prior studies conducted on US real estate and international property equity returns.

The results of this present study document significant return regularities in European property markets. It seems that calendar anomalies continue to be a puzzle with respect to equity pricing and contradict APT logic. Detection and documentation of return regularities are important functions in equity markets.

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