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RETURN'S SEASONALITIES IN THE LATIBEX MARKET

ANOMALIAS DE CALENDARIO EN EL MERCADO LATIBEX

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Abstract

This paper investigates the most important calendar anomalies in a market that have received very little attention by researchers. The anomalies investigated are the day of the week, turn of the month, turn of the year, and holidays. The methodology we propose allows to simultaneously considerate all the mentioned anomalies through a single model. Although most of the empirical evidence reports calendar anomalies as accepted stylised facts of financial markets, a growing number of recent investigations find these anomalies weakening in most markets. Our results support this set of papers, since we do not report calendar anomalies in the LATIBEX indices. In addition, given the peculiarities of the LATIBEX market, our results also stress the importance of particular features of individual stock markets in the existence of calendar anomalies.

Keywords: *Calendar anomalies; LATIBEX market.*

JEL Classification: *G10.*

Resumen

Este trabajo investiga las anomalías de calendario más importantes en un mercado que ha recibido una atención casi inexistente de los investigadores. Las anomalías investigadas son el día de la semana, cambio de mes, cambio

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de año y el efecto vacaciones. La metodología propuesta permite considerar simultáneamente todas las anomalías investigadas, a partir de un único modelo. A diferencia de la mayoría de evidencia empírica existente, no encontramos anomalías de calendario en los índices LATIBEX. Nuestros resultados apoyan las conclusiones de un número creciente de trabajos que muestran un debilitamiento de las anomalías de calendario en los rendimientos de las acciones. Subrayan, además, la importancia de las características particulares de los mercados de valores en la existencia de estas anomalías.

Palabras Clave: *Anomalías de calendario; Mercado LATIBEX.*

Clasificación JEL: *G10.*

I. INTRODUCTION

During the last decades, numerous studies have revealed the existence of empirical regularities in the daily performance of shares and stock indices in most countries. Among these anomalies, the existence of abnormal returns related with the calendar following, for example, the day of the week, the turn of the month, the turn of the year, and the existence of holiday periods are among the most important.

Despite the time elapsed since the first investigations on the issue and the numerous papers published, the seasonality of stock returns is still attracting the interest of researchers nowadays. Some examples of recent research in the subject include Bouman and Jacobsen (2002) investigation of the "Sell in May and go away" anomaly in thirty-seven countries; Singleton and Wingender (2003) and Chandra (2006) investigations of the day of the week effect and Moller and Zica (2008) re-examination of the January, or turn of the year, effect. For the Spanish case, a significant number of papers proves the prevalence of the issue today: García (2008b) reports stronger anomalies for small and medium capitalization stocks compared with blue chip companies; Cáceres *et al.* (2006) and Maroto *et al.* (2007) investigate the day of the week effect, the former in the most important European markets while the later in the LATIBEX; Meneu and Pardo (2004) analyze the holiday effect while Aragó (2003) investigates the existence of abnormal returns depending on the month of the year.

With few exceptions, a common feature to these papers is the focus on a single anomaly. Nevertheless, the joint consideration of anomalies would provide with more robust results in relation to those obtained by considering each of them individually. Suppose, for example, that stock returns are exceptionally high during the first days of January, but this is not the case for the other months of the year. Papers investigating the existence of abnormal returns associated to the turn of the year will report empirical evidence of the existence of this anomaly. However, papers investigating the turn of the month effect will possibly provide empirical evidence for this anomaly (since the

turn of the year also means a change of month) and will wrongly support the existence of a turn of the month effect. On the contrary, the joint investigations of the turn of the month and turn of the year effect will conclude about the existence of the later but not of the former. Similar situations could occur with other anomalies. To avoid this problem this paper jointly investigates the existence of abnormal returns following the day of the week, turn of the month, turn of the year and holiday periods.

This paper investigates calendar anomalies in the LATIBEX and LATIBEX Top indices. Only Maroto *et al.*, mentioned at the beginning of this section, have previously investigated abnormal returns in the LATIBEX indices. However, the authors only focus on the existence of a day of the week effect in stock returns, without considering other calendar anomalies. Another contribution of our paper is that since the LATIBEX indices have not been used so far in similar investigations, it provides important advantages to avoid data mining problems. This threat, which questions the validity of empirical results, was clearly expressed by Lakonishok and Smidt (1988: 405): "Data snooping (…) is also a collective sin. One hundred researchers using the same data contrasted a hundred different scenarios. The eleventh cent theory derives from the above results and contrasts using more or less the same data." Lucey and Whelan (2001) suggest two possible solutions to this problem: wait for time to provide new data for checking the validity of the hypothesis, or preferably find a new database and relatively independent who has not previously been used and contrast the assumptions made from this new database. From this standpoint, the use of LATIBEX indices provides with undoubted advantages.

The structure of the paper is as follows: next section discusses the main calendar anomalies in stock markets, with special attention to the Spanish case. Section 3 briefly presents the LATIBEX indices. Section 4 discusses the methodology we propose to investigate the existence of anomalies in the LATIBEX indices. Then, results are analyzed in the context of previous investigations. The final section reports the main conclusions of the investigation.

II. CALENDAR ANOMALIES

This paper investigates the existence of abnormal returns associated with the day of the week, turn of the month, turn of year and holiday periods. We have also investigated the existence of autocorrelation in returns depending on the day of the week.

The so-called day of the week effect was initially reported by French (1980) observing that average returns were negative on Mondays and lower than on other days of the week. This result was highly unexpected, because if returns were generated during physical time, Mondays returns should be about three times higher than on other days of the week. This anomaly is usually attributed to factors related to the microstructure of financial markets, such as dividends payments, which mostly takes place on Mondays, or the diffusion of firms' bad news that tend to occur during the weekend. However, the causes of this anomaly are still not entirely clear. Empirical evidence for the Spanish case shows conflicting results depending on the period investigated. While Santesmases (1986) does not report a day of the week effect for

the period 1979-83, more recently Corredor and Santamaría (1996), Camino (1997) and García (2007) detected abnormally high returns on Fridays.

The existence of positive autocorrelation in stock indices daily returns is a widely known phenomenon. The most accepted explanation for this event, originally raised by Fischer (1966), is based on the existence of non-synchronous trading. Accordingly, the delayed reaction of asset prices in the less liquid stock of the index would be the cause of the observed autocorrelation of daily index returns. Keim and Stambaugh (1984) note, however, that the autocorrelation of returns is especially important between Mondays and Fridays. Subsequently, Bessembinder and Hertzel (1993) conclude that autocorrelation is particularly intense between days separated by intervals of non negotiation, including weekends and holiday periods. García (2007) and (2008a) report similar results, stressing the importance of overnight periods.

Ariel (1987) reports the existence of abnormally high returns during the first days of the month. This anomaly is usually attributed to the restructuring of portfolios that would occur mainly during at the beginning of each month. For the Spanish case, García (2008b) reports a strong turn of the month effect in the IBEX-35 and the IBEX-Small caps indices.

The turn of the year effect was revealed by Rozeff and Kinney (1976) observing abnormally high returns during the first days of the year, especially for small capitalization companies. A similar behavior, not only limited to small-capitalization companies, has been observed in different countries. The most accepted explanation for this anomaly is based on the realization of losses by investors for tax purposes. An alternative explanation blames institutional investors restructuring their investment portfolios at the beginning of the year. For the Spanish case, numerous studies have investigated the existence of this anomaly. Among them, Santesmases (1986), Fernández and Yzaguirre (1995) and Marhuenda (1998) have reported evidence of abnormally high returns during the month of January, in different periods under investigation, although there are discrepancies among the authors regarding the causes of the anomaly: taxation on the one hand, and the performance of institutional investors in portfolio make-up operations on the other. Also related to the change of the year, there is a widespread belief by professional investors that markets tend to experience a rally in prices as it nears the end of the year. This belief has not been proven so far rigorously, nor said what would be the factor or factors that cause this behavior. In fact, if it is related to the January effect, a basic conclusion could be that if the January effect is caused by the repurchase on January of those shares sold in December for tax reasons, for this same reason one would expect abnormally lower returns around the last days of the year. Finally, García (2008b) reports a January effect for the IBEX-Small caps but not for the IBEX-35 index. However, regarding the December rally, he does not find evidence for any of the indices.

Finally, the existence of abnormal returns around holiday periods was initially revealed by Lakonishok and Smidt (1988). This anomaly, which involves abnormally high returns the day before and after holidays, as well as high levels of autocorrelation on returns the first trading day after the holidays, is usually attributed to the preferences shown by different groups of investors to trade share before the start of the holiday periods. In the Spanish case, there are contradictory findings: while Meneu and Pardo

(2004) conclude that returns are abnormally high the day preceding the start of a holiday, for the most important shares traded on the continuous market as well as for the IBEX-35 index, García (2008b) does not find a holiday effect, either for the IBEX-35 or the IBEX-Small caps.

III. THE LATIBEX INDICES

LATIBEX is the only international market for Latin American securities. The market, born in December 1999, was approved by the Spanish Government and is regulated under the Spanish *Ley del Mercado de Valores*. It represents a framework to channel European investments to Latin America, allowing investors to buy and sell stocks of the main Latin American companies through a single market, with a single operating and clearing system, with recognized standards of transparency and security and, non less important, in one single currency, the euro. On the other hand, it also allows Latin American companies an easy way of raising capital in Europe, solving the complexity and reducing legal and operational risks for European investors. The companies listed on the LATIBEX market present the same information that they provided to regulators in their home countries.

There are three LATIBEX indices: the FTSE LATIBEX All Share (in this paper referred as the LATIBEX index) includes all the companies quoted in the market, the FTSE LATIBEX Top (in this paper referred as the LATIBEX TOP) is formed by the 15 most liquid companies of the market, and the FTSE LATIBEX Brazil, formed by the most liquid Brazilian companies quoted in the market. The three indices are built in collaboration with FTSE, a world leader provider of equity, bond and alternative assets indices.

Nowadays the market is formed by 38 securities corresponding to 33 companies from Brazil, Mexico, Chile, Peru, Argentina and Puerto Rico.

IV. MODEL AND METHODOLOGY

4.1. The Model

The model we propose allows a simultaneous investigation of empirical regularities previously discussed by including the daily index return as the dependent variable and dummy variables for each of the anomalies investigated as regressors. The dummy variables are: M, T, TH, and F (score one if the day is a Monday, Tuesday, Thursday and Friday respectively, and zero otherwise. Wednesday is the default category); PRH / PTH (score one for the day before the start / after the completion of a holiday period, and zero otherwise. For the purposes of this paper a holiday period has been defined as any period of at least four consecutive days of non-trading), TM (score one for the first five trading days of each month, and zero otherwise), D (score one for the last ten trading days of the year and zero otherwise) and J (score one for the first ten trading days of the year and zero otherwise). We have also introduced in the model the dependent variable delayed one period as well as this variable multiplied

by each of the four dummy variables indicating the days of the week, to measure the existence of first order autocorrelation in returns depending on the day of the week. Finally, we have introduced the dependent variable delayed one period multiplied by the variable PTH to capture the existence of differential levels of autocorrelation the first trading day after the holiday periods.

Accordingly, the proposed model is given by the following expression that has been estimated for the LATIBEX and LATIBEX TOP indices.

$$R_t = \alpha_0 + \alpha_1 M_t + \alpha_2 T_t + a_3 TH + a_4 F + \alpha_5 R_{t-1} + \alpha_6 M_t * R_{t-1} + \alpha_7 T_t * R_{t-1} + \alpha_8 TH_t * R_{t-1}$$
$$+ \alpha_9 F_t * R_{t-1} + \alpha_{10} TM_t + \alpha_{11} PRH_t + \alpha_{12} PTH_t + \alpha_{13} PTH_t * R_{t-1} + \alpha_{14} D_t + \alpha_{15} J_t + \varepsilon_t$$

Where R_t is the daily return of the stock index during the day t, defined in the usual way, as $R_t = \ln (P_t/P_{t-1})$, and ε_t is the error term.

4.2. Dataset and estimation method

The proposed model has been estimated for the LATIBEX and LATIBEX TOP indices during the period December, 1999 to December, 2008 for the LATIBEX, and January, 2002 to December, 2008 for the LATIBEX TOP. Therefore, we have worked with 2,279 observations for the LATIBEX and 1,761 for the LATIBEX TOP. In both cases we have used all the available observations.

Most empirical studies investigating calendar anomalies in stock markets have performed Ordinary Least Squares (OLS), or any of its variants. Since Mandelbrot (1963) however, numerous studies have shown that financial assets daily returns hardly meet the conditions of the normal distribution function. On the contrary, these returns are usually characterized by a degree of asymmetry, by a leptokurtic nature, and by the existence of volatility clusters. In this situation, Connolly (1989) recommends the use of GARCH models in the investigation of anomalies in stock returns, since these models explicitly integrate the abnormality of the error term.

Although Makridakis and Hibon (2000) have warned about the predictive capabilities of GARCH models, recent years have been characterized by the appearance of numerous variants of models within the GARCH family. However, according to Bollerslev (1986), for most financial series the initial model GARCH (1,1) that includes an autoregressive and a moving average lag for the error term, performs well. In the same line, Hansen and Lunde (2005) after comparing a wide range of GARCH models find no evidence that the original model GARCH (1,1) is overtaken by more sophisticated models. Consequently, this has been the model used in this research.

Table 1 provides descriptive statistics of the LATIBEX and LATIBEX TOP daily returns.

As expected, Table 1 shows the existence of asymmetry and kurtosis in daily returns, a common situation in financial series. In addition, Figures 1 and 2, as well as the test performed, reject the null hypothesis of normality in both indices. Finally, Figures 3 and 4 show the usual clusters of volatility that characterizes daily returns.

TABLE 1

DESCRIPTIVE STATISTICS OF DAILY RETURNS

Variable	Obs.	Mean	Std. Dev.	Min.	Max.	Skewnes	Kurtosis
LATIBEX	2,279	0.0005	0.0210	–0.2066	0.1166	–0.5021	10.9423
LATIBEX TOP	1,761	0.0005	0.0197	–0.1966	0.1159	–0.6838	12.5623

FIGURE 1

LATIBEX DENSITY FUNCTION

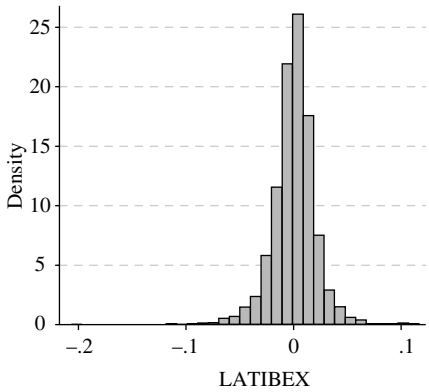

FIGURE 2

LATIBEX TOP DENSITY FUNCTION

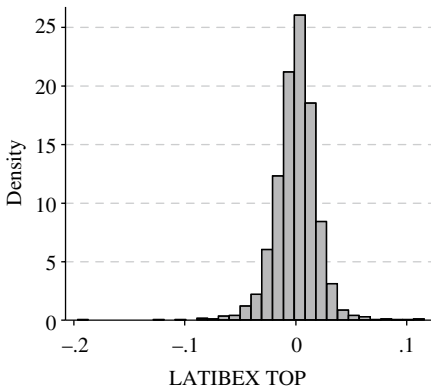

FIGURE 3

LATIBEX DAILY RETURNS

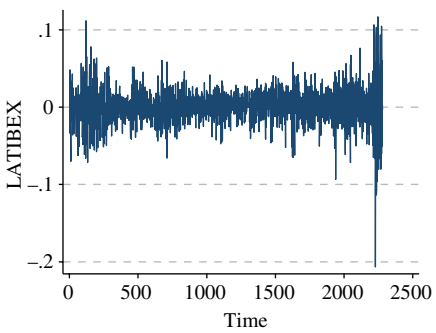

FIGURE 4

LATIBEX TOP DAILY RETURNS

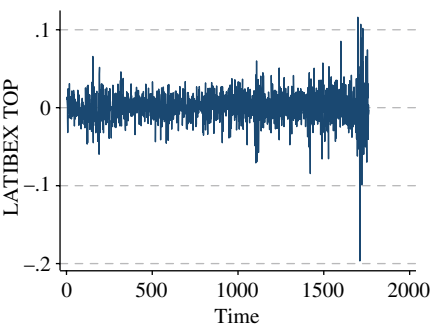

TABLE 2

ESTIMATES OF THE MODEL

	LATIBEX	LATIBEX TOP
M	–.0001388	–.0008267
	(.0011205)	(.0011740)
T	–.0004752	–.0016988
	(.0011047)	(.0012200)
TH	.0003146	–.0005636
	(.0010698)	(.0011293)
F	–.0003517	–.0007493
	(.0010802)	(.0011476)
R_{t-1}	–.0293877	–.0145027
	(.0500514)	(.0579580)
M^*R_{t-1}	.0819523	.0916773
	(.0712366)	(.0818247)
T^*R_{t-1}	–.1308647	–.0898456
	(.0741211)	(.0868964)
TH^*R_{t-1}	–.000846	.0690126
	(.0657016)	(.0801597)
F^*R_{t-1}	.1125899	.1763845**
	(.0702788)	(.0847333)
TM	.0012700	.0006344
	(.0007947)	(.0008903)
PRH	.0032527	.0052327
	(.0023141)	(.0053685)
PTH	–.000398	.0056065
	(.0022905)	(.0043791)
$PTH*R_{t-1}$	.3087858	.0504953
	(.1871154)	(.4731632)
D	.001409	–.0001811
	(.0016745)	(.0019579)
J	.0012108	.0000550
	(.0015546)	(.0017809)
CONSTANT	.000553	.0015382
GARCH Effects		
C	5.34e-06***	9.00e-06***
	(1.33e-06)	(1.84e-06)
ARCH(1)	.0721607***	.0878111***
	(.0076415)	(.0119029)
GARCH(1)	.9156456***	.8869561***
	(.0092477)	(.0141504)
N	2,278	1,760
Log likelihood	5,917.8	4,676.286
Sig. Level:	0.1059	0.1731

* Significant at a 0.05 level.
** Significant al 1%.

V. RESULTS

This article has used the conventional methodology to investigate calendar anomalies in stock returns, with the particular feature of investigating the most important anomalies through a single model that allows a simultaneous consideration of all the anomalies investigated. Table 2 presents the estimates of the model for the LATIBEX and LATIBEX Top indices, with standard errors in parentheses. As it can be seen, the estimates of the GARCH parameters are statistically significant at any level of significance. However, the model is not statistically significant for the LATIBEX or the LATIBEX TOP, indicating that, contrary to most evidence documented for stock markets worldwide, there appears to be no calendar anomalies in the LATIBEX market. The unusual feature of these indices, formed by companies of Latin American countries quoted in a stock market different than its country of origin, could be a possible explanation of this unexpected behaviour. The reason could be that calendar effects tend to be associated to individual and idiosyncratic effects on national markets. Thus, having a composite index with shares from several different markets could make the effects to be diluted. We have not found any previous investigation of calendar anomalies in indices formed by stocks from various national markets.

Accordingly, unlike most papers investigating the issue that have to offer explanations for the existence of the detected anomalies, we face the uncommon situation of having to explain why do the typical calendar anomalies present in most stock markets worldwide are not observed in the LATIBEX indices.

First of all, we want to comment that our results are consistent for both indices. None of the estimate coefficients in the model corresponding to the LATIBEX index is statistically significant at the common levels, while for the LATIBEX TOP, only the coefficient associate to variable F^*R_{t-1} is statistically significant at a 1% level, with a positive sign. This fact indicates the existence of positive autocorrelation in the LATIBEX TOP index between Fridays and Thursdays returns, autocorrelation that is not observed in the LATIBEX. For the latter, this variable also shows a positive coefficient but non-significant at the required levels. Previous research tends to detect positive autocorrelation in indices returns, being particularly strong on Fridays and Mondays. In our case, significant levels of autocorrelation have been detected only on Friday's returns and only for the LATIBEX TOP index.

As mentioned in the introductory section, we only know about a previous investigation for the LATIBEX market, although the focus of the article was exclusively on the day of the week effect. Maroto *et al.* report abnormally high Fridays returns compared with the other days of the week, a behavior not observed in this paper. There are several possible explanations for these contradictory findings, being the different time period used in both studies and the model proposed, the most feasible ones. Maroto *et al.* investigate the day of the week effect for the period: January 2003-April 2005. That is two years and three months. Unlike them, we have used all the data period available for both indices: December, 1999 to December, 2008 for the LATIBEX, and January, 2002 to December, 2008 for the LATIBEX TOP. That makes a nine years period for the LATIBEX and a six years period for the LATIBEX TOP. In addition, unlike Maroto *et al.*, our model includes not only the day of the week but also the other most important calendar anomalies.

Therefore, with the only exception of Fridays autocorrelation for the LATIBEX TOP index and unlike most previous research, we find no evidence of the most important anomalies affecting stock returns: day of the week, turn of the month, holidays, turn of the year, and autocorrelation. Our findings are surprising, in principle, since calendar anomalies constitute a well accepted stylized fact of stock markets indices (e.g. Linn and Lockwood, 1988). However, there is a growing amount of evidence supporting the decreasing importance of these anomalies, especially in developed markets. Mehdian and Perry (2002) conclude that the January effect in the US stock returns disappeared after the 1987 crash. Schwert (2003) observes that the strength the day of the week effect in the US has decreased since it was first reported by French (1980). Still for the US stock markets but with a more global view regarding number of anomalies considered, Marquering *et al.* (2006) find that the weekend, the holiday, and the January anomalies have disappeared after being published. However, this is not the case for the turn-of the month effect, still present over time. Coutts and Sheikh (2002) do not observe a day of the week, January or holiday effects on the all gold index on the Johannesburg Stock Exchange. Nevertheless, since the LATIBEX indices are formed by Latin-American companies quoted in the Spanish stock exchange, the most suitable comparison is with the Spanish stock market indices, the IBEX-35 being the most important. In a recent paper investigating calendar anomalies, García (2008b) finds evidence of only two calendar anomalies in the IBEX-35: a turn of the month effect and a significant level of autocorrelation on Monday's returns. On the contrary, the IBEX-Small caps, the Spanish reference index for small capitalization stocks, shows anomalies regarding the day of the week, holidays, turn of the month, turn of the year, and strong levels of autocorrelation not only on Mondays but also on Tuesdays, Wednesdays and Thursdays. Since the companies included in the LATIBEX indices, especially in the LATIBEX TOP are more comparable with companies in the IBEX-35 than with small capitalization stocks, our results can be explained in line with those reported by García (2008b).

Therefore, our results support this relatively small but growing number of papers finding calendar anomalies being every time less important, especially, in developed stock markets. The peculiarities of the LATIBEX indices, already mentioned, provide interesting insights about the causes of market anomalies, reinforcing Lakonishok and Smidt (1988) conclusions that more than global phenomena, return anomalies can be due to certain peculiarities of the individual markets.

VI. CONCLUSIONS

Empirical regularities in returns following the calendar have been intensely investigated during the last three decades. A general agreement among investors seems to exist about the existence of calendar anomalies in index return in national markets worldwide. However, since not all the anomalies are observed in all markets, the causes of these anomalies are in general associated to particular features of individual security markets, among them, the microstructure of the market and the behaviour of market participants. Following this line, one of the merits of this paper has to do with the particular features of the market investigated, the LATIBEX, formed by Latin-

American companies quoted in the Spanish Stock Exchange. First of all, because the issue has been scarcely investigated in Latin-American markets, and secondly because this is the first investigation on the issue concerning companies quoted in other markets out of its home market. In addition, since the importance of institutional investors in the LATIBEX market is relatively higher than in the other Spanish stock markets, the non-existence of calendar anomalies in the LATIBEX could offer some support to the role played by individual investors in the existence of return anomalies. A natural extension of this research would be to investigate calendar anomalies in national Latin-American markets, through the model proposed in this paper.

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