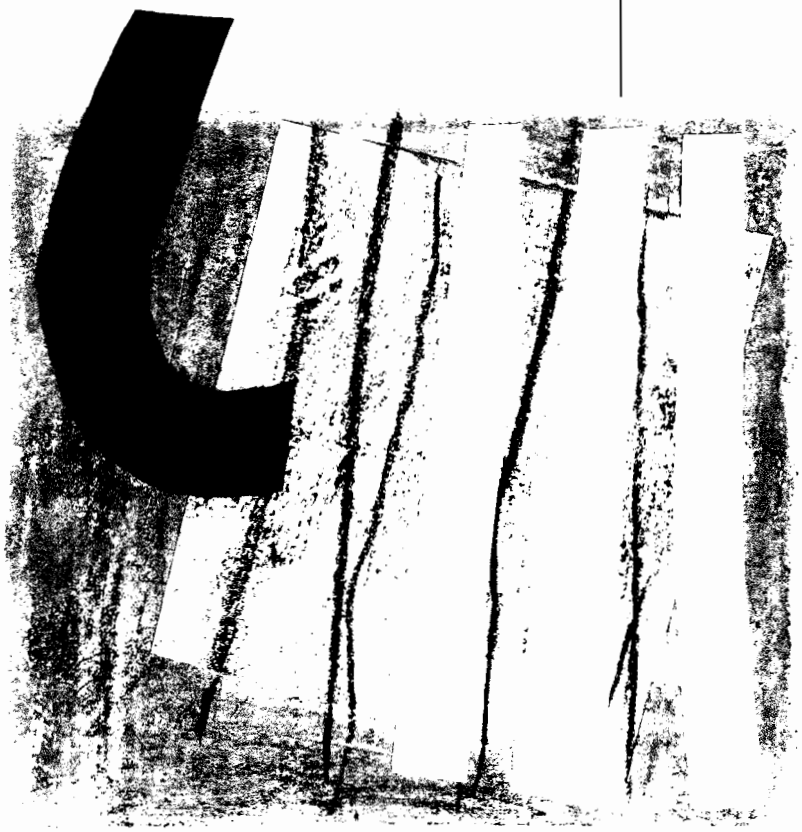
DAILY SEASONALITY AND STOCK MARKET REFORMS IN SPAIN

J. Ignacio Peña

94-26



WORKING PAPERS

Universidad Carlos III de Madrid

Business Economics Series 02
Working Paper 94-26
June 1994

Departamento de Economía de la Empresa
Universidad Carlos III de Madrid
Calle Madrid, 126
28903 Getafe (Spain)
Fax (341) 624-9875

DAILY SEASONALITIES AND STOCK MARKET REFORMS IN SPAIN

J. Ignacio Peña*

Abstract

This paper addresses the consequences of Spanish Stock Exchange Reform on the seasonal patterns of daily asset excess returns. Before the Reform, positive abnormal average Monday excess returns are found. Possible causes are discussed and related with clearing and trading mechanisms. After the Reform daily seasonal effects disappear, suggesting an increase in the market's operational efficiency.

Key Words
Daily Seasonalities, Market Efficiency.

* Peña, Departamento de Economía de la Empresa de la Universidad Carlos III de Madrid.
The author acknowledges financial support from the ARGENTARIA chair grant program.

DAILY SEASONALITIES AND STOCK MARKET REFORMS IN SPAIN

Abstract:

This paper addresses the consequences of Spanish Stock Exchange Reform on the seasonal patterns of daily asset returns. Before the Reform, positive abnormal average Monday excess returns are found. Possible causes are discussed and related with clearing and trading mechanisms. After the Reform daily seasonal effects disappear, suggesting an increase in the market's operational efficiency.

DAILY SEASONALITIES AND STOCK MARKET REFORMS IN SPAIN

1.INTRODUCTION

Research in weekend effects an other financial markets anomalies has blossomed in recent years, as can be seen in Guimaraes et al. (1989). Evidence of international "weekend effects" are provided in Jaffe and Westerfield (1985) and its relationships with country-specific settlement procedures are discussed for instance in Solnik (1990).

For the Spain stock market, the pioneering work of Santesmases (1986) found no evidence of daily seasonalities, but his sample was from 1979 to 1983, where the trading period took place only from Tuesday to Friday. Rubio (1991) using data between 1984 and 1988 reports a positive and significant average Monday return; Martinez Abascal (1993) using data from 1985 to 1989 also found the positive Monday effect. Those results are in contrast with the usual weekend effect, where the average return on Friday is abnormally high and the average return on Monday is abnormally low. This paper aims to extend previous research using a larger sample 1986-1993, and more comprehensive database. In particular we use the Market's general Index and also 60 stocks grouped in seven sector-specific portfolios. We offer one possible explanation for this "exotic" Monday effect based on the clearing and trading procedures of the spanish market. Another contribution of this paper is to take into account the effect of institutional changes in the market after the spanish "Big Bang", the new Spanish Securities Market Act of 28th July, 1988 which began to operate on 29th July, 1989.

The paper is organized as follows. Market structure is discussed first. Then we present data, methodology and results. We treat clearing and trading procedures and present concluding remarks in the final section

2.MARKET STRUCTURE

There are four stock exchanges in Spain; Madrid, Barcelona, Valencia and Bilbao. Madrid is the dominant exchange, accounting for almost 90% of trading activity. At the end of 1992 the total market value of equities quoted on the Madrid Stock Exchange was about 1% of World's capitalization. The largest individual sector was Banking (24% of the total), followed by Electrical Utilities (21%), Telecommunications (11%), Oil and Chemicals (10%), Construction (8%), Investments (6%) and Metal Industrial (5%). Foreign investors are free to invest in the Spanish securities markets. The Spanish Securities Market Act (SSMA) took effect in July 1989 and its main points were:

a) Official Stock Market Agents, previously appointed by the Government, were replaced by private Brokers and Dealers.

b) The introduction of the Computer Assisted Trading System (CATS) open from 11:00am to 5:00pm and the termination of the traditional open outcry trading process. That system become fully operational in the first quarter 1990. However some floor trading remain for small stocks from 10:00am to 12:15pm.

c) The previously regulated Brokerage Fees were liberalized, and the resulting commission price war among Spain's brokers has led to a 0.12% commission or less for typical market transactions.

d) The setting up of the National Stock Exchange Commission (CNMV), Spain's version of the US's SEC.

e) A new settlement and clearing service was created (NSL) and was operational at the same time that CATS; cash balances are cleared in 48 hours. Before SSMA, cash balances of operations from one given week (Monday to Friday) were cleared on next week's Friday. The settlement period is T+10, and before SSMA was T+30. In April 1993 the CNMV opened its new Servicio de Compensacion y Liquidacion (SCVL), the securities settlement and clearing service aimed at expediting the settlement period. The new system initially reduces the settlement period in Spain from T+10 and in some cases T+15 to T+7; later in 1993 the exchange believes this period will be reduced further to T+5.

Madrid Stock Exchange's general Index (IGBM) is made up each year of 70-90 companies and represents about 80-85% of the total capitalization of the market, excluding foreign stocks. It accounts for dividends and stock splits, and is a market value weighted index. Therefore it should reflect mainly the behavior of the big firms.

3.DATA AND METHODOLOGY

The data used in the analysis include the daily returns of IGBM, and the daily returns of a sample of 60 stocks grouped in 7 sectorial value-weighted portfolios: Banks (BAN), Electric Utilities (ELE), Communications (COM), Chemical&Oil (CHE), Construction (BUI), Investments (INV) and Metal Industrial (MET) , which represent some of the most actively

traded stocks on the market and have been listed without interruptions in almost all cases from January 2,1986 to March 31,1993 so we have 1885 sample data points. The value traded on these 60 stocks accounts for almost 80 percent of the total value of stocks traded on the Madrid Stock Market during this period[1].

For each day, we compute the return as the percentage change in the value of the index (portfolio) from the previous day, taking into account dividends and stock splits. Then we subtract the risk free interest rate, to compute excess returns. On Mondays we also subtract the two day rate to take into account the weekend devoid of interest. We analyze the total sample and two subsets to take into account the introduction of CATS. As the new system started at the end of 1989 and became operationally representative along the first quarter of 1990, we select the last day of these period, March 31, 1990 as the effective date of CATS implantation. We do not use the data from December 1989 to March 1990 to avoid problems with the transition period.

Following French (1980), Gibbons and Hess (1981) and Keim and Stambaugh (1984), we construct a test for differences in the mean return across the days of the week by computing the following regression for IGBM and the sectorial portfolios:

$$r_{t(i)} = \alpha_1 d_{1t(i)} + \alpha_2 d_{2t(i)} + \ldots + \alpha_5 d_{5t(i)} + e_{t(i)} \qquad (1)$$

where i=1, 2, 3 and t(1)=1, ..., 1885; t(2)=1, ..., 1000; t(3)=1101, ..., 1885 and where d_{1t}=1 if day t is a Monday, and d_{1t}=0 otherwise; d_{2t}=1 if t is a Tuesday, etc.

---

[1] Details on the data (firms, sectors, etc.) are available on request.

Some preliminary data analysis pointed out nonconstant variance and one-lag autocorrelation in the data. Therefore, to improve consistency and efficiency, we estimate model (1) allowing for first order autocorrelation and heteroscedasticity i.e.

$$e_{t(i)} = \Phi_1 r_{t-1(i)} + a_{t(i)}$$
$$a_{t(i)} \sim (0, \sigma^2_{a_{t(i)}}) \qquad (2)$$

For consistent inference based on estimated parameters in (1) and (2) we use White (1980) estimator of the parameters' covariance matrix.

The regressions were also run in an amended form with four dummy variables plus an intercept term. Arbitrarily a dummy variable for Mondays is excluded. The coefficients of this model are the means for each day of the week deviated from Monday. The F statistics from these regressions enable us to test if the observed excess return on Monday is different from the rest of the week. We perform the test for total sample, before and after CATS.

3.1 RESULTS

Results are reported in Tables 1 to 3. Some explanations are in order. The estimated parameters are above and t-statistics below. F-statistic is given and below its p-value. As a general test for residual autocorrelation we report the portmanteau statistic Q_{LB} by Ljung-Box with 5 degrees of freedom, and its associated p-value. Also, we include Q_2 McLeod-Li statistic as a general test for heteroscedasticity/nonlinearity and its p-value. Overall results

signal a significant positive average Monday return almost in all cases, for the total sample, and even more clearly before CATS. However that effect disappears after CATS.

Highly significant Φ_1 parameters can be related to non-synchronous trading problems and associated factors addressed elsewhere (see Peña (1993) for evidence on these issues) and the results do not necessarily indicate weak form inefficiency. Before CATS, Monday effects are clearer. Also autocorrelation seems to be more evident, specially in the case of Banks. One reason for this could be that, before CATS, Banks were not traded in the usual open outcry method, but instead followed a written order entry system ("par cassiers"). The method is that trading orders are accumulated in an order "book" and using a computer program one clearing price is provided. Spanish banks used to "care" about their own price quotations and usually some kind of "intervention" was not uncommon. Other specific features of the Banking sector in the stock market are described in Berges and Soria (1992).

In Table 4 we present F-statistics to test whether the observed excess returns on Mondays is different from the rest of the week. Overall, previous results are confirmed. Before CATS we can reject the equality hypothesis at reasonable significance levels. After CATS however, that hypotheses is not rejected.

The consequences of the above results for the weak form of the Efficient Market hypotheses could be addressed designing trading systems to take into account those regularities and, adjusting for market risk and brokerage fees, compare its profits against a conservative buy-and-hold policy. For instance we could buy a selected portfolio on Tuesdays or Wednesdays and sell on Mondays. Some simple simulation exercises were done (available on request) and

the results agree with other experiments reported in Martinez Abascal (1993). The transaction costs are high and only slim economically significant (before taxes) profit can be obtained.

After CATS no weekday effects are apparent and the autocorrelations are lower suggesting improvements in the operational efficiency of this market.

3.2 A COMMENT ON TRADING AND CLEARING EFFECTS

It can be argued that before CATS, trading and clearing effects are the responsible for Monday effects. In fact, it was customary for the Official Market Agents to accumulate orders coming from outside Madrid in one given week and execute them at the beginning (Monday) of the next week. This could cause some price pressures at the beginning of the week.

Another explanation could be related with clearing mechanisms as follows. Before CATS any transaction (buy/sell) in one given week (from Monday to Friday) was cleared in cash on the following week's Friday. That gives the investor the possibility of buying stocks without using any cash, provided that offsetting orders are placed before the end of the week. Therefore an extra volume of buy orders should be expected on Monday to profit from five-day trading with no cash. Unfortunately data on sell and buy orders are not available for daily samples.

4.CONCLUSIONS

The existence of one special form of the weekend effect is documented in the Spain stock market. Before CATS, average Monday excess returns were abnormally high. Also significant autocorrelations are found suggesting one nontrivial amount of trading frictions in this market, specially in the Banks sector. However is not clear that trading systems based on these empirical regularities could "beat the market".

Overall, results suggest that introduction of the new system of clearing and trading (after CATS) has improved the operational efficiency in this market, lowering frictions as signaled by lower autocorrelations and that Monday effects disappear.

REFERENCES

- Berges, A. y P. Soria (1992) Comportamiento Bursatil de los Bancos Españoles. Civitas-Escuela de Economia.

- French, K. (1980) Stock Returns and the weekend effect. Journal of Financial Economics, 8, 55-70.

- Gibbons, M. R. and P. Hess (1981) Day of the Week Effects and Asset Returns. Journal of Business, 54, 579-96.

- Guimaraes, R. M. C., B. G. Kingsman and S. J. Taylor (eds.) (1989) A Reappraisal of the Efficiency of Financial Markets. Springer-Verlag.

- Jaffe, J. and R. Westerfield (1985) The Week-end Effect in Common Stock returns: The International Evidence. Journal of Finance, 40, 433-54.

- Keim, D. and R. Stambaugh (1984) A Further Investigation of the Weekend in Stock returns. Journal of Finance, 39, 819-34.

- Martinez Abascal, E. (1993) Eficiencia Debil del Mercado Bursatil Español y Comparaciones Internacionales. Bolsa de Madrid.

- Peña, J. I. (1993) Nonsynchronous Trading, Efficiency and Market Reforms. Working paper. Universidad Carlos III de Madrid.

- Rubio, G. (1991) The stock Market in Spain: Performance, Structure and the Behavior of Asset Prices. Journal of Financial Markets and Portfolio Management. 3, 45-92.

- Santesmases, M. (1986) An Investigation of the Spanish Stock Market Seasonalities. Journal of Business Finance and Accounting, 13, 267-76.

- Solnik, B. (1990) The Distribution of Daily Stock Returns and Settlement Procedures: The paris Bourse. Journal of Finance, 45, 1601-09.

- White, H. (1980) A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica, 48, 817-38.

TABLE 1 (Total Sample, White Covariance Matrix)

	Mon	Tue	Wed	Thu	Fri	R^2	F(p)	$Q_{LB}(5)$	Φ_1
IGB	.0013	-.0009	-.0003	.0004	.0009	.075	30.6	4.91	.263
	2.3*	-1.07	-1.17	.38	1.68		.000	.43	5.2**
BAN	.0008	-.0001	-.0007	.0003	.0012	.138	60.5	1.46	.365
	1.3	-.31	-1.6	.58	2.1*		.000	.92	7.7**
COM	.0004	-.0006	-.0002	.0012	.0010	.005	1.86	2.2	.057
	.4	-.7	-.2	1.4	1.0		.09	.85	.097
ELE	.0016	-.0011	-.0005	.0000	.0009	.023	9.17	2.8	.134
	2.6**	-1.3	-.6	.00	1.04		.000	.83	2.6**
MET	.0036	-.0019	-.0011	.0005	-.0011	.451	140.1	1.2	.179
	3.7**	-2.1*	-1.35	.60	-1.4		.000	.92	3.5**
CHE	.0034	-.0021	.0004	-.0000	-.0003	.179	34.17	1.48	.184
	3.6**	-1.9	.53	-.07	-.42		.000	.91	4.9**
BUI	.0028	-.0016	-.0006	.0008	.0007	.253	48.9	1.6	.305
	2.6**	-1.8	-.8	1.1	1.0		.00	.82	8.9**
INV	.0007	-.0006	-.0001	.0002	.0010	.152	25.6	4.3	.311
	1.1	-.8	-.2	.3	1.5		0.00	.51	7.2**

** 1% Significant * 5% Significant

TABLE 2 (Before CATS, White Covariance Matrix)

	Mon	Tue	Wed	Thu	Fri	R^2	F(p)	$Q_{LB}(5)$	Φ_1
IGB	.0033	-.0014	.0000	.0006	.0008	.152	39.26	19.1	.367
	4.3**	-1.9	.00	.83	1.06		.000	.11	5.3**
BAN	.0019	-.0007	-.0003	.0002	.0018	.339	112.4	4.1	.574
	3.3**	-1.0	-.6	.48	3.1**		.000	.51	11**
COM	.0012	-.0022	-.0002	.0012	.0013	.008	1.96	4.3	.065
	.8	-1.5	-.2	1.0	.88		.08	.51	.087
ELE	.0049	-.0011	-.0004	-.0002	.0006	.040	9.12	7.5	.155
	3.6**	-1.3	-.4	-.23	.4		.000	.32	2.5**
MET	.0087	-.0013	-.0022	.0016	-.0010	.504	111.1	10.2	.171
	5.8**	-1.3	-1.75	1.3	-.84		.000	.22	3.3**
CHE	.0068	-.0015	.0010	.0002	-.0008	.210	32.4	5.2	.264
	5.3**	-1.5	.93	.27	-.78		.000	.47	6.3**
BUI	.0057	-.0023	-.0001	.0015	.0007	.319	51.4	4.8	.361
	5.5**	-2.01*	-.16	1.9	.70		.000	.32	7.7**
INV	.0017	-.0012	-.0008	.0013	.0011	.154	28.6	4.5	.212
	2.2*	-1.6	-.2	1.9	1.4		0.00	.71	6.1**

** 1% Significant * 5% Significant

TABLE 3 (After CATS, White Covariance Matrix)

	Mon	Tue	Wed	Thu	Fri	R^2	F(p)	$Q_{LB}(5)$	Φ_1
IGB	-.0009 -.8	.0010 1.1	-.0011 -1.6	-.0004 -.47	.0009 1.08	.020	3.3 .006	1.46 .93	.124 1.9
BAN	-.0011 -.9	.0008 .92	-.0013 -1.56	.0002 .23	.0012 1.3	.034	5.57 .000	2.3 .85	.169 2.6**
COM	-.0007 -.6	.0015 1.7	-.0001 -.12	.0012 1.2	.0006 .5	.005	0.86 .54	1.1 .94	.034 .65
ELE	-.0006 -.5	.0014 1.6	-.0004 -.6	.0005 .58	.0013 1.48	.011	1.89 .093	2.2 .85	.087 1.2
MET	.0019 1.8	-.0012 -1.1	-.0018 -1.6	-.0017 -1.6	-.0013 -1.2	.082	13.9 .000	1.5 .92	.157 2.5**
CHE	.0006 .6	.0003 .24	-.0000 -.06	-.0005 -.57	.0003 .32	.001	0.03 .99	2.1 .87	.028 .43
BUI	.0005 .4	-.0010 -.8	-.0015 -1.2	.0020 -1.6	-.0000 -.02	.051	8.35 .000	2.8 .83	.218 4.2**
INV	-.0014 -1.1	-.0012 -.9	-.0015 -1.2	-.0025 -2.0*	.0011. 95	.085	15.6 0.00	1.6 .89	.087 2.3*

** 1% Significant * 5% Significant

TABLE 4 F-Statistics for differences in means

	TOTAL SAMPLE		BEFORE CATS		AFTER CATS	
	F-STAT	P-VAL	F-STAT	P-VAL	F-STAT	P-VAL
IGB	3.0	0.017	5.7	0.000	0.85	0.543
BAN	1.9	0.113	4.5	0.000	1.81	0.151
COM	1.7	0.183	1.8	0.152	0.07	0.951
ELE	3.1	0.011	4.6	0.000	1.0	0.387
MET	6.4	0.000	7.2	0.000	1.2	0.316
CHE	5.2	0.000	6.9	0.000	2.1	0.076
BUI	3.2	0.011	6.8	0.000	0.67	0.533
INV	1.1	0.214	4.3	0.000	1.4	0.324