SIMPLE TRADING RULES: TRADING ON IBEX AT MEFF

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ABSTRACT

Several trading rules are analyzed using all daily returns on every Ibex future contracts, since market data from MEFF was available on April 20th, 1992 till March 31st, 2000. The analyses are: calendar anomalies and technical indicators based on moving averages. In an informal test, results are contrasted with the return of a simple of buy-and-hold strategy. Results show that if the investor follows the analyzed trading strategies, he or she will get a better return than the index in a up-market but a significant worst return in a down-market. So, finally, indexing is the best option compared with these trading strategies. In a formal test, signals from these rules are included in an OLS model trying to explain daily returns. Results show that signals can no explain the variance of returns. Finally, it is concluded that the market it is efficient because there is no proof that the contrary could be happening.

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1 TRADING ON IBEX

1.1 INTRODUCTION

In recent years, several studies suggest that returns can be predictable using simple trading rules. That is, those studies provide evidence about a probable predictive power of the past returns on future returns.

Brock, Lakonishok y LeBaron (1992) study two of the simplest and most popular trading rules (moving averages and trading range break) by utilizing the Dow Jones Index from 1897 to 1986. His results provide strong support for the technical strategies. Buy signals consistently generate higher returns than sell signals, and further, the returns following buy signals are less volatile than returns following sell signals. Moreover, returns following sell signals are negative, which is not easily explained by any of the currently existing equilibrium models. They do not consider transaction costs however.

Lamothe and Monjas (1993) analyze the efficiency of the future on 10 years notional bond traded at MEFF. They conclude that the results using technical rules outperform significantly the results that can be get using son random rules. In fact, they provide evidence that the market is inefficient during the period that was studied (1992).

For the Spanish market, too:

- Casanovas (1977) implemented a trading strategy based on filters and concluded that this strategy gets better returns than a simple buy-and-hold strategy, although transaction cost are not included.

- Iruretagoyena (1991) studied daily ILBM returns (1941-1988) using moving average techniques, among others. His conclusions indicate that these strategies beat the buy-and-hold strategy.

- Martínez Abascal y Morales (1992) studied daily returns of IGBM and a simple index representing small stocks, for the period 1985–1989 and 1971–1990, using moving averages strategies. His results indicate that several strategies, specially using the small stocks index, are successful. Moreover, they report that the results of strategies based on moving averages are less volatile than the index returns and present a better return and risk relation.

- Martínez Abascal y Morales (1994) studied daily returns of Ibex and the Future on Ibex from January 1992 and November 1993, using moving averages investment strategies. Their conclusions are that several strategies have won more than the buy-and-hold strategy over these indexes, and with a similar risk. Although their report that their results are not statistically significant, so there are no certainty about their continuity on time.

- Ros Pueyo (1994) studied Ibex daily returns from 1987 to 1993, using several trading strategies. His conclusions indicate that, because the strong tendencial behavior over the time studied, most of the indicators studied are not successful (compared with a buy-and-hold strategy) when they are used in their original form, although they are in their inverse form. Besides that, moving averages are even more successful.

- Fernández-Rodríguez, Sosvilla-Rivero y Andrada-Félix (1999) have replicated the Brock, Lakonishok y LeBaron (1992) study when they apply the same methodology on IGBM daily returns between January 1966 and October 1997. Similar conclusions are reached in both studied.

Broadly speaking, studies concluded that trading strategies have different success depending of the cycle of the market:

- In bear markets, these strategies have saved losses son they are good portfolio insurance.

- In bull markets, these strategies used get results barely lower than a buy-and-hold strategy.

- In stable markets, these strategies get losses in some cases.

In conclusion, these strategies are more useful for defense than for aggressive purposes, more saving losses (insurance) than reaching higher returns.

Those results (it is supposed) are founded in the autocorrelations of returns. There is certain evidence in that sense too. By example, for the USA, Jegadeesh (1990) study the stock market and finds negative serial correlation for lags up to months and positive serial correlation for longer lags. And Cutler, Poterba y Summers (1991) present results from many different asset markets generally supporting the hypothesis that returns are positively correlated at the horizon of several months and negatively correlated at the 3-to-5 year horizon.

For the Spanish market, Casanovas (1977) studied daily returns of IGBM and of 60 stocks for 1971-1975. His conclusions indicate a positive auto correlation for one-day lag and no correlation in another case. While the time to measure returns is increased, auto correlation diminished proportionally. Like Fama (1965) is concluded that stock returns distributions are not normal but leptokurtic. Martinez Abascal (1992) studied daily returns of IGBM and a simple index representing small stocks, for the period 1985 – 1989 and 1971 – 1990. His results indicate a daily auto correlation of 50% and 30% respectively.

Another area of interest is the potential different behavior of prices and returns due of expiration day effects of stock index derivatives. Stoll y Whaley (1986) show that the standard deviation of returns was higher when the futures expired in comparison when nothing expired. However, when the CBOE S&P100 option expired, but the futures did not, the volatility was not significantly higher than on days when nothing expired. Also, stock prices tend to fall on expiration days. If

we compare the behavior of the S&P500 index on expiration days with its behavior on non-expiration days, the price effect and the volatility effect are both statistically significant.

It has been well documented that returns on many securities vary by the day of the week. In particular, Friday returns are generally high and Monday returns (the return from Friday close to Monday close) are even negative. The day of the week effect has also been explored in the stock index futures market. Given the strong relationship that must hold between stock index futures and the stock index itself; it would be expected to find an effect in the futures market if there is one in the stock market itself. Most studies (for instance, Dyl and Maberly, 1986) find a weekend effect – price changes from the Friday close to the Monday open are low or negative.

In the same line of reasoning, there is a well documented pattern in the month of the year effect in many markets. However, maybe because of the short expiration of futures contract, there is no a wide number of this kind of studies in this area of investment.

Another important area of wide investment interest is Technical Analysis. In futures markets, more than any other segment of the financial markets, technical trading systems seem to find favor. To have any chance of succeed, technical analysis depends on the existence of patterns in futures prices. In most markets, scholars find that price patterns do exists, but that these patterns are not sufficiently strong to permit technical trading strategies to generate a profit. To make a trading profit, including covering transaction costs, would require very significant patterns. Many studies are based on simulations of trading systems, instead of systems that are in actual use. While many of these studies (for instance, suggest that technical analysis may have some merit, this is a very controversial area and the final word has not yet been written on this subject.

Technical analysis set that the market has three movements. The most important, primary movement lasts from one to several years and characterized market tendency. Secondary movement implies an intermediate reaction that lasts between three weeks to several months. Finally, tertiary movements last from hours to less than three weeks and, they have no importance in order to make a forecast because short term can be manipulated. So, the study of daily returns has sense when a long-term view is applied.

Technical analysis uses as indicators as oscillators.

Indicators are methods that follow tendency. Their main function is to indicate when a tendency is consolidated. For this buy or sell signals are generated accordingly to the direction of the market, that is, bull or bear market.

However, they fail when the main tendency is a lateral one, that is, when prices fluctuate inside a band. Then, they are only useful when tendency is well established. This disadvantage can be corrected when a filter is added. So, indicators are commonly modified adding a filter (1% normally). That way the

number of signals is diminished. If the indicator is inside the band, it means that a lateral tendency is dominating and, in consequence, no signal is generated.

Oscillators, by the other hand, are methods who identify change in market tendency. Their main function is indicating when a tendency is accelerating or decelerating. For this, buy or sell signals are generated accordingly to the expected tendency, that is, bull or bear market.

Nevertheless, oscillators fail when the main tendency is a bull or a bear market, that is, they can generate buy or sell signals although that main tendency is consolidating. For the same reasons that in the previous case, a filter is added.

In practice, however, both types of strategies are summed. That way, a moving average over a momentum could be implemented. In this study, several individual strategies will be simulated (involving just one rule). But a set of combined strategies will be analyzed too (involving more than a rule).

Buy or sell signals are generated when prices reach new highs and lows (resistance and support levels). In this sense, two types of reasoning exist.

In his simpler form, first reasoning sets that:

- A buy signal is generated when a price penetrates level resistance. Technical analysis believes that a lot of investors are in disposition of selling with top prices. This selling pressure will cause certain resistance to more new highs given the last one. However, if price reaches a new high then it is said that resistance levels are broke. In that case, a buy signal is generated.

- A sell signal is generated when price penetrates support level. Rationality behind this is that price has difficulties in penetrate support levels because a lot of investors are in disposition of buying with bottom prices. However, if price falls below support level, then new bottoms are expected.

In essence, this first line of reasoning recommends buying when price reaches and surpasses his last maximum and selling when price falls under his last minimum.

In his simpler form, second reasoning sets that:

- A sell signal is generated when price is bigger than certain limit in, which is considered that the asset is over bought. This is fundament in the fact that in a bull market, prices tend to be close to the last maximum.

- A buy signal is generated when price is lower than certain limit in, which is considered that the asset price is over sold. This is fundament in the fact that in a bear market, prices tend to be close to the last minimum.

In essence, this second line of reasoning recommends buying when market is oversold and selling when market is overbought.

In summary, investment strategies based on technical analysis generate buy or sell signals corrected by filters. This method intent to develop a strategy in which investor will be long while a buy signal is on and until a sell signal is generated. When that signal is generated, investor will sell and could be out of the market or adopt a short strategy. In this form, potential investment horizons are divided in term of bull or bear market.

One of the most popular strategies is Moving Averages (MA). In MA, a buy signal is generated when short term MA is bigger than a long term MA and a sell signal is generated when short term MA is smaller than a long term MA. Besides simple moving averages, where weights are equal, there are weighted and exponential moving averages. These are used when a bigger weight is necessary for recent observations in order to avoid that signal are delayed.

The aim of this paper is to test the day of the week anomaly, the month of the year anomaly, a possible auto correlation structure and some simple technical trading rules based on MA.

2 DATA AND METHODOLOGY

The Spanish Ibex-35 (Ibex) index is a value-weighted index comprising the 35 most liquid Spanish stocks traded in the continuous auction market system.

MEFF trades a futures contract on the Ibex since 1992, with trading during the three nearest consecutive months and the other three months of the March-June-September-December cycle. Expiration day is the third Friday of the contract month. Last day of trading is expiration day. Actually, multiplier is 10 euros; prices are quoted in full points, with a minimum price change (tick) of one index point. Liquidation is by difference respect to “Final daily liquidation price on Ibex 35” (defined later).

It is important to say that Ibex is not adjusted by cash dividends. So when a hedged over a stock portfolio is implemented a difference is obtained. In fact, an identical portfolio replying the Ibex index will obtain a larger return.

Data consists of all daily returns on every Ibex future contracts, since the beginning of market data on April 20th, 1992 till March 31st, 2000. Data was obtained from MEFF (disclaimer is accepted).

Daily returns are measured as log differences of daily and previous prices. Prices are “Final daily liquidation price on Ibex 35”, which is the price fixed at the end of the day used in order to liquidate all the open interest. Every investor will pay o collect the difference between the price in his or her operation (or the last daily liquidation) and the final daily liquidation price.

Methodology is set in two parts.

First, two anomalies are studied: the day of the week effect and the month of the year effect. In each case, properties of data are calculated (mean, deviation,

etc) then a regression analysis is performed using OLS. For the day of the week, the expiration day is studied too. Then, an auto correlation analysis is performed using a standard procedure.

Finally, several trading rules on generic MA will be studied using a simulated process. It will be simulated the success that an investor had won if she or he had invested using the signals of the trading strategies considered over April 20th, 1992 till March 31st, 2000. The technique will be applied to daily returns of each contract.

Three basic strategies will be simulated:

- A long strategy when a buy signal is generated. It will be long until a sell signal is generated. It will be out of the market in other case.

- A short strategy when a sell signal is generated. It will be long until a buy signal is generated. It will be out of the market in other case.

- A permanent investment strategy. It will be long when a buy signal is generated. It will be in the market until a sell signal is generated. Since that moment, it will be short until a buy signal is generated.

Besides that, in order to establish a benchmark, a buy and hold the spot index strategy will be implemented in the following way:

- When the investor is long, accordingly to the trading strategy, the spot index will be bought, until a sell signal is generated. It will be out of the market in other case.

- When the investor is short, accordingly to the trading strategy, the spot index will be sold, until a buy signal is generated. It will be out of the market in other case.

- When the investor has the permanent strategy, it will be long in the spot index until the final of the investment horizon. In sum, a buy and hold strategy will be implemented.

All the transaction will be generated at the final of the day.

In a nutshell, for each of the trading rules, six strategies will be implemented, three accordingly to the trading rules and three accordingly to the spot index. Each one will be corrected with a filter system.

Finally, it is noteworthy to say that in the simulation could be implemented a risk free correction while the investment would be out of the market. Besides that, commissions could be simulated. However, given that the benchmark portfolio will be out of the market at the same time and will incurs in the same number of transactions, those problems or precisions will be eliminated. Nevertheless, the anterior is not valid when a permanent strategy is implemented.

3 RESULTS

3.1 ANOMALIES

Table 1 contains summary statistics for series for IBEX and the Future of IBEX respectively analyzing the day of the week effect.

TABLE 1
SUMMARY STATISTICS OF DATA AND THE DAY-OF-THE-WEEK EFFECT

A simple statistical analysis is performed for the days of the week using dummies. Fri-All is Friday using all data. Fri-No is Friday using Fridays without ending of contracts and Fri-Yes is Friday using Fridays with endings. N is number of observations. Mean is the correspondent mean, St. De is standard deviation, Max is maximum observation, Min is minimum observation, Skew is Skewness and Kurt is Kurtosis. Besides that, a standard regression analysis is performed (OLS) for Ibex and the future of Ibex using dummy variables for each month. Coef is the coefficient obtained, test t is the mean divided by standard deviation and R2C is coefficient of determination.

IBEX

	IBEX	MON	TUE	WES	THU	Fri-All	Fri-No	Fri-yes
N	2.066	412	420	418	409	407	310	99
Mean	0,0007	0,0000	0,0012	0,0001	0,0003	0,0021	0,0023	0,0016
St. De.	0,0125	0,0128	0,0122	0,0127	0,0133	0,0116	0,0107	0,0139
Max	0,0632	0,0603	0,0573	0,0632	0,0470	0,0478	0,0337	0,0478
Min	-0,0734	-0,0563	-0,0427	-0,0713	-0,0734	-0,0599	-0,0316	-0,0599
Skew	-0,3389	-0,1379	0,1774	-0,1092	-1,0813	-0,3313	-0,1412	-0,5577
Kurt.	3,6862	3,1215	1,7488	4,4736	5,6721	2,3349	0,4430	3,9920
Coef		-0,001	0,001	-0,001	-0,001	0,002	0,002	0,001
Test T		-1,364	0,898	-1,172	-0,833	2,483	2,390	0,691
R2C		0,001	0,000	0,001	0,000	0,003	0,003	0,000

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	F-IBEX	MON	TUE	WES	THU	Fri-All	Fri-No	Fri-yes
N	10233	2037	2065	2072	2022	2037	1548	495
Mean	0,0007	0,0002	0,0011	0,0002	-0,0002	0,0021	0,0024	0,0008
St. De.	0,0143	0,0144	0,0135	0,0143	0,0153	0,0137	0,0126	0,0167
Max	0,0669	0,0627	0,0544	0,0644	0,0461	0,0669	0,0669	0,0538
Min	-0,0813	-0,0709	-0,0426	-0,0813	-0,0803	-0,0685	-0,0348	-0,0685
Skew	-0,4573	-0,4058	0,0361	-0,1807	-1,1248	-0,3319	-0,0298	-0,6149
Kurt.	3,6037	3,8748	1,3709	4,5627	4,2418	2,7952	0,7211	3,9453
Coef		-0,001	0,001	-0,001	-0,001	0,002	0,002	0,000
Test T		-1,801	1,537	-1,709	-2,926	4,898	5,268	0,235
R2C		0,000	0,000	0,000	0,001	0,002	0,003	0,000

As can be noted, in the case of Ibex, that there is no day-of-the-week effect but slightly on Friday however this has no explanatory power measuring by the coefficient of determination.

In the case of the future of Ibex, certainly the effect is the same but a little stronger however neither there is a strong explanatory power.

Table 2 and Table 3 contain summary statistics on the month-of-the-year effect on Ibex and the future of Ibex respectively.

TABLE 2
SUMMARY STATISTICS OF THE MONTH-OF-THE-YEAR EFFECT ON IBEX

A simple statistical analysis is performed for the days of the week using dummies. Fri-All is Friday using all data. Fri-No is Friday using Fridays without ending of contracts and Fri-Yes is Friday using Fridays with endings. N is number of observations. Mean is the correspondent mean, St. De is standard deviation, Max is maximum observation, Min is minimum observation, Skew is Skewness and Kurt is Kurtosis.

IBEX	JAN	FEB	MAR	APR	MAY	JUN
N	176	182	197	158	169	172
Mean	0,0014	0,0018	-0,0002	0,0012	0,0013	-0,0001
St. De.	0,0142	0,0106	0,0116	0,0116	0,0111	0,0097
Max	0,0603	0,0337	0,0305	0,0364	0,0470	0,0234
Min	-0,0713	-0,0238	-0,0536	-0,0348	-0,0378	-0,0233
Skew	-0,3245	0,1128	-0,3535	-0,0791	0,1935	-0,1912
Kurt.	5,0816	0,2335	1,7427	1,5331	2,0344	-0,2254

IBEX	JUL	AUG	SEP	OCT	NOV	DEC
N	178	171	174	169	166	154
Mean	-0,0006	-0,0009	-0,0008	0,0009	0,0032	0,0019
St. De.	0,0110	0,0128	0,0162	0,0171	0,0106	0,0114
Max	0,0284	0,0253	0,0632	0,0573	0,0333	0,0318
Min	-0,0304	-0,0603	-0,0733	-0,0734	-0,0256	-0,0323
Skew	-0,1876	-1,2578	-0,4494	-0,1914	0,0591	-0,3120
Kurt.	0,2324	4,3617	4,1183	3,1509	0,6639	0,5702

TABLE 3
SUMMARY STATISTICS OF THE MONTH-OF-THE-YEAR EFFECT ON THE FUTURE OF IBEX

The same than Table 2 but applied on the future of Ibex.

F-IBEX	JAN	FEB	MAR	APR	MAY	JUN
N	843	860	924	797	830	892
Mean	0,0011	0,0017	-0,0002	0,0014	0,0011	0,0000
St. De.	0,0172	0,0122	0,0140	0,0131	0,0123	0,0110
Max	0,0627	0,0330	0,0375	0,0382	0,0461	0,0294
Min	-0,0813	-0,0334	-0,0709	-0,0416	-0,0400	-0,0333
Skew	-0,3493	0,1082	-0,7441	-0,1764	-0,0970	-0,2602
Kurt.	4,0765	-0,3003	3,0133	1,0711	1,2188	0,2695

F-IBEX	JUL	AUG	SEP	OCT	NOV	DEC
N	882	861	889	860	821	774
Mean	-0,0003	-0,0014	-0,0007	0,0007	0,0032	0,0021
St. De.	0,0126	0,0150	0,0187	0,0175	0,0117	0,0130
Max	0,0669	0,0366	0,0644	0,0577	0,0391	0,0377
Min	-0,0475	-0,0717	-0,0803	-0,0611	-0,0348	-0,0447
Skew	-0,0253	-1,3518	-0,6607	0,0521	-0,2400	-0,4734
Kurt.	1,7581	4,9100	3,8152	2,2261	0,9034	1,3938

Table 4 contains the results for the “month of the year effect” using a regression analysis.

TABLE 4
THE MONTH OF THE YEAR EFFECT: REGRESSION ANALYSIS

A standard regression analysis is performed (OLS) for Ibex and the future of Ibex using dummy variables for each month. Coef is the coefficient obtained, test t is the mean divided by standard deviation and R2C is coefficient of determination.

MONTH OF THE YEAR	IBEX			FUTURE OF IBEX		
	COEF	TEST T	R2C	COEF	TEST T	R2C
January	0,001	0,778	0,000	0,000	0,875	0,000
February	0,001	1,166	0,001	0,001	2,148	0,000
March	-0,001	-1,098	0,001	-0,001	-1,965	0,000
April	0,001	0,538	0,000	0,001	1,485	0,000
May	0,001	0,590	0,000	0,000	0,789	0,000
June	-0,001	-0,944	0,000	-0,001	-1,436	0,000
July	-0,001	-1,426	0,001	-0,001	-2,152	0,000
August	-0,002	-1,771	0,002	-0,002	-4,388	0,002
September	-0,002	-1,632	0,001	-0,001	-2,991	0,001
October	0,000	0,154	0,000	0,000	-0,018	0,000
November	0,003	2,612	0,003	0,003	5,339	0,003
December	0,001	1,223	0,001	0,001	2,793	0,001

As can be appreciated, there is no month-of-the-year effect but maybe in November. However, again, there is no important explanatory power.

Table 5 contains the results for an auto correlation analysis.

TABLE 5
AUTOCORRELATION ANALYSIS

A standard auto correlation analysis is performed for Ibex and for the Future of Ibex. Lag is in days. Coef is the coefficient obtained, test t is the mean divided by standard deviation and R2C ins coefficient of determination.

LAG DAYS	IBEX			FUTURE OF IBEX		
	COEF	TEST T	R2C	COEF	TEST T	R2C
01	0,12	5,36	0,01	0,03	2,65	0,00
02	-0,04	-1,91	0,00	-0,03	-2,96	0,00
03	-0,04	-1,74	0,00	-0,05	-5,13	0,00
04	0,01	0,36	0,00	-0,01	-0,96	0,00
05	0,01	0,55	0,00	0,03	2,90	0,00
06	-0,03	-1,33	0,00	-0,04	-3,59	0,00
07	0,00	0,09	0,00	-0,03	-2,87	0,00
08	0,01	0,66	0,00	0,02	2,04	0,00
09	0,03	1,28	0,00	0,04	4,11	0,00
10	0,04	2,01	0,00	0,04	4,49	0,00
15	0,04	1,93	0,00	0,04	4,27	0,00
20	-0,07	-2,98	0,00	-0,05	-4,78	0,00
30	-0,02	-0,87	0,00	-0,02	-1,65	0,00

As can be appreciated, there is no in the case of Ibex. But in the case of the future of Ibex, this can be stronger. However, with no explanatory power.

3.2 TECHNICAL ANALYSIS

Table 6 contains results for the trading rules analyzed.

Table 6
RESULTS ON SIMULATIONS USING TECNICAL TRADING RULES

An MA using deferments periods and a 0% filter is studied. Three strategies are compared:

- A long strategy, that buy when a in-signal is generated and that stay invested until an out-signal is generated.

- A short strategy, that sell short when an out-signal is generated and that stay invested until an in-signal is generated.

- A global strategy, that is the sum of a long and a short strategy.

Return is mean daily return. TIM is test of equality of means, which say how different means are: a positive sign says that the active strategy wins and vice versa. Test t is mean return divided by standard deviation. Trans is number or percentage of days in the market.

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		Long strategy			Short strategy			Total strategy		
		ACC	IND	TIM	ACC	IND	TIM	ACC	IND	TIM
Mms 5	Return	2,37	2,10	0,40	1,68	2,10	-4,42	0,63	2,10	-2,35
	Test t	4,38	4,79		2,29	4,79		1,44	4,79	
Mms 10	Return	1,94	2,03	-0,13	2,14	2,03	-4,53	0,25	2,03	-2,79
	Test t	3,71	4,51		2,66	4,51		0,55	4,51	
Mms 15	Return	3,28	2,06	1,75	0,67	2,06	-2,78	1,68	2,06	-0,58
	Test t	6,40	4,49		0,77	4,49		3,62	4,49	
Mms 20	Return	3,21	1,79	1,97	0,89	1,79	-2,66	1,57	1,79	-0,33
	Test t	6,03	3,80		1,00	3,80		3,30	3,80	
Mms 50	Return	2,03	1,52	0,60	3,34	1,52	-3,40	0,33	1,52	-1,44
	Test t	3,21	2,71		2,54	2,71		0,56	2,71	
Mms 50-1	Return	2,27	1,11	1,33	2,87	1,11	-2,79	0,63	1,11	-0,58
	Test t	3,54	1,94		2,19	1,94		1,06	1,94	
Mms 100	Return	3,37	1,70	1,28	0,02	1,70	-0,75	2,51	1,70	0,62
	Test t	4,15	1,70		0,01	1,70		3,13	1,70	

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		Long strategy			Short strategy			Total strategy		
		ACC	IND	TIM	ACC	IND	TIM	ACC	IND	TIM
Mms 5	Return	2,72	2,09	0,91	1,19	2,09	-3,78	1,07	2,09	-1,63
	Test t	5,10	4,79		1,59	4,79		2,45	4,79	
Mms 10	Return	1,98	2,05	-0,10	2,09	2,05	-4,49	0,31	2,05	-2,71
	Test t	3,77	4,55		2,60	4,55		0,70	4,55	
Mms 15	Return	3,36	2,03	1,91	0,47	2,03	-2,51	1,85	2,03	-0,27
	Test t	6,59	4,39		0,54	4,39		3,99	4,39	
Mms 20	Return	3,51	1,83	2,36	0,30	1,83	-2,05	2,06	1,83	0,34
	Test t	6,72	3,88		0,33	3,88		4,31	3,88	
Mms 50	Return	2,29	1,49	0,94	2,80	1,49	-2,90	0,75	1,49	-0,89
	Test t	3,67	2,59		2,05	2,59		1,26	2,59	
Mms 50-1	Return	2,49	1,35	1,32	2,44	1,35	-2,53	1,02	1,35	-0,38
	Test t	3,95	2,31		1,77	2,31		1,71	2,31	
Mms 100	Return	2,93	1,55	1,05	1,14	1,55	-1,13	1,94	1,55	0,30
	Test t	3,64	1,54		0,53	1,54		2,43	1,54	

As can be noted, in both cases, in the long strategy, that is when the model identified a bull market, the model cannot beat the market. A simple buy-and-hold strategy performs as well as the technical trading rule. This can be seen observing the test of the mean. Never the parameter reach a number bigger than 2, except in one case.

In the short strategy, that is when the model identified a bear market, the model cannot beat the market. Moreover, a simple buy-and-hold strategy performs a lot better than the technical trading rule. Again, this can be seen observing the test of the mean. In this case, almost ever the parameter is greater than 2 but negative. The minus sign indicate that the mean return of the buy-and-hold strategy is significantly bigger.

In the total or global strategy, the simple buy-and-hold strategy largely outperforms the technical trading rule because of the short strategy as indicated before.

So, in this case can be concluded that an indexing strategy (buy-and-hold) outperform easily the simple trading rules studied.

Table 7 shows the results for the regression model.

TABLA 7
REGGRESSIONS ON SIGNALS GENERATED

A standard regression analysis is performed (OLS) for Ibex and the future of Ibex using as explanatory variables signals generated by technical rules. Coef is the coefficient obtained, test t is the mean divided by standard deviation and R2C is coefficient of determination.

IBEX

Rule	Const. Test t	Signal Test t	R2C
mmp 5	4,88	-2,15	0,00
mmp 10	4,78	-2,57	0,00
mmp 15	4,83	-0,66	0,00
mmp 20	4,54	0,87	0,00
mmp 50	3,83	0,08	0,00
mmp 50-1	3,84	0,08	0,00
mms 100	2,63	0,23	0,00

THE FUTURE OF IBEX

Rule	Const. Test t	Signal Test t	R2C
mmp 5	5,01	-2,91	0,00
mmp 10	4,84	-2,56	0,00
mmp 15	4,78	-0,46	0,00
mmp 20	4,41	1,06	0,00
mmp 50	3,78	0,02	0,00
mmp 50-1	3,80	-0,01	0,00
mms 100	2,44	0,40	0,00

When a regression model is implemented, it can be observed that signals generated add no value to the analysis, that is, signal have no statistical power in order to explain the variance of returns neither of ibex nor the future of ibex. These results are consistent with previous results.

4 CONCLUSIONS

Several trading rules are analyzed using all daily returns on every Ibex future contracts, since market data from MEFF was available on April 20th, 1992 till March 31st, 2000.

The analyses are: calendar anomalies and technical indicators based on moving averages.

In an informal test, results are contrasted with the return of a simple of buy-and-hold strategy. Results show that if the investor follows the analyzed trading strategies, he or she will get a better return than the index in a up-market but a

significant worst return in a down-market. So, finally, indexing is the best option compared with these trading strategies.

In a formal test, signals from these rules are included in an OLS model trying to explain daily returns. Results show that signals can no explain the variance of returns.

Finally, it is concluded that the market it is efficient because there is no proof that the contrary could be happening. This can be conciliating with previous studies that observed some degree of inefficiency but at the beginning of the market.

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