Performance metrics for Spanish investment funds

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Practical applications

This paper is useful for investors and managers of investment funds since it tries to identify the true performance of these portfolios. The empirical results obtained in the Spanish equity fund market provide evidence for the incorrect performance valuations when classical indexes are considered. These problems are caused by: 1) the asymmetric return distributions; 2) the negative return premia. On this subject, the application of the original measures proposed in this work leads to coherent performance rankings. So, these rankings suppose very useful information for fund investors to value the management quality of each fund and for fund managers to know their relative position with respect to the rest of the market.

Abstract

The aim of this study is to examine the most appropriate way to capture the true performance of Spanish equity funds, considering that almost all have significantly asymmetric return distributions over the time period studied. We apply alternative risk measures, such as semi-standard deviation and absolute deviation and test if the associated performance measures provide markedly different rankings from the classic indices. We find that one subset of funds analysed displays negative return premia, and make an additional adjustment to the suggested performance metrics. Overall when comparing the rankings, we see

strong evidence that — despite the strong asymmetry in returns — the non-traditional performance metrics do not differ markedly from the traditional measurements. This would point to the Spanish equity market behaving more like more mature and liquid markets, and hence being amenable to the application of classic performance and investment management tools. Derivatives Use, Trading & Regulation (2006) 12, 219–227. doi:10.1057/palgrave.dutr.1850043

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INTRODUCTION AND AIMS

Investment funds have been one of the most important recent phenomena in Spanish financial markets. The growth of the assets under management by Spanish funds have been one of the biggest in Europe for the past 15 years, with a compounded annual rate of growth greater than 25 per cent. In all, 250bn euros are currently managed by approximately 2,600 Spanish investing funds.

Investment funds are now the third most important investment alternative in Spanish home portfolios, ahead of other products such as pension funds and life insurances. The average assets managed by each Spanish fund are, however, still one of the lowest in the European Union, reporting a market map where a small number of large funds coexist with a vast majority of small funds. The overall picture points to a set of vehicles reflecting illiquidity and ‘youth’ — often leading to strong asymmetric return distributions.

In this study, we examine the degree of asymmetry of the returns of these funds and then evaluate different metrics for capturing their performance. To determine the performance values for each fund, we initially consider three of the indices most commonly implemented in the financial literature, these being Sharpe Ratio¹, Treynor’s Index² and Jensen’s Alpha³, while taking into account the total risk of each portfolio and its systematic risk.

In line with studies by Damant *et al.*,⁴ Eftekhari *et al.*,⁵ Konno and Shirakawa,⁶ Okunev⁷ and Pedersen and Satchell,^{8,9} using variance, and therefore standard deviation, to measure the total risk in portfolios was not the most suitable method when the historical return distributions of said portfolios display problems of asymmetry. This is supported by Sortino and

Price,¹⁰ who defend the use of other alternative risk measures such as semi-standard deviation and propose alternative ratios for performance — this was taken further in Eftekhari *et al.*⁵ and Pedersen and Satchell,⁹ who examined such alternative metrics in more detail. Hence, these are also tested to see if different from the traditional performance metrics.

Such alternative measures have also appeared in the works of Damant and Satchell,¹¹ Hwang and Pedersen,¹² Eftekhari and Satchell¹³ and Pedersen.¹⁴

Recent studies focused on the application of asymmetric risk measure are those conducted by Ang *et al.*,¹⁵ Hyung and De Vries,¹⁶ Campbell and Kraeussl,¹⁷ Cheng,¹⁸ Gu,¹⁹ Post and Van Vliet²⁰ and Morton *et al.*²¹

Our preliminary examinations also reveal that a subset of those portfolios considered display a negative return premium in comparison to the risk-free assets considered. Hence, we apply complementary measurements of performance based on studies conducted by Ferruz *et al.*²² and Ferruz and Sarto.^{23,24}

Finally, we examine the levels of correlation existing among all the performance indices taken into consideration to opine on whether moving to the less traditional metrics is justified empirically as well as theoretically — that is we will see whether rankings of real fund performance changes significantly.

The fundamentally differential elements of this work are its focus on a relatively infrequently analysed market, as is the case with the Spanish market, and the degree to which Spanish investment funds display problems with asymmetry as regards their returns distributions — which, as far as we are aware, has not been analysed previously for the Spanish market. It is also the first time that alternative measures to determine levels of performance has been

applied to Spanish data using the methodologies of Hwang and Pedersen,²⁵ Estrada²⁶ and Eftekhari and Satchell.¹³

In the following section we shall analyse the characteristics of the database used. The third part of this study develops the empirical analysis and we reserve the final section for our conclusions.

THE DATABASE

We analyse 85 Spanish equity funds, which have the Spanish domestic market as the principal investment objective. The time-frame for the study spans from July 1994 to December 2004, inclusive. The reason for these funds being chosen is due exclusively to the fact that they represent the entire population of funds to survive the aforementioned timescale. We note that this will in fact understate the asymmetry in returns of Spanish funds, since those which have failed would exhibit higher skewness. Nonetheless, we consider this the most appropriate data upon which to base our investigations. Our dataset is biweekly returns from this period.

Asymmetry of return distributions

We have used the skewness coefficient of Fisher below to test for skewness in the data.

$$a_3 = \frac{\left(\sum_{t=1}^n R_t - E(R) \right)^3}{\sigma^3} \bigg/ n$$

In Table A1 (in Appendix A), we have shown the asymmetry coefficients corresponding to the biweekly return distributions of each investment fund. In this table, we find an identification number for each fund and the level of significance of asymmetry presented by each portfolio. In this respect, the level of significance is 1 per cent in 66 funds and 5 per cent in 74 funds, a circumstance that demonstrates the generalized nature of this

problem. This problem of asymmetry in the Spanish Market can be due to the youth of the market because the investment funds have experienced high growth only in the last 15 years, which is a short period of time comparing to more mature markets like the US or UK.

Negative return premia

Studies by Ferruz *et al.*²² and Ferruz and Sarto^{23,24} demonstrate the problems that can arise when the average historical return of portfolios taken into consideration is below the level of risk-free assets. In this respect, they demonstrate that indices such as Sharpe or Treynor do not function correctly when faced with variations in the level of risk in the portfolio.

Specifically, the aforementioned authors offer an alternative measure $S_p(1)$ of performance to Sharpe's Ratio which, while maintaining the nature of the original index, considers the return premium in relative terms.

$$S_p(1) = \frac{E_p/R_f}{\sigma_p}$$

Table A2 (in Appendix A) displays the average biweekly return values of each portfolio in addition to their standard deviation and the level of systematic risk using the β coefficient applied in correlation with the Madrid Stock Exchange General Index (IGBM). There are 20 funds that display a biweekly average return of less than 0.13 per cent corresponding to the riskfree assets considered, Treasury Repos with overnight securities. Hence, we make the corrections above where this is a problem.

ANALYSIS OF PERFORMANCE MEASURES

Hence, as mentioned earlier, the traditional indices of Sharpe, Treynor and Jensen are taken

into consideration in this study. But given the characteristics of the database outlined above, we supplement these with semi-standard deviation and absolute deviation (to capture asymmetry). Additionally, both these ‘new’ metrics and the Sharpe Ratio with the above adjustments in consideration of the return premium in a relative sense as opposed to in absolute terms. Hence, we have six metrics tested in all.

Specifically, in accordance with these considerations, in addition to the $S_p(1)$ index, we propose two alternative indices to the Sharpe Ratio. The first of these is expressed as follows:

$$P(1) = \frac{E_p/R_f}{SSD_p}$$

where E_p represents the average return on portfolio p ; R_f indicates the average return on the risk-free asset; SSD_p is the semi-standard deviation of the return on portfolio p .

This index is therefore similar to Sortino’s index, although the return premium is expressed in relative terms. The semi-standard deviation is calculated as follows:

$$SSD_p = \left[\frac{1}{n} \sum_{t=1}^n (\min[0, R_{pt} - E_p])^2 \right]^{1/2}$$

And the second measure is:

$$P(2) = \frac{E_p/R_f}{AD_p}$$

where AD_p indicates the absolute deviation of the returns on portfolio p , which would be calculated as follows:

$$AD_p = E[|R_p - E_p|]$$

The results of applying the aforementioned indices are illustrated in Tables A3 and A4, where we display the funds corresponding to the best quartile from applying Sharpe, Treynor and Jensen’s indices in Table A3 and for the alternative indices $S_p(1)$, $P(1)$ and $P(2)$ in Table A4. The strong similarity is immediately apparent. Finally, Table 1 indicates the levels of correlation among all the six classifications considering the whole dataset.

As can be seen, the correlation between the measures is very high. What this implies is that although the theory suggests we change from traditional to asymmetric measures corrected for the negative excess returns, in practice there is not a material change in performance rankings of the funds from doing so.

CONCLUSIONS

This paper is a study of the performance of Spanish domestic equity funds to determine how one best can calculate their performance. Given the relative youth of these funds and illiquidity of the market, the key question is whether traditional measures of performance (Sharpe, Treynor and Jensen) are applicable. The study

Table 1: Correlation coefficients between two-by-two performance rankings

	<i>Sharpe</i>	<i>Treynor</i>	<i>Jensen</i>	$S_p(1)$	$P(1)$	$P(2)$
Sharpe	—	0.9748	0.9564	0.9198	0.9200	0.9130
Treynor	—	—	0.9336	0.9009	0.9113	0.9104
Jensen	—	—	—	0.9483	0.9451	0.9449
$S_p(1)$	—	—	—	—	0.9981	0.9945
$P(1)$	—	—	—	—	—	0.9954
$P(2)$	—	—	—	—	—	—

includes all funds operating the whole period between July 1994 and December 2004.

We find significant asymmetry in biweekly return distributions in 74 of the 85 portfolios analysed — this represents a problem when employing common total risk measures such as variance or standard deviation, which require symmetric return distributions to be valid for general investor preferences. Moreover, we observe that a subset of the investment funds in the sample do not attain the average return corresponding to risk-free assets, a situation which also leads to anomalies in the performance rankings resulting from measurements such as Sharpe's Ratio or Treynor's Index.

In order to avoid the two aforementioned theoretical issues, alternative performance indices are proposed in the empirical study, which on the one hand, include risk measurements such as semi-standard deviation or absolute deviation and, on the other, approach the return premium in a relative sense.

The calculated performance rankings resulting from the application of all the measurements considered, however, barely differ from one another. What this suggests is that despite the anomalies described above, the traditional performance metrics to be applied. While this could be a signal that investor preferences are generally mean–variance in nature, a more plausible explanation is that the market has matured quite rapidly and — much faster than some emerging markets areas — has reached a level where tools for analysis should be based on those tools applied in the world's most sophisticated markets.

DISCLAIMER

We stress that the opinions stated in this paper exclusively reflect the view of the author and are not those of Mercer Oliver Wyman.

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Appendix A

Table A1: Asymmetry test of the investment funds of the sample

12	−4.17	134	−3.33	243	−5.23	445	−2.86
13	−8.69	136	−4.73	248	−6.56	446	−2.73
24	−3.61	137	−2.54	252	−5.13	449	−2.87
30	−5.54	139	−5.07	262	−3.88	451	−5.33
33	−4.00	148	−1.96	265	−4.48	453	−4.02
36	−4.43	151	−2.09	276	0.42	454	−2.57
38	−3.37	157	−5.89	279	−4.20	461	−1.31
40	−3.60	160	−0.57	282	−4.84	463	−4.14
41	−2.37	164	−3.90	294	−4.39	466	−4.75
46	−2.88	168	−2.42	321	−2.90	468	−3.98
58	−5.17	174	−1.99	336	−3.15	475	−6.12
59	−2.66	186	−4.08	346	−3.94	476	−4.30
65	−3.89	187	−4.14	351	−4.45	477	−4.62
71	−3.32	193	−5.27	365	−4.03	484	−2.65
76	−9.28	207	−2.40	377	−0.84	487	−9.46
87	−3.90	211	−4.98	382	−0.44	497	−6.16
90	−4.08	215	−4.71	393	−1.43	498	−1.14
100	−3.08	219	−2.50	403	−5.31	502	0.70
108	−5.46	228	−4.49	419	−4.14	503	−6.50
114	−4.27	229	−4.68	421	−0.71		
124	−4.42	231	−4.44	422	0.21		
131	−4.07	233	−2.80	428	−4.76		

Note: The numbers in bold are the fund identification numbers according to the supervisor authorities of the Spanish Market.

Table A2: Statistics of the funds in the sample

	<i>Mean (%)</i>	<i>σ (%)</i>	<i>β</i>		<i>Mean (%)</i>	<i>σ (%)</i>	<i>β</i>		<i>Mean (%)</i>	<i>σ (%)</i>	<i>β</i>
12	0.19	2.30	0.60	160	0.21	3.44	0.86	377	0.67	2.22	0.42
13	0.15	2.43	0.60	164	0.28	3.65	1.00	382	0.19	1.10	0.26
24	0.14	2.11	0.53	168	0.24	3.98	1.05	393	0.04	2.29	0.54
30	0.18	1.69	0.45	174	0.27	2.48	0.63	403	0.19	1.47	0.37
33	0.24	3.15	0.85	186	0.20	3.51	0.95	419	0.23	3.63	0.91
36	0.23	3.12	0.85	187	0.23	2.06	0.54	421	0.24	2.96	0.62
38	0.12	2.44	0.63	193	0.05	2.47	0.63	422	0.17	3.00	0.69
40	0.17	2.00	0.53	207	0.20	1.34	0.32	428	0.28	3.59	0.94
41	0.15	2.71	0.71	211	0.31	1.84	0.47	445	0.11	2.52	0.62
46	0.32	2.74	0.66	215	0.20	3.06	0.83	446	0.07	2.55	0.60
58	0.27	3.48	0.95	219	0.12	2.08	0.43	449	0.14	2.43	0.62
59	0.18	3.21	0.82	228	0.26	3.61	0.97	451	0.17	1.69	0.44
65	0.13	2.99	0.76	229	0.09	3.45	0.86	453	0.27	3.81	1.05
71	0.17	1.56	0.36	231	0.03	4.00	0.91	454	0.03	2.54	0.60
76	0.02	3.46	0.85	233	0.11	2.19	0.53	461	0.15	1.95	0.47
87	0.13	1.85	0.50	243	0.14	1.94	0.46	463	0.22	3.69	1.01
90	0.30	3.59	0.97	248	0.23	1.91	0.43	466	0.17	3.29	0.89
100	0.16	1.99	0.49	252	0.23	2.30	0.59	468	0.21	1.60	0.43
108	0.31	3.44	0.94	262	0.34	3.12	0.82	475	0.30	3.48	0.92
114	0.09	2.74	0.71	265	0.23	2.79	0.72	476	0.36	3.72	1.02
124	0.19	1.46	0.39	276	0.35	1.51	0.36	477	0.35	3.73	1.01
131	0.28	3.94	1.04	279	0.07	1.87	0.48	484	0.24	1.40	0.29
134	0.35	2.73	0.73	282	0.18	3.59	0.98	487	0.11	3.66	0.91
136	0.28	3.52	0.96	294	0.09	2.38	0.32	497	0.25	3.49	0.92
137	0.06	2.74	0.67	321	0.26	2.03	0.48	498	0.19	1.05	0.27
139	0.18	2.22	0.61	336	0.22	3.00	0.78	502	0.48	1.91	0.29
148	0.09	3.01	0.72	346	0.12	3.10	0.77	503	0.10	3.28	0.82
151	0.21	2.86	0.77	351	0.23	3.46	0.94				
157	0.18	2.79	0.74	365	0.13	1.78	0.45				

Table A3: Rankings of Sharpe's, Treynor's and Jensen's performance measures

	<i>Sharpe</i>		<i>Treynor</i>		<i>Jensen</i>
377	0.2383	377	0.0127	377	0.0044
502	0.1771	502	0.0118	502	0.0028
276	0.1414	276	0.0060	276	0.0014
211	0.0953	211	0.0037	211	0.0007
134	0.0781	484	0.0034	134	0.0006
484	0.0695	134	0.0029	46	0.0004
46	0.0664	46	0.0028	484	0.0004
262	0.0636	321	0.0025	262	0.0002
476	0.0594	262	0.0024	321	0.0002
321	0.0591	248	0.0022	248	0.0000
477	0.0574	382	0.0022	476	0.0000
174	0.0546	476	0.0022	382	0.0000
382	0.0507	174	0.0021	174	0.0000
248	0.0502	477	0.0021	477	0.0000
108	0.0489	498	0.0019	498	−0.0001
475	0.0477	207	0.0018	207	−0.0001
498	0.0472	475	0.0018	187	−0.0002
187	0.0466	108	0.0018	468	−0.0002
90	0.0458	187	0.0018	403	−0.0003
207	0.0433	90	0.0017	124	−0.0003
468	0.0423	252	0.0016	475	−0.0003

Table A4: Rankings of the performance measures $S_p(1)$, $P(1)$ and $P(2)$

	$S_p(1)$		$P(1)$		$P(2)$
377	216.8555	377	308.2332	377	290.8604
502	180.0280	502	267.9166	502	281.3508
276	168.0345	276	240.2057	276	213.5395
498	128.9604	382	180.9977	382	177.8486
382	127.1919	498	178.7577	498	171.9377
211	123.0518	484	164.9954	484	171.6569
484	121.5316	211	160.6403	211	163.7080
207	105.6582	207	143.5833	207	137.3943
124	95.1907	321	126.7023	248	134.1599
403	94.0620	124	126.1746	403	127.6107
468	93.1409	134	124.6339	124	125.1870
134	92.9542	403	124.0520	321	123.3775
321	91.8181	468	123.1986	468	122.6765
248	88.6346	248	116.5368	134	122.1280
46	84.3344	46	115.3256	46	111.5366
187	82.0473	174	108.6909	187	106.7029
174	79.7809	187	108.2803	71	104.2226
262	77.9133	262	104.1017	174	102.4450
71	77.0738	71	102.4261	262	102.0625
30	74.6152	30	98.3378	252	99.7181
252	72.9181	252	95.5272	30	99.2002