

Performance of Dow Jones Sustainability Indexes

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Abstract

Currently sustainability is a frequently used buzzword in the business world and in business schools. RobecoSam, in collaboration with Dow Jones, created and continually updates sustainability indexes. The alpha from the Jensen Performance index and the Four Factor Model are used to estimate the monthly abnormal performance, alpha, for four of these indexes with three indexes having two different time periods. When the CRSP value weighted index is used as the market proxy, all fourteen of the alpha estimates are negative and the smallest p value for the null hypothesis that the population alpha equals zero is 0.08. When the MSCI World Index is used as the market proxy all fourteen of the alpha estimates are positive and five have a p-value less than 0.06, 6 percent.

I. Motivation

Eccles, Ioannou, and Serafeim (2012) use 27 environmental and social policies to select 90 High Sustainability firms and 90 Low Sustainability firms. One example of an environmental policy used to select a High Sustainability firm is: Does the company have initiatives to recycle, reduce, reuse, substitute, treat, or phase out total waste? They indicate that many of the criteria they use for firm selection for High Sustainability firms are consistent with the criteria RobecoSam uses to select the firms in their sustainability indexes.

Using the Four Factor Model and monthly data, their estimate of alpha is 0.0096 for the time period 1993-2010 for the 90 High Sustainability firms. This value for the High Sustainability firms is just under one percent per month, is statistically significant with a p-value less than one percent, and is equivalent to an annual rate of just over 12 percent for 18 years. During this same time period the average annual rate of return on the S&P 500 was approximately 8 percent.

These positive alphas are exceptional. An obvious question: What is the performance of the Dow Jones Sustainability indexes?

The alpha from the Jensen Performance index and the Four Factor Model are used to estimate the monthly abnormal performance, alpha, for five of the DJSI that have been in existence for at least four years.

II. Introduction

As of May 2013, RobecoSam has 19 sustainability indexes. (<http://www.sustainability-index.com>). This research uses data for four of these indexes: 1) DJSI (Dow Jones Sustainability Index) World, 2) DJSI North America, 3) DJSI United States, and 4) DJSI Asia Pacific. Table 1 below contains information about each of the four indexes. Since 89.50% of the North America index is made up of firms with headquarters in the United States the performance of this index should be similar to the U.S. index.

Table 1: Features of four of the Dow Jones Sustainability Indexes, DJSI

DJSI Index	World	North America	U.S.	Asia Pacific
Currency	USD	USD	USD	USD
Introduced	9/8/1999	9/23/2005	9/23/2005	1/16/2009
Base month and year	12/1993	12/1998	12/1998	12/2003
Components	342	141	119	154
Country allocation, 1 st	U.S.	U.S.		Japan
Country allocation, 1 st , %	30.39%	89.50%		45.20%
Country allocation, 2 nd	UK,	Canada		Australia
Country allocation, 2 nd , %	15.55%	10.50%		31.30%
Sector allocation, 1 st	Financials	Oil & Gas	Oil & Gas	Financials
Sector allocation, 1 st , %	20.27%	17.23%	16.64%	32.47%
Sector allocation, 2 nd	Consumer goods	Technology	Technology	Consumer goods
Sector allocation, 2 nd , %	13.90%	14.41%	16.10%	15.33%
Component, 1 st	GE	Exxon Mobil	Exxon Mobil	Samsung
Component, 1 st , %	2.70%	6.61%	7.38%	6.85%
Component, 2 nd	Nestle	GE	GE	Toyota
Component, 2 nd , %	2.62%	3.94%	4.40	6.33%

Source: Fact sheets on <http://www.sustainability-indexes.com/library/factsheets.jsp> (3/29/2013)

III. Selection Process

Each DJSI is composed of sustainability leaders as identified through a corporate sustainability assessment. The index represents the top 10% of the largest 2,500 companies in the Dow Jones Global Total Stock Market Index based on long-term economic, environmental and social criteria.

RobecoSam defines sustainability as a company's capacity to prosper in a hypercompetitive and changing global business environment. Companies that anticipate and manage current and future economic, environmental and social opportunities and risks by focusing on quality, innovation and productivity will emerge as leaders that are more likely to create a competitive advantage and long-term stakeholder value.

The DJSI components are selected by a systematic corporate sustainability assessment and include only the leading sustainability companies' worldwide. The objective of Corporate Sustainability Monitoring is to verify a company's involvement and management of critical environmental, economic and social issues or crisis situations that can have a highly damaging effect on its reputation. In addition, the consistency of a company's behavior and management of crisis situations is reviewed in line with its stated principles and policies.

Thirteen economic, twelve environmental, and fourteen social criteria are used to evaluate each firm. The thirteen economic factors are: 1) Anti-crime policy/measures, 2) Brand Management, 3) Codes of Conduct and/or Compliance and/or Corruption and/or Bribery, 4) Corporate Governance, 5) Customer Relationship Management, 6) Innovation Management, 7) Market Opportunities, 8) Marketing Practices, 9) Price Risk Management, 10) Research & Development, 11) Risk & Crisis Management, 12) Stakeholder Engagement, and 13) Scorecards/Measurement Systems.

IV. Literature Review

Other than the Eccles, Ioannou, and Serafeim (2012) study mentioned above most of the research has been event studies. Two are Cheung (2011) and Adams, Thornton, and Sepehri (2012).

Cheung uses an event study method to see what happens to stocks that enter and leave the index. Specifically, it studies U.S. stocks that enter and leave the World Index. The period studied is 2002 through 2008 and looks at 80 inclusions (firms added to the index) and 97 exclusions (firms dropped from the index). On day of inclusion there are short term statistically significant positive rates of return. On day of exclusion there are short term statistically significant negative rate of return.

Adams, Thornton, and Sepehri compares rates of return for 107 firms in United States firms in Dow Jones Sustainability Index, North America to 107 firms from S&P 500 that are not in DJSI, North America. The period covered is 2008 and 2009 and uses weekly data. The average for DJSI firms is 0.08% versus -0.03% for S&P 500 firms not in DJSI. The p-value testing null hypothesis that these two means are equal is 0.852.

V. Data Sources

The sources used for the data in the Jensen and Four Factor Performance indexes are:

- Monthly rates of return for four Dow Jones World Sustainability Indexes were download from web site: <http://www.sustainability-index.com/index-values/index.jsp>.
- Monthly data for two and four factor performance evaluation model was download from web site: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Note: market return used to measure $R_m - R_f$ is the value-weight return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ that have a CRSP share code of 10 or 11 at the beginning of month, good shares and price data at the beginning of the month, and good return data for the month.
- Monthly data for MSCI World Index, which is the second market proxy used, is from Morningstar Direct.

VI. Performance Measures

The Jensen Performance Index (Jensen, 1967) and the Four-Factor Regression Model (Fama and French, 1993, and Carhart, 1997) are used to measure performance. The Jensen Performance Index can be thought of as being a subset of the Four-Factor Regression Model. The Jensen Performance Index contains only the first factor, independent variable, in the Four-Factor Regression Model. The mathematical form of the Four Factor Regression Model is

$$R_t - R_{f_t} = \alpha + \beta_1 * R_{mRf_t} + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * MOM_t + \epsilon_t$$

where

R_t is the rate of return in month t on the Dow Jones Sustainability Index, DJSI,
 Rf_t is the rate of return in month t for the risk free proxy,
 $RmRf_t$ is the rate of return in month t for value-weighted market index minus the risk-free proxy,
 SMB_t is the small minus big proxy (size effect) in month t,
 HML_t is the high minus low proxy (book-to-market effect) in month t, and
 MOM_t is the momentum proxy in month t.

The dependent variable is monthly rate return for the sustainability index, R_t , minus the monthly risk free rate, Rf_t .

Additional information for the four independent variables:

$RmRf_t$ = Return in month t for value weighted market portfolio minus the T-bill rate in month t;
 SMB_t = Month t difference between the rates of return for value weighted portfolios of small and big firm stocks;
 HML_t = Month t difference in rates of return for value weighted portfolios of high and low book-to-market stocks; and
 MOM_t = Month t difference in rates of return for stocks with high past returns minus those with low past returns (Momentum).

The estimated y-intercept, or alpha = α , is interpreted as the mean monthly abnormal return.

VII. Results

Tables 2 and 3 contain the results when the Jensen Performance Index is used to estimate alpha. Table 2 contains the results when the CRSP value weighted index is used as the market proxy and Table 3 contains the results when the MSCI World Index is used. Three indexes, World, North America, and United States, are estimated using two time periods. The first time period is from the start of the index through end of 2012 and the second time period is from start of 2009 through end of 2012. The Asia Pacific index is measured only for the time period 2009 – 2012 because the index started in January 2009

Table 2: Jensen Performance Index, CRSP Value Weighted Index is Market Proxy

Dow Jones Sustainability Index	α , Alpha Coef., %	α , Alpha p value	$RmRf$ Coef.	$RmRf$ p value	n	Adj. R^2
World, 99-12	-0.068	0.640	1.034	<0.001	160	0.88
World, 09-12	-0.396	0.200	1.129	<0.001	48	0.89
North America, 05-12	-0.100	0.279	0.963	<0.001	88	0.97
North America, 09-12	-0.101	0.403	0.959	<0.001	48	0.97
United States, 05-12	-0.119	0.197	0.929	<0.001	88	0.97
United States, 09-12	-0.105	0.353	0.930	<0.001	48	0.98
Asia Pacific, 09-12	-0.339	0.354	1.021	<0.001	48	0.82

When the CRSP value weighted index is the market proxy all 7 of the alpha estimates are negative and none are statistically significant at the five percent level. The smallest p-value is

0.197. Also, the highest adjusted R squared values are, as expected, 0.97 and 0.98, for the North America index and the United States index.

The p values for alpha are measuring the statistical significance of the null hypothesis that the population alpha equals zero. The alpha values, α , are in percentages. For instance, 0.154 (first alpha in Table 3), is 0.154 percent per month, which is \$0.154 per \$100 per month or 15.4.0 cents per \$100 per month ($100 \times 0.154 / 100$).

Table 3: Jensen Performance Index, MSCI World Index is Market Proxy

Dow Jones Sustainability Index	α , Alpha Coef.,%	α , Alpha p value	<i>RmRf</i> Coef.	<i>RmRf</i> p value	n	Adj. R ²
World, 99-12	0.154	0.016	1.085	<0.001	160	0.98
World, 09-12	0.058	0.620	1.109	<0.001	48	0.98
North America, 05-12	0.139	0.312	0.879	<0.001	88	0.93
North America, 09-12	0.336	0.033	0.887	<0.001	48	0.95
United States, 05-12	0.112	0.451	0.840	<0.001	88	0.91
United States, 09-12	0.324	0.060	0.854	<0.001	48	0.94
Asia Pacific, 09-12	0.069	0.778	1.007	<0.001	48	0.91

When the MSCI World Index is the market proxy all 7 of the Jensen alpha estimates are positive and two are statistically significant at the five percent level, p – value less than or equal to 0.05 or 5 percent. They are World index for the 1999 – 2012 time period with a p-value of 0.016 and North America index for the 2009 – 2012 time period with a p-value of 0.033. The Adjusted R Squared values range from 0.91 to 0.98 which indirectly indicates the degree of diversification (R squared = 100% indicates fully diversified).

When testing the null hypothesis that the regression coefficient, beta, equals zero all of the p values are less than 0.001 (Tables 2, 3, 4, and 5). This is expected since the typical beta estimates are close to the market beta of one.

Tables 4 and 5 contain the results when the Four Factor Performance Index is used to estimate alpha. Table 4 shows the results when the CRSP value weighted index is used as the market proxy and Table 5 shows the results when the MSCI World Index is used. The time periods used are the same as those for Tables 2 and 3.

When the CRSP value weighted index is the market proxy all 7 of the alpha estimates for the Four Factor Model are negative and none are statistically significant at the five percent level. The smallest p-value is 0.080 for the World Index for the 2009 – 2012 time period. Also, the highest adjusted R squared values are, as expected, for the North America index and the United States index, 0.97 and 0.98.

Table 4: Four Factor Model, CRSP Value Index is Market Proxy

Dow Jones Sustainability Index	α ,		<i>RmRf</i> Coef.	<i>RmRf</i> p value	<i>SMB</i> p value	<i>HML</i> p value	<i>MOM</i> p value	n	Adj. R^2
	α , Alpha Coef.	Alpha p value							
World, 99-12	-0.042	0.774	1.051	<0.001	0.051	0.291	0.479	160	0.88
World, 09-12	-0.487	0.080	1.183	<0.001	0.007	0.373	0.005	48	0.91
North America, 05-12	-0.079	0.341	0.993	<0.001	<0.001	0.410	0.433	88	0.97
North America, 09-12	-0.092	0.370	0.991	<0.001	<0.001	0.487	0.163	48	0.98
United States, 05-12	-0.098	0.243	0.958	<0.001	<0.001	0.310	0.778	88	0.97
United States, 09-12	-0.047	0.644	0.965	<0.001	<0.001	0.215	0.862	48	0.96
Asia Pacific, 09-12	-0.401	0.260	0.983	<0.001	0.430	0.990	0.013	48	0.84

Table 5: Four Factor Model, MSCI World Index is Market Proxy

Dow Jones Sustainability Index	α ,		<i>RmRf</i> Coef.	<i>RmRf</i> p value	<i>SMB</i> p value	<i>HML</i> p value	<i>MOM</i> p value	n	Adj. R^2
	α , Alpha Coef.	Alpha p value							
World, 99-12	0.170	0.010	1.082	<0.001	0.686	0.175	0.651	160	0.98
World, 09-12	0.030	0.783	1.120	<0.001	0.058	0.169	0.018	48	0.99
North America, 05-12	0.134	0.326	0.854	<0.001	0.505	0.116	0.803	88	0.93
North America, 09-12	0.377	0.019	0.866	<0.001	0.471	0.096	0.214	48	0.96
United States, 05-12	0.107	0.471	0.814	<0.001	0.442	0.113	0.964	88	0.91
United States, 09-12	0.384	0.024	0.839	<0.001	0.521	0.067	0.063	48	0.95
Asia Pacific, 09-12	0.018	0.943	0.951	<0.001	0.509	0.876	0.089	48	0.92

When the MSCI World Index is the market proxy all 7 of the alpha estimates for the Four Factor Model are positive and three are statistically significant at the five percent level. The smallest p-value is 0.010 for the World Index for the 1999 – 2012 time period. Also, the highest adjusted R squared values are, as expected, for the World Index, 0.98 and 0.99.

VIII. Summary

One major result is the estimates of alpha are all negative when using the CRSP value weighted index as the market proxy and positive when using the MSCI World Index as the market proxy. The primary reason for this could be the better performance of the CRSP value weighted index.

Overall there are 28 estimates of alpha and five have a value that is statistically significant at the five percent level. By chance the expected number of statistically significant alphas given that the population alpha is zero would be one or two.

These results are not consistent with the research by Eccles, Ioannou, and Serafeim (2012). One possible explanation could be that the 90 U.S. firms that are their High Sustainability firms are not large global U. S. firms that are in three of Dow Jones Sustainability Indexes we study.

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