

SUSTAINABLE ENTERPRISES: RESPONSES OF MARKET VALUES

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Abstract. This paper aims at checking corporate performance in particular regions, based on stock market indices, specifically, searching for positive relationship of stock market performance and corporate sustainability. To obtain the comparable results, the data on stock market index were taken from the Dow Jones index family (based on the Bloomberg information platform), which should ensure the uniformity of index construction, review, maintenance and calculation. Theoretically, the differences between indices can arise for several reasons: different financial results of the sustainable and non-sustainable corporations, perceived competitive future advantages of sustainable corporations over non-sustainable enterprises, and the differences in the structure of indices. This paper specifically analyses the third reason. Hypothesis about different market performance of sustainable enterprises versus non-sustainable (or sustainability-neutral) enterprises is being raised and tested. Differences of indexes integrating sustainable and sustainability neutral enterprises, caused by differences in compositions of the sectors' and countries' weights, are being taken into account and mathematically equalized, and insights about sustainable enterprises market performance formulated. The obtained conclusion reveals how enterprise sustainability affects financial market performance.

Keywords: sustainability, stock market, index, Dow Jones.

Introduction

After the Earth Summit in 1992 in Rio de Janeiro, the concept of sustainable development was widely accepted by the business world. Business leaders took the challenge of implementing the new concept in business philosophy, strategy and operations, in order to contribute to the solution of global problems. Transposing this idea to the business level, corporate sustainability can accordingly be defined as meeting

the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities, etc.), without compromising its ability to meet the needs of future stakeholders as well (Dyllick *et al.* 2002).

This broad concept of corporate sustainability boosted many studies in various areas of business. In many cases, it can be said that the concept also covers other theories, which originated from business ethics, like corporate responsibility, and corporate citizenship, corporate social responsibility (Málovics *et al.* 2008; Shinkle *et al.* 2011). Porter and Kramer have introduced a new term 'shared value as a new way to achieve economic success', where social progress is integrated into firms' competitiveness (2006; 2011). Consulting business related to sustainability issues introduced its own interpretation of this concept. For example, the Sam group explains that 'Corporate Sustainability is a business approach that creates a long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments. Corporate sustainability leaders achieve a long-term shareholder value by gearing their strategies and management to harness the market's potential for sustainability products and services, while, at the same time, successfully reducing or avoiding sustainability costs and risks' (SAM group 2011). The comprehensive term to sustainable business was given by the International Institute for Sustainable Development, Deloitte & Touche and the World Business Council for Sustainable Development. They state that the sustainable development for business enterprises is 'adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today, while protecting, sustaining and enhancing the human and natural resources that will be needed in the future' (Labuschagne *et al.* 2005).

In modern economy, enterprises seek to get reward for doing good and doing well. Businesses evaluating their decisions prop to the calculation of costs and revenues over the short and long term. In general, theoretical approaches to the problem of how the social and environmental investments affect economic results can be divided into two groups, despite different accents of economics theories (neoclassical microeconomics, resources theory, stakeholder and others). One group of researchers emphasizes that such investments are only additional costs for business (Freedman 1970; Telle 2006), while another group argues that, in the long term, it will decrease costs and stimulate the increase in revenues (Heal 2005; McWilliams 2006). This discussion is important for investors who could choose corporations' stocks based on sustainable investment principles, which is a part of the strategy called responsible investment. The increased public interest in sustainable investments is also reflected by the growing number of financial products in the stock exchange markets i. e. the sustainability indices. These indices provided by these companies facilitate the exchange of information between the firms and stakeholders and play an important role in fostering the sustainable performance of firms.

The purpose of this work is to check corporate performance in several regions based on broad stock market indices, specifically testing for positive relationship of stock market performance and corporate sustainability. In order to make the results comparable, stock market index data were taken from Dow Jones index family, which

should ensure the uniformity of index construction, review, maintenance and calculation. The Dow Jones Sustainability Group Index was introduced in 1999 in order to determine and highlight the sustainably driven companies, which were presented as leaders, integrating economic, environmental and social aspects in their businesses strategies, processes and everyday tasks. This commercial index signals to the investor that the sustainability mark presents respectable and profitable businesses.

The hypothesis about a positive relationship between the corporations' sustainability activities and stock performance is examined by carrying out an empirical analysis. Regions or countries having a strongly positive attitude to sustainability affect the level of relationship between the corporations' sustainability activities and stock performance.

The paper is structured as follows. Introduction is presented in Section 1. Section 2 addresses some important theoretical issues associated with the concepts considered. Sections 3 and 4 provide the analysis and describe the main findings of the research. Section 5 summarizes the results, providing the concluding remarks and possible benchmarks for future research.

A review of the literature on the problems of the corporation's social and environmental investment and financial performance

The question whether the corporation's social and environmental investment creates the financial rewards has raised many discussions for approximately thirty-five years. The most controversial article was published by Milton Friedman (The New York Times Magazine, 1970), where he wrote that 'there is one and only one social responsibility of business— to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud' and forced a long range of discussions and studies. Rapidly changing climate, declining resources and social problems force businesses to be more involved in solving global problems.

A great amount of studies on the relationship between corporate environment or social performance and economic success can be classified into several groups according to the scope of the analysis. The first group relies on historical accounting data and the analysis of interrelationships between corporate environmental and social performance, and the main financial ratios, such as return on assets, return on equity, and return on sales of specific firms or economic sectors (Galbreath, 2006). The second group investigates stock returns in the context of various aspects of corporate sustainability (Margolis, 2007). This group of studies can be split into event studies, analysing short-term reaction of stock price to particular published information on corporate environment or social activities (Gupta and Goldar, 2005; Curan and Moran, 2007; Blancard and Laguna, 2010) and a long-term analysis of stock performance. Some scientists from both groups use econometric instruments to incorporate accounting and market information into one model (Telle 2006; Ziegler *et al.* 2010, 2011). This article continues the research into the problem, which may help answering the question how stock market reacts to corporations' efforts to work based on sustainability principles.

The data and methods used in the research

This paper concentrates on indices taken from Dow Jones indices group in order to track the investor reaction to sustainability of companies as expressed in stocks' returns. Dow Jones Sustainability World Index represents 10% of the largest 2500 companies in the Dow Jones Global Stock market index based on long-term economic, environmental and social criteria. The components are selected according to a systematic corporate sustainability assessment that identifies the sustainability leaders in each of 57 industry groups. The underlying research methodology accounts for general as well as industry-specific sustainability trends and evaluates corporations based on a variety of criteria including climate change strategies, energy consumption, human resources development, knowledge management, stakeholder relations and corporate governance (SAM group, 2011). The Dow Jones Global Total Stock Market and Dow Jones Sustainability World Index group, specifically the US, Europe and Nordic regions, were taken in order to compare regional differences in data. The Nordic region was taken as a new index (introduced in 2010) to highlight that the Nordic countries' potential is higher than the potential of other European countries. The Nordic countries have the highest sustainability ratings (Eurostat, Human Development Index). Therefore, the interest in their business sustainability might be higher as well. Although the index was introduced in 2010, based on the available information, the calculation of the index performance was started on 30 September 2005.

In order to make the results comparable, all stock market index data were taken from Dow Jones index family, which should ensure the uniformity of index construction, review, maintenance and calculation. The daily data for the period from 30 September 2005 to 31 March 2011 were taken based on the Bloomberg information platform. All indices are expressed in monthly price returns in the US dollars. The analysed period includes the global financial crisis of 2008-2009, which gives the additional possibility of a brief discussion about the performance of specified indices during the financial crisis.

Theoretically, the differences between two indices can be accounted for by several reasons:

1. Different financial results of sustainable and non-sustainable corporations.
2. Sustainable corporations have some advantages (e.g. they are more valuable for specific investors) over non-sustainable business.
3. Differences in the structure of indices.

This paper specifically analyses the third reason. The index sector composition is very important for overall index performance because some sectors were much more profitable than others over the analysed period. In order to check the differences in the structure distribution for particular countries and economic sectors, the DJSGI-DJGI distribution differences are found and then related to the performance of the DJGI for each of the groups (including countries and economic sectors). The framework used is similar to the performance attribution analysis of Bodie, Kane and Markus (2004):

$$\begin{aligned} (R^{DJSI} - R^{DJI})_{ADJUSTED} &= (R^{DJSI} - R^{DJI})_{TOTAL} - \\ &- \left[\sum_{i=1}^n ((W_{i,c}^{DJSI} - W_{i,c}^{DJI}) * R_{i,c}^{DJI}) \right] <\text{effect of country distribution differences} \\ &- \left[\sum_{i=1}^n ((W_{i,s}^{DJSI} - W_{i,s}^{DJI}) * R_{i,s}^{DJI}) \right] <\text{effect of sector distribution differences} \end{aligned}$$

where R^{DJSI} is index return (sustainable indices);
 R^{DJI} is index return (a general index);
 W_i^{DJSI} is weight in sustainability indices;
 W_i^{DJI} is weight in general index;
 R_i^{DJI} is the performance of a general index with respect to a specific factor;
 i,c is a specific factor (country);
 i,s is a specific factor (sector).

The results obtained

The performed analysis comprises several steps:

- ▲ First, the monthly index return series and overall indices return over the considered period are analysed for sustainable and overall market indices (respectively DJSGI and DJGI) for the period from 30 September 2005 to 31 March 2011.
- ▲ Second, the results of different indices' performances were compared in three regions, including the US, Europe and Nordic countries.
- ▲ Third, the index return differences, due to the countries' and sectors' distribution, are considered.

In this article, all stock market index data were taken from Dow Jones index family based on the Bloomberg information platform. In general, the information about stock indices is presented by index price fluctuation. To simplify the comparison of the changes of different market indices over the defined period, it is important to unify their measurement units. In this paper, all indices were set to be equal to one at the beginning of the period (2005.10.01) in order to obtain the comparable results for the initial analysis. The fluctuations of data of DJSGI and DJGI for the analysed period, expressed by monthly price changes in the US dollars, are presented in Figure 1.

It can be seen that the fluctuation trends of overall and sustainable indices in the three regions are very similar during the observed period. A very strong impact of the financial crisis can be clearly observed during the period from the second half of 2008 until the first quarter of 2009. Based on the first comparison of the performance of the overall index in three regions with their sustainable counterpart, it can be seen that, in the USA and Europe, the performance of indices covering only sustainable corporations was worse than the overall market index during the whole period. In Nordic countries, the trend was similar until the financial crisis of 2008, but changed afterward and the performance of the sustainability index was better than that of the general market index over the whole observation period.



Figure 1. The fluctuation of DJSGI and DJGI data (2005.10.01 – 31 March 2011) (Bloomberg)

The aggregated results obtained over the selected period are presented in Table 1. In this table and further, the cumulative index returns over the period are reflected by the index value on the last day of the period. If the value is larger than one, the index performance is positive, if it is smaller than one, it is negative.

Table 1. The performance of stock indices in the period from 2005.10.10 to 2011.03.31 (Bloomberg)

Region	Dow Jones Sustainability World Index (DJSI)	Dow Jones Global Stock Market Index (DJI)	Differences (DJSI - DJI)
US	1.00	1.13	-0.13
Europe	1.02	1.10	-0.08
Nordic	1.46	1.41	0.06

<http://www.bloomberg.com/3/31/2011>

It should be noted that the comparison of average monthly index returns does not show the statistical significance of differences in means between the sustainable market index and overall market index for any of the three regions analysed. Therefore, the first brief analysis does not show any significant differences in the results. Therefore, a more comprehensive analysis of a possible impact of non-sustainability-related factors on the overall index performance is required.

For further analysis, the differences in the structure of indices were taken into account. Based on the available index description, it is possible to describe in detail the Dow Jones US Index and all analysed sustainability indices according to distribution

by sectors and countries. The information about sectors' and countries' distribution is taken from the Fact Sheet of Dow Jones (Fact sheet, 2011.02.28). Unfortunately, the countries, and sectors' distribution information is not publicly available for Dow Jones European and Dow Jones Nordic indices. Therefore, the STOXX family indices are used instead of these indices in further analysis (Bloomberg, 2011.02.28). Though, there are slight discrepancies between Dow Jones and Stoxx family indices, their returns over the analysed period are almost identical. To check the similarity of these two indices, the correlation analysis was performed, using the percentage price changes of both indices over the analysed period (the correlation coefficient was 0.99). Therefore, it should be a reliable alternative. The sectors' distribution covers ten industries, defined by the industry classification benchmark. Structural differences in sectors' distribution are presented in Table 2.

Table 2. Sectors' weight differences in stock index composition (in percent) (Bloomberg)

Sectors' distribution	US		Europe		Nordic	
	Dow Jones sustainability US index (DJSI) %	Dow Jones U.S. Index (DJI) %	Dow Jones sustainability Europe index (DJSEI) %	STOXX600 Index	Dow Jones sustainability Nordic index (DJSEI) %	STOXX600 Index (Nordic)
Financials	6.64	16.35	24.65	20.26	8.75	20.36
Technology	19.23	15.87	2.76	2.78	18.24	7.01
Industrials	13.47	13.15	11.31	12.19	21.54	22.86
Oil & Gas	11.60	12.38	7.03	9.36	9.97	9.82
Consumer Services	8.91	11.66	5.22	6.94	9.27	6.93
Health Care	12.12	10.44	9.89	8.55	14.59	10.4
Consumer Goods	14.04	9.89	15.72	16.76	3.18	7.03
Basic Materials	4.00	3.91	13.45	11.00	2.76	6.55
Utilities	4.08	3.44	4.81	6.67	3.60	2.55
Telecommunications	5.91	2.91	5.16	5.51	8.11	6.49
Total	100	100	100	100	100	100

It can be observed in the composition of the US indices, that the financial and consumer services' sectors have higher weights, while the weights of the consumer goods and technology's sectors are lower in Dow Jones U.S. Index compared with sustainable index distribution. The differences in Europe are smaller - oil and gas and utilities sector has a higher weights while basic materials' and financial sectors have lower weights in the STOXX600 Index. The sector weights in the Nordic region are more divergent – the financial, technologies and health care sectors differ to a great extent. Some sectors were much more profitable than others over the analysed period. The performance of different sectors for the overall Dow Jones indices is presented in Table 3.

Table 3. Sector performance (Bloomberg)

Sector	US	Europe	Nordic
Financial	0.62	0.71	0.71
Technological	1.37	0.96	1.61
Industrial	1.28	1.56	1.98
Oil & Gas	1.49	0.99	1.56
Consumer Services	1.22	1.05	1.08
Health Care	1.11	1.08	0.99
Consumer Goods	1.23	1.61	1.05
Basic Materials	1.7	1.98	1.10
Utilities	0.96	1.14	1.14
Telecommunications	1.08	1.10	0.96

It is interesting to note that sectors' performance was quite different for the three regions analysed. Financial sectors was the worst performing sector having negative returns of around 30% in the European and Nordic regions and up to 38% in the US. A highly negative impact of low performance of the financial sector was the result of the international financial crisis. This negative result may influence the performance of the overall index because in some cases, the financial sector accounts for more than 20% of the overall index values (see Table 2). In several other sectors, index performance was different in different regions. The most profitable sectors in the US and Europe are basic materials' sectors, while, in the Nordic region the Industrial sector is the best performer.

A similar analysis was performed for the differences in the distribution of the European countries and the Nordic region. The substantial differences were observed in the countries' weight in the composition of indices as well as in individual countries' return differences.

Table 4. The differences distribution of the countries' and performance differences (Bloomberg)

Countries' distribution	Dow Jones sustainability index	STOXX600	Difference	STOXX600 performance
U.K.	30.12	26.96	3.16	1
Germany	18.09	12.63	5.46	1.41
Switzerland	14.89	11.85	3.04	1.36
France	12.14	16.21	-4.07	1.09
Spain	8.91	6.07	2.84	1.08
Netherlands	5.51	6.08	-0.57	1.07
Italy	4.23	4.66	-0.43	0.71
Denmark	1.65	2.04	-0.39	1.69
Norway	1.27	1.9	-0.63	1.46

Countries' distribution	Dow Jones sustainability index	STOXX600	Difference	STOXX600 performance
Sweden	1.18	5.05	-3.87	1.57
Finland	1.1	1.66	-0.56	1.04
Ireland	0.4	0.9	-0.5	0.45
Portugal	0.4	0.67	-0.27	1.07
Greece	0.11	0.35	-0.24	0.45
Austria	0	0.85	-0.85	0.9
Belgium	0	2.14	-2.14	1.13

Describing great differences in sectors' and countries' index composition supplemented with the differences in their performance, it is important to highlight the overall index performance related to such differences. Applying the above-mentioned formula, it is possible to eliminate the differences in index return attributed to the differences in sectors' and countries' weight distribution. The calculated differences in stock performance due to index structural differences are presented in Table 5.

Table 5. Differences in stock performance related to the index structure (Bloomberg)

Region	DJSI	Dow Jones stock index (DJI)	Differences DJSI-DJI $(R^{DJSI} - R^{DJI})_{TOTAL}$	Difference depending on sectors' distribution	Difference depending on countries' distribution	Differences remaining, adjusted for structural distribution $(R^{DJSI} - R^{DJI})_{ADJUSTED}$
US	1.000	1.130	-0.130	0.055	0.000	-0.185
Europe	1.020	1.100	-0.080	-0.037	0.007	-0.050
Nordic	1.460	1.410	0.060	0.088	-0.020	-0.008

The analysis of the results of the sectors' and countries' differences shows that the differences in the distribution have a positive effect on the sustainability indices, particularly, due to sectors' distribution, except for the European index. After the elimination of the above-mentioned structural differences in the performance of all three regional sustainability indices they become smaller than the respective general market indices. The performed research, based on the specified conditions, has confirmed the primary tendencies that the stock return of the currently sustainable corporations is not higher than that of other corporations.

One of the possible explanations of the differences in return of the sustainable corporation indices may be the fact that a lower return acts as a compensation for the lower volatility of the future share price dynamics. From the investor's perspective, it could be expected that sustainable companies having responsible and disciplined management staff would decrease the risk of negative future challenges and lead to a long-term shareholder value. For further research, the accounting data of sustainable and non-sustainable corporations can be analysed. However, it is very problematic for such a great number of companies.

To conclude, the performance of all three regional sustainability indices was worse than the performance of the respective general market indices, but the relative performance of the Nordic region sustainability index is better than that of Europe or the US. The Nordic region differs from others in its strong positive attitude to enhancing sustainability as priority in their state strategies. This policy leads to increasing awareness of all players in the market of sustainable economics, and reconciles the state, business and consumers philosophy. Therefore, the stated hypothesis cannot be proved statistically, but there are some aspects which show positive biases.

A case study of the Baltic region

The geographic proximity of the Baltic region to the Nordic region and its positioning fosters the establishment of many institutional relationships and leads to the development of inter-dependencies among these markets, including equity markets. The specific features of the Baltic region are analysed by many scientists (Aktan 2010; Pilinkus 2010; Tvaronavičienė 2009; Melnikas 2008;). Over the period between 2003 and 2004 the Nordic and Baltic exchanges came under the control of the financial services company OMX, which is now part of the Nasdaq OMX group (Lee 2010). NASDAQ OMX uses a common classification of indices for the Nordic and Baltic markets. The NASDAQ OMX Baltic index family includes Benchmark, Tradable, All Share and Sector indices.

For some reasons, the sustainability indices have not been constructed in the Baltic States. Usually, the indices with specific features are constructed only for large regions or countries. Dow Jones group has only recently introduced the Nordic index. The market capitalization of Lithuania or even the Baltic region is relatively small. Therefore, the index covering the Baltic States may be too narrow in scope to arouse interest of index.

Another problem associated with the construction of this index is the requirement for thorough evaluation of corporate sustainability as a prerequisite. Rating agencies mentioned in Section 2 usually evaluate only big corporations, because it may be cost-inefficient to analyse small corporations. Consequently, the organisations are not interested in the evaluation of sustainability either.

The official list of Lithuanian companies named as members of the national responsible business network of Lithuania is presented on the website of the Ministry of Social Security and Labour of the Republic of Lithuania. The voluntary incentive was supported by the Global Compact Network and the United Nations Development Programme. This list contains fifty four enterprises and thirteen organisations, with only eight of these companies listed in the stock exchange. According to the author's knowledge, there is no such sustainability assessment in Latvia. It is considered that the Baltic region is lacking the long-term practice of joint evaluation of enterprises having economic, social and environmental dimensions. With the development of the Baltic stock market and the increase of the interest in sustainability, this index could emerge in these countries in the future.

CONCLUSIONS AND DISCUSSIONS

This paper is devoted to the empirical analysis of stock market reaction to sustainability issues. The data of Dow Jones group indices and Stoxx600 family indices on the period from January 2005 to March 2011 are used as a tool to check a positive relationship between stock market performance and corporate sustainability. In order to get the robust results, sectoral distribution is analysed in detail within the structure.

The results obtained in the analysis of sectoral and countries' differences show that differences in their distribution have a positive effect on the sustainability indices, especially, due to the contribution of sectoral distribution. After the elimination of the abovementioned structural differences in the performance of regional sustainability indices they become smaller than the respective general market indices. It could be expected from the investor's perspective that sustainable companies having responsible and disciplined management staff would decrease the risk of negative future challenges and lead to a long-term shareholder value. For further research, the accounting data of sustainable and non-sustainable corporations can be analysed. However, this is very problematic for such a big number of companies.

The analysis reveals that the relative performance of the Nordic regions' sustainability index is better than the performance of this index in Europe or the US. The Nordic region differs from others in having a strong positive attitude to enhancing sustainability as a priority in state strategies. This policy helps increasing the awareness of all players in the market of the sustainable economics and reconciling state, business and consumers' philosophy. Therefore, though the stated hypothesis cannot be proved statistically, there are some aspects which show positive biases.

For some reasons, the sustainability indices have not been constructed in the Baltic States. It is considered that indices with some peculiarities are constructed only for large regions or countries. Dow Jones group has only recently introduced the Nordic index. The Lithuanian market capitalization or even the Baltic region is relatively small. Therefore, the index covers organisations to evaluate sustainability. At the moment in Lithuania the official list of companies named as responsible businesses is presented on the website of the Ministry of Social Security and Labour of the Republic of Lithuania. This voluntary incentive by the Global Compact Network and the United Nations was introduced in 2005 and now covers sixty one company. According to the author's knowledge, Latvia does not have such a list. With the development of Lithuanian stock market and increasing interest in sustainability, this index could emerge in the future in these countries.

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Giedrė LAPINSKIENĖ

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Santrauka. Straipsnyje analizuojamas korporacijų veiklos efektyvumas tam tikruose regionuose, remiantis akcijų indeksų svyravimais, ypač siekiant patikrinti galimą pozityvų santykį tarp akcijų gražos bei priklausymo darnių korporacijų indeksui. Siekiant palyginti skirtingus indeksus, remiamasi Dow Jones indeksų grupės šeima (iš Bloombergo sistemos); tai užtikrina vienodą indeksų sudarymo, keitimo ir skaičiavimo metodologiją.

Teoriškai skirtumai tarp indeksų gali susidaryti dėl kelių priežasčių: skirtumai pačių indeksų struktūroje, skirtingi finansiniai rezultatai tarp darnos siekiančių ir nedarnių korporacijų, darnios korporacijos turi tam tikrą pranašumą prieš nedarnias. Straipsnyje dėmesys sutelkiamas į pirmąją priežastį, nes šalių bei sektorių svorių indekso pasiskirstymo skirtumai gali lemti visą indekso rezultatą dėl to, kad kai kurių šalių ar sektorių indeksai konkrečiu laikotarpiu yra pelningesni už kitus.

Reikšminiai žodžiai: darnumas, akcijų rinka, indeksas, Dow Jones.