

Investment Attractiveness of “Green” Financial Instruments

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Abstract: Nowadays the largest institutional investors and exchange-traded funds invest a great part of their portfolio in the assets connected with environmental-friendly activities. “Green” financial instruments can accumulate resources for climate change adaptation and infrastructure projects in areas such as renewable energy generation, energy effectiveness, clean water, low-carbon transport, etc. Thus, the concept of sustainable development not only pay attention to the climate risks but also creates new factor of investment attractiveness and makes the investment process more conscious and less speculative. Governments are also interested in the development of “green” instruments as their can play a significant role in the adaptation to the climate change and movement of the capital flows from the financial sector into the ecological industrial projects. The study shows that the necessary funds can be accumulated successfully due to defensive character of “green” instruments and their sustainability to the market shocks.

Keywords: Sustainable development, sustainable investing, “green” bonds, “green” indices, ESG principles.

1. INTRODUCTION

Throughout 2017 and during the first half of 2018 the issue of sustainable investing was never far from the front pages of financial and economic journals. Social responsible investing is an investment discipline that considers environmental, social and corporate governance (abbr. ESG) criteria to generate long-term competitive financial result and positive ethical impact. According to the World Bank estimates, in 2016 social investments have reached \$10,4 trillion. According to a survey conducted by the Ministry of Finance of the United States of America, 85% of “millennials” (the young people who were born at the end of the 20th century) are involved in sustainable investing. It is anticipated that their influence on this market will become stronger when this generation inherits from the parents (“Baby Boomers” generation) assets in the amount of \$41 trillion.

Few years ago, Warren Buffett got a share over 9% in Axalta Coating Systems – one of the world’s largest producers of auto paints. Company’s stocks show modest growth; however, Buffett have found this company attractive as it has always a high degree in miscellaneous ESG ratings and excellent reputation in terms of management quality. In the middle of 2017 Swiss Re – one of the world’s largest reinsurance companies and institutional investors – declared that all its portfolio in the amount of \$130 billion will be managed in strict accordance with ESG principles. The vogue for sustainable investing has generated the great variety of thematic exchange-traded funds (abbr. ETF).

2. THEORY AND DEVELOPMENT OF HYPOTHESES

An important driver of sustainable investment and corporate sustainable development is the application of green indices reflecting the performance of securities of the companies which strictly follow ESG principles with a strong involvement in activities devoted to environmental protection and implementing adaptation to climate change. “Green” indices are designed to act as an indicator of performance of stocks in areas such as energy efficiency, renewable energy generation, pollution mitigation and advanced materials, providing a global benchmark for institutional and retail investors seeking to integrate environmental factor into their portfolio. The great variety of “green” indices is presented in the Standard & Poor’s (abbr. S&P), Nasdaq, Dow Jones (abbr. DJ), MSCI and FTSE index families. These families involve all-inclusive S&P Global Eco, DJ Sustainability World, Nasdaq OMX Green Economy, MSCI World ESG Universal, FTSE Environmental Market indices based on long-term economic, environmental and social criteria. These indices are comprised not only of the companies whose core business activity aimed to develop environmentally-friendly techniques, but also the companies which are deeply involved in different ecological initiatives and development of social responsible reporting. The “green” economy index families also include regional, sector and sub-sector, thematic indices. The latter sub-group provides exposure to companies which demonstrate the best results in specific fields, for example, in reduction of carbon footprint.

In order to evaluate investment attractiveness of the “Green” Index Investing Strategy, the authors calculated yield for the sample of “green” indices and

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Table 1: Classification of the Most Frequently used “Green” Indices

Index family	All-inclusive	Regional	Sector	Thematic
Standard & Poor's	S&P Global Eco	S&P Japan Eco		S&P Carbon Efficient
Dow Jones	DJ Sustainability World	DJ Sustainability World Developed/North America/United States/Europe/Eurozone/Asia Pacific/Emerging Markets/Korea/Japan/Australia/Islamic Market Sustainability		
Nasdaq	Nasdaq OMX Green Economy	Nasdaq OMX Green Economy Europe/Asia, Nasdaq OMX GES Sustainability Nordic, Nasdaq OMX GES Ethical Nordic	Energy Efficiency, Transportation, Green Building, Water, Renewable Energy Generation, Pollution Mitigation, Recycling, etc.	
FTSE	FTSE Environmental Market	FTSE Developed/Emerging/Asia Pacific/Europe/Eurozone/China Green Revenues, FTSE4Good Europe/US Benchmark, FTSE4Good Environmental Leaders Europe	FTSE EO Renewable and Alternative Energy/Water Technology	FTSE CDP Carbon Strategy 350, FTSE EO Waste and Pollution Control Technology
MSCI	MSCI World ESG Universal, MSCI Global Environment	MSCI Emerging Markets/Europe/USA ESG Universal	MSCI Global Alternative Energy/Clean Technology/Green Building	

Table 2: Description of the “Green” Indices Included into the Sample

Index	Description
S&P Global Eco	Index is comprised of 40 of the largest publicly traded companies in six ecology related industries.
DJ World Sustainability	Index includes the top 10% of the leading sustainability companies, across the 2500 largest companies globally. Criteria in the selection of companies includes climate change strategies, energy consumption, and corporate governance.
Nasdaq OMX Green Economy Global	Indices track the performance of companies across the spectrum of industries most closely associated with the economic model around sustainable development through every economic sector globally/in Europe.
Nasdaq OMX Green Economy Europe	

relevant broad market indices for several periods which were characterized by overall growth or recession. The sample includes the main “green” indices reflecting the performance of American and European companies according to the high degree of transparency, market efficiency and great progress in implementation of the ESG principles. These circumstances allowed authors to get an objective judgment, as far as possible.

Hypothesis of the study is that “Green” Index Investing represent defensive strategy in comparison with investing in the broad market indices.

The analysis of the performance of the indices for the selected periods demonstrates that in times of recession the “green” investments were less vulnerable to the overall slowdown.

The comparison of the mostly common used multipliers – Price/Earnings Ratio, Price/Book Value Ratio, Dividend/Price Ratio – shows that stocks from the “green” indices are not overestimated in comparison with stocks from the broad market indices while their dividend yield slightly higher. This confirms the hypothesis about defensive nature of sustainable investments.

This is important to note that the “green” indices were less volatile during the whole analyzed periods. In comparison with MSCI World Index their volatility was relatively higher due to the fact that American and European financial markets are more liquid than the average all over the world exchanges.

Table 3: Description of the Periods of Growth and Recession on the American and European Financial Markets Included into the Sample

Period	Growth/Recession	Description
30.12.2015-10.02.2016	Recession	Profit taking by investors on the threshold of the new concerns about the deceleration of economic growth in China.
10.02.2016-25.04.2016	Growth	Optimistic expectations about upcoming Tax reform and infrastructure plan according to the Trump's agenda.
09.11.2017-11.01.2018	Growth	The US Government launched Tax reform. In this regard, investors were waiting for the excellent financial results of the corporations.
29.01.2018-04.05.2018	Recession	Several Fed's officials said four rate hikes will be appropriate in 2018.

Table 4: Performance of the Indices for the Periods of Growth and Recession Included into the Sample

	30.12.2015-10.02.2016	10.02.2016-25.04.2016	09.11.2017-11.01.2018	29.01.2018-04.05.2018	5 Years
"Green" indices					
S&P Global Eco	-6,00%	+8,00%	+4,00%	-2,00%	+47,55%
DJ World Sustainability	-12,01%	+13,33%	+5,25%	-7,54%	+41,92%
Nasdaq OMX Green Economy Global	-10,17%	+15,71%	+6,61%	-4,87%	+56,64%
Nasdaq OMX Green Economy Europe	-8,03%	+10,89%	+3,92%	-5,44%	+34,83%
Broad market indices					
S&P 500	-10,90%	+12,74%	+7,08%	-6,67%	+82,12%
Dow Jones Industrial Average	-9,60%	+12,96%	+9,01%	-8,23%	+80,89%
Nasdaq Composite	-15,44%	+14,29%	+6,84%	-3,44%	+131,65%
Stoxx 600	-14,28%	+10,00%	+1,84%	-3,19%	+35,64%
MSCI World	-11,31%	+13,18%	+6,34%	-6,48%	+56,10%

Table 5: Multipliers of the Indices Included into the Sample

	Price/Earnings	Price/Book value	Dividend/Price
"Green" indices			
S&P Global Eco	21,12	2,25	2,08%
DJ World Sustainability	16,32	1,99	2,92%
Nasdaq OMX Green Economy Global	21,50	2,69	2,03%
Nasdaq OMX Green Economy Europe	16,62	2,01	2,74
Broad market indices			
S&P 500	20,91	3,13	1,90%
Dow Jones Industrial Average	18,73	3,77	2,16%
Nasdaq Composite	24,77	4,22	1,02%
Stoxx 600	16,66	1,84	3,38%
MSCI World	18,82	2,27	2,38%

Table 6: Standard Deviation of Daily Returns of Indices Included into the Sample

	30.12.2015- 10.02.2016	10.02.2016- 25.04.2016	09.11.2017- 11.01.2018	29.01.2018- 04.05.2018	5 Years
«Green» indices					
S&P Global Eco	1,20%	0,70%	0,63%	0,82%	0,72%
DJ World Sustainability	1,22%	0,99%	0,38%	0,81%	0,75%
Nasdaq OMX Green Economy Global	1,19%	0,78%	0,47%	0,98%	0,74%
Nasdaq OMX Green Economy Europe	1,33%	1,09%	0,60%	0,90%	0,93%
Broad market indices					
S&P 500	1,33%	0,81%	0,41%	1,31%	0,78%
Dow Jones Industrial Average	1,31%	0,76%	0,44%	1,42%	0,77%
Nasdaq Composite	1,62%	0,96%	0,64%	1,46%	0,91%
Stoxx 600	1,65%	1,36%	0,54%	0,90%	0,96%
MSCI World	1,12%	0,76%	0,35%	0,92%	0,67%

In order to approve the initial hypothesis, the authors created model portfolios with the use of bonds. The first consists of "green" bonds, while the other involves bonds of the same issuers. All the pairs of securities are characterized by fixed type of coupon and the closest maturity dates. The portfolios were constructed in accordance with the principles of regional and industry diversification.

On order to calculate Value-at-Risk Measure the conventional capital for an each portfolio in the amount of \$10 million was divided into equal parts between securities.

The analysis shows that the «green» portfolio can be measured as less risky in comparison with

traditional bonds, particularly with regard to the negative developments of recent days such as the trade wars between the United States and the European Union, geopolitical tensions on the Korean peninsula, too much hawkish rhetoric of Fed officials, etc. These figures show that the «green» bonds of companies which accumulate funds to finance infrastructure projects (e.g. Digital Realty, Southern Power, Electricite de France) are less vulnerable to global shocks in preference to the issuers which are not involved in huge projects in the areas of energy efficiency, alternative energy and, for example, utility services (IT and financial companies). This allows to conclude that conservative investors should prefer infrastructure «green» bonds.

Table 7: Model Portfolios

N	Issuer	Country	Industry sector	«Green»bond	Basic bond
1	French Republic	France	Government	FRTR 1 3/4 06/25/39	FRTR 1 1/4 05/25/36
2	BNP Paribas SA	France	Financial	BNP 0 1/2 06/01/22	BNP 1 1/8 10/10/23
3	Societe Generale SA	France	Financial	SOCGEN 0 1/8 10/05/21	SOCGEN 4 7/8 04/21/21
4	Electricite de France SA	France	Utilities	EDF 1 10/13/26	EDF 4 1/8 03/25/27
5	European Investment Bank	Supranational	Government	EIB 2 1/4 03/07/20	EIB 2 5/8 03/16/20
6	Morgan Stanley	United States	Financial	MS 2.2 12/07/18	MS 2 1/2 01/17/19
7	Digital Realty Trust LP	United States	Financial	DLR 3.95 07/01/22	DLR 3 5/8 10/01/22
8	Apple Inc	United States	Technology	AAPL 3 06/20/27	AAPL 3.2 05/11/27
9	Bank of America Corp	United States	Financial	BAC 2.151 11/09/20	BAC 4.3 11/15/19
10	Southern Power Co	United States	Utilities	SO 4.15 12/01/25	SO 1.85 06/20/26

Table 8: Yield Since the Beginning of 2018 as of 04.05.2018

	"Green" Portfolio	Basic portfolio
Standard deviation of daily returns	0,1504%	0,1481%
Performance Change	-11,3133%	-21,3333%
Sharpe Ratio	-0,1060	-0,1892

Table 9: Value-at-Risk for the Model Portfolios as of 04.05.2018

№	Issuer	"Green" bond	Basic bond
1	French Republic	116 353,49	108 426,14
2	BNP Paribas SA	73 687,33	73 956,80
3	Societe Generale SA	73 171,93	71 798,91
4	Electricite de France SA	77 642,77	76 605,22
5	European Investment Bank	88 000,43	72 028,30
6	Morgan Stanley	1 504,69	2 062,48
7	Digital Realty Trust LP	17 140,14	18 893,07
8	Apple Inc	44 333,30	43 862,64
9	Bank of America Corp	9 111,37	4 796,39
10	Southern Power Co	33 746,45	76 515,95
	Total	410 467,50	479 567,19

Table 10: Value-at-Risk for the Model Portfolios as of 23.07.2018

№	Issuer	"Green" bond	Basic bond
1	French Republic	116 170,77	106 730,19
2	BNP Paribas SA	72 688,30	72 838,81
3	Societe Generale SA	72 784,70	71 817,78
4	Electricite de France SA	75 911,94	76 197,58
5	European Investment Bank	83 109,58	72 366,42
6	Morgan Stanley	977,17	1 358,07
7	Digital Realty Trust LP	16 971,57	18 171,69
8	Apple Inc	43 693,21	42 758,64
9	Bank of America Corp	8 627,38	4 485,65
10	Southern Power Co	34 294,23	77 124,81
	Total	393 811,59	467 863,44

The both portfolios were downloaded into the PORT in the Bloomberg Terminal. The following figures were calculated with in the system with the help of "Scenario Analysis" function.

3. CONCLUSION

The quantitative analysis of the "green" indices and "green" bonds showed that such instruments are less

vulnerable to the overall recessions on the financial markets. This means that investors tend to hold sustainable assets in their portfolio rather than "usual" securities. The multipliers, the Sharpe Ratio and VAR Analysis demonstrate that "green" investments can be used by conservative investors interested in relatively high dividend yield and stable performance. In other words, "green" investments can be classified as

Name	P&L (Equity Markets Rebound in Port	P&L (Greece Financial Crisis - Port	P&L (Libya Oil Shock - Feb 2011) Port	P&L (Russian Financial Crisis - 2008) Port	P&L (Oil prices Drop - May 2010) Port	P&L (Japan Earthquake in M. Port
GREEN PORTFOLIO	5,297,238.00	-838,398.94	1,455,335.00	-9,984,421.00	-1,581,696.00	758,880.88
AAPL 3 06/20/27	-937,836.88	123,882.11	70,131.95	-950,876.44	261,303.73	106,491.66
BAC 2.151 11/09/20	-103,877.39	17,080.09	31,671.33	-386,567.88	-9,715.08	20,235.40
BNP 0 1/2 06/01/22	1,421,153.25	-284,229.13	206,773.86	-1,407,199.88	-673,292.19	92,310.30
DLR 3.95 07/01/22	-172,514.94	31,863.76	53,125.74	-721,561.31	37,262.19	44,202.52
EDF 2 10/13/26	1,157,529.50	-191,789.58	295,546.72	-1,519,677.63	-549,442.25	109,041.70
EIB 2 1/4 03/07/20	1,698,428.13	-283,242.31	51,524.25	-1,901,778.63	-552,616.25	-57,965.70
FRTR 1 3/4 06/25/39	1,184,207.50	-26,490.84	461,630.84	-366,799.34	474,912.91	282,147.00
MS 2.2 12/07/18	-2,241.42	-1,284.77	1,620.17	-106,245.92	-20,425.50	-804.63
SO 4.15 12/01/25	-405,925.19	65,756.23	84,041.85	-1,192,608.25	137,028.52	74,996.13
SOCGEN 0 3/8 10/05/21	1,458,315.88	-289,944.50	199,268.19	-1,431,105.75	-686,712.06	88,226.47

Picture 1: Scenario Analysis for the "green" portfolio as of 04.05.2018.

Name	P&L (Equity Markets Rebound in Port	P&L (Greece Financial Crisis - 2015) Port	P&L (Libya Oil Shock - Feb 2011) Port	P&L (Russian Financial Crisis - 2008) Port	P&L (Oil prices Drop - May 2010) Port	P&L (Japan Earthquake in M. Port
BASIC PORTFOLIO	6,427,756.00	-1,092,469.38	1,746,700.00	-10,877,418.00	-2,617,868.50	844,408.00
MS 2 1/2 01/17/19	16,031.13	-928.92	2,604.11	-133,908.38	-34,581.12	-2,446.00
BAC 4.3 11/15/19	-21,031.73	6,033.46	15,186.31	-249,781.84	-37,492.54	4,419.10
FRTR 1 1/4 05/25/36	1,178,250.38	-52,934.10	426,950.25	-475,320.28	369,493.25	255,495.00
DLR 3 5/8 10/01/22	-204,856.02	34,371.47	56,506.71	-755,531.88	46,701.67	46,940.00
AAPL 3.2 05/11/27	-908,619.88	122,311.59	70,093.69	-941,754.81	252,638.02	104,957.00
EIB 2 5/8 03/16/20	1,320,098.50	-276,951.72	178,833.50	-1,500,147.50	-683,750.50	68,973.00
BNP 1 1/8 10/10/23	1,339,833.25	-264,891.47	229,832.66	-1,544,936.38	-664,286.38	89,865.00
EDF 4 3/8 03/25/27	1,180,824.38	-188,326.63	293,041.03	-1,561,275.25	-552,416.44	101,588.00
SOCGEN 4 7/8 04/21/21	1,589,157.50	-289,019.94	201,041.47	-1,721,568.00	-752,481.94	65,643.00
SO 1.85 06/20/26	938,068.38	-182,133.08	272,610.34	-1,993,193.75	-561,692.44	108,970.00

Picture 2: Scenario Analysis for the basic portfolio as of 04.05.2018.

relatively defensive investments which can provide investor with the additional value in terms of ESG principles.

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