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Measures for Sustainable Investment Decision Making – A Triple Bottom Line Approach

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Traditionally, most investors have only taken economic variables (profitability and risk) into account when making investment decisions. In this paper we propose two measures, the *Relative Sustainable Performance Measure (RSPM)* and the *Measure of Commitment-failure (MC)*, that permit sustainable investment decision making, which takes environmental and social variables into consideration in addition to the economic variables. This makes a Triple Bottom Line (TBL) approach to investment decision making possible. We apply our measures to the worldwide chemical sector and validate them. Moreover, we propose a *2D Graphical Sustainability Analysis*, which is simple and easy for investors to understand when making investment decisions and can be used if they are concerned about environmental and social matters.

I. INTRODUCTION

Traditionally, when making investment decisions, investors take into consideration the classic measures of profitability and risk, which are concerned with the economic aspects of investment. However, in the last few decades, environmental, social and corporate governance (ESG) issues have become more important, and more data about those issues has started being disclosed by companies.

Nevertheless, for investors to be able to consider these factors, they do not only need data but also measures to help them to make sense of those data.

To date, there have been many attempts to create measures for the "integration of economic, social and corporate governance performance and reporting in enterprises" (Hřebíček et al. [1]). Having analysed the literature around this topic, we can say that we have not found any measure that made companies comparable, gave the formula for making the calculations, used continuous variables (and not just yes and no answers) , were based on public data and provided an easy comparison with the sector's performance. The closest measure to the one that we sought can be found in the paper by Hahn and Figge [2], which presents a formula for calculating the Sustainable Value of a company (based on the VCR, mentioned below) which, unfortunately, is of no use for comparing one company to another since it is not a size-adjusted measure. All in all, our review of the existing tools for sustainable investment decision making reveals a lack of disclosure of methods of calculation (except Hahn and Figge [2]) in those cases in which the measures allow for comparison of companies (for example, the ratings by Sustainalytics).

Therefore, in this paper we propose new measures that make it easier for investors to take into consideration environmental and social factors when deciding whether to invest in a company or another. We also propose a *2D Graphical Sustainability Analysis*, and show the implementation of both the measures and the graphical analysis applying them to real data from the chemical sector.

II. MEASURES FOR SUSTAINABLE INVESTMENT DECISION MAKING

In this paper we propose two measures that make a more complete company analysis possible: the Relative Sustainable Performance Measure (RSPM) and the Measure of Commitment-failure (MC). We have validated the measures, firstly, analysing their properties and, secondly, graphically and analytically after applying them to data of the chemical sector worldwide. In particular, we have proven that the RSPM gives more information than the Return on Total Assets (ROTA) and that the MC is different from the standard deviation of the RSPM.

A. Relative Sustainable Performance Measure (RSPM)

The relative sustainable performance measure provides an assessment of how well a company is performing in environmental and social matters that makes it possible to draw comparisons between companies. It is based on the profitability measure proposed by Hahn and Figge [2], i.e. the Value Contribution of the Resource (VCR), which is calculated as stated in Equation (1).

$$VCR_{i,t}^{C} = Profit_{t}^{C} - RU_{i,t}^{C} * RE_{i,t}^{Market} \quad (1)$$

where $VCR_{i,t}^{C}$ is the Value Contribution (to the Profit) of the Resource i by Company C in year t, $Profit_{t}^{C}$ is the Total Returns of the Company C in year t measured, in our case, as the EBIT in millions of USD, $RU_{i,t}^{C}$ is the Use of the Resource i by the Company C, measured in the units required in each case, and $RE_{i,t}^{Market} = \frac{Profit_{t}^{Market}}{RU_{i,t}^{Market}} = \frac{\sum_{C=1}^{N} Profit_{t}^{C}}{\sum_{C=1}^{N} RU_{i,t}^{C}}$ is the Efficiency of Use of the Resource i by the Market in year t, with N being the total number of Companies.

We propose a modification this measure that makes every company comparable to every other and is calculated as follows:

$$RSPM_{i,t}^{C} = \frac{VCR_{i,t}^{C}}{TA_{t}^{C}} \quad (2)$$

where $RSPM_{i,t}^{C}$ is the Relative Sustainable Performance Measure of the Resource i of the Company C in year t and TA_{t}^{C} is the Total Assets of the Company C in year t.

B. Measure of Commitment-failure

The measure of commitment-failure emerged from the idea that since sustainability is a relatively new matter for companies, investors could be interested in having a way to measure how companies are performing environmentally and socially over time.

Like financial downside measures that only take into account the left (negative) side of the distribution of the variable analysed we propose a way to detect which companies have decreased their interest in these matters over time. In particular, we need to separate upward and downward movements of the RSPM over time and disregard upward movements, since they are not dangerous in this case. Therefore, we propose a measure, the MC, that works like downside-risk measures and considers only downward RSPM movements:

$$MC_{i}^{C} = \left| \frac{\sum_{t=2}^{T} A_{i,t}^{C} * Z(A_{i,t}^{C})}{W} \right| \quad (3)$$

where $A_{i,t}^{C} = RSPM_{i,t}^{C} - RSPM_{i,t-1}^{C}$, $Z(A_{i,t}^{C})$ is a function which is 1 if $A_{i,t}^{C} < 0$and 0 if $A_{i,t}^{C} \geq 0$, T is the last year for which data are available and W is the total number of two consecutive year periods for which information is available to compute if $A_{i,t}^{C}$.

III. 2D Graphical Sustainability Analysis

Taking both measures proposed into account at the same time, we present the 2D graphical sustainability analysis: a tool for making sustainable investment decisions. By using it investors can choose not only those companies that have positive RSPM values but also those which also work to maintain them or even make them better.

One really valuable aspect of this 2D graphical sustainability analysis is that investors can apply it to whatever resource or set of resources they are concerned about or consider most important, as RSPM and MC are calculated for each of them. In this paper, the resources considered are the following:

1. Environmental:
   (a) CO2 equivalent emissions
   (b) NOx emissions
   (c) SOx emissions
   (d) Total Waste
   (e) Total Energy Use
   (f) Water Use

2. Social:
   (a) Injury Rate
   (b) Total Donations

We have also calculated the combination of the environmental resources, the social resources and all resources. The three combinations are represented in the 2D sustainability graphical analyses in Figure 1.

In each graph we represent the MC on the x-axis and the time series Average RSPM for each company on the y-axis. Therefore, every point on a graph corresponds to a company.

According to our analysis, investors should choose companies with high RSPM and low MC (especially MC=0) over those with lower RSPM and/or higher MC. Thus, preferences expand to the top left part of the graph. However, the final investment decision will depend on the investor's specific concerns and his/her threshold of tolerance.

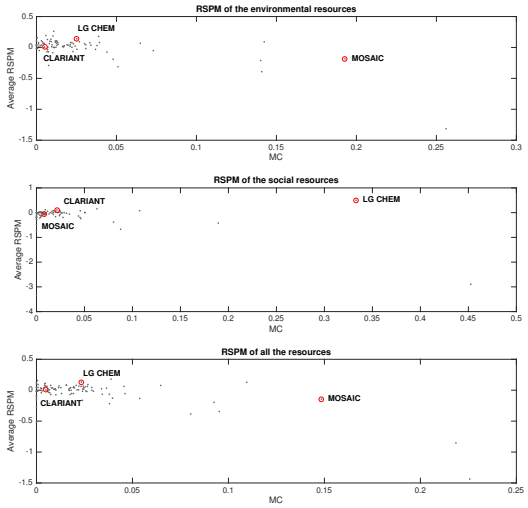

FIGURE 1: 2D ANALYSIS FOR GROUPED RESOURCES

IV. Conclusions

In this paper we present two measures that enable sustainable investment decisions to be made, following the TBL approach: the RSPM, which shows how well a company performs in environmental and social matters; and the MC, which detects which companies have decreased their interest in those matters. Both measures are very flexible and thus really useful because they can be calculated for different resources and resource combinations (in which the resources can be weighted as desired in line with the investor's preferences) and for different time frames.

This is a contribution to the sustainable investment literature, because to the best of our knowledge no-one has presented measures with calculation formulas, and to date

there have been no dynamic measures such as the MC.

We also apply these measures to real public data on companies in the chemical sector and validate them. Particularly, we show that the RSPM is different from the ROTA and that the MC is different from the standard deviation of the RSPM. It is noteworthy that both the measures proposed are applicable to any industrial sector and that the relevant/selected resources may be different in each one.

Moreover, we propose an intuitive 2D graphical analysis based on the two measures proposed. This is a useful tool that can help investors make investment decisions. It is useful both to investors seeking to maximise profits and to those more concerned about non-economic issues, since it can be supplemented by well-known economic and financial measures.

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