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Does Ethic Rating Decrease Firms' Cost of Capital? Empirical Insights from the Italian Setting

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Abstract *This paper focuses on the issues relating to the reduction of firms' cost of debt connecting to the ethic rating score as a topic of crucial relevance especially in terms of creditworthiness. The literature on ethic rating presents risk reduction as potential benefits. Consequently, an efficient market should recognize an "ethical financial premium" to socially responsible firms, corresponding to a less cost of debt financing. We have developed a model using the annual report of all Italian listed firms and the ratings issue by Standard Ethics. The sample is composed by 186 observations, so we have used a panel data analysis to test our research hypothesis. Overall, the results are statistically significant but the financial market does not recognize an ethical premium to socially responsible firms. It means that variables chosen can explain the whole model, but specifically there is not a positive association between cost of debt and ethic rating.*

Key words Corporate social responsibility, cost of debt, fixed effect, ethic rating, random effects joint

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1. Introduction

Before the July 2008, the score assigned to Lehman Brothers by the main rating agencies did not raise particular concerns. Three different agencies evaluated the fifth global bank in the USA with a rating A2 (Moody's) and A (Standard & Poor's e Fitch). Two months later Lehman Brothers bankrupt with a loss of $630 billion. Cases like this reveal a predictive inability of the three biggest rating agencies in the world (Reinhart, 2009). These mistakes have certainly contributed to bringing the world economy in the actual difficult state. The work and the credibility of these agencies are called into question, especially in Europe and the United States. The models used for the allocation of credit ratings picked on because they are based on historical data provided by the companies themselves and poorly predictive. Hence, it is very simple to create potential conflicts of interest between the evaluator and evaluated, where often the former is financial adviser of the latter (Partnoy, 1999).

The original assumption of finance, ethical or unethical, should be to be intermediary between available resources and the real economy. However, parallel to this trend, "is spreading a new culture which seeks investment with ethical characteristics, where the investor aims not only to speculation, but focuses on activities that meet certain requirements of social and environmental responsibility" (AFE - Ethical Finance Association). It is a phenomenon called ethical finance and it is characterized by a morally impeccable use of the money, which will be direct to organizations that stand out for special attention to the environment and the social fields. In this case, investors will not only seek an economic return on their investment, which can be measured only in terms of quantity but they also want to fund worthy initiatives in a sustainability of long-term run.

The aim of a good financial investment should not be only the profit for the investor (shareholder value), but also all stakeholders' one (stakeholder value) (Clarkson, 1995; Sciarelli, 2012).

Instead of the traditional rating, characterized by the oligopoly of three large operators who adopt methodologies recognized worldwide, the ethical rating is issued by a much larger number of agencies,

without which any of these individually able to impose their influence. Currently, between the United States and Europe, the company best known ethical rating are about twenty, among which include Axia, E-Capital Partners, EIRIS, KLD, SAM, Standard Ethics and Vigeo. An investor may be surprised in front of numerous judgments on social responsibility because there are often same scores by different agencies. It follows a strong limit: the lack of common guiding line (i.e. Tomasi, 2012).

In this study we consider the ratings provided by Standard Ethics. There are three fundamental pillars in order to evaluate firms' CSR as described follow:

Competition	Properties	Management
Market and competitors Market and monopolies Tender Corruption	Properties and conflicts of interest Protection of minority shareholders and appoints administrators Participation in general meeting Communication and information	Administrators and conflicts of interest Transparency and information Employment and human resources selection Health and safety and social communication Transformations Environmental protection Consumers and quality Science and technology Local communities Business partner

Figure 1. Corporate Social Responsability

Nowadays, companies that consider the sustainability topic are numerous (Sorrentino and Smarra, 2015). They aim to gain a sustainable competitive advantage. Applying a rating called "ethical" (i.e. an assessment methodology that classifies on the basis of environmental, social and corporate governance: ESG - Environmental, Social and Governance), these entities transmit a strong reputational value, which always most market participants seek to guide their investment decisions (Gabbi, 2004).

However, a possible weakness of the phenomenon is the lack of common guidelines, which prevent the comparability and the universal validity of the opinions expressed. In addition, a very important problem is the failure of the firm point to set international CSR policies. With the recent crisis has lowered the quality of firms' sustainability goals in the long run, but the majority of them make responsibility policies with low profile that give them an immediate return, in particular focused on brand return.

2. Literature review and hypothesis

Corporate social responsibility has been the focus of much academic research since the mid - 1960's. During the1960s and the 1970s, there was a proliferation of new definitions instead during the 1980s; there were more empirical research (Carrol, 1999; Bertolini, 2006; Carrol, 2010).

Bowen (1953) argued that social responsibilities: "*refers to the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society*". Keith Davis for example argued that social responsibility referred to 'businessmen's decisions and actions taken for reasons at least partially beyond the firm's direct economic or technical interest' (Davis, 1960). At the same time, William C. Frederick argued that businesses' resources should also "*be used for broad social goals and not simply for the narrowly circumscribed interests of private persons and firms"* (Frederick, 1960). Walton in 1967 gave another definition of CSR *"In short, the new concept of social responsibility recognizes the intimacy of the relationships between the corporation and society and realizes that such relationships must be kept in mind by top managers as the corporation and the related groups pursue their respective goals"*.

According to Patrick Murphy (Murphy, 1978) during the early 1970s there was a period of changing social *consciousness and recognition of overall responsibility* in which there was a focus on charitable donations by businesses. But we must wait until the eighties, when R. Edward Freeman published "Stakeholder Theory" (Freeman, 1984), still considered the first important interpretation to the concept of social responsibility. The concept of corporate social responsibility (CSR) that comes from the contribution of Freeman contrasts with neoclassical theories, such as the "Theory of the Shareholder", developed by Milton Friedman. According to the US economist "*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" (Friedman, 1970). Milton Friedman (1970) argued that the only responsibility of firms was profit maximization and that public preferences combined with democratic empowerment implied that governments, and not firms, should manage externalities and provide public goods (Sorrentino, 2015; Sorrentino *et al*., 2015).

In the last decade, CSR has become a very important strategy of corporate governance (Reinhardt and Stavins, 2010; Goss and Roberts, 2011; Servaes and Tamayo, 2013; Czarniewski, 2014).

Orlitzky *et al*. (2003) argue that corporate social responsibility could provide internal or external benefits (or both) and that, moreover, these positive effects can be higher than the related costs.

CSR activities have been considered as mere marketing activities with the aim to "appear" socially responsible, improving corporate image, but without any effective and real organizational and managerial change (Lee, 2008; Fieseler, 2011).

Gelb and Strawer (2001) argue that the practice of CRS is an important function of a business entity and firm will expend resources in selecting and implementing CSR practices.

In the latest UN Global Compact – Accenture CEO study (2010), 93 percent of the 766 participant CEOs from all over the world argue Corporate Social Responsibility as a "very important" factor for their organizations' future success (Cheng et al., 2014).

This change is demonstrated by many research have been focused on investigating financial implications of companies' CSR activities (Angel, 1997; Orlitzky *et al*., 2003; Margolis and Walsh, 2007; Wood, 2010; Marfo *et al*., 2015). The findings of studies have given various results about relationship between CSR and firms' performance. In particular from 1970 to 1990 have been published 60 studies on the relationship between corporate social responsibility and corporate financial performance. Based on the analysis of Griffin and Mahon (1997) 33 empirically studies, issued from 1970 and 1990, have found positive relationships while negative relationship were supported by 1 study in the 1970s, 17 studies in the 1980s, and 3 studies in the 1990s. Finally, others studies have shown inconclusive findings (Griffin and Mahon, 1997). In 2007, Margolis and Walsh (2007) analyzed 167 empirically studies on the link between corporate social responsibility and financial performance. The analysis shown that 45 studies (27%) reported positive direction, while only 3 studies (2%) showed negative direction, 97 studies (58%) supported inconclusive result and 22 studies found in both directions. The study Giulio, Migliavacca, Tencati (2007) and Cajias, Fuerst, Bienert (2014) highlights that firms with a high number of CSR concerns diminished their capital costs. Goss and Roberts (2011) and Izzo (2012) underline that empirical researches about the link between CSR and cost of debt do not occur in literature.

In fact, has only been in the last years that some researches have analyzed relationship between cost of debt and CSR ratings. These researches argue that corporate social responsibility could relevant to reduce firms' cost of debt through a reduction of information asymmetry problems (Fama, 1970; Botosan, 1997; Capalbo, 2003; Lee and Faff, 2009; El Ghoul, 2011; Doust and Pakmaram, 2015). If risk reduction is a consequence of a socially responsible behavior and social responsibility investments, banks apply the best conditions to companies with high level of performance related to CSR policies (such as stakeholder theory argues) (Spicer, 1978; Fombrun e Shanley, 1990).

Goss and Roberts (2011) explore the link between corporate social responsibility and debt using a sample of 3996 loans to US firms. Their study demonstrate that firms with the worst social performance pay up to between 7 and 18 basis points more than firms that are more responsible at the same time, for the majority of the firms, the impact of CSR is not economically important.

Using a sample of 332 firms, representative of North America, Europe and Asia, Izzo and Magnanelli (2012) have investigated the correlation between the social performance and the cost of debt. Their study shows that exists a positive correlation between the social performance and the cost of debt but CSR is not considered as an element of value having an impact on the risk profile of the firm, but kind of waste of resources that may affect the performance of the company, regardless of the country field action.

On the basis of aforementioned literature review, we want to test the follow hypothesis:

H_1: Financial market assigns an ethical premium to ethic firms.

3. Methodology of research

Many recent studies have analyzed panel, or longitudinal, data sets. Two very famous ones are the National Longitudinal Survey of Labor Market Experience (NLS) [1] and the Michigan Panel Study of Income Dynamics (PSID)[2] . In these data sets, very large cross sections, consisting of thousands of micro units, are followed through time. The analysis is conducted testing the hypothesis on a sample of 31 companies and it covers a period of 6 years, from 2008 until 2013, for a total number of observations equal to 186. The sample is heterogeneous and includes companies from belonging to different industries.

In our model the dependent variable is the cost of debt, measured by the ratio 'financial interests expenses on financial debt', which represents a proxy of the total cost of debts faced by the firm. Banks and institutional investors are expected to examine past disclosures to make risk estimates and evaluate the rate of cost of debt to be applied to the firms (Najah, 2013). Consequently, according to Sengupta (1998), in this study we examine the main variables, which affect the cost of debt, with particular regard to the CSR rating of the firm. In order to correctly test the relation expressed in the hypothesis and verify the existence of an effect of the CSR performance on the cost of debt, we considered some control variables that previous literature considered the most relevant in affecting the cost of debt. The major part of the control variables included in the model mainly impact, directly or indirectly, on the risk profile of the company, acting in this way on the cost of debt applied by the banks to the firms. In particular, the risk depends on the financial structure of the company, its operating profitability, the specific risk level of each firm and the value attributed by the market, as a sort of first general judgement recognized by the external environment. Moreover, as control variables, we also included the industry in which the firm operates, which can impact on the debt considering if the firm operates in a high or low risky industry (enriching the previous proxy of the specific risk).

The descriptive statistics can be summarized in the following tables (tabs 1-2-3)[3]:

Table 1. Descriptive statisics

DUMMY (Etiche/Non Etiche)

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	186
25%	0	0	Sum of Wgt.	186
50%	0		Mean	.3924731
		Largest	Std. Dev.	.4896191
75%	1	1		
90%	1	1	Variance	.2397268
95%	1	1	Skewness	.4404122
99%	1	1	Kurtosis	1.193963

Financial expenses/Financial liabilities

	Percentiles	Smallest		
1%	.0002755	.0002709		
5%	.0036116	.0002755		
10%	.0197495	.000406	Obs	186
25%	.0454111	.0009715	Sum of Wgt.	186
50%	.1424109		Mean	.2929211
		Largest	Std. Dev.	.6096519
75%	.3289655	1.284364		
90%	.6981385	2.464156	Variance	.3716754
95%	.8929964	2.62631	Skewness	8.045014
99%	2.62631	7.064714	Kurtosis	84.90358

[1] http://www.bls.gov/nls/nlsdoc.htm and http://psidonline.isr.umich.edu/
[2] http://psidonline.isr.umich.edu/
[3] Data are analysed by STATA.

So, consistently with existing literature on the cost of debt, the control variables are:

- Operating Profitability: expressed by the Return on Investments ratio (ROI) and it is expected to be negatively correlated with the cost of debt;
- NetDebt/TotLiab: expressed by the Net Debt/Total Liabilities (NET_DEBT/TOT_LIA); it controls for financial pressure and it is expected to be positively correlated with the cost of debt;
- Leverage: expressed by the Net Debt/Total Equity (LEV); it controls for financial pressure and it is expected to be positively correlated with the cost of debt;
- Operating risk: expressed by the unlevered Beta (BETA UNLEV), that is depurated by the financial structure effect. The unlevered beta is the coefficient representing the volatility compared to the market and measures the operating risk; it is expected to be positively correlated with the cost of debt;
- Size: expressed by the Total Assets (TA); it is expected to be negatively correlated with the cost of debt. According to Diamond (1989; 1991) larger firms are better able to withstand negative shocks to cash flow and are thus less likely to default. In addition, there are reputation effects that increase with firm size, hence, larger firms are viewed as less risky by banks and should enjoy lower yields on debt;
- EPS: The portion of a company's profit allocated to each outstanding share of common stock. It indicates financial performance.

Table 2. Descriptive statistics

Tot asset

	Percentiles	Smallest		
1%	82.119	80.031		
5%	2343.3	82.119		
10%	3334	1184	Obs	186
25%	6059	1375	Sum of Wgt.	186
50%	12280.5		Mean	116145.8
		Largest	Std. Dev.	249196.3
75%	51503	915696		
90%	526616	1044375	Variance	6.21e+10
95%	810345	1072943	Skewness	2.500146
99%	1072943	1106804	Kurtosis	8.033863

Roi (EBIT/IC)

	Percentiles	Smallest		
1%	-.2965	-.413		
5%	-.0231	-.2965		
10%	.0040019	-.1025998	Obs	186
25%	.0466	-.0968	Sum of Wgt.	186
50%	.0862		Mean	.6211825
		Largest	Std. Dev.	4.021818
75%	.145149	.8636		
90%	.2674177	25.81	Variance	16.17502
95%	.5436	34.55	Skewness	7.854702
99%	34.55	34.61	Kurtosis	63.61106

Beta unlevered [Beta/1+(1-T)(D/E)]

	Percentiles	Smallest		
1%	.11	.11		
5%	.26	.11		
10%	.28	.11	Obs	186
25%	.52	.11	Sum of Wgt.	186
50%	.78		Mean	.6932258
		Largest	Std. Dev.	.270919
75%	.86	1.28		
90%	.96	1.28	Variance	.0733971
95%	1.12	1.28	Skewness	-.2534454
99%	1.28	1.28	Kurtosis	2.603418

Table 3. Descriptive statistics

EPS

	Percentiles	Smallest		
1%	-4.06	-6.54		
5%	-.9	-4.06		
10%	-.245	-3.87	Obs	186
25%	.1024	-3.28	Sum of Wgt.	186
50%	.45665		Mean	.5729527
		Largest	Std. Dev.	1.357454
75%	1.0063	4.37		
90%	1.6813	4.4103	Variance	1.842682
95%	2.15	4.75	Skewness	.5466587
99%	4.75	9.34	Kurtosis	17.09613

NetDebt/TotLiab

	Percentiles	Smallest		
1%	.0002529	.0002212		
5%	.0005681	.0002529		
10%	.0037829	.0002594	Obs	186
25%	.1129064	.0003246	Sum of Wgt.	186
50%	.5329777		Mean	1.169363
		Largest	Std. Dev.	3.193096
75%	.7768343	11.38642		
90%	1.276003	13.62493	Variance	10.19586
95%	7.012103	14.23199	Skewness	6.439261
99%	14.23199	32.54899	Kurtosis	55.13091

Leverage

	Percentiles	Smallest		
1%	.0003376	.0002863		
5%	.0007173	.0003376		
10%	.0018783	.0003503	Obs	186
25%	.0187324	.0004168	Sum of Wgt.	186
50%	.7915036		Mean	2.302753
		Largest	Std. Dev.	4.964682
75%	2.326144	17.87783		
90%	4.850092	29.91206	Variance	24.64806
95%	9.689412	31.55447	Skewness	4.735059
99%	31.55447	39.16524	Kurtosis	29.56167

The descriptive statistics includes Skewness and kurtosis. Skewness is a measure of symmetry, or more precisely, the lack of symmetry (D'Ambra, 2001). A distribution is symmetric if it looks the same to the left and right of the center point. Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. That is, data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak. With reference to the dependent variable (financial expenses/financial liabilities), Skewness and Kurtosis are many highs, thus we can see that the original data's variability is not stable (D'Ambra, Spedaliere, 2003). As such, we used the logarithmic transformation. There are at least two good reasons that they can justify their use. First, it stabilizes the variability of the panel, when this is found increasing with the increase of the trend, we helping to achieve the stability of variances. The second reason relates to the use of the transformation in conjunction with the differences of the Panel, we helping to achieve symmetry of model.

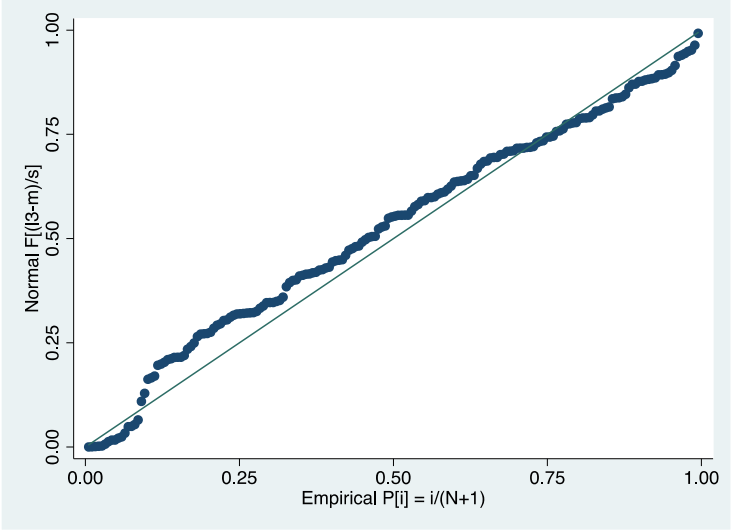
Table 4. Shapiro – Wilk Test

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
DUMMYEtich~e	186	0.99566	0.608	-1.142	0.87325
Financiale~b	186	0.38190	86.577	10.226	0.00000
Totasset	186	0.50543	69.274	9.715	0.00000
RoiEBITIC	186	0.12444	122.638	11.025	0.00000
Betaunleve~E	186	0.97088	4.078	3.222	0.00064
EPS	186	0.75901	33.755	8.067	0.00000
NetDebtTot~b	186	0.32614	94.386	10.424	0.00000
Leverage	186	0.46594	74.805	9.891	0.00000

A hypothesis test for normality of dataset we performed the Shapiro - Wilk test where the null hypothesis accepts the normality of the test for p-values < 0.05, and alternative hypothesis rejects the normality of the test. In this study all variables are significant. Seeing the Normal Probability Plot we was possible to verify graphically the validity of the model's normality assumptions that requires the analysis panel. (Figure 2)

Figure 2. Normal Probability Plot



To examine the main variables which affect the cost of debt, we estimate the pooled model, the fixed effects model, and the random effects model. The impact of CSR disclosure on a firm's cost of debt is examined testing the hypothesis through a linear regression model: We present in the tables 5, 6 and 7 the regression results. The significance of the model results medium with a R^2 of 0.2851, which means that the variables can sufficiently, explained together the dependent variable. Our initial hypothesis, H1, aimed at verifying if financial markets recognize an ethical financial premium to socially responsible firms, including the CSR performance into the cost of debt definition process.

Actually, the results are in contrast with our initial hypothesis. In fact, the dependent variable, cost of debt, appears to be positively and significantly correlated (t = 1.69) with the dummy ethic/no ethic. This sign of the relation means that the higher is the dummy ethic/no ethic score, the higher the cost applied by the banks to their borrowings, due to the fact that nowadays, banks still do not recognize an investment in CSR (dummy ethic/no ethic) as a profitable investment, but it is seen as a waste of money. Thus, the results of the regression seem to confirm that we can't expect a lower cost of debt if the companies are socially responsible.

Table 5. Regression Model

Source	SS	Df	MS
Model	8.02421134	7	1.14631591
Residual	86.2612754	178	0.484613907
Total	94.2854867	185	0.50965128

Table 6. Regression Model

N° of obs.	186
F(7,178)	2.37
Prob > F	0.0246
R-squared	0.2851
Adj R-squared	0.0491
Root MSE	0.69614

Table 7. Coefficients

logy	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
DUMMYEtiNoEtic	.0273539	.1112008	0.25	0.678	-.1920875 .2467954
Totasset	6.70e-07	2.33e-07	1.88	0.005	2.10e-07 1.13e-06
RoiEBITIC	-.0197987	.0137839	-1.44	0.153	-.0469996 .0074022
Betaunlevered	-.6193949	.2265787	-1.73	0.007	-1.066521 -.1722688
NetDebt/TotLiab	.010391	.0185224	0.56	0.056	-.0261609 .0469428
Leverage	.0009769	.0124074	0.08	0.037	-.0235077 .0254616
_cons	-.6017633	.1853921	-3.25	0.001	-.9676125 -.2359141

It should be emphasized that a panel data regression differs from a time series or cross-section regression in that it consider both the temporal and the companies' dimension.

On the analysis obtained from the regression model, we have cut the variables not significant and we analysed with a panel data for the presence of two indices: N x T where N describes the number of the companies and T the time. As Following, the general modeling framework for analyzing panel data:

$$y_{it} = \alpha_{it} + \beta_{it} x_{it} + \varepsilon_{it} \quad (1)$$

Where i = 1,...n is the individual (group, country, ...) index, t = 1,...T is the time index and ε_{it} a random disturbance term of mean 0. Moreover, α_{it} is the intercepts and β_{it} the slope vector.

The framework used in the present paper to estimates a panel data is described by the following cross-sectional model where more configurations are possible.

Broadly, they can be arranged as follows:

1. Pooled Regression where y_{it} contains only a constant term, then ordinary least squares provides consistent and efficient estimates of the common α and the slope vector β.
2. Panel homogeneous where Y_i contains α and β are identical for all companies.
3. Fixed Effects where y_{it} is unobserved, but correlated with x_{it}, then the least squares estimator of β is biased and inconsistent as a consequence of an omitted variable. This fixed effects approach takes α_i to be a group-specific constant term in the regression model.
4. Random Effects where the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated as such.

When using FE (table 8) we assume that something within the company may impact or bias the predictor or outcome variables and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. Fixed Effects remove the effect of those time-invariant characteristics so we can assess the net effect of the predictors on the outcome variable. Another important assumption of the Fixed Effects model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity's error term and the constant (which captures individual characteristics) should not be correlated with the others. If the error terms are correlated, then

FE is no suitable since inferences may not be correct and we need to model that relationship (probably using random-effects), this is the main rationale for the Hausman test (presented later on in this document). The Prob >F is < 0.05,so we failed to reject the null that the coefficients for all years are jointly equal to zero, therefore time fixed- effects are needed in this case.

The rationale behind random effects model (tab. 9) is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model: *"...The crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not" [Green, 2008, p.183]*

If you have reason to believe that differences across entities have some influence on your dependent variable then you should use random effects. An advantage of random effects is that you can include time invariant variables (i.e. gender). In the fixed effects model these variables are absorbed by the intercept.

Figure 3. The general procedure of homogeneity test presented by Hsiao (1986)

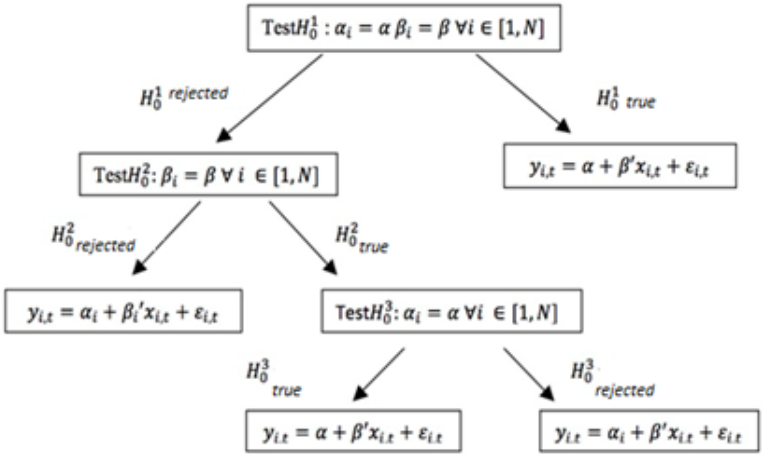


Table 8. Fixed effects

Fixed-effects (within) regression — Number of obs = 186
Group variable: **Company** — Number of groups = 31

R-sq: within = **0.0335** — Obs per group: min = 6
between = **0.0229** — avg = 6.0
overall = **0.0275** — max = 6

F(5,150) = 1.04
corr(u_i, Xb) = **-0.0647** — Prob > F = 0.3972

logy	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
DUMMYEticheNonEtiche	.1150159	.1817412	0.63	0.528	-.2440876	.4741194
Totasset	5.12e-07	9.20e-07	0.56	0.578	-1.31e-06	2.33e-06
RoiEBITIC	-.0216933	.0151644	-1.43	0.155	-.0516567	.0082701
NetDebtTotLiab	.0266976	.0174332	1.53	0.128	-.0077487	.061144
Leverage	-.0116881	.0124332	-0.94	0.349	-.036255	.0128788
_cons	-1.053123	.135334	-7.78	0.000	-1.32053	-.7857157
sigma_u	.47311808					
sigma_e	.58634954					
rho	.39433119	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 150) = 3.71 — Prob > F = 0.0000

Table 9. Random Effects

```
Random-effects GLS regression                   Number of obs      =       186
Group variable: Company                         Number of groups   =        31

R-sq:  within  = 0.0311                         Obs per group: min =         6
       between = 0.0543                                        avg =       6.0
       overall = 0.0409                                        max =         6

                                                Wald chi2(5)       =      6.42
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.2675
```

logy	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DUMMYEticheNonEtiche	.0419711	.1367217	0.31	0.759	-.2259985	.3099408
Totasset	6.21e-07	3.50e-07	1.78	0.076	-6.45e-08	1.31e-06
RoiEBITIC	-.0214758	.0139055	-1.54	0.122	-.04873	.0057785
NetDebtTotLiab	.0240852	.0167219	1.44	0.150	-.0086891	.0568595
Leverage	-.0059551	.0115944	-0.51	0.608	-.0286798	.0167695
_cons	-1.047387	.1171248	-8.94	0.000	-1.276948	-.8178267
sigma_u	.43052861					
sigma_e	.58634954					
rho	.35028092	(fraction of variance due to u_i)				

All the coefficients are jointly significant as showed the F-stat (Prob > F = 0.0000) and the signs are in the expected direction so that the specification of the model is consistent with the demand model.

To select the baseline model, three steps have been carried out (table 7 and 8). First the F test following the fixed effect estimation has been considered to verify if pooled or fixed panel estimation is more appropriate. The F test (F test that all u_i=0: F(30, 150) =3.71 Prob > F = 0.0000) indicates that there are significant individual (regional) effects, implying that ignoring unobserved heterogeneity can induce omitted variable bias (Hsiao, 2003; Skrondal and Rabe-Hesketh, 2004). Therefore, the pooled OLS estimates are biased and inconsistent, and we accept the presence of the regional effects.

Then the selection between fixed and random has been performed. The identification of the choice of treating the individual effects between fixed and random is delicate. The choice has been attributed to a series of factors:

1. Number of individuals, when N individuals are randomly drawn from a large population, a random effect model is more appropriate. Conversely, when the attention is on specific N individuals.

2. Determinants of the individual effects: if they were motivated by a high number of random circumstances and not observable, a random effect model would be more specific.

3. Nature of the sample, when the sample is closed and exhaustive, the fixed effects are the natural candidates. When the sample is open (N individuals are extracted from a population), the random effects is more interesting.

4. Type of inference: it is up to researchers to choose if we want to make inferences about the characteristics of the population (because even interested in the behaviour of individuals excluded from the sample) by inference not conditional, or we want to focus on the effects in the sample for inference conditional respondents in sample.

To follow, the modified Wald test for group wise heteroskedasticity (Ho: homoscedasticity) does not reject the null and concludes for homoscedasticity.

The Breusch and Pagan Lagrange multiplier (LM) test (tab.10) helps to decide between the random effects regression and the pooled OLS regression.

The null hypothesis in the LM test is that variances across entities are zero. That is, there is no significant difference across units (i.e. no panel effect). We reject the null and conclude that the random effect is appropriate, while the pooled OLS not.

According to Baltagi, cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years). This is not much of a problem in micro panels (few years and large number of cases).

The null hypothesis in the B-P/LM test of independence is that residuals across entities are not correlated. In this paper, the *Breusch and Pagan LM test* (Ho: no cross-sectional dependence) reveals that there is independence, thus residuals are not contemporaneously correlated.

Here we could to accept the null and conclude that a random effect is appropriate.

To decide between fixed or random effects you can run a Hausman test (tab.11) where the null hypothesis is that the preferred model is random effects vs. the alternative the fixed effects (see Green, 2008, chapter 9). It basically tests whether the unique errors (u_i) are correlated with the regressors; the null hypothesis is they are not.

Table 10. Breusch and Pagan Lagrange multiplier (LM) test

Breusch and Pagan Lagrangian multiplier test for random effects

FinancialexpensesFinancialliab[Company,t] = Xb + u[Company] + e[Company,t]

Estimated results:

	Var	sd = sqrt(Var)
Financi~b	.3716754	.6096519
e	.234655	.484412
u	.1282575	.3581305

Test: Var(u) = 0

chibar2(01) = 45.37

Prob > chibar2 = 0.0000

If there is no correlation between the independent variables and the unit effects, then estimates of α_i in the fixed effect model should be similar to estimates of α_i in the random effect model. Put differently, the null hypothesis is that the two estimation methods fixed and random should yield coefficients that are "similar". The alternative hypothesis is that the fixed effects estimation is preferable to the random effects estimation. Given that the Hausman test returned a p-value of 0.7758 it can be inferred that the differences among estimators aren't systematic at the 5% significance level. If the Hausman test does not indicate a significant difference ($p > 0.05$), however, it does not necessarily follow that the random effects estimator is "safely" free from bias, and therefore to be preferred over the fixed effects estimator (Clark and Linzer, 2012). In most applications, the true correlation between the covariates and unit effects is not exactly zero. A major objection to use the RE model relates to its restrictive assumption that the independent variables are uncorrelated with the random effects term (or unit effect). Since a variable varies both within and between clusters, many argue that this an unrealistic assumption to satisfy, since unobserved heterogeneity will almost always be correlated with the independent variables. This controversial assumption often makes the FE model, which does not incorporate this assumption, a superior choice over the RE model (Beck, 2001; Kristensen and Wawro, 2003; Wilson and Butler, 2007).

Table 11. Hausman test

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
DUMMYEtich~e	.1150159	.0419711	.0730447	.1197374
Totasset	5.12e-07	6.21e-07	-1.09e-07	8.51e-07
RoiEBITIC	-.0216933	-.0214758	-.0002175	.0060495
NetDebtTot~b	.0266976	.0240852	.0026124	.0049291
Leverage	-.0116881	-.0059551	-.005733	.0044893

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 1.78
Prob>chi2 = 0.7758

4. Results

The results of the regression with panel data analysis for fixed effects seem to confirm that we cannot expect a lower cost of debt if the companies are socially responsible. The largest part of the control variables included in the model appears significantly correlated with the cost of debt and in line with the expectations and the previous researches. Aligned with the literature, our results show an inverse relation between the cost of debt and the operating profitability of the company, expressed by the control variable ROI (t = -1.44), which means that to a high ROI corresponds a lower cost of debt.

The results show also a significant and positive effect (*t = 1.73*) of the risk of the company, expressed by the Beta Unlevered (BETA), on the cost of debt, which indicates that if the risk of the company increases, the cost of debt arises. Similarly, a positive and significant relation (t = 1.88) is found between the dependent variable and the size of the company, expressed by the Total Assets (TA) of the firm, which indicates that banks apply higher interest rate to larger firms because they are perceived as more risky than smaller ones.

Concerning the impact of debt on total liabilities (NetDebt/TotLiab), expressed by the ratio between the Debt and the Total Liabilities, the results show a positive and significant relation (*t = 0.56*) with the dependent variable, highlighting how a high level of debt make the cost of debt rising. Finally, variable Leverage that indicates the financial leverage (Debt/Equity), shows a positive association with the dependent variable (*t = 0.08*). Consistent with the previous result, this one indicates that using high levels of financial leverage, the cost of debt proportionally increases.

5. Conclusions

This paper focuses on the issues relating to the reduction of firms' cost of debt connecting to the ethic rating score as a topic of crucial relevance especially in terms of creditworthiness. We have developed a panel data analysis to test our research hypothesis.

We have chosen the main variables, which affect the cost of debt, with particular regard to the CSR rating of the firm, using a sample of 31 companies of Italy over the period 2008-2013.

In order to correctly test the relation expressed in the hypothesis and verify the existence of an effect of the CSR performance on the cost of debt, we considered some control variables that previous literature considered the most relevant in affecting the cost of debt. The major part of the control variables included in the model mainly impact, directly or indirectly, on the risk profile of the company, acting in this way on the cost of debt applied by the banks to the firms. In particular, the risk depends on the financial

structure of the company, its operating profitability, the specific risk level of each firm and the value attributed by the market.

The independent variables show the same trends consistent with the main literature of management, finance and accounting. In fact, the operating profitability of the company (ROI) expresses an indirect relation with the cost of debt.

The cost of debt is directly related to the leverage, in fact seeing the last variable in table 7 (Leverage) is highlighted a positive association with the dependent variable. This is consistent with the relation between ROI and leverage.

It can possible see the same with respect the ratio between the Debt and the Total Liabilities, in fact the results show a positive and significant relation with the dependent variable.

The risk of the company expressed by Beta Unlevered indicates that a risky firm is subjected to a high level of cost of debt.

Similarly, a positive and significant relation is found between the dependent variable and the size of the company, expressed by the Total Assets (TA) of the firm, which indicates that banks apply higher interest rate to larger firms because they are perceived as more risky than smaller ones.

Overall, the results are statistically significant, but the financial market does not recognize an ethical premium to socially responsible firms. It means that variables chosen can explain the whole model, but specifically there is not a positive association between cost of debt and ethic rating.

In other words, it can possible to distinguish between “hateful debt” and “healthy debt” as cited by Robert Shiller in one of his most famous book “Finance and good society” (2012).

An example of “hateful debt” is the American subprime mortgages because they have been granted so unscrupulous too many loans to families with low incomes and badly informed who were not explaining the implications of the debt. Conversely, a “healthy debt” is the debt that gives benefits to the community.

Dunfee (2003) argues that social investing consists in “investment strategies based on non-financial criteria that include a religious or social field”, but it is necessary to extend this definition introducing, for example, the criteria to choose a good borrower. The reason could lies in the fact that banks do not achieve relevance to corporate social responsibility definition.

Overall, this study is focused on Italian listed firms considered by Standard Ethics, so could be interesting in the future to extend this research to other countries with the aim to highlight similarities and differences about CSR topic.

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