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Linkage between company scores and stock returns

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Abstract. Previous studies on company scores conducted at firm-level, generally concluded that there exists a positive relation between company scores and stock returns. Motivated by these studies, this study examines the relationship between company scores (Corporate Governance Score, Economic Score, Environmental Score, and Social Score) and stock returns, both at portfolio-level analysis and firm-level cross-sectional regressions. In portfolio-level analysis, stocks are sorted based on each company scores and quintile portfolio are formed with different levels of company scores. Then, existence and significance of raw returns and risk-adjusted returns difference between portfolios with the extreme company scores (portfolio 10 and portfolio 1) is tested. In addition, firm-level cross-sectional regression is performed to examine the significance of company scores effects with control variables. While portfolio-level analysis results indicate that there is no significant relation between company scores and stock returns; firm-level analysis indicates that economic, environmental, and social scores have effect on stock returns,

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however, significance and direction of these effects change, depending on the included control variables in the cross-sectional regression.

Keywords: company scores, corporate governance, economic, environmental, social, stock return.

JEL Classification: G11, G17, G30

1. INTRODUCTION

In recent years, businesses have becoming more focused on corporate social responsibility. Companies have been integrating environmental, social, economic, governance purposes into their business mechanism by making changes in various lines of business, such as research and development, production plans, and accounting practices (Callan & Thomas, 2009, Ignatavičius et al., 2015; Tvaronavičienė & Černevičiūtė, 2015; Dobrovolskienė et al., 2017; Mingaleva, et al. 2017, Melas et al., 2017). Moreover, the recent biggest accounting and unethical corporate scandals, including those of Enron, WorldCom, Arthur Anderson, Enron, Merck, etc., have raised the attention to the ethical issues and company score practices considerably (Jo & Kim, 2008, Michailova et al., 2017).

As the interest to company scores increases, motivations behind them and their contribution to companies' performance and profitability form one of the most striking issue in the finance literature. Motivated by the previous literature, this study is focused on company scores effects upon company performance. This study extends the literature scope on the subject by examining company scores effect on stock returns at both portfolio-level analysis and firm-level cross-sectional regression. We use Corporate Governance Score, Economic Score, Environmental Score, and Social Score as companies' scores and examine their relationship with stock returns. We firstly conducted portfolio-level analysis based on the studies of (Bali, Cakici and Tang,2009) and (Umutlu,2015). According to this analysis, decile portfolios for each year are formed by sorting stocks based on each company scores. Therefore, portfolios with different levels of company scores values are obtained. If company scores have effects on stock returns, then portfolios with different levels of company scores values should generate statistically significantly different returns. This assumption is tested by implementing an independent mean difference t-test and examining Jensen alpha from Fama and French 3-Factor model between end portfolios, that is, portfolio 10 and portfolio 1.

In addition to the portfolio-level analysis, existence and significance of effects from company scores on stock returns is also tested by performing firm-level cross-sectional regression analysis. This type of analysis allows controlling for other stock related variables, which are market value (MV), price-earnings ratio (PE), price-to-book ratio (PE), and conditional beta (BETA), simultaneously. The nested version of the firm-level cross-sectional regression is run for each year. The portfolio-level analysis results indicate that for four company scores, the portfolios with different level of company score earn statistically different raw returns and in some cases different risk adjusted returns. Moreover, firm-level cross-sectional regression results showed that economic, environmental and social scores have significant effect on expected stock returns, but direction and significance of the effects change depending on the inclusion of control variables in the cross-sectional regression.

The paper contributes to the current literature in several ways. Firstly, many of the previous studies focusing on company scores conducted firm-level analyses and some of them did the statistical tests. This study combines the subject of the studies focused on company score and the methodology of those

studies that performed portfolio-level analysis. In other words, both portfolio-level analysis and firm-level cross-sectional regression are performed to test the effect of company scores on stock returns.

The rest of the paper is organized as follows. Section 2 summarizes studies focusing on company score and portfolio-level analysis. Section 3 describes the data and the variables. Section 4 describes the methodology for portfolio-level analysis and firm-level cross-sectional regression analysis. Section 5 presents the results. The final section concludes the paper.

2. LITERATURE REVIEW

The most striking issue in the finance literature is to determine the variables that explain the changes in the stock returns. The literature about determining changes in stock returns generally started with the Capital Asset Pricing Model, which is the fundamental model in the asset pricing literature. However, the studies that rejected the validity of the CAPM has paved the way for searching different stock related variables that explains best the changes in the stock returns. In addition, the biggest accounting and corporate governance scandals has paved the way for examining the effect of company scores.

The literature review part of the paper firstly focuses on some studies about company scores and secondly some studies performed portfolio-level analysis with stocks. In the company score literature part, the studies, which are investigated the relation between company performances and corporate social responsibility, corporate governance, distinguish themselves from other studies according to their data used, method implemented. As a company performance measure, some studies used only accounting-based measures (Ammann, Oesch, & Schmid, 2011; Bhagat & Bolton, 2008; Brown & Caylor, 2009; Renders, Gaeremynck, & Sercu, 2010; Core, Guay, Tjomme, & Rusticus, 2006; Aras, 2015; Ruf, Muralidhar, Brown, Janney, & Paul, 2001; & Callan & Thomas, 2009) & some of them used both accounting- & stock-market-based measures (McGuire, Sundgren, & Schneeweis, 1988; Nollet, Filis, & Mitrokostas, 2016; & Pava & Krausz, 1996). The Table 1, which is showed in Appendix 1, gives summary of some articles, which focused on company scores.

Ammann, Oesch, and Schmid (2011) examined the relationship between corporate governance and firm value based on firm-level analysis in the yearly dataset from Governance Metrics International (GMI), which involves 22 developed countries, for the time interval 2003-2007 (it makes 6663 firm-year observations). Their governance data includes 64 different governance characteristics classified by GMI in 6 groups. These groups are accountability, financial disclosure and internal control, shareholder rights, remuneration, market for control, and corporate behavior. Moreover, financial data is represented by Tobin's Q as a performance measure. Firm-level panel analysis shows that the relation between corporate governance and firm value is strong and positive. Author also conducted robustness check and concluded their their results are robust to alternative calculation techniques. Moreover, it is pointed out that better corporate governance affairs cause economically and statistically significant higher firm values. Furthermore, it is stated that cost of corporate governance implementation is lower than its benefits to the firm capital in short- and long-term.

Bhagat and Bolton (2008) focused on measuring corporate governance and its relation with firm performance. As a firm performance indicator, they used accounting-based variables Return on Asset (ROA) and Tobin's Q. Authors stated that the reason being not using stock-based performance measures is they are vulnerable to investor expectancy. Moreover, as corporate governance measures, they used the Gompers, Ishii, and Metrick (GIM G-Index) and Bebchuck, Cohen, and Ferrel (BCH E-Index) indices, TLC Benchmark Score, Brown and Caylor GovScore, stock ownership of board members, CEO-chair duality, and directors' independency. The relation between corporate governance and firm performance is examined regard to the inter-relations among corporate ownership structure, corporate governance,

corporate capital structure, and corporate governance by implementing Ordinary Least Square (OLS), two-stage least squares (2SLS), and three-stage least squares (3SLS). It is concluded that there exists significantly positive relation between current and future operating performances and some corporate governance measures, which are GIM G-Index, BCF E-Index, stock ownership of board members, and CEO-chair separation. On the other hand, it is stated that board independency has a negative effect on current and future operating performance.

Brown and Caylor (2009) examines the effects of 51 corporate governance provisions on firm operating performance. The dataset used is Institutional Shareholder Services (ISS) and corporate governance data is conducted using in February 1, 2003. Moreover, as a firm performance measures, return on asset and return on equity are used and these variables are conducted for the 2002 fiscal year end. The OLS regression results indicates that six corporate governance provisions have significant and positive effects on return on asset and return equity. Furthermore, nine governance provisions, which are mandated by the US stock exchanges, do not have a significant effect on firm operating performance. In other words, the governance provisions related with exchanges are less associated with firm operating performance than those not related with exchanges.

Renders, Gaeremynck, and Sercu (2010) seek an answer whether corporate governance rating have an effect on company performance or not. Their sample data involves 5 years (1999-2003). Corporate governance ratings are gathered from Deminor Rating, which includes largest 300 European Union companies. Moreover, Tobin's Q, market-to-sales ratio, market-to-book value, return on asset, return on equity are used as performance indicators. The 2SLS results show that the higher the corporate governance ratings the higher firm performance. However, this relation is obscured by econometric problems.

Core, Guay, and Rusticus (2006) focused on findings of Gomper, Ishii, and Metrick (GIM) (2003), which states that having weak shareholder rights cause significant poor stock return performance. They follow the steps of GIM and as a corporate governance measure, G-Index; index of shareholders rights is used. Return on Asset is used as an indicator of operating performance. The sample period is the same with GIM' study (1990-1999) and the method used is OLS. The analysis results show that the firms that have weak corporate governance mechanism have lower operating performance. Authors state that the companies with weak shareholder rights have greater abnormal stock returns than those with strong shareholder rights. Moreover, they rejected the hypothesis that weak governance firm have poor stock returns based on shareholders' rights.

Aras (2015) examines corporate governance practices effects on financial structures in major emerging markets BRICK (Brazil, Russia, India China, South Korea and Turkey). The governance practices are board structures, board procedures, disclosures, audit committee meeting frequency, ownership structures, and minority shareholder rights. In addition, financial structures are profitability and leverage and the indicator are return on asset. The firm-level yearly data includes nonfinancial firms and data period is 2005-2013. Panel data analysis results show that companies' financial structure is strongly affected by corporate governance factors, which are board independency, women on board, and the number of board meetings.

McGuire, Sundgren, and Schneeweis (1988) analyzed the relation between companies' corporate social responsibility and their financial performances. As a corporate social responsibility data, they used corporate reputations' rating gathered from Fortune surveys. As a financial performance data, both accounting-based and stock-market-based measures and risk measures are used. Accounting-based measures are return on asset, sales growth, operating income growth, total assets, and asset growth. Stock-market-based measures are total return, risk-adjusted return, and alpha. Market risk measures are beta, and standard deviation of total return. Moreover, OLS analysis is implemented for the year of 1983 with the

firms that survey involves. It is concluded that firms' prior performances are more related with corporate social responsibility then their subsequent performance for both accounting- and stock-market-based measures. In addition, it is pointed out that risk measures have a strong effect on social responsibility ratings.

Ruf, Muralidhar, Brown, Janney, and Paul (2001) investigated the effects of changes in Corporate Social Performance (CSP) on changes in financial accounting measures. CSP measurement is conducted based on the study of Ruf et al. (1998). The financial measures used are changes in return on equity, changes in return on sales, and growth in sales. Moreover, the analyses are held in the periods of 1991-1992, 1992-1993, 1993-1994, and 1994-1995. The data set contains 496 companies, which are in Kinder, Lydenber, and Domini Inc. (KLD). The relation is examined by implementing separate OLS regressions for all periods and financial measurements. Authors concluded that for the current and subsequent year's growth in sales are positively related with changes in CSP. Moreover, for the third financial period there is a positive and significant relation between changes in return on asset and CSP.

Callan and Thomas (2009) analyzed the relation between Corporate Financial Performance (CFP) and CSP by implementing detailed benchmark, using current financial data and list of control variables for social performance indicators. The study includes firm-level data of 650 firms in KLD's database from 2003 to 2006. Authors used four measures of CFP, which are return on asset, return on sales, return on equity, Tobin's Q. The regression analyses results show that there is a positive relation between CSP and CFP and these findings supports the stake holder theory.

Nollet, Filis, and Mitrokostas (2016) investigated both linear and non-linear relation between CSP and CFP for the S&P 500 companies in the period from 2007 to 2011. Authors used both accounting-based financial performance indicators, which are return on asset and return on capital; and market-based financial performance indicators, which are excess stock returns. In addition, for CSP measures, Bloomberg's Environmental Social Governance (ESG) Disclosure score is used. The linear panel regression results indicate that CSP has a significant negative effect on return on capital. On the other hand, non-linear model points out that there is a U-shaped relation between CSP and accounting-based measures, but in longer run, this relation is positive.

Pava and Krausz (1996) focused on 53 firms, which were referred as being socially-responsible by Council on Economic Priorities (CEP) for time interval 1985-1987 and 1989-1991. The long-term relation between financial performance and corporate social responsibility is examined by implementing trend analyses. Authors separated financial variables in four groups: market-based measures (market return, price to earnings ratio, market value to book value), accounting-based measures (return on assets, return on equity, earnings per share), risk measures (current ratio, quick ratio, debt to equity ratio, interest coverage, Altman's Z-score, market beta), and firm-specific characteristics (capital investment intensity, size, number of lines of business, dividend-payout ratio). Authors concluded that the companies, which are referred as socially responsible, do not have significant better performance than other companies. In addition, there is a significant positive relation between corporate social responsibility and traditional financial performance.

In related literature of the portfolio-level analysis, the studies distinguish themselves by investigating changes in the stock return at portfolio-level analysis. The Table 2, which is showed in Appendix 2, gives summary of some articles, which are performed portfolio-level analysis.

Bali, Cakici, and Tang (2009) used daily returns from July 1963 to December 2004 in NYSE, AMEX, NASDAQ and calculated monthly conditional betas. The monthly conditional beta values, which changes over time, are estimated by implementing Fama-MacBeth (1973) regression analysis, AR (1), MA (1), and GARCH (1,1). Moreover, authors formed 10 portfolios by ascending order beta values of stocks. Portfolio level analysis showed that the difference between end portfolio returns are statistically

significant, but there exists reverse relation. Furthermore, they implemented 3-factor Fama-French model and they concluded that conditional beta has a negative effect on adjusted stock returns.

Bali, Cakici, and Whitelaw (2011) examined the relation between maximum daily return within a month and stock returns for nonfinancial firms traded in NYSE, AMEX, and NASDAQ from July 1962 to December 2005. They firstly determine the maximum daily returns within a month and formed decile portfolios for each month by sorting stocks based on their maximum return within a month. Equal- and value-weighted portfolio return results showed that there is statistically significant and negative difference between portfolio 10 (stocks with the highest MAX) and portfolio 1 (stocks with the lowest MAX).

Bali, Brown, and Caglayan (2014) examined the relation between risk and hedge fund returns for 10.305 hedge funds that are gathered from Lipper TASS dataset from July 1994 to March 2012. The monthly beta values for each stock is estimated by using previous 36 months' monthly values with the rolling window approach. Furthermore, quintile portfolios are formed for each month by sorting stocks based on beta values. The portfolio-level analysis results indicated that the return on portfolio 5 that includes hedge funds with the highest beta values is higher than the return on portfolio 1 that includes hedge funds with the lowest beta values. However, it is pointed out that the relationship between beta and hedge funds returns is not statistically significant.

Umutlu (2015) investigated the cross-sectional relations between idiosyncratic volatility and expected stock returns by using daily and monthly data of three test assets; Global Industry Index, Local Industry Index, Local Stock Market Index from January 1973 to May 2011. Firstly, monthly global idiosyncratic volatility (GIVOL) values are estimated by performing International Capital Asset Pricing Model (ICAPM) and Global Fama-French 3-Factor Model for three test groups. Then, for each month 3 portfolios are formed based on GIVOL values for each test groups. It is concluded that portfolios with different levels of GIVOL values do not statistically generate different portfolio returns.

The literature showed that there is no consensus about effects of company score on company performance. Some studies indicate that corporate governance and corporate social responsibility affects positively company returns (Core et. al, 2006; Bhagat and Bolton, 2008; Ammann et. al, 2011; Renders et. al, 2010; Aras, 2015; McGuire et. al, 1988; Pava and Krausz, 1996; Ruf et al, 2001; and Callan and Thomas, 2009) and some of them stated that these relations are negative (Bhagat and Bolton, 2008; Aras, 2015; and Nollet et. al, 2016). On the other hand, Brown and Caylor (2009) pointed out that there is no significant relation between corporate governance and company performance based on performance measures of return on asset and return on equity. Therefore, effects of company scores on stock returns is still needed to be clarified with supported studies to conclude a consensus. Starting from this point of view, the relationship between company scores and stock returns are investigated both at portfolio-level and firm-level analysis.

3. METHODOLOGY

3.1. Data

The data set is obtained from Datastream and it includes data of all companies in S&P 500 Index form January 2002 to December 2016. The data set includes yearly and daily returns, yearly market value (MV), price-earnings ratio (PE), and price-to-book ratio (PB) for all companies. Yearly data are used in analyses stage; however, daily data is used to estimate yearly beta values for each stock. Moreover, the study uses yearly data of Corporate Governance Score, Economic Score, Environmental Score, and Social Score as company scores.

The S&P 500 Index is used to proxy the market portfolio, yearly and daily returns data of the index is used in the analysis. Moreover, yearly and daily 1-month Eurodollar deposit rate is obtained from Datastream to calculate the daily and monthly risk-free rate.

As mentioned above the study focuses on four different types of company scores, which are also obtained from the same database. In Datastream, the corporate governance score measures a company's systems and processes and it ensures that the company's board members and executives act on behalf of best interests of its long-term shareholders. The economic score measures a company's ability to generate sustainable growth and to provide high return on investment by using all its resources efficiently. The environmental score measure effects of a company's activities on living and non-living systems, which are air, land, and water, as well as complete ecosystems. In other words, environmental score shows how a company does well when using its resources and management practices to avoid environmental risks. The social score measures a company's ability to create trust and loyalty based on its workforce, customers, and society when the company uses its best management practices. Moreover, the social score also reflects the company's reputation.

In this study, MV and PB are also used to calculate SMB (Small-Minus-Big) and HML (High-Minus-Low), respectively, which are the components of Fama and French 3-Factor Model. SMB and HML are calculated as follows. Firstly, stocks are sorted based on MV and PB values for each year and decile portfolios are formed. Furthermore, portfolio returns are calculated as equal- and value-weighted over the years. Therefore, the return difference between end portfolios are used to represent SMB and HML values. SMB is included in the model to examine whether or not the stocks that have higher market values generate higher returns. On the other hand, HML is included in the model to examine whether or not the stock that have higher price-to-book value generate higher returns.

BETA represents the conditional beta, which is calculated by performing the regression equation (1) based on the traditional approach of Fama and MacBeth (1973). BETA is estimated for each stock and for each year by using daily data within a year.

$$R_{i,d} - r_{f,d} = \alpha_i + \beta_{1i}\left(R_{m,d-1} - r_{f,d,t-1}\right) + \varepsilon_{id} \quad (1)$$

where $R_{i,d}$ is the return on stock *i* on day *d*, $R_{m,d}$ is the market return on day *d-1*, and $r_{f,d}$ is the risk-free rate on day *d*. The regression coefficient β_i shows the beta of stock *i*.

3.2. Portfolio – level Analysis

The effect of company scores is examined by performing portfolio-level analysis. These portfolios are formed based on four different types of company scores. In addition, portfolios are formed for each year. Firstly, stocks are formed based on a company score for each year and decile portfolios are generated. Therefore, while portfolio (1) includes the stocks that have the lowest company scores, the portfolio (5) includes the stocks that have the highest company scores. Moreover, the portfolio returns are calculated as equal- and value-weighted based on the market values. This portfolio formation process is repeated for all company scores.

Firstly, independent mean difference t-test is conducted to examine the effects of company scores. This test examines the existence and significance of return difference between portfolio 10 and portfolio 1. It is expected to conclude that the return on portfolio (10), which includes stocks with the highest company scores, is higher than the return on portfolio (1), which includes stock with the lowest company scores. The independent mean difference t-test is performed between the yearly average returns of

portfolio 10 and 1 for the wholes sample period, which consists of 14 years. The equations below show the relevant hypothesis for the test:

$$H_0 : \mu_{low,score} = \mu_{high,score}$$

$$H_1 : \mu_{low,score} \neq \mu_{high,score}$$

According to independent mean difference t-test, if the portfolio 10 (highest company score) provides higher returns and portfolio 1 (lowest company scores) provides lower returns, it is expected to reject the null hypothesis. Therefore, it can be concluded that there is a statistically significant difference between the average returns of portfolio 10 and portfolio 1. In other words, it can be stated that portfolios with different level of company score values generate statistically different portfolio returns.

In addition to raw return mean difference test, the second test, which examines the existence of differences between risk adjusted portfolio returns, is implementing Fama and French (1993, 1995, 1996) 3-Factor model and ICAPM. The difference between risk-adjusted returns are examined by testing whether the Jensen alpha values from models are different from zero. In FF 3-Factor model, the return difference between portfolios 10 and 1 is regressed on the excess return of the market portfolio, SMB, and HML as specified in Equation (2). On the other hand, in ICAPM the returns difference between portfolio 10 and 1 is regressed on only the excess return of the market portfolio as specified in Equation (3) (Umutlu, 2015).

$$R_{10-1,t} = \alpha_0 + \beta_1 R_{m,t} + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t \quad (2)$$

$$R_{10-1,t} = \alpha_0 + \beta_1 R_{m,t} + \varepsilon_t \quad (3)$$

where $R_{10-1,t}$ shows the return differences between portfolio 10 and 1 in year *t*; $R_{m,t}$ shows the excess return for the global market portfolio in year *t*; α_0 shows the regression intercept; and ε shows the error term. Moreover, SMB_t and HML_t show the yearly averaged portfolio return differences between end portfolios for year *t*, which are formed based on market value and price-to-book value, respectively.

The regression analyses are performed by using time series observation for the whole sample, which includes 14 years. Then, the t-statistics obtained from the regression analysis for the Jensen are used the test the following hypothesis.

$$H_0 : \alpha_0 = 0$$

$$H_1 : \alpha_0 \neq 0$$

According to this hypothesis, rejecting the null hypothesis means that there is statistically significant difference between adjusted risk returns of end portfolios. In other words, it can be concluded that company scores have an explanatory effect on stock returns that are purified form the systematic effects of risk factors.

3.3. Firm-level Cross-Sectional Regressions

The effect of company score is also tested by conducting firm-level cross-sectional regression. This type of regression analysis allows us to examine the effects of other control variables simultaneously. The

nested version of the following firm-level cross-sectional regression is run for each year in the sample period to examine the explanatory effects of company scores and control variables on future stock returns

$$R_{i,t+1} = \lambda_{0,t} + \lambda_{1,t}CGS_{i,t} + \lambda_{2,t}ECOS_{i,t} + \lambda_{3,t}ENVS_{i,t} + \lambda_{4,t}SOS_{i,t} + \lambda_{5,t}MV_{i,t} + \lambda_{6,t}PE_{i,t} + \lambda_{7,t}PB_{i,t} + \lambda_{8,t}BETA_{i,t} + \varepsilon_{i,t+1} \quad (4)$$

where $R_{i,t+1}$ shows the realized stock return on stock *i* in year *t+1*, $CGS_{i,t}$ is the corporate governance score on stock *i* in year *t*, $ECOS_{i,t}$ is the economic score on stock *i* in year *t*, $ENVS_{i,t}$ is the environmental score on stock *i* in year *t*, $SOS_{i,t}$ is the social score on stock *i* in year *t*, $MV_{i,t}$ is the market capitalizations of stock *i* in year *t*, $PE_{i,t}$ is the price-earnings ratio for stock *i* in year *t*, $PB_{i,t}$ is the price-to-book ratio for stock *i* in year *t*, $BETA_{i,t}$ is the conditional beta on stock *i* in year *t*.

Firm-level cross-sectional regression is performed by using values of all companies in S&P 500 Index within a year. Then, the time series averages of regression coefficients are calculated over the 14 years based on Fama and MacBeth (1973) approach to test their effects on stock returns.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Portfolio – level Analysis

The relationship between company scores and stock returns is firstly examined by implementing portfolio-level analysis for four different types of company scores from January 2002 to December 2015. Decile portfolios are formed based on each company score and the existence and significance of raw and risk adjusted return differences between end portfolios is teste by conducting independent mean difference t-tested, FF 3-Factor model, and ICAPM.

Table 3 shows the value-weighted and equal-weighted average yearly returns of decile portfolios, which are formed by sorting stocks on each company score. In addition to the average raw returns of decile portfolios, the table also reports the average raw return differences with the corresponding t-statistics, the regression intercepts for FF 3-Factor model and ICAPM with the relevant t-statistics. The results show that for all company scores the value- and equal-weighted portfolio returns do not have neither increasing nor decreasing pattern portfolio 1, which includes stocks with the lowest company scores to portfolio 10, which includes stock the highest company scores. Moreover, the null hypothesis, which states that the yearly average returns on the end portfolio are the same, cannot be rejected according to t-statistics of the raw return mean difference test for all company scores. It means that the portfolios with the different level of company scores do not statistically produce different returns. In addition, the t-statistics for Jensen alpha indicate that the null hypothesis, which states that the regression intercept for FF 3-Factor model and ICAPM is equal to zero, are rejected for some company scores. In other words, Jensen alpha from FF 3-factor model points out that environment governance score and social score have effects on risk adjusted stock returns according to both equal- and value-weighted analysis. On the other hand, Jensen alpha from ICAPM indicate that corporate governance score (equal-weighted base) and environment and social score (both equal- and value-weighted base) have effects on risk adjusted stock returns. However, the results for Jensen alpha may not be valid because of running FF 3-Factor model and ICAPM with 15 years' observations.

Table 3

Returns of Portfolios Sorted by Four Different Types of Company Scores

Decile portfolios are formed for every year from 2002 to 2016 by sorting stocks based on each company scores; Corporate Governance Score, Economic Score, Environmental Score, and Social Score. Portfolio 1 (10) includes the stocks with the lowest (highest) company score values. The table presents the value-weighted (VW) and equal-weighted (EW) average monthly returns for each company score portfolio. Moreover, average raw returns, Jensen alpha from Fama-French 3-Factor Model and ICAPM for 10-1 portfolio are presented with the relevant t-statistics (in the parentheses).

Deciles	Corporate Governance Score		Economic Score		Environment Score		Social Score	
	VW Average Return	EW Average Return	VW Average Return	EW Average Return	VW Average Return	EW Average Return	VW Average Return	EW Average Return
1 Low	0,1735	0,1818	0,1431	0,1451	0,1757	0,1812	0,2056	0,2076
2	0,1237	0,1497	0,1467	0,1239	0,1738	0,1848	0,2086	0,1823
3	0,1637	0,1506	0,2013	0,1927	0,1366	0,1331	0,1740	0,1479
4	0,1291	0,1370	0,0658	0,1103	0,1980	0,1655	0,1505	0,1418
5	0,1240	0,1475	0,1040	0,1178	0,1848	0,1598	0,1368	0,1351
6	0,0809	0,1263	0,1361	0,1550	0,1109	0,1315	0,1333	0,1451
7	0,1156	0,1456	0,0938	0,1369	0,1220	0,1338	0,1199	0,1029
8	0,1280	0,1314	0,1166	0,1287	0,0828	0,0961	0,1031	0,1122
9	0,0977	0,1179	0,0983	0,1343	0,1384	0,1001	0,0992	0,1281
10 High	0,1106	0,1012	0,1296	0,1382	0,0758	0,1067	0,0790	0,0819
10-1	-0,0629 (-0,82)	-0,0806 (-0,93)	-0,0135 (-0,17)	-0,0068 (-0,07)	-0,0999 (-0,82)	-0,0743 (-0,98)	-0,1266 (-1,25)	-0,1257 (-1,31)
α_0 (10-1) Without SML and HML	-0,0456 (-1,24)	-0,0653 (-2,65)	0,0040 (0,08)	0,0121 (0,29)	-0,0865 (-2,24)	-0,0781 (-2,57)	-0,1069 (-4,65)	-0,1100 (-4,23)
α_0 (10-1) With SML and HML	-0,0062 (-0,11)	-0,0127 (-0,29)	0,0326 (0,43)	0,0553 (0,73)	-0,1069 (-1,79)	-0,1588 (-2,57)	-0,1254 (-4,18)	-0,1663 (-4,19)

The portfolio-level analysis results show that portfolios that include different level of company scores produce significantly different future stock returns.

4.2. Firm-level Cross-Sectional Regressions

In addition to portfolio-level analysis, the relationship between company scores and stock returns is also examined by conducting Fama and MacBeth (1973) regression analysis. This firm-level cross-sectional regression test the existence of the relation between company scores and the cross-section expected stock returns under the control of MV, PE, PB, BETA.

Table 4

Firm-Level Cross-Sectional Regressions

For each year from 2002 to 2016, the stock return is regressed on the previous month's four company score values, which are corporate governance score (CGS), economic score (ECOS), environmental score (ENVS), social score (SOS), and four control variables, which are market capitalization (MV), price-earnings ratio (PE), price-to-book ratio (PB) and conditional beta (BETA). The values from firm-level cross-sectional regression is reported by taking time series averages of the coefficient estimates and R-square values. The t-statistics are reported in parentheses.

CGS	**ECOS**	**ENVS**	**SOS**	**MV**	**PE**	**PB**	**BETA**	R^2
-0,0713 (-1,66)	0,0272 (2,24)	0,0074 (0,48)	0,0099 (0,51)	-0,0555 (-6,01)	-0,0001 (-0,01)	-0,0014 (-2,57)	0,0046 (0,04)	0,1330
-0,0721 (-1,76)	0,0128 (1,06)	-0,0107 (-0,82)	-0,0102 (-0,44)					0,0453
-0,0948 (-2,97)								0,0156
	-0,0239 (-1,52)							0,0125
		-0,0296 (-3,54)						0,0109
			-0,0313 (-3,75)					0,0113
-0,0341 (-1,12)				-0,0507 (-6,12)	0,0001 (0,01)	-0,0013 (-2,48)	0,0071 (0,07)	0,1069
	0,0167 (1,47)			-0,0560 (-7,25)	0,0093 (0,39)	-0,0014 (-2,73)	0,0157 (0,15)	0,1086
		0,0059 (0,53)		-0,0549 (-5,90)	0,0070 (0,32)	-0,0014 (-2,51)	0,0060 (0,06)	0,1056
			0,0084 (1,27)	-0,0559 (-7,46)	0,0093 (0,36)	-0,0014 (-2,59)	0,0211 (0,21)	0,1013

Table 4 reports the results for the nested version of the firm-level cross-sectional regression equation (4), which regress the realized stock returns on the previous month's values of CGS, ECOS, ENVS, SOS and MV, PE, PB, and BETA. The results are reported by taking time-series averages of the slope coefficients of the regression equation over the 15 years from 2002 to 2016. Moreover, the table also reports all R-square values and the t-statistics of the slope coefficients (in parentheses). When company scores are included in the regression alone, it can be concluded that all company scores affect stock returns negatively, but this negative relation is only statistically significant for corporate governance score, environmental score and social score. On the other hand, when each company score is included in the regression with the control variables, the direction of the company scores effects on stock returns become reverse. However, this positive effect on stock returns is not statistically significant for all scores. Moreover, the average of regression coefficients of BETA is positive as the literature assumes, but it is statistically insignificant. This result is inconsistent with the assumptions of CAPM, but consistent with the prior empirical studies that reject validity of CAPM. Furthermore, MV affects stock returns in a significantly negative way for all the nested versions of the firm-level cross-sectional regression.

The results indicate that generally there is no statistically significant relation between company scores and stock returns. It can be stated that investors generally do not pay attention to company scores in the investment decision process.

5. CONCLUSION

The recent agency problems have triggered more attention to the company scores. Recently, companies have been changing their business plans in the hope of benefiting from these changes, such as higher company performance, profitability, etc. Therefore, examining the effects of company scores on company performance is one of the most remarkable topic for both emerged and emerging markets. Some studies mentioned above showed that the effects of company scores is positive (Core et. al, 2006; Bhagat & Bolton, 2008; Renders et. al, 2010; Aras, 2015; McGuire et. al, 1988; Pava & Krausz, 1996; Ruf et al, 2001; & Callan & Thomas, 2009), strongly positive (Ammann et. al, 2011; McGuire et. al, 1988), and some of them indicates negative relation (Bhagat & Bolton, 2008; Aras, 2015). Furthermore, some studies point out that even the effects on company performance is negative or insignificant for current data, in the long-term the effects on performance turn into positive (Nollet et. al, 2016). In addition to firm-level analysis, some studies are performed at portfolio-level analysis to examine the changes in stock returns (Bali et. al, 2009; Bali et. al, 2011; Bali et. al, 2014; Umutlu, 2015).

Motivated by the previous studies, the existence and significance of cross-sectional relationship between company scores and stock returns is investigated by performing both portfolio-level analysis and firm-level cross-sectional regression analysis. Stocks are sorted based on for each company score for each year and decile portfolios are formed. Firstly, independent mean difference t-test is conducted between the high and low company score portfolios to examine existence raw return difference between end portfolios. Furthermore, the existence of risk-adjusted returns differences between end portfolios is tested based on Jensen alpha from Fama-French 3-Factor model and ICAPM. On the other hand, the existence and significance relation between company scores and stock returns is also tested by firm-level cross-sectional regression analyses, which allow including several control variables simultaneously.

The portfolio level analysis results showed that portfolios with different levels of company scores do not produce statically different raw returns and in some cases risk adjusted returns. Moreover, firm-level cross-sectional regression results pointed out that in some cases there is a relationship between corporate governance score, environmental score, social score and stock returns. However, the direction and the significance of the effects of thee company score change depending on whether including control variables in the regression analysis.

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APPENDIX 1

Literature Review for Company Scores

Authors	Data Interval	Data Type	Financial Data Measures	CP/CS/BE Measures	Methodology	Relation
Core, Guay, and Rusticus (2006)	1990-1999	Yearly	Return on Asset	Corporate Governance: G-Index; index of shareholders rights	OLS	firm performance & G-Index (positive)
Bhagat and Bolton (2008)		Yearly	Return on Asset (ROA) and Tobin's Q	Corporate Governance: GIM G-Index, BCH E-Index, TLC Benchmark Score, Brown and Caylor GovScore, stock ownership of board members, CEO-chair duality, directors independency	OLS, 2OLS, 3OLS	operating performance & GIM G-Index, BCF E-Index (positive), operating performance & board independency (negative)
Brown and Caylor (2009)	2002-2003	Yearly	Return on Asset and Return on Equity (ROE)	Corporate Governance: 51 provsions	OLS	operating performance & 9 corporate governance provisions mandated by US stock market (insignificant)
Ammann, Oesch, and Schmid (2011)	2003-2007	Yearly	Tobin's Q	Corporate Governance: accountability, financial disclosure and internal control, shareholder rights, remuneration, market for control, and corporate behavior	panel analysis	firm value & corporate governance (strongly positive)
Renders, Gaeremynck, and Sercu (2010)	1999-2003	Yearly	Tobin's Q, market-to-sales ratio, market-to-book value, return on asset, return on equity	Corporate Governance: Deminor Ratings	2SLS	firm performance & corporate governance ratings (positive)
Aras (2015)	2005-2013	Yearly	Return on Asset	Corporate Governance: board structures, board procedures, disclosures, audit committee meeting frequency, ownership structures, and minority shareholder rights	panel analysis	firm performance & board independency (positive), firm performace & woman on board (negative)
McGuire, Sundgren, and Schneeweis (1988)	1983	Yearly	Accounting-based measures: return on asset, sales growth, operating income growth, total assets, and asset growth. Stock-market-based measures: total return, risk-adjusted return, and alpha. Market risk measures: beta, and standard deviation of total return.	Corporate Social Responsibility: Fortune survey ratings	OLS	prior firm erformance & CSR (strongly positive), current firm performance & CSR (positive), risk measures & CSR ratings (strongly positive)
Pava and Krausz (1996)	1985-1987, 1989-1991	Yearly	Market-based measures: market return, price to earnings ratio, market value to book value. Accounting-based measures: return on assets, return on equity, earnings per share. Risk measures: current ratio, quick ratio, debt to equity ratio, interest coverage, Altman's Z-score, market beta. Firm-specific characteristics: capital investment intensity, size, number of lines of business, dividend-payout ratio	Corporate Social Rresponsibility: Council on Economic Priorities (CEP) scores	Trend analysis	firm performance & CSR (almost positive)
Ruf, Muralidhar, Brown, Janney, and Paul (2001)	1991-1992, 1992-1993, 1993-1994, 1994-1995	Yearly	changes in return on equity, changes in return on sales, and growth in sales	corporate social responsibility: based on the study of Ruf et al. (1998)	OLS	current-following year's growth in sales & CSR (positive)
Callan and Thomas (2009)	2003-2006	Yearly	return on asset, return on sales, return on equity, Tobin's Q	Corporate Social Responsibility: KLD (Kinder, Lydenberg, and Domini)'s data	OLS	firm performance & CSR (positive)
Nollet, Filis, and Mitrokostas (2016)	2007-2011	Yearly	Accounting-based measure: return on asset and return on capital. Market-based measure: excess stock returns	Corporate Social Responsibility: Bloomberg's Environmental Social Governance (ESG) Disclosure score	OLS	return on capital & CSR (negative), accounting-based measures & CSR (U-shaped)

APPENDIX 2

Table 2

Literature Review for Portfolio-Level Analysis

Authors	Research Question	Data (Time Interval)	Freq. of Data	Model	Estimation Techniques	Conclusion
Bali, Çakıcı and Tang (2009)	Different than static (unconditional) beta, focusing on conditional beta. Examines the cross-sectional relation between conditional betas and expected stock returns.	NYSE, AMEX, NASDAQ (July 1963 - December 2004)	Daily	CAPM, 3-Factor model	OLS, AR(1), MA(1), GARCH (1,1) (portfolio-, and firm-level analyses)	There is no sgnificant relation between conditional beta and stock returns, but rolling beta has an effect on stock returns.
Bali, Cakici, and Whitelaw (2011)	Examines the cross-sectional relation between maximum dailt return within a month and expected stock returns	NYSE, AMEX, NASDAQ (July 1962 - December 2005)	Daily, Monthly	4-Factor Fama-French-Chart Model	OLS (portfolio-level analyses)	There is a sgnificant negative relation between maximum daily return withina month and stock returns.
Bali, Brown, and Caglayan (2014)	Examines the cross-sectional relation between macroeconomics risk and expected hedge fund returns	10.305 hedge funds from Lipper TASS dataset (July 1994 to March 2012)	Monthly	GARCH, VAR	OLS (portfolio-level analyses)	There is no sgnificant relation between macroeceonomic risk and hedge fund returns.
Umutlu (2015)	Examines the cross-sectional relation between idiosyncratic volatility and expected stock returns	Global Industry Indexes, Local Industry Indexes, Local Stock Market Indexes (January 1973 - May 2011)	Yearly, Monthly	ICAPM, Global FF-3 Model	OLS (portfolio-level analyses)	There is no sgnificant relation between idiosyncratic volatility and stock returns.