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INVESTIGATING THE RELATION OF SYSTEMATIC RISK AND THE HERFINDAHL INDEX WITH THE COST OF STAKEHOLDERS' EQUITY

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ABSTRACT

Customers for company managers are their most important asset, so they consider communication with customers as a beneficial interaction. Indeed, all customers play an equal role in the success of organizations. When most markets are mature and getting new customers is difficult, companies have an urgent need to maintain loyal and key customers so that acquiring a new customer, as experts say, costs six to nine times more than keeping current customers. This research determines the relationship between the Herfindahl index, systematic risk, and the cost of stakeholders' equity. Its statistical population consists of companies admitted to the Tehran Stock Exchange. 119 companies as sample population were selected from the statistical population (510 people) by stratified random sampling method. The results showed a relationship between the Herfindahl customer index and the cost of stakeholders' equity. There is also a relationship between systematic risk and the cost of stakeholders' equity. Such a reaction by investors can be because of the asymmetry of information. Their reaction to changes in cash is not because of the profitability of investments and the growth rate of companies in the coming years, but only for the financial limitations of companies.

Keywords: Systematic Risk, Herfindahl Customer Index, Cost Of Stakeholders' Equity

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INTRODUCTION

Presently, customers want to purchase products that satisfy profit needs with privileges such as superior quality, more services, higher speed, more suitable price, and efficient guarantee of products. Organizations and companies should check which of the various demands of customers they can satisfy while being profitable. Companies that have accepted the marketing philosophy and have considered the customer and put them at the center of operations are trying to create and continuously increase customer value (Forouzandeh: 2010: 269). The managers of these companies have realized that customers are their most important asset, so communication with customers is a beneficial interaction for them. Of course, all customers play an equal role in the success of organizations. When most markets are mature and getting new customers is difficult, companies have an urgent need to maintain loyal and key customers, so acquiring a new customer, as experts say, costs six to nine times more than keeping current customers. Therefore, customer relationship management studies emphasize the issue of focusing on key customers. Customer relationship management encourages organizations to identify key and important customers and retain them for future transactions. As they show, focusing on key customers reduces the cost of attracting new customers and increases the organization's revenues from loyal customers (Khanlari, 2006). The cost of capital is conceptually defined by the expected return. It is the minimum expected rate of return. If the expected return is less than the cost of capital, the value of the economic unit will decrease. Therefore, the management should try to bring the expected return to at least the level of the cost of capital to maintain the value of the economic unit. Here, the key to success is reducing the cost of capital. If the management succeeds in reducing the cost of capital of the economic unit, the expected return of surplus from the implementation of profitable projects, which is not cost-effective for the rival economic unit with a higher capital cost, will increase the value of the economic unit (Francis, 2004). Business risks caused by the business model and operating environment are important factors in determining the capital cost of a business unit (Modigliani and Miller, 1958). An important factor in assessing the inherent risk of future and current cash flows of a business unit for legislators, researchers, and market participants is the customer focus of the business unit. For example, Statement No. 131 of financial accounting standards requires business units to disclose information about their major customers because customers reveal the importance of concentration risk. As the available evidence indicates, business units recognize this risk. While approximately 0.45 of the joint-stock business entities in their reports rely on at least one customer for a significant part of their income (Ellis et al., 2012). There is little evidence about the effect of the customer concentration risk on the financing motives of the business unit.

Statement of the Problem

A very important feature that legislators, researchers, and experts consider very important in assessing the inherent risks of companies' current and future cash flows is focusing on the company's customer orientation. This is because these customers exhibit a significant concentration risk. Customer concentration can also affect other aspects of companies' activities. Its example is the effect of customer concentration on the company's equity costs. Likewise, since customer concentration can affect the present and future operational activities of the business unit, expectedly the customer concentration risk has an impact on the cost of stakeholders' equity. Therefore, this research expects, as Dhaliwal et al. (2016) show, a significant relationship between the customer concentration risk and the cost of the stakeholders' equity. This research attempts to examine the relationship between customer concentration risk and the cost of equity in the Tehran Stock Exchange. The main questions of this research are as follows:

Is there a relationship between the Herfindahl index and the cost of stakeholders' equity?

Is there a relationship between systematic risk and the cost of stakeholders' equity?

Research Background

This study investigates the impact of company risk on the cost of stakeholders' equity in the maturity stage of companies listed on the Tehran Stock Exchange. It selected 145 companies by systematic elimination from among the companies admitted to the Tehran Stock Exchange from 2004 to 2014 and investigated research hypotheses. It examines the hypotheses of the effect of risk on the cost of stakeholders' equity in companies in the maturity stage (Pakrovanan and Salehi Sfi, 2016). They investigated the relationship between the cost of stakeholders' equity and the life cycle of companies listed on the Tehran Stock Exchange. The test sample is selected from the companies admitted to the stock exchange through elimination sampling. The independent variable of this research is the life cycle of companies. Dickinson's method creates indicators for the stages of the company's life cycle. The dependent variable is the cost of stakeholders' equity. The cost of stakeholders' equity is the return that shareholders need for their investment in the company. It is widely used in the valuation of investment projects and the estimation of equity risk. Specific company characteristics such as size, age, risk, stock liquidity, leverage, and disclosure quality determine the cost of capital, which is measured by the abnormal profit growth model as the adjusted model of Olson and Joytner. Hasani Kalvani and Shirnejad (2016) investigated the relationship between customer concentration and supplier's cost of capital. The assumption is that greater customer concentration increases supplier risk, which leads to a higher cost of capital. As the results showed, there is a positive relationship between customer concentration and supplier capital cost, and this relationship was more obvious for those suppliers who were more likely to lose their major customers. The evidence also showed that suppliers with more secure government customers had lower capital costs. Finally, the results indicated a positive relationship between the company's customer concentration and suppliers' debt costs. The structure of customer concentration has generally a significant impact on financing costs. Dhaliwal et al. (2016) investigated the influence of government ownership on the company's risk-taking between 2006 and 2009 with the multivariable regression method. If a company has state ownership, state owners have conflicts of interest with private owners. Because government companies make policies according to the government's policies in the company to achieve the government's goals. The results of this research, according to the statistical sample of companies admitted to the United Arab Emirates Stock Exchange, show an inverse relationship between government ownership in Emirati companies and the company's risk-taking. Odin (2016) examined the impact of profit quality and liquidity on the cost of capital in the Taiwan Stock Exchange during the years 2000 to 2011. It has used facultative accruals based on three criteria and real profit management as indicators of profit quality, transaction volume, stock liquidity, and market liquidity as liquidity criteria and liquidity risk of market shares as liquidity risk criteria. It has used also panel data analysis. As for the effect of earnings quality and liquidity on the cost of capital, business entities that manipulated their accruals reported a higher cost of capital and those that used actual operating profit reported a lower cost of capital. The cost of capital is indirectly affected by the quality of profit and liquidity through information asymmetry, which is measured based on the difference between the buying and selling prices. As the results showed, the business units that used facultative accruals or real interest could reduce their cost of capital at high levels of information asymmetry. The higher the transaction volume and liquidity risk, the lower the cost of capital when the information asymmetry is low. As Hsu et al. (2015) showed by using the multivariate regression method, the main customer of the supplier was faced with an abnormal negative stock return in declaring bankruptcy. The customer's poor financial position or performance can be a warning about inherent problems in the supplier's ability to retain customers. Kolai et al. (2015) investigated product competition market and business unit investment decisions. It investigated the relationship between competition in the product market and investment decisions of large companies. As their findings showed through observations of the company year 1990-2010 with multivariate regression method, managers make their investment decisions with more risk when there is higher market competition. Likewise, free cash

flow increases the relationship between market competition and investment decisions. Indrarini and Yaoman (2015) investigated the relationship between risk management through corporate governance mechanisms and banks' performance during the financial crisis of 2008. As they found, if there is a risk management committee on the bank's executive board, the bank's performance improves during the crisis period. This research investigated whether risk management is relevant in corporate governance mechanisms, such as board members, and whether reporting to the company's CEO or directly to the board of directors is associated with better bank performance during the 2007-2008 financial period. They have examined 372 banks. This research has used the criteria of sales efficiency, asset efficiency, and equity efficiency by measuring the performance of banks. Likewise, it has used the criteria of managerial ownership of the company, size of the board of directors, and independence of the board of directors for corporate governance. As the results of the research show, banks that better control risk management can directly and positively influence the independence of the board of directors and managerial ownership during the crisis. Corporate governance variables have also a negative effect on bank performance. Ibi et al. (2012) investigated the relationship between the concept of the cost of stakeholders' equity and the expected return with the multivariate regression method. They showed that the concept of the cost of stakeholders' equity was different from the expected return and there is a correlation between the expected return and cash flow, growth cash flow, and financial leverage. There is also a relationship between the cost of stakeholders' equity and the amount of market risk, between the cost of capital, growth, financial leverage, and risk, predicting future returns and the characteristics of the information environment of companies. Hoges et al. (2009) investigated the risk tolerance and ownership structure of the company during the years 2004-2007 with the multivariable regression method. This research has widely investigated the concentration of ownership as an external control mechanism in the studies of the governance board. It has been found that the effect of concentration of ownership on risk-taking is not obvious and depends on the optimal balance between the costs and benefits of major owners. Paligrove (2010) examined the relationship between competitive power and cost of debt during 3 years between 2008 and 2010. As he showed, there is a direct and positive relationship between the cost of debt and competitive power. Companies that have higher debt costs are more competitive than other companies. He also showed that the relationship between the cost of debt and competitive power is higher in small companies and companies whose shares are not highly liquid. Walata (2012) investigated the effect of the quality of corporate governance on the amount of corporate risk disclosure. This research also paid attention to other variables of corporate governance, including the size of the board of directors and the number of non-compulsory boards of directors besides the amount of institutional ownership and major shareholders. Its findings showed that the size of the board of directors and the number of non-obligatory boards of directors have a positive relationship with the company's risk level. Netim et al. (2013) conducted research in 2002-2011 during the global financial crisis by examining effective corporate governance through risk management. They have examined 240 companies. This research proposed the question of whether the quality of corporate governance affects companies exposed to great risk in South Africa during the global financial crisis in 2007-2008. Its findings are largely predictive of a theoretical framework that includes insights from theories of agency, organizational legitimacy, sources of affiliation, and adaptive beneficiaries.

Research Method

This research is descriptive-correlation and methodologically is post-event. Because it can be used in the process of using information, it is applied research. It used a multivariable regression model to test the hypotheses, which are confirmable according to the results of the data test.

Research Hypotheses

Hypothesis 1: There is a relationship between the Herfindahl customer index and the cost of stakeholders' equity.

Hypothesis 2: There is a relationship between systematic risk and the cost of stakeholders' equity. The companies admitted to the Tehran Stock Exchange during the years 2010 to 2016, whose information was accessible, have been the research statistical population according to the proposed hypotheses.

4-2 Measurement of Research Variables

Dependent variable: cost of stakeholders' equity

The cost of stakeholders' equity is the return that shareholders need for their capital in the company and is widely used in the evaluation of capital projects and estimates of capital risk (Camara et al., 2009). The cost of capital in companies is the cost of providing resources by different groups and is used to carry out the economic activities of the companies. One of these groups is the cost of common stakeholders' equity of companies, which is the cost of financial resources provided by this group as the cost of equity.

Calculating the cost of stakeholders' equity through Gordon's growth model (Damodaran 10, 2002)

This model, assuming that k represents the capital cost of ordinary shares (the expected rate of return of ordinary shareholders), can obtain k from the following equation:

$$\text{Equation (2)} \quad \text{Cost of equity} = \frac{D_1}{P_0} + g$$

In the above model: D_1 is the cash dividend paid at the end of the first year, P_0 is the price of each share at the beginning of the year, and g is the dividend growth rate obtained from the following relationship.

$$g = \left[\frac{EPS_t}{EPS_0} \right]^{\left(\frac{1}{t}\right)} - 1$$

Independent Variables:

Herfindahl Customer Index

This index is a result of the total squares of the sales market share of companies in an industry. If the concentration ratio in an industry is higher (the number of companies active in the industry is less or the major sales volume of the industry is in the hands of one or a few specific companies), then the obtained number for the Herfindahl-Hirschman index will be larger and vice versa. Industries with a lower concentration ratio are generally more competitive than other industries (Ali et al., 2008).

Systematic risk:

It is part of the risk that cannot be reduced by diversifying stocks. The criterion for measuring systematic risk is beta, which measures the proximity of the yield rate fluctuation of a type of securities in comparison with the yield rates of all available securities in the market and is calculated as following relationship (Saeidi, 2011: 41):

$$\beta = \frac{Cov(R_m, R_i)}{\delta^2_{rm}}$$

Control variables

Company Size: The company size is measured by the natural logarithm of the book value of total assets (Dhaliwal et al., 2016).

Financial leverage of the company: The financial leverage of the company is measured by the ratio of total debt to total assets (Dhaliwal et al., 2016).

Return on assets of the company: The Company's return on assets is measured by the ratio of net profit to total assets (Dhaliwal et al., 2016).

4-3 Research models

The first hypothesis is examined according to model 1:

$$\text{Cost of Capital}_{it} = b_0 + b_1 \text{CHHI}_{it} + b_2 \text{ROA}_{it} + b_3 \text{LEV}_{it} + b_4 \text{SIZE}_{it} + E$$

Where a is the y-intercept, Cost of Capital_{it} is the cost of stakeholders' equity of company i in year t, LEVERAGE_{it} is the financial leverage of company i in year t, CHHI_{it} is Herfindahl index of company i's customer in year t, SIZE_{it} is the company size i in year t, and ROA_{it} is the return on assets of the company i in year t.

The second hypothesis is examined according to model 2:

$$\text{Cost of Capital}_{it} = b_0 + b_1 \text{BETA}_{it} + b_2 \text{ROA}_{it} + b_3 \text{LEV}_{it} + b_4 \text{SIZE}_{it} + E$$

Where a is the y-intercept, Cost of Capital_{it} is the cost of stakeholders' equity of the company i in year t, LEVERAGE_{it} is the financial leverage of company i in year t, BETA is the systematic risk of the company i in year t, SIZE_{it} is the company size i in year t, and ROA_{it} is the return on assets of the company i in year t.

Data Analysis

4-1 Descriptive research findings: Descriptive methods present a table, use descriptive statistics tools such as the central and dispersion indicators, and describe the research data. The following table contains descriptive statistics for all research variables. The valid and correct observation for each variable is 7 years. The desired data concerns 119 companies admitted to the Tehran Stock Exchange, which covers the period from 2009 to 2015. The first part presents the most important central indicators and dispersion of research variables. It used the average for the central indices and the variable standard deviation for the dispersion indices. Maximum and minimum values are also provided for each variable. Table 1 gives these indicators. The digits in this table were calculated by Excel and STATA version 12 software.

Table 1: Descriptive statistics

Variable	Abbreviation	Minimum	Maximum	Mean	Standard deviation
Cost of equity	CC	031.0	34.0	124.0	17.0
Herfindahl customer Index	CHHI	05.0	42.0	19.0	21.0
Systematic	BETA	05.0	87.0	29.0	16.0

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risk					
Financial Leverage	LEV	23.0	89.0	42.0	31.0
Return on assets	ROA	13.-0	67.0	18.0	17.0
Company size	SIZE	54.9	14.15	62.12	49.0

5-2 Normality test

Table 2: Normality Test

Variable	Shapiro-Wilk	Sig.
Error sentence of the first hypothesis	0.372	687.0
Error sentence of the second hypothesis	1.51	074.0

The normality test of the variables determines the used statistics. The normality test determines the distribution and dispersion of the data. As Table 2 shows, the significance level of this test for all data is above 5% and indicates that these data are normal. The normality of the data determines the distribution and dispersion of the data.

5-3 Collinearity test

Table 3: Collinearity Test

Variable	Abbreviation	First hypothesis	Second hypothesis
Herfindahl customer Index	CHHI	27.1	-
Systematic risk	BETA	-	08.1
Financial Leverage	LEV	13.1	69.1
Return on assets	ROA	21.1	54.1
Company size	SIZE	31.1	54.1

Collinearity values greater than 5 indicate the possibility of collinearity between independent variables and values greater than 10 show a serious problem in using regression in the current situation (Hassas Yeganeh et al., 2018) Likewise, all collinearity values are smaller than 5, which indicates the absence of collinearity between independent variables.

5-4 F-Limer test

Table 4: F-Limer Test

Hypotheses	Effects test	Statistic	Sig.	Test result
1	F	22.92	0.000	Fixed effects
2	F	21.75	0.000	Fixed effects

As the results of this test show, the significance level of the model is below 5%. Therefore, the hypothesis H0 (integrated model) is not confirmable

5-5 Hausman test

Table 5: Hausman Test

Hypotheses	Test summary	Chi-square statistic	Sig.	Test result
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1	Random period	66.21	0.000	Fixed effects model
2	Random period	63.28		Fixed effects model

As the results show, the significance value for the research hypotheses is less than 5%. Therefore, the hypothesis of a fixed effects model is confirmable. This means that there is a relationship between the estimated regression error and the independent variables. Therefore, the panel data method is used to test the hypotheses.

5-6 Test of heterogeneity of variances and autocorrelation

Table 6: Test of autocorrelation and heterogeneity of variance

	Test of autocorrelation			Test of heterogeneity of variance		Hypotheses
	Sig.	F		Heterogeneity	Sig.	
No	391.0	64.0	No	103.0	04.1	1
No	183.0	87.0	No	092.0	12.1	2

Examining the results of the heterogeneity of variances test indicated a significance level of more than 5%. Therefore, the null hypothesis is not rejected. This means that the research variables have homogeneity of variance and lack of autocorrelation.

- Test of the first hypothesis

H0: There is no relationship between the Herfindahl customer index and the cost of equity

H1: There is a relationship between the Herfindahl customer index and the cost of equity

Table 7 shows the optimality of the model for hypothesis testing. The f statistic (68.11) and the significance level (0.000) confirm the significance of the model for hypothesis testing. The results of the Waldridge test also show the absence of autocorrelation between the disturbance sentences. The adjusted coefficient of determination is 0.27. The Herfindahl customer index variable is the independent variable, the cost of equity is the dependent variable, and the variables of company size, financial leverage, and return on assets are control variables. As the coefficient (0.045) and significance level (0.000) in Table 6 show, the Herfindahl index variable has a positive and direct relationship with the cost of equity variable. The variables of company size, financial leverage, and return on assets are associated with the cost of equity. Since there is a relationship between the Herfindahl customer index and the cost of equity, the first hypothesis of the research is confirmable.

Table 7: Test of the First Hypothesis

CC it= b0+ b1CHHI it + b2 ROA it + b3 LEV it + b4 SIZE it + E				
Variable	Abbreviation	Coefficient	t-statistic	Sig.
Herfindahl customer index	CHHI	045.0	24.4	000.0
Financial Leverage	LEV	23.0	22.3	000.0
Return on assets	ROA	02.-0	15.-2	039.0

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Company size	SIZE	099.-0	54.-4	000.0
y-intercept	β_0	34.0	65.2	012.0
Adjusted coefficient of determination		0.27	f-statistic	68.11
			Sig.	000.0

Second Hypothesis Test:

H0: There is no relationship between systematic risk and cost of equity

H1: There is a relationship between systematic risk and the cost of equity

Table 8 shows the optimality of the model for hypothesis testing. The f statistic (89.71) and significance level (0.000) confirm the significance of the model for hypothesis testing. The results of the Waldridge test also show the absence of autocorrelation between the disturbance sentences. The adjusted coefficient of determination is 0.33. The systematic risk variable is an independent variable, the cost of equity is a dependent variable, and variables of company size, financial leverage, and return on assets are control variables. As the coefficient (0.093) and significance level (0.000) in Table 7 show, the systematic risk variable has a positive and direct relationship with the cost of equity variable. The variables of company size, financial leverage, and return on assets are associated with the cost of equity. Since there is a relationship between systematic risk and the cost of equity, the second hypothesis of the research is confirmable.

Table 8: Test of the Second Hypothesis

CC it= b0+ beta it + b2 ROA it + b3 LEV it + b4 SIZE it + E it				
Variable	Abbreviation	Coefficient	t-statistic	Sig.
Systematic risk	beta	093.0	12.3	000.0
Financial Leverage	LEV	27.0	07.3	000.0
Return on assets	ROA	054.-0	63.-2	013.0
Company size	SIZE	027.-0	76.-2	011.0
y-intercept	β_0	06.-0	37.-1	133.0
Adjusted coefficient of determination		0.33	f-statistic	71.89
			Sig.	000.0

CONCLUSION

The first hypothesis is that there is a relationship between the Herfindahl customer index and the cost of equity, which was tested with the statistical method of multivariate regression and is confirmable according to the results of the panel data test. Likewise, as the results show, the Herfindahl customer index variable is an independent variable, because its significance level is higher than the acceptable error level of 5% and has a significant relationship with the cost of equity variable. Such a reaction by investors can be because of the asymmetry of information: their reaction to changes in cash does not concern the profitability of investments and the growth rate of companies in the coming years, and concerns only the financial limitations of companies. As Dhaliwal et al. (2016) showed, there was a positive relationship between customer concentration and the supplier's cost of capital and this relationship was more obvious for those suppliers who were more likely to lose their major customers. The evidence also showed that

suppliers with more secure government customers had lower capital costs. Finally, the results revealed a positive relationship between the company's customer concentration and suppliers' debt costs. Therefore, the structure of customer concentration has a significant impact on financing costs. Likewise, the research results are consistent with the research results of Dhaliwal et al. (2016).

The second hypothesis is about the relationship between systematic risk and the cost of equity. It is tested by multivariate regression statistical method, which is confirmable according to the results of the panel data test. Likewise, the systematic risk variable is an independent variable, because its significance level is higher than the acceptable error level of 5% and has a significant relationship with the cost of equity variable. Such a reaction from investors can concern investors' willingness to get more returns; they escape from risk and expect to get more returns for bearing higher risks. Dhaliwal et al. (2016) also showed a positive relationship between customer concentration and the supplier's cost of capital. This relationship was more obvious for those suppliers who were more likely to lose their major customers. The evidence also showed that suppliers with more secure government customers had lower capital costs. Finally, the results revealed a positive relationship between the company's customer concentration and suppliers' debt costs. Thus, the structure of customer concentration has a significant impact on financing costs. Likewise, the research results are consistent with the research results of Dhaliwal et al. (2016).

5-1 Suggestions

1- As the first hypothesis of the research proves, there is a relationship between the Herfindahl customer index and the cost of equity. Since a high Herfindahl customer index can affect the competitive power of the companies and reduce their profitability, investors, analysts, and investment companies should consider the Herfindahl index for the expected rate of investment. The companies should prevent their concentration in the company by reducing the power of one customer in the company so that the company can finance itself through proper use and avoid paying excess financing costs.

2- As the second hypothesis shows, there is a relationship between systematic risk and the cost of equity, because the cost of equity is based on the rate of return expected by investors and is relevant to their amount of risk. Since the major part of the imposed non-operational costs are financing costs, and the conversion of operating profit into losses resulting from the continuous activities of the company occurs by the imposition of these costs, the investors should consider the systematic risk regarding the expected rate of return to achieve their desired return.

- Suggestions for Future Research

Investigating the relation of systematic risk and Herfindahl customer index with the cost of equity in companies listed on the Tehran Stock Exchange for short-term periods of less than one year (interim financial statements).

5-2 Limitations of the Research

The most important limitation of this research is the number of disturbing variables that may affect the relationships between the variables. The most important of them are macroeconomic factors such as inflation rate, interest rate, and political and economic instability of the country that have a great impact on investments and stock market transactions.

Future research should investigate separately the relation of systematic risk and the Herfindahl customer index with the cost of equity in companies listed on the Tehran Stock Exchange in each industry.

Similar research can be conducted using other risks such as commercial and financial risks.

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