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Research Article

The Systematic Risk Behavior in the Life Cycle Stages of Companies and the Moderating Effect of Managerial Ability

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Abstract

Firm characteristics influence systematic risk and, according to life cycle theory, these characteristics change over the life cycle following a predetermined pattern. Therefore, changes in systematic risk are expected following a predicted pattern. Given the different nature of companies and the different abilities of managers in various industries and different stages of the life cycle, it can be assumed that systematic risk in different industries and the ability to manage to affect this relationship. Therefore, the purpose of this paper is to investigate the systematic risk behavior over the life cycle and the moderating role of management ability. So, the systematic risk of 124 companies listed on the Stock Exchange during the years 2011-2017 and during different stages of the life cycle using three models of Anthony and Ramesh (1992), Dickinson (2010) and Saravia et al. (2016) and methodology Data were analyzed by simple regression and T-Student. The results show that corporate life cycle risk behaves differently in some industries such as basic steel and sugar and food industries except sugar. The management ability as a moderator relationship over the whole company rather than industry-level is effective in this relationship.

Keywords: Systematic Risk, Managerial Ability, Life Cycle, Financial Leverage.

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1. Introduction

The study of systematic risk factors (market equity beta) is one of the most important accounting and financial companies (Hong And Sarkar,2007; Schlueter and Silver, 2014). Market participants widely use market equity beta for various purposes (Graham and Harvey, 2001; Groenewold And Fraser, 2000). According to portfolio theory, the relevant risk is systematic, and investors can reduce non-systematic risk through diversification. However, this risk is affected by several factors. To date, several determinants and influences on systematic risk have been identified in the relevant literature, including the effect of operational and financial risk (Gahlon And Gentry, 1982; Hamada, 1972), the effect of intrinsic business risk (Chung, 1989; Griffin and Dugan, 2003) and the effect of default and developmental authority (Hong and Sarkar, 2007).

Based on these studies, it can be stated that beta is a function of company characteristics such as asset structure, capital structure, and other characteristics. It is reasonable to expect the beta to conform to a specific pattern throughout the life cycle. According to company life cycle theory, the structure of corporate change is following a predictable pattern. It should also be noted that companies in the industry have a different predictable pattern, so it can be argued that each company, in each industry and during each stage of the life cycle of that industry can have different systematic risk and that changes over a pattern over the life cycle of the company. The management ability and characteristics in response to the company's acceptable level of risk in the capital market have always been discussed, especially after the financial crisis in the global financial markets. The US financial crisis between 2007-20078, the recent Greek debt crisis of 2013-2010, and the financial crisis in the Iranian capital market changed attention to management and provided research area about management capabilities and provided his characteristics in dealing with company risks. A capable manager is a person who also shows his ability in terms of risk response very well. Also, to achieve the highest return during the company's life cycle, managers should have different functions and abilities during the life cycle stages. Risk has been studied in different studies, but no distinction is made between systematic and non-systematic risk. Also, in most studies that examine risk and life cycle, different industries are not considered. While in different industries, products with different technologies and competitiveness have different life cycles and risks. Due to the importance of systematic risk and lack of attention to the pattern of change during the life cycle in Iranian research, as well as different functions of managers in the life cycle and different industries, so in this research, we intend to examine the pattern of systematic risk change and the performance of managers in each industry during the life cycle of the company. In other words, this study seeks to answer the following questions

1- How to change systematic risks during the life cycle of companies

2- How to change systematic risks during the life cycle of different companies in one industry

3- The effect of different life cycle models on the above relationships

4- The moderating effect of management ability on how systematic risks change during the life cycle of companies in one industry

2. Literature Review

In the following, first, a brief explanation about systematic risk and the life cycle of the company and its models is given. Finally, the literature related to systematic risk during the life cycle of the company is reviewed.

2.1. Systematic risk

In financial knowledge and economics, the risk is divided into two categories:

systematic and non-systematic risk. Systematic risk is defined risk as a result of general market factors, and at the same time, affects the total price of securities in the financial market. One of the effective factors that create this type of risk is economical, political, and social developments such as exchange rate changes, business cycles, monetary and fiscal policies. Systematic or unavoidable risk is not specific to one or more companies. Still, it is related to the whole market, and among the factors affecting it can be macro government policies, exchange rate changes, inflation, business cycles, etc. According to the new stock portfolio theory, unsystematic risk can be eliminated, but the systemic risk remains. The beta index is an indicator for measuring systemic risk. However in studies such as Hill and Stone (1980); Mandelker And Rhee(1984); Mensah (1992); And Scotter and Sears (2014) have stated that this risk is also affected by the structure and characteristics of companies (operational, financial and inherent business risk). Companies' characteristics change during the life cycle, so we can expect that risk is related to the life cycle. First, a brief definition of the life cycle is presented, and then the relationship between these two variables is discussed.

2.2. Life cycle

One of the topics that have entered the various areas related to the company in the last decade is the life cycle of the company. According to company life cycle theory, companies' financial and other economic characteristics change over time according to a clear and predetermined pattern. This pattern was identified by leading economists such as Schumpeter (1943). The economist believes that a company starts at the beginning of its activity as an entrepreneur (in terms of innovation) and eventually ends like a company with bureaucratic management. To describe the life cycle, financial and non-financial characteristics related to the company are used, separating and classifying each stage from another stage in the company's life cycle stages. The following are four stages of a company's life cycle that are common in economic literature.

- **Startup stage**: In this stage, the young company is small, and its owner is in the founders' hands (Stepanyan, 2012). Such companies have other characteristics such as high product innovation, informal organizational structure (Moores & Yuen, 2001), low assets, low cash flows from operating activities, and profitability (Karami, and Amrani,2010).
- **Growth phase**: In this step, the company's size is more expanded than the previous phase, and revenues increase. Most financial resources are invested in productive assets, and the company is flexible in terms of liquidity. In such companies, the investment return is higher than the weighted average cost of capital (Karami and Amrani,2010).
- **Maturity stage**: The sales of companies in this stage are stable and financial resources are provided from within, and the assets are more than the growth stage. Due to sufficient liquidity, financing is done from within, and return on investment is equal to or greater than the rate of capital supply (Morse and Eun, 2001; Stepanyan, 2012).
- **Declining stage(renewal/rebirth)**: In this stage, growth opportunities are very small, profitability, liquidity, and fulfillment of obligations are declining, and the company is in a very competitive environment, and due to low liquidity, financing from external sources is common, and return on investment is lower than the rate of financing (Morse and Eun, 2001; Stepanyan, 2012).

2.2.1. Models for determining the life cycle stages of the company

In studies such as Anthony and Ramesh (1992); Thanatawee (2011); Deangelo et al.

(2006); Dickinson (2010); Chen et al. (2012); Ramalingegowda et al. (2013) were used financial variables such as age, sales growth, capital expenditures, size, growth and investment opportunities, financial leverage, profit-sharing rate, cash flow pattern and capital structure for steps classification of the life cycle. The following are two common methods used in Iranian research to determine the company's life stages and a new method proposed in 2016.

2.2.1.1. Anthony and Ramesh Method (1992)

Anthony and Ramesh (1992) use a criterion that combines the three criteria of financial statements "sales growth," "capital expenditures" and "dividend ratio" and "age" and divides the life cycle stages of companies into three stages of growth, maturity, and decline that are shown in the table below

Table 1. Anthony and Ramesh (1992) life cycle model

Life Cycle Stages	Sales Growth	Capital Expenditures	Dividend Ratio	Age
growth	high	high	low	Low(young)
Maturity	average	average	high	Average(mature)
decline	low	low	low	High(old)

In this model, the company's age is used as an indicator of the life cycle, so that it is based on the assumption that the company goes through the stages of its life cycle uniformly. Companies can still enter the life cycle stages sequentially by using different product innovation methods, entering new markets, or making structural changes. It can be claimed that the life cycle is different from the age of the company. This method also assumes that the distribution of other classified variables is also uniform, and optional breakpoints should be considered to determine the life cycle. (Azad Amir et al., 2014).

2.2.1.2. Dickinson Cash Flow Patterns Method

In 2010, Dickinson grouped the company's life cycle stages using cash flow categories (including operating activities, investment, and financing), as shown in Table 2. In this method, companies are separated into life cycle stages independently and do not have Anthony and Ramesh's (1992) method.

Table 2. Cash flow-based life cycle model - Azad Amir et al. (2014)

Cash flows	startup	Growth	Maturity	Maturity	Saturation	Saturation	Declining	Declining
The net cash flow of operating activities	-	+	+	-	+	+	-	-
The net cash flow of investment activities	-	-	-	-	+	+	+	+
The net cash flow of financing activities	+	+	-	-	+	-	+	-

2.2.1.3. Saravia et al. (2016) Life cycle model

In 2016, Saravia and colleagues introduced a new model for the life cycle. They claim that using a firm age variable can reduce the potential impact of omitted variables on economic results. Although these variables can be a good proxy for effective components during the company's life cycle, it isn't easy to quantify them. According to the company's age, they have expressed a new proxy for the life cycle components. They stated that the age variable is a suitable proxy for the life cycle and stated that the LN(FIRMAGE) is good for the early stages of the life cycle; 1/FIRMAGE is a good proxy development stage of the life cycle, and $FIRMAGE^2$ can show the entry into decline.

2.2.2. Systematic risk throughout the life cycle of the company

Müller (1972, 2003) argued in his company life cycle theory that younger firms have better opportunities to grow and expand than mature firms. Companies usually start their life cycle with financial features such as negative free cash flow and constantly need external financing. In addition, younger companies are more likely to go bankrupt but are more likely to grow. Mature companies are characterized by a positive free cash flow that distributes their profits to their shareholders. Mature firms are more stable, diverse, with lower risk and uncertainty, indicating features such as less volatility in cash flows from operations and sales. As a result, according to this theory, mature firms are stronger than systematic shocks, and therefore their beta should be relatively low. In other studies such as Garcia et al. (2016), Saravia (2014); And Cervia and Cervia-Matos (2016) have shown that according to life cycle theory, the characteristics of younger companies are different from those of mature companies. Therefore, it is expected that young companies' beta will be different from that of mature companies. The beta of younger companies will have more beta due to the volatile growth and will gradually decrease. In other words, the beta is not stable. Beta instability over time means that retrospective market risk measures are not a good predictor of future risk. Identifying the effective relationship between accounting variables and market risk can lead to improved forecasting models for estimating future market risk. Financial models of risk (e.g., CAPM) do not consider the operational components and environmental conditions affecting risk (Alaghi, 2011). However, companies in different industries have different structures and characteristics, so it is expected that companies in different industries have different life cycles and systematic risk in different industries, and in each one of the stages of the industrial life cycle is to take different values. Therefore, the research hypothesis is expanded as follows.

Hypothesis 1: The beta level of market equity varies over the life cycle of each industry.

2.3. Managerial ability

Companies go through three stages of growth, maturity, and decline in their life cycle. In the growth phase, despite the growth of sales and the achievement of unexpected profits, they bear a high commercial risk due to the ambiguity in the market's long-term reaction to products. The company's ability to generate cash flow and access to financial resources is required to invest in new products' research and development. At this stage, managers play an important role in achieving the company's goals by recognizing profitable investment opportunities and optimal resource allocation. In the next stage and entering the company into maturity, business risk is reduced. With the stabilization of the company's position in the market, sales stability, and cash inflows, the company's need for external financing is reduced. At this stage, the company has the appropriate investments during the growth period and responds to market needs. Technological changes and deviations from the previous year's performance are low (Nasim and Penman, 2001). At this stage, management's ability to achieve the goals by investing in projects with reasonable returns is so important. Their managers' motivations lead to increased managerial ability, and managers with higher profit incentives will lead to greater returns for companies. (Tsui, 2018) .In the decline phase, the company faces declining sales and increased business risk, obsolescence of technology, and the companies' inability to provide New products. At this stage, if managers can maintain the efficiency of the company's processes and invest in profitable projects, the company will have to leave the industry and end operations. It should be noted that the ability of management has changed over time. In some stages of the life cycle, managers learn to increase efficiency and learning, achieve optimal ways to perform activities, and enter other stages by reducing general knowledge to destruction (Agarwal and Gort, 2002). By using their skills and abilities and being aware of the company's life cycle, management can reduce operational and financial risks. According to previous research (Mendelker and Rahi, 1984; Scotter & Severs, 2014), reducing these risks affects systematic risk. Paying attention to the life cycle makes it possible to control environmental stimuli related to the company's life stages that cause companies' same strategic reactions and separate management ability from these specific environmental factors (Hambrick and Mason, 1984). Life cycle stages describe stimuli from the external environment (such as the commodity market) and stimuli from the internal environment (such as the company's life) and include a set of features that affect The company's specific strategies (Jawaher and McLaughlin, 2001). Therefore, it is expected that the ability to manage the moderating effect on the relationship between risk and life cycle, so the research hypotheses are:

Research Hypothesis 2: Management performance moderates the relationship between systematic risk and life cycle.

3. Research Methodology

3.1. Statistical population

This research population is all stock exchange companies that are more than 5 years old, and their 60-month returns are available during the years 2011-2018. Banks, financial services and insurance companies, and intermediaries and financial companies whose fiscal year was not March 20 have been eliminated. According to the above cases, the number of companies surveyed is 864 company -year. After collecting the data, it was analyzed using Excel and Eviews software.

3.2. Research method

The present study method is inductive and post-event (using past information), and its statistical method cross-sectional. To analyze the data, first, the companies are located in 6 industries. They are classified into emergence, growth, maturity, and decline stages using differentiating variables and finally using T-STUDENT statistical methods and Simple regression tests the research hypothesis. In order to determine the life cycle stages, the three methods of Anthony and Ramesh (1992), Dickinson (2010), and Cervia et al. (2016) have been used. Cervia et al. (2016) model to investigate beta change over the life cycle is:

$$\beta_{it} = \alpha_0 + \alpha_1 firmage_{it} + \alpha_2 growth_{it} + \alpha_3 businessrisk_{it} + \alpha_4 financialleverage_{it} + \alpha_5 operatingrisk_{it} + \alpha_6 firmsize_{it} + \alpha_7 growthoptions_{it} + \sum_{t=1}^{\tau-1} \theta_t Time_{it} + \varepsilon_{1it}$$

Where:

β_{it} is the equity beta (systematic risk) derived from the market model. The first independent variable $firmage_{it}$ shows the age of the company i at time t. According to the literature review, it is predicted that systematic risk decreases over the life cycle. The second independent is the growth variable equal to the percentage change in the company i from -1 t to t. Gahlen and Gentry (1982), decomposition of the beta model, believe that an increase in income reduces systematic risk, so systematic risk is expected to have a negative relationship with growth. The next variable $businessrisk_{it}$ represents the inherent business risk of firm i at time t and is obtained by obtaining the standard deviation of the percentage change in annual net sales during the 5 years prior to year t. According to the research literature, systematic risk increases (decreases) as business risk increases (decreases) (Chung, 1989; Scotter & Severs, 2014). The fourth explanatory variable shows the financial leverage of company i at time t. It is obtained by dividing the book value of the debt by the total market value of the equity and the debt's book value. Like the Hamada (1972) research in which researchers identified a positive relationship between the two variables, a positive relationship is expected in this article as well. The next variable of this research.” $operatingrisk_{it}$” is the operational risk of a company i at time t, which is obtained through the standard deviation of the percentage of changes in operational cash 5 years before time t. The firm's operational risk increases operational cash flow volatility, leading to a higher market equity beta (systematic risk) (Chung, 1989; Schelloter & Sears, 2014). The sixth determinant of systematic risk in the model is the company's size, which is obtained through the natural logarithm of the company's sales. Larger companies have less systematic risk. The last independent variable is the growth options of the company i in year t. Hong and Sarkar (2007) showed that market equity beta is a function of increasing growth options, and therefore in this study, we consider a positive relationship between these two variables. Given that Q-Investment Theory states that investment opportunities with Q-Tobin increase (Jovanovic and Russeau, 2002) in this study, Q-Tobin is an indicator for measuring authority (options). Also, in order to control the effects of macroeconomics, which is the same for all companies, the time variable has been used.

4. Results of the research

4.1. Descriptive statistics

The table below shows the number of companies in each industry and the life cycle stages. As can be seen, the largest number of companies during the year 2011-2018 is related to the automotive industry (32 companies) and non-metallic minerals industry (21 companies). Also, the pharmaceutical industry had the lowest number of companies (12 companies).

Table 3. Descriptive statistics

	Industry	**N**
0	Other	11
1	automotive industry	32
2	Chemical	17
3	Medicinal	12
4	Metals	13
5	Sugar And Food Except for Sugar Industry	18
6	Non-Metallic Mineral	21
	Total	124

Table 4 - The average of variables in each industry

IND	roe	mtb	tacc	cfo	MNG	Cap	PayRatio	businessrisk	firmage	TQ	operatingrisk	firmsize
0	0.078	1.37	0.017	0.053	0.16	0.017	0.62	0.94	29.6	1.7	5.85	5.83
1	0.0472	1.7	0.019	0.056	0.26	0.017	0.41	0.38	35.4	1.3	11.12	6.2
2	0.09	1.26	0.014	0.097	0.18	0.024	0.65	0.38	38.3	1.7	8.41	6.27
3	0.147	2.18	0.085	0.083	0.19	0.018	0.74	0.28	39.5	2.11	3.35	6.1
4	0.094	1.54	0.03	0.82	0.2	0.025	0.58	0.46	37.9	1.74	4.43	6.2
5	0.054	1.74	0.005	0.07	0.13	0.03	0.44	0.54	47.9	1.96	2.89	5.81
6	0.094	2.07	-٠.003	0.1	0.15	0.03	0.65	0.35	35	1.81	2.02	5.97

The table below shows the average of each variable in each industry. The youngest companies are related to the automotive industry and non-metallic minerals (35 and 35.4 years). Therefore, it is expected that these industries' systematic risk will be higher than in other industries. Industries with larger companies are also expected to have less systematic risk because larger companies can deal with company risks rather than smaller companies. According to Table 4, the automotive industry is larger (6.24). The highest average operational risk is related to the automotive industry, and the non-metallic mineral industry has the lowest operational risk.

4.2. Inferential statistics

4.2.1. Hypothesis test No. (1)

In order to investigate the differences between systematic risk over the life cycle of each industry, three methods of Anthony and Ramesh (1992), Dickinson (2010), and Sarvia et al. (2016) have been used. According to Anthony and Ramesh (1992), there is no significant difference in various industries at different stages of the systematic risk life cycle.

In Dickinson's (2010) method, industry, the risk decreases during maturity (T-Value-2.467) in the metals industry, and there is a significant difference with the growth period in terms of systematic risk.

In the" sugar and food except for the sugar industry "industry, the risk increases during the Saturation period, and the difference with the maturity period is significant (T-Value = 17.812). According to the study of Grenold and Froster (2000) and Kim (1993), which stated that 5 years is a reasonable period for systematic risk estimation, the 5-year beta index was also used as a systematic risk index. The results show that in Anthony and Ramesh (1992) method in the non-metallic mineral industry, the systematic risk during the growth period is higher than maturity (T-Value = 1.935). According to Dickinson's (2010) method in the chemical industry, systematic risk during growth is greater than maturity (T-Value = 2.511). Sadati Meidani and Gharazi (2016) also showed in their research that the maturity and growth stage has a significant relationship with company risk, and other states do not have a significant relationship with company risk. However, they ignored the different industries (Tables 5 and 6). Sarvia et al.'s (2016) method show no significant difference between systematic risk in all other industries except the metals industry. In the metals industry, systematic risk is higher in younger companies (P-Value = 0.0245). After entering the growth stage, their risk gradually decreases (P-Value = 0.0155) and in the maturity stage(P-Value = 0.0358) and even in the decline stage of this industry(P-Value = 0.0489), the risk of companies in such industries reaches a minimum. The reduction of risk in the period of decline, which is contrary to the results of Saravia et al. (2016), is because a major part of the metals market is global markets; In other words, companies supplying metals are usually very strong exporters, and this has caused the state of global markets to affect the business situation of these companies. According to the statistics and analysis provided, it seems that an increase in prices will accompany the price of metals in 2018. This indicates that companies supplying base metals whose products are sold in foreign markets will have a reasonable increase in profitability. Therefore, it can be said that their systematic risk decreases even in the period of decline (Table 7)

4.2.2. Hypothesis test No. (2)

In this hypothesis, we want to identify the impact of managerial ability on the company's life cycle stages' systematic risk relationship. Entering the mediator variable did not affect the overall results observed before. This means that the effect of other variables on risk is more than the managerial ability. However, it can not be said that the ability to manage does not affect this relationship, and other variables should be considered. However, when examined separately in the industry (the model was fitted at the level of all companies), it was shown that managerial ability as a moderating relationship in the early stages of a company's life is very important and has a reducing effect on the relationship.

5. Conclusions and Suggestions

This study examines the systematic risk over the company's life cycle and the role of the moderating variable of managerial ability. Past research has shown that systematic risk is a function of firm characteristics such as asset structure, capital structure, and other characteristics. Therefore it can be argued that beta changes over the life cycle of the firm. Due to the different nature of industries, this study has been conducted at the industry level and per three methods of determining the life cycle. The results showed that in Anthony and Ramesh's (1992) method and Dickinson's (2010), except for the sugar and food except for the sugar industry, the risk increases during the saturation. The difference with maturity is significant. (T-Value = 17.812), in other industries, different betas in the life cycle did not differ significantly. Sarvia et al.'s (2016) method used a different method than the previous two methods. There is no significant difference between systematic risk in all other industries except the metals industry. In domestic and foreign studies, systematic risk has not been presented separately for industries. However, in the field research, Sadati Meidani and Gharazi (2016) showed a significant relationship between company risk in the stage of maturity and growth. Finally, it was shown that the managerial ability as a moderating relationship is very important in the early stages of the company's life and has a reducing effect on the relationship while in other stages, this effect is increasing. But it does not affect the results when considered in different industries. This may be due to low companies in each industry and the lack of consideration of other variables such as risk management. Mashayekhi and Haji Azimi (2016) showed that a positive and significant relationship between managers' ability and company performance is observed only in the growth and maturity stages. This research is useful for professional activists and researchers. Corporate executives, investors, and other stakeholders often use beta estimates of market equity when making decisions to calculate the cost of capital for a particular project or valuation models calculated to buy another company. Researchers use it in event studies to measure abnormal returns and to test asset pricing models. In each of these cases, determining beta and instantaneous behavior is useful in order to modify the systematic risk assessment.

Table 5. Inferential Statistics - Systematic Risk - Anthony and Ramesh Method(1992)

5year Annual beta				Annual beta				5year Annual beta				Annual beta				
Declining	**Maturity**	**Maturity**	**Growth**	**Declining**	**Maturity**	**Maturity**	**Growth**	**Declining**	**Maturity**	**Maturity**	**Growth**	**Declining**	**Maturity**	**Maturity**	**Growth**	
Chemical								**Automotive Industry**								
0.516	0.426	0.426	0.637	0.516	0.505	0.505	0.637	0.703	0.970	0.970	0.988	1.025	1.391	1.391	1.346	Average
0.045	0.076	0.076	0.110	0.045	0.283	0.283	0.110	0.727	0.312	0.312	0.468	0.839	0.7480	0.748	1.186	Variance
7	36	36	5	7	36	36	5	6	47	47	7	6	47	47	7	N
-0.973		1.357		-0.095		0.763		0.749		0.0669		0.928		-0.104		T-Value
0.177		0.116		0.462		0.235		0.241		0.474		0.195		0.460		P-Value
1.812		2.015		1.713		1.895		1.943		1.894		1.943		1.89		d
Sugar And Food Except Sugar Industry								**Non Metallic Mineral**								
0.486	0.396	۰,۳۹۶	0.085	0.599	0.459	0.459	-0.782	0.877	1.148	1.148	1.602	1.004	1.178	1.178	1.497	Average
0.0002	0.071	0.071	0.179	0.160	0.355	0.355	2.058	0.505	0.530	0.530	0.253	0.453	0.618	0.618	0.457	Variance
2	13	13	3	2	13	13	3	7	28	28	7	7	28	28	7	N
-1.208		-1.222		-0.426		-1.469		0.897		1.935		0.589		1.078		T-Value
0.1252		0.1731		0.356		0.140		0.197		0.038		0.284		0.153		P-Value
1.782		2.920		2.920		2.919		1.833		1.771		1.796		1.812		d
								Other								
								1.079	0.922	0.922	0.459	1.454	1.069	1.069	0.926	Average
								0.059	0.115	0.115	0.346	0.192	0.467	0.467	0.962	Variance
								7	38	38	3	7	38	38	3	N
								-1.472		-1.625		-1.930		-0.249		T-Value
								0.084		0.123		0.039		0.413		P-Value
								1.796		2.920		1.782		2.220		d

Table 6. Inferential Statistics - Systematic Risk - Dickinson Method(2010)

5year Annual beta			Annual beta			5year Annual beta			Annual beta			
Saturation	Maturity	Growth	Saturation	Maturity	Growth	Saturation	Maturity	Growth	Saturation	Maturity	Growth	
Automotive Industry						**Non Metallic Mineral**						
0.271	0.216	0.370	0.373	0.1599	0.239	0.013	-0.036	0.693	-	-0.205	0.0069	Average
0.658	0.630	0.507	0.690	0.515	0.815	0.482	0.623	0.383	-	0.475	0.932	Variance
24	167	21	4	110	48	19	106	9	-	98	27	N
-0.380		-1.27	-0.610		-0.627	-0.392		-0.747	-		-0.148	T-Value
0.704		0.240	0.542		0.531	0.696		0.456	-		0.882	P-Value
0.054		-0.154	-0.213		-0.08	-0.049		-0.106	-		-0.027	d
Medicinal						**Chemical**						
-0.328	0.155	-0.229	-	-0.264	-0.116	0.124	-0.006	0.710	0.066	0.056	0.038	Average
0.738	0.349	0.325	-	0.313	0.696	0.592	0.538	0.625	0.665	0.592	0.550	Variance
10	50	19	-	40	11	124	90	5	5	65	22	N
0.728		0.830	-		-0.686	-0.720		-2.511	-0.0318		0.132	T-Value
0.469		0.409	-		0.496	0.473		0.0136	0.974		0.895	P-Value
0.173		0.074	-		-0.148	-0.129		-0.716	-0.009		0.018	d
Sugar And Food Except Sugar Industry						**Metals**						
0.071	-0.059	-0.097	-1.267	-0.071	0.071	0.013	0.1199	0.3606	-0.189	0.0499	0.378	Average
0.292	0.509	0.381	0	0.516	0.399	0.447	0.605	0.517	0	0.608	0.424	Variance
10	91	12	1	66	17	9	56	14	1	57	16	N
-1.218		0.307	17.812		-1.23	0.630		-0.150	2.976		-2.467	T-Value
0.226		0.758	0.000		0.222	0.530		0.1374	0.0043		0.017	P-Value
-0.129		0.037	1.196		-0.143	0.107		-0.240	0.239		-0.328	d
						Other						
						0.095	0.064	-0.065	-0.0457	-0.696	0.0403	Average
						0.556	0.523	0.345	0.507	0.418	0.437	Variance
						14	51	9	6	32	24	N
						-0.1801		0.956	-0.108		-0.049	T-Value
						0.857		0.342	0.914		0.348	P-Value
						-0.0298		0.130	-0.0238		-0.109	d

Table No. 7- Inferential Statistics - Saravia et al. (2016) - by industry sepration

Fourth	Third	Second	First	Fourth	Third	Second	First	Literature Review	Variables
Automotive Industry				**Other**					
			-0.000599 (0.8521)				-0.005 (0.3719)	-	FIRMAGE
		0.000 (0.8454)				-0.000 (0.3570)		+	FIRMAGE2
	1.994 (0.3561)				3.92 (0.4300)			+	1/FIRMAGE
-0.048 (0.5593)				-0.150 (0.3957)				-	LN(FIRMAGE)
0.0530 (0.0069)	0.0533 (0.0064)	0.0512 (0.0067)	0.05244 (0.0072)	0.0755 (0.1945)	0.07542 (0.1949)	0.0767 (0.1842)	0.076 (0.1901)	-	GROWTH
0.112 (0.2588)	0.113 (0.2516)	0.105 (0.3124)	-0.109 (0.2792)	-0.083 (0.1752)	-0.084 (0.1824)	-0.080 (0.1781)	-0.081 (0.1751)	+	BUSINESSRISK
0.2181 (0.2736)	0.2295 (0.2462)	0.176 (0.374)	0.197 (0.323)	0.442 (0.221)	0.435 (0.2291)	0.4496 (0.2125)	0.446 (0.2167)	+	FINANCIALLEVERAGE
-0.000871 (0.5823)	-0.000889 (0.5751)	-0.001069 (0.4920)	-0.00094 (0.5492)	0.000505 (0.9337)	0.000646 (0.9151)	0.000152 (0.9802)	0.0003 (0.9560)	+	OPERATINGRISK
0.0751 (0.1435)	0.0758 (0.1368)	0.0699 (0.1819)	0.0729 (0.1596)	0.0343 (0.6064)	0.033 (0.6203)	0.0294 (0.634)	0.0326 (0.6122)	-	FIRMSIZE
-0.0088 (0.8675)	-0.0088 (0.8586)	-0.0049 (0.9193)	-0.0069 (0.8893)	-0.0255 (0.5479)	-0.0249 (0.5605)	-0.0279 (0.634)	-0.0266 (0.527)	+	TOBINSQ
0.347	0.347	0.346	0.346	0.205	0.203	0.209	0.208	Adjusted R-squared	
1.06	1.06	1.05	1.05	1.317	1.31	1.32	1.32	Durbin-Watson stat	
Medicinal				**Chemical**					
			-0.0020 (0.5042)				-0.00096 (0.7732)	-	FIRMAGE
		-0.000 (0.1953)				-0.000 (0.4829)		+	FIRMAGE2
	-1.964 (0.4627)				-3.09 (0.2746)			+	1/FIRMAGE
0.00729 (0.9389)				0.033 (0.7569)				-	LN(FIRMAGE)
0.475 (0.0124)	0.481 (0.0124)	0.422 (0.0211)	0.455 (0.0146)	0.0833 (0.3865)	0.0966 (0.3086)	0.0699 (0.464)	0.0743 (0.44)	-	GROWTH

Table No. 7- Inferential Statistics - Saravia et al. (2016) - by industry sepration

Fourth	Third	Second	First	Fourth	Third	Second	First	Literature Review	Variables
0.0724 (0.6305)	0.045 (0.7617)	0.103 (04635)	0.0941 (0.5237)	0.1988 (05617)	0.248 (0.6612)	0.1529 (0.6559)	0.1672 (0.6267)	+	BUSINESSRISK
0.294 (0.3196)	0.3356 (0.2597)	0.2289 (0.4329)	0.2566 (0.3829)	-0.569 (00854)	-0.619 (0.0606)	-0.520 (0.1186)	-0.535 (0.1071)	+	FINANCIALLEVERAGE
0.000892 (0.8929)	-0.00279 (0.9662)	0.002791 (0.6744)	0.00203 (0.759)	-0.000144 (0.9802)	-0.000754 (0.8948)	0.000194 (0.9733)	0.000137 (0.9812)	+	OPERATINGRISK
-0.0367 (0.5502)	-0.0197 (0.9240)	-0.1310 (0.4892)	-0.1209 (0.5285)	-0.238 (0.000)	-0.287 (0.0000)	-0.272 (0.0001)	-0.277 (0.0001)	-	FIRMSIZE
-0.0391 (0.4618)	-0.0452 (0.3914)	-0.023 (0.6727)	0.031 (0.5648)	-0.146 (0.0157)	-0.148 (0.0137)	-0.148 (0.0171)	0.146 (0.0168)	+	TOBINSQ
0.19732	0.202	0.2165	0.2016	0.438	0.442	0.439	0.438	Adjusted R-squared	
1.768	1.787	1.793	1.767	1.204	1.217	1.214	1.206	Durbin-Watson stat	
Sugar And Food Except Sugar Industry				**Metals**					
			-0.003 (0.3751)				-0.011 (0.0358)	-	FIRMAGE
		-0.000 (0.4158)				-0.000142 (0.0489)		+	FIRMAGE2
	6,575 (0.2567)				16.47 (0.0155)			+	1/FIRMAGE
-0.158 (0.3083)				-0.455 (0.0245)				-	LN(FIRMAGE)
-0.02063 (0.1856)	-0.0211 (0.1696)	-0.0207 (0.1813)	-0.0205 (0.1872)	0.0067 (0.7919)	0.0067 (0.892)	0.0066 (0.896)	0.0067 (0.893)	-	GROWTH
0.01317 (0.824)	0.01416 (0.8101)	0.0085 (0.854)	0.0108 (0.855)	-0.114 (0.4484)	-0.118 (0.4303)	-0.108 (0.4758)	-0.111 (0.463)	+	BUSINESSRISK
0.129 (0.735)	0.148 (0.7004)	0.096 (0.8009)	0.110 (0.7737)	0.0512 (0.8934)	0.0667 (0.8620)	0.047 (0.9019)	0.0453 (0.9056)	+	FINANCIALLEVERAGE
0.01175 (0.2072)	0.01166 (0.2056)	0.10956 (0.2445)	0.001139 (0.2250)	-0.002731 (0.1416)	-0.002520 (0.1896)	-0.003053 (0.0866)	-0.0029 (0.1082)	+	OPERATINGRISK
-0.0614 (0.4311)	-0.0586 (0.452)	-0.070 (0.3563)	-0.066 (0.3914)	-0.03182 (0.6036)	-0.0367 (0.5502)	-0.021 (0.726)	-0.026 (0.6657)	-	FIRMSIZE
0.0417 (0.5210)	0.0470 (0.4725)	0.0335 (0.6017)	0.0368 (0.568)	-0.140 (0.0697)	-0.142 (0.0653)	-0.139 (0.0763)	-0.139 (0.0735)	+	TOBINSQ
0.193	0.199	0.186	0.188	0.439	0.433	0.433	0.436	Adjusted R-squared	
1.64	1.655	1.629	1.631	1.097	1.102	1.092	1.094	Durbin-Watson stat	
				Non Metallic Mineral					
							-0.000947 (0.759)	-	FIRMAGE
						0.000 (0.8473)		+	FIRMAGE2

Table No. 7- Inferential Statistics - Saravia et al. (2016) - by industry sepration

Fourth	Third	Second	First	Fourth	Third	Second	First	Literature Review	Variables
					2.916 (0.2196)			+	1/FIRMAGE
				-0.076 (0.414)				–	LN(FIRMAGE)
				0.0942 (0.3127)	0.0953 (0.3037)	0.0917 (0.3354)	0.092 (0.3255)	–	GROWTH
				0.167 (0.2037)	0.161 (0.2184)	0.183 (0.1746)	0.174 (0.1900)	+	BUSINESSRISK
				-0.228 (0.5474)	-0.260 (0.4869)	-0.138 (0.7205)	-0.184 (0.6314)	+	FINANCIALLEVERAGE
				0.01708 (02066)	0.01744 (0.1957)	0.01852 (0.1756)	0.176 (0.8096)	+	OPERATINGRISK
				0.01688 (0.8640)	0.01851 (0.8492)	0.35300 (0.7243)	00240 (0.8096)	–	FIRMSIZE
				0.00260 (0.9955)	-0.003003 (0.9481)	0.006629 (0.8867)	0.003957 (0.9323)	+	TOBINSQ
				0.175	0.1802	0.1713	0.1717		Adjusted R-squared
				1.239	1.246	1.235	1.234		Durbin-Watson stat

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