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YILDIZ TECHNICAL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
M.A. ECONOMICS PROGRAMME

M.A. THESIS

INDUSTRY CONCENTRATION AND STOCK RETURN: EVIDENCE FROM TURKEY

CEREN ERDURAK
14729013

THESIS ADVISOR
Prof. Dr. MURAT DONDURAN

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ABSTRACT

INDUSTRY CONCENTRATION AND STOCK RETURN: EVIDENCE FROM TURKEY

Ceren Erdurak
June, 2019

In manufacturing sector, firms are able to influence their stock returns by means of risky cash flows due to their operating decisions. These decisions are not only dependent on firms' financial structures but also on their characteristics related to product markets. Competition level among firms which represent firms' distinctive features is one of the important factor for the estimation of stock returns. Creative destruction hypothesis and structure, conduct and performance paradigm are channels in order to determine the relation between stock returns and competition. Therefore, this relation is subject for finance and also microeconomy. The aim of this study is to examine the relation between industry concentration and stock return in terms of Turkey's product and stock market. Quarterly unbalanced data (from March 1998 to December 2018) is used for the Fama-MacBeth regression of firms' returns on industry concentration with other controlling variables. Moreover, Herfindahl-Hirschman index by sorting firms according to Statistical Classification of Economic Activities in the European Community (NACE) is used in order to measure industry concentration. Although, there are analyses from other countries for the relation between concentration and stock return, this study is the first empirical evidence from Turkish manufacturing firms and their stock shares listed in Borsa Istanbul.

Keywords: Herfindahl- Hirschman Index, Stock Return, Fama-MacBeth Regression, Industry Concentration

ÖZ

ENDÜSTRİ YOĞUNLAŞMASI VE HİSSE SENEDİ GETİRİSİ: TÜRKİYE ÜZERİNE BİR ÇALIŞMA

Ceren Erdurak
Haziran, 2019

İmalat sektöründe, firmalar operasyon kararlarından doğan riskli nakit akımlarıyla hisse getirilerini etkileyebilmektedirler. Bu kararlar sadece firmaların finansal yapılarına bağlı olmamakla birlikte onların imalat sektöründeki özelliklerine de bağlıdır. Firmaların ayırt edici özelliklerinden olan aralarındaki rekabet düzeyi hisse getirilerini tahmin etmede önemli faktörlerden biridir. Yaratıcı yıkım hipotezi ve yapı, davranış ve performans paradigması hisse getirileri ve rekabet arasındaki ilişkiyi belirlemek için ilgili kanallardır. Bu nedenle bahsi geçen ilişki hem mikroekonominin hem de finans alanının kapsamına girmektedir. Bu çalışmanın amacı endüstri yoğunlaşması ve hisse getirisi ilişkisini Türkiye imalat ve hisse piyasası yoluyla incelemektir. Üç aylık periyodlardan (Mart 1998'den Aralık 2018'e kadar) oluşan dengesiz panel verileri endüstri yoğunlaşması üzerine firma getirilerinin Fama-MacBeth regresyonu için diğer kontrol değişkenleriyle birlikte kullanılmıştır. Bununla birlikte endüstri yoğunlaşmasını ölçmek için Herfindahl-Hirschman endeksinden firmaları Avrupa Topluluğunda Ekonomik Faaliyetlerin İstatistiki Sınıflamasına (NACE) göre tasnif ederek yararlanılmıştır. Hisse getirisi ve endüstri yoğunlaşması için farklı ülkelerden analizler olsa da bu çalışma Türk imalat firmalarının ve onların borsaya kote edilmiş hisse senetleri için yapılan ilk ampirik örnektir.

Anahtar Kelimeler: Herfindahl-Hirschman Endeksi, Hisse Getirisi, Fama-MacBeth Regresyonu, Endüstri Yoğunlaşması

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Istanbul; June, 2019 Ceren Erdurak

CONTENTS

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ABBREVIATIONS

BIST	: Borsa Istanbul
CAPM	: Capital Asset Pricing Model
FM	: Fama-MacBeth
FINNET	: Financial Infromation News Network
HHI	: Herfindahl- Hirschman Index
NACE REV	: Statistical Classification of Economic Activities in the European Community Revision
KAP	: Public Disclosure Platform
OLS	: Ordinary Least Squares

1. INTRODUCTION

In the beginning, Bain (1951) led the way in matter of empirical survey of the link between concentration and firms' profits by studying during the period from 1936 to 1940 American manufacturing profits rates of seller which had different concentrated level in industries. Bain (1951) suggested the hypothesis the fact that oligopolistic industries' firms within high concentration level had larger profit rate than less concentrated oligopolistic firms and others firms. Empirical test didn't succeed about explaining link between firms' concentration and profits rates due to lack of data or character of sample or another causes.

Prior to the analysis of various articles appertaining to concentration and excess stock returns, it is need of determination of concentrations' effects on profitability. Secondly, it will be examined the main subject which is effects of product market structure on stock returns through theories in industrial organizations.

Industry concentration plays a role in explicating firm's profitability while Peltzman (1977) made difference by supporting linkage between concentration and efficiency. He notices that there is a connection among growth, concentration and efficiency because according to Peltzman (1977) , growth leads to decrease expansion cost. Therefore both concentration and firm's investment through which efficiency is provided increase. In addition, Peltzman (1977) criticizes the antitrust policy due to increasing prices vice versa decreasing efficiency and also owner wealth. However, he did not pay attention about lack of innovation progress in concentrated industries. Indeed, this absence ends up by lowering expected returns according to Hou and Robinson (2006)'s empirical study.

Measure of risk which is named beta, fails to explain expected stock return. Therefore, various articles in the literature are written about the relation

between other variables and expected stock return. Fama and French (1992)'s article is one of the most popular for this topic. Particularly, firms' variables due to financial structure are important in order to determine the estimation of excess return. Furthermore, directors of corporations have the authority in terms of using risky cash flow throughout operating decisions. These decisions arise from firms' distinctive features such as its market powers. Although relation of industry concentration and expected returns are examined in various article along with literature, we will try to explain mentioned relation through Turkish manufacturing sector and its equity market.

Our study is the first empirical analysis based on Turkish survey data. The aim of this thesis, statistically significant relation can be found between industry concentration and stock return. We examine the relation between firm's competition and stock return in the fifth section. In introduction, it is told a general review about link between industry concentration and stock return. There are two types channels providing the related link and these two types are mentioned in the channels between industry concentration and stock returns sub-section. Before the explanation of empirical results in empirical results section, we study the measuring for concentration along with other controlling variables' calculation methods. In addition, we deal with both concentration spread and Fama-MacBeth cross-sectional regression. In section 5, we explain our obtained results from Turkish manufacturing firms and its listed stock return in Borsa Istanbul.

2. COMPETITION AND STOCK RETURNS IN INDUSTRY

1. Literature Review

When we analyzed effects of firm's capital structure on product market competition according to economic studies, it could be found various channels such as cash flow decision in product markets' firms or firm's behavior against distress risk etc. In addition, it is necessary to identify variables which provide connection between firms' competition and excess returns due to operating activities.

Particularly, the study of Fama and French (1992) shed light on explaining of variation in expected returns in terms of various factors like beta, size, momentum, book-to-market, earning-to-price ratio etc. Even though characteristics pertain to industry sector has used as components in explanation of average expected returns, Hou and Robinson (2006) is in the lead rank about empirical determination of relation between industry concentration and stock return in United States. In literature search, it is also possible to get various articles which don't harmonise with Hou and Robinson (2006) such as Gallagher and Ignatieve (2010) and Dan et al. (2007).

Hou and Robinson (2006) lead the way for research of link between industry concentration and stock return. According to this research, competition among firms in product market influences firms' operating decisions like realizing investment project under the uncertainty of future and opportunity cost of realization of investment. As a result increasing in riskiness of cash flows leads higher returns for the firm. They deduce from their empirical study on United States's product market securities between July 1963 and December 2001 that firms in more concentrated industries are exposed to earn lower return due to

increasing innovation risk and also distress risk. Both of them are in the scope of industrial organization. Hou and Robinson (2006) do not pay attention to effectiveness of channels such as distress risk or innovation risk. It is possible that negligence in this topic results from ambiguity in the literature. Schumpeter (1912) explains innovation in accordance with the idea of innovation risk channel while according to later research, Schumpeter (1942) claims that monopolistic firms have the advantage about creation of innovative idea rather than competitive firms. Therefore these firms strengthen market power through innovation. Actually Hou and Robinson (2006) point out expansion of researches on innovation risk. Secondary channel between industry concentration and stock returns in the article is distress risk which relates to Structure/Conduct/Performance paradigm. When analyzed literature about asset pricing model, Hou and Robinson (2006)'s article is important with regard of expression on expected stock returns model via market power.

In addition, competition in industry may affect firm's stock return performance through profitability. Therefore, it is examined that industry concentration is whether explanatory variable or not with regards to the determination of profitability. Hou and Robinson (2006) refer to Campbell and Shiller (1988a)'s article in order to examine the relation between profitability and stock return. By means of this article, dividend-price ratio model is constituted in order to test expect future dividend through time series regression of U.S stock price index. Dividend-price ratio model provides expect future dividend and discount rates for next period. However, in case of unexplained consistently variation in the dividend-price ratio, this variation depends to another explanatory variable. Hou and Robinson (2006) which define related variation due to cash flow's shock examine the effect of industry concentration on mentioned explanatory variable. Melicher et al. (1976) analyze the impact of profitability due to imperfect competition in market on firm's financial structure. However, relation between industry concentration and profitability is considered in this study differently from mentioned study which is predicted industry concentration as consistent and unexplained variation on cash flow's shocks. According to Melicher et al. (1976), while industry concentration is calculated as percentage of firm's

output, equity returns which is measured as the ratio dividend of shareholders to issued capital. By separating equity return into operating and financing related profitability, firm's financial structure becomes significant on determination firm's profit. For instance, as long as firm's market power increases, equity return increases, and thus related increasing stimulates rising firm's operating profitability. Particularly, most concentrated firms benefit from operating profitability rather than other firms in market.

Frankel and Litov (2009) are interested in whether recent earning's sustained variation is derived from the historical data of earnings. It is the point to be emphasized that whether mentioned variation is priced by stock return. In this study, instead of concentration ratio, it is observed stock return's firms sorted by size. In addition, change on earnings is not statistically significant in terms of pricing stock return. Therefore, the effect of change in earnings on profitability is limited.

In literature, there are disagreements about the explanatory power of volatility in dividend on future firm's profitability. Nissim and Ziv (2001) question the relation between variation in dividend and forecasting earning's variation. According to result of this study, volatility in dividend is significant when predicted the next two years' earnings. In addition, mentioned positive relation is valid for dividend volatility and future profitability of firms. However, Grullon et al. (2005) contradict with the previous article's result. According to Grullon et al. (2005), regression of return on equity which is calculated as the ratio of earnings to book value of equity has different consequences on dividend variation if linear regression model is transformed into nonlinear model.

Datta et al. (2011) examine whether market power appertaining to industry concentration is explanatory variable for predictability of future earnings. On the one hand, there are several articles which have different results about the relation between competition in product market and firm's profitability. This profitability is able to affect the expectation of firms' stock returns.

On the other hand, Hou and Robinson (2006) argue that there is negative relation between industry concentration and stock returns whereas Bustamante and Donangelo (2017a) defend contrary opinion and they are saying that more

competitive industries are weak against systematic shocks.

In order to establish connection between concentration and stock returns, it can be utilized risk-based channels such as innovation risk and distress risk originated from theories in industrial organization. For whatever reason it might be, firm's characteristics and product market competition are connected with financial structure like variance of stock return stemming from product market competition. Risk-based channels do not only play a role in explicating link between concentration and competition but product market demand also affects this link. When analyzed by Aguerrevere (2009), the variation of product market demand influences asset return in competitive industry as well as concentrated industries such that this return rises in parallel with increasing of product market demand for concentrated industries and vice versa for competitive industries.

As we mentioned above with reference to the study of Fama and French (1992), industry concentration may appear like independent variable in order to determine the estimates of firm's stock return. However, this inference is not valid for all of empirical studies for several countries such as example of Hashem and Su (2015)'s about British manufacturing sector. By means of channels which consist of distress and innovation risk, it is tried to relate industry concentration to expectation of firm's stock return along with literature. However, these channels are criticized about ambiguity and lack of risk perception. Firstly, when it is examined innovation risk whether it is capable of explanation the relation between competition and stock return, various results come to existence. Hou and Robinson (2006) criticize more concentrated firms in respect of incurious for research and development activities. Although this inference is proved by increasing of RandD's expenditure in competitive product market, new firms may want for capital requirement in order to innovative investment rather than incumbent firms. Furthermore, Hou and Robinson (2006)'s perception of distress risk is criticized in terms of systematic risk. When new firms start access to market, incumbent firms' market power tends to decrease against new firms. However, when contraction period is in existence economy, systematic risk affects new firms rather incumbents. In the following

sub-section, we will explain broadly innovation and distress risk channels in terms of relation between industry concentration and stock return.

2. Channels Between Industry Concentration and Stock Returns

Impacts of firm's financial structure on stock return are found out throughout articles in literature like Campbell and Shiller (1988b), Moskowitz and Grinblatt (1999), Fama and French (1992). However, effects of firm in industrial organization such as firm's concentration ratios does'nt come to be known sufficiently when analyzed literature review. Hou and Robinson (2006) is one of the leading article with respect to interaction between stock return and firm's characteristic beyond its financial structure. In addition, according to Hou and Robinson (2006) this interaction is related to firm's decision on cash flow which is affected by competition in manufacturing sector.

It is important to determine relation between competition which is a subject of product market and stock returns included in capital market. At same time, it is difficult to assign channels in order to correlate competition with stock returns because when analyzed effect of competition on stock return through these channels in literature review, there are various interpretations of this effect due to mentioned channels. Bustamante and Donangelo (2017b) point out decreasing entry barrier to industry which causes diminishing less concentrated firm's markup. Therefore, the more competition become in market, the less incumbents firms are influenced by distress risk. Whereas Bustamante and Donangelo (2017b) refer to negative relation between industry competition and expected stock returns Hou and Robinson (2006) look at this relation from a different aspect such that more concentrated firm may avoid aggregate demand shock relative to competitive firms. Therefore, increasing in concentration among firms stimulates diminishing in expected stock return through aggregate demand shock. In result, afromentioned channels are based particularly on theories of industrial organization. Channels determine risk factor exposed by firm in industry, and therefore this risk factor is priced when determined value of firm's asset.

Theoretical impacts of industry concentration on stock returns are considered

differently in various articles. When examined Hou and Robinson (2006), there are two channels affecting expected returns through competition in industries. One of those is innovation risk based on creative destruction of Schumpeter (1912) and other channel is distress risk based on Structure/Conduct/Performance paradigm. As mentioned those channels result from industrial organization literature and therefore, interpretation of those channels gets changed with different empirical results due to various articles and new channels are incorporated into the theoretical literature.

2.1. Innovation Risk

Schumpeter (1912) is the founder of creative destruction theory. Becker et al. (2012) explicate this theory which consists of three mechanism which is named variation, selection and retention respectively. New product may influence not only decision of own producing company but also related industry market structure. For instance, competition among firms can change with new product development. Therefore, first mechanism is based on how innovation changes economic structure. Second mechanism is deal with both consumers' preference about new product and entrepreneurial ability of firm's leader. Consumers' preferences for new product discourage them from purchasing old product which is worse rather than latter. Firm's leader attempts to raise innovation through research and development speeding. Third mechanism underlines customer's reaction process on persistence of old product against new product till adoption period.

Creative destruction in industrial organization bases on eradicating of old product by launching new product. This idea creates stimulation of new firm's entrance and new product to market. Therefore, this hypothesis causes destruction as well as innovation.

Norton (1992) examines in detail schumpeterian creative destruction hypothesis. According to this hypothesis, entrepreneurs are encouraged to product new goods by innovation in order to increase total productivity growth. On the one hand, success of entrepreneurs at new good production entails increase research and development spending. On the other hand output demand of old goods in

market start to decrease. However, purchase request for new good from innovative company raises both economic growth and entry of new firm. As it is known, in literature creative destruction theory may be interpreted by including two different point of view which are placed in Schumpeter (1912) and Schumpeter (1942). When Norton (1992) analyzed ideas of Schumpeter (1942), according to this idea which is named market power hypothesis, lack of entrepreneur's encouragement leads to cease innovation in product market. Since innovative companies in oligopolistic market start to obtain market powers, new firms are unable to compete with incumbents firms's opportunities. Therefore, entrepreneurs of new firm give up to entry firm and innovative technology in production market gradually decreases.

In literature, several articles are in existence to test verification of schumpeterian creative destruction hypothesis by way of sample countries' industrial firms. Nicholas (2003) examines both of schumpeterian creative destruction and market power hypothesis in terms of U.S industrial firms' patent portfolios. From 1918 to 1928, these portfolios are observed in terms of innovation equation on the purpose of testing mentioned schumpeterian hypothesis. Regression of patent production function which equals to innovation equation on independent variables indicates that market power hypothesis is valid for U.S. firm's patent portfolio during data period. Mentioned independent variables contain firm's experience years, market power and firm's bond and stock in order to determine capital formation for innovation.

In addition, creative destruction hypothesis is influenced firm's characteristics in industry or economic conditions in market. Thesmar and Thoenig (2000) investigate preferences of firms exposed fluctuations by firm's industrial structure. Qualified employee is in demand with the uses of innovative technique in production market. According to survey of Thesmar and Thoenig (2000), as long as input of labor ameliorates in production function through innovation, economic growth raises as provided by creative destruction hypothesis.

Chun et al. (2008) question the variation among firms' performances due to increasing in investment of information technology. In order to determine causes

of this variation, regression of firm's efficiency is measured via stock returns and also sales growth on information technology with controlling other variables like leverage, research and development spending, firm's competition based on sales etc. Therefore, information technology is related to significantly variation among firms' performances. Chun et al. (2008) select firm's performance indicator from various variables with the aim of affirmation for schumpeterian creative destruction hypothesis. If firm is placed in economy which have positive indicators such as high income level, openness in financial market, high transparency in firm's financial accounts, firms invests high technology project. As a result of innovative investment leads economic growth through increasing productivity.

Kumar and Sundarraj (2016) analyze financial structure of technological firms which applies different methods of innovation. These methods derive from schumpeterian creative destruction hypothesis. This hypothesis goes into division by process of innovation. For instance, innovation can occur suddenly through entrepreneur of new firm or can occur continually by innovative company. In mentioned analysis, innovation is stated through firm's profitability, stock return, market value, indebtness, patent variable. While firm's profitability is obtained by ratio of firm's net profit to revenue, stock return determines in comparison with recent and previous year data. In addition, patent variables is defined in terms of patent and citation's number. As a result of related analysis, permanency of innovation has a positive effect on firm financial structure rather than existing innovation at suddenly and temporally.

Kogan et al. (2013) focus on the stock market's effects of gain sharing due to innovation. Two types of technological progress is applied in this article which are named as embodied and disembodied technical progress. The aim of this article tests how the positive impact of technical progress is shared among economic agents such as firm, industry, consumer, stockholder etc. Negative relation between innovation shock and stock return is one the result of this article. Decreasing in stock return of old product is due to diminishing of innovation .

2.2. Distress Risk

In industrial organization, Structure/Conduct/Performance paradigm came into existence with Mason (1939). According to this article, it is explicated relation between price and public policy. Monopolistic firms limit decisions of supply side's participants through price making, restriction of production amount etc. Therefore, Mason (1939) explains entry of barriers in market by firms in most concentrated industries and this market structure indicates *Structure* part in relevant paradigm. Fluctuation in price level by less competitive firm leads business cycle problem like continuity of employment. Due to non-estimative of cost and demand conditions, more competitive firms does not survive on market. This situation refers to *Conduct* part in relevant paradigm. Finally firms in more concentrated industries obtain supernormal returns rather than other firms in market and thus public policy suffered from unfair distribution of economic resources. This situation describes the part of *Performance* in the paradigm.

Green (1987) deals with structure, conduct and performance paradigm for Canadian competitive market. In despite of this work, it is explained several approach or paradigms to support the anti-trust policy among firms. Delorme Jr et al. (2002) work on mentioned paradigm by taking example of United States manufacturing sector from 1980 to 1990. One of the important results of this article, structure, conduct and performance does not affect each other simultaneously, lags are formed among them. When analyzed determinants of mentioned paradigm which are structure, conduct and performance does not cause the arising of the following determinant. For instance, characteristic related to industry structure such as competition, may be not affected the industry performance as proposed earlier working about mentioned paradigm. It is worth noting that the unidirectional relation between concentration and firm profitability is found according to afromentioned empirical study. While profitability is influenced by concentration, the exact opposite situation is not in existence. In addition , firms' advertising activities may not be significant factor on firms' profitability. When taking into consideration of basic's related paradigm, market structure which is regarded as

exogenous factor forms *structure* determinant. Production technology is accompanied with by market structure. Delorme Jr et al. (2002) try different indicators in order to analyze the relation between determinants of mentioned paradigm. These determinants are represented several dependents variables. Whereas Herfindahl-Hirschman index (HHI) substitutes for structure, advertising and operating profit replaces with conduct and performance, respectively.

According to hypothesis of Hou and Robinson (2006), as long as firms increases its profitability due to market power, it is difficult to exit from the market because of sunk cost or other cost. Therefore, incumbents are exposed to low distress risk causing low expected stock returns.

3. DATA AND METHODOLOGY

1. Data Sources

In order to empirically analyze linkage between industry concentration and product market structure in Turkey, it is made use of data related to firm's income statement and balance sheet from Public Disclosure Platform (KAP) during 2010 and 2016 while the remainder required data are obtained by Borsa Istanbul (BIST). We will benefit from survey data of Financial Information News Network (FINNET). We use the quarterly unbalanced data from March 1998 to December 2018.

In this study, it is determined 261 firms with 127 manufacturing industries whose firms are in listed companies of BIST. Mentioned 127 manufacturing industries are classified in accordance with Statistical classification of economic activities in the European Community NACE Rev.2 code. Under favor of this code, firms are grouped as economic activity. Therefore, standardization through relevant code among countries provides firm's sorting according to its economic activity.

We don't add financial companies to our data sample similar to exemplary previous studies in literature. In addition, we obtain market return for our regression analysis from BIST100's index data. In the light of information received from Borsa Istanbul, mentioned index is consisted of 100 stock shares according to market price and trading volume.

2. Methodology

2.1. Measuring of Industry Concentration

Herfindahl-Hirschman Index (HHI) is essential to calculate industry concentration. This index states mathematically as follows:

$$\text{Herfindahl}_j = \sum_{i=1}^{I} s_{ij}^2$$

where s_{ij} represents market share of firm i in industry j at given year t, I represents number of firms.

When analyzed previous studies, in order to calculate s_{ij}, net sales, total assets and equity which are received from firm's income statement are used such that $H(Sales)$, $H(Asset)$, $H(Equity)$ are obtained for industry concentration. In addition, Hou and Robinson (2006) measure industry concentration according to averaging HHI for each industries along observation time period by taking into account result's of past three years index. Considering interpretation of Nawrocki and Carter (2010), HHI is valued between 0 and 1 as to concentration level. As long as to HHI converge to 1, industry's market power increases such as less competitive firm. Otherwise, HHI converges to 0 which is valid for more competitive firm. Moreover, there are various studies about HHI by interpreting value of index. For example, Brezina et al. (2016) are defined relevant index's value under three types such as unconcentrated, moderately concentrated and highly concentrated. According to this study, if industry is unconcentrated, its index gets value under 0,15. If industry is moderately concentrated, its index value changes between 0,15 and 0,25. Finally, highly concentrated industries which has the value exceeds 0.25. Brezina et al. (2016) determine the effects of graduated HH index results when a new firm entries in the industry.

We measure industry concentration through HH index for 127 manufacturing industries classified as to NACE Rev.2 code during our observation yearly data period. In our summary statistic analysis, we calculate HHI via net sales H(Sales), via total assets H(Asset) and via book value of equity H(Equity).

2.2. Controlling Variables

In order to test empirically the link between average stock returns and industry concentration, it will be benefited from regression analysis in which Fama and MacBeth (1973) leads the field. Fama and MacBeth (1973) determine New York Stock Exchange common stocks such as data sample including periods between January 1926 and June 1968. According to modest two parameter model, expected return on any security depends on expected return of zero-β security and risk premium. Furthermore, β appears to if and only if measure of the risk of asset in efficient portfolios. However, relevant statement about β is contradicted by article such as Fama and French (1992).

Bali et al. (2016) explain main differences of Fama-MacBeth (FM) regression analysis from conventional two parameter of portfolio model. Firstly in FM regression analyses is used controlling variables for test link between risk and expected return but on the assumption that relation between dependent and independents variables are linear. Like Hou and Robinson (2006) and others similar articles apply regression analysis through two part which are cross-sectional regression and time series regression analysis. According to Bali et al. (2016), distinction between these parts is based on average of regression coefficients through time series. Relevant average coefficients which are tested by means of standard errors, t-statistics and p-values must be different zero for statistically significant for analysis.

In economics or financial literature, the development of capital asset pricing model (CAPM) has important place in order to understand the link between expected returns and risk. However, Fama and French (1992) criticize the market βs of CAPM that another variables such as leverage, book-to-market equity, size and earnings-price ratios are more effective than market βs in order to analyze the cross-section of expected returns. Furthermore, out of Fama and French (1992), several academic authors found insufficient of CAPM with respect to measure of risk and to expected stock return like Bhandari (1988). According to Bhandari (1988), leverage (denoted as $debt/equity$ ratio) which relates positively to expected return was more efficient about measure of risk than market βs. Bhandari (1988) also explains that the relation between the estimated coefficients

of *debt/equity* ratio and inflation are not significant whereas relation market β and inflation are significant. This conclusion may stem from beta of CAPM which is the measure of systematic risk and also inflation is one of the systematic risk's type.

Size is another determinants for the cross-section of expected return. Firm's size and its risk level of stocks is correlated negatively in the article of Banz (1981). However, size may not play active role in explanation of stock return in crisis period. Hung et al. (2014) deal with crisis period such as 1929 Great Depression, 1987 stok market crush, dot-com buble and finally 2009 credit crunch and with non-crisis period including periods between 1929 and 2012. In Crisis periods when compared with non-crisis periods, market beta and other variable like size were not sufficient for explanation of cross-section of stock return.

The ratio of book value of equity to market value is positively associated with stock return. Dempsey (2010) investigates this statement in Australian stock market and gets similar result to previous studies in literature.

2.2.1. Beta

At first glance, beta is defined briefly as the measure of risk. Particularly, in capital asset pricing model (CAPM) that is suggested by Sharpe (1964), Lintner(1965), Mossin (1966), beta is the slope of univariate regression of expected return on any risky security in a condition of market premium as independent variable. Thus, beta of security j may be as indicated below equation:

$$B_j = \frac{\mathrm{Cov}(R_{j,t}, R_{m,t})}{\mathrm{Var}(R_{m,t})} \tag{3..1}$$

where $R_{j,t}$ symbolizes excess return of security j and $R_{m,t}$ is market return.In fact, the equation (3.1) is derived from standard CAPM equation which is that

$$E[R_{j,t}] = R_{f,t} + \beta_j(E[R_{m,t}] - R_{f,t}) \tag{3..2}$$

where $R_{f,t}$ states the risk free security

There are several methods in the case of calculating the estimation of beta and at the same time estimation period lengths and data frequencies of aforementioned

beta can be changed such as daily (monthly) with excess returns observations through determined monthly (yearly) period. Bali et al. (2016) estimate firstly market beta using simple CAPM regression of the stock's excess return on the market risk premium through daily return for the months like β^{1M}, β^{3M}, β^{6M}, β^{12M}, β^{24M}. In addition to this, it is possible to measure beta like monthly return for the years period such as β^{1Y}, β^{2Y}, β^{3Y}, β^{5Y}. Moreover, Bali et al. (2016) examine two more various estimating the market beta in terms of Scholes and Williams (1977)'s method and Dimson (1979)'s method. According to Scholes and Williams (1977), CAPM may be improved by adding series of regression against nonsynchronicity issue and they propose estimating beta as

$$\beta_i^{\mathrm{SW}} = \frac{\hat{b}_i^- + \hat{b}_i + \hat{b}_i^+}{1 + 2\rho} \tag{3..3}$$

where ρ is autocorrelation of market risk premium. When analyzed estimation of beta, daily return data is calculated. In contrast to equation of (3.1),Dimson (1979) examine bias issue based on infrequently traded stocks such as

$$\beta_i^{\mathrm{D}} = \sum_{k=t}^{k=-t} \hat{b}_i^k \tag{3..4}$$

where $\hat{b}_i^k$ symbolizes range of regression coefficients.

As a result of total 11 different estimating CAPM measures of beta through time-series each one of cross-sectional beta coefficients, as long as estimation period lengths increase with monthly or daily data, standard deviation of each estimating beta proceeds to decrease significantly. Moreover, Bali et al. (2016) state that effects of β_i^{SW}, β_i^{D} which derive from simple regression model are noninfluential over true value of beta.

Bali et al. (2016) measure also market beta with Fama -MacBeth regression except CAPM regression. Before calculating different market beta, it is necessary to winsorization about estimating beta values in order to eliminate extreme values for both upper and lower limit. Prior to time-series averages of monthly cross-sectional regression coefficients for each different market betas, it should determine monthly cross-sectional regression coefficients in which future stock excess return that is dependent variable belongs to the ensuing month

relative to market excess return. While, there are two several ways such as daily and monthly return based for the estimating market betas, monthly based data are not statistically significant rather than daily based data. By means of Fama-Macbeth regression analyses, assumption of CAPM, it means that positive relation between excess return and beta, is not valid again for aforementioned empirical analyses. Moreover, mean of intercept coefficients is also positive and statistically significant along analysis against CAPM's other prediction. According to Black et al. (1972), this prediction is based on not be possible risk-free security and thus every portfolio in model separates as zero-beta and non zero beta. If market beta, namely non-zero beta is only effective factor for average excess return on CAPM regression, intercept terms should be zero over excess return. However, results of adjusted R-squared along Bali et al. (2016) 's empirical analysis are so low rather than 1 and close to zero. This result demonstrates that proxy determinants are not chosen successfully in order to expect future return.

When analyzed the articles associated with the relation between industry concentration and average returns, their method about estimation of beta is based on the technique of Fama and French (1992). According to Fama and French (1992)'s empirical analysis, β is not any more only determinant for the future excess return against CAPM's prediction such that β is insufficient for measure stock risk by indicating insignificant relation on expected excess returns. Therefore, considering by firm's characteristic data such as size, book-to-market ratio, leverage, earning price ratio is tried to construct multifactor asset pricing model in order to predict stock returns risk. Size and book-to-market ratio are used as robust proxies rather than β on relevant empirical analyses. It is important for us to understand techniques of estimation beta which is placed in this empirical analysis. During analysis period, cross-sectional stock returns is calculated monthly for the regression analysis.

Differential technique of Fama and French (1992) is started from the estimation of beta for the market portfolios by using both size and pre-ranking betas criteria. Initially, stocks are sorted through 10 size quintiles and thereafter these 10 size quintiles portfolios are separated again by means of pre-ranking betas using five

annual basis period lengths data with monthly frequencies data. Therefore, while stocks is placed in size-beta portfolios at each June of t year, expected future return is determined through equal-weighted portfolio on one-year-ahead. Finally, the regression of average returns from 100 size-beta portfolios on market return provides estimating beta according to CAPM model. Fama and French (1992) apply full-period β in order to determine beta of 100 size-beta portfolios as well as theirs stock returns via the Fama-MacBeth cross-sectional regression.

Hou and Robinson (2006) and Hashem and Su (2015) which follow the same relevant methods but only calculating of periods lengths for pre-ranking are different. However, it is worth mentioning that emprical analyses based on long data period are designed to technique of Fama and French (1992) by using pre-ranking betas. For instance, Dan et al. (2007)'s empirical analysis periods continues along only 4 yearly length for calculating control variables because of avoiding from deviation among Chinese stock market returns. Therefore, Dan et al. (2007)'s analysis indicates that monthly excess return of individual stocks regressed on market index monthly return during 36 months. In addition, Fama and French (1992) use non financial firms because financial firms lead increasing in leverage ratio due to distress risk.

We will measure quarterly market beta through regression of firm's stock excess return on market return portfolio of BIST100 along calculating period from March 1998 to December 2018 . We don't use technique where is applied as monthly data's afromentioned examples due to avoiding from time lag between accounting variables. Therefore, calculation of stock return and other control variables be occurred simultaneously.

We follow our estimation of beta according to Lau et al. (2002)'s calculating of estimated beta which is named post-ranked beta. However, we calculate quarterly post-ranked beta differently from Lau et al. (2002). Relevant empirical analysis's data short period lengths resembles to our analysis's time period. Considering that this empirical analysis, firstly it is required to examine between 24 and 60 monthly data set in order to estimate the market beta. Contrary to Fama and French (1992) which determine pre-ranking beta precede from the post-ranking betas by using aforementioned time period, Lau et al. (2002) do not calculate

pre-ranking beta due to short time period data. After determining number of portfolios by composing equally firm number in each portfolio, it is calculated equally weighted portfolio returns from July of initial year (t) to June of following year (t+1). We calculate regression of portfolio returns over quarterly market return due to BIST 100 index. We don't take into account current and lagged market return together due to lack of stock price over past years for calculating lagged market beta. As a result, forgoing stages are applied quarterly along our data period from March 1998 to December 2018. Therefore, estimated beta is the mean of quarterly all portfolio's beta.

2.2.2. Size

In literature, articles refer size effect with market equity or market capitalization. Mathematically, market equity is briefly that number of shares times stock price. Banz (1981) explains the size effect as the negative relation between stock return and market capitalization. In fact, there are various empirical analysis connected with size effect. One of those is Simlai (2009) which examines effects of firm's characteristics variables like size and book-to-market ratio over explanation of stock excess returns by considering conditional variance of error term and by calculating logarithmic form of dependent variables against changes in time. By considering Fama and French (1993)'s technique in Simlai (2009)'s analysis, portfolios which relate to risk factors are sorted according to three and two categories respectively for book-to-market ratio and size. One of the relevant variable which is size as proxy for risk factor (SMB) stated the difference between small and big size size portfolio returns. Moreover, these returns split itself into three categories according to book-to-market equity value(HML). Simlai (2009) obtains the results that excess return decreases against rise of size decile in case of portfolios sorted only size criteria. In addition, time series regression of excess returns portfolios grouping with size and book-to-market ratio on three risk factor which is size (SMB), book-to-market ratio (HML) and market premium (MKT) is statistically significant about determining of the excess returns. Therefore, SMB factor decreases once more against rise of size decile in relevant

time series regression.

Another empirical example is Lau et al. (2002). In this example, it is observed cross sectional regression of excess returns on firm's variable like size, beta, book-to-market ratio, sales growth, cash flow to price ratio and earning price to ratio from 1988 to 1996 according to Malaysia and Singapore data's separately. Lau et al. (2002) divide cross-sectional regression analysis into subsequent period such as January monthly data and except of January monthly data by modeling empirical analysis of Pettengill et al. (1995) which is stated various relation between stock return and beta relative to positive or negative market premium. When analyzed size effect on excess stock return regression adding others control variables, as a result of cross-sectional regression Lau et al. (2002) obtains negative relation between size which is calculated as natural logarithm of market capitalization and excess stock return both Singopore and Malaysia countries for except monthly January data. Moreover, size is not statistically significant for January data with respect to determining excess stock returns.

In our empirical analysis, we calculate size as stock's number of shares outstanding of times relevant stock price according to quarterly data from March 1998 to December 2018. In fact, aforementioned calculation defines market capitalization (MktCap). In literature, most researchers such as Hou and Robinson (2006) determine size variable by calculating as ln MktCap due to possibility of extreme variation in stock prices causing skewness problem. Therefore, we use ln MktCap in our regression analysis.

2.2.3. Momentum

At first glance, according to Jegadeesh and Titman (1993), the concept of momentum in order to predict excess stock return arises from strategy of contrarian portfolios which based on investing in stocks with low performance in contrast to stocks with high performance considering past three or five year's observations for these stock returns. Relative strengths strategies predicate opposite strategy of the preceding one. However, effects of both strategies restricts with regards to time period because of short or long term reversal effect when examined most of empirical analysis in literature. Moreover,

Jegadeesh and Titman (2001) make inferences empirically in the matter of validity for behavioral or rational arguments of momentum effect on estimating future excess return by enlarging data period than Jegadeesh and Titman (1993) from 1965 to 1998. In fact, latter article resembles to first in terms of results as summary statistics even though long duration analysis in the latter. However, it is worth mentioning that there are differences about portfolio formation among two analysis. One of the most important difference is removing stocks which are either cheaper from $5 or have smallest decile among market equity sorting. This implementing provides decreasing January effect which is based on negative return between first and tenth decile portfolio with ordering past 6 month returns in contrast to other months on portfolio return through momentum factor. As a result of Jegadeesh and Titman (2001)'s analysis, behavioral arguments may be appropriate to explain instability over excess return due to validity period of momentum factor and this process is limited with 12 months since formation of portfolio in mentioned analysis.

We calculate momentum factor based on past 11 monthly stock returns by following method of Bali et al. (2016). According to this method, it is preferred past 11 monthly stock returns from t-11 to t-1 instead of past 12 monthly stock returns because of short-term reversal effect. Relevant calculation method is represented as follows :

$$\text{Mom}_{i,t} = 100 \left[\prod_{m=t-11}^{t-1} (R_{i,m} + 1) - 1 \right]$$

where $R_{i,m}$ defines stock return i for the month m.

2.2.4. Book-to-Market Ratio

One of the most important controlling variable that is book to market ratio is defined by dividing book value of equity to its market value. Fama and French (1992) put emphasis on effects of book-to-market ratio factor on concerning prediction for excess return. Furthermore, Fama and French (1993) use relevant factor with size factor as mimicking return's portfolio while it is formed portfolios through these factor in order to estimate time-series regression analysis on stock returns.

Pontiff and Schall (1998) obtain statistically significant result on prediction of market return through book-to-market ratio by the reason of its book value which is leading indicator for variation's cash flow. Considering that estimation of market return, Down Jones Industrial Average Index is used in an attempt to calculate book- to-market ratio specific to industry level rather than firm level. According to Pontiff and Schall (1998)'s book-to-market ratio, book value consists of stock's book value included in relevant index. While denominator defines current level of index, numerator dates from December of previous given year t. Divergence in computational time is eliminated through first-order autoregressive technique and time series regression executes by assigning mimicking independent variables. In addition, time series regression of various market returns is executed on Down Jones book-to-market ratios with other independent variable related to several dividend and bond yields. Although results of this regression for Dow Jones book-to-market ratio's significance level change over different time period, generally it is successful in order to explain estimation of future returns. This empirical analysis reveals that book-to-market ratio is important indicator for future market returns as long as book value converge to estimated cash flow.

Similar to afromentioned empirical analysis, Lewellen (2004), Fama and French (2008) use book-to market ratio owing to prediction of future excess return. However, Lewellen (2004) points out that book-to-market ratio explains estimation of future excess return since there is positive relation between discount rate and book-to-market ratio without referring to cash flow. Moreover, considering relevant analysis, dividend yield is deemed successful for expectation market returns rather than book-to-market and operating earnings to price ratio.

Fama and French (2008) examine relation book-to-market ratio and prediction of stock returns instead of market return. Variation in the expected cash flows is at the center of the change in book-to-market ratio. Therefore, Fama and French (2008) reform book-to-market ratio as follows:

$$\mathrm{BM}_t = \mathrm{BM}_{t-k} + dB_{t-k,t} - dM_{t-k,t}$$

where BM_t defines logarithmic function of B/M ratio at time t, BM_{t-k} is

logarithmic function of B/M ratio at time t-k, $dB_{t-k,t}$ denotes change among these logarithmic function from t-k to t, finally, similarly, $dM_{t-k,t}$ implies change in logarithmic function of price from t-k to t. Using of mentioned equation is tried to gather information about variation of price and book value of equity in order to increase robustness of future return's prediction. As a result of Fama and French (2008) while change in book value of equity may try to interpret through various method or different sample , change in price due to business cycle is not estimated easily.

In empirical literature, it is considering book-to-market ratio from a different angle in terms of ratio's examination through value premium with other controlling variable for more than one countries such as Fama and French (2012), Cakici et al. (2013), Cakici et al. (2016).

Consequently, in order to examine book-to-market ratio we use book value of equity and market value of equity according to quarterly data from March 1998 to December 2018. In addition, we could use market equity which is calculated as size variable because we don't account both size and book-to-market ratio at different time periods.

2.2.5. Earnings

Ball (1978) explores the relation between earning-price ratio and expected returns through the concept of risk. In this article, risk, expected returns and earnings correlate with positively each other.

Bali et al. (2008) focus on significance of earnings by categorized as firm's level earning and aggregate earnings for estimation stock return. In this study, it is worthy of notice that aggregation level of firms changes results. By considering the main findings of relevant study, whereas aggregate earnings with 17 industry portfolios is not robust results for estimation of excess returns, aggregate earnings with 48 portfolios is statistically significant about estimation of excess returns.

We measure return on sales and return on assets instead of earning-price ratio. Return on sales is the ratio of net profit due to income statement at quarterly data to sales from quarterly data also. In a similar manner, we calculate return on sales such as the ratio of net profits to total sales. However, Hou and Robinson (2006)

examine earnings such that earnings are equal to income before extraordinary items plus interest expense plus income statement deferred tax.
According to Fama and French (1992), earning is equal to income before extraordinary items plus income statement deferred taxes minus preferred dividend.

2.2.6. Leverage

We calculate leverage at given year t as the ratio of total debt t due to income statement at quarterly data to equity. In addition, we measure leverage as the ratio of market value of firm to total assets. Market value of firm is obtained both directly from FINNET's data and from Hou and Robinson (2006)'s market value of firm equation. According to related equation, market value of firm is equal to size plus total assets minus equity.
Fama and French (1992) observe this control variable by separating two types which are the ratio of total asset according to book value of equity and to market value of equity. In this study, one of the two types of leverage is explained positively excess return, and the other one is opposite to former result.

2.3. The Concentration Spread

The spread is applied in industries sorting by quintiles calculated with Herfindahl Index on sales, equity, assets etc. Average stock returns which belong to these concentration quintiles are separated into firm and industry levels. As mentioned sample articles like Hou and Robinson (2006),Dan et al. (2007), Ignatieva et al. (2011), Hashem and Su (2015) determine concentration quintiles according to June of each year but calculating periods of average stock returns can change among articles. While quintile 1 represents more concentrated firms or industries, quintile 5 represents most competitive firms or industries. By means of firms in each concentration quintiles are calculated equally weighted average stock returns for firm-level returns. However, if industry-level returns will be measured, it should be computed average firms' returns for each industry prior to calculated equally weighted average returns of each industry sorted according to concentration quintile. Finally, obtained

results in mentioned articles are statistically significant at 5%.

Hou and Robinson (2006) generate concentration spread tables not only with monthly average stock returns but also adjusted average returns are added in this table. According to Hou and Robinson (2006), through following method of Daniel et al. (1997) adjusted firm level return is created. Firstly, for obtained adjusted firm level return, raw return is eliminated from the effect of controlling variable which is size, book-to-market, momentum by means of benchmark. This benchmark is arranged by grouping all sample portfolios according to relevant variables. Therefore, adjusted return should be equal to zero providing that afore-cited controlling variables explains completely total variation in stock returns. Concentration quintiles via five different groups are determined in June of each year. When analyzed results for both firm level and industry level about raw returns, it is stated that negative relation between concentration and average returns. In addition, difference between Quintile 5 and Quintile 1 for adjusted returns in firm level or industry level changes slightly. It means that industry concentration is directly average excess returns without other controlling variables.

Dan et al. (2007) examine industry concentration effect on stock returns with table of concentration spread and cross-sectional average returns by sorting quintiles based on net sales, equity and total asset. Unlike Hou and Robinson (2006), average stock returns are calculated as yearly not monthly and in addition to this, adjusted stock return is not used as independent variable. Moreover %5 significant level is also valid in this table. When examining the results in the table, there is negative and decreasing relation between average yearly stock returns and concentration both firm-level returns and industry level returns in Chinese capital market. Therefore, as long as industry concentration level augments, average stock return decreases contrary in contrast to Hou and Robinson (2006).

Another example is a subject of Australian stock market. Ignatieva et al. (2011) follow same method with Hou and Robinson (2006) as well as using raw returns in concentration spread related to average returns. On the contrary of Hou and Robinson (2006), in this relation raw returns are positive and increasing

towards more concentrated firms or industries. T-statistic which are belongs to average raw returns on firm and industry level is more than %5 significant level. Although adjusted average returns on firm and industry level increase according to average return from quintile 5 to quintile 1 concentration, but this rises is not monotonically and not statistical significant for adjusted return on industry level.

Finally, even though Hashem and Su (2015) for U.K stock return markets obtain similar results with Hou and Robinson (2006) by not using average adjusted returns both firm and industry level.

In order to prepare concentration spread table in our case, we will apply other technique and different time interval between average stock returns and sorted quintiles rather than Hou and Robinson (2006). We study three time periods which are involved, 1998q2-2002q4, 2003q1-2009q4, 2010q1-2018q4. In addition, we use H(Assets) and H(Equity) in order to determine average stock return.

2.4. Fama-MacBeth Cross-Sectional Regressions

Hou and Robinson (2006) make use of Fama-MacBeth(FM) regressions in order to determine whether industry concentration, which is measured as $H(Sales)$, relate with calculated monthly stock returns. When analyzed this relation, regression is separated as firm-level regressions and as industry-level regressions. Therefore, dependent and independent variables in both level regressions changes by considering types of level like industry average returns against individual stock returns. While average coefficient of leverage is statistical significant as univariate regressions on the contrary multivariate regressions, industry concentration is statistical significant both at two variety of regression analysis as well as it remains valid for two level regressions. Therefore, contrast in competition and average returns continues throughout mentioned levels regressions.

It is worth noting that whether above-mentioned inference is valid for examples articles in literature such as Dan et al. (2007), Ignatieva et al. (2011), Hashem and Su (2015).

Even though regression analysis in Dan et al. (2007) provide also statistical

significance for impact of concentration on average returns, associated with controlling firm's characteristics variables, this findings are not similar effect like Hou and Robinson (2006) due to positive relation between industry concentration and stock returns both firm and industry level. Dan et al. (2007) correlates these results with generally low quality of least concentrated industries and high profitability of more concentrated industries in Chinese stock market.

In Australian stock market's example, Ignatieva et al. (2011), reveal the same results with Chinese stock market's example in which there is negative relation between industry concentration and average stock returns through by use of time-series of Fama-MacBeth regression with controlling variables.

Hashem and Su (2015) apply Fama-MacBeth regression of firm and industry level monthly stock returns associated with controlling mentioned independent variables such as post ranking beta, book-to-market ratio, leverage, momentum, size. According to Hashem and Su (2015) agreed with Hou and Robinson (2006), as long as distress risk decreases, excess return will decrease because of return due to risk. Although $H(Sales)$ index is statistically significant for average stock returns regression, significance of other controlling variables varies by single regression or multiple regression or by different sample. For the sake of example, competitive industries in American product market lead higher leverage ratio and then higher leverage causes increasing in return on equity based on excess return of competitive industries. However, decreasing in return depends on higher leverage for UK's example. Finally in accordance with outcome from Hashem and Su (2015)'s research industry-level regression resembles to firm-level regression. Consequently, in the light of foregoing articles, we will construct time-regression analysis of stock returns for concentration index by taking into consideration other independent variables. Our Fama-MacBeth cros-sectional regression is that:

$$R_i = \delta_0 + \delta_1\beta + \delta_2 H(\text{Sales}) + \delta_3 \ln(\text{Size}) + \delta_4 \ln(\text{BM})\delta_5\text{Momentum} + \delta_6\ \text{Leverage} + \varepsilon_i$$

where R_i represents in logarithmic function of dependent variable and is defined as time-series of average monthly stock returns. $H(\text{Sales})$ indicates that total

sales, while ln (Size) and Leverage indicate outstanding shares times firm's stock price and the ratio of total debts to equity, respectively. ln (BM) is the ratio of equity to size.

4. EMPIRICAL RESULTS

1. Summary Statistics

1.1. Summary Statistics For Concentration Ratios

In order to examine the relation between concentration ratio and stock return, we present primarily summary statistics for concentration ratios in Table 4.1. These ratios are calculated by means of HHI. Hsales, Hassets, Hequity are the types of concentration ratios. Based on 261 firm's in our quarterly dataset; total sales, total assets and equity are used respectively to measure Hsales, Hassets and Hequity. Industry classification of mentioned 261 firm's is required to determine HHI. Therefore, we use two-digit NACE Rev 2. codes for this classification. In addition, quarterly our dataset is obtained from March 1998 to December 2018 by means of Financial Information News Network (FINNET). When analyzed mean values of concentration ratios in Table 4.1, the value of Hsales is 0.495 and thus is higher rather than others. While all types of concentration ratios have same worth in terms of maximum and minimum, its percentile values are changed. For instance, 90% of Hsales's survey data is arranged from 0 to 0.991. As long as concentration ratios's value converges to 1, it means that competition in firms are decreasing.

Table 4..1: Summary statistics of HHI

Variable	Obs	Mean	Std. Dev.	Min	Max	P1	P10	P50	P90	P99
Hsales	15868	.495	.279	0	1	0	.243	.406	.991	1
Hassets	15868	.401	.268	0	1	0	.156	.317	.911	1
Hequity	15868	.43	.244	0	1	.118	.162	.379	.865	1

In Table 4.2, we examine cross-correlation for concentration ratios in terms of Hsales, Hassets and Hequity. If the correlation of two variables converges to

1, these variables are correlated highly between each other. Whereas Hassets interacts with Hequity with valuing at 0.496, correlation result between Hsales and Hequity is 0.312 and decreases rather than the preceding one.

Table 4..2: Cross-correlation for HHI table

Variables	Hsales	Hassets	Hequity
Hsales	1.000		
Hassets	0.239	1.000	
Hequity	0.312	0.496	1.000

1.2. Summary Statistics For All Variables

According to our quarterly survey data obtained from FINNET, we create table (Table 4.3) for descriptive statistic including entire variables without any exception such as dependent, independent or controlling variables. Size is equal to outstanding shares of firms in our data times its closing prices. We use ln(Size) in order to eliminate skewness problem arising from extreme value of stock prices. While return on assets is obtained through the ratio of firm's net profit or loss to total assets, return on sales is the ratio of firm's net profit to sales. In this table, there are more than one types variable for market value of firm and for leverage. Hou and Robinson (2006) calculate market value as size plus total assets minus equity. In addition, we use directly firm's market value quarterly data by means of FINNET. Book to market value is defined the proportion of equity to size. Beta is calculated quarterly and market return is obtained from BIST100 index. Furthermore, firm's quarterly stock return is used for calculation of momentum. While leverage 1 is defined as the ratio of total debts to equity, leverage 2 is equal to the ratio of total assets minus equity to equation of market value using Hou and Robinson (2006)'s method.

Table 4..3: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	P1	P10	P50	P90	P99
Total Sales	9129	3604921	1.25e+07	208.418	2.08e+08	10834.48	95357.43	686847.2	6419891	5.03e+07
Total Assets	12706	5052952	1.50e+07	101.419	3.05e+08	41151.81	163070.2	1116571	1.07e+07	8.32e+07
Book to Market Value	15056	9.814	50.184	.001	1870.961	.083	.343	1.577	14.279	169.401
Dividend to Equity	5750	.107	.144	.001	2.68	.004	.015	.067	.232	.596
Leverage 1	14476	3.635	131.329	0	15588.83	.003	.086	.844	3.757	21.218
Leverage 2	12059	.677	53.374	-4347.018	3736.081	-11.108	-.471	.824	1.495	12.849
Market Value to Total Assets	12589	15.889	146.35	0	12301.46	.002	.038	.636	11.564	307.677
Market Value to Assets 2	12059	.66	64.119	-6435.702	536.781	-60.55	-1.379	.956	2.51	58.221
Return on Sales	9129	.017	.374	-15.17	3.506	-.808	-.128	.037	.184	.585
Return on Assets	12471	1.029	21.41	-144.536	2249.941	-.829	-.047	.013	.587	20.596
ln(Size)	15711	17.539	2.657	7.413	24.578	10.469	14.035	17.673	20.827	23.418
Beta	15868	.722	.219	-5.001	7.356	.069	.484	.744	.942	1.065
Momentum	15723	102.96	13.347	34	485	74	92	101	116	146

1.3. Descriptive Statistics of H(Sales) Sorted Quintile Portfolios

Before the analyzing relation between stock return and concentration ratios, we work with portfolios which are arranged by means of H(Sales) quintiles in order to examine between relation concentration ratio such as H(Sales) and controlling variables. H(Sales) is consisted of four rank varying by concentration level. Whereas H(Sales) is 0.9114 in most concentrated industries, H(Sales) is 0.2004 in most competitive industries. $In(Size)$ is higher for most concentrated firm rather than least concentrated. When analyzed mean value of sales and assets among related ranks, the highest concentration quintile has maximum value. However, dividend to book equity does not tend to rise as long as increasing concentration level. Moreover, book to market value in more competitive industries is significantly higher rather than other quintiles. It is worth noting that return on assets (ROA) and return on sales (ROS) are not highest for more concentrated industries. In opposition to our conclusion related ROA and ROS, Hou and Robinson (2006) finds positive relation between increasing concentration quintile and return on assets and return on sales. Therefore, the profitability of most concentrated industries is considered as entry barrier for competitive firms according to Hou and Robinson (2006)'s result. Types of leverage are not stable among concentration quintiles. In addition, market value to total assets (MVA) is highest value for competitive firms unlike Hou and Robinson (2006). Beta does'nt vary considerably between concentration levels.

Table 4..4: Characteristics of H(Sales) Sorted Quintile Portfolios

Rank	Hsales	ln(Size)	Assets	Sales	DB	ln(BM)	Beta	Lev. 1	Lev. 2	MVA2	MVA	ROA	ROS	Mom.
Low	0.2004	16.9693	3638424	2055926	0.0999	0.9242	0.7357	2.3324	2.0973	-0.2973	20.2936	1.1068	0.0207	103.5664
2	0.3570	17.8775	4158080	3204002	0.1168	0.4671	0.7153	7.3957	0.5765	2.8026	11.0430	0.6048	0.0145	102.3089
3	0.5108	17.7514	6055654	2934823	0.0955	0.5841	0.7210	2.9629	-0.4679	-0.8500	17.7872	1.5027	0.0327	102.9278
Highest	0.9114	17.5508	6279540	6126806	0.1145	0.5763	0.7154	1.8100	0.6791	0.9307	14.8783	0.8953	0.0006	103.0378

2. Panel Data Results

In Table 4.5, we observe simple regression of H(Sales) on controlling variables. We use Fama and MacBeth (1973) cross-sectional regression and we utilize Hou and Robinson (2006)'s regression equation:

$$\text{H(Sales)}_{jt} = \alpha_t \sum_{n=1}^{N} \lambda_{nt} X_{jt} + \varepsilon_{jt}$$

where X_{jt} denotes controlling variables. From March 1998 to December 2018, regression of H(Sales) on mentioned variables calculates as quarterly periods. While in the first row it is defined times series average of quarterly cross sectional coefficient estimates, second row is in use for t-statistics. When analyzed coefficient estimates of related variables, none of them is not statistically significant at the 5% level.

Table 4..5: Simple Regressions for Several Variables

ln(Size)	ln(Assets)	ROA	ROS	MVA	DB	Leverage	ln(BM)	Beta
0.0051	-0.0028	-0.0001	0.0059	-0.0001	0.21251	-0.0018	-0.0098	-0.037
(0.4347)	(-0.0424)	(-0.1416)	(-0.0951)	(-0.3684)	(0.5884)	(-0.2351)	(-0.5609)	(-0.3108)

In the following Table 4.6, Table 4.7 and Table 4.8, we employ panel data method in order to analyze pooled, random and fixed effects of H(Sales), H(Asset) and H(Equity)regression on controlling variables. These variables consist of $ln(Size)$, return on assets, dividend to equity, leverage 1, $ln(BM)$, beta. In addition, we have unbalanced panel data for mentioned effects and t-statistics is stated in parentheses as noted in second row.

When observed pooled approach due to OLS (ordinary least squares) method in Table 4.6, return on assets, leverage 1 and $ln(BM)$ are not statistically significant. We obtain pooled effects by pooling data of all variables over time period and thereafter we use OLS method for coefficient estimates of variables.

Wooldridge (2015) explains that fixed or random effects in panel data are due to unobserved factors. These unobserved factors influence dependent variables through two channels such as time-variant effect or vice versa. In addition, Wooldridge (2015) examines related effects by using regression model which is

that:

$Y_{it} = \gamma_0 + \delta_0 d2_t + \gamma_1 X_{it} + \alpha_i + \varepsilon_{it}$

where $t = 1, 2$ and i uses for the explanation of cross-sectional unit. α_i denotes fixed effect or unobserved effect which does not change over time. Although panel data provides the correlation between this effect, α_i , and independent variables like $\gamma_1 X_{it}$. In addition, Wooldridge (2015) uses fixed effect estimator like first-differenced estimator in order to remove unobserved effects because of constant over time. When analyzed the fixed effects in Table 4.6, leverage 1, $ln(BM)$ and beta have statistically significant effects on H(Sales) and there are negative relation between H(Sales) and mentioned independent variables.

Random effect estimator is used for removal of the unobserved effect but in this situation, explanatory variable is not correlated with unobserved effect. According to last column of the Table 4.6, leverage 1 and $ln(BM)$ are highly negatively correlated with H(Sales). The cross-sectional regression coefficient of beta correlates statistically significant with H(Sales).

Table 4..6: Regression table for Hsales

	(1) Pooled	(2) Fixed	(3) Random
ln(Size)	0.00876***	−0.00257	−0.00265
	(3.66)	(−0.81)	(−0.88)
Return on Assets	−0.0000789	−0.00107	−0.0000606
	(−0.71)	(−1.25)	(−0.49)
Dividend to Equity	0.0684**	0.0178	0.0208
	(2.63)	(0.89)	(1.05)
Leverage 1	0.00279	−0.00944***	−0.00834***
	(1.81)	(−3.94)	(−3.82)
lnBM	−0.00725	−0.0228***	−0.0227***
	(−1.57)	(−4.03)	(−4.22)
Beta	0.112***	−0.0533**	−0.0488**
	(5.79)	(−2.86)	(−2.68)
Constant	0.257***	0.624***	0.599***
	(5.68)	(9.50)	(9.58)
Observations	4534	4534	4534

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The time series of average cross-sectional regression of H(Equity) is presented in the Table 4.7. According to first column of this table, leverage 1 is negatively correlated with H(Equity). In related column, pooled effects is valid. While return on assets, leverage 1 are highly and negatively correlated with H(Equity) in terms of fixed effects, $ln(Size)$, $ln(BM)$ have the positive effects on H(Equity). However, regression coefficient of beta is not significant for H(Equity). According to random effects in third column of Table 4.7, $ln(Size)$, $ln(BM)$ have positive and significant effect on H(Equity). Leverage 1 is correlated with negatively H(Equity).

Table 4..7: Regression table for Hequity

	(1) Pooled	(2) Fixed	(3) Random
ln(Size)	−0.000535	0.00532**	0.00419**
	(−0.23)	(3.28)	(2.63)
Return on Assets	−0.0000734	−0.00198***	−0.000192
	(−0.69)	(−4.53)	(−1.73)
Dividend to Equity	−0.000872	−0.0115	−0.0107
	(−0.04)	(−1.13)	(−1.06)
Leverage 1	−0.00437**	−0.00635***	−0.00648***
	(−2.96)	(−5.22)	(−5.45)
lnBM	−0.00401	0.0128***	0.0111***
	(−0.91)	(4.47)	(3.94)
Beta	0.0305	0.00111	0.000497
	(1.64)	(0.12)	(0.05)
Constant	0.414***	0.324***	0.349***
	(9.54)	(9.71)	(9.50)
Observations	4534	4534	4534

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$ln(Size)$, $ln(BM)$ have negatively and significant effects on H(Assets) in terms of pooled effects in Table 4.8. Dividend to equity and leverage 1 are highly positively statistically significant (t-statistics are 3.29 and 6.39 respectively). For fixed effects, $ln(Size)$, $ln(BM)$ are highly and negatively significant for H(Assets). Similarly, $ln(Size)$, $ln(BM)$ have highly and negatively significant effects on H(Assets) according to random effects.

Table 4..8: Regression table for Hassets

	(1) Pooled	(2) Fixed	(3) Random
ln(Size)	-0.00869^{***}	-0.0201^{***}	-0.0201^{***}
	(-3.56)	(-8.65)	(-8.96)
Return on Assets	-0.0000581	-0.00112	-0.000107
	(-0.51)	(-1.80)	(-0.89)
Dividend to Equity	0.0872^{**}	0.0266	0.0282
	(3.29)	(1.84)	(1.95)
Leverage 1	0.0100^{***}	-0.00314	-0.00290
	(6.39)	(-1.81)	(-1.75)
lnBM	-0.0159^{***}	-0.0137^{***}	-0.0140^{***}
	(-3.38)	(-3.36)	(-3.51)
Beta	0.0282	-0.0148	-0.0133
	(1.43)	(-1.10)	(-1.00)
Constant	0.517^{***}	0.785^{***}	0.797^{***}
	(11.19)	(16.50)	(16.40)
Observations	4534	4534	4534

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 4.9, regression of firm's excess returns on H(Sales) concentration quintiles by dividing observation period into four sub-periods such as 1998q2-2002q4, 2003q1-2009q4, 2010q1-2018q4. We define excess return as the difference between firm's stock return and average of total stock returns appertaining to its quarterly period. Therefore, firm's average stock returns regression is determined by taking H(Sales)'s concentration quintiles and observation period of return into consideration. Moreover, we examine regression of average stock return on H(Assets) and H(Equity) concentration ratios regardless of sub-period observation. None of excess return's coefficient estimates is not statistically significant at the 5% level.

Table 4..9: Average Stock Returns

Periods	**1**	**2**	**3**	**4**
1998q2-2002q4	-0.0014	0.0126	-0.01376	0.003107
	(-0.017)	(1.09)	(-1.19)	(0.27)
2003q1-2009q4	0.0032	-0.0036	0.0003	-0.0002
	(0.56)	(-0.53)	(0.04)	(-0.03)
2010q1-2018q4	0.002	-0.0018	-0.0007	0.001
	(0.4)	(-0.38)	(-0.16)	(0.22)
H(Assets)	0.0014	-0.0001	-0.0022	0.001
	(0.38)	(-0.04)	(-0.62)	(0.28)
H(Equity)	-0.0001	-0.0031	0.002	0.0012
	(-0.01)	(-0.87)	(0.54)	(0.33)

We use Fama and MacBeth (1973) cross-sectional regression of firm's stock return on H(Sales) as concentration ratio and on other controlling variables such as ln(Size), ROA, ROS, dividend to equity, leverage 1, In(BM), beta. We use quarterly and unbalanced panel data as used in other our tables. In addition, we define Fama and MacBeth (1973) cross-sectional regression as indicated below:

$$R_i = \delta_0 + \delta_1\beta + \delta_2 H(\text{Sales}) + \delta_3 \ln(\text{Size}) + \delta_4 \ln(\text{BM}) \delta_5 \text{Momentum} + \delta_6 \text{ Leverage} + \varepsilon_i$$

where R_i represents in logarithmic function of dependent variable and is defined as time-series of average monthly stock returns. $H(\text{Sales})$ defines that total sales, while $\ln(\text{Size})$ and Leverage indicate outstanding shares times firm's stock

price and the ratio of total debts to equity, respectively. ln (BM) is the ratio of equity to size. According to Table 4.10, coefficient estimate of cross-sectional regression for H(Sales) is not statistically significant such as other controlling variables with excluding momentum variable. Furthermore, momentum is statistically significant along with each regression of excess return on independent variables's several combinations.

Table 4..10: Fama-MacBeth Regressions

H(Sales)	**ln(Size)**	**ln(BM)**	**Momentum**	**Beta**	**Leverage**
-0.0058	0.0067	-0.0023	0.0091	-0.0201	-0.0015
(-0.1052)	(0.6465)	(-0.1543)	(5.885)	(-0.1848)	(-0.2449)
	0.0067	-0.0023	0.0091	-0.021	-0.0016
	(0.6451)	(-0.1494)	(5.9233)	(-0.1932)	(-0.2438)
		-0.0075	0.0092	0.005	-0.0018
		(-0.5473)	(5.99)	(0.0906)	(-0.3502)
			0.0092	-0.0026	-0.0012
			(6.0299)	(0.0239)	(-0.2185)
				0.0076	-0.0012
				(0.1388)	(-0.2092)
					-0.0011
					(-0.1853)

2.1. Periods

In the following Table 4.11, Table 4.12 and Table 4.13, we report pooled, fixed and between effects according to mentioned periods which are 1998q2-2002q4, 2003q1-2009q4, 2010q1-2018q4. According to between effects, between regression estimator is used in random effects model. In Table 4.11, data survey is referred to from June1998 to December2002. While time-series of average cross-sectional coefficient for $ln(Size)$ is positively and significant effects on firm level stock returns. H(Sales) has not significant effect on stock returns. Momentum is highly statistically significant for the cross-sectional regression of firms' stock returns. Abovementioned results are valid in terms of the pooled effects. Similarly, momentum is highly statistically significant in terms of fixed effects. $ln(BM)$ is highly and significantly correlated with firms' stock returns. According to between effects, H(Sales) and leverage 1 have not significant effects on mentioned returns.

Table 4..11: Regression table for Period 1

	(1) Pooled	(2) Fixed	(3) Between
Hsales	−0.00995	−0.0615	0.0144
	(−0.51)	(−1.32)	(0.71)
ln(Size)	0.0112**	−0.00542	0.0131**
	(2.76)	(−0.60)	(3.08)
lnBM	0.00388	−0.0445***	0.0181**
	(0.72)	(−3.48)	(3.28)
Momentum	0.00383***	0.00378***	0.00351**
	(13.31)	(12.66)	(2.93)
Beta	−0.0551	0.137	−0.124**
	(−1.42)	(1.05)	(−3.24)
Leverage 1	0.0000230	0.00000706	0.0000309
	(1.35)	(0.35)	(1.92)
Constant	−0.526***	−0.303	−0.512***
	(−7.64)	(−1.58)	(−3.59)
Observations	2431	2431	2431

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 4.12, regression of firms' stock return is obtained during 2003q1-2009q4. Whereas momentum is highly and positively statistically significant on stock return's regression along with effects of three types. H(Sales) is not significant during related effects.

Table 4..12: Regression table for Period 2

	(1) Pooled	(2) Fixed	(3) Between
Hsales	−0.00843	0.0226	−0.0139
	(−0.76)	(1.32)	(−0.95)
ln(Size)	0.00579**	−0.00306	0.00564**
	(2.76)	(−0.43)	(2.66)
lnBM	0.000788	−0.0288**	0.00945**
	(0.27)	(−3.21)	(2.90)
Momentum	0.00642***	0.00633***	0.00677***
	(26.74)	(25.90)	(4.27)
Beta	−0.00259	0.0752	−0.0206
	(−0.11)	(0.80)	(−0.89)
Leverage 1	−0.000246	−0.000724	0.00126*
	(−0.74)	(−1.88)	(2.17)
Constant	−0.746***	−0.632***	−0.774***
	(−17.46)	(−3.99)	(−4.72)
Observations	4162	4162	4162

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 4.13, we report the time-series of average cross-sectional regression of firm level stock return on both H(Sales) and other controlling variables during 2010q1-2018q4. Similarly H(Sales) is not statistically significant for firm's stock return in terms of related effects.

Table 4..13: Regression table for Period 3

	(1) Pooled	(2) Fixed	(3) Between
Hsales	−0.00237	−0.0137	0.00518
	(−0.29)	(−0.78)	(0.42)
ln(Size)	0.00759***	0.0142**	0.00651**
	(5.40)	(3.02)	(3.20)
lnBM	−0.00445	−0.0132*	0.00524
	(−1.77)	(−2.36)	(1.35)
Momentum	0.00690***	0.00676***	0.00924***
	(32.10)	(30.84)	(7.32)
Beta	−0.0177	−0.268***	−0.00510
	(−1.30)	(−6.82)	(−0.29)
Leverage 1	−0.0000306	−0.0000824	−0.000189
	(−0.34)	(−0.84)	(−0.49)
Constant	−0.837***	−0.767***	−1.067***
	(−25.81)	(−8.01)	(−8.27)
Observations	7480	7480	7480

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. CONCLUSION

The effects of industry concentration on expected stock return are the topic of this thesis. Although there are several articles related to this topic, our study is the first empirical research for Turkish manufacturing sector. During the study, we try to find how Turkish manufactured firms' concentration level affects their expected stock return. However, we don't obtain significant result for this relation according to our empirical results. We use the quarterly and unbalanced data in order to avoid the lag between dependent and independent variables. We define various independent variables as controlling variables when analyzed the relation between industry concentration and stock return. Due to using broadly survey data, we benefit from the Financial Information News Network's (FINNET) database. We eliminate non-manufactured firms in order to prevent extreme results from financial ratios such as leverage in banking sector. Therefore, we have limitation on determination of firms. In addition, manufactured firms which are quoted on the stock exchange are limited. Due to lack of research and development expenditure's information as quarterly data, we don't analyze innovation risk channel for the relation between the concentration level's Turkish manufacturing sector and its stock return's profitability. Moreover, we use several types of equation for dependent of variables such as leverage and market value of firm. Although we explain distress risk as a channel for the relation between competition and stock return, we don't test by means of Turkish survey datas. Fama-MacBeth cross-sectional regression is used for the related relation. Concentration level of firms is determined by the means of Hirschman-Herfindahl index. We measure this index according to three variable like total assets, total sales and total equity. Even though Fama-MacBeth cross-sectional regression of H(Sales) on

independent variables is insignificant for univariate regression, multivariate regression of H(Sales) on certain independent variables is significant. As we mentioned earlier, panel data results are obtained through fixed, random, pooled and between effects. Fama-MacBeth cross-sectional regression of firms' stock returns on H(Sales) is not statistically significant at the 5% level. Therefore, according to quarterly and unbalanced data (from March1998 to December2018), Turkish manufacturing firms' concentration levels are not statistically significant determinant for the expectation of relevant firms' stock returns. However, momentum is only highly statistically significant determinant for this regression with high t-statistic results.

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