

Investments and the impact of the financial choice finance essay

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Abstract

This paper examines the relation between firm's investment activity and its financing (by means of bank lending and operating liquidity). Specifically, this study seeks to understand investment activity under the constructs of external (by means of bank lending) and internal finance (by means of cash flow from operations). This is done by operationalizing these variables using a model of investment behavior. This model is a traditional econometric model, with the annual investments to be the dependent variable and as independent variables, operating cash flow, bank liabilities, and EBITDA are computed and considered into the model. Subsequently, in order to examine the aforementioned relation, a sample from two sets of companies was taken. These companies, which are established in Greece, belong to two different business sectors. Specifically the enterprises come from the energy production sector and the supermarket sector (part of the retail trade sector) regarding the period 2006–2010. These companies are not listed on the stock market and the respective data was taken from the ICAP database. Next, multivariate regressions run for the energy and the retail sector (supermarkets) respectively in order to test the relation for the two sectors independently. The results presented in this paper show that the apparent conclusion from the analysis illustrates that Investments done by super markets and energy companies have a strong positive correlation with operating cash flow, (bank) loans and EBITDA. More specific, a stronger positive relation with investments appears to be with bank loans than with operating cash flow regarding the supermarkets (retail trade sector). On the other hand, regarding the energy production sector a stronger positive

relation with investments appears in EBITDA and as well in bank loans than in operating cash flow. Although, the operating cash flow is significant for the investments of the energy firms, it appears to be insignificant in the case when bank loans and earnings (EBITDA) participate in the model. This seems to indicate that the energy market, which is more liquidity constrained (has less positive operating cash flow), is forced to borrow in order to make investments while the super market sector, which is not liquidity constrained (has high positive operating cash flow) borrow for its investment activity without being obliged to do so. In general, in the supermarket sector the most influential factor is bank loans regardless of the high value of the positive operating cash flow, while investments from companies of the energy sector are strongly, positively associated with bank loans and EBITDA.

" Investments and the impact of the financial choice"

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Introduction

Research proposal and motivation

This paper examines the relation between firm's investment activity and its financing (by means of bank lending and firm's operating liquidity).

Investment decisions always require decisions based on insufficient information, and especially nowadays, with economic hardship on the increase and a growing lack of financial resources, investment decision making becomes an even more challenging task for the most firms. In order to continue operating, firms must evolve or expand, therefore money, or else funds are needed in order to be invested. Furthermore, banks are recognized

as the main financing institutions and are operating as intermediates in the economical environment, when a firm under liquidity constraints plans to access capital from outside the company. However, when the market face a financial crisis and money becomes more costly to hold, banks deal with financing dilemmas as well in order to avoid bankruptcy or high losses. The capacity of a firm to borrow depends on many guarantees that can offer and on the conditions of market (level of interest rates) (Soumaya 2012). The literature that documents the sensitivity of firms' investments to fluctuations in their internal funds has been initiated by Fazzari, Hubbard, and Petersen (1988). Under their approach the sensitivity is measured by the coefficient obtained from regressing investment on cash flow, and controlling for investment opportunities using Tobin's Q. They find that firms' investment policies are indeed sensitive to their cash flow fluctuations and that most financially constrained firms have greater cash flow sensitivity than least constrained firms. In addition they emphasize on the importance of cash flow as a determinant of investment spending, because of a " financing hierarchy," in which internal finance has important cost advantages over external finance. They view firms as constrained when external financing is too expensive. In that case, firms must use internal funds to finance their investments rather than to pay out dividends. On the other hand, Kaplan and Zingales (1997), who re- examine the entire methodology pioneered by Fazzari Hubbard and Perersen (1988) have a different point of view. Their identification of financially constrained firms is based on the qualitative and quantitative information contained in the firms' various reports. Due to the fact that the degree of financial constraint is not observable, different papers

use different proxies to represent and measure it. Particularly, Nathalie Moyen (2002) suggests that the contradicting results are due to the use of different criteria for identifying financially constrained firms. She presents two models: the unconstrained model in which firms can raise funds on external markets and the constrained model in which firms cannot do so. Additionally, Arun Khanna (2004), who seeks to understand whether the investment liquidity sensitivities represent liquidity constraints, argues that a number of these prior studies based on Tobin's Q framework and testing the neo-classical model of corporate investment are subject to the caveat that liquidity captures future expectations of firm profitability that are due to mismeasurement of Q. His study removes this caveat while retaining the Fazzari, Hubbard and Petersen's (1988) methodology by using propensity score regressions that match a-priori sorting of firms into liquidity constrained and non-liquidity constrained regression framework. He focuses on inventory investments of two sets of Indian manufacturing firms: issuers and non-issuers of short-term debt during 1996-97. Furthermore, Gomes (2001) examines investment behavior when firms face costs in the access to external funds. He begins by fully specifying a model of investment under financial constraints consistent with several empirical regularities about firm behavior observed in the data and finds that despite the existence of liquidity constraints, standard investment regressions predict that cash flow is an important determinant of investment only if one ignores q . The particular findings provide support to the argument that the success of cash-flow-augmented investment regressions is probably due to a combination of measurement error in q and identification problems. In addition, Devereux

and Schiantarelli (1990) provide some econometric evidence on the impact of financial factors like cash flow, debt, and stock measures of liquidity on the investment decisions of U. K. firms. They introduce these variables via an extension of the Q model of investment, which explicitly includes agency costs. Under their approach, firms are grouped according to firm size, age, and type of industry (growing and declining). Additionally, they argue whether the significance of cash flow is due to the fact that it proxies for output or because it is a better measure of market fundamentals than Q. This research aims to inspect empirically the relation between investment activity and its financing (by means of firm's operating liquidity and bank lending). The elements in focus are the investment activity, the firm's bank liabilities (loans), the firm's operating liquidity, which could affect in different ways the investment behavior in different sectors, and the firm's EBITDA. More specifically, this study examines investment behavior and the possible sources of funding (bank debt or firm's operating cash flow). The methodology followed here is to examine the investment behavior among two business sectors of the Greek economy. The energy production sector and the supermarkets – part of the retail sector. Both sectors have appealing characteristics for this research that makes them suitable and worth focusing in order to draw interesting conclusions. The first hypothesis of this research tests whether a higher liquidity business sector does not depend on bank lending to make investments. And the next hypothesis expands by investigating whether the low levels of external source of finance (bank loans) negatively impacts the investment activity independently from the liquidity of the business sector. Specifically, this study seeks to understand

the investment behavior under these variables using a model of investment activity, which is a traditional econometric model, with the annual investments to be the dependent variable and as independent variables, the firm's operating cash flow, firm's (bank) liabilities and firm's EBITDA. Subsequently, in order to examine the aforementioned a sample of companies was taken from each sector under examination respectively; the energy production sector and the supermarket sector (part of the retail trade sector), regarding the period 2006–2010. These companies are not listed on the stock market and the respective data was taken from ICAP database. The link between financing choices and investments is an important research question reflected by the number of studies in finance and macroeconomics. This study will add more empirical investigation to the subject. The confidence in external and internal validity is quite high because this is an observational study combining the benefit of using real world data and the benefit of an experimental design (distinguishing groups based on sectors' liquidity levels). This research design helps to examine the impact of the choice of finance (a choice between operating cash flow -firm's internal source of finance and bank loans- external source of finance) on investment activity. The results of the regression model for the energy and retail trade sectors are not similar. Considering the supermarkets from the retail trade sector, it is found that the statistical significant estimates of the coefficients for the model are operating cash flow, EBITDA and bank loans. All the estimates have a positive value, implying a positive effect on investment. Concerning the energy sector, although operating cash flow seems to be a statistically significant variable when it is a single explanatory variable in the

model, this does not seem to be the situation when other variables such as EBITDA and bank loans participate in the model. The final variables that seem to have a statistically significant effect on investment activity are EBITDA and bank loans. The apparent conclusion from the above analysis illustrates that Investments done by super markets and energy companies have a strong positive correlation with operating cash flow, (bank) loans and EBITDA. More specific, a stronger positive relation with investments appears to be with bank loans than with operating cash flow regarding supermarkets sector. On the other hand regarding the energy production sector a stronger positive relation with investments appears in EBITDA and bank loans rather than with operating cash flow. Although, the operating cash flow is significant for the investments of the energy firms, it appears to be insignificant in the case when bank lending and earnings (EBITDA) participate in the model. This seems to indicate that the energy sector, which is more liquidity constrained (has less positive operating cash flow) is forced to borrow in order to make investments while supermarket sector which is not liquidity constrained (has high positive operating cash flow) borrow for its investment activity without being obliged to do so. Generally, investment activity in energy sector is influenced more from EBITDA and less from bank loans, despite it is more liquidity constrained. On the other hand, investment activity in supermarkets sector is strongly influenced by bank loans although the companies of the sector is characterized from higher positive operating cash flow in comparison to that of the energy sector's companies.

Literature review

Investment Decision Making

Investment decision making is a significant managerial function which can be considered as the field of economics that analyzes the use and distribution of resources in markets in which decisions are made under uncertainty (Fabozzi 1999). As investment activity can be considered to buy new equipment or even to achieve a successful marketing promotion. In this research, investment activity is going to be measured taking data from the companies' financial statements. And will be recognized as the cost value of fixed assets (tangible and intangible).

The investment environment

A company is vitally affected by the social, economic, legal, technological and political factors of the environment where it operates. Business environment is the total of all external forces, which affect the organization and operations of a business. Those external forces may be beyond the control of the firm's management and may affect the enterprise and its functioning in various ways. In particular, from the end of 2008, in Greece, there has been evidence that financing squeeze has particularly affected liquidity. Due to the fact that banks in Euro zone have been less willing to lend Greek banks, the borrowing costs have spiraled upwards.

Financing choices

Firms may choose to finance their investment from a wide range of sources of funds. Capital is the term used by firms for funds needed for investment purposes, i. e., capital equipment and not for short-term operating needs.

Internal and external source of finance

To provide internal and external finance means to involve in business activities using funds either from inside the company or from outside. When a company uses internal finance, takes advantage of existing supplies of capital from profits and other sources, whereas when using external finance requires either going into debt or giving up control. While companies can borrow money in a variety of ways, take public shares, or request venture capitalists to invest directly, sources of external funding can be limited if a company does not seem like a good investment prospect or appears to be a poor credit risk or is not on the stock market. This fact can limit opportunities for external finance, as a company might not be willing to pay high interest or take other tradeoffs to access capital. On the other hand, internal finance is limited in essence to what a company can raise on its own, and how much liquidity it is willing to sacrifice to bring a given project to completion.

Consequently, liquidity can be a substantial issue if projects cost more than companies expect, as the company may end up dedicating additional internal funds that won't be able to access rapidly. Almeida and Campello (2008) argue that the relation between internal funds and external financing is fundamentally affected by the endogeneity of investment when firms are financially constrained. They explain that the negative effect of internal funds on the demand for external financing is concentrated among firms that are least likely to face high external financing costs (firms that distribute large amounts of dividends, that are large, and whose debt is rated). For firms in the other end of the spectrum (low payout, small, and unrated), external financing is insensitive to internal funds. Fazzari, Hubbard

and Peterson (1988) argue that in an imperfect capital market, internal and external capital, are not perfect substitutes for each other. As a result, investment activity may depend on such financial factors such as availability of internal finance, easy access to debt or new equity finance, or the functioning of particular credit markets. There has been a lot of empirical research studying the interaction between investment and financial decisions with firm-level data, to test the possibility that firms' investment activity is subject to financing constraints. Following Fazzari, Hubbard and Peterson (1988), much of this literature adds a cash flow variable to a standard Q model of investment, and investigate the sensitivity of investment to cash flow. However, a more recent and active literature has questioned whether the sensitivity of a firm's investment to its own cash flow provides a useful indicator of financing constraints. Arun Khanna (2004) argues that a number of these prior studies based on Tobin's Q framework and testing the neo-classical model of corporate investment are subject to the caveat that liquidity captures future expectations of firm profitability that are due to mismeasurement of Q. He seeks to understand whether the investment liquidity sensitivities represent liquidity constraints. His study removes this caveat while retaining the Fazzari, Hubbard and Petersen's (1988) methodology by using propensity score regressions that match a-priori sorting of firms into liquidity constrained and non-liquidity constrained regression framework. He focuses on inventory investments of two sets of Indian manufacturing firms: issuers and non-issuers of short-term debt during 1996-97. The findings show that the differences in liquidity sensitivities are reflecting differences in liquidity constraints driven by

differences in bank dependence. Additionally, Gomes (2001) examines investment behavior when firms face costs in the access to external funds and found that despite the existence of liquidity constraints, standard investment regressions predict that cash flow is an important determinant of investment only if one ignores q . Additionally, the presented results highlight the enormous difficulties in using standard investment regressions in practice, and cast serious doubt on the common interpretation of cash flow effects as evidence in favor of financing constraints. As mentioned, the common use of Tobin's Q to control for the investments opportunities of a firm is quite frequent in the various literature. However, since the companies included in the sample of this research are not publicly traded, thus no information can be used to construct a measure of Tobin's Q . Hence, a reduced form dynamic investment equation with an error-correction specification, rather than the Q model is adopted. As a final remark, in the finance literature, two competing theories attempt to explain the financing decisions in firms – the static trade-off theory and the pecking order theory. The pecking order theory is a theory first suggested by Donaldson in 1961 and was modified by Stewart C. Myers and Nicolas Majluf in 1984. It states that companies prioritize their sources of financing (from internal financing to equity) according to the cost of financing. First preferring internal financing, then debt, and to raise equity as a financing means of last resort. For this reason, internal funds are used first, and when that is depleted, debt is issued, and when it is not sensible to issue any more debt, equity is issued. On the other hand, the trade-off theory of capital structure refers to the idea that a company chooses how much debt finance

and how much equity finance to use by balancing the costs and benefits. Frank and Goyal (2005) provide a thorough review of the related literature. Finally, regarding this research since the companies are not listed on the stock market, the external finance source is considered to be bank loans, whereas as internal finance source is considered to be operating cash flow.

Banks as intermediates- External source of finance

The banking sector is reported as the most important source of financing in the economies. Lending which may be on short, medium or long-term basis is one of the services that commercial banks provide to their customers. In essence, banks grant loans to individuals, business organizations and governments in order to enable them to get on investment and development activities. Apparently, firms need liquidity to undertake valuable projects when they arise. External finance, when available, is substantially more expensive than internal finance due to factors such as transaction costs, agency problem and asymmetric information. The capacity of a firm to borrow depends on many guarantees that can offer and on the conditions of market (level of interest rates) (Soumaya 2012). Large public corporations can raise liquidity from capital markets, however smaller companies have more difficulties raising liquidity from capital markets due to high transaction cost and asymmetric information. This problem of a higher cost of external finance is commonly thought to be more serious for small firms because they are more disadvantaged in accessing external finance particularly due to the lack of available means of external finance (small firms rely more heavily on bank loans), and due to the lack of availability of public information on small firms (Chow & Fung 1998). Moreover, Ninh, Hermes & Lanjouw (2003)

illustrate[1]that the access to bank loans and the interest rates does affect investment decisions and considered on the decision making process.

Investments and Operating Liquidity - Internal source of finance

Liquidity is the term used to describe how easy it is to convert assets to cash. The most liquid asset is cash because it can always be used easily and immediately. Papers, studying the relationship between firms' cash flows and investment, find mixed results regarding whether or not more financially constrained firms show higher or lower sensitivity of investment to cash flows. This is mainly caused due to the use of different criteria for describing financing constraints, which is highly unobservable. Soumaya (2012) analyzes the effect of the debt, liquidity and firm size on the investment-cash flow sensitivity on a sample of 82 French firms, from 1999 to 2005. The results show that debt has a negative effect on the investment-cash flow sensitivity and the firm size has a positive effect on this relationship. Moreover, Kaplan and Zingales (1997) show that the effect on the risk of waiting is greatest for low-liquidity firms, increases in cash flow can have a greater positive effect on the investment of high-liquidity firmsKadapakkam at al 1998 explain that either by the fact that large companies have much flexibility in the timing of their investment or by the fact that they are more sensitive to agency problems, the investment-cash flow sensitivity is higher in the group of large firms and is lower in the group of small firms and is independent of the chosen size measure. Chow & Fung (2000) studied the relationship between firm size and liquidity constraints by using a firm level data of manufacturing enterprises in Shanghai during the period of 1989–

1992. Their empirical results surprisingly show that small manufacturing firms in Shanghai are actually less liquidity-constrained than their larger counterparts in financing their fixed investment. Finally, in order to carry out an investment, managers need to find funds. It could be equity or (long term) loans from banks. A loan commitment is a contract with a financial institution entitling the borrower to lend a certain amount up to a fixed maximum period. Additionally, given the importance of cash flow, being in determining the investment performance of firms, this research captures firm's liquidity by means of its operating cash flow.

Research Study and Hypotheses

In the following analysis a different approach from the previous papers is applied in order to establish empirically the link between investments and financing choices. This research aims to inspect empirically the relation between investment activity and its financing - a choice between internal and external source of finance (by means of firm's operating liquidity and bank lending)The method applied here is straightforward. It is a comparison between the actual investment behavior of two business sectors regarding their financing sources and their impact on the respective investment behavior. Subsequently, in order to examine the under-investigation relation, a sample from two sets of companies was taken. These companies, which are established in Greece, belong to two different business sectors. Specifically the enterprises come from the energy production sector and the supermarket sector (part of the retail trade sector) regarding the period 2006-2010. These companies are not listed on the stock market and the respective data was taken from the ICAP database. In more specific the

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sample and the data for this study are going to be fully described below. Particularly, , this study seeks to understand the investment activity using a model of investment behavior, which is a traditional econometric model and standard regressions were run, with the annual investments to be the dependent variable. As independent variables, firm's operating cash flow, firm's (bank) liabilities, and firm's EBITDA are computed and considered into the model. The hypotheses, which are going to be examined through this research, are the following: Hypothesis 1: A higher liquidity business sector does not depend on bank lending to make investmentsHypothesis 2: The low level of external source of finance (bank lending) negatively impacts the investment activity, independently from the liquidity of the business sector.

Description of the research method

In statistics, linear regression is an approach to model the relationship between a scalar dependent variable y and one or more explanatory variables denoted x . In case of one explanatory variable the regression is called simple regression, whereas in case of more than one explanatory variable is called multiple regression. The empirical method applied for this study is the use of a traditional econometric model, and two sets of multiple regressions were run regarding energy companies and supermarkets. Next, in order to estimate the regression coefficients, the Method OLS is used. In statistics, ordinary least squares (OLS) is a method for estimating the unknown parameters in a linear regression model. This method minimizes the sum of squared vertical distances between the observed responses in the dataset and the responses predicted by the linear approximation.

Ordinary least squares (OLS) is known as the most common method of

estimation for the regression model. The least squares fitting procedure can be used for data analysis as a purely descriptive technique. Additionally, the procedure has strong theoretical justification if a few assumptions are made about how the data are generated. In a multiple linear regression model the dependent variable theoretically is assumed to be a linear function of the independent variable plus an error that accounts for all other factors not included in the model. In the regression equation, is the dependent variable, are the independent explanatory variables, and is the disturbance or error term. The goal of regression analysis is to obtain estimates of the unknown parameters which indicate how a change in one of the independent variables affects the values taken by the dependent variable. The statistical packages used for the analysis are Eviews and SPSS. As aforementioned, in order to detect causal relationships between variables, a multiple linear regression model is applied to the data, one for each sector. With the use of regression the magnitude and the direction of the relationship between variables is concerned and additionally it focuses on using the relationship for prediction.

Model selection and variables

More simplified, the econometric model is the following: Firstly, the investment activity is represented by the dependent variable, which is considered to be the firm's annual investments. In the balance sheet investments are considered to be the cost value of fixed assets (tangible and intangible). Thus, this approach to measure the investment behavior is adopted. Secondly, in order to examine the relationship between firm's investment activity and firm's operating liquidity, an independent variable that is representative of the firm's liquidity is put into the model and is

considered to be the firm's operating cash flow (after the payment of taxes and interest). Thus, the first independent variable x_1 is the operating cash flow calculated from data of each company's financial statements. A spreadsheet has been created in order to compute each company's operating cash flow and essentially this will be the variable in the model that will measure firm's operating liquidity. Business Cash flow is the movement of money into or out of the business. A cash flow statement shows how operations and investments have been financed or how financial resources have been employed. In other words, a Cash Flow Statement indicates the sources from which the company has obtained funds, and how it has used them over a period. In recent years, cash flow has gained in popularity as a financial measure because it is more difficult to manipulate than certain other metrics, such as revenues. Since operating cash flow deals with actual money, is much harder for managers to manipulate the numbers. Cash Flow Statement is usually found in a company's annual report. In Greece this information is available only for the enterprises listed to Athens Stock Exchange. However, the sample taken includes in majority non - listed companies, therefore the operating cash flow calculations were done manually. The net cash flow of a company over a period (a quarter or a full year) is equal to the change in cash on the balance sheet over this period: positive if the cash balance increases (more cash becomes available), negative if the cash balance decreases. Furthermore, in order to reflect on the model, the firm's external financing, an additional independent variable, which is represented by the firm's liabilities to banks, is added. Thus, the second independent variable x_2 is considered as the bank liabilities, both

short and long term. Finally, the last independent variable x_3 is EBITDA (Earnings Before Interest Taxes, Depreciation and Amortization). This variable stands for firm's liquidity and financial position because it demonstrates a representative view of the company and its economic position. EBITDA is a capital structure neutral and therefore, this multiple can be used to directly compare companies with different levels of debt. Also, it is the most widely used firm's valuation measure based on enterprise value. EBITDA, as well as operating cash flow, will provide the model a broader firm view.

The Data set

The data gathered are from the annual balance sheets of firms operating in Greece from the retail trade market (super markets) and energy production sector. All data are taken from the firms' annual financial statements using the database of ICAP[2](not publically available). The time period under research is from 2006 to 2010. Though, in order to calculate operating cash flow figures, the balance sheets of 2005 were used. Also, in order to have consecutive figures for each year of the examined time period several companies were excluded from the initial dataset. Thus, when running the analysis the companies with missing information were left out. Out of the 118 available supermarket companies and 92 energy production companies 72 and 74 firms respectively were included in the final annual consecutive sample.

Introduction to the sample groups

Two groups of companies are considered in this study; companies from the energy production sector and supermarkets part of the retail trade sector. The samples under research are considered to be two independent samples. This is because there is no particular connection between a member of one group and a member of the other group. A brief summary of the characteristics of the two sectors under examination is as following.

Energy production sector

The energy production sector includes enterprises either producing energy from renewable sources or from conventional sources. Electricity production from renewable energy sources (RES) is one of the major growth centers of industry, with the field of wind power to hold a leading role in the growth of the sector. The liberalization of the electrical power market (Law 2773/1999) resulted in the formation of new dynamics in the broader energy sector. The environment where those firms operate is highly competitive. The entry of new firms is constant, since the relevant industry is still in its early stages. The existing entry barriers for a company to operate in energy production either from renewable sources or from conventional sources, are associated with high initial investment costs and with lengthy and bureaucratic licensing process (from installation to production license). At the same time, the new entrants have to face the established companies in the industry, which have already developed a strong energy sources portfolio and possess a significant advantage in the permitting process. The Greek energy production market is characterized at the time being, by relatively low figures in comparison with other countries but is including a remarkable

number of companies both in the construction and the production sector. In this industry there is no price competition, because prices are fixed, defined by the current institutional framework and are common to all energy production units. However, phenomena of competition appear between firms at energy sources portfolio, as the majority of enterprises (groups) are engaged in a race to obtain production licenses and exploitation of renewable sources in order to maintain and increase their energy potential. To conclude, the ongoing economic recession in Greece has decreased electricity consumption by around 4%, thus causing plans for the creation of new plants to be stalled. As the Greek energy production sector is a business that is considered to be capital intensive, large amounts of funds are necessary. However, when the economical environment and the intermediates cannot finance all projects the entity by itself have to invest all the sufficient funds in order to proceed with a project. This limitation can cause investment delays or actual decrease of investing activity in cases of low liquidity, until the market stabilizes. Finally, 74 companies were selected to be tested. From each of these companies, operating cash flow, EBITDA, loan liabilities and annual investments were computed and taken into consideration. There was no favorite made by size or profits, and the elimination of some companies from the initial dataset was due to missing information.

Supermarkets (Retail trade sector)

The examinee business sector –supermarkets, is one of the most dynamic commercial sectors in the Greek economy. The supermarkets corporations in Greece present a dynamic development in recent years. A natural feature of

this sector is the high mobility of firms, in the form of mergers and acquisitions, and the frequent enlargement of the branch network throughout the territory of Greece. The dynamic is reinforced by the competition, which year after year gets busier, forcing firms to seek survival and development strategies. The entry of even more foreign firms in the market has sharpened the competition between firms in the industry, leading to structural changes and rearrangements (merger, acquisition by clustering common market, expansion of chain stores through franchising, etc.) Additionally, supermarket chains, in order to meet the competition are continuously expanding their product range and extending into new forms of sale setting, like outlets in smaller store area, with emphasis on fresh products and products for basic needs. The Industry of supermarkets is divided into the following categories "large chains nationwide network of shops smaller chains that operate locally (e. g. in the regions where they belong) Isolated shops supermarkets (e. g. Convenience stores, Discount stores, Cash and Carry) Several supermarkets are integrated in clusters using a common brand. Principal object of the Group is the joint purchasing of products aimed at improving the bargaining power of its members with their suppliers. As aforementioned, the relevant industry is characterized in recent years by highly mobility regarding the Mergers & Acquisitions market. Fierce competition in conjunction with the entry of foreign supermarket chain stores, has contributed to the increase in mergers and acquisitions, as several companies are trying to strengthen their position in the domestic market. The main benefit for the company that makes such actions is summarized as increased bargaining power in market issues and as new

markets covering both geographically and "qualitative". Also, the development and adoption of modern technology by enterprises of this sector offers a comparative advantage over the competition. The rational use of technology from supermarkets is improving business efficiency and the quality of service to consumers. Furthermore, as Greece continues to fight against the recession, the retail environment continues to see numerous closures and the value of sales to decrease. Only the more robust networks and the most value-focused retailers succeed in growing amid the recession. Finally, 72 companies from the Greek retail trade sector were selected to be tested. From each of these companies, operating cash flow, EBITDA, loan liabilities and annual investments were calculated and taken into consideration, , and the elimination of some companies from the initial dataset was due to missing information. There was no favorite made by size or profits.

Empirical Research

In this section, the findings of the statistical analysis are provided. The method of the data collection is described. Also, descriptive statistics (mean and standard deviation) of the data are calculated and tabulated, in order to have a broader description of the two samples. Graphs that depict the characteristics of the data are demonstrated as well with a detailed description of the methodology used is presented. Also, the model assumptions, the tests applied and the results interpretation are included.

Statistics

The samples under research are considered to be two independent samples because there is no particular connection between a member of one group and a member of the other group. The normality of the variables is not a serious restriction if the sample sizes are not too small. Below some descriptive statistics of the variables under examination are provided. First the average value, the standard deviation and the annual rate of change as a percentage are presented. The change of 2006 has been calculated from 2005 to 2006. Next, a graph that shows the evolution of each variable during the examined time period is illustrated. InvestmentsThe under research variable concerning the investment activity of a firm was considered to be the fixed assets (cost value of tangible and intangible) of each company.

Table 1: Investment mean (μ), and standard deviation (s) for the time period 2006 – 2010 (in ' 000). Comparison between

sectorsInvestmentsYearSectorMeanStandard deviationRate of change

(%)

Year	Sector	Mean	Standard deviation	Rate of change (%)
2006	Energy	12.057	815.044	820,9
2006	Super market	28.494	774.335	917,
2007	Energy	16.161	322.265	034,0
2007	Super market	33.772	793.221	818,
2008	Energy	18.203	325.541	412,6
2008	Super market	37.776	3103.071	911,
2009	Energy	19.084	328.714	34,8
2009	Super market	40.424	4110.011	47,
2010	Energy	20.020	932.618	64,9
2010	Super market	41.962	6112.619	63,

Graph 1: Average investments (' 000) and their annual rate of change in energy sector and the supermarket sectorGenerally investments seem to increase in both sectors. Also, by observing the data it is apparent that in supermarkets the investments (in absolute numbers) are more than two

times higher than the relative in energy companies. Regarding energy companies, the annual rate of increase in 2006 is 21% and in 2007 it's increasing to 34%. The following period there is still an increase in investments but in a declining route. As concerns super markets, the annual rate of increase in 2006 is 17, 9% and in 2007 it's increasing to 18, 5%. From 2008 to 2010 the annual rate of increase in investments has a declining route to end up in 2010 with almost a 3, 8% increase, close to the 4, 9% of the energy companies. In conclusion, during the period 2006-2008, it is observed higher annual rates of increase in investments of the energy sector than those of the super market sector. Both sectors' annual rate of increase declines sharply the period 2008-2009, whereas in 2010 the annual rate of increase continues to decrease in supermarkets sector and stabilizes in energy sector.

Operating Cash flow Each firm's liquidity was estimated with the use of the operating cash flow, which was calculated from each firm's financial statements. Information regarding operating cash flow is not available in databases such as ICAP. Therefore, as aforementioned, it has been calculated manually with the use of spreadsheets[3]. The data of the balance sheets for each company were inserted in the aforementioned spreadsheets in order to calculate the operating cash flow of each firm in the sample. Descriptive statistics of the operating cash flow are shown in table 2.

Table 2: Operating Cash flow mean (μ), and standard deviation (s) for the time period 2006 – 2010 (in ' 000). Operating Cash

flowYearSector	Mean	Standard deviation	Rate of change
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(%)

2006Energy1. 165, 44. 341, 9-612, 0Super market3. 454, 09. 682, 1-64,
72007Energy338, 86. 226, 6-70, 9Super market5. 209, 319. 786, 750,
82008Energy1. 211, 45. 605, 4257, 6Super market3. 135, 99. 346, 0-39,
82009Energy1. 519, 14. 413, 625, 4Super market3. 891, 315. 428, 724,
12010Energy2. 297, 44. 489, 551, 2Super market2. 757, 510. 780, 1-29,
10Operating cash flow fluctuates during the examined period. Specifically in
the energy companies there is a big decline in 2007 which probably has to
do with the delay in payments from Greek Regulatory Authorities. After that
year there is an increase till 2010. The fluctuation of the operating cash flow
is also depicted to its annual rate of change. Operating cash flow of super
markets after a sharp increase in 2007 has a declining pattern until 2010,
with an exception in 2009 that presents an annual rate of increase 24, 1%.
Thus, although operating cash flow of the super markets is generally higher
(in absolute numbers) than the one in energy companies, in 2010 values
tend to approach each other between the two sectors. In conclusion,
excluding 2007 and 2009, the annual rate of change in operating cash flow
as regards the supermarkets is negative, whereas in energy sector, from
2008 and onwards the annual rate of change is positive. Graph 2: Average
Operating Cash flow (‘ 000) and its annual rate of changeBank LoansAnother
factor that may influence investing activity is considered to be the bank
financing, which is represented by the variable bank loans in the model.
From the balance sheet as bank loans was considered to be the bank
liabilities, both short term and long term. Table 3: Bank loans mean (μ), and
standard deviation (s) for the time period 2006 – 2010 (in ‘ 000). Comparison

between sectors Bank loans Year Sector Mean Standard deviation Rate of change

(%)

2006 Energy 5.747, 28.834, 48, 3 Super market 8.564, 841.001, 2132, 6%
 2007 Energy 7.918, 513.098, 637, 8 Super market 9.874, 449.200, 715, 3%
 2008 Energy 8.757, 615.150, 110, 6 Super market 11.829, 948.971, 619, 8%
 2009 Energy 8.027, 014.482, 4-8, 3 Super market 12.294, 946.932, 13, 9%
 2010 Energy 7.690, 714.926, 4-4, 2 Super market 13.032, 248.005, 16, 0%

The average bank loans provided to super markets increase during the examined time period with a fluctuating annual rate of increase. On the other hand, the average bank loans of the energy sector increase till 2007 with an increasing annual rate of increase. In 2008 the increasing is maintained, whereas in years 2009 and 2010 the average bank loans provided to the energy companies decrease. In conclusion, the average bank loans in the supermarkets sector are in general higher (in absolute numbers) than those provided to the energy sector. Year 2009, is the turning point for the energy sector, since average bank loans begin to decrease. On the contrary, average bank loans to supermarkets continue to increase during the examined period.

Graph 3: Average Bank loans (' 000) and their annual rate of change

Examining the percentage of loans and operating cash flow of the companies as a portion of investments one notes the following. The percentage of investments covered by loans in energy sector during the examined period is higher than the corresponding percentage of the super markets that fluctuates to 30%. From 2008 and onwards the participation of bank loans to investment activity tends to decline as concerns the energy

sector. On the other hand operating cash flow participation to the investment activity of the energy sector declines sharply in 2007, while the next years of the examined period has a stable increase. Regarding the supermarkets sector, the portion of operating cash flow to investments fluctuates depending on the participation of bank loans to the investment activity.

Table 4: Average Bank loans as a percentage of investments and operating cash flow

(%)

Operating Cash flow/Investments

(%)

2006 Energy 47, 7% 9, 7% Super market 30, 1% 12, 1% 2007 Energy 49, 0% 2, 1% Super market 29, 2% 15, 4% 2008 Energy 48, 1% 6, 7% Super market 31, 3% 8, 3% 2009 Energy 42, 1% 8, 0% Super market 30, 4% 9, 6% 2010 Energy 38, 4% 11, 5% Super market 31, 1% 6, 6% EBITDA In order to represent the value of a company into the model EBITDA is computed. That is the most widely used valuation proxy based on enterprise value. An advantage of EBITDA is that it is a capital structure neutral and therefore, this multiple can be used to directly compare companies with different levels of debt. Additionally, EBITDA provides the model with a broader firm view. Table 5: EBITDA mean (μ), and standard deviation (s) for the time period 2006 – 2010 (in ' 000).

Comparison between sectors EBITDA Year Sector Mean Standard deviation Rate of change

(%)

2006Energy1. 143, 32. 137, 732, 6Super market2. 944, 67. 755, 78,

02007Energy1. 560, 52. 931, 636, 5Super market3. 953, 810. 784, 034,

32008Energy2. 000, 44. 096, 028, 2Super market4. 104, 31. 1669, 43,

82009Energy2. 412, 63. 757, 720, 6Super market4. 051, 212. 294, 0-1,

32010Energy2. 419, 43. 510, 60, 3Super market3. 857, 413. 025, 4-4,

8EBITDA in energy production companies is lower than in supermarkets as shown in table 5 and graph 5. In supermarkets, EBITDA has an increasing route till 2008, maintains same levels in 2009 and decreases in 2010. As regards the energy sector, EBITDA follows an increasing route until 2009 and in 2010 maintains same levels. Graph 4: Average EBITDA (' 000) and its annual rate of change

Regression analysis

As aforementioned, the statistical packages used for the analysis are Eviews and SPSS. Also, in order to detect causal relationships between variables, a multiple linear regression model was applied to the data, one for each sector. With the use of regression, the magnitude and the direction of the relationship between variables are concerned and additionally it focuses on using the relationship for prediction. Generally, whenever one dependent variable is significantly correlated with independent variables, the researcher may use the score on independent variable to predict the score on the dependent variable. In a multiple linear regression model the dependent variable theoretically is assumed to be a linear function of the independent variable plus an error that accounts for all other factors not included in the model. In the regression equation, is the dependent variable, are the

independent explanatory variables, and is the disturbance or error term. The goal of regression analysis is to obtain estimates of the unknown parameters which indicate how a change in one of the independent variables affects the values taken by the dependent variable. The common aspect of the applications described above is that the dependent variable is a quantitative measure of some condition or behavior. As aforementioned, the method of estimation for the regression model is ordinary least squares (OLS). This procedure can be used for data analysis as a purely descriptive technique and additionally has strong theoretical justification if a few assumptions are made about how the data are generated. The starting point is the regression equation presented above which describes some causal or behavioral process. The independent variables play the role of experimental or treatment variables. The error term captures the effects of all omitted variables. In an experiment, randomization of the treatments (independent variables) ensures that the omitted factors (the disturbances) are uncorrelated with the treatments. This greatly simplifies inference. Non-experimental researchers, however, must substitute assumptions for experimental controls. The validity of non-experimental results therefore depends critically upon the accuracy of the assumptions. The well known "Gauss-Markov Assumptions", are sufficient to guarantee that ordinary regression estimates will have good properties. First, the errors have an expected value of zero: $E(u_i) = 0$. This means that on average the errors balance each other out. In order to test the normality of the variables the Jarque – Bera statistical test could be used. Second, the independent variables are non-random. As a consequence of this assumption, the independent

variables will in fact be independent of the disturbance. Third, the independent variables are linearly independent. That is, no independent variable can be expressed as a (non-zero) linear combination of the remaining independent variables. The failure of this assumption, known as multicollinearity, clearly makes it infeasible to disentangle the effects of the supposedly independent variables. In order to test the data for multicollinearity the independent variables should be plotted against each other with the use of Eviews. If the correlation coefficient r is smaller than 0, variables are negatively correlated, while if r is greater than 0, variables are positively correlated. Fourth, the disturbances are homoscedastic. This means that the variance of the disturbance is the same for each observation and shouldn't depend on the independent variables. Fifth, it is assumed that the disturbances are not autocorrelated meaning that disturbances associated with different observations are uncorrelated. Not all the conditions mentioned above are critical when using a linear regression model. Only conditions 1, 2 and 3 needs to be respected in order to have a consistent model. When the regression model complies with all the assumptions mentioned above, the model is said to be consistent and efficient.