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MASTER'S THESIS

**CORPORATE INVESTMENT AND CASH FLOW
SENSITIVITY: EVIDENCE FROM TURKEY**

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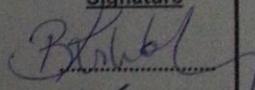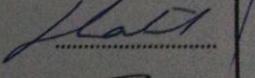**Supervisor**

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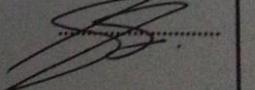
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ABSTRACT

Master's Thesis

Corporate Investment and Cash Flow Sensitivity: Evidence from Turkey.

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The understanding the effects of financial constraints and firms' investment decisions is an important issue of research in macroeconomics and microeconomics areas. From macroeconomics perspective, defining impact of financial constraints on investment decisions provide valuable information about the mechanism through which monetary policy affects real economic. In microeconomics area, understanding the effects of financial constraints contributes to the understating of firms' corporate finance behaviors and the importance of firm heterogeneity in firms' activities. Using a comprehensive firm-level data of Turkish manufacturing firm and employing different empirical strategies and econometric techniques for the period 2009-2012 this thesis work tests impact cash flow of constrained and unconstrained Turkish firm's on investment.

This thesis result following Fazari, Hubbard and Peterson (1988). There is found that financially constrained firms in Turkey have high sensitivity to investment. Furthermore financially constrained firms face restricted access to external financing. These firms are likely to experience high underinvestment cost.

Key words: Financing Constraints, Investment, Cash Flow, Investment Cash Flow Sensitivity, Tobin's Q.

ÖZET

Yüksek Lisans Tezi

İşletmelerın Yatırım ve Nakit Akım Duyarlılığı: Turkiye üzerinde Bir Çalışma.

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Mali kısıtlamalar ve şirketlerin yatırım kararlarının etkilerini anlamak, makroekonomi ve mikroekonomi alanlarının araştırmasında önemli bir konudur. Makroekonomi açısından bakıldığında, mali kısıtlamaların yatırım kararları üzerinde etkisinin tanımlanması, para politikasının reel ekonomiyi etkileme mekanizması hakkında önemli bilgiler sağlar. Mikroekonomi alanında, mali kısıtlamaların etkilerini anlamak, firmaların kurumsal finansman davranışlarını ve firmalarda firma faaliyetlerinin heterojenliğinin öneminin anlamasına katkıda bulunur. Bu çalışma, 2009-2012 periyodu için Türk imalat sanayindeki firma-düzeyi veri setini kullanarak ve farklı ampirik stratejileri ve ekonometrk teknikleri uygulayarak, mali kısıtlı ve kısıtsız Türk şirketlerini nakit akışlarının yatırıma etkisini incelemektedir.

Bu tezin sonucu, Fazari, Hubbard ve Peterson (1988) çalışmalarının sonucu ile aynıdır. Türkiye'deki mali kısıtlı şirketlerin yatırıma karşı epeyce duyarlı oldukları saptanmıştır. Bunun dışında Türkiyede mali kısıtlı şirketler dış kaynaklı fon sağlamaya sınırlı erişime karşı karşıyadırlar.

Anahtar Kelimeler: Mali Kısıltmalar, Yatırım, Nakit Para, Yatırım ve Nakit Para arasında duyarlılık. Tobin Q.

CORPORATE INVESTMENT AND CASH FLOW SENSITIVITY:
EVIDENCE FROM TURKEY

CONTENTS

CHAPTER ONE

IMPERFECT CAPITAL MARKET, INVESTMENT CASH FLOW
SENSETIVITY, EMPIRICAL MODEL

ABBREVIATIONS

WITHIN GROUP	Fixed Effect of Linear Regression
GMM	Generalized Method of Moments Estimation
First diff. GMM	First Differenced Generalized Method of Moments Estimation
OLS	Ordinary Least Squares
et al.	et alii (=and other people)
ISE	Istanbul Stock Exchange
PP&E	Property Plant and Equipment

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INTRODUCTION

The impact of financial constraints on investment decisions of firms has remained one of the preferred areas of research in corporate finance and economics. A good understanding of the impact can provide valuable information about the mechanism through which monetary policy affects real economic activities and the understanding of the macroeconomic dynamics. Empirical evidence also examine on different financial factors affecting investment decisions of firms.

The neoclassical view of perfect capital market suggests that investment and finance treated separately and can not affect each others, they linked only by the cost of capital. Modigliani and Miller argue that in perfect capital market financial structures of firms are irrelevant for investment decisions. This implies that external finance and internal finance are perfect substitutes (Modigliani and Miller, 1958:292). The General Theory of Employment, Interest and Money developed by Keynes investigates relationship between investment and finance is central to an understanding of the system as a whole (Keynes,1936:56). This relationship can explain involuntary unemployment and the trade cycle. The key idea of *The General Theory* is there is a direct and positive relationship between employment and aggregate expenditure because employment level is determined by spending of money. Joan Robinson and Paul Davidson followers of Keynesian studies, known as 'Post Keynesians', suggest that relationship between investment and finance based on fundamental uncertainty.

The recent research of the asymmetric information approach has established a link between finance and the real activity. In the real world the capital markets are imperfect and major empirical research show inconsistent result with Modigliani and Miller's idea because there are factors such as taxes, transaction costs and information asymmetries which make internal finance and external finance are no longer perfect substitutes. It implies that financially constrained firms with high costs of external finance use internal finance for investment.

Fazzari, Hubbard and Peterson (1988) provide empirical evidence that the financially constrained firms are most sensitive to the availability of internal funds by this conditions the sensitivity of investment to cash flow will be increase as firms availability of firm to external finance will be decreases. In contrast to this evidence, Kaplan and Zingales (1997) indicate that the least constrained firms have the highest investment cash flow sensitivity. Meyer and Kuh (1957)'s empirical work is based on investment behavior of firm which investigates the significance of financing constraints on firm-level business investment. Hoshi, Kashyap, and Scharfstein (1991), Shin and Park (1998) suggest evidence that the sensitivity is higher for more constrained firms.

A classification of firms into constrained and unconstrained criteria is other important issue behind debates over investment cash flow sensitivity. There are many studies which use different method of classification firms into constrained and unconstrained group. For example, Oliner and Rudebusch (1992) in their studies use size, age and pattern of insider trading, Whited (1992) use bond rating, Schaller (1993) use degree of shareholding concentration, Bond and Meghir (1994) use dividend payout ratio. The seminal paper by Fazzari et al. (1988) classifies firm according to their dividend payment and financially constrained firms considered as low-dividend paying firms. Cleary (1999) uses financial variables such as debt ratio, current ratio, net income margin, sales growth and financial slack in order to construct an index of financial strength of firms. Problems with this classification technique are correlation of classified group with investment level or with the firm-effect and time invariant component of the error term. The recent study of Allayannis and Mozumdar (2001) recently presents that including negative cash flow observations in the sample reduces the estimated sensitivity for the entire sample. Allayannis and Mozumdar (2001) investigation is important due to explaining the results reported by Kapan, Zingales and Cleary (1999).

The incremental contribution of this thesis to existing literature is to evaluate the impact financially constrained and unconstrained firms on the investment using data of firms listed in Istanbul Stock Exchange from 2009 to 2012 time period.There are few empirical studies on investment in Turkey

focusing on firm level studies. This thesis builds an estimable dynamic investment model with borrowing constraints based on the existing models in the literature using firm level data. Firm level studies can provide more detailed information on how well a country's reforms are able to reduce the problems related to capital market imperfections. This framework of analysis can be used to analyze the degree of credit constraints in Turkey. The principal contribution of this paper is to clarify the role of cash flow in investment equations by introducing, alongside *Q*, which represents the firm's contractual obligations for future new investment projects. Another aspect of thesis is its contribution to the debate on the effects of financial constraints on investment, with a focus on Turkey.

In this thesis firms are used as sample and in order to investigate their financial status firms whose size and age are below their median values are considered as constrained firms. Further, the firms which don't pay dividends are also considered as financially constrained firms. Observing the result of cash flow, coefficients of constrained and unconstrained firms sorting by these three variables is main aim of this thesis. There are three certain words used in the thesis as specific shorthand. First is ''investment'' which is capital formation of firm and implies capital expenditure on existing physical capital goods. Second is ''cash flow'', which is firm's undistributed profit after tax and dividends plus the depreciation and amortization. Third is Tobin's Q which is indicating investment opportunity of firm is included in investment model for controlling future profitability. In general, prices of security and financial markets are evaluated by Q-theory. However, presence of information asymmetry in capital market creates gaps in the information sets of the firm's insiders and outsiders. Q is considered as outsiders' evaluation of opportunities. It is possible that cash flow significantly affects investment because it is correlated with the insiders' evaluation of opportunities. Cash flow variable include information about managers' forecasts of investment opportunities. Including *Q,* sales, sales growth, size, coverage and leverage in investment equations improves the degree to which investment opportunities are measured.

According to financial report of World Business Environment Survey conducted in 1999 and 2000 presents that more than half of the private firms in Turkey are considered as financially constrained. Descriptive statistics in the thesis indicate 56%, 28%, 51% of 540 firm-year observations sorted by dividend, size, and age respectively are financially constrained. It is strongly balanced panel with four year time period. For estimation method pooled OLS, Within Group, and GMM estimator are used. Due to suffered bias results, regression model results are based on GMM estimation method because this method is more efficient. Empirical works of this thesis finds that financially constrained Turkish manufacturing firms's cash flow is sorted by total assets, age and dividends.There are also two variables that have consistent results. First is coverage which has positive and higher sensitivity for unconstrained firms than constrained firms sorted by dividend, total assets and age. It can be concluded that inability to generate cash flow for unconstraint firms in Turkey in order to stay solvent, coverage ratio is one the important determinants for their investment decisions. Another consistent result is leverage. Leverage has higher coefficient for constrained firms than unconstrained firms sorted by dividend and size. This result can be explained that constrained firms in Turkey are unable obtain debt from financial institutions without enough collateral.

This thesis consists of three chapters. The first chapter reviews theoretical literature, classifying theories into Keynesian's General theory, Neoclassical, New Keynesian and Post Keynesian theory. This chapter mainly contributes to the existing literature by introducing financial constraints and investment. The second chapter describes the data and discusses the methodology. The last chapter of the thesis discusses the results of the empirical study. The thesis will end with a conclusion.

CHAPTER ONE

IMPERFECT CAPITAL MARKET, INVESTMENT AND CASH FLOW SENSITIVITY, EMPIRICAL MODEL

1.1. THE RELATIONSHIP BETWEEN INVESTMENT AND FINANCE: THE THEORETICAL LITERATURE

1.1.1. The General Theory: Liquidity Preference

During the Great Depression, Keyne had published, The General Theory of Employment, Interest, and Money. The key idea of *The General Theory* is there is a direct and positive relationship between employment and aggregate expenditure (Bas, 2011:291). And employment level is determined by the spending of money. Keynes argued that preference to save over investment in financial market lead to total spending falls. Decrease of spending can reduce incomes, which reduces savings again. This continues until the desire to save becomes equal to the desire to invest. This "equilibrium" called depression, where people are investing less, have less to save and less to spend. According to his view unemployment could be solved by increasing aggregate expenditure and through this economic crisis would be overcome. Since investment is a component of aggregate demand, increase investment also could solve problem of unemployment. Keynes claims that investments don't depend on saving it depends on expectation and liquidity preference. Keynes believes that government can impact on market by reducing this volatility through control of aggregate expenditure. He suggests several measures. First reduction interest rate can encourage investment. The second set redistributive tax system which could divert income from society with high income to society with low income. This way increase investment and aggregate expenditure will always remain sufficient to maintain full employment.

When a man buys an investment or capital-asset, he purchases the right to the series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of the asset (Keynes, 1936:69). There are also exist selling price a minimum return which enterpreneur require from investment. Relationship between these two variables called marginal efficency of capital. Keynes claims that entrepreneur can increase their investment until marginal efficiency of capital falls to the level of the rate of interest. And there are three types of risks could affect on the volume of investment. First is entrepreneur's risk, second is lenders' risk and third is unexpected change in the volume of money. Keynes demonstrates how the relationship between investment and finance is central to an understanding of the system as a whole. According to his view that expectations from future profit and interest rate are main determinant of investment amount make firms' entrepreneur decide whether invest money for profit or lend it. If future profit from investment is higher than interest rate firms' entrepreneur decided to make investment otherwise is vice versa. In General Theory, Keynes demonstrates liquidity preference theory, where he claims importance of interest rate and profit expectation on investment. According to Keynes, the rate of interest is "the reward for parting with liquidity for a specified period". Liquidity preference means preference of people to keep their wealth in the form of cash. Keynes gives three explanations of preference people keep their money as cash. First is because of transaction, second is to meet unforeseen expenditure considered as precautionary and third for speculation. Liquidity preference depends on rate of interest. Higher the rate of interest lower will be the liquidity preference of the people. On the other hand, lower the rate of interest, higher will be the liquidity preference.

Briefly stated, the Keynesian General Theory puts forward of studying relationship between investment and finance. The aspect of finance most emphasized by Keynes is the independent nature and role of money itself and the supplanting of thrift by liquidity preference as the foil for marginal 'productivity' in the investment decision (Hayes, 2003:17).

1.1.2. Neoclassical Theory: Uncertainty as Risk.

After The General Theory the development of the theory of the relationship between investment and finance follows Modigliani and Miller theorem. It demonstrates how under the assumption of perfect capital markets a corporation's cost of capital remains independent of its capital structure despite uncertainty. In a perfect capital market neoclassical theories of investment have two different assumptions. First theory characterize representative firm. Second theory Modigliani and Miller theorem contradicts other studies that investment decisions of firms are affected by various financial factors such as internal liquidity, debt leverage, dividend payment. They essential works states that internal and external sources of funds are perfect substitutes. It indicates that capital market perfect.

Before Modigliani and Miller theorem the idea that financial system has strong influence on the cyclical behavior was demonstrated by Fisher in 1993. His theory of ''debt deflation'' connects collapse of financial system with collapse of real economy activity. Theory posited that falling prices in a recession led a redistribution of wealth from debtors to creditors by which accelerated downturns. Since the lower consumption propensities of creditors ensured that the demand and subsequently output was brought down. A similar idea is suggested by Keynes"if the fall of wages and prices goes far, the embarrassment of those entrepreneurs who are heavily indebted may soon reach the point of insolvency with severely adverse effects on investment." (Keynes, 1936:264)Keynesian in his work takes into consideration dependence of investment on current profits and current cash flow. But Keynesian economics declined because of simultaneous rise in inflation and employment. Change of economic methodology was also one of the reasons overturn of Keynesian works in late the 1960's and early 1970's. The new methodology had deep effect on macroeconomics. Five separate neutrality results made invalid aspects of Keynesian economics. One of the neutralities is the Modigliani-Miller theorem claimed the irrelevance of current profits to investment spending.

The Modigliani-Miller Theorem provides conditions under which a firm's financial decisions do not affect its value. Modigliani and Miller explains the

Theorem as follows: ... with well-functioning markets (and neutral taxes) and rational investors, who can 'undo' the corporate financial structure by holding positive or negative amounts of debt, the market value of the firm – debt plus equity – depends only on the income stream generated by its assets. (Villamil, 2013:1). It follows, in particular, that the value of the firm should not be affected by the share of debt in its financial structure or by what will be done with the returns – paid out as dividends or reinvested

Modigliani and Miller produced two propositions. First is the invariance of firm value to its capital structure and second is its invariance to dividend policy. The first theorem implicates that choice between debt and equity as a source of investment finance not affect the value of a firm excluding of existence optimal leverage ratio. The second theorem also states that dividend policy does not affect a firm's value and there is no optimal payout ratio.

This theorem demonstrates that under conditions of perfect capital markets, the cost of investment to firms is the same regardless of which methods of finance choose by implying that firms' value determined by discount rate and cash flow and wholly independent from liabilities used to finance firms' assets. Modigliani Miller theorem of the irrelevance of capital structure states that the amount and structure of debt taken up by a company do not affect its value if, 1) there are no taxes, 2) bankruptcy does not entail any real liquidation costs for the company nor any reputation costs for its directors and 3) financial markets are perfect, that is, are competitive, frictionless and free of any informational asymmetry (Pagana, 2005:2). Modigliani Miller study in 1960s became dominant and neoclassical theory used their approach. And major works did not use financial variables in their empirical investment equations.

1.1.3. New Keynesian Theory: Asymmetric Information

The Modigliani-Miller Theorem was power until seminal contributions of Akerlof (1970), Spence (1973) and Stiglitz and Weiss (1976). Akerlof (1970) in his paper on asymmetric information overturn one of the Modigliani-Miller

assumptions. He described the problem of quality and uncertainty by using car as example of market. Due to information asymmetry the seller knows more about a product than the buyer. And lemon is defective car which was investigated after it has been bought. This market with asymmetric information is close to Gresham Law characteristic, where the bad drives out the good. Buyers try to use market statistics to identify the quality of goods in markets. But the difficulty of distinguishing good quality from bad is inherent in the business world; this may indeed explain many economic institutions and may in fact be one of the more important aspects of uncertainty (Akerlof, 1970:500).

George Akerlof's (1970) study was followed by Stiglitz and Weiss (1981). Stiglitz and Weiss (1981) in their work Credit Rationing in Market with Imperfect Information illustrate how high interest rate on the loan trigger two types effects. One is adeverse selection effect, another is moral hazard effect. Stiglitz and Weiss demonstrate that interest rate serves as a screening device. As interest rate increase, adverse selection effect shows that demand of high risky borrowers expand whereas less risky borrowers drop out of the market. Moral hazard effect demonstrates that with high interest rate borrowers induce to choose projects for which the probability of default is higher.

The relationship between finance and investment can be illustrated involving two parties one as firm borrowers and other parties as bank lenders. Both borrowers and banks seek to maximize profit the former through their choice of a project, the latter through the interest rate they charge borrowers and collateral they require of borrowers (Stiglitz, 1981:395). When firms finance their projects they use internal funds such as cash and external funds such as equity and loan from financial intermediary. Banks setting high price loan and using credit ration tools for maximizing their profit this make costly and difficulty access to external funds.

Another paper of Greenwald, Stiglitz and Weiss (1984) demonstrates two proposition: 1) Many firms face credit constraints it means the unavailability of credit, which restricts firm's investment, or curtails working capital and by that limits their production, 2) Firms that are not credit constrained may still face an increase in the effective cost of capital, which induces them to reduce their

investment. Increasing of the effective cost of capital has further effects on the pricing decisions of firms (Greenwald, Stiglitz and Weiss, 1984:195). Second proposition explains that raise equity capital restricted by asymmetric information. Attempt to sell equity may give negative signal about firm value and this can reduce their market value.

Myers and Majluf (1984) in their work produced assumptions where managers of firm should have better information about firm's value than potential investors in order to make decisicion issue equity or debt for financing project or forgone from this investment opportunity. There are three statements of management's behaviour in assymmetric information: (1) Management acts in the interests of all shareholders, and ignores any conflict of interest between old and new shareholders; (2) Management acts in old shareholders' interest, and assumes they are passive, (3) Management acts in old shareholders' interest, but assumes they rationally rebalance their portfolios as they learn from the firm's actions (Myers and Majluf, 1984:18). They make conclusions about model by following properties: issue safe securities is better than issue equity; managers can act in the interest of old stockholder and may forgo good investment oppotunities rather than issue new equity to finance them; for financing new project firm can use Slack (cash plus short term investments + 0.5 inventories+ 0.7 accounts receivables- short term loans) in other words collect cash by restricting dividends; if firm issue equity for financing project, the price of stock fall, if firm make decision issue debt securities stock price not fall. An equilibrium model under wich source to use for finance investment developed under these assumptions.

Fazzari and Variato (1996) investigate that reasons of financial constraints is acquiring because of different availability to information. Recent theoretical research on the functioning of capital markets show that asymmetric information can cause credit to be rationed or prevent from obtaining funds through new equity issues, even though firms have investment opportunities with positive net present value (Fazzari and Variata, 1996: 352). Asymmetric information states that internal finance is less costly than external finance. New Keynesian considers asymmetric information as a market imperfection where potential finance have

inluence on investment. But this influence only potential because involve only constrained firms.

1.1.4. Post Keynesian Theory

Post Keynesian economists try to rebuild economic theory of Keynes's ideas. In Post Keynesian works the primary objectives of a firm are explained as growth and acquisition of power. And profit of firm one of the factor which allows company to finance growth.

Kalecki (1937) one of the Post Keynesian economists claim that profits is a significant variable that influence on capital accumulation. Profit use for financing investment and this leads to increasing capital stock. Kalecki (1937) implies that use this profit for financing investment less risky rather than use external fund. He demonstrates very important distinction between investment decisions and actual investment outlays. This is important because investment operates immediately to increase the level of output, but also raises capacity, and the increased capacity affects investment decisions in the next period (Ghosh, 2013:4). He divided investment into three processes: investment orders, investment output and deliveries of investment goods. His study was held that investment orders take into consideration the ratio of profit to capital stock and long term interest rate, investment output is the result of past decision and expectation not taking into account. He identifies macroeconomic foundation in his profit function. Profitability of investment determined by aggregate expenditures and income flows not by marginal productivity of capital like in Keynesian theory. However, both Keynes (1936) and Kalecki (1937) recognized the importance of risk and uncertainty in determining investment decisions. Post Keynesian writers followed by Kalecki's study. Hyman Minsky's (1986) Theory of Economic Dynamics held same Kalecki's (1937) views on the determinants of profits where aggregate profits equal investment plus the government's deficit. He also claims that issue is not creating money, issue is getting money. And availability to external finance depends on the firm's liability structure. Minsky (1986) emphasized the importance of firm leverage and the strength of a firm's balance sheet as a key

determinant of investment. He also asserts that if firm finance investment by internal funds today it will have a greater ability to access external fund in future.

Adrian Wood (1975) the last Post Keynesian economists try to explain why new equity is substitute for internal funds and why new issue has inelastic demand. There are three explanations of inelastic demand. First is new issue have transaction cost, second is investors have different expectations and third is their new equity by expanding portfolio reduce diversification by that increasing risk.

In sum, Post Keynesian investment theory implies that investment is always positively related to cash flow as cash flow is the safest means of financing.

1.2. IMPERFECT COMPETITION AND INVESTMENT CASH FLOW SENSTIVITY

There is a large literature estimating the relationship between firm financing constraints and investment cash flow sensitivity. First paper was put forward by Fazzari, Hubbard, and Petersen (1988). In their work they investigate this relationship theoretically and empirically by adding cash flow to investment equation. They used manufacturing firms to analyze investment cash flow sensitivity. Financially constrained firms were defined as low-dividend-paying firms. Fazzari Hubbard and Peterson (1988) presented that firms which financially constrained due to costly external finance rely more on internal finance in making investment decisions. They also find that investment have sensitivity to balance sheet variables that measures liquidity. If capital market imperfections lead to binding financial constraints on investment several important implications arise for the study of macroeconomic investment fluctuations and the impact of public policy on capital spending (Fazzari, Hubbard, and Peterson, 1988:184).

They consider these points briefly in their work for some suggestion course for future study. Myers and Majluf (1984) also in their work of asymmetry information explained that for financially constrained firms external finance is costly. On the other hand, financially unconstrained firms have lower level of

information asymmetry and the investment-cash flow sensitivity is not high for unconstrained firms.

However Kaplan and Zingales (1997) demonstrate opposite evidence from low dividend payout subset of the Fazzari, Hubbard, and Peterson (1988) sample. In their work, they divide firms into five groups according to their financial statements. First group is not financially constrained with high dividends, repurchased stock, and when annual report shows more liquidity than it would need for investment in future year. Another group has healthy interest coverage. Third group as possibly financially constrained doesn't report as financial constraints, but doesn't look liquid either. Fourth group includes firms that have difficulties in obtaining financing. Last group has more liquidity problems and because of this reduce their investment. They point in their study that raising external finance is costly because of asymmetric information. Alternatively, it is possible that nonmonotonic behavior of the investment cash-flow sensitivity is driven by mischaracterization of the reasons why firms are reluctant to raise external finance (Kaplan and Zingales, 1997:212). Their study holds that most highly unconstrained firms and the most highly constrained firms have higher investment-cash flow sensitivity than other group of firms. Moreover in contrast to Fazzari Hubbard and Peterson (1988) they show that unconstrained firms have higher investment-cash flow sensitivity than constrained firms. Kadapakkam, Kumar, and Riddick (1998) in their study divide financial statement firms according theirs size and investigate that financially unconstrained firms have higher investment cash flow sensitivity than constrained firms. Cleary(1996) also finds that financially constrained firms' cash have lower sensitivity to investment.

In the most recent exchange in this ongoing debate, Fazzari et al. (2000) contest Kaplan and Zingales' conclusions by arguing that the Kaplan and Zingales' sample is too small and homogeneous (Allayannis and Mozumdar, 2002:904). Moreover they argue that Kaplan and Zingales' (1997) result of lower investment and cash flow sensitivity of financially constrained firms were because distress firms were taken as a sample. Cleary's (1999) result is opposite evidence to Fazzari Hubbard and Peterson (1988) it is because he uses firms with negative cash flow as a sample in his model.

Cleary, Povel, and Raith (2007) examine that there is nonlinear relationship between cash flow and investment. A firm's investment is a U-shaped function of its internal funds. While investment is increasing in different measures of internal funds for majority of firms, it is decreasing for those with the lowest levels of internal funds, which comprise a large fraction (Cleary, Povel and Raith, 2007:2). This study was complemented by Lyandres (2007) he demonstrates non-monotonic relationship between financial constraints and investment cash flow sensitivity. He claims that investment cash flow sensitivity is decreasing in the cost of external financing when it is relatively low and is increasing in the financing cost when it is high (Lyandres, 2007:1).

The interpretation of that the correlation between cash flow and investment is negative has been the important topic of debate. Some argue that it is because of financial constraints, others claim that correlation between cash flow and investment opportunities are not properly measured by Tobin's Q. Charlton et al. (2002) investigates that the relationship between financial constraints of a firm and its investment-cash flow sensitivity depends on which sector firms have their organization. Allayannis and Mozumdar (2004) examine the Kaplan and Zingales and Cleary (1999) works which are diverging from other literature, by the finding fact that investment of firms in bad financial statement cannot respond to cash flow. They find both of the studies have such fact because of taken negative observations of cash flow and small sample of firms. Moyen (2004) divide firms into financially unconstrained criteria when they can raise external funds and financially constrained when firms don't have access to external funds. The results of financially constrained, identified as simulated sample, support Kaplan and Zingales theory that uconstrained firms' investments have high sensitivity to cash flow than contsrained firms. Carpenter and Guariglia (2008) claim that it is imperfect use only Q variables for measure investment opportunities, because it includes only equity market participants. In their work they add firm's contractual obligations for future new investment, to which only insiders can access to this information. Putting it in regressions with Q variables they improve measures of investment opportunities. Result shows that explanatory power of cash fall for large firms decrease but remain constant for small firms. Their result suggests that

while cash flow may contain information about investment opportunities not captured in Q, the significance of cash flow in investment equations stems from its role in capturing the effect of credit frictions. (Carpenter and Guariglia, 2008:20)

Almeida and Campello (2009) suggest that for unconstrained firms internal and external financing substitute each others and these firms have high investment cash flow sensitivity when thay reduce external finance. However, constarained firms make investment only when they have enough internal and external funds for it. Therefore their inside and oudside finance are complements and constrained firms have lower investment-cash flow sensitivity.

Almeida and Campello (2009) try to indetify whether financing frictions influence on corporate investment. They develop an idea that tangibility of a firm's assets can help firm to get external financing and increase their investment. Their result show that tangibility of constrained firms' assets have high investment–cash flow sensitivities but no effect on financially unconstrained firms. This argument implies a nonmonotonic effect of tangibility on cash flow sensitivities: at alow level of tangibility, the sensitivity of investment to cash flow increases with asset tangibility, but this effect disappears at a high level of tangibility (Almeida and Campello ,2007 :2).

Agca and Mozumdar (2007) in their work make critical review of Erickson and Whited (2000) and Cummins, Hassett, and Oliners' (2006) studies. In these studies, they demonstrate that cash flow doesn't have any additional explanatory power in the models of investment when measurement error in q is taken into account. Agca and Mozumdar (2007) explain these results by several subjects. In particular, the Cummins, Hassett, and Oliners' (2006) findings are subject to (1) several implementation shortcomings, (2) an unnecessarily restricted set of instruments and (3) a possible data discrepancy. Similarly, EW's approach and findings suffer from (1) lack of robustness to small changes in variable definitions, (2) specification test rejections, and (3) conflicting results with sample and estimator extensions (Agca and Mozumdar, 2007:47).

Ascioglu, Hegde, and McDermott (2008) use measures of asymmetric information to divide firms to more or less financially constrained, they assume that firms have private information about their investment opportunities

Set paper of studies investigate that measures of market liquidity and probability of informed trading are useful to capture information asymmetry between informed and uninformed investors. Ascioglu, Hegde, and McDermott(2008) argue that firms with higher effective spreads, greater price impact of trades, and higher probability of informed trade are likely to rely more on internal cash flows and internally generated capital for investment spending than firms with lower effective spreads and PIN (Ascioglu, Hegde and McDermott, 2008: 1039). They find a negative relationship between a firm's information asymmetry and their investment-cash flow sensitivity.

Almeida, Campello, and Weisbach (2004) demonstrate new empirical test influence of the financial constraints on firm policies. Apart from the investment-cash flow sensitivity literature, they introduce cash flow sensitivity of cash. Empirically, financially constrained firms' holdings of liquid assets should increase when cash flow are higher, and their cash flow sensitivity should be positive, in contrast, unconstrained firms cash flow sensitivity of cash should display no systematic patterns. (Almeida, Campello, and Weisbach , 2004:1801) In their empirical research, Almeida, Campello, and Weisbach (2004) classify firms according to firm's payout policy, assets size, bond ratings, commercial paper rating and an index measure. Their results show that constrained firms have positive cash flow sensitivity to cash holdings while unconstrained firms do not. This conclusion leads that cash holdings can be valuable then other sources of funds. Denis and Sibilkov (2007) based on this study make point that cash holdings are consistent with two competing views. Under one view, higher cash holdings increase the value of constrained firms because they allow the firms to undertake valuable projects that might otherwise be bypassed and alternatively, if financial constraints are a byproduct of potential moral hazard problems, high cash holdings might increase the likelihood of agency problems and empire-building by managers of constrained firms (David, Denis, and Sibilkov, 2007:249). Their work investigate that, for financially constrained firms, high

cash holdings are a value-increasing response to financing frictions and their work also support the prediction of Myers and Majluf (1984) that firms facing financial constraints should save cash and use it later.

All above studies give conflicting evidence on whether investment-cash flow sensitivity has a positive relationship or negative/non-linear relationship with the financial constraints that a firm faces.

In empirical theory financial constraints can be explained by sensitivity of investment to internal funds. This concept of illustration demonstrates in Figure 1 below:

Figure 1: Market Imperfections and Investment Cash Flow Sensitivity
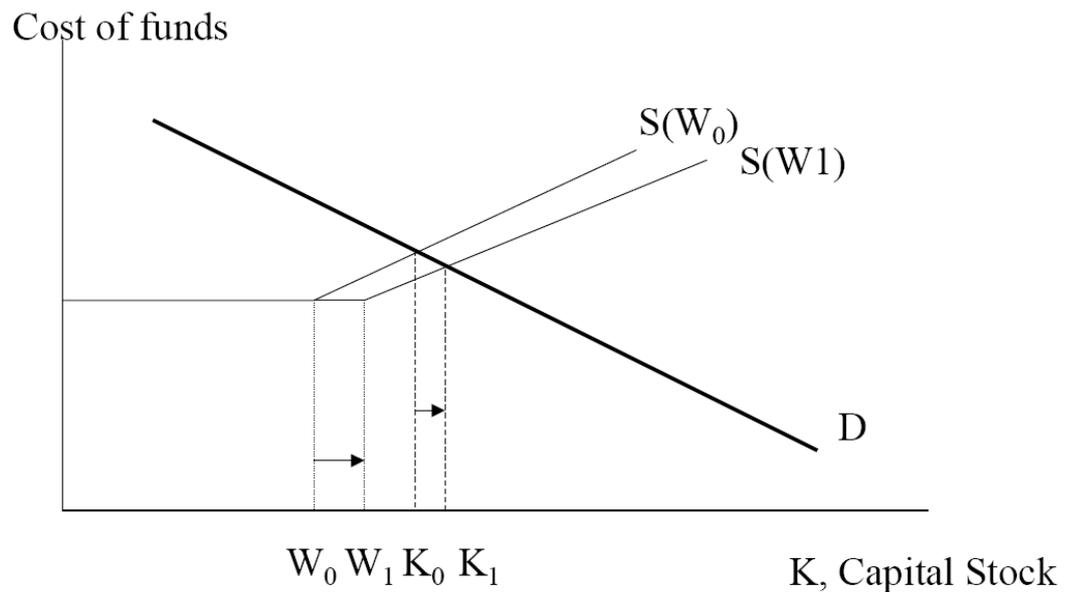
Source: Hubbard, 1998:4

Figure 1 presents the demand for capital and the supply of funds in the presence of information asymmetries. *S(W)* represents the supply of funds, where *W* is the level of internal funds of the firm. As information asymmetry will lead outsiders to demand of external finance, therefore for funds above the level of internal finance is represented by an upward sloping supply curve, where the firm have higher costs of capital.

Firm with net worth of *W0* and investment demand curve *D*, due to imperfect capital market, the firm will only invest up to the point *K0*. This imply that lack of finance don't allow firm achieve to optimal investment. An increase in net worth (or internal funds) from *W0* to *W1* in the financially constrained firms will lead to an increase in investment from *K0* to *K1*, holding the investment opportunities unchanged. This increase in internal funds which are independent of the investment opportunities helps to alleviate the problems of financial constraints and leads to an increase in investment and the level of capital stock. The slope of the *S(W)* curve is typically determined by the level of information problems a firms faced. For firms that are facing high information problems, the *S(W)* curve tend to be much steeper, on the other hand well established firms facing low information problems ten to have a flatter *S(W)* curve which indicates that the costs of external funds is close to their internal funds. This provides a justification for the investment cash-flow sensitivities studies, where higher sensitivity of investment to cash-flow suggests the presence of financing constraints.

1.2.1. Internal Sources versus External Sources of Finance

In an imperfect capital market external finance can't substitute completely the internal finance. Cost of internal finance is lower than external finance like issuance new equity or debt finance, therefore it is more preferable. There are several reasons exist why cost of internal finance cheaper. Among them are agency problem, transaction costs, tax advantages, asymmetric information and cost of financial distress.

When firms issue new equity they should pay additional fee for transaction cost like registration fee, underwriting discounts, taxes, selling and administrative charges. For small size firms this expense is coslier than for big size firms. Many economists over decades from Irving Fisher to Alan Greenspan claimed that low capital gains taxes encourage entrepreneurship and investment in the economy. This corporate tax system emphasizes cost advantage to internal finance over external finance. When new shares issues, lower tax on capital gain make

incentive to invest in the companies that build the economy rather than trying to make quick profits by speculating on stocks

The pecking theory was postulated by Myers and Majluf (1984) claimed that cost of financing increases with asymmetric information which assumes that at least one party to a transaction has relevant information whereas the others do not. And when manager, who better knows about true value of their firm than investors, issue new equity, investors believe that the firm is overvalued and managers want to take advantage from this over-valuation. Therefore investors ask a lower value to the new equity issuance.

Agency cost arises when debt holders' interest are considered. While shareholders goal is increase value of firm by accepting all risky project which they invest on , debt holders carry about earning of firm, because it can affect on their fixed claim on cash flow, therefore debt holders demand covenants from manager which restrict their behavior on investment decisions. Furthermore, as soon as the amount of debt increases, debt holders will be more and more powerful, and their interferences in firm's investment decisions will increase accordingly (Margarits and Psillaki, 2007:3). Hence, shocks to working capital, such as a debt deflation or a decline in internal finance, will make debt finance more expensive at the margin, probably at a time when the need for new debt is most acute (Fazzari, Hubbard and Peterson, 1988:152).

Cost of debt financing like issue new equity is high when asymmetric information exist. Lenders cannot define borrowers' quality. By setting high interest rate, good borrowers can find another source of finance and bad borrowers can reduce expected profit of lenders. Credit rationing theory can choose this problem but create discrimination that only largest firms can easy access to debt market. All of these explanations show why internal finance is less costly than issue new equity or debt finance.

Cost of advantage of internal finance over new debt of equity finance of firms' investment presents "hierarchy of finance", where firms have preference order to finance investment. This concept can be understood from the graphical illustration of figure 1 below which represents hierarchy of finance model with no debt finance.

Figure 2: Hierarchy of Finance with No Debt of Finance
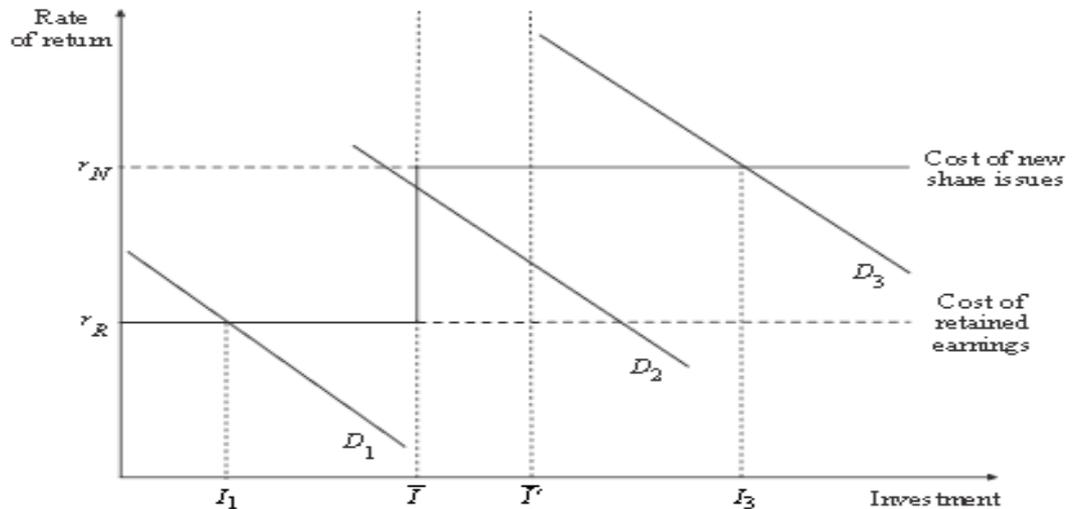
Source: Bond and Meghir, 1994:5

Rate of return r_R represents cash flow, rate of return r_N represents new shares of issue firm, D1, D2 and D3 indicate possible investment opportunities for firms. $\bar{I}$ represent maximum level of investment with internal funds that available for firms. If firms have small investment opportunities D1 it will be financed completely by internal finance and investment level will be at I1 point. If firms have high investment opportunities D3, they use internal with external finance.

From this graphical illustration can be concluded that a rise in retained earnings would shift the maximum level of investment that can be financed internally, so that there also would be an increase in the investment of constrained firms.

Debt of finance is cheaper than equity of finance. Graph below represents investment opportunities with internal and external finance such as debt and equity.

Figure 3: Hierarchy of Finance with Debt of Finance
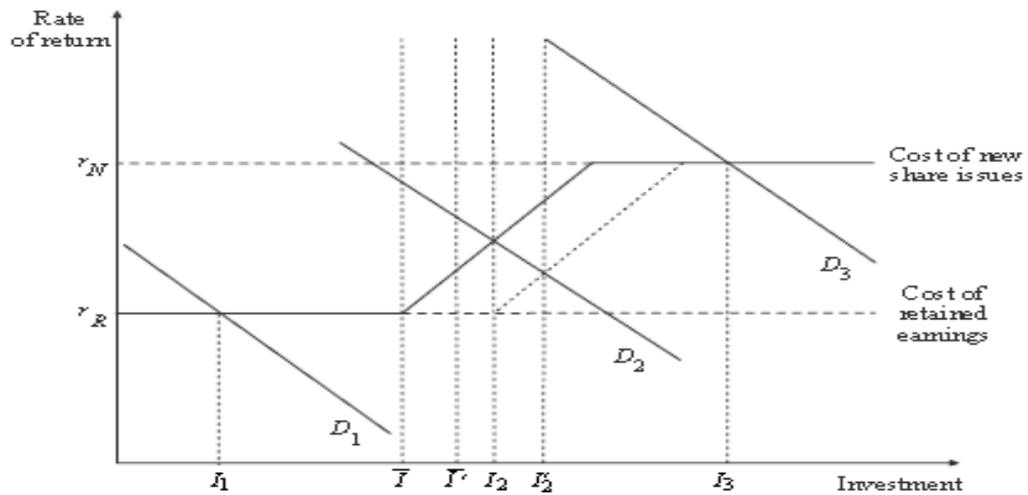
Source: Bond and Meghir, 1994:8

Investment opportunities with D2 increase their investment to I2 and firms can finance this investment with debt and equity funds. But these firms still financially constrained by internal funds of finance when they want to increase their investment level even though now they can finance their investment from debt.

1.3. EMPIRICAL STUDIES OF INVESTMENT MODEL

All empirical studies based on profit maximization follow that investent expenditures should be sensetive to the cost capital. The fundamental factor through which costs affect investment demand is the expected profitability of increments to the capital stock, which depends mainly on the marginal product of capital and the firm's expectation of the future demand for its product (Parker, 2010:3). Empirical literature on investment model captures traditional neoclassical approaches, q models, and modern approaches. First empirical investment model is the accelerator model. This model claims that demand of investment determined by the foreseen volume of production and growth of this

output influence on investment decision. This model well for empirical works, but have lacks for theoretical background. While neoclassical approaches close this gap. The first neoclassical model is developed by Jorgenson (1971), which implies that the investment rate is determined by the user cost of capital. These models failed because investment is formulated as static expectations. Therefore the Q theory of investment model was developed by introducing convex adjustment cost of capital.

1.3.1. The Q Model

The neoclassical investment theory views investment as a choice variable for managers, whose aim is to maximize the firm's value. This aim is a function of the capital stock from previous period and can be present as follows:

$$V_t\ (K_{t-1}) = max\{R(\ K_t, L_t,\ I_t\ ) + \beta\ E_t[V_{t+1}\ (K_t)]\} \qquad (1)$$

Where $V_t\ (K_{t-1})$ is the firm's value at current period, β is a discount factor, and E_t is the expectation operator. Hayashi (1982) derive from this model equation the optimal investment rate $(I/K)_t$:

$$(I/K)_t = b_i + 1/a\ Q_{it} + \varepsilon_{it} \qquad (2)$$

$$\varepsilon i_t = v_i + u_t + w_{it}, \qquad (3)$$

Where v_i captures unobserved firm specific variables, u_t includes time specific variables and has a common effect on all firms; w_{it} presents a stochastic disturbance to the firm.

Major studies use equation (2) under the null of perfect capital market and to test the null against the alternative in which financial factors affect investment. One of the financial factors is cash flow that includes information about a firm's

financial position. Theory that average Q summarizes all the information about the expected discounted present value of additional investment assumes that no other variables including financial variables should be a significant determinant of investment. But some variables as cash flow have significant result and there are three alternative interpretations that have been proposed in the literature for this finding. The first interpretation of significance of cash flow in Q model is financial constraints faced by firms due to capital market imperfection (Fazzari Hubbard and Peterson, 1988). Second interpretation of significance cash flow is due to fails of the Q model. Cash flow is closely correlated with future profitability and sales of company and gives additional information about firm's investment opportunities in a Q model. This model fails because of measurement error, when the stock markets are not efficient market value of firm can show wrong result since the market value of the firms is derived from firms' stock prices. And third explanation of the significance of cash flow is that managers use free cash flow to overinvest in other words such firms use investment policies focus on firms' growth in size.

1.3.2. The Euler Equation.

The Euler equation is alternative model of investment derived from Q models. The Euler equation model derived under the assumption of perfect capital market and was extended by Bond and Meghir (1994). This equation imlies that the marginal benefits generated by the marginal unit of capital at time t should equal to the discounted value of marginal costs for investment at time t+1, which makes the firm indifferent between investment in two adjacent periods. If the marginal benefits of an additional unit of capital at time t exceeded the marginal costs for investment at time t+1, the firm would invest more in time t and vice versa. By that optimal rate of investment presents as follows:

$$\left(\frac{I}{K}\right)_{t+1} = \left(\frac{b^2}{2-b}\right)\varphi_{t+1} + b + \varphi_{t+1}\left(\frac{I}{K}\right)_t - \frac{\varphi_{t+1}}{2\left(\frac{I}{K}\right)^{2t}} + \frac{\varphi_{t+1}}{a\left(\frac{CF}{K}\right)t} + \frac{\varphi_{t+1}}{aJt+1} + u_{t+1} \qquad (4)$$

where φ_{t+1} is real discount rate and J_{t+1} is user cost of capital. An attractive feature of the Euler equation model is that current investment is positively related to expect future investment and to the current-average-profits term and negatively relate to the user cost of capital.

The coefficients on these variables would measure the effects of financial constraints on the firm's discount rate. The Euler equation approach can also take explicit account of that fact that firms are heterogeneous. When firm divide to constrained and unconstrained, Euler equation model is not rejected by the over identifying restriction test for firms facing low information problems, but the Euler equation model are rejected when firms facing high information problems. Euler equation model does not depend on firms' market value to measure expected profitability. The Euler model fails to detect the presence of financial constraints if the tightness of the constraints is constant over time. Therefore in most studies the error-correction model is also used to test the hypothesis of financial constraints.

1.3.3. The Error Correction Model.

One of the alternative investment models in order to test the hypotheses of financial constraints is the error correction model. This model was introduced by Bean (1981).

$$\frac{I_{it}}{K_{it-1}} = (a_{t-1})s_{it-1} + a_{it}\Delta s_{it} + (a_3 + a_4)\Delta s_{it} - 1 -$$
$$-(1 - a_1 - a_2)(k_{it} - 2 - s_{it} - 2) + v_i + v_t + v_{jt} + e_{it} \qquad (5)$$

where k_{it} represents the firms' capital stock, s_{it} represents the firms' sales, $_{it}j$, the real user cost of capital and $_{it}v$ is a firm-specific effect. The error correction model

has a long-run or 'target' level of capital stock and allows a flexible specification of the adjustment dynamics to be estimated form the data. Cash flow of unconstrained firms in this model is expected to be small and insignificant and cash flow of constrained firms are expected to be significant and positively signed if financially constrained firms respond more strongly to cash flow than unconstrained firms.

CHAPTER TWO

DATA AND METHODOLOGY

2.1. DATA

The data come from the database called "Iş yatirim" investment, which contain balance sheet, income statement and ownership information for Turkish firms listed on the Istanbul Stock Exchange. The sample which consists of 135 companies was selected according to following criteria. Only manufacturing firms which are distributed in several industries like the most important metal, constructions and chemicals were taken over four year time period from 2009-2012. Firms which are belonging to regulated and financial institutions were excluded because they have high cash flow variables and lowly investment firms. A firm-year observation which has missed value in any variables was also dropped. All variables used in investment equation collected manually by using firm's balance sheet and income statement.

2.1.1. Deteminants of Investment Cash Flow Sensetivity

The table below represents the dependent, independent variables with calculation and symbols used in the regression model.

Investment.

One of the important indicators of investment is capital expenditure. Many studies in empirical and theoretical works use capital expenditure as a variable in measure of investment. Capital expenditures are expenditures creating future benefits. A capital expenditure is incurred when a company spends money either to buy fixed assets. Fixed assets represent investment in physical assets such as land, building, machinery and vehicles. In this thesis it defines as changes in real tangible fixed assets plus depreciation scaled by lagged fixed assets in order to

compare and control the size scale effects. This ratio measures how much investment each group invested relative to their asset base

Table 1: Definition of Variables

Variable	Definition	Symbol
Investment	Investment in Property Plant and Equipment/ Beginning of year capital stock	I_{it}/K_{it-1}
Cash Flow	Income before extraordinary items + depreciation and amortization / Beginning of year capital stock.	CF_{it} / K_{it-1}
Tobin Q	Price of share * Capital / Total assets	Q_{it-1}
Total Asset	Natural logarithm of total assets of firms	$ASSET_{it-1}$
Leverage	Long liability divided by fixed assets	$LEVER_{it-1}$
Sales	Total net Sales/ Beginning of year capital stock	S/K_{it-1}
Sales Growth	Percentage growth in total net sales	$\Delta SALES_{it-1}$
Coverage	EBIT/ Interest expenses	$COVER_{it-1}$

Cash Flow

Cash flow is revenue or expenses stream that changes a cash account over a given period. As independent variable in equation it demonstrates firm's cash flow rate calculated as cash flow divided by beginning-of-year capital stock. One of the essential items of firm is their solvency which can predict future and current performance. Companies with ample cash on hand are able to invest the cash back into the business in order to generate more cash and profit. Cash flow defines degree of market imperfection caused by financial constraints. Cash flow is used as a standard proxy for firm's internal net worth. In this thesis work expected that coefficient of cash flow for constrained firm would be higher than for unconstrained firms.

Tobin Q

Tobin Q was first introduced by James Tobin. He hypothesized that combining market values of all the companies on the stock market should be approximately equal to their replacement costs. This ratio calculated as the Market Value of company divided by the Total Asset Value of company. Tobin Q includes sufficient information that drives firms to investment decision. In literature, Q ratio included to control for firm's investment opportunities. Firms with good investment opportunities grow faster than those firms which need more financing and this makes them financial constrained, but if their investment opportunities recognized by market it will be easy for firms access to external finance. This ratio as profit indicator is included in equation as explanatory variable which shows that firms with high investment opportunities have high profit as well.

Total Assets

Total assets are everything that company owns. Total assets listed on balance sheet: current assets, liquid assets inventory and long term asset take place in this item. Total assets represent firm size in most studies. Small firms are likely to be young firms have higher information asymmetry costs than large firms. Large firm's advantages are they have lower bankrupt tendency and lower transaction costs. So firms with greater total assets are considered as large firms and less likely to be financially constrained. There are many evidences of using this sample as financially constrained criteria.

Leverage Ratio

Leverage is a ratio of long term liabilities divided by firm's fixed assets. It indicates firm's debt capacity. Firms with high leverage may have higher agency cost. These agency costs can arise from 'moral hazard' generated by the firms' managers by making an excessively risky investment. The reason for this risky

behavior is that with high leverage the firms may retain most of the profit from any success but lenders incur most of the losses from failure due to the limited liability nature of debt contracts.

Sales and Sales growth

In accountinting sales represent operating revenue earned by company for selling its products. Sales is main income of company and this item used for measure performance company. Sales in this equation represents variable defined as sales scaled by beginning of year capital stock. Sales with higher amount give a good sign and indicate that company operate very well. A high ratio indicates a high degree of efficiency in asset utilization and alow ratio reflects inefficient use of assets.

Sales growth item indicate growth percentage in sales between two time period. This ratio calculated by substract current and previous time of sales and result divided by previous time sales.

Coverage

Coverage indicate firm's ability to meet its financial obligations. If coverage shows high ratio, it means ability of the firms to fulfill its obligations to its lenders.

Coverage ratio below one means that company is not generating sufficient revenues to satisfy interest expenses. Investors take into account company's ratios over time in order to indentify company's financial position. Coverage is calculated by dividing a company's earnings before interest and taxes of one period by the company's interest expenses of the same period. In most studies on the effects of financial constraints on firms' activities used coverage ratio and this ratio indicate as a measure of internal financial constraint

2.1.2 Financial Constrains Criteria

The overall evidence of the empirical studies on financial constraints suggests that investment cash flow sensitivity consistent for financially constrained firms in the imperfect capital market. In order to lead these findings, investment equation model was controlling with firm specific characteristics to indentify financially constrained and unconstrained firms. For investigating firm's financial status, variables in equation were sorted by medians of total assets, age, and dividend payment.

Dividend: Access to eternal finance for constrained firms is more costly. If the cost disadvantage of external finance is large, it should have greatest effect on firms that retain most of their income, Fazzari, Hubbard and Petersen (1988). According to more studies, Arnott and Asness (2003), high dividends indicate higher earnings growth results. Firms with a high dividend payout ratio are less likely to face moral hazard and adverse selection problems and obtaining external finance are easier for them. By that can be concluded that firms that pay dividends are not financially constrained. In these studies firm that pay dividend considered as unconstrained firms and otherwise as constrained.

Firm size: Firm size is calculated as natural logarithm of total assets. It has been used as one of the major proxy variables for the level of financial constraints (Gertler and Gilchrist, 1994). Small firms categorized as financially constrained firms, because of high transaction costs of issuing debt or equity, restricted public information and possibility to be bankruptcy. Firms are classified as small and large depending on whether they are below or above the median of total assets respectively. Fazzari Hubbard and Peterson (1988) use size as main proxy, results of their studies and suggest that small firms have significantly higher investment cash flow sensitivities.

Age: Similar to size, firm's age also considered as an important financially constrained criteria. Because young firms do not have long record information it

makes difficult for them access to external finance. Younger firms are more likely to be financially constrained and face severe agency cost problem Firm's age is used as proxy variable in order to categorize firms to constrained and unconstrained criteria, Almeida and Campello (2007).

2.2. METHODOLOGY

2.2.1. Investment Model

The literature on investment includes two theories of investment, first is the neoclassical theory and second is the Q theory. These both models later augmented by financial variables in order to examine the effects of capital market imperfections. Kaplan and Zingales (1997), Cleary (1999), Alayannis and Mozumdar (2004), Cleary (2006), Islam and Mozumdar (2007) developed the cash flow augmented equation as follows:

$$I_{it}/K_{i(t-1)} = a_0 + a_1 I_{i(t-1)}/K_{i(t-2)} + a_2 Q_{i(t-1)} + a_3 CF_{it}/K_{i(t-1)} + \delta t + \eta t + u\ It \qquad (6)$$

The ratio of capital expenditure to beginning-of year capital stock is a proxy variable for investment, $CF/K_{i,t}$ is cash flow scaled by capital stock, where cash flow represents firm's net income plus depreciation, Q denotes Tobin Q, demonstrates market value of assets to book value, δt contains fixed effects for each firm, ηt is time fixed effects and u_{it} is error term. Baseline investment model was added with financial variables such as total assets, coverage, leverage, sales and sales growth of firm. This model after including these variables present as follows:

$$I_i/K_{i,t-1} = \begin{array}{l} \alpha_0 + \mu_1 I_{i(t-1)}/K_{i(t-2)} + \mu_2 Q_{i,t-1} + \mu_3\ CF/K_{i,t-1} + \mu_4 ASSET_{i,t-1} + \\ \mu_5 COVER_{i,t-1} + \mu_6 \Delta SALES_{i,t-1} + \mu_7 LEVER_{i,t-1} + \mu_8 S/K_{i,t-1} + \delta t + \eta t + u\ it \end{array} \qquad (7)$$

where *ASSET* is defines as natural logarithm of total asset, *COVER* presents coverage ratio of firm which is calculated by dividing earning to interest, this ratio shows the level of resources of firm that are used to service the firm's debt. Δ*sales*

is sales growth, *LEVER* is long term debt divided by fixed assets, leverage ratio measures firm's collateral deficiency for its borrowing and the amount of debt capacity. *S/K* is sales rate. Year dummies are included to capture year specific effects like changes in macroeconomic conditions in Turkey while inclusion of firm dummies variables give permanent, but unobservable firm specific effect.

To compare investment-cash flow sensitivity of constrained firms with unconstrained firms regression model are sorted by dividend paying firms, total assets and age. Firms that pay dividend considered as unconstrained firms. Firm that above median of total assets and age considered as unconstrained firms. Further presents regression model of unconstrained firms and constrained firms which are sorted by dividend, size and age.

Unconstrained Model:

$$I_i/K_{i,t-1} = \begin{aligned} &\alpha_o + \beta_1 I_{i(t-1)}/K_{i(t-2)} + \beta_2 Q_{i,t-1} + \beta_3 CF/K_{i,t-1} + \beta_4 ASSET_{i,t-1} + \\ &+ \beta_5 COVER_{i,t-1} + \beta_6 \Delta SALES_{i,t-1} + \beta_7 LEVER_{i,t-1} + \beta_8 S/K_{i,t-1} + \delta t + \eta t + u_{it} \end{aligned} \quad \text{if divid. paid} \quad (8)$$

$$I_i/K_{i,t-1} = \begin{aligned} &\alpha_o + \beta_1 I_{i(t-1)}/K_{i(t-2)} + \beta_2 Q_{i,t-1} + \beta_3 CF/K_{i,t-1} + \beta_4 ASSET_{i,t-1} + \\ &+ \beta_5 COVER_{i,t-1} + \beta_6 \Delta SALES_{i,t-1} + \beta_7 LEVER_{i,t-1} + \beta_8 S/K_{i,t-1} + \delta t + \eta t + u_{it} \end{aligned} \quad \begin{aligned}&\text{if total asset} \quad (9)\\ &> \text{medians}\end{aligned}$$

$$I_i/K_{i,t-1} = \begin{aligned} &\alpha_o + \beta_1 I_{i(t-1)}/K_{i(t-2)} + \beta_2 Q_{i,t-1} + \beta_3 CF/K_{i,t-1} + \beta_4 ASSET_{i,t-1} + \\ &\beta_5 COVER_{i,t-1} + \beta_6 \Delta SALES_{i,t-1} + \beta_7 LEVER_{i,t-1} + \beta_8 S/K_{i,t-1} + \delta t + \eta t + u_{it} \end{aligned} \quad \begin{aligned}&\text{if age} \quad (10)\\ &> \text{medians}\end{aligned}$$

Constrained Model:

$$I_i/K_{i,t-1} = \begin{aligned} &\mu_o + \gamma_1 I_{i(t-1)}/K_{i(t-2)} + \gamma_2 Q_{i,t-1} + \gamma_3 CF/K_{i,t-1} + \gamma_4 ASSET_{i,t-1} + \\ &\gamma_5 COVER_{i,t-1} + \gamma_6 \Delta SALES_{i,t-1} + \gamma_7 LEVER_{i,t-1} + \gamma_8 S/K_{i,t-1} + \delta t + \eta t + u_{it} \end{aligned} \quad \begin{aligned}&\text{if divid.} \quad (11)\\ &\text{not paid}\end{aligned}$$

$$I_i/K_{i,t-1} = \begin{cases} \mu_o + \gamma_1 I_{i(t-1)}/K_{i(t-2)} + \gamma_2 Q_{i,t-1} + \gamma_3 CF/K_{i,t-1} + \gamma_4 ASSET_{i,t-1} + \\ \gamma_5 COVER_{i,t-1} + \gamma_6 \Delta SALES_{i,t-1} + \gamma_7 LEVER_{i,t-1} + \gamma_8 S/K_{i,t-1} + \delta_t + \eta_t + u_{it} \end{cases} \quad \begin{array}{c} \text{if total assets} \\ < \text{medians} \end{array} \quad (12)$$

$$I_i/K_{i,t-1} = \begin{cases} \mu_o + \gamma_1 I_{i(t-1)}/K_{i(t-2)} + \gamma_2 Q_{i,t-1} + \gamma_3 CF/K_{i,t-1} + \gamma_4 ASSET_{i,t-1} + \\ \gamma_5 COVER_{i,t-1} + \gamma_6 \Delta SALES_{i,t-1} + \gamma_7 LEVER_{i,t-1} + \gamma_8 S/K_{i,t-1} + \delta_t + \eta_t + u_{it} \end{cases} \quad \begin{array}{c} \text{if age} \\ < \text{medians} \end{array} \quad (13)$$

The purpose of these equations is to compare the differential impact of cash flow to investment in constrained and unconstrained firm sorted by total assets, age, and dividend. Therefore β_2 and γ_2 estimation is main estimation which represents sensitivity of investment to cash flow. To check whether there is any multicollinearity a problem, correlation matrixes is run before Lagged versions of the all variables were used in the regression model.

2.2.2. Hypothesis

A large literature demonstrates that there is high sensitivity between investment and cash flow of financially constrained firms (Fazzari Hubbard Peterson, 1988). A number of studies such as Kaplan and Zingales (1997) and Moyen (2004) investigate the relation between the firm's debt ratio and the existence of financial constraints on the basis of the wide-spread belief that external finance providers take into account the firm's existing debt position in their decision whether extend credit. Kaplan and Zingales (1997) investigate the relation between the firm's interest coverage and the existence of financing constraints. Results of this thesis are expected to be same as studies above. Using balanced panel of 135 firms listed on Istanbul stock exchange the period 2009-2012, in this thesis was estimated dynamic regression models to check the following key hypothesis:

1) Investement- cash flow sensetivity is pozitive in the cash flow augmented investment equation.

Ho: a_3 in equation (6) $= 0$ vs. Ha: a_3 in equation (6) >0

2) Dividend paying firms have low cash flow investment sensitivity.

Ho: γ_2 in equation (11) $= \beta_2$ in equation (8) vs. Ha: γ_2 in equation (11) $> \beta_2$ in equation (8)

3) Smaller firms have high investment- cash flow sensitivity:

Ho: β_2 in equation (12) $= \gamma_2$ in equation (9) vs. HA: β_2 in equation (12) $> \gamma_2$ in equation (9)

4) Investment- cash flow sensitivity of younger firms are higher than Investment -cash flow sensitivity of mature firms

Ho: β_2 in equation (13) $= \gamma_2$ in equation (10) vs. HA: β_2 in equation (13) $> \gamma_2$ in equation (10)

2.2.3. Estimating approach

The assumption of the research is tested based on the regression analysis with the aid of STATA statistical analysis software. For estimation this approach Ordinary Least Squares (OLS) estimator was used first. Given longitudinal data {y X}, each element of which has unit identifier *i* and the time identifier *t,* number of models that arise from the most general linear model presents as follows:

$$y_{it} \sum_{k=1}^{K} = X_{kit\beta_{kit}} + \varepsilon_{it} ; \qquad i = 1, N; \quad t = 1, T \qquad (13)$$

There can be assumed balanced panel of N * T observations. Since this model contains K*N*T regression coefficients, it cannot be estimated from the data. By ignoring the nature of the panel data and applying pooled ordinary least squares, which would assume that $\beta_{kit} = \beta_k$ $\forall$ k, i, t but that model might be viewed as

overly restrictive and is likely to have a very complicated error process (e.g., heteroskedasticity across panel units, serial correlation within panel units, and so forth). Thus pooled OLS estimation is not often considered to be practical, yet, this estimation method are likely to suffer from biases due to unobserved firm-specific heterogeneity, as well as possible endogeneity of regressors. Therefore Within Groups estimator, which only account for the former bias is used as a second estimator method. Within group estimator suggests if X explanatory variable change how much does Y dependent variable change within group. Regression model of fixed effect represents as follows:

$$y_{it} \sum_{k=1}^{K} = X_{kit\beta_{kit}} + u_i + \varepsilon_{it} \tag{14}$$

The important thing is fixed effect estimator removes *uit* (fixed –effect parameters) in order to exclude assumptions that *ui* may be correlated with some of the regressors in the model. But Fixed effect could have problem of endogeneity. *Cov(xit,εit)=0* is assumptions of exogeneity. If it is violated, endogeneity problem could be exist where the independent variable and the idiosyncratic error term are correlated. Under endogeneity the FE-estimator will be biased, (Brüderl, 2005).

Finally, GMM estimator method, proposed by Arellano and Bond (1991) was used in regression. These estimation controls both for unobserved firm-specific heterogeneity and for the possible endogeneity of the regressors. This method of estimation is more efficient than OLS and Within Group estimators. GMM estimation can be explained in more detail by using Equation (8)-(13) as follows:

$$y_{it} = ay_{t-1} + \beta' X_{it} + v_i + v_t + e_{it}, \tag{15}$$

where *y* is the ratio of investment to beginning-of year capital stock, and *X* are set of explanatory variables as Tobin's *Q,* cash flow, total assets, coverage ratio, sales growth, leverage and ratio of sales to beginning-of year capital stock. But this

equation doesn't include the lagged dependent variable and vi represent firm-fixed effect as *vt* denotes a time fixed effect and e_{it}, is an idiosyncratic component.

In order to eliminate firm fixed effect, this estimation method relies on first-differenced estimating equation by including appropriate lags of the right-hand side variables as instruments. By rewriting Equation (15), first differenced equation is representing as follows:

$$y_{it} - y_{i(t-1)} = a(y_{i(t-1)} + y_{i(t-2)}) \ \beta'(X_{it} - X_{i(t-1)}) +$$
$$+ (v_t + v_{t-1}) + (e_{it} - e_{i(t-1)}) \qquad (16)$$

These instrument variables in Equation (16) using for solving endogeneity problem in regression and the correlation between $(y_{i(t-1)} - y_{i(t-2)})$ and $(e_{it} - e_{i(t-1)})$. By assuming that error term has not serially correlation, and explanatory variables weakly exogenous, the GMM estimator uses moment conditions which are represent as follows:

$$E[y_{i(t-s)}(e_{it} - e_{i(t-1)})] = 0 \text{ for } s \geq 2; t = 3,\ldots, \qquad (17)$$

$$E[X_{i(t-s)}(e_{it} - e_{i(t-1)})] = 0 \text{ for } s \geq 2; t = 3,\ldots, \qquad (18)$$

These moment conditions mean dependent variables and explanatory variables use as instrument variables and can be lagged twice or more. So variables as $I_{it}/K_{i(t-1)}$, Q_{it-1}, $CF_{it}/K_{i(t-1)}$, $ASSET_{i,t-1}$, $COVER_{i,t-1}$, $SALES_{i,t-1}$, $DEBT_{i,t-1}$, $(S/K)_{i,t-1}$, in Equation (8) - (13) by using GMM estimation method can be lagged twice or more. Whether the GMM estimation method is consistent depends of choosing valid instruments. There are two tests for checking validity of instruments, first is the *J* test and second is the test for second-order serial correlation of the residuals (*m2*).

A null hypothesis of m2 test means there is no second-order correlation of the residuals. The GMM estimator is consistent if a null hypothesis is not rejected. The Hansen/Sargan *J* statistic is a test of overidentifying restrictions. The *J* statistic is asymptotically distributed as chisquare distribution, under the null of

instrument validity, with degrees of freedom equal to the number of instruments minus the number of parameters. Using rule of thumb, if the $p\text{-}values$ for the Sargan's test and the m2 test are not significant, the instruments are valid and there is no gross misspecification in the model.

CHAPTER THREE

EMPIRICAL FINDINGS AND EMPIRICUL RESULTS

3.1 EMPIRICAL FINDINGS

3.1 .1.Descriptive Statistics

Table 2 summarizes the number of observations, mean, standard deviation, minimum, maximum and median for a selection of financial variables from the sample of 540 firm-year observations. (I/K) is defined as investments in PP&E divided by beginning-of-year capital stock or tangible fixed assets. Investment (Iit) in this thesis represents the change in real tangible fixed assets plus depreciation. It is divided by fixed assets (Kit) in order to compare and control the size scale effects. S/K is defined as sales divided by beginning-of-year capital stock. (CF/K) is defined as net income before extraordinary items plus depreciation and amortization divided by beginning-of-year capital stock. COVER is the interest coverage defined as EBIT divided by interest expenses. LEVER is defined as long liability divided by fixed assets. Q is the beginning-of-year market value of common equity divided by beginning-of-year book value of common equity. Sales growth is percentage growth in total net sales. ASSET is logarithms of firms' total assets.

Data given in this table 2 present statistical results of financial variables of 135 manufacturing firms listed on Istanbul Stock Exchange from 2009 to 2012 period of time. Average investment and standard deviation of Turkey's manufacturing firm reported as 0.18% and 0.22% respectively while their cash flow and standard deviation equal to 0.39% and 0.60% respectively. Minimum size of manufacturing firms reportes as 5.59 and maximum as 10.13. Sales scaled by capital stock considered as fixed asset turnover ratio, which represents the operational efficiency of the firm. Average sales report as 5.77 while maximum and minimum equal 401.2 and 0.0002 respectively with 19.88% of standard deviation.

Table 2: Descriptive Statistics

Variable	Obs	Median	Mean	Std. Dev.	Min	Max
$I_{it}/K_{i(t-1)}$	540	0.106	0.182	0.225	0.0001	1.586
$CF_{it}/K_{i(t-1)}$	540	0.236	0.389	0.601	-1.498	3.939
$Q_{i(t-1)}$	540	0.383	0.678	1.139	0.0001	10
$ASSET_{i(t-1)}$	540	8.338	8.228	0.846	5.591	10.13
$COVER_{i(t-1)}$	540	0.673	2.054	16.75	-70.72	346.9
$\Delta SALES_{i(t-1)}$	540	0.091	0.100	0.299	- 0.998	1
$LEVER_{i(t-1)}$	540	0.284	0.514	0.768	0.0001	8.393
$S/K_{i(t-1)}$	540	2.830	5.773	19.88	0.0002	401.2

Notes: This table presents the number of observations, median, mean, standard deviation, minimum and maximum for a selection of financial variables from the Turkish manufacturing firm's sample of 540 firm-year observations. *(I/K)* is defined as investments in PP&E divided by beginning-of-year capital stock. *(CF/K)* is defined as net income before extraordinary items plus depreciation and amortization divided by beginning-of-year capital stock. *Q* is the beginning-of-year market value of common equity divided by beginning-of-year book value of common equity. *ASSET* is logarithm of total assets. *Coverage* is the interest coverage defined as EBIT divided by interest expenses and preferred dividends. *S/K* are total net sales divided by beginning-of-year capital stock .*Δ SALES* is sales growth defined as percentage growth in total net sales. *LEVER* is long term debt liability divided by fixed assets

Further Table 3 demostrates descriptive statistics of constrained and unconstrained firms sorted by dividend, size and age. This table is the summary statistics of the firms for the key regression variables used in the regression for the whole sample of constraints and unconstraint firms sorted by median of total assets, dividend, age. (I/K) ratio indicates how much investment of each firm invested relative to their asset base. All firms invest 0.18 % of their total tangible fixed assets. Based on age, young firm considered as constraints firms are investing heavily. They invest 20% of their total tangible fixed assets while mature firm invest 16.7%. Constrained firms are sorted by dividend and size invest moderately 16.6% and 17.9% of their tangible fixed assets respectively while unconstrained firms are sorted by same criteria invest 20.2% and 18.4% respectively.

Cash flow ratio for all firms reported as 38.9%. Unconstraint firms (55%, 42%, 42.4%) sorted by dividend, total assets and age, have particularly higher cash flow ratio relatively to constrained firms (26.5%, 35.7%, 35.3%). This cash

flow ratio of Turkey firms is significantly higher compare to firms in Belgium, France, Germany, and the UK reported in 2003 by Bond et al. which is ranging from 11% to 13%.

Table 3: Descriptive Statistics of Financially Constrained Group

Variable	Divident		Size		Age		
	Uncons	Constr	Uncons	Constr	Unconst	Constr	AllFirms
$Iit/Ki(t-1)$	0.202 (0.23)	0.166 (0.21)	0.184 (0.225)	0.179 (0.226)	0.167 (0.200)	0.200 (0.250)	0.182 (0.225)
$CFit / Ki(t-1)$	0.550 (0.688)	0.265 (0.488)	0.420 (0.589)	0.357 (0.612)	0.424 (0.587)	0.353 (0.598)	0.389 (0.600)
$Qi(t-1)$	0.983 (1.39)	0.503 (0.850)	0.699 (1.05)	0.658 (1.22)	0.556 (1.34)	0.777 (0.814)	0.678 (1.13)
$ASSETi(t-1)$	8.31 (0.855)	8.16 (0.834)	8.83 (0.394)	7.59 (0.718)	8.30 (0.835)	8.14 (0.827)	8.22 (0.84)
$COVERi(t-1)$	3.73 (24.84)	0.746 (4.10)	2.13 (6.201)	1.97 (23.17)	3.27 (21.15)	0.732 (9.31)	2.054 (16.7)
$\Delta SALESi(t-1)$	0.080 (0.296)	0.115 (0.301)	0.128 (0.283)	0.069 (0.313)	0.092 (0.295)	0.112 (0.300)	0.100 (0.29)
$LEVERi(t-1)$	0.383 (0.779)	0.538 (0.760)	0.402 (0.740)	0.527 (0.798)	0.537 (0.794)	0.495 (0.755)	0.514 (0.76)
$S/Ki(t-1)$	6.59 (5.62)	4.71 (26.02)	7.79 (4.43)	3.85 (28.01)	6.37 (25.87)	5.21 (9.42)	5.77 (19.8)

Notes: The table reports sample mean, corresponding standard deviations are presented in parentheses. (I/K) is investment, Q is the ratio of market to book value of total assets, (CF/K) is cash flow, ASSET is logarithm of total assets, COVER is coverage ratio. S/K is sales. ΔSALES is percentage growth in total net sales. LEVER is total debt divided by total assets. The total number of firm-year observations is 540. See notes in Table 2.

Tobin's Q is added to capture the firm's investment opportunities. Table of descriptive statistics unconstrained firms report Q ratio as 0.98%, 0.69%, 0.55% and constrained 0.50%, 0.65% and 0.77% sorted by dividend, size and age. There are seen in table that unconstrained firms sorted by dividend and size have high opportunity of investment than constrained firm while constrained firm sorted by age have higher investment opportunities. If Tobin q is greater than 1.0 then the market value is greater than the value of the company's record assets. This

suggests that the market value reflects some unmeasured or unrecorded assets of the company. High Tobin's q values encourage companies to invest more in capital because they are "worth" more than the price they paid for them. On the other hand, if Tobin's q is less than 1, the market value is less than the recorded value of the assets of the company. Recent literature suggests eliminating firm years with Tobin's Q in excess of 10 as an attempt to tackle the measurement error problem of investment opportunities (Almeida and Campello, 2007). Table 2 presents maximum Q ratios equal to 10 which are close to the suggested cut-off point; this is expected to minimize the probable measurement problem to some extent.

Mean of total assets give better indicator in order to better understand the differences among constrained and unconstrained firm. Table 3 presents mean of total assets unconstrained firm (8.31%, 8.83% and 8.30%) which is higher than constrained firm (8.16%, 7.59% and 8.14%) sorted by dividend, total assets and age.

The interest coverage of unconstrained firms (3.73%, 2.13% and 3.27%) has higher coverage than constrained firms (0.74%, 1.97% and 0, 73%) sorted by dividend, size and age. An interest coverage ratio below 1 indicates the company is not generating sufficient revenues to satisfy interest expenses.

Average sales growth of constrained firm (11.5% and 11.2%) is higher than unconstrained firm (8% and 9.2%) sorted by dividend and age while unconstrained firms sorted by size have higher growth rate (12.8%) than constrained (6.9%). It can be concluded that young firms and firms that don't pay dividend have higher sales growth.

Leverage defined as the book value of total long term liabilities divided by fixed assets. This ratio shows firm's debt capacity. Constrained firms (53.8% and 52.7%) sorted by dividend and size have higher leverage than unconstrained firms (38.3% and 40.2%). But young firms have lower leverage (49.5%) compare to mature firms (53.7%).

Table 3 shows that sales turnover ratio of all firms equal to 5.77%. Unconstrained firms sorted by dividend, total assets and age with ratio equals to

6.59 7.79%, 6.37% perform high turnover compare to constrained firm reported as 4.71% , 3.85% and 5.21%.

3.1.2. Correlation Matrix

Correlation matrix in table 4 presents the Spearman's rank correlation coefficient between the rankings of firm-years according to the various classification schemes. Null hypothesis of Spearmen test implies that there is no monotonic correlation in the population against the alternative hypothesis while alternative suggests that there is monotonic correlation. Correlation between the different schemes is surprisingly low only cash flow has moderate positive and monotonic relationship with investment and coverage.

Table 4: Correlation Matrix for All Firms

	$I_{it}/K_{i(t-1)}$	$CF_{it}/K_{i(t-1)}$	$Q_{i(t-1)}$	$ASSET_{i(t-1)}$	$COVER_{i(t-1)}$	$\Delta SALES_{i(t-1)}$	$LEVER_{i(t-1)}$	$S/K_{i(t-1)}$
					All firms			
I_{it}/K_{it-1}	1.0000							
CF_{it}/K_{it-1}	0.5027***	1.0000						
$Q_{i(t-1)}$	0.0926*	0.1452***	1.0000					
$ASSET_{it-1}$	0.1128***	0.1456***	-0.0381	1.0000				
$COVER_{it-1}$	0.1370***	0.5015***	0.1704**	0.1606***	1.0000			
$\Delta SALES_{it-1}$	0.1954***	0.2368***	0.0041	0.0926***	0.1833***	1.0000		
$LEVER_{it-1}$	0.2570***	0.1196***	-0.1898*	0.0727***	-0.1007*	0.1226***	1.0000	
S/K_{it-1}	0.3268***	0.3906***	-0.0294	-0.1316***	-0.0077*	0.2581***	0.287***	1.0000

Notes: This table presents the Spearman's rank correlation coefficient between the rankings of firm-years according to the various classification schemes.* and ** denote statistical significance at the 5% and 1% significance level, respectively

Table 5 represents correlation matrix for unconstrained firms sorted by dividend, total assets and age. Unconstrained firms with high dividend payment and mature criteria have moderate correlation of investment to cash flow and cash

flow has positive relationship with coverage. There also can be seen that large firm's cash flow have correlation with sales. Table 6 shows correlation matrix for constrained firm and sorted also by same variables. Result of this panel shows same result. Moreover cash flow variables of constrained firms have moderate correlation with sales and sales growth.

Table 5: Correlation Matrix for Unconstrained Firms

Panel A, Firms sorted by dividend

	$I_{it}/K_{i(t-1)}$	$CF_{it}/K_{i(t-1)}$	$Q_{i(t-1)}$	$ASSET_{i(t-1)}$	$COVER_{i(t-1)}$	$\Delta SALES_{i(t-1)}$	$LEVER_{i(t-1)}$	$S/K_{i(t-1)}$
I_{it}/K_{it-1}	1.0000							
CF_{it}/K_{it-1}	0.5069***	1.0000						
$Q_{i(t-1)}$	0.1042	0.2248***	1.0000					
$ASSET_{it-1}$	-0.0348	-0.0533	-0.0515	1.0000				
$COVER_{it-1}$	0.0483	0.3569***	0.2520**	-0.0065	1.0000			
$\Delta SALES_{it-1}$	0.1922***	0.2806***	-0.0488	0.0082	0.1209*	1.0000		
$LEVER_{it-1}$	0.3513***	0.1771***	-0.3392*	0.1181*	-0.2152***	0.2288***	1.0000	
S/K_{it-1}	0.3570***	0.5300***	-0.0413	-0.2033***	-0.0630	0.2633***	0.3611*	1.0000

Panel B, Firms sorted by size

	$I_{it}/K_{i(t-1)}$	$CF_{it}/K_{i(t-1)}$	$Q_{i(t-1)}$	$ASSET_{i(t-1)}$	$COVER_{i(t-1)}$	$\Delta SALES_{i(t-1)}$	$LEVER_{i(t-1)}$	$S/K_{i(t-1)}$
I_{it}/K_{it-1}	1.0000							
CF_{it}/K_{it-1}	0.3979***	1.0000						
$Q_{i(t-1)}$	0.1473***	0.1777***	1.0000					
$ASSET_{it-1}$	0.1881***	0.1247**	-0.0576	1.0000				
$COVER_{it-1}$	0.1155**	0.5658***	0.2208**	0.0803	1.0000			
$\Delta SALES_{it-1}$	0.1619***	0.1809***	-0.0244	0.0442	0.1809***	1.0000		
$LEVER_{it-1}$	0.1848***	0.0696	-0.2301*	0.2843***	-0.0761	0.1223**	1.0000	
S/K_{it-1}	0.2833***	0.3711***	-0.0148	-0.1092**	-0.0071	0.2109***	0.2509***	1.0000

	Iit/Ki(t-1)	CFit /Ki(t-1)	Qi(t-1)	ASSETi(t-1)	COVERi(t-1)	ΔSALESi(t-1)	LEVERi(t-1)	S/Ki(t-1)
Iit/Kit-1	1.0000							
CFit /Kit-1	0.4749***	1.0000						
Qi(t-1)	0.1211**	0.2552***	1.0000					
ASSETit-1	0.1120*	0.0889	-0.0491	1.0000				
COVERit-1	0.1587***	0.5555***	0.3103**	0.0236	1.0000			
ΔSALESit-1	0.1585***	0.2051***	-0.0685	0.0446	0.1927***	1.0000		
LEVERit-1	0.1967***	0.0744	-0.3551*	0.1651***	-0.1703***	0.1044*	1.0000	
S/Kit-	0.3447***	0.4226***	-0.0847	-0.0451	0.0338	0.2402***	0.348***	1.0000

Notes: This table presents the Spearman's rank correlation coefficient for unconstrained firm sorted by age, size above medians and firm which pay dividend .* and ** denote statistical significance at the 5% and 1% significance level, respectively.

Table 6: Correlation Matrix for Constrained Firm

Panel A, Firms sorted by dividend

	Iit/Ki(t-1)	CFit /Ki(t-1)	Qi(t-1)	ASSETi(t-1)	COVERi(t-1)	ΔSALESi(t-1)	LEVERi(t-1)	S/Ki(t-1)
Iit/Kit-1	1.0000							
CFit /Kit-1	0.4868***	1.0000						
Qi(t-1)	0.0412	-0.0088	1.0000					
ASSETit-1	0.2158***	0.2316***	-0.0837	1.0000				
COVERit-1	0.1286**	0.4693***	0.0344	0.2446***	1.0000			
ΔSALESit-1	0.2183***	0.2530***	0.0694	0.1714***	0.2601***	1.0000		
LEVERit-1	0.2033***	0.1082*	- 0.0522	0.0731	- 0.0219	0.0454	1.0000	
S/Kit-1	0.3021***	0.3126***	-0.0071	-0.0626	0.0217	0.2567***	0.2259***	1.0000

Panel B, Firms sorted by size

	Iit/K_{it-1}	$CFit/Ki_{(t-1)}$	$Q_{i(t-1)}$	$ASSET_{i(t-1)}$	$COVER_{i(t-1)}$	$\Delta SALESi_{(t-1)}$	$LEVERi_{(t-1)}$	$S/Ki_{(t-1)}$
$Iit/Kit-1$	1.0000							
$CFit/Kit-1$	0.6745***	1.0000						
$Q_{i(t-1)}$	-0.0247	0.0844	1.0000					
$ASSET_{it-1}$	-0.1507	-0.1337	0.0130	1.0000				
$COVER_{it-1}$	0.1618**	0.3693***	0.0437	-0.1151	1.0000			
$\Delta SALES_{it-1}$	0.2837***	0.3552***	0.0836	-0.0227	0.1477*	1.0000		
$LEVER_{it-1}$	0.4017* **	0.1970**	-0.1108	-0.0908	-0.1063	0.1632**	1.0000	
S/Ki_{t-1}	0.4279***	0.4647***	-0.0572	-0.0097	0.0452	0.4036***	0.3386***	1.0000

Panel C, Firms sorted by age

	Iit/K_{it-1}	$CFit/Ki_{(t-1)}$	$Q_{i(t-1)}$	$ASSET_{i(t-1)}$	$COVER_{i(t-1)}$	$\Delta SALESi_{(t-1)}$	$LEVERi_{(t-1)}$	$S/Ki_{(t-1)}$
$Iit/Kit-1$	1.0000							
$CFit/Kit-1$	0.5329***	1.0000						
$Q_{i(t-1)}$	0.0717	0.0187	1.0000					
$ASSET_{it-1}$	0.1116	0.1859***	-0.0522	1.0000				
$COVER_{it-1}$	0.1407**	0.4510***	0.0178	0.2481***	1.0000			
$\Delta SALES_{it-1}$	0.2115***	0.2843***	0.1003*	0.1487**	0.1895***	1.0000		
$LEVER_{it-1}$	0.3111***	0.1412**	0.0083	-0.0241	-0.0555	0.1375**	1.0000	
S/Ki_{t-1}	0.3251***	0.3493***	0.0520	-0.1974***	-0.0696	0.2893***	0.1890***	1.0000

Notes: This table presents the Spearman's rank correlation coefficient for constrained firm sorted by age, size below medians and firm which do not pay dividend .* and ** denote statistical significance at the 5% and 1% significance level, respectively.

3.2. REGRESSION RESULTS

3.2.1. Regression results for investment equation

Table 7 presents baseline regression of equation (6) for full sample firms. This equation estimates with OLS, Within Group, and first-differenced GMM estimator. The coefficients of the cash flow (0.177, 0.188 and 0.255) are positive and statistically significant for three estimation methods. This evidence accepts first hypotheses that investement- cash flow sensetivity is pozitive in the cash flow augmented investment equation. In particular the cash flow and investment positively related to each other. Tobin Q in three estimation methods is not statistically significant.

Table 8 presents baseline regression with adding specification as sales, sales growth, size, leverage, coverage variables. Result of equation (7) in Table 8 reports that by adding this variables R^2 increase, but not significantly in the OLS and Within Group results (0.36%, 0.30%) compare to regression results of baseline equation(0.33%, 0.21%). This specification will be used in further works, where equation will be sorted by constrained and unconstrained group. The p coefficient represents the proportion of the total error variance accounted for by unobserved heterogeneity. This coefficient reports as -0.11% in Table 7 and -0.58% in Table 8 which indicates that unobserved firm-specific characteristics should be taken into account.

OLS estimation method could be biased due to endogeneity of the cash flow variables, Within Groups estimator is run for controlling the former bias, but this estimator not accounts for the latter bias. Therefore GMM estimators are run. This estimation method are useful in simultaneously controlling for unobserved heterogeneity and endogeneity problems by using first-differenced transformation to control for heterogeneity in the sample, and used lagged values of the regressors as instruments to control for endogeneity problems. But when instruments are weak first-differenced GMM suffers from the finite-sample bias.

Table 7: Regression Results

Variable	OLS (pooled) I	Within Group II	First diff. GMM III
Intercept	0.044*** (0.016)	0.084*** (0.026)	–
$I_{i(t-1)} / K_{it-2}$	0.256*** (0.050)	- 0.082 (0.058)	0.184* (0.111)
CF_{it} / K_{it-1}	0.177*** (0.024)	0.188 *** (0.027)	0.255*** (0.078)
Q_{it-1}	0.001 (0.012)	0.018 (0.016)	-0.045 (0.047)
Time Dummies	YES	YES	YES
Numb. of obs	405	405	270
Numb. of firms	135	135	135
Numb.of inst.	-	-	11
R^2	0.33	0.21	-
Ftest (p-value)	19.62 (0.0000)	14.72 (0.0000)	4.05 (0.002)
p	-	-0.11	
m2	-	-	0.014
J(p-value)	-	-	0.318

Notes: This table shows the estimated results of equation 1 using OLS, FE and Firstdiff. GMM. The figures reported in parentheses are asymptotic standard errors. Time dummies were included in all specifications. Standard errors and test statistics are asymptotically robust to heteroskedasticity. ρ represents the proportion of the total error variance accounted for by unobserved heterogeneity. *m2* is a test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. The *J* statistic is a test of the overidentifying restrictions, distributed as chi-square under the null of instrument validity. Instruments for Firstdiff. GMM are *Iit /Ki(t-1), Qit, CFit /Ki(t-1),* all lagged two and three times; time dummies. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level.

One of the ways to test whether the finite-sample bias is compares the lagged dependent variable from the GMM estimator with the results from the OLS and the Fixed-effects estimators. Results in both regressions equation (6) and (7) show same evidence where the coefficient of the lagged dependent variables lie above the fixed-effects estimates and below the OLS estimates. This implies that the finite-sample bias would not be a major problem for this thesis. Therefore thesis study specifications will be estimated with first-differenced GMM estimator other ways two-step GMM estimators should be used.

Table 8:Regressiıon Results Using Specification

Variable	OLS (pooled) I	Within Group II	First diff. GMM III
	0.066	-1.14***	
	(0.085)	(0.282)	
Intercept			
	0.247***	-0.150*	0.225***
$Ii_{(t-1)} / Ki_{t-2}$	(0.056)	(0.081)	(0.066)
	0.166***	0.196 ***	0.190***
CFi_t / Ki_{t-1}	(0.025)	(0.033)	(0.030)
	0.005	0.014	0.002
Qi_{t-1}	(0.013)	(0.018)	(0.009)
	-0.006	0.156***	-0.005
$ASSETi_{t-1}$	(0.010)	(0.036)	(0.011)
	-0.001	-0.004**	-0.002*
$COVERi_{t-1}$	(0.001)	(0.001)	(0.001)
	0.114	0.0002	0.083**
$\Delta SALESi_{t-1}$	(0.032)	(0.038)	(0.038)
	0.001	0.006***	0.001
S/Ki_{t-1}	(0.002)	(0.002)	(0.001)
	-0.003	-0.063*	-0.009
$LEVERi_{t-1}$	(0.020)	(0.038)	(0.022)
Time Dummies	YES	YES	YES
Numb. of obs	405	405	270
Numb. of firms	135	135	135
Numb.of instruments	_	_	42
R^2	0.36	0.30	-
Ftest (p-value)	12.82 (0.0000)	11.32 (0.0000)	11.01 (0.0000)
ρ	-	-0.58	
m2	-	-	0.071
J(p-value)	-	-	0.234
	-	-	

Notes: This table shows the estimated results of equation (2) using OLS, FE and Firstdiff. GMM. Instruments for Firstdiff. GMM are *Iit /Ki(t-1), Qit, CFit /Ki(t-1), ASSETi(t-1), COVERi(t-1)*, *ΔSALESi(t-1), LEVERi(t-1)and S/Ki(t-1),* all lagged two and three times; time dummies. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see *Notes* to Table 7.

Table 7 and 8 report p-values(m2) for the Arellano-Bond and Hansen J statistics, number of instruments used, number of firms and the firm years involved in the estimations. There is one and two times lagged of right hand variables use in equation (6) and (7) as instruments. These instruments are found to be jointly valid by the p-value of the estimated Hansen-J statistics. So that the consistent result are not driven by the choice of instruments.

3.2.2. Dynamics of Investment-Cash Flow Relationship of Constrained and Unconstrained Group

Main purpose of this empirical study is to examine how cash flow of constrained and unconstrained firms sorted by dividend, size and age impact on investment. Besides that there will be also observe effect of sales, sales growth, size of firms, leverage and coverage on investment constrained and constrained firm

Table 9 presents first difference of GMM results of the baseline model with added explanatory variables such as size, sales, sales growth, leverage and coverage, which lagged once and two times as instruments.

This Table 9 reports result of equation for unconstrained firm and equation for constrained firm by sorting with dividend, total assets, age. Table shows cash flow's coefficient $\beta 2$ for unconstrained firms (0.217, 0.190 and 0.239) are greater than cash flow's coefficient $\gamma 2$ for constrained firms (0.264, 0.307 and 0.252). These results of cash flow are statistically significant and accept second, third and fourth hypotheses. Second hypotheses that dividend paying firms have low cash flow investment sensitivity is accepted and reported in column I in Table 9. There are presents that β2 coefficient in equation (8) (0.217) lower than γ2 coefficient in equation (11) (0.246).

A third hypothesis presents that smaller firms invest more after controlling for the liquidity constraints also accepts. Column II in Table 9 reports result that $\gamma 2$ coefficient of cash flow for constrained firms in equation(12) (0.301)is greater than $\beta 2$(0.190) coefficient of cash flow for unconstrained firms.

Table 9: Regression Results with Specification Controlling for Constrained and Unconstrained Group

Dependent Variable Iit/Ki(t-1)	Dividend I		Size II		Age III	
	Unconstr	Constr	Unconstr	Constr	Unconstr	Constr
Intercept	0.571 (0.457)	0.346 (0.218)	-1.40 (1.06)	0.399* (0.215)	0.331* (0.198)	0.081 (0.031)
Ii(t-1) / Ki(t-2)	0.237** (0.118)	0.194** (0.076)	0.191*** (0.067)	0.235** (0.272)	0.234 (0.294)	0.321 ** (0.097)
CFit / Ki(t-1)	0. 217*** (0.054)	0. 264*** (0.052)	0.190*** (0.051)	0.307*** (0.080)	0.239*** (0.072)	0.252*** (0.089)
Qi(t-1)	-0.012 (0.014)	0.028** (0.013)	-0.015 (0.023)	-0.001 (0.025)	0.019 (0.017)	0.020* (0.027)
ASSETi(t-1)	-0.068 (0.055)	-0.035 (0.026)	0.172 (0.122)	-0.044 (0.031)	-0.029 (0.022)	0.0008 (0.015)
COVERi(t-1)	0.007** (0.002)	0.005** (0.002)	0.005 ** (0.001)	0.003** (0.003)	0.003** (0.001)	0.001* (0.004)
ΔSALESi(t-1)	-0.002 (0.002)	-0.029 (0.088)	0.142 (0.092)	0.105 (0.096)	0.260** (0.123)	0.090 (0.086)
LEVERi(t-1)	0.047*** (0.016)	0.096 ** (0.058)	0.057** (0.022)	0.078 ** (0.012)	0.051*** (0.031)	-0.021 (0.030)
S/Ki(t-1)	0.013 (0.008)	-0.002 (0.003)	0.001 (0.004)	0.115 (0.088)	0.001 (0.002)	0.001 (0.004)
Numb. of obs	171	234	290	115	195	207
Numb. of firms	74	94	100	43	65	69
Numb.of instruments	36	43	31	21	26	40
Ftest (p-value)	17.38(0.000)	37.54(0.0000)	14.5(0.0000)	21.91(0.0000)	11.16(0.0000)	11.11(0.0000)
m2	0.026	0.087	0.003	0.137	0.434	0. 012
J(p-value)	0.646	0.162	0.166	0.343	0.777	0. 322

Notes: The figures reported in parentheses are asymptotic standard errors. Time dummies were included in all specifications. *m2* is a test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. The *J* statistic is a test of the overidentifying restrictions, distributed as chi-square under the null of instrument validity. For all specifications time dummies and industry dummies are included, all specification are estimated with first differenced GMM estimator which used lagged values of all right side variables dated t-2 as instruments. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level. Also see *Notes* to Table 7.

A Fourth hypothesis shows that younger firms invest more after controlling for the liquidity constraints also supports in the empirical results, where Column III demostrates that cash flow coefficient of young firms (0.252) is greater than cash flow coefficient of mature firm (0.239).

Results are presented in Table 9 are consistent and follows with the empirical works of Fazzari, Hubbard and Peterson (1988) and by that held fourth hypotheses of this thesis. These evidences confirm theory and empirical results of Fazzari Hubbard and Peterson (1988). It can be concluded that since external financing for constrained firms in Turkey also costly and these firms use more internal finance for their investment

Other financial variables do not have influence on investment only covearge, leverage sorted by dividend, size and age also sales growth of unconstrained firms sorted by age have consistent results. Coverage ratio can be understood as a solvency based ratio, which measures the firm's ability to serve its debt. The inability to generate cash to service the interest cost will lead firms into insolvency. Coverage ratio of unconstrained firms (0.007%, 0.005% and 0.003%) have more impact on investment than ratio of constrained firms (0.005%, 0.003% and 0.001%) sorted by dividend, total assets and age. It can be concluded that unconstraints firms in Turkey follows some rules to maintain them solvent, given that their inability to generate cash flows, the coverage ratio is an important determinant to their investment decisions. For the whole sample, leverage is an important determinant of the investment decisions. Constrained and unconstrained firms' investment and leverage ratio are consistent but constraints firms' leverage (0.096% and 0.078%) sorted by dividend and size has more sensitivity to investment than unconstrained firms(0.047%, 0.057% and 0.051%) sorted by dividend, size and age, this evidence is explained by the idea that constrained firms in Turkey are unable to obtain loans without enough collateral. Banks in Turkey typically require the debt to be "over collateralized" to protect them from the drop in value of the collateral. Due to the limited tangible fixed assets that private firms can use as collateral, they will find it difficult to secure loans and are very sensitive to the leverage measure.

Sales growth shows how well company operates. Coefficient of sales growth of mature firms is consistent. It implies that sales growth of mature firm's impact on firm's investment decisions.

CONCLUSION

The theoretical studies have extended that relationship between investment and cash flow for large companies depends on ready access to external finance. Keynes (1936) abstracted from financial structure and attributed the role of finance to the volatility of expectations in financial markets and the determination of the rate of interest by liquidity preference (Mark Gerard Hayes, 2003). Post Keynesian theory depends heavily on the assumption of imperfect competition implying that constrained aggregate investment requires a new equity issue discount. Their models focus on expected demand, uncertainty and the role of internal funds across different firm categories. Moreover Post Keynesian and New Keynesian investment theories suggest because of fundamental uncertainty of the future and the risk-averse, managers would like to avoid future debt commitments. Post Keynesian also presents that risk aversion as a characteristic of the periods of downturns in the economy, while agents might act as risk loving during the boom periods. On the other hand, the New Keynesian perspective points to the information asymmetries in the credit markets and interprets this positive link as a "supply side" constraint imposed by creditors.

Recent study of Fazzari, Hubbard, and Petersen (1988) suggests that under imperfect capital market firms face a cost differential between external and internal sources of funds and the financially constrained firm would have higher investment-cash flow sensitivity. A large body of literatures is followed Fazzari, Hubbard and Peterson evidence using data from a variety of contexts. In contrast to these studies Kaplan and Zingales (1997) and Cleary (1999) investigate evidence where financially constrained firms have not high sensitivity to investment using data on US firms and Cleary (1999) using international data. Alti (1997) in their studies investigates that younger firms' investments are more sensitive to cash flow fluctuations than older firms' investments.

There are many literatures that discuss about how to identify firm's financial status. Firm's cash flow, dividend, firm's constrained model and Cleary's index are used in order to classify firm to constrained and unconstrained group. Fazzari, Hubbard, and Petersen's (1988) study suggests that financially constrained firms

have a higher cash flow sensitivity while Kaplan and Zingales (1997) and Cleary (1999) work present opposing evidence. Kaplan and Zingales (1997) explained their result by evidence that cash flow is an excellent proxy for firms' underlying income shocks and higher cash flows lead to more investment. When income of unconstrained firms rises they can also increase their borrowing. Kaplan and Zingales (1997) suggest that these external funds do not take into consideration in regression model therefore cash flow sensitivity of unconstrained firms is magnied.

Fazzari, Hubbard, and Petersen (1988) classify firms to constrained criteria according to their dividend payment level and unconstrained firms according to their high debt. Their result investigates that unconstrained firms' cash flow have lower sensitivity to investment than constrained firms and unconstrained firms exhibit a positive correlation while constrained firms have a negative investment-dividend correlation. Constrained firms usually use cash flow and assets sales when they have deficient in fund for investment. Therefore constrained firms have strong relationship between investment and cash flow and their investment policy have high sensitivity to cash flow fluctuations than other firms.

Main purpose of this thesis is to investigate and observe impact of cash flow on investment of financially constrained and unconstrained manufacturing firms in Turkey employing different empirical strategies and econometric techniques. There are used panel data of 135 manufacturing firms listed on Istanbul Stock Exchange with time period from 2009 to 2012 years. Regression model are estimated by pooled OLS, Within Groups and GMM estimation method. The differenced GMM (Arellano and Bond 1991) is more effective method to control for firm-specific and time invariant fixed effects. Regression equation includes lagged dependent variables and all variables lagged two or three periods of times as instruments.

Firms are classified to financially constrained group according to small, young and dividend payment criteria. Besides Q, investment and cash flow five other financial variables such as sales, sales growth, total assets, leverage and coverage are added to models. There are three evidence. First is investment model sorted by size, second is investment model sorted by dividend, third is model

sorted by age. Result of the three evidence presents that coefficients of cash flow are pozitive and consistent for constrained and unconstrained firms. But constrained firms in Turkey which do not pay dividend, small by size and younger by age have higher sensetivity of cash to investment. It can be concluded that after controlling for firm's constrained criteria this evidence follows the Fazzari Hubbard and Peterson (1988) study where firms based on financially constrained criteria face higher sensitivity. This result could be not only because of higher information costs but also because these firms have lower availability to external funds. In spite of new financial instruments and institutions such as the Istanbul Stock Exchange and the Capital Market Board which reduce the stringency of credit rationing in the corporate sector, Turkey continues face credit rationing of small firms which are forced to finance investments mostly from internal sources and short-term borrowing while larger firms have better access to external funds and therefore less depend on their internally generated cash flow for doing investment outlays.

Other financial variables have different impact on investment. For example coverage coefficient of unconstrained firms and constrained firms in three evidences gives pozitive and consistent results. But unconstrained firms higher sensetivity than constrained firms. This can be implied unconstrained firms in Turkey follow rules to maintain themselves solvent, when they couldn't generate cash flows this condition influences on investment decisions. Leverage ratio has positive and consistent result for both constrained goup of firms which are sorted by dividend, size and age. But constrained firms sorted by dividend and size have higher sensitivity. It can be explained that financially constrained firms in Turkey are unable to obtain loans without enough collateral. Banks in Turkey typically require the debt to be "over collateralized" to protect them from the drop in value of the collateral. Due to the limited tangible fixed assets that private firms can use as collateral, they will find it difficult to secure loans and are very sensitive to the leverage measure. Sales growth shows how well company operates. Coefficient of sales growth of mature firms is consistent. It implies that sales growth of mature firm's impact on firm's investment decisions.

The thesis makes a contribution to the literature on financing constraints analyzes the impact of financial market frictions on corporate policies. This framework of analysis can be used to analyze the degree of financing constraints in Turkey and these financing constraints have implications for the firm's capital structure and capital budgeting decisions, which is an important insight for investors who are seeking reliable information to assess the firm's future performance in terms of risk and return. Results are useful for policy-makers and also bring forward a number of insights that are potentially useful to the business community. First there are found that financially constrained firms use more internal fund for investment and leverage of constrained firms have high sensitivity to investment. This means that there is room for stimulation growth through increased credit availability, which is an important insight for policymakers. There are limited studies about financial constraints using data on Turkish firms and this thesis with firm level data can provide insights on the impact of deregulation on the investment decisions of the firm. Manufacturing firms in Turkey economy take major place. These firms support fact that besides internal fund they need external finance to finance their investment. Therefore, decreasing the financing constraints of those firms, which in turn will allow them to invest according to their growth opportunities and improve their capital allocation, should be high on policy makers' agenda. (Yeşiltaş, 2009:27).

The main limitation of this work is that for the panel data set only a few years were used as a sample for observation. Availability of more years would be allowed in empirical research to get the long-term impact of cash flow of firm's on investment.

REFERENCES:

Agca, S. and A. Mozumdar. (2008).The Impact of Capital Market Imperfections on Investment-Cash Flow Sensitivity. *Journal of Banking and Finance*.32(2): 207-216.

Akerlof, George A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics*, 84(3): 488-500.

Almeida, H. and M. Campello. (2007). Financial Constraints, Asset Tangibility and Corporate Investment. *Review of Financial Studies. 20* (5):1429-1460.

Almeida, H., M. Campello, and M. S. Weisbach. (2004). The Cash Flow sensitivity of cash. *The Journal of Finance.* 59 (4): 1777-1804.

Allayannis, G., Mozumdar, A. (2001). Investment, Cash Flow, and Hedging. Working Paper,Virginia Tech

Alti, Aydogan. (2003). How Sensitive is Investment to Cashflow when Financing is Frictionless? *Journal of Finance.* 58(2): 707-722

Arellano, M. and S. Bond. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies.* 58(2): 277-297.

Ascioglu, A., S. P. Hegde, and J. B. McDermott. (2008). Information Asymmetry and Investment-Cash ow Sensitivity. *Journal of Banking and Finance.* 32(6): 1036-1048

Bernanke, B. and M. Gertler. (1989). Agency Costs, Net Worth, and Business Fluctuations. *The American Economic Review.* 79(1): 14-31.

Bert D'Espallier., Sigrid V. and Ludo P. (2009). Corporate Investments and Financing Constraints: Analyzing Firm-Varying Investment-Cash Flow Sensitivities. *Review of Business and Economics*. 461-488.

Bond, S., and C. Meghir. (1994). Dynamic Investment Models and the Firm's Financial Policy. *Review of Economic Studies*, 61:197-222

Carpenter,E.and B.C.Petersen. (2002). Is the Growth of Small Firms Constrained by Internal Finance? *Review of Economics and Statistics*. 84(2): 298-309.

Cleary, S. (1999). The Relationship Between Firm Investment and Financial Status. *The Journal of Finance*. 54(2): 673-692.

Cleary, S., P. Povel,and M. Raith. (2007). The U-shaped Investment Curve: Theory and Evidence. *The Journal of Financial and Quantitative Analysis*. 42(1): 1-39.

Denis, D. J. and V. Sibilkov, (2009), Financial Constraints, Investment, and the Value of Cash Holdings, *Review of Financial Studies*, forthcoming.

D'Espallier, B., S. Vandemaele, and L. Peeters (2008). Investment-Cash Flow Sensitivities or Cash-Cash Flow Sensitivities? An Evaluative Framework for Measures of Financial Constraints. *Journal of Business Finance and Accounting* 35 (7): 943-968.

Erickson, T. and T.Whited. (2002). Two-step GMM Estimation of the Errorsin-Variables Model Using High-Order Moments. *Econometric Theory*. 18(03): 776-799.

Fazzari, S.Hubbard, R.Glenn and Petersen, Bruce C.(1988). Financing Constraints and Corporate Investment. *Brookings Papers on Economic Activities*. 1:141-195.

Fazzari, S., Glenn R. Hubbard, and Bruce C. Petersen. (2000).Investment-Cash Flow Sensitivities are Useful: a Comment on Kaplan and Zingales. *The Quarterly Journal of Economics*. 695-705.

Fazzari, Steven M. and M. J. Athey. (1987).Asymmetric information, financing constraints, and investment. *The Review of Economics and Statistic.* 69(3): 481-487.

Fazzari,Steven M. (1989). Keynesian Theories of Investment: Neo-, Post- and New. *Revista de EconomiaPolitica.* 9:101-111.

Fazzari, Steven M. and Variato, Anna M.(1996).Varieties of Keynesian Tnvestment theories: Further Reflections. *Journal of Post Keynesian Economics.* 18(3): 359-368

Fisher, Irving. (1930). The Theory of Interest, New York, Macmillan

George A. Akerlof. (1970). The Market for Lemons: Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics.* 84: 488-500.

Gertler, M. (1992). Financial Capacity and Output Fluctuations in an Economy with Multi-Period Financial Relationships. *The Review of Economic Studies*. 59 (3):455-472.

Gilchrist, S. and C. P. Himmelberg. (1995). Evidence on the Role of Cash Flow for Investment. *Journal of Monetary Economics*. 36(3):541-572.

Goergen, M. and L. Renneboog. (2001). Investment Policy, Internal Financing and Ownership Concentration in the UK. *Journal of Corporate Finance*. 7(3):257-284.

Greenwald, B. and J. Stiglitz. (1993). Financial Market Imperfections and Business Cycles. *The Quarterly Journal of Economics.* 108 (1): 77.

Guariglia, A. and Carpenter,R.(2008). Cash Flow, Investment, and Investment Opportunities: New Tests Using UK Panel data. *Journal of banking and finance.* 32 (9):1894-1906.

Guariglia, A. (2008). Internal Financial Constraints, External Financial Constraints, and Investment Choice: Evidence from a Panel of UK Firms. *Journal of Banking and Finance.* 32 (9): 1795-1809.

Hansen, L. P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica.* 50 (4): 1029-1054.

Hausman, J. A. and D. A. Wise. (1977). Social Experimentation, Truncated Distributions, and Efficient Estimation. *Econometrica* 45 (4):919-938.

Hayes M.G. (2003). Investment and Finance Under Fundamental Uncertainty. University of Sunderland

Hayashi, F. (1982). Tobin's Marginal q and Average q: A Neoclassical Interpretation. *Econometrica.* 50 (1): 213-224.

Himmelberg, P., R. Hubbard, and D. Palia (1999). Understanding the Determinants of Managerial Ownership and the Link Between Ownership and Performance. *Journal of Financial Economics.* 53 (3): 353-384.

Hiller and Worrall. (1993). Asymmetric Information, Investment Finance and Real Business Cycles. Department of Economics and Accounting.University of Liverpool

Hoshi, T., A. Kashyap, and D. Scharfstein. (1991). Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups. *The Quarterly Journal of Economics*. 106 (1): 33-60.

Hovakimian, G. (2009). Determinants of Investment Cash Flow sensitivity. *Financial Management*. 38(1):161-183.

Hovakimian, A. and Hovakimian, G. (2009). Cash Flow Sensitivity of Investment. *European Financial Management*. 15:47-65.

Hu, X. and F. Schiantarelli. (1998). Investment and Capital Market Imperfections: A Switching Regression Approach Using US Firm Panel Data. *The Review of Economics and Statistics*. 80 (3): 466-479.

Hubbard, R. G. (1998). Capital Market Imperfections and Investment. *Journal of Economic Literature*. 36:193–227.

Islam, S. and A. Mozumdar. (2007). Financial Market Development and the Importance of Internal Cash: Evidence From International Data. *Journal of Banking and Finance*. 31 (3): 641-658.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*. 76 (2):323-329.

Jorgenson, D. W. (1963). Capital Theory and Investment Behavior. *The American Economic Review*. 53 (2): 247-259.

Joseph E.Stiglitz, Andrew Weiss. (1981). Credit Rationing in Markets with Imperfect Information. *The American Economic Review*.71:393-410.

Kalecki, Michal. (1937). The Principle of Increasing Risk. *Economica*, 4: 440-447

Kaplam, S. and Zingales, L. (1997). Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints? *Quarterly Journal of Economics*. 112:169-215.

Kashyap, A. K., O. A. Lamont, and J. C. Stein.(1994). Credit Conditions and the Cyclical Behavior of Inventories. *The Quarterly Journal of Economics*. 109(3): 565-592.

Keynes, J Maynard. (1936). The General Theory of Employment Interest and Money. Collected Writings of John Maynard Keynes, 1973. 7.

Khan, T. (2006). Company Dividends and Ownership Otructure: Evidence From UK Panel Data. *The Economic Journal*.116 (510): 172-189.

Lyandres, E., (2007). Costly External Financing, Investment Timing and Investment-Cash Flow Sensitivity. *Journal of Corporate Finance.* 13:959–980.

Randal, W. L. and Éric Tymoigne. (2008). Macroeconomics Meets Hyman P. Minsky: The Financial Theory of Investment.Working Paper. The Levy Economics Institute and University of Missouri

Modigigliani, F. Miller, M.(1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review*. 48:261-97.

Moyen, N. (2004). Investment-Cash Flow Sensitivities: Constrained Versus Unconstrained Firms. *Journal of Finance*. 69: 2061-2092.

Myers, S. Majluf, N. (1984). Corporate Finance and Investment Decisions when Firms Have Information that Investors Do Not Have. *Journal of Financial Economics*. 13:187-221.

Morellec, E. Nikolov, B. and N. Schürhoff. (2010). *Corporate Governance and Capital Structure Dynamics: Evidence From Structural Estimation*.Working paper.

Mark T. Leary and Michael R. Roberts.(2008). *The Pecking Order, Debt Capacity, and Information Asymmetry*.Working Paper. Cornell University.

Oliner, S., and G. Rudebusch, (1992). Sources of the Financing Hierarchy for Business Investment. *Review of Economics and Statistics*.74(2): 643-654.

Petersen, Mitchell. (2005). *Estimating standard errors in finance panel data sets: Comparing approaches.* Working Paper. Northwestern University.

Shin, H. and Y. H. Kim.(2002). Agency Costs and Efficiency of Business Capital Investment: Evidence From Quarterly Capital Expenditure, *Journal of Corporate Finance.* 8:139–158.

Steven, M. Fazzari,(1999). *Minsky and the Mainstream: Has Recent Research Rediscovered Financial Keynesianism?* Working Paper N.278. Washington University in St. Louis and The Jerome Levy Economics Institute.

Stiglitz, Joseph E. and Weiss, Andrew. (1981). Credit Rationing in Markets with Imperfect Information, *American Economic Review*, 71(3): 393-410.

Yeşiltaş.(2009). Financing Constraints and Investment: The Case Of Turkish Manufacturing Firms. A Master's of thesis. Department of Economics Bilkent University.