Financially Constrained Firms: The Impact of Managerial Optimism and Corporate Investment on Inefficiencies Leading to Low Market Valuation - The Case of Greece

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Abstract Financial constraints in capital markets can underline the macroeconomic effect of fluctuations in investment to cash flow and liquidity which has as a result several firms to reduce their access to low-cost finance. The examination of this aspect in detail determines the magnitude of the effects of internal finance on investment. Diversification as an underlying factor of financial constraints can create several costs. Diversified firms have the tendency to overinvest in lines of business which display poor investment opportunities. Diversification indeed reduces value. This loss in value is found mainly for firms of all sizes having managers with a higher level of optimism. The link between optimism and corporate investment is more pronounced in financially constrained firms. When the wedge between the internal and external cost of funds increases, a firm is considered to be more financially constrained. Managers are undisputedly optimistic and firms with optimistic managers tend to invest more. The investment of firms with optimistic managers is more sensitive to cash flow especially for financially constrained firms. Analysing a sample of listed companies in Greece, it is found that the higher the managerial optimism, the lower the excess value of a firm. Optimism and financial constraint measures are based on the insider stock transaction behaviour of all senior managers they have to report to the Hellenic Capital

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Market Commission. These findings show that the investigation of decision-making processes in Greece is crucial.

Keywords Managerial optimism • Investment • Financial constraints • Excess value

1 Introduction

Financing investment may not be a problem for large, well-known firms. However, many analysts believe that smaller, less well-known firms sometimes find it difficult to finance worthy projects. Banks and outside investors may be reluctant to fund unfamiliar firms, forcing these firms to finance their investment internally. As such, these firms can be defined as financially constrained. The implications for the economy are serious if firms are financially constrained. By forcing firms to finance their own investment, financial constraints can make the economy less stable.

A growing body of evidence suggests many firms in the economy are financially constrained. Financial constraints affect both the stability and growth of the economy. By making investment spending more volatile, financial constraints make the economy more volatile. And by slowing investment spending on plant and machinery, financial constraints slow the economy's long-term growth. By making firms dependent on the availability of internal funds, financial constraints make business investment spending more volatile. Aggregate investment spending in the economy fluctuates much more than any other major component of national spending. One of the most significant predictions of the literature is that the link between managerial optimism and corporate investment is most usually encountered in financially constrained or equity-dependent firms.

Heaton (2002) find that optimistic managers prefer internal financing to external financing because they believe market investors underestimate the value of their firm and thus hesitate to raise funds from the financial markets. Several empirical studies, such as Lin et al. (2008) and Hackbarth (2008), confirm this theoretical prediction by Heaton (2002) and show that managerial optimism can explain pecking order preferences in financial decisions. Barros and Silveira (2009) further show that firms with optimistic managers will choose a more aggressive financing policy, resulting in firms that have higher leverage ratios, affecting their capital structure.

Managerial behaviour tendencies may not only affect a firm's financing decisions but also impact its investment decisions. Jensen (1986), using the concept of agency cost of free cash flow, predicts that managers may invest in negative NPV projects due to self-interest. This agency cost between managers and shareholders may thus cause overinvestment, resulting in investment distortions. Malmendier and Tate's (2005a) study is the first to consider managerial optimism in corporate investment decisions. They measure the timing of CEO's stock option exercise as the proxy for CEO optimism and find that overoptimistic CEOs are significantly more responsible for the firm's cash flow. By hand-collecting data on how the press

portrays each CEO as the measure of managerial optimism, Malmendier and Tate (2005b) reconfirm their findings that managerial over-optimism accounts for corporate investment distortions. Using a unique database of German companies to proxy for managerial optimism, Glaser et al. (2008) show that the investment-cash flow sensitivity is higher for firms with optimistic managers, which again supports the findings of Malmendier and Tate (2005a, b).

2 Theoretical Background

2.1 Overconfidence and Optimism

The notion that specific managers may be overconfident regarding their own abilities to manage, the selection of upper investment projects and the precision of their knowledge are encouraged by psychological studies of judgement. The most significant finding in this area of study is the phenomenon of overconfidence (Tversky and Kahneman 1986). They simply argue that overconfidence consists of factors such as the illusion of control, insensitivity to predictive accuracy, self-enhancement tendencies and finally misunderstanding of chance processes. All the above-mentioned causes of overconfidence apply to the managerial decision making of mergers. Griffin and Brenner (2004) argue that all concepts that characterise overconfidence are linked.

Weinstein (1980) provides evidence that individuals are especially overconfident regarding projects to which they are highly committed. Malmendier and Tate (2005a, b) argue about the potential of control and commitment concerning managers' internal investment decisions. Optimistic managers tend to invest more. However, the possible case of overinvestment due to overconfidence and managerial optimism may be a source of long-run underperformance (Glaser and Weber 2007). In his seminal paper regarding optimism, Roll's (1986) *hubris hypothesis* suggests that managers share an overly optimistic opinion of their competence to create value. Hubris usually is developed after a person has lived through a period of success. Hubris refers to the extravagant confidence of people who strongly believe that their opinion is always the right one. Consequently, hubris feelings can lead to harmful and unfavourable behaviour, especially for a manager who is seriously affected by hubris and may become a burden to his/her firms. As a result, these managers often trigger their own downfall. Therefore, hubris as a psychological characteristic may induce disastrous outcomes for the manager and his firm.

Generally, the *hubris hypothesis* (Roll 1986) serves as an alternative explanation of corporate mergers and acquisitions. Hubris when referring to individual decision-makers regarding bidding firms can give an explanation on why bids are made even when there exists a positive valuation error. Therefore, bidding firms which are affected by hubris tend to pay too much for their mergers and acquisition investment targets. According to Roll (1986), psychologists offer explanations on the fact that individuals do not always make rational decisions, under risk and uncertainty. In a series of studies (Oskamp 1965; Tversky and Kahneman 1981;

Kahneman et al. 1982), it is observed that economists have a reputation of arrogance due to the fact that they constantly ignore the psychologists' evidence that individuals do not always act rationally. However, Roll (1986) suggests that corporate takeovers usually reflect individual decision making.

The psychology and behavioural economic literature underline self-attribution bias as the most common source of overconfidence. According to Malmendier and Tate (2005a), overconfidence is equal to over-optimism. Over-optimist managers overestimate the returns of their investment decisions and regard external funds excessively costly. Optimistic managers are at higher risk because they use to overestimate the future cash flows of their decisions.

According to Doukas and Petmezas (2007), the overconfidence hypothesis states that managers are overconfident and overinvest. They also feel that they are superior than others and more competent. Specifically, overconfident managers strongly believe that future merger outcomes are mainly under their control. A chief executive officer (CEO) who suffers from delusion of control is more likely to be heavily optimistic about the future outcome of a merger. Malmendier and Tate (2005a, 2008) also try to demonstrate that overconfidence helps explain merger decisions. Positive CEO beliefs based on overconfidence and risk-seeking decisions emerge as the most well-defined ways to integrate private investment and corporate merger decisions.

2.2 Finance Constraints, Diversification and Corporate Investment

In their seminal work, Fazzari et al. (1988) try to address thoroughly the relationship between conventional models of investment and capital market imperfections referring to the access of individual firms to capital markets. Regarding mature firms with well-known prospects and capacities, conventional representative firm models in which financial framework appears not to be relevant to the investment decision may well be applied. Yet, for the rest of the firms, financial factors seem to be extremely relevant due to the fact that external funds are not a perfect substitute for internal funds, especially when referring to the short run. On the one hand, when the cost disadvantage of external finance is small, withholding practices will display little or nothing regarding investment. Thus, firms will use external funds to support investment. On the other hand, when the cost disadvantage is major, firms which tend to invest more of their income may possibly have no low-cost sources of investment finance. Therefore, their investment will be affected by the fluctuations of cash flow.

Financial constraints in capital markets can underline the macroeconomic effect of fluctuations in investment to cash flow and liquidity which has as a result several firms to reduce their access to low-cost finance. In order to examine this aspect in detail, Berger and Ofek (1995) also examine the diversification effect on firm value.

Theoretical arguments recommend that diversification can result in either value-enhancing or value-destroying effects. Greater operating efficiency, greater debt capacity and lower taxes may be some of the possible benefits when a firm functions in different lines of business. On the contrary, the use of increased discretionary resources in order to undertake value-decreasing investments and the phenomenon of cross-subsidies which allows low-performing segments to use resources of the high-performing segments are some of the possible disadvantages of diversification. Therefore, Berger and Ofek (1995) support the idea that there is no clear image regarding the positive and negative effects of diversification on firm value.

Consistent with diversification activity is Berger and Ofek's (1995) theoretical justification developed during the late 1960s regarding the benefits of diversification. Evidently this trend has changed in the recent years. More recent theoretical arguments tend to support the costs of diversification. Chandler (1977) states that due to the fact that multi-segment firms create a pattern of specialised management, they are subsequently more efficient and, therefore, more profitable than focused firms. Weston (1970) suggests that liquidity allocation is more effective and more profitable for internal capital markets.

Diversified firms, therefore, are more efficient in allocating liquidity because they create a larger internal capital market. An alternative version of this argument belongs to Stulz (1990) who argues that the creation of larger capital markets from diversified firms leads to the reduction of underinvestment problem that was also described earlier by Myers (1977). These internal capital market theories foresee that diversified firms overall make more positive net present value investments than they would as separate isolated segments. Additionally, Lang and Stulz (1994) show that Tobin's Q and firm diversification are negatively correlated and consequently diversified firms tend to display lower Tobin's Q values compared to nondiversified firms.

3 Methodology

3.1 Research Question

Research Question: The investment-cash flow sensitivity of firms with optimistic managers is more pronounced in financially constrained (equity-dependent) firms. The following approach is chosen in order to test the second research question. The Kaplan–Zingales index (Kaplan and Zingales 1997) is used which was mainly used in past studies too. This index is meant to capture firms with high need for funds. Another index that is used is the Whited–Wu index (Whited and Wu 2006) which basically captures firms with high costs of external funds. Finally, we incorporate the Cleary index (Cleary 1999) which separates the sample into three categories of firms' dividend payment policies, as well as an index of Glaser et al. (2008) who make an addition to Cleary index (Cleary 1999) by adding firm size.

3.2 Sample and Data

The unique sample of Greek nonfinancial firms listed in the ASE was tested in order to produce useful results. These results may be extremely important for managers of Greek companies in order to overcome the difficulties they face. The narrow bounds for investment and rising of firms and the general financial crisis of public as well as private sectors make the role of Greek managers much more difficult. Therefore, the firm sample is multi-faceted. It consists of firms from 11 different industries and sectors in order to incorporate the whole substance of optimism. The process is to exclude financial firms due to the differences in the way they compile their annual reports. Thus, the 184 nonfinancial sample firms will be the starting point for the research, in order to produce significant results and add to the existing knowledge on this subject.

Data is gathered from the stock market as well as from balance sheets and cash flow statements for all firms of the sample. Focus is placed on every firm's annual report in order to gather all necessary data for the methodology. The next step is to classify stock prices on an everyday basis for all firms for the years from 2007 to 2012. Data is accessed from the ASE and is accumulated for every sample firm. Balance sheet data is necessary in order to formulate the basic variables that will be used in regression analysis. Balance sheet data is gathered from the web pages of all firms and is accumulated on an annual basis.

Basic regressions are run from 2005 to 2012 in order to have an analysis of the effects of managerial optimism on subsequent corporate investment, aiming to see if there is something special about the period of interest in terms of investing conditions. The main data source for stock price data is the ASE. ASE is the primary data source of studies that analyse corporate decisions in Greece.

Directors' dealing data is obtained from Directors Deals Global Data and Analysis, a specialised global data market company which analyses and monitors all shared transactions made by directors in the shares of their own company. Therefore, this work uses all the available data regarding the Greek case for the period of 6 years (2007–2012). During this period, a total of 18,575 directors' dealings are reported. Due to the fact that this study focuses on the transaction behaviour of individuals, all transactions that were executed by legal entities are excluded. The procedure is to maintain only the transactions that are described as buys or sells and exclude awards, contract buys, etc.

3.3 Financial Constraint Measures

One of the most significant predictions of the literature is that the link between optimism and corporate investment is most usually encountered in financially constrained or equity-dependent firms. The most used index and consequently the most used methodology on financial constraints is of Kaplan and Zingales (1997).

Their index is mainly designed for identifying firms with high need for funds. However, there are other indices too that have emerged in relative literature such as the Cleary index (Cleary 1999) and the Whited–Wu index (Whited and Wu 2006). Both indices are supposed to capture firms with high costs of external funds.

This study opts to choose the following approach. As in Glaser et al. (2008), the Kaplan–Zingales index (Kaplan and Zingales 1997) is used as well as the Whited–Wu index (Whited and Wu 2006) in order to capture the differences in their approaches regarding financial constraints: the high need of funds as well as the high costs of external funds, respectively. These indices have been constructed for the US stocks only. However, there are several studies in literature which incorporate these indices for firms in Europe. Bris et al. (2006) focus on the identification of financially constrained firms in Germany and the rest of Europe with the use of Kaplan–Zingales index (Kaplan and Zingales 1997). These indices are displayed below, as they were presented in Glaser et al. (2008):

$$\begin{aligned}\text{Kaplan} - \text{Zingales} - \text{index} = {} & -1.001909^* \frac{\text{cash flow}}{\text{total capital}} \\ & + 0.2826389^* \text{Tobin's Q} + 3.139193^* \text{Leverage} - 39.3678^* \frac{\text{dividend}}{\text{total capital}} \\ & - 1.314759^* \frac{\text{cash}}{\text{total capital}} \end{aligned} \quad (1)$$

Kaplan and Zingales (1997) measure investment or capital expenditures using COMPUSTAT item 128. They also measure cash flow as the sum of earnings before extraordinary items and depreciation. They deflate investment and cash flow by capital, measured as net property, plant and equipment at the beginning of the fiscal year. Finally, they measure Tobin's Q as the market value of assets divided by the book value of assets where the market value of assets equals the book value of assets plus the market value of common equity minus the sum of the book value of common equity and balance sheet deferred taxes.

$$\begin{aligned}\text{Whited} - \text{Wu} - \text{index} = {} & -0.091^* \frac{\text{cash flow}}{\text{total assets}} \\ & - 0.062^* \text{dummy (positive dividend)} + 0.021^* \frac{\text{long term debt}}{\text{total assets}} \\ & - 0.044^* \ln (\text{total assets}) + 0.102^* \text{industry sales growth} \\ & - 0.035^* \text{sales growth} \end{aligned} \quad (2)$$

As an additional financial constraint measure, the Cleary index (Cleary 1999) is used. The method of Cleary (1999) suggests that the sample of US firms is divided into three subsamples according to the dividend payment policy which is being followed be each sample firm. The first group consists of firms which increase dividends and are likely not financially constrained. The second group consists of firms which cut dividends and are likely financially constrained, while the third

group consists of firms which do not change their dividend payment policy. His basic tool is a discriminant analysis he performs in order to discover firm characteristics that are related with the categorisation of firms into the above-mentioned three groups.

To calculate Cleary index (Cleary 1999) with Greek coefficients, "dummy" variable is needed as the dependent variable. This "dummy" variable takes the value of 1 if a firm increases dividends and takes the value of 0 if a firm decreases dividends. This variable is controlled for current ratio, fixed charge coverage, financial slack divided by lagged capital, net income margin, sales growth and the debt ratio. To create the index, all coefficients of variables that are significant at the 5% level are used.

Consistent with Glaser et al. (2008), it is expected that this fourth index will best rank Greek firms in analysing the link between managerial optimism and corporate investment for financially constrained firms due to the fact that it is calibrated for a European country (Germany) and thus may serve as a better proxy for the Greek case too. Moreover, it includes the natural logarithm of assets to incorporate firm size to capture one significant case of financial constraints, the high costs of external funds.

3.4 Financial Constraints Scores with the Calculation of Cleary Index (Cleary 1999)

A probit regression is run in order to calculate the Cleary index (Cleary 1999). The choice is this type of regression, due to the fact that the dependent variable is dichotomous and can only take two values. The dependent variable is a "dummy" variable that takes the value 1 if the firm increases dividends and takes the value 0 if the firm cuts dividends. Our dependent variable is regressed across several independent variables: current ratio, fixed charge coverage, financial slack divided by lagged capital, net income margin, sales growth, long-term debt divided by total assets and the natural logarithm of total assets.

The regression equation that arises with the use of the probit regression is presented below. It has a similar form with the linear regression equation with the difference that the dependent variable Y takes the form of $\Phi^{-1}(\pi)$ because Y cannot be observed; only the consequences of Y can be observed. If Y is below a certain level, one is able to observe a success. Otherwise, we are forced to observe a failure. The regression of the dependent variable Y on several independent variables $X_1, X_2, \ldots, X_7$ displays how the boundaries between success and failure change with the incorporation of the independent variable X. The area under the normal curve below the values of the dependent variable Y is the probability of a success for the controlling independent variable X. As the values of X change, the boundary values of Y_x change, having as a result the change of the probability of success. Formally,

the area under the curve less than Y (the standard normal cumulative function) is denoted as

$$\Phi(y) = \int_{-\infty}^{Y} \frac{1}{\sqrt{2\pi^e}} - \frac{x^2}{2} \mathrm{d}x \tag{3}$$

Thus, the probit linear regression model can be written as

$$\pi = \Phi(b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7) \tag{4}$$

This equation gives the model the form of the inverse link. One can, therefore, write the probit model in terms of the link function as follows:

$$\begin{aligned} \text{Probit}\,(\pi) &= \Phi^{-1}(\pi) \\ &= b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + \varepsilon \end{aligned} \tag{5}$$

$\Phi^{-1}(\pi)$ = the value of the dependent variable ("dummy" variable)
$X_1, X_2, \ldots, X_7$ = the values of the independent variables (current ratio, fixed charge coverage, financial slack/lagged capital, net income margin, sales growth, long-term debt/total assets and the natural logarithm of total assets)
b_0 = constant
$b_1, b_2, \ldots, b_7$ = coefficients
ε = the error term

3.5 *Optimism and Financial Constraints*

Fixed-effect panel regression of capital expenditures on several control variables is used for the one third of all stocks with the highest financial constraints as identified by the indices of Kaplan and Zingales (1997), Whited and Wu (2006), Cleary (1999) and Glaser et al. (2008) in order to examine the impact of the behaviour of optimistic managers to firm financial constraints. The methodology followed is the one of Glaser et al. (2008), and, thus, the firms are separated according to how financially constrained they are. It states that the investment-cash flow sensitivity of firms with optimistic managers is more pronounced in financially constrained (equity-dependent) firms. The classification of managers into optimistic and not optimistic is done by the use of the managerial "dummy" variable. The "dummy" variable is equal to 1 when members of the executive board and the supervisory board (ALL), only the executive board (EB) or only the CEO are classified as optimistic in a given year.

The next step is to assess the constraint scores on all three groups of managers of the study (ALL, EB and CEO) and run several regressions with dependent variable, the capital expenditures divided by lagged assets. The choice is to use an independent variable cash flow divided by lagged assets, lagged Tobin's Q, managerial

optimism, as well as the optimism × (cash flow/lagged assets) based on the methodology of Malmendier and Tate (2005a). This new independent variable is constructed to test, due to the fact that Glaser and Hirn (2007) showed that firms which display the highest financial constraints normally do not display the highest investment-cash flow sensitivity, and therefore it is not possible to split the sample in optimistic managers and not optimistic managers. All regressions include firm and year fixed effects, and the time period tested is 2007–2012.

Therefore, for the dependent variable CAPEX/lagged assets (dependent or criterion) and the independent variables (independent or predictors) cash flow/lagged assets, lagged Tobin's Q, managerial optimism and optimism × (cash flow/lagged assets), the regression equation that arises with the use of the least square methods has the next form:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \varepsilon \tag{6}$$

Y = the values of the dependent variable (CAPEX/lagged assets)
$X_1, X_2, \ldots, X_4$ = the values of the independent variables [cash flow/lagged assets, lagged Tobin's Q, managerial optimism and optimism × (cash flow/lagged assets)]
b_0 = constant
$b_1, b_2, \ldots, b_4$ = coefficients
ε = the error term

3.6 Determinants of the Excess Value

In the last part of the regression methodologies, the procedure involves running several regressions in order to examine whether managerial optimism is associated with inefficiencies which can lead to low market valuation of firms. The choice is to use excess value on a focused-firm "dummy" indicator as a dependent variable on several control variables as Berger and Ofek (1995) propose. Excess value of a company is the natural logarithm of the ratio of a firm's actual value to its imputed value. A firm's imputed value is the sum of the imputed values of its segments, with each segment's imputed value being equal to the segment's sales multiplied by its industry median ratio of total capital (market value of equity plus book value of debt) to sales. More analytically, excess value EV_i and imputed value $I(V)_i$ of a company i are defined as

$$EV_i = \ln\left(\frac{Vi}{I(V)i}\right), \text{ and} \tag{7}$$

$$I(V)_i \sum_{j=1}^{n} \left(AI_{ij} \times \text{multiple of segment j of firm i}\right) \tag{8}$$

V = total capital (market value of equity plus book value of debt)

Multiple of segment j of firm i = median ratio of V to accounting item (sales ratio) of focused firms in industry of segment j
AI_{ij} = accounting item of segment j of firm i
n = number of segments of firm i

The independent variables are the natural logarithm of total assets, capital expenditures divided by sales, EBIT divided by sales and managerial optimism "dummy" variable. The process was to first run a pooled OLS regression without the use of managerial optimism for the whole sample of the firms without separating the regressions accordingly to the three groups of managers (ALL, EB and CEO). The pooled OLS regression model assumes that the coefficients are the same for all individuals.

The dependent variable is excess value on a focused-firm indicator as it was calculated previously. The independent variables of the regression are the natural logarithm of total assets, capital expenditures divided by sales and EBIT divided by sales. Therefore, the regression equation that arises has the next form:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \varepsilon \tag{9}$$

Y = the values of the dependent variable (excess value on a focused-firm indicator)
X_1, X_2, X_3 = the values of the independent variables (the natural logarithm of total assets, capital expenditures divided by sales and EBIT divided by sales)
b_0 = constant
b_1, b_2, b_3 = coefficients
ε = the error term

The next step is to run a series of fixed-effect panel regressions. In regressions 16–21, the managerial optimism "dummy" variable is incorporated. Since there are "dummy" variables in the model, there are $n - 1$ entities included. However, there is only one "dummy" variable. Therefore, the regression equation for fixed-effect panel regressions remains unchanged, as in pooled OLS regression equation that was presented above. The "dummy" variable is equal to 1 when members of the executive board and the supervisory board (ALL), only the executive board (EB) or only the CEO are classified as optimistic in a given year. The managerial optimism "dummy" variable takes lagged values in the last three fixed-effect panel regressions of the study for the determinants of excess value. These lagged values are also incorporated separately in order to compare the possible changes in last year's and current year's values.

4 Empirical Findings

4.1 Financial Constraints and the Effects of Managerial Optimism

Cash flow is generally highly correlated with investment opportunities. Constrained firms when there are favourable investing opportunities also tend to invest more and consequently issue additional debt to finance these opportunities. Additionally, Tobin's Q and managerial optimism as independent variables also display lower coefficient statistic values when compared to the whole sample firms. This result is consistent with Kaplan and Zingales (1997), Cleary (1999) and Glaser and Hirn (2007).

However, the regression specification does not take into account the effect of debt financing. As a consequence, the investment-cash flow sensitivity of unconstrained firms is enlarged. The difference between unconstrained firms and constrained firms is that on one hand unconstrained firms, with more cash flow, tend to use debt in order to increase both their investment as well as their dividend payment, and on the other hand, constrained firms have to choose whether to apportion their cash flow to investment or dividend payments. Therefore, the link between investment and cash flow sensitivity is weaker for constrained firms (Moyen 2004).

The focus is on the newly added control variable of *optimism* × (cash flow divided by lagged assets) that was previously introduced. The constraint scores that are of particular interest are the ones based on the index of Glaser et al. (2008). As thoroughly analysed in the previous chapter, the most appropriate index to examine the financial constraints of the sample firms is the Glaser–Schafers–Weber index (Glaser et al. 2008). It contains the natural logarithm of total assets in order to capture the essence of firm size in the results. It has already been tested for German firms, and as Glaser et al. (2008) state, this index is the most suitable to be used for European firm samples. For this reason, the focus is placed on the results of the last three regressions (10–12).

The next step is to test the new optimism control variable that was introduced in the regression model (Table 1). One can observe that for the Glaser–Schafers–Weber index (Glaser et al. 2008), the optimism × (cash flow divided by lagged assets) variable is significant in all regressions for all three groups of managers (All, EB and CEO). This control variable is significant in ALL regressions for the Kaplan–Zingales index (Kaplan and Zingales 1997) as well as for the Whited–Wu index (Whited and Wu 2006) and in CEO regression for the Cleary index (Cleary 1999). The results are similar when lagged constrained measures are incorporated. It is not surprising, though, due to the fact that there is some persistence of the ranking of firms over time (Glaser and Hirn 2007).

However, not consistent with Glaser et al. (2008) is the fact that there is no strong evidence regarding optimism and CEO transactions. The stronger results of Glaser et al. (2008) are found for the regressions when optimism is based on CEO

Table 1 Empirical results: Optimism and financial constraints

Constraints score	Kaplan–Zingales			Whited–Wu			Cleary			Glaser–Schafers–Weber		
Optimism based on	All	EB	CEO	All	EB	CEO	All	EB	CEO	All	EB	CEO
	1	2	3	4	5	6	7	8	9	10	11	12
Cash flow/ lagged assets	0.008	0.010	0.014	0.010	−0.008	0.012	0.012	0.012	0.016	0.011	0.012	0.010
	(0.009***)	(0.008***)	(0.007***)	(0.030**)	(0.028**)	(0.006***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)
Lagged Tobin's Q	0.070	0.023	0.010	0.067	0.019	0.010	0.036	0.037	0.035	0.039	0.036	0.043
	(0.007***)	(0.004***)	(0.007***)	(0.008***)	(0.005***)	(0.010***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)
Managerial optimism	−0.088	−0.012	−0.006	−0.022	0.011	−0.005	0.001	−0.001	0.003	0.004	0.005	0.002
	(0.005***)	(0.005***)	(0.007***)	(0.009***)	(0.005***)	(0.005***)	0.495	0.741	0.309	0.234	0.297	0.559
Optimism × (cash flow/ lagged assets)	−0.090	0.003	0.110	−0.020	0.012	0.005	0.003	0.134	0.200	0.212	0.122	0.220
	(0.030**)	0.857	0.118	(0.050**)	0.129	0.435	0.524	0.170	(0.060*)	(0.070*)	(0.100*)	(0.070*)
Constant	0.046	0.044	0.049	0.047	0.044	0.050	−0.015	−0.016	−0.014	−0.023	−0.019	−0.027
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.019**)	(0.000***)	(0.076*)	(0.000***)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cases	1202	588	614	1202	699	503	1187	663	524	1175	754	421
Firms	61	61	61	61	61	61	61	61	61	61	61	61
Adjusted R^2	0.393	0.189	0.261	0.347	0.280	0.238	0.181	0.351	0.181	0.273	0.196	0.447

This table shows fixed-effect panel regression results of capital expenditures on several control variables for the one third of all firms with the highest financial constraints as identified by the Kaplan–Zingales index, the Whited–Wu index, the Cleary index (with own coefficients) and Glaser–Schafers–Weber index. The dependent variable is capital expenditures divided by lagged assets. In all regressions, we analyse cash flow divided by lagged assets and lagged Tobin's Q as control variables. Furthermore, we also include an optimism "dummy" variable and optimism × (cash flow divided by lagged assets) as explanatory variables. The "dummy" variable is equal to 1 when members of the EB and SB (ALL), only the EB or only the CEOs are classified as optimistic in a given year. All regressions include firm and year fixed effects. Time period is 2007–2012. All variables are winsorised at the 1% level

Robust *p*-values are in parentheses

***Significance at 1%, **Significance at 5% and *Significance at 10%

transactions. This work's findings, therefore, do not consolidate the fact that CEOs play a key determinant role in firm performance and corporate outcomes (Bertrand and Schoar 2003; Bennedsen et al. 2006).

Interestingly, as already mentioned above in regressions using the Glaser–Schafers–Weber index (Glaser et al. 2008), all *optimism* × *cash flow* variables are significantly related with capital expenditures (regressions 10–12). This work, therefore, is able to state that the investment-cash flow sensitivity of firms with optimistic managers is more pronounced in financially constrained (equity dependent) firms and thus confirm research question of this study.

4.2 Managerial Optimism and the Determinants of Excess Value

Based on Glaser et al. (2008), this subsection demonstrates the possibility of the existence of a connection between managerial optimism and inefficiencies which leads to lower market valuation of firms. The main instrument is first of all a pooled OLS regression. This regression model is chosen since there are panel data (both time series and cross section). All the data are put together, without making any distinction between cross section and time series. Therefore, running a regression over all the data using ordinary least squares, it leads to the use of pooled OLS regression. It is the easiest to run, and it is often used as simple benchmark to which more stilted regressions can be compared.

The dependent variable is excess value. According to Berger and Ofek (1995), the excess value of a firm is the natural logarithm of the ratio of a firm's actual value to its imputed value. A firm's imputed value is the sum of the imputed values of its segments, with each segment's imputed value being equal to the segment's sales multiplied by its industry median ratio of total capital (market value of equity plus book value of debt) to sales. The actual value of a firm includes all aspects of the business in terms of both tangible and intangible assets (Table 2).

In regressions 14 and 15, the same regression is run first without the use of fixed effects and second with the use of year fixed effects. The observation made is that the indicators of profitability and firm size are significantly correlated to the excess value of the firm either with the use or not of the year fixed effects. The difference exists regarding the growth opportunity indicator, the ratio of EBIT to sales. Although its coefficient estimate remains at the same levels, there is no statistical significance between the control variable and excess value when fixed effects are run.

The next six regressions (16–21) present results when managerial optimism variable is controlled for with lagged values (regressions 19–21) or not (regressions 16–18) with the use of fixed effects. The results are similar with those presented in Berger and Ofek (1995) and Glaser and Muller (2010). Table 2 shows that the existence of diversification itself does not seem to be the reason for the

Table 2 Determinants of the excess value

Optimism based on				All	EB	CEO	All (lagged)	EB (lagged)	CEO (lagged)
	Pooled OLS	FE	FE	FE	FE	FE	FE	FE	FE
Type of regression	13	14	15	16	17	18	19	20	21
Focused firm	0.748	0.054	0.055	0.051	0.054	0.055	0.055	0.045	0.051
	(0.000***)	(0.360)	(0.328)	(0.421)	(0.285)	(0.321)	(0.323)	(0.331)	(0.340)
Ln (total asset)	0.101	0.146	0.155	0.153	0.156	0.174	0.148	0.144	0.162
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)
CAPEX/sales	0.003	0.590	0.359	0.382	0.390	0.631	0.207	0.001	0.001
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.001***)	0.230	0.244
EBIT/sales	0.058	0.052	0.060	0.005	0.005	−0.003	0.096	0.013	0.038
	(0.002***)	(0.099*)	0.120	0.122	0.118	(0.089*)	(0.060*)	0.437	0.164
Managerial optimism				−0.047	−0.039	−0.031	−0.083	−0.022	−0.058
				(0.003***)	(0.009***)	(0.016**)	(0.003***)	(0.016**)	(0.013**)
Constant	−0.143	−0.225	−0.260	−0.224	−0.232	−0.234	−0.230	−0.238	−0.240
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)
Year fixed effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cases	1799	1799	1799	1799	1799	1799	1754	1754	1754
Firms	328	327	332	330	299	296	320	299	294
Adjusted R^2	0.321	0.447	0.448	0.447	0.446	0.447	0.447	0.450	0.447

This table shows coefficient estimates from regressions of excess value on a focused-firm indicator and control variables such as in Berger and Ofek (1995). Excess value is the natural logarithm of the ratio of a firm's actual value to its imputed value. A firm's imputed value is the sum of the imputed values of its segments, with each segment's imputed value equal to the segment's sales multiplied by its industry median ratio of capital to that accounting item. Control variables are the natural logarithm of total assets, capital expenditures divided by sales and EBIT divided by sales. In regressions 4–6, we include our optimism "dummy" variables. In regressions 7–9, we include lagged values of our optimism "dummy" variables. Regression 1 shows a pooled OLS regression; regression 2 is a fixed-effect panel regression without year fixed effects. Regressions 3–9 show fixed-effect panel regression with year fixed effects. Time period is 2007–2012

Robust *p*-values are in parentheses

***Significance at 1%, **significance at 5% and *significance at 10%

diversification discount and the lower excess value of the firm. Also consistent with Villalonga (2004a, 2004b), this work finds that on average, diversification does not destroy the excess value of a firm.

Another observation is that there exists a negative statistically significant correlation between managerial optimism and excess value. The higher the managerial optimism, the lower the excess value. This result is in line with Glaser et al. (2008) and is found to be robust across all optimism measures. However, this result is not consistent with insider trading based on private information since managers are likely not to be correct with their expectations regarding their firm's performance. As opposed to Glaser et al. (2008), the observation here is that lagged optimism variables maintain their statistical significance at either 1% (ALL) or 5% (EB and CEO). In line with Glaser et al. (2008), the stronger results with the highest coefficient estimates are encountered for the group of ALL managers. There exists the stronger negative statistically significant relationship between managerial optimism and excess value.

To summarise the observation, adjusted R^2 values of the models are stable, and they explain almost 50% of the outcomes of this model. Based on the related literature, low R^2 values are a common phenomenon, and hence the values obtained in this work are accepted since the variables fit the expectations. Finally, it is important to underline the fact that in some firms managers are biased. Often, these biased managers make decisions which end up to be harmful for their firms. The overall findings in this study show that overinvestment due to managerial optimism may serve as one possible explanation for the observed low excess value of firms. Yet, consistent with Glaser et al. (2008), all optimism measures are highly negatively correlated with excess value only where the link between optimism and corporate investment seems to be less strong. Therefore, managerial biases are likely to affect other corporate decision making to the damage of the firm.

5 Conclusions

Research in the field of behavioural finance and optimism as a cognitive, personal characteristic is a rapidly developing field. Usually, optimism is correlated with positive outcomes for the independent director (Ravina and Sapienza 2010) as well as for his firm too. However, the extensive use of optimism in all aspects of everyday life can prove disastrous since over-optimism may often be associated with negative outcomes too. Yet, it should be underlined that being moderately optimistic regarding a future event may induce great personal profits.

It is widely accepted by researchers that managers principally are optimistic. They display optimism in every single aspect of their career. Often, optimism slips into overconfidence and arrogance inducing unfavourable outcomes for the manager and his firm. If the term "hubris" is used for every action of a manager which incorporates overconfidence, one is easily able to see that this "hubris" may often lead the manager to face his personal downfall, not only his firm's decline.

The investment-cash flow sensitivity has also been examined in this thesis regarding the impact of financial constraints on investment. The general assumption that exists is based on the statement that the sensitivity of investment to cash flow should be higher for financially constrained (equity-dependent) firms. These firms are forced to cope with the monotonicity hypothesis which implies that there is a wedge between the internal and external costs of funds. The use of investment-cash flow sensitivity, therefore, has become something of a standard in recent years as far as corporate finance literature is concerned (Shin and Stulz 1998; Malmendier and Tate 2005a; Almeida and Campello 2007; Glaser et al. 2008).

This study added to the existing literature on the field of managerial optimism, by examining its impact on corporate investment in the case of Greece. As part of the literature which links psychological and economic variables to test behavioural finance models, this study is the first to investigate managerial optimism and its impact on corporate investment in Greece. The importance of this study lied in finding how managerial decision making works within a firm, how biased a manager is when he has to make extremely important decisions regarding the firm's future performance and success and how managerial optimism affects corporate investment decision making.

Additionally, this work confirmed the research question too. Financially constrained firms compared to the whole sample of firms did not display high investment-cash flow sensitivities. Constrained firms when there are favourable investing opportunities have the tendency to invest more. They tend to issue more debt in order to be able to finance these advantageous investing opportunities. Moreover, there was no strong evidence regarding optimism and CEOs' transactions. This work's findings did not justify the fact that a CEO plays a significant role in corporate firm performance. Therefore, in financially constrained firms, the investment-cash flow sensitivity with optimistic managers was more noticeable. The fact that a firm is financially constrained implies that optimistic managers affect cash flow of investment at a higher level than managers who are not optimistic. Again, optimism as a managerial cognitive characteristic played an important role in corporate investment decision making.

Finally, this work investigated the impact of diversification and managerial optimism on the excess value of a firm too. First of all, it was found that the existence of diversification did not seem to rationalise the phenomenon of diversification discount and the lower excess value of the firm. Instead, managerial optimism significantly affected the excess value of the firm. More specifically, the higher the managerial optimism, the lower the excess value of the firm. This can be justified because possible overinvestment due to the existence of managerial optimism may constitute an explanation for the low excess value of firms.

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