ASSET GROWTH AND FIRM PERFORMANCE EVIDENCE FROM GREECE

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ABSTRACT

This study provides evidence drawn from publicly traded companies in Greece on the predictability of assets growth with respect to firm performance. We employ discriminant analysis and a logit specification to test our models. Results indicate that assets growth is predictable at an 85.7% rate in large companies. This rate is high compared those in other prediction studies such as bankruptcy, qualified audit reports and going-concern opinions.

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KEYWORDS: asset growth, firm performance, discriminant analysis, logit

INTRODUCTION

Assets are the economic resources of a company expected to benefit the firm's future operations. Certain kinds of assets including cash and accounts receivable are monetary items. Others like inventory, land, buildings and equipment are nonmonetary, physical items. Still other assets like patents, trademarks, and copyrights-are non-physical. The assets of a business enterprise are an integral part of business operations. Assets work in conjunction with other components of liabilities and equity in the overall business operations. Stock returns are a high priority measure of performance. However, prior studies show the market is slow to incorporate publicly available information, contrasting the efficient market hypotheses. Sales and earnings growth are also important measures of performance. Growth provides additional capabilities, opportunities, revenue and profit. Growth can be organic or from mergers and acquisitions.

The purpose of this study is to highlight differences between companies with positive versus negative asset growth. Using firm performance financial ratios as predictors it is shown that assets growth can be predicted at an 85.7% rate in large companies using discriminant analysis. Logit specifications produce a lower predictability. The prediction rates here are high compared to other prediction studies such as bankruptcy, corporate acquisitions, qualified audit reports and going-concern opinions. The contribution of this study is two-fold. First, it provides empirical evidence with a test of two prediction models in a new area of research. Second it adds a firm based analysis in a research area which has previously been examined primarily at the macroeconomic level. The remainder of the paper is organized as follows: Section 2 provides a review of the literature. Section 3 describes the research design. Section 4 presents the empirical analysis and results. Section 5 provides some concluding comments and suggestions for further future research.

LITERATURE REVIEW

Prior studies in this area have focused on decomposition of stock returns, disaggregation of growth in net operating assets, post-acquisition returns, the impact of R & D increases, capital investments, stock returns, and predictability of stock returns based on balance-sheet growth. In an effort to identify the information that moves stock prices, Campbell (1991) decomposes stock returns into a component that reflects information about cash flows, and a component that reflects information about discount rates.

Lakonishok et al (1994) presented evidence that investors over-react to past sales growth rates. Ohlson et al (1995) and Feltham and Ohlson (1995) show that growth in net operating assets as well as current profitability affect future profitability and firm value. Research finds differential persistence of the cash flow and accrual components of earnings for one-year-ahead ROA (Sloan, 1996).

Fairfield et al (2003) disaggregated growth in net operating assets into accruals and growth in long-term operating assets. They found that both components of growth in net operating assets are negatively associated with one-year-ahead return on assets. Whether growth is in current or long-term net operating assets it has been found that the market's apparent mispricing of accruals relates to investors inability to correctly assess the implications of growth in net operating assets for future profitability. Loughran and Vijh (1997) examine 947 acquisitions from 1970-1989. They investigated post-acquisition returns in the context of shareholders wealth gains. They found a relationship between post-acquisition returns and the mode of acquisition. Firms that complete stock mergers during a five-year period following the acquisition earn on average negative excess returns of -25%. However, firms that complete cash tender offers earn positive excess returns of 61.7%. Their results also indicate that when the acquisition succeeds the gains from stock mergers tend to be dispersed within five years. According to Franks et al (1991) there are no significant abnormal returns over a three-year period after the last bid date. Agrawal et al. (1992) found that mergers are followed by significant abnormal returns of -10.0% over a five-year period after the effective date but tender offers are not.

Ikenberry et al (1995) showed that firms buying back their stock over-perform for a period of five years. Bradley et al (1983) showed that abnormal gains realized by target companies after the announcement of a tender offer disappear if the bid does not succeed and no subsequent bid materializes within five years. Asquith (1983) found that the announcement of an unsuccessful merger bid generates an immediate increase in the price of target shares but the entire gain disappears within a year after bid termination.

Eberhart et al (2004) examined a sample of 8,313 cases where firms unexpectedly increase their R&D investments by an economically significant amount between 1951 and 2001. This study offers several notable insights that contrast previous studies. The most important reasons for increasing R&D are the following: i) R&D increases differ from other attributes because they represent a managerial decision, ii) these increases differ from events such as stock repurchases because there is no formal announcement by managers, iii) these increases represent investment decisions, not financing decisions. Arguments that R&D investments are different from other long-term investments are the following: i) the cost of an R&D investment is more clearly tangible because its accounting treatment is as an expense and not capitalized, ii) the potential benefit of an R&D increase reflects intangible information about future cash flows.

The difference between tangible and intangible information has been examined by Daniel and Titman (2006) who argued that investors react inappropriately to intangible information but not to tangible information. Eberhart et al (2004) found consistent evidence that R&D increases affect shareholders experience implying significantly positive long-term abnormal stock returns follow. Almost the same happens to firms which experience significantly positive abnormal operating performance. The conclusion is that the market does not quickly recognize the value of R&D investments. These authors also classified firms into high-tech, low-tech, high-growth, and low-growth firms and thus investigated whether their findings differ across certain groups of firms. The results indicate that R&D increases positively affect all four categories of firms. Their evidence suggests that high-tech firms exhibit better abnormal operating performance than low-tech firms. Chan et al (1990) find high-tech firms make R&D investments which are likely to be more beneficial than in other groups of firms.

Szewczyk et al (1996) found that there are firms with better investment opportunities. They could be high-growth firms with market-to-book ratios greater than unity. These firms are more likely to make better R&D investments. Titman et al (2004) investigated whether investor's under-react to empire

building implications of increased investment expenditures. They found that firms that increase their investment expenditures the most tend to under-perform their benchmarks over the following five years. The second half of the 1980's decade was the period in which empire builders were subject to hostile takeovers. There is no relation between returns and abnormal capital in the 1984 to 1989 period. With regard to capital expenditures it has been found that although firms tend to invest more following increases in their stock prices, cash flows tend to be the best predictor of a firm's investment expenditures (Fazzari et al (1988); Morck et al (1990)).

McConnell and Muscarells (1985) argued that when major capital investments are announced stock prices tend to respond favourably. On the other hand, Loughran and Ritter (1995) found that firms with financing choices associated with increased investment such as equity issuances generally experience negative stock returns. On the contrary, firms with choices associated with decreased investment, such as repurchases, generally experience positive returns (Ikenberry et al, 1995). According to Daniel and Titman (2006) the information that a firm presents in its financial statements is its past and current performance. This is tangible information. All other information is intangible information. The above mentioned authors found the cross-sectional relation between past performance measures and future stock returns is not significant. Rather, they found that book-to-market and reversal effects arise because future returns are cross-sectionally related to past realizations of intangible information. That is to say a component of past returns that can not be explained by tangible information about past performance.

Chan et al (2010) examined several hypotheses about the predictability of stock returns based on balance-sheet growth. The hypotheses are related to: the long-run under-performance of acquirers after mergers; investors extrapolation of past growth; over-expansion by managers due to agency costs and under-performance following equity market timing by managers. They found adverse consequences of asset expansion are aggravated in cases where predictability is low, or corporate governance is weak. When asset growth is primarily in the form of cash accumulation, the negative returns are mitigated.

DATA AND METHODOLOGY

Prior studies employ a variety of methodologies. A sample of 265 firms listed on the Athens Stock Exchange(ASE) were selected for investigation in this study. The sample size is based on the number of firms that appeared on the Internet in 2009. Only firms that had data for the year 2008 were selected to facilitate computation of asset growth. Of the 265 firms in the sample, one hundred six firms had positive asset growth 159 had negative asset growth.

Discriminant analysis and Logit models are employed in this study. Discriminant analysis and Logistic regression examine the power of explanatory variables to predict whether individual cases are drawn from one or another of two populations. For both types of analysis, Y is an indicator variable representing the type of assets growth, with Y=1 if the firm has positive asset growth and Y=0 otherwise. The predictor variables, denoted by a row vector x, include eleven financial ratios for the firm. The two types of analysis are closely related, as will be shown below. Type of asset growth is the dependent variable and eleven financial ratios were used as independent variables.

Our model for discriminant analysis assumes that predictor vector x is drawn from one of two multivariate normal distributions corresponding to firms with Y=1 and Y=0, respectively. The research hypothesis postulates that the two populations have different means but the same covariance matrix. A linear discriminant function w= a + xb is formed as a linear combination of the predictor variables. Here a is an intercept and b is a column vector of discriminant coefficients. Because x is assumed to be multivariate normal, the linear discriminant value w is also normally distributed. Under the research hypothesis, the normal distributions for Y=1 and Y=0 have different means but a common variance. Both a and b are estimated from the data in such a way that the statistical distance or separation of the Y=1 and

Y=0 samples on the linear discriminant scale is as large as possible. Results of this estimation procedure and an assessment of the discriminating power of the predictor variables are shown in Section 3.
Logistic regression considers the probability P(Y=1|x) that a firm with predictor vector x will have positive asset growth. For brevity, we let p=P(Y=1|x). By definition, the probability that the firm will not have positive asset growth is 1-p=P(Y=0|x). The logistic regression model assumes that the log-odds of event Y=1 is the following linear combination of the predictor variables:

$$\log\left[\frac{p}{1-p}\right] = c + xd \quad (1)$$

Here p/(1-p) denotes the odds in favor of Y=1, c is an intercept term, and d is a vector of regression coefficients estimated from the data using the maximum likelihood method. The model estimation attempts to associate large probabilities p with firms for which Y=1 and small probabilities p with firms for which Y=0. Results of this estimation procedure and tests of whether the predictor variables successfully classify firms from the two populations are given in Section 3.

The strict statistical assumptions for the analysis established by Palepu (1986), Karels and Prakash (1987); and Maddala (1991) are: (1) equal probability distributed between the two groups of companies and the efficiency of each model using different data; (2) further statistical implications related to the unequal sampling rates and, (3) the stability of discrete models overtime.

Variables that reflect profitability and activity ratios were selected for this study representing firm performance. These variables are used as predictors in the prediction models and as discriminating factors between the two groups of companies (those with a positive asset growth and those with negative asset growth). The four predictors are: Net Income/Total Assets (NITA) which indicates the profitability of assets. Sales/Total Assets (SATA) indicates how efficiently a company uses its assets to produce income. Net Income/Sales (NISA) indicates the percentage of sales that contributes to net income. Net Income/Equity (NIEQ) indicates the profitability of the owners investment. Receivables/Sales (RECSA) indicates the percentage of sales that are made on account.

The probability of asset growth is conditional on five independent variables identified above using discriminant analysis or a Logit specification on our i) full sample, ii) sample with large companies and, iii) sample with small companies. The estimated model is:

$$Prob\ of\ Asset\ Growth = \beta_0 + \beta_1 NITA + \beta_2 SATA + \beta_3 NISA + \beta_4 NIEQ + \beta_5 RECSA + \varepsilon_i \quad (2)$$

Prob of Asset Growth takes on the value of 1 if firm i has a positive asset growth and 0 if firm i has a negative asset growth. B_0, B_1, B_2 and so on are parameters to be estimated. ε_i is a random disturbance term.

The full sample was segregated into two groups, a sample of large companies and a sample of small companies based on the mean of assets of all firms. The average mean assets is 2,644,873.98 euro. The maximum value of assets is 113,394,000 and the minimum is 3,908 euro.

EMPIRICAL ANALYSIS AND RESULTS

The means of each variable used in the analysis are illustrative of the differences between groups of companies. Table 1 indicates the average means of each variable/ predictor and their significance. Differences between the positive and negative asset growth groups of companies are focused in SATA (Sales/Total Assets) and RECSA (Receivables/Sales) when all data are used. However, when outliers are

excluded there are no large differences. Average ratio differences are significant for NITA (Net Income/Total Assets), NISA (Net Income/Sales) and NIEQ (Net Income/Equity).

Table 1: Mean Average Ratios

	Full Sample			**Outliers Excluded**		
	Positive Change	Negative Change	Significance	Positive Change	Negative Change	Significance
NITA	0.0002	-0.030	0.000***	0.016	-0.030	0.000***
SATA	0.749	229.763	0.103	0.756	0.595	0.147
NISA	0.000	-0.000	0.000***	0.000	-0.000	0.000***
NIEQ	0.000	-0.000	0.000***	0.000	-0.000	0.000***
RECSA	22.589	1.718	0.457	1.474	1.036	0.587

*This table shows the mean levels of the variables used in the analysis. The first column indicates the mean of companies with positive asset growth, the second column indicates the mean of the companies with negative asset growth. The third column reports significance. The first three columns refer to the full sample. The next three columns have the same meaning with outliers excluded. ***, ** and * indicate significance at the 1, 10 and 5 percent levels respectively.*

It is important to test for normality because outliers may have a large influence on the results. The Kolmogorov-Smirnov technique is an appropriate normality test statistic. Prior studies have shown that non-normally distributed financial ratios are characterized by the presence of outliers. The data here has only one outlier for the variable SATA (sales/Total Assets) and five outliers in the variable RECSA (Receivables/Sales). The number of outliers is small relative to other studies that examine the distributional properties of financial ratios (Deakin,1976; So,1987;Karels and Prakash,1987). Table 2 reports Kolmogorov-Smirnov statistics that indicate normality of the variables. Almost all variables are not normally distributed.

Table 2: Normality Test (Kolmogorov-Smirnov)

	Full Sample		**Outliers Excluded**	
	Positive Change	Negative Change	Positive Change	Negative Change
NITA	1.542(0.017**)	3.210(0.000***)	1.542(0.017**)	3.210(0.000***)
SATA	3.548(0.000***)	6.618(0.000***)	3.448(0.000***)	1.593(0.012**)
NISA	4.984(0.000***)	6.156(0.000***)	4.984(0.000***)	6.156(0.000***)
NIEQ	2.992(0.000***)	5.490(0.000***)	2.995(0.000***)	5.490(0.000***)
RECSA	4.987(0.000***)	5.429(0.000***)	3.824(0.000***)	4.690(0.000***)

This table indicates Kolmogorov-Smirnov z-statistic for companies with positive asset growth and companies with negative asset growth for the full sample and with outliers excluded. Numbers in parenthesis indicates two tails significance

Coefficients for each model and for each variable using the full sample are given in Table 3. The results for discriminant analysis are presented in Panel A. The results for Logit analysis are presented in Panel B. The best fitting model is identified through an examination of all empirical findings drawn from tests of discriminant and logit analysis. Wilks' Lambda is one of several statistics available to test the significance of the discriminant function as a whole. The significant Lambda shown in Table 3 indicates that the null hypothesis that the two groups have the same mean discriminant function scores, is rejected and we conclude that the model is discriminating. In discriminant analysis almost all variables contribute marginally. In this case, NITA (Net Income/Total Assets), NIEQ (Net Income/Equity) and RECSA (Receivables/Sales) are positively related with asset growth while SATA (Sales/Total Assets) and NISA (Net Income/Sales) have a negative relationship with asset growth. When outliers are excluded only NISA(Net Income/Sales) has a negative relationship with asset growth. In the Logit analysis one variable, Net Income/Equity, contributes heavily. When outliers are excluded variables NISA (Net Income/Sales) and NIEQ (Net Income/Equity) contribute tremendously. NISA(Net Income/ Sales) is the only variable which has a negative relationship with assets growth in both the full and restricted samples.

Table 3: Regression Coefficients

Panel A: Discriminant Analysis

	Full Sample		**Outliers Excluded**	
Variable	**Predicted Sign**	**Coefficient**	**Predicted Sign**	**Coefficient**
NITA	+	1.290	+	1.127
SATA	-	0.588	+	0.331
NISA	-	0.680	-	0.405
NIEQ	+	0.107	+	0.098
RECSA	+	0.456	+	0.616
EIGENVALUE	0.037		0.044	
CORRELATION	0.189		0.206	
WILK'S LAMBDA	0.964		0.957	
X^2	9.287		10.885	
SIGNIFICANCE	0.098*		0.054*	
OBSERVATIONS	529		529	
VALID	261		255	

Panel B: Logit Analysis

	Full Sample			**Outliers Excluded**		
Variable	Predicted Sign	Coefficient	p-value	Predicted Sign	Coefficient	p-value
NITA	+	4.272	0.027**	+	4.170	0.034**
SATA	+	0.000	0.887	+	0.116	0.393
NISA	-	160.87	0.933	-	137.94	0.690
NIEQ	+	489.48	0.709	+	463.91	0.718
RECSA	+	0.017	0.384	+	0.087	0.072*
X^2	12.176			12.078		
SIGNIFICANCE	0.032**			0.034**		
WALD TEST	9.836			10.061		
NAGELKERKE R2	0.062			0.062		
OBSERVATIONS	529			529		
VALID	261			255		

*This table shows the regression estimates of the model. Prob of asset growth=b0+b1(NITA)+b2(SATA) +b3(NISA)+b4(NIEQ)+b5(RECSA+ei). The first column indicates the predicted sign, the second column reports regression coefficients and the third column indicates p-values with the full sample and with outliers excluded. Several other statistics are given along with the number of observations. Panel A provides all these statistics using discriminant analysis while Panel B provides corresponding statistics using a logit specification. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Coefficients for each model and variable using the sample of large companies are given in Table 4. The moderate value of Wilk's Lambda shown in Table 4 indicates the two groups have the same mean discriminant function scores and we conclude that the model is moderately discriminating. NITA (Net Income/Total Assets), NIEQ (Net Income/Equity), NISA (Net Income/Sales), and RECSA (Receivables/Sales) each have a positive relationship with asset growth while SATA (Sales/Total Assets) has a negative relationship with asset growth. When outliers are excluded only NIEQ (Net

Income/Equity) has a negative relationship with asset growth. In the logit analysis one variable contributes to the discrimination (Net Income/ Assets). When outliers are excluded the picture does not change significantly.

Table 4: Regression Coefficients for Large Company Sample

Panel A: Discriminant Analysis

	Full Sample		Outliers Excluded	
Variable	**Predicted Sign**	**Coefficient**	**Predicted Sign**	**Coefficient**
NITA	+	0.063	+	0.395
SATA	-	0.819	+	0.857
NISA	+	0.045	+	0.967
NIEQ	+	0.976	-	0.206
RECSA	+	0.209	+	0.082
EIGENVALUE		0.430	0.258	
CORRELATION		0.548	0.453	
WILK'S LAMBDA		0.699	0.795	
X^2		5.899	2.867	
SIGNIFICANCE		0.316	0.720	
OBSERVATIONS		45	37	
VALID		21	17	

Panel B: Logit Analysis

	Full Sample			Outliers Excluded		
Variable	**Predicted Sign**	**Coefficient**	**p-value**	**Predicted Sign**	**Coefficient**	**p-value**
NITA	+	28.516	0.029**	+	4.891	0.875
SATA	-	2.892	0.227	-	2.033	0.409
NISA						
NIEQ						
RECSA	+	0.002	0.989	-	0.066	0.661
X^2	3.046			0.721		
SIGNIFICANCE	0.023**			0.868		
WALD TEST	5.154			4.249		
NAGELKERKE R2	0.203			0.063		
OBSERVATIONS	45			37		
VALID	21			17		

*This table shows the regression estimates of the model Prob of asset growth=b0+b1(NITA)+b2(SATA) +b3(NISA)+b4(NIEQ)+b5(RECSA+ei). estimated using the large firm sample. The first column indicates the predicted sign the second column reports regression coefficients and the third column indicates p-values. Several other statistics are given along with the number of observations. Panel A provides statistics using discriminant analysis while Panel B provides corresponding statistics using a logit specification. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Coefficients for each model and for each variable using the sample of small firms are given in Table 5. The significant Lambda shown in Table 5 is similar to the full sample indicating that the null hypothesis

that the two groups have the same mean discriminant function scores is rejected and we conclude that the model is discriminating.

Table 5: Regression Coefficients for Small Company Sample

Panel A: Discriminant Analysis

	Full Sample		**Outliers Excluded**	
Variable	**Predicted Sign**	**Coefficient**	**Predicted Sign**	**Coefficient**
NITA	+	1.279	+	0.802
SATA	-	0.580	+	0.475
NISA	-	0.676	-	0.191
NIEQ	+	0.105	+	0.124
RECSA	+	0.478	+	0.054
EIGENVALUE	0.036		0.032	
CORRELATION	0.188		0.177	
WILK'S LAMBDA	0.965		0.969	
X^2	8.401		7.305	
SIGNIFICANCE	0.135		0.199	
OBSERVATIONS	486		486	
VALID	239		234	

Panel B: Logit Analysis

	Full Sample			**Outliers Excluded**		
Variable	**Predicted Sign**	**Coefficient**	**p-value**	**Predicted Sign**	**Coefficient**	**p-value**
NITA	+	3.788	0.047**	+	3.560	0.071
SATA	+	0.000	0.866	+	0.150	0.300
NISA	+	54.009	0.974	-	1333.78	0.594
NIEQ	+	450.66	0.732	+	471.61	0.721
RECSA	+	0.002	0.613	+	0.016	0.852
X^2	9.952			7.847		
SIGNIFICANCE	0.077			0.165		
WALD TEST	16.209			15.037		
NAGELKERKE R2	0.056			0.045		
OBSERVATIONS	486			486		
VALID	239			234		

*This table shows the regression estimates of the model: Prob of assetsgrowth)=b0+b1(NITA)+b2(SATA) +b3(NISA)+b4(NIEQ)+b5(RECSA) + ei. The analysis is completed using the sample of small firms. The first column indicates the predicted sign, the second column reports regression coefficients and the third column indicates p-value. Several other statistics are provided along with the number of observations. Panel A provides all the statistics using discriminant analysis while Panel B provides corresponding statistics using a logit specification. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

NITA (Net Income/Total Assets), NIEQ (Net Income/Equity) and RECSA (Receivables/Sales) are positively related with asset growth while SATA(Sales/Total Assets) and NISA(Net Income/Sales) have a negative relationship with asset growth. This is the same effect as found in the full sample. When outliers are excluded only NISA (Net Income/Sales) has a negative relationship with asset growth. In the logit

analysis two variables contribute adequately: NIEQ (Net Income/Equity) and NISA (Net Income/Sales). When outliers are excluded variables NISA (Net Income/Sales) and NIEQ (Net Income/Equity) contribute heavily. NISA (Net Income/ Sales) is the only variable with a negative relationship with asset growth either using all data or with outliers excluded.

Summarizing the results we note that discriminant analysis provides similar results in the full sample and two sub samples. On the other hand, using Logit we see that the full sample and the sample of large companies more closely resemble each other. Once the discriminant analysis coefficients are estimated, it is possible to calculate discriminant scores for each observation in the sample, or any firm, and to assign the observations to one of the groups based on this score. The essence of the procedure is to compare the profile of an individual firm with that of the alternative groupings. The firm is assigned to the group it most closely resembles.

Results offered in next Table 6 indicate a preference to discriminant analysis for the full sample or the sample of large companies. The picture is different using logit. The rate of prediction accuracy in the full sample is 65.9% with discriminant analysis and 58.2% with logit. When outliers are excluded the rates are 65.1% and 61.6%, respectively. Using the large company sample the rate is 85.7 % using discriminant analysis and 76.2 % using logit. When outliers are excluded the rates are 76.5% and 70.6% respectively. Using the small company sample the rate is 66.5 % for discriminant analysis and 61.9 % for logit. When outliers are excluded the rates are 61.5% and 63.7% respectively.

In Panel A, the first number in the first row for the full sample indicates the number (and percentage) of companies of the positive growth group correctly classified into this group. The second number (and percentage) indicates the number of companies in the positive growth group that have been misclassified into the negative growth group. The first number (and percentage) in the second row of the full sample indicates the number of companies of the negative growth group that have been misclassified into the positive growth group and the second number (and percentage) indicates the number of companies of the negative growth group that have been correctly classified. The same interpretation applies to the logit case in Panel A and to the remaining Panels B and C.

Based on the above empirical findings the prediction accuracy of asset growth in large companies is high (85.7 %) compared to corresponding rates in other business events like prediction of bankruptcy, corporate acquisitions and audit reports. Even the lower rates in this study are comparable with other studies.

CONCLUSIONS AND SUGGESTIONS FOR FURTHER FUTURE RESEARCH

This study purports to discriminate companies with positive asset growth from companies with negative asset growth. Using discriminant analysis and a logit specification with firm's performance financial ratios as predictors we are able to predict the direction of asset growth with accuracy above 85.0 % in large companies. These findings clearly indicate that asset growth can be predicted and the models are discriminating. From a statistical point of view, discriminant analysis performed a little better than logit. The only discriminating variable is NIEQ (Net Income/Equity) which has a positive relationship with asset growth using either analysis technique. Discriminant analysis provides similar results in the full sample as well as the small and large firm sub-samples. Using logit the full sample and large firm sample more closely resemble each other.

Additional market variables could allow for better predictions. Another venue for research is an examination of liquidity ratios as well as issuance of debt or equity securities as they relate to asset growth. This study is subject to limitations drawn from the fact that only publicly traded Greek companies

are examined in the analysis. Future research might include an analysis of privately held companies and companies from other countries.

Table 6: Classification Table by Group (Percent Correct-Overall Index)

Panel A: Full Sample				
	Discriminant Analysis		**Logit**	
	Correctly Classified	**Incorrectly Classified**	**Correctly Classified**	**Incorrectly Classified**
Positive Growth	92(59)	65(41)	147(94.2)	9(5.8)
Negative Growth	25(23.8)	80(76.2)	100(95.3)	5(4.7)
Prediction Accuracy	65.9%		58.2%	
Outliers Excluded	Correctly Classified	Incorrectly Classified	Correctly Classified	Incorrectly Classified
Positive Growth	117(76.5)	36(23.5)	143(93.5)	10(6.5)
Negative Growth	53(52.0)	49(48.0)	88(86.3)	14(13.7)
Prediction Accuracy	65.1%		61.6%	
Panel B: Large Firm Sample				
	Discriminant Analysis		**Logit**	
	Correctly Classified	**Incorrectly Classified**	**Correctly Classified**	**Incorrectly Classified**
Positive Growth	3(60.0)	2(40.0)	1(20.0)	4(80.0)
Negative Growth	1(6.3)	15(93.8)	1(6.2)	15(93.8)
Prediction Accuracy	85.7%		76.2%	
Outliers Excluded	Correctly Classified	Incorrectly Classified	Correctly Classified	Incorrectly Classified
Positive Growth	2(50)	2(50)	0(0.0)	4(100.0)
Negative Growth	2(15.4)	11(84.6)	1(7.7)	12(92.3)
Prediction Accuracy	76.5%		70.6%	
Panel C: Small Firm Sample				
	Discriminant Analysis		Logit	
	Correctly Classified	Incorrectly Classified	Correctly Classified	Incorrectly Classified
Positive Growth	94(62.3)	57(37.7)	146(96.7)	5(3.3)
Negative Growth	23(26.1)	65(73.9)	86(97.7)	2(2.3)
Prediction Accuracy	66.5%		61.9%	
Outliers Excluded	Correctly Classified	Incorrectly Classified	Correctly Classified	Incorrectly Classified
Positive Growth	96(65.3)	51(34.7)	144(98.0)	3(2.0)
Negative Growth	39(44.8)	48(55.2)	82(94.3)	5(5.7)
Prediction Accuracy	61.5%		63.7%	

This table indicates prediction accuracy with an analysis of the dispersion of the firms in each group of companies. Panel A provides results for the full samples, Panel B provides results for large companies and Panel C provides results for small companies.

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