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Firm Characteristics and Accounting Fraud: A Multivariate Approach (Firma Karakteristikleri ve Muhasebe Hilesi: Çok Değişkenli Yaklaşım)

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Accounting Fraud, Financial Statements, Regression Analysis.

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Abstract
The accounting frauds have massive adverse impacts on the business environment. Due to high incidence of accounting fraud in the economic environment, regulatory bodies make considerable efforts to the development of a reliable and accurate model that can detect accounting fraud. The primary objective of this paper is to establish an empirical model that significantly contributes to the development of a reliable model for detecting accounting fraud committed by firms listed on Borsa İstanbul. This study investigates ten accounting variables with probit regression analysis and covers 144 firms between the time period of 2005 to 2015. The results indicate that firms with low liquidity ratios are more probable to issue fraudulent financial statements, negative financial performance is a vital motivational factor for fraud, smaller firms are more likely to issue fraudulent financial statements, firms with high debt to equity are more likely to be classified as fraud firms and fraud firms have lower accounts receivable turnover and inventory turnover than non-fraud firms.

Anahtar Kelimeler
Muhasebe Hilesi, Mali Tablolar, Regresyon Analizi.

Jel Sınıflandırması
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Özet
Muhasebe hilelerinin ekonomik çevreye olumsuz büyük etkileri bulunmaktadır. Ekonomik çevrede devamlı yaşanan muhasebe hileleri, düzenleyici kurumların muhasebe hilelerini tespit etmek için güvenilir ve doğru bir model oluşturulmasına yönelik çabalarını hızlandırmıştır. Bu çalışmanın temel amacı, Türkiye'de faaliyet gösteren firmalar tarafından gerçekleştirilen muhasebe hilelerinin tespit edilmesinde kullanılabilecek bir model oluşturmaktır. Probit regresyon analizi kullanılan çalışmada 10 tane muhasebe değişkeni kullanılmıştır ve 2005-2015 dönemi incelenmiştir. Muhasebe hilesi yaptığı tespit edilen 72 firmanın ve muhasebe hilesine başvurmayan 72 firmanın muhasebe verilerinin analizi sonucunda, negatif finansal performans, borç öz sermaye oranın yüksek olması, düşük alacak devir hızı, stok devir hızı ve likidite oranları önemli risk faktörleri arasında olduğu görülmektedir.

1. Introduction

Financial statements provide information associated with the firms' financial position and financial performance. This information is heavily needed by investors, creditors, and stockholders to take economic decisions. Financial market participants may fail to make accurate and rational investment decisions if financial statements disclosed by the firm do not reflect the true financial position and performance of a company. The preparation of financial statements in accordance with financial reporting standards is essential for the well-functioning financial markets.

According to the ''International Standard on Auditing (ISA) No. 240: The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statements'', accounting fraud is intentionally committed and materially misstate the firm's financial statements. ISA 240 notes that accounting fraud can be perpetrated by manipulation of accounting records, misrepresentation of economic events and misapplication of accounting standards. The American Institute of Certified Public Accountants (AICPA, 1997) in Statement on Auditing Standards (SAS) No.92: Consideration of Fraud in a Financial Statement Audit states that an incentive to commit fraud, an opportunity to commit fraud, and also, rationalization of fraudulent behaviour must exist when fraud is committed.

Accounting fraud is one of the most debated issues in the current business climate. As a result of high-volume accounting frauds such as Enron, Parmalat, and WorldCom, the accounting fraud grabs the attention of the society. Practitioners, policymakers, and academicians try to find out root causes of accounting fraud. New auditing standards, laws and commission reports have been created to mitigate financial statement fraud during the last two decades. Undoubtedly, the understanding of the underlying factors related to accounting fraud is prominent for preventing the future cases.

As can be seen from the past experiences, accounting fraud committed by firms has adverse impacts on the efficiency of an entire economy. Kedia and Philippon (2009) stated that accounting fraud mitigates overall economic efficiency. As a result of

accounting fraud, the efficiency of firms and the public trust in financial statements have deteriorated.

The business world has witnessed numerous accounting frauds and corruption scandals. Fraudulent financial reporting has huge adverse impacts on the economic development. High volume bankruptcies caused by accounting fraud have significantly eroded the public trust in financial statements that are disclosed by firms. The number of accounting fraud and corruption scandals generally increases during credit crunch periods (Giroux, 2008).

Over the last decades, many research studies have investigated factors associated with accounting fraud. These studies primarily focus on trends, methods and consequences of accounting fraud as well as detecting and preventing accounting fraud. Most of them focus on developed countries and there are few studies that investigate factors related to accounting fraud in developing countries. This study seeks to identify factors affecting accounting fraud in Turkey.

In recent decades, accounting fraud committed by firms has grabbed the attention of legislators, business community and academicians in Turkey, as in the case of the most of the developing countries. Further research studies are needed to detect accounting fraud since previous research studies have provided mixed results. The main objective of this paper is to establish an empirical model that significantly contributes to the development of a reliable model for detecting accounting fraud committed by firms listed on Borsa Istanbul. The use of a reliable model may help fraud investigators to detect and deter accounting irregularities. Most approaches in detection of accounting fraud comprise accounting ratios and quantitative model.

The rest of this paper is organized as follows. Section 2 presents previous research studies and hypothesis development. Section 3 shows the research design and sample data used in empirical analysis. Section 4 discusses the results of empirical analysis. In the final section, the concluding comments and suggestions for future research studies are provided.

2. Literature Review and Hypothesis Development

In this section, previous research studies that analyzed the factors related to accounting fraud are provided. There has been a massive effort for the development of the empirical models that identify factors related to accounting fraud. Previous research studies demonstrate that quantitative models are very useful in determining factors related to accounting fraud committed by firms.

The term 'fraud' covers a wide range of activities. ''Association of Certified Fraud Examiners'' has defined three types of fraud. The first, known as corruption, arises from bribery, economic extortion or illegal gratuities. The second type of fraud that arises from intentional misuse of firm's assets is known as employee fraud. The third one is known as financial statement fraud. Financial statement fraud involves intentional misstatements or omissions of amounts or disclosures in financial statements. The majority of research studies on fraud focus on the third type of fraud.

Spathis (2002) developed a model for detecting factors related to falsified financial statements. He found that firms with a low stock turnover ratio, low return on assets and low Z-scores are more likely to commit financial statement fraud. His study includes seventy-six firms and the results of the empirical analysis indicate that there is a great potential in detecting falsified financial statements through analysis of financial statements disclosed by firms. Kaminski et al. (2004) investigate whether financial ratios of fraud firms differ from those of non-fraud firms. Their study includes seventy-nine firms and the results of the discriminant analysis indicate that there is not much difference between financial ratios of fraud firms and financial ratios of non-fraud firms. Only three financial ratios, fixed assets to total assets, total liabilities to total assets and working capital to total assets, are statistically significant.

Firms' corporate governance mechanisms play a vital role in financial statement fraud. Fama and Jensen (1983) stated that the management of a firm has ultimate responsibility for the firm's operations. Sarbanes- Oxley Act that came into effect in 2002 states that a firm's management is responsible for ensuring financial statements disclosed by firm are free of material misstatement. Beasley (1996)

analysed the relation between the composition of board of directors and financial statement fraud. The results of logit analysis suggest that non-fraud firms have a significantly higher percentage of outside board members and board size than fraud firms and the characteristics of outside board members influence the likelihood of financial statement fraud. Smaili and Labelle (2009) investigated the impact of corporate governance mechanisms on the financial statement fraud. They found that poor corporate governance practices increase the likelihood of occurrence of financial statement fraud and firms that have fewer independent members in the board of directors and audit committee and a high turnover level of auditors are more likely to commit financial statement fraud. Uzun et al. (2004) found that as the percentage of independent members in the audit committee and board of directors increases, the likelihood of accounting fraud mitigates.

Beneish (1999) used financial statement data of firms that violated accounting rules to determine whether the information provided by financial statements is useful in identifying firms that manipulate accounting numbers. He concluded that unusual increases in receivables and accruals decrease the asset quality and sales growth increase the likelihood of accounting fraud. He provided a probit model that may be used as a useful analytical tool for detecting accounting fraud. Bell and Carcello (2000) estimate a logistic regression model that may help to detect fraud-firms. Their study includes 77 fraud firms and 305 non-fraud firms, they claim that weak control environment, ownership status, firm's management that lied to auditors, an interaction term between a weak control environment, the aggressive management attitude toward financial reporting process and inadequate profitability are significant risk factors related to accounting fraud. They provide support for the existence of the fraud triangle theory.

Fraud triangle theory is critically important to identify factors that may lead someone to commit corporate fraud. The American Institute of Certified Public Accountants (AICPA) in Statement on Auditing Standards (SAS) No.99: Consideration of Fraud in a Financial Statement Audit states that an incentive to commit fraud, an opportunity to commit fraud and rationalization of fraudulent behaviour must exist when accounting fraud is committed. These factors are known

as the fraud triangle. Fraud triangle theory states that the likelihood of fraudulent activities significantly increases when a person has necessary knowledge, ability and opportunity (Turvey, 2013). Statement on Auditing Standards No.99 states that auditors have responsibility for detecting material misstatements resulting from fraud. Firms that issue fraudulent financial statements are likely to receive an adverse audit opinion. This is because fraudulent financial statements issued by the firm are not fairly presented and material misstatements have adverse effects on the reliability of financial statements. Based on fraud triangle theory, Persons (2011) investigated financial ratios related to fraudulent financial reporting and suggested that firms that issue fraudulent financial statements have higher financial leverage, lower profitability, and lower liquidity. Lou and Wang (2009) investigated the effectiveness of fraud triangle theory in detection of fraudulent financial statements. They state that fraud triangle theory is a useful tool that provides valuable results and more financial pressure on firms and low firm size is positively correlated with fraudulent financial reporting. Skousen et al. (2009) examined the usefulness of fraud triangle theory in the detection of fraudulent financial statements issued by firms. They develop variables that serve as proxy measures for the incentive, opportunity and rationalization and conclude that rapid asset growth, financial distress and external financing are positively associated with fraudulent financial reporting. According to the fraud triangle theory, the management of a firm may attempt to manipulate accounting numbers. Harris and Bromiley (2007) point out that poor relative financial performance can cause pressure that leads the firm management to commit accounting fraud. Albrecht et al. (2004) stated that the management of a firm with high debt and leverage might report higher earnings than actual to meet its debt obligations and other covenants. Bai et al. (2008) suggested that there is a strong association between accounting data and fraudulent financial statements. The use of accounting data can be used to identify firms that commit accounting fraud. Motivated by these concerns, the following hypothesis is developed.

H_1: Accounting data are predictors of falsified financial statements.

3. Research Design

3.1. Data and Sample

This section is devoted to variables and sample firms. The use of correct variables significantly increases the efficiency of an empirical model. Multivariate regression models have often proven very useful in detecting accounting fraud. In this paper, a probit regression model is developed. The data used in the univariate and multivariate analysis covers the period from 2005 to 2015. To be included in the sample, a firm has to be listed on Borsa Istanbul and its financial statements must be available on the website of public disclosure platform. Firms operating in the financial industry are excluded in the sample since the accounting rules that these firms should follow are significantly different. Annual reports of sample firms are obtained from ''public disclosure platform''. These annual reports include a balance sheet, profit and loss statement, cash flow statement, statement of owner's equity and notes to the financial statements. Fraud firms are disclosed to the public through weekly bulletins issued by Capital Markets Board of Turkey. These weekly bulletins also summarize the accounting–based enforcement actions taken by Capital Markets Board of Turkey. Table 1 presents the industry classification of fraud firms and non-fraud firms included in the empirical analysis. As can be seen from Table 1, the most heavily represented industry in the sample is ''Food, Beverage and Tobacco'' and the least represented industry in the sample is ''Wood Products''.

Table 1: Industrial Classification of Sample Firms

Sectors	Fraud Firms	Non-Fraud Firms
Food, Beverage and Tobacco	16	16
Non- Metallic Mineral Products	14	14
Fabricated Metal Products, Machinery and Equipment	18	17
Chemicals, Petroleum Rubber and Plastic Products	12	11
Basic Metal Industries	7	8
Paper and Paper Products, Printing and Publishing	2	4
Wood Products	3	2
Total	72	72

The sample consists of 144 firms. Seventy-two firms that committed accounting fraud and seventy-two firms that did not commit accounting fraud are considered in the empirical analysis. Fraud firms are matched with non-fraud firms. Pairings were made on the basis of industry classification and asset volume.

3.2. Empirical Models and Variables

Previous research studies on the topic of accounting fraud are meticulously considered to find variables used in the empirical analysis. Such work of Spathis (2002), Kaminski et al. (2004), Beasley (1996), Persons (2011), Loebbecke et al. (1989), Uzun et al.(2004), Beneish (1999), and Bell and Carcello (2000) include suggested indicators of accounting fraud. These accounting ratios are associated with liquidity, profitability, operational efficiency and as well as solvency. Probit regression analysis is employed to analyze the usefulness of accounting variables in identifying fraud firms and non-fraud firms.

Table 2: Description of Variables

Dependent Variable	
Fraud	Coded 0 if the firm did not commit accounting fraud and 1 if the firm committed accounting fraud.
Independent Variables	
Size	Logarithm of total assets
Liquidity ratios	Current ratio, working capital / total assets
Profitability ratios	Return on assets, return on equity, profit margin
Operating efficiency ratios	Inventory turnover, accounts receivable turnover
Solvency ratio	Debt to total equity, interest coverage ratio

All of these variables are available to investors, creditors, stockholders and other stakeholders. Previous studies prove that firm size is highly related to accounting fraud. The logarithm of total assets is included in the empirical model to analyse the

relationship between firm size and accounting fraud. Firms that commit accounting fraud are small- sized enterprises (Beasley et al., 1999; Beneish, 1999).

Kreutzfeldt and Wallace (1986) stated that firms that commit accounting fraud have problems with meeting short-term obligations. Persons (2011) stated that a lower degree of liquidity degree might provide an incentive for the firm's management to commit accounting fraud. Liquidity ratios play a vital role in distinguishing between fraud firms and non-fraud firms. For this purpose, current ratio and working capital to total assets are used.

The profitability ratios are significant fraud predictor in previous studies (Spathis, 2002; Beasley, 1996; Persons, 2011; Spathis et al., 2002; Loebbecke et al., 1989; Beneish, 1999). Summers and Sweeney (1998) report that the firms' management want to maintain or improve the past level of profitability. Spathis (2002), Beneish (1999), Kucuksozen and Kucukkocaoglu (2004), and Kreutzfeldt and Wallace (1986) support the assertion that low levels of profitability increase the likelihood of accounting fraud. If the firms' management fail to meet expectations, they may commit accounting fraud to artificially inflate earnings. This aspect is measured by return on assets, return on equity and profit margin.

The amounts of accounts receivable and inventory are highly affected by subjective estimates. Firms may commit accounting fraud by manipulating inventory and accounts receivable (Persons, 2011; Schilit, 1993; Stice, 1991). Kaminski et al. (2004) report that inventory and accounts receivable are useful in evaluating accounting fraud risk. Beasley et al. (1999) state that inventory and accounts receivable are the most common falsified accounts. Spathis et al. (2002) state that high inventory turnover ratio is related to an increased likelihood of committing accounting fraud.

Debt to total equity and interest coverage ratio are among the major accounting ratios that affect financial statement users' decisions. Christie (1990) put forward the claim that debt to total equity ratio is positively associated with income increasing accounting policy. Persons (2011) argue that fraud firms have a higher ratio of debt to total equity than non-fraud firms. Interest coverage ratio is included to capture effects of total interest charges on the likelihood of occurrence of

accounting fraud. It is expected that financial statements of firms with a lower interest coverage ratio have much more accounting irregularities than other firms.

4. Empirical Results

4.1. Descriptive Statistics

In this section, descriptive statistics of variables are provided. Table 3 presents the results of descriptive statistics of variables and univariate tests. Univariate test provides valuable information about the variables used in the empirical analysis. The results of univariate tests indicate that accounting ratios may be helpful in determining firms that commit accounting fraud. The univariate test results reveal that log of total assets, current ratio, working capital to total assets, return on assets, return on equity, profit margin, interest coverage ratio, accounts receivable turnover and inventory turnover ratio are statistically significant at the 0.05 level.

There is a statistically significant difference in the means of non-fraud firms and fraud firms at the 95% confidence level for profit margin. Results in Table 3 state that non-fraud firms have a higher return on equity and return on assets. The size of fraud firms is lower than that of non-fraud firms. There are significant differences in the means of non-fraud firms and fraud firms at the 95% confidence level for the current ratio and working capital to total assets. This implies that fraud firms are more likely to suffer from liquidity problems than non-fraud firms.

The pairwise comparison suggests that firms with lower accounts receivable turnover and inventory turnover ratio are more likely to publish falsified financial statements. The available evidence seems to suggest that fraud firms do not have a strong credit collection policy. A low accounts receivable turnover ratio cause firms to face difficulties in meeting short-term obligations. The mean value of interest coverage ratio is higher for non-fraud firms than fraud firms reflecting that fraud firms cannot generate sufficient revenue to pay interest expense. This also implies that fraud firms are at a high risk of defaulting on their short-term and long-term debt. Considered altogether, the results of univariate tests indicate that accounting ratios are useful in discriminating between non-fraud and non-fraud firms.

Table 3: Descriptive Statistics

Variables	Mean		Standard Deviation		t	Sig.(two-tailed)
	Non-Fraud	Fraud Firms	Non-Fraud	Fraud Firms		
Log assets	8.226	7.916	0.929	0.747	2.011	0.044
Current ratio	1.800	0.836	0.943	0.431	6.159	0.000
Working capital to total assets	0.200	0.029	0.203	0.384	2.768	0.0056
Return on assets	0.056	-0.065	0.085	0.248	4.870	0.000
Return on equity	0.127	-0.174	0.175	0.584	5.038	0.000
Profit margin	0.080	-0.173	0.124	0.505	4.043	0.000
Debt to equity	1.332	1.587	1.158	1.358	-0.764	0.445
Interest coverage ratio	2.521	0.151	2.639	2.458	5.837	0.000
Accounts receivable turnover	6.342	3.728	5.032	2.114	2.817	0.0048
Inventory turnover ratio	6.965	3.708	5.198	1.984	2.859	0.004

4.2. Empirical Results and Discussion of Probit Regression

This study investigates accounting variables at the aggregate level and probit regression analysis is selected for the analysis of the sample. The interaction effects of accounting variables are analyzed through the use of probit model. Table 4 presents the results of probit regression analysis. As can be seen from the results of probit regression analysis, probit model yields valuable information for identifying firms that committed accounting fraud. The results of probit model reveal that the relationship that exists between dependent and independent variable is statistically significant (χ^2= 82.73, p<0.000). Additionally, the strength of this relationship is R-squared 0.80, implying a strong relationship. The results of probit regression analysis indicate that logarithm of assets, current ratio, working capital to total assets, return on assets, return on equity, profit margin, debt to equity and accounts receivable turnover are statistically significant. On the other hand, the coefficients of inventory turnover ratio and interest coverage ratio are not statistically

significant. These non-significant variables in the probit model may be useful variables at the aggregate level.

The results reported in Table 4 seem to suggest that non-fraud firms have higher liquidity ratios than fraud firms. This is consistent with the findings of Persons (2011) and Kreutzfeldt and Wallace (1986). In other words, firms with low liquidity ratios are more probable to issue fraudulent financial statements. The negative coefficients of return on assets, return on equity and profit margin imply that low profitability ratios are positive factor that increases the likelihood of fraudulent financial reporting, confirming the findings of Spathis (2002), Beneish (1999), Beasley et al. (1999), Kucuksozen and Kucukkocaoglu (2004), and Kreutzfeldt and Wallace (1986). Negative financial performance appears to be a vital motivational factor for accounting fraud.

The results of probit regression model reveal that smaller firms are more likely to issue fraudulent financial statements. The relatively small size of firms that commit accounting fraud may suggest that smaller firms are unable to hire executives who have a deeper knowledge of financial reporting process or implement internal controls that mitigate the risk of accounting fraud. The negative coefficient of debt to equity states that firms with high debt to equity are more likely to be classified as a fraud firm. This is consistent with the findings of Persons (2011), Spathis et al. (2002), Bell and Carcello (2000) and Christie (1990). The pressures of financial distress may provide strong incentives for some firms to commit accounting fraud.

According to the results of probit regression model, fraud firms have lower accounts receivable turnover and inventory turnover than non-fraud firms. This result parallels with the findings of Persons, (2011), Schilit (1993), Stice (1991) and Kaminski et al. (2004), however, contradicts the findings of Spathis et al. (2002). Generally speaking, recording fictitious sales decrease accounts receivable turnover ratio. In the current business climate, a high inventory turnover ratio is much more favourable. This is because the firm is able to sell its inventory faster and, therefore, generate more quickly sales revenue. The negative coefficient on inventory turnover ratio indicates that firms with low inventory turnover ratio are much more likely than the firms with high inventory turnover ratio to commit accounting fraud. Taken

together, the probit regression model depicted in Table 4 may be useful in identifying fraudulent financial statements.

Table 4: The Results of Probit Regression Model

Independent Variables	Coefficient	Std. Error	Sig.
Constant	9.774	3.182	0.002***
Logarithm of assets	-0.524	0.295	0.076*
Current ratio	-2.849	1.031	0.006***
Working capital to total assets	-1.828	2.160	0.097*
Return on assets	-2.244	3.571	0.043**
Return on equity	-1.585	0.988	0.090*
Profit margin	-1.169	1.442	0.047**
Debt to equity	0.372	0.220	0.092*
Accounts receivable turnover	-0.187	0.085	0.028**
Inventory turnover ratio	-0.113	0.067	0.191
Interest coverage ratio	-0.064	0.120	0.594
Summary Statistics			
Adjusted R-Squared	65.6 %		
$\chi 2$	82.73		
Sig. (p-value)	0.000		

Notes:

* Denotes significance at the 10% level.

** Denotes significance at the 5% level.

***Denotes significance at the 1% level.

The classification results obtained through probit model in detecting fraud firms are presented in table 5. It is worth noting that a classification table is an important tool to be used in assessing the performance of the model. As can be seen from the table 5, the overall percent of correct classification is 84.7 %. The model incorrectly classifies only twelve out of 72 fraud firms and ten out of 72 non-fraud firms. The results of classification table indicate that the proposed probit model can significantly contribute to the development of a reliable model for identifying firms that commit accounting fraud.

Table 5: Classification Table

Observed	Fraud firms	Non-fraud firms	Percentage correct
Fraud firms	60	12	83.3%
Non-fraud firms	10	62	86.1%
Overall percentage			84.7%

5. Conclusion

Financial statements reflect quantified information association with firms' financial position and financial performance. Information provided by financial statements is crucially important for financial statement users. The reliability and accuracy of financial statements have significant impacts on the efficiency of financial markets. Past experiences show that bankruptcies of firms caused by falsified financial statements mitigate public trust in financial statements. The variables selected for the probit regression analysis are logarithm of total assets, current ratio, working capital to total assets, return on assets, return on equity, profit margin, debt to equity, accounts receivable turnover, inventory turnover ratio and interest coverage ratio. The proposed multivariate model has satisfactory performance in correctly identifying the firms that commit accounting fraud. An accurate and reliable model that identifies fraudulent financial statements would serve as a critical analytical tool for fraud investigators. Early detection of accounting frauds helps government authorities in maintaining the stability of financial markets. The results of probit regression analysis indicate that accounting ratios can shed light on the likelihood of financial statements fraud. With more advanced empirical models and a greater number of accounting ratios, it is possible to create a more effective empirical model.

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