

# Differences in business fraud between state-owned and private companies : case of Croatia

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DIGITALNI AKADEMSKI ARHIVI I REPOZITORIJI

## DIFFERENCES IN BUSINESS FRAUD BETWEEN STATE-OWNED AND PRIVATE COMPANIES: CASE OF CROATIA

MARIJANA BARTULOVIĆ<sup>1</sup>, DIJANA PERKUŠIĆ<sup>2</sup>, IVAN KOVAČEVIĆ<sup>3</sup>

### Abstract

Fraud presents a serious problem and arising issue for all of society at national and global levels. According to global fraud research conducted by the Association of Certified Fraud Examiners, it is estimated that the average company loses about 5% of its annual revenue due to different types of business fraud. Total estimated annual fraud losses according to global ACFE research reaches about 4.7 trillion dollars. Business frauds also present an important issue for the Croatian economy, business community and society as a whole. Thereby, considerable attention should be given to this issue with the aim of raising awareness throughout society on fraud and its negative and destructive impact on all of society. The main purpose of this paper is to examine differences in fraud characteristics between state-owned and private companies in the Republic of Croatia. Research was based on data on business frauds obtained by the Association of Certified Fraud Examiners Croatia which included 124 respondents. Data were related to frauds that occurred in Croatian companies in 2021 and 2020. In this paper we focused on fraud characteristics such as fraud loss, type of fraud, fraud duration and methods of fraud detection in order to determine whether fraud in privately owned companies differs significantly from fraud in state-owned companies. Research results revealed how differences in fraud characteristics among privately and state-owned companies exist. Based on a sample of Croatian companies that were victims of fraud, it is noted how fraud in state-owned companies lasts longer and creates greater losses in comparison to fraud in private owned companies. Moreover, data related to estimated fraud loss and fraud duration were statistically significant in terms of differentiating these two groups of companies. Based on data on discriminatory variables a logistic regression model correctly classified 78.46% of companies in the group of companies that are privately or state-owned.

**JEL classification:** M41, K42

**Keywords:** Frauds, State-owned Companies, Private Companies

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## INTRODUCTION

In today's turbulent times and challenging business environment where companies are moving from one crisis to another, business fraud presents a serious problem. Karpoff (2021, p.1) emphasizes that "COVID-19 pandemic and resulting economic shutdown" will increase fraud in the next period. These same predictions are pointed out in research performed by the Association of Certified Fraud Examiners (ACFE) and Grant Thornton (2021). Soltani pointed out how "corporate fraud goes on at a deeper level within the company and the environment in which it operates (Soltani, 2014, p. 252) while Grandstaff and Solsma (2021, p. 421) indicate how the main characteristics of fraud are that it lasts longer, generates greater fraud losses and the number of companies affected by fraud increases over time. According to global fraud research conducted by the ACFE, total estimated annual fraud losses reach about 5% of its annual revenue or 4.7 trillion dollars (ACFE, 2022, p. 8). However, these are only estimates and most frauds remain undetected since fraud perpetrators use various schemes to hide the fraud. Fraud is a global problem since "it has devastating consequences for shareholders, employees, firms and communities" (Bekiaris & Papachristou, 2017, p. 473).

No organization, regardless of industry or region, is resistant to the issue of fraud. It is considered that "financial reporting fraud and other forms of financial reporting misconduct are a significant threat to the existence and efficiency of capital markets" (Amiram et al., 2018, p. 2). According to ACFE (2022, p. 6) "occupational fraud is very likely the costliest and most common form of financial crime in the world". Fleming et al. (2016) state how fraud causes losses to employees, customers, suppliers and society as a whole. Occupational frauds can be defined as "frauds that are committed by individuals against the organizations that employ them" (ACFE, 2022, p. 6). According to the Institute of Internal Auditors (IIA, 2017, p. 23) fraud is defined as "any illegal act characterized by deceit, concealment, or violation of trust. These acts are not dependent upon the threat of violence or physical force. Frauds are perpetrated by parties and organizations to obtain money, property, or services; to avoid payment or loss of services; or to secure personal or business advantage." Fraud, as part of white collar crime, presents a serious problem, and it can be classified in three main categories (ACFE, 2022, p. 10): 1) asset misappropriation, 2) corruption, and 3) financial statement fraud. Asset misappropriation is the most common type of fraud and occurs in about 86% of cases. However, this type of fraud generates the lowest losses with median loss of USD 100.000 per case. Financial statement fraud is represented in only 9% of cases but ac-

ording to results, it is the costliest category of fraud. This type of fraud generates a median loss of USD 593,000 per case. Corruption falls between these two categories since it happens in 50% of cases and causes a loss of USD 150,000 per case. Bekiaris and Papachristou (2017, p. 473) state how three conditions need to be present to commit fraud: opportunity or motive, pressure, rationalization and capability. According to Wolfe and Hermanson (2004, p. 38) "opportunity opens the doorway to fraud, and incentive and rationalization can draw the person toward it. But the person must have the capability to recognize the open doorway as an opportunity and to take advantage of it by walking through, not just once, but time and time again".

The Association of Certified Fraud Examiners Croatia (ACFE Croatia) performed its first survey on fraud in the Republic of Croatia according to ACFE methodology in 2021. The sample included 124 respondents, i.e., companies in which fraud occurred during 2021 and 2020. Results were presented in the report "How do we steal? Research on Business Fraud in the Republic of Croatia". The report gives information on types of fraud, costs, methods, perpetrators and other fraud characteristics in Croatia. The aim of this paper is to examine differences in fraud characteristics between state-owned and privately owned companies in the Republic of Croatia. We focused on fraud characteristics such as fraud loss, type of fraud, fraud duration and methods of fraud detection in order to determine whether fraud in privately owned companies differs significantly from fraud in state-owned companies.

The paper is organized as follows: after the introductory part of the paper, the second chapter presents previous research in this area. In the third chapter, research sample, methodology and results are presented, while the last, fourth part of the paper, gives concluding remarks.

## PREVIOUS RESEARCH

Previous scientific research in this area is quite rare. The reason for this can be found in the unavailability of data on fraud and companies victimized by fraud. One of the main characteristics of fraud is concealment and fraud perpetrators use various schemes to hide the fraud. ACFE has been conducting empirical research on fraud since 1996. In their research, they analyse and present different characteristics of fraud committed around the world: type of fraud, loss caused by fraud, methods of concealing fraud, effectiveness of control mechanisms, perpetrators, etc. Their research contributes to understanding characteristics of professional fraud in order to improve fraud detection and prevention. For years their research has shown how asset misappropriation is the most common type of fraud. It

assumes stealing assets from an employer and occurs in around 86% of fraud cases (ACFE, 2022). Financial statement fraud, according to ACFE research, presents the least common type (it occurs in around 9% of cases) but the most expensive fraud scheme. Financial statement fraud can be defined as "a scheme in which an employee intentionally causes a misstatement or omission of material information in the organization's financial reports" (ACFE, 2022, p. 94). Corruption, as a type of occupational fraud is defined as "scheme in which an employee misuses their influence in a business transaction in a way that violates their duty to the employer in order to gain a direct or indirect benefit" (ACFE, 2022, p. 94) and it happens in 50% of fraud cases and causes a median loss of USD 150.000.

Authors in their fraud research point out how fraud causes significant losses in market value of a firm (Karpoff et al., 2008), impact image and financial position of the company (Beasley et al., 2010) and "have significantly eroded the public trust in financial statements that are disclosed by firms" (Ozcan, 2016, p. 130). Research on fraud performed by Fleming et al. (2016) was based on data gathered by the ACFE. The aim of their research was to determine differences in fraud characteristics among private and public companies. According to results public companies have stronger anti-fraud controls, are exposed to greater fraud losses, experience fraud with a larger number of perpetrators and have less fraud that is discovered by accident. Giriūnas and Mackevičius (2014) examined fraud in the public sector of Lithuania. According to results, fraud in the public sector is more frequent when compared to fraud in the private sector and in most of the cases is initiated from the side of upper management. Based on analysis of corporate fraud in India, Gupta and Gupta (2015) conclude that weak regulatory systems and weak coordination between different regulatory bodies make fertile ground for fraud. Ozcan (2016) conducted research on characteristics of a company and accounting fraud on a sample of 144 firms listed on Borsa Istanbul in the period 2005 to 2015. According to research results, firms that achieve low liquidity ratios, have negative financial performance and have high debt to equity ratios are more vulnerable to fraud. Also, results revealed how smaller firms are more exposed to fraud as well as those with lower accounts receivable turnover and inventory turnover.

Characteristics of corporate fraud, causes of fraud and fraudster business profiles were examined by Bekiaris and Papachristou (2017). Based on reports of the ACFE in the period from 2004 to 2016 they examined fraud evolution and concluded how in the observed period asset misappropriation was the most often fraud scheme. They also point out that the banking industry as well as the government sector were in

other side the communication and utilities sectors are the least exposed to fraud. Moreover, according to research results, owners involved with fraud cause the greatest fraud losses. Tenure and position are found to be positively related to fraud loss and authors point out how "to commit fraud a person should be trusted and have gained access to valuable information, to overlap controls" (Bekiaris & Papachristou, 2017, p. 473). Junger et al. (2020) examined characteristics of fraud on a sample of 300 fraud cases related to Dutch companies. The authors focused on three fraud categories: CEO fraud, fraudulent contracts and ghost invoices. According to results, fraud committed by CEOs are conducted online, while most fraudulent contract and ghost invoices are conducted offline.

Halar et al. (2022) performed a comprehensive analysis of ACFE reports in the period 2014-2022. By analyzing reports on fraud during this period, the authors also came to the conclusion that asset misappropriation is the most common form of fraud in all periods of observation. Furthermore, the longer the fraud goes undetected, the greater the fraud loss is. Fraud reports have indicated that tips are the most common way of fraud detection and the key control mechanisms that companies had at the time when the fraud occurred are external audit, formal code of conduct and internal audit. Results of this research have shown that most fraud cases (about 70%) occurred in the for-profit sector (private or state-owned companies). It is followed by the government sector, and the non-profit sector is according to research results least exposed to fraud. Analysis of specific industries within ACFE reports in the period 2014-2022 has shown that the banking industry is most exposed to fraud which is in line with the results of Bekiaris & Papachristou (2017). It is followed by government and public administration and the manufacturing industry.

Bartulović et al. (2022) compared characteristics and trends in fraud in the Republic of Croatia with global results. They concluded that the main features of fraud in Croatia do not deviate significantly from global fraud trends, but certain differences exist. Misappropriation of assets is in Croatia also the most common type of fraud and it occurred in 52% of cases. Corruption as a form of fraud occurred in 31% of fraud cases and is the second most represented form of fraud. Differences compared to the global results are observed in the third place. More precisely, on a global level financial statement fraud is the third most common type of fraud while in Croatia the third most common type of fraud is computer fraud which occurred in 22% of cases. Also, Croatian results showed that more than 50% of organizations that were fraud victims had no adequate control mechanisms at the time when the fraud occurred. The authors point out how "different control mechanisms present fraud detection and prevention

measures, and are being imposed as an indispensable tool in the fight against fraud on a global level... in the practice of Croatian companies, this form of fraud prevention and detection has proved to be insufficiently represented and ineffective” (Bartulović et al., 2022, p. 117).

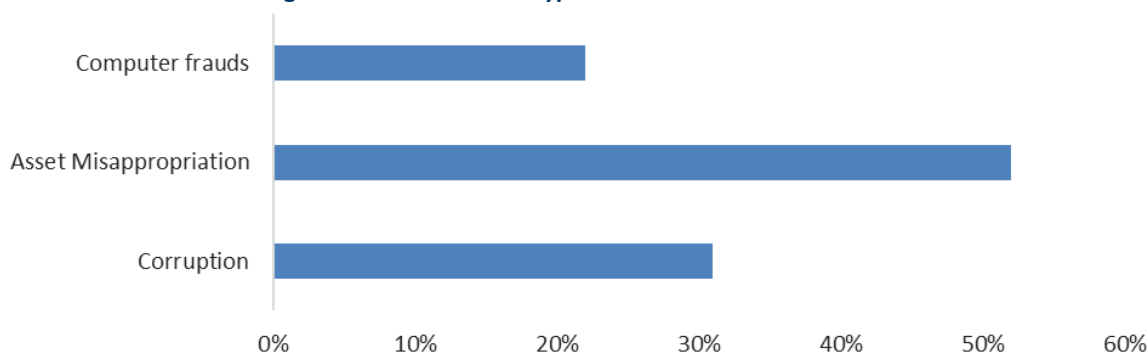
## METHODOLOGY & EMPIRICAL RESULTS

### RESEARCH SAMPLE AND METHODOLOGY

Research was based on data gathered by Association of Certified Fraud Examiners Croatia (ACFE Croatia). They performed comprehensive fraud research according to the methodology of ACFE for the first time in the Republic of Croatia in 2021. Within the research fraud that happened during 2021 and 2020 were analyzed and a total of 124 companies from 16 different industrial sectors were included in the research. Results of the research were presented in the report “How do we steal? Research on Business Fraud in the Republic of Croatia” (ACFE Croatia, 2022). Business or occupational fraud is usually divided into three main categories: corruption, misappropriation of assets, and financial statement fraud (ACFE, 2022, 10). These three categories have dominated for years, although it must be pointed out how in recent years, new forms of fraud related to computer fraud have been detected. Misappropriation of assets has been for years the most prevalent type of occupational fraud. This type of fraud is present in 86% of cases at the global level and in 52% of fraud cases in Croatia.

Croatian survey results show how corruption as a type of fraud is represented in 31% of analyzed fraud cases while at the global level corruption is represented in 50% of cases. Moreover, research of fraud in Croatia has shown that computer fraud or cybercrime is the third most common type of fraud in Croatia, and it was noticed in 22% of cases. It should be noted how on a global level, financial statement fraud is in third place, and it is represented in 9% of cases. According to Croatian fraud results this type of fraud is represented in 16% of cases. Croatian results are in some aspects similar to global results and follow global fraud trends. However, some specificities can be pointed out. For example, at the global level 42% of fraud is initially detected by tip-offs. In Croatia this percentage is much lower and amounts to 22% meaning that 22% of fraud in Croatian companies was detected by tip-off. Also, it should be pointed out that half of the analyzed companies at the time when fraud was detected did not have any type of anti-fraud controls. Results have shown that Croatia significantly lags behind global trends in the implementation of anti-fraud controls (ACFE Croatia, 2022) and there is significant space for improving anti-fraud systems in Croatian companies. Also, when estimated loss is observed, differences for the Croatian sample in comparison to global trends can be observed. At the global level it is estimated that the average company loses 5% of its annual revenue to fraud while in Croatia these estimates go to 13 % (ACFE Croatia, 2022, p. 5).

Figure 1: Most common types of business fraud in Croatia



Source: ACFE Croatia, 2022, p. 8.

In this paper we focused on analysis of differences in fraud between state-owned and private companies. In determining differences in fraud characteristics between these two groups we focused on the following parameters: fraud loss, type of fraud, fraud duration and methods of fraud detection. In further analysis we eliminated all companies with missing data on some of

the required parameters. Finally, our sample consisted of 65 observations. Out of the total number of companies 49 companies, or 75.38% ,were privately owned companies and the other 16, or 24.62%, were state-owned. Distribution of companies due to ownership status is shown in Table 1.

**Table 1: Ownership structure of analyzed companies**

Ownership	Number of observations	%
Private	49	75.38
State-owned	16	24.62
Total	65	100.00

Source: Author's own work.

The aim of the paper was to determine differences in fraud characteristics between private and state-owned companies. In order to determine differences among these two groups logistic regression was used. Logistic regression is a statistical method used for predicting outcomes of a categorical dependent variable. In logistic regression the dependent variable can have two or more outcomes and in our research the dependent variable is binary – the company is privately owned or not. Logistic regression is used to obtain the probability that a unit from the sample (in our case a certain company) belongs to a certain group (group of companies in state or private ownership). Value 1 is assigned to state-owned companies and value 0 to those that

were privately owned. The independent variables that predict the outcome of the dependent variable are the following: fraud loss, type of fraud, fraud duration and methods of fraud detection. Descriptive statistics for independent variables are presented in Table 2. Fraud loss refers to total financial loss caused by fraud in the affected company. The variable type of fraud indicates the way fraud was committed: by asset misappropriation, corruption, financial statements fraud or some other form of fraud. Fraud duration indicates the time that elapses between the start of the fraud and its detection while variable methods of fraud detection indicate the way the fraud was initially discovered.

**Table 2: Group statistics**

Total sample	No. of obs.	Mean	Std. Dev.	Min	Max
Fraud loss	65	3.5692	1.6767	1	6
Type of fraud	65	2.5077	1.8125	1	6
Fraud duration	65	17.4769	24.1150	1	100
Methods of fraud detection	65	4.5692	3.4595	1	11

Source: Author's own work.

In performing logistic regression, using several independent variables can lead to the problem of high collinearity among two or more independent variables. Due to fact that in practice there is usually a smaller or larger dependence of independent variables it was nec-

essary to test the level of multicollinearity. Therefore, before running logistic regression, multicollinearity between the independent variables was analyzed. Table 3 shows the results of multicollinearity analysis.

**Table 3: Correlation matrix**

	Fraud loss	Type of fraud	Fraud duration	Methods of fraud detection
Fraud loss	1.0000			
Type of fraud	-0.0246	1.0000		
Fraud duration	-0.1892	-0.1197	1.0000	
Methods of fraud detection	-0.0298	-0.0942	0.2861	1.0000

Source: Author's own work.

As shown in Table 3, there is no problem of multicollinearity between the observed variables so all independent variables were included in the next step of analysis. In the next step, logistic regression was performed, and the results are presented in the following part of the paper.

## RESEARCH RESULTS

The aim of this paper was to determine differences in fraud characteristics between private and state-owned companies. As presented in Table 4, the logit regression model is statistically significant. The variables fraud loss and fraud duration are statistically significant in the context of differentiating between the observed two groups of companies.

**Table 4: Logit regression model**

Type of ownership~p	Coef.	Std. Err.	z	P > z	[95% Conf. Interval]
Fraud loss	-0.4943	0.1973	-2.51	0.012	[-0.8810 -0.1076]
Type of fraud	-0.0476	0.1877	-0.25	0.800	[-0.4155 0.3202]
Fraud duration	0.0236	0.0129	1.81	0.070	[-0.0019 0.0490]
Methods of fraud detection	-0.0113	0.0938	-0.12	0.905	[-0.1951 0.1726]
_cons	0.1731	0.9743	0.18	0.859	[-1.7365 2.0827]

Number of observations = 65, LR chi2 (4) = 12.70, Probability > chi2 = 0.0128, Log likelihood -29.92429, Pseudo R2=0.1751

Source: Author’s own work.

The other two variables, type of fraud and methods of fraud detection were not statistically significant in the context of differentiating privately and state-owned companies. Classification results are shown in Table 5. Classification accuracy shows how many companies from the sample were correctly classified by the logistic regression model into the group of private or state-owned companies. Accuracy of logistic regression model amounts to 78.46%. This means that 78.46% of

companies were correctly classified in the group of companies that are privately or state-owned according to available data on the independent – discriminatory variables fraud loss and fraud duration. From total number of state-owned companies (16 observations) the model correctly classified 4 cases. In the group of privately owned companies, out of 49 observations the model correctly classified 47 cases.

**Table 5: Classification results**

Privately companies - 0 State owned companies - 1		Predicted group membership		Total	
		1	0		
Original	Count	1	4.00	12.00	16.00
		0	2.00	47.00	49.00
	%	1	25.00	75.00	100.00
		0	4.08	95.92	100.00

Source: Author’s own work.

Thus, based on the research results, it can be concluded that differences in fraud characteristics exist among privately owned and state-owned companies. Estimated fraud loss and fraud duration are variables that are statistically significant in terms of differentiating these two groups of companies. Fraud duration is presented by the number of months or time that passes between the initiation of fraud and its detection. According to the results of fraud research in Croatia the average duration of fraud is 8 months, which is shorter than the global trend. According to global fraud results for 2022, average fraud duration is 12 months. In our analysis we focused on differences between publicly and state-owned companies. According to available data, average fraud duration for the sample of privately owned companies is 6 months and in state-owned companies this period reaches 12 months. So, differences in fraud duration among two groups of companies exist and these differences are statistically significant in terms of differentiating among private and state-owned companies. Private companies in most of the detected fraud cases were faced with losses under 200,000 HRK while in state-owned companies, the loss usually was in the range of HRK 1 to 5 million. It can be noticed how state-owned companies are exposed to

greater fraud loss and this variable is also statistically significant in terms of distinguishing private and state-owned companies. It should be emphasized that results are in line with results obtained by Fleming et al. (2016) who also revealed that public companies are exposed to greater fraud losses.

## CONCLUSIONS

The aim of this paper was to analyze data gathered by ACFE Croatia in order to determine differences in fraud characteristics among privately and state-owned companies. Results of the first fraud research conducted according to ACFE methodology show how Croatian companies lose 13% of their annual revenue due to different types of fraud. So, fraud research shows how Croatian companies follow global trends and that no organization is resistant to fraud. As Bekiaris and Papatristou (2017, p. 473) state, frauds are “complex in structure, difficult to detect and difficult even for a specialist to fully comprehend them”. Various organizations (for example ACFE, The IIA...) emphasize the issue of fraud and its destructive impact on all of society and researchers in this area try to point out different characteristic of fraud, fraud perpetrators, detection meth-

ods and so on, in order to contribute to better understanding of this phenomenon.

Within this research we analyzed differences in fraud among privately and state-owned companies. Results of the conducted logistic regression indicate that differences in fraud characteristics among two observed groups of companies exist. Moreover, estimated fraud loss and fraud duration were statistically significant in terms of differentiating these two groups of companies. Based on data on independent – discriminatory variables the logistic regression model correctly classified 78.46% in a group of companies that are privately or state-owned. According to results, fraud in state-owned companies have fraud duration of 12 months and generate losses from 1 to 5 million HRK. On the other side, in private companies it takes 6 months from the moment when fraud occurs to the time when it is detected. Moreover, state-owned companies are exposed to greater fraud losses which is in line with ACFE (2022, p. 13) observation that the longer a fraud remains undetected, the greater financial loss is.

Grandstaff and Solsma (2021, p. 421) also point out that fraud lasts longer and generates greater losses so it can be concluded that the anti-fraud community should respond to these issues by a stronger fight against fraud. However, certain limitations should be pointed out. In the research sample there is a difference between the number of state-owned and privately owned companies. It should be noted that the research is based on data on fraud that occurred in the Republic of Croatia in the years 2020 and 2021 and included 124 respondents. Most of them were from the

private sector which created disproportion in our final sample. Also, we eliminated all companies missing data on some of the required parameters which resulted in 65 observations. It should be noted that certain variables that could be relevant to our research (such as size, financial result, etc.) were not included due to lack of data.

In the end, the aim of this paper is to contribute to a better understanding of fraud characteristics in Croatia and to our best knowledge this is first research on fraud differences between state-owned and privately owned companies in Croatia. Also, the authors emphasize the fraud issue and its destructive effect on companies, employees and society as a whole and thus this paper aims to contribute to raising awareness about fraud and the importance of fighting fraud at all levels of society. The authors encourage future research in this area aware of the fact that researchers are faced with unavailability of the data on fraud and companies victimized by fraud. Future research in this area could focus on more in-depth analysis of fraud cases and fraud characteristics in order to highlight fraud characteristics and the destructive impact of fraud on company performance and society as a whole.

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