
ADVANCED CORPORATE FINANCE

THE IMPACT OF CORPORATE
SCANDALS ON YEARLY MARKET
RETURNS OF PUBLICLY LISTED
COMPANIES

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List of Abbreviations

PLC	Publicly Listed Companies
F&F	Fama and French
DJI	Dow Jones Index
MOM	Momentum Factor

Abstract

Throughout history, the desire to obtain strategic advantages has often led companies and boards of directors to behave unethically and irresponsibly. When these types of actions come to light, they are considered scandals, which - with today's easy access to information - are disclosed in a short time and can cause serious repercussions. The objective of this paper is to measure the effect of these scandals on yearly market returns using the constituents of the DAX and DowJones index (DJI) in the period from 2009 to 2019.

Therefore, three regression models were developed. The first one allows to quantify the direct effect of the number of scandals on market returns, while the second one analyzes the influence of penalty fees on market returns, respectively. The third and primary model merges the first two models and additionally considers other economic and financial variables, such as the GDP and Fama and French (F&F) Momentum factor to determine the effect of corporate scandals on market returns when other variables are included as well. The first model divides all companies taken into consideration in quartiles based on the number of scandals caused. The second model, instead, introduces the penalty fees as an independent variable, which is calculated with the sum of all fees related to scandals.

Despite the regression results and the respective analysis pointing towards the fact that corporate scandals do have some sort of negative impact on market returns, results weren't significant enough to state a definite conclusion. Bear in mind that these results must be interpreted with caution given the limitations of both the model and the respective data, such as the time frame considered and the sample size.

1. Introduction

In the 21st century there was a rash of corporate scandals, accusing several managers and accountants for corrupt and deceitful practices (Kuhn & Ashcraft, 2003). It has been increasingly mentioned in the news exposing deep, widespread problems for the overall society on a global scale (Comen & Frohlich, 2019).

A highly competitive market environment, which is also due to today's globalized world, makes it attractive for companies to commit fraud to ensure competitive advantage and decrease the risk of losing market share. Experiencing corporate scandals can trigger several reactions from investors. Investors become more cautious regarding their investment strategy and existing investment portfolio. In the worst case, they leave the stock market, which especially individual investors are likely to do (Nguyen, 2021). Yet, investors do not only influence the market in the aftermath but also beforehand since they impact the corporate governance through their voting behavior. However, research by Enriques and Romano (2018) shows that the voting behavior of investors rarely changes after the scandal becomes public due to dispersed ownership and "rational reticence". Existing research investigated that corporate scandal affects the firm's equity by legal sanctions and reputation (Murphy, et. al, 2009). Legal sanctions arise from governmental restrictions, whereas reputation is highly impacted by the investors' reactions to the respective corporate scandal. According to Murphy et. al. (2009) corporate scandal which do not damage customers or other related parties do not have a very significant impact on the firms' reputation and thus a smaller decrease in the firm's equity is expected, respectively. Yet, the extent to which the corporate scandal impacts the market return of PLC's has not been sufficiently researched and hence it is interesting to see if it matters and if yes, the extent to which corporate scandals impact the market returns of PLC's. Corporate scandals can be demarcated into different categories, which will be further explained in chapter two. Due to the limitations given, this paper solely focuses on scandals which are related to a hefty penalty and impact various stakeholders of the company. Furthermore, this paper focuses on the impact on PLC's since for this type of company, the market return can be easily measured.

One of the most recent and widespread corporate scandals was committed by the German fintech company "Wirecard" in 2019/2020 (McCrum, 2020). The company's stock price increased significantly over the years with a peak of 191 Euro per share in 2019 and thus dividend payments increased from 17.3 EUR to 24.7 EUR in 2018 (Thomson Reuters, 2021). As shown in Appendix 6, after the announcement of the corporate scandals, the share price dropped immediately due to the reaction of the shareholders. The "Wirecard" case is just one example out of many. Since (financial) corporate scandals are a very present topic in today's society they impact individuals as well as institutional investors regarding their investment portfolio decisions. Therefore, this paper aims to

examine the extent to which corporate scandals actually impact the market returns to contribute to existing discussion on the effect of corporate scandal and thus lead to the following research question, which will be answered in this paper:

How does corporate scandal affect the yearly market returns of publicly listed companies?

2. Literature Review

Corporate scandals, one of the “hot topics” nowadays, has not only captured the attention of regulators but also the attention of individuals, investing their money on the financial market and seeking high market returns (MacLean, 2007). Often corporate scandals are the result of a combination of pressure and opportunity (Baucus, 1994). It occurs whenever negative information about a company is disclosed, usually through a prohibited action. It must be demarcated between fraud and corporate scandal. In this paper, fraud is defined as the prohibited act itself which then leads to a corporate scandal as soon as the fraud is disclosed. Corporate scandals can be distinguished in different categories. Financial scandal relates to fraudulent accounting practices leading to a manipulation of the financial statements (Kuhn & Ashcraft, 2003), whereas the latter two relate to a personal illegal action by an individual within the company not related to the financial statement, or the exploitation of the environment. Since Murphy et. al (2009) exaggerate the fact that corporate scandals which directly affects customers (or in this case investors) has the highest impact on the firm’s value of equity, this paper solely focuses on corporate scandals related to financials, since investors are directly affected if fraudulent actions within the financial statements are disclosed and thus impacts market returns of the PLC.

Corporate scandals decrease the firm’s value of equity since they directly affect the shareholders’ investment decision (Murphy et. al, 2009) – then why does an increasing number of companies commit fraud?

According to the narcissist theory, executives with a high level of self-confidence and narcissism are more likely to commit fraud to maintain a positive self-image at the company’s or other individual costs (Watts et. al, 2018). Other studies show that organizational scandals mainly occur because of the pressure/opportunity model. This means that a company commits a corporate scandal because of scarcity or due to blocked access to needed resources which then creates pressure on the company. The illegal action is then perceived as an opportunity to avoid the bottleneck (MacLean, 2007).

One of the biggest challenges when it comes to corporate scandals is finding accountability. It can be very complex to navigate through corporate policies, laws and the reality of the facts. It is important to clarify the criteria used to define and find responsibility for each scandal.

According to Watts et. al (2018) the “Enron and Arthur Andersen” cases set a precedent for assigning responsibilities. The court held the companies responsible arguing that if a corporation could benefit from its employees’ actions, it should also be held responsible for those actions, respectively. This decision allowed prosecutors to apply criminal charges to companies. Thus, with criminal charges the reputational loss is inevitable, and fraudulent or criminal events are typically identified as causing the most severe financial losses (Gatzert, 2015).

Reputation is considered as the primary metric to be used to assess possible negative effects on a corporation's market return in this paper, because reputation is also one of the main motivational drivers of individual investors to access the financial market. There are financial and non-financial aspects of reputation and while financial aspects have a direct impact on financial performances, the non-financial aspects act more indirect and have a major impact in the long-run, constituting the basis of the future of the companies’ performances.

To completely understand the effects of corporate scandal the timing of the disclosure of the corporate scandal must be taken into consideration. If the event occurs during negative market-sentiment years, we should expect a stronger market reaction and consequently a more severe decrease in market returns (Bonini et. al, 2010).

3. Research Methods

Our research methodology is constructed to measure the impact of corporate scandals and the related penalties on the yearly stock return of index constituents of the DAX and the DJI from 2009 until 2019. We chose the DAX and the DJI, by the reason of their similarity of size, as both indices comprise 30 members. In terms of the timeframe we consider 2009 until 2019 as a very good benchmark, because larger crises, such as the world financial crisis in 2008 and the Covid-19 pandemic in 2020 would have heavily influenced and most likely falsified our findings. Additionally, we only considered a 10-year timeframe, as otherwise the acquisition of the data would have heavily exceeded our capabilities. We chose yearly stock returns, as it can be quite complicated and thus not highly accurate to correctly match scandals to their appearance month. The corporate scandals and the related fines have been derived from the database “goodjobsfirst.org”. After extracting the data from the database we ended up with a total of 3542 corporate scandals. Following the extraction, the penalties were matched to their according appearance year. For the yearly stock returns of the constituents we used the Refinitiv Eikon Datastream. Additional variables influencing our models are the GDP, in order to measure economic development, as well as the F&F Momentum, which delivers a good indication, whether scandals have a short-, or long-term impact in certain periods of bad market momentum. The

phenomenon was described in the literature review above. For measuring the impact, we set up three different models.

The first model (Appendix 2) takes all constituents of the DAX and the DJI in the period from 2009 until 2019 into account and divides them into quartiles based on the total number of scandals in the given period. Consequently, four least square regressions, by using the “linest” function in Excel, were performed, one for each quartile. The x-variable represents the number of scandals in each year, whereas the y-variable represents the market return in the given year (average of stock returns in each year for each quartile), with a total number of observations of 600, as both indices in total contain 60 constituents. As a result, we received four betas, one for each quartile (from 2009-2019). As a preliminary result, we expected the betas in quartile number four to be a lot higher, compared to the first quarter, given the higher number of scandals in quartile four.

Model 2 (Appendix 3) pursues a similar approach as Model 1. The only difference is the fragmentation of the quartiles based on the penalty amount, which now corresponds as the independent variable. The y-variable, the sample size and the number of observations remains as in the previous model. Our preliminary assumption in terms of the outcome remains unaffected as well, as we expect the betas of the companies with a substantially higher penalty amount to be larger, than the according betas, based on low-penalty amounts.

For the third model (Appendix 4) we measure the impact of the number of scandals and the according penalty fee amount on market returns in the US (DJI) and Germany (DAX), by adding certain additional variables to the model. The penalty fee amount is computed by the sum of all penalties related to scandals. Besides the number of scandals, the penalty fees and the yearly market return, we included the GDP for the United States and Germany as well as the F&F Momentum Factor in our model. The GDP was selected, as it represents the economic development during the observed period, whereas the F&F momentum reflects the influence of stronger market reactions in times of a negative market-sentiment and therefore, a more severe decrease in market returns (Bonini et. al, 2010). The paper states that scandals can have a higher impact, if they occur in a bad market-momentum period. In order to receive a proper output, the Data Analysis tool in Microsoft Excel was used, where we define the market returns in the observed period as the y-variable. The x-variables on the other hand will be represented by the number of scandals, the penalty amounts, the GDP of the respective country and the F&F Market Momentum. The regression will be run twice. In the first computation we only consider US data, whereas in the second computation we only consider German data. By doing so we receive a number of comparable results, for each country. This helps us to properly evaluate, if there are big discrepancies on the US and the German market. As a preliminary result, we expect the data from the US to be more

significant, as not only the total number of scandals is higher in the US than in Germany, but also the total penalty amount in the US is significantly higher compared to Germany as shown in the table below:

US	Germany
2228 Scandals	1314 Scandals
\$ 54.061.147.918,49	\$ 45.979.573.376,29

Table 1. Comparison between Number of Corporate Scandals and the Penalty Sum in the US and Germany from 2009 to 2019

4. Results

The goal of our first 2 models was to study the relationship between corporate scandals (in the form of the “number of scandals” and “penalty fee amount” variables) and stock market returns directly (with no additional variables). We did so by comparing the betas from the regressions for each quartile and each year (data presented in Appendix 2 and 3) as mentioned in the previous section of the report.

For the first model we considered the number of scandals as the only dependent variable and returns as the independent variable:

$$Returns = \alpha + \beta_1 \text{Number of Scandals} + e$$

Equation 1. Impact of Number of Scandals on Returns

As seen in Appendix 2, Q3 beta was very close to 0, which suggests that corporate scandals carried out by these group of companies had little to no impact on market returns. In this situation, a % change in the number of scandals would not have a significant impact on returns. On the other hand, Q1 beta was negative at -0.13, meaning that a 1% increase in the total number of scandals would result in market returns falling by 0.13%. This suggests that in fact, for a certain group of companies, corporate scandals have a negative impact on market returns when considering no additional variables. Q2 beta was the highest at 0.03, meaning that a 1% increase in the number of scandals would result in a 0.03% increase in returns. Finally, Q4 beta was 0.01, meaning that a 1% increase in the number of scandals would result in a 0.01% increase in returns. The latter two betas revealed something rather unexpected, since they suggest that there is a positive correlation between the number of scandals and market returns. However, note, that this correlation is very small given the close-to-zero (and thus insignificant) betas (0.03 and 0.01 for Q2 and Q4 respectively). The model also hints towards the possibility that for companies with a low number of scandals per year (Q1), the negative impact on returns is more significant. A possible explanation for this might be that returns suffer more from scandals when they are an isolated

occurrence, and not when they are more frequent such as for companies in Q4. If corporate scandals were to be considered in an investment strategy, it could be helpful for the investor to consider the quartile to which the stock under analysis belonged to. In the best-case scenario, the stock is in Q2, Q3 or Q4, where corporate scandals show a slight positive or no relation at all to market returns. However, not only were the betas close to zero (revealing low correlation between total number of scandals and market returns), but also the R^2 of these regressions were no bigger than 10%. Meaning that these conclusions must be taken with precaution, since there are many more variables that impact stock market returns.

Additionally, we performed a similar analysis with a second model using the total penalty fee amount instead of the number of scandals:

$$Returns = \alpha + \beta_1 Penalty Sum + e$$

Equation 2. Impact of Penalty Sum on Returns

We reorganized the companies in quartiles as well, but this time, depending on the amount of cash (in dollars) paid in the form of fees for each scandal. This allows us to further study the impacts of corporate scandals on market returns, by comparing these results to the ones from the first model and conclude whether the frequency (number of scandals) or size (amount of fees paid) of the scandal impacted market returns the most. In the end, our data has shown that overall, the amount of fees paid had little to no impact on returns. As seen in Appendix 3, the betas for all four quartiles were negative but very close to zero, meaning they aren't significant enough for us to extract a significant and reasonable conclusion. However, the average R^2 for the regressions across the 4 quartiles was approximately 22%, which is double the value of the maximum R^2 of the regressions in the first model. This led us to conclude that the small negative correlation obtained from the betas of each quartile might be amplified with a large enough sample size, and that is why we decided to include the "penalty fee amount" variable in our main model.

For our third and primary model our goal was to build up on our findings from the previous models by adding additional variables that also impact market returns:

$$\begin{aligned} \text{Returns} = & \alpha + \beta_1 \text{Number of Scandals} + \beta_2 \text{Penalty Sum} + \beta_3 \text{GDP} \\ & + \beta_4 \text{Momentum Factor} + e \end{aligned}$$

Equation 3. Impact of Number of Scandals, Penalty Fee, GDP and F&F MOM on Market Return

In an attempt to account for the regional difference as well, we decided to separate this model into two versions, one for the DJI (US) and one for the DAX Index (Germany). As expected, both GDP and the Momentum Factor were statistically significant (for a 5% significance level) in explaining market returns (as seen by Appendix 4). As for the other variables, in the German version of the model, the number of scandals presented a beta of -0.03. Meaning that, for a 1% increase on the number of scandals, market returns decrease by 0.03%. Nonetheless, its p-value reveals a lack of significance for the model, since it is higher than 5% and thus allowing us to conclude that we cannot say that its beta is different from zero for a 5% significance level (acceptance of the null hypothesis). The same can be concluded for the penalty fee amount variable in both versions of the model, which further confirms our findings from the second model, i.e. the penalty amount paid from scandals show little to no impact on market returns. However, in the US version of the model, the number of scandals variable was in fact significant for our model, that is, we can say that its coefficient of -0.2 is different from zero for a 5% significance level. Meaning that, for a 1% increase on the number of scandals, market returns decrease by 0.2%, suggesting once more (this time also accounting for other variables affecting the market) that corporate scandals negatively impact returns, and hence, there is a negative correlation between market returns and corporate scandals. Surprisingly, this correlation was only evident in the US market according to our data, and not in the German market. A possible explanation for this is, for instance, the higher corporate exposure to the media in the US in comparison to Europe, especially when a large scandal takes place.

As shown in Appendix 4, for the US version of the model, the adjusted R-squared was 79.9%, implying that the model explains substantially the variation on our dependent variable (returns). Also, its Significance F was 0.7%, highlighting the significance of this model for a 5% significance level, meaning that at least one coefficient is not equal to zero (since the p-value is lower than the significance level). The same cannot be said for the German version of the model, which shows an Adjusted R-squared of 19.5% and a Significance F of 22%. Although it is not uncommon for R-squared values to be lower in finance related models, the discrepancy between the US and German versions of the model was rather unexpected.

5. Critical Reflection

As discussed in chapter four, the analysis undertaken in this paper comes to the result that there is only little impact caused by the disclosure of corporate scandals on market returns of publicly listed companies. However, there are restrictions given in the sample size, which impact the result and must be considered when interpreting the results. In this paper, the impact of scandals in two specific markets was analyzed: the DJI in the US and DAX in Germany. To determine the overall impact of market returns, this could be extended to a global basis. Furthermore, only yearly data was analyzed, and corporate scandals were matched to a specific year instead of a month, which reduced the overall sample size considered in the regression models. To achieve a more accurate result in the future, monthly or even daily data should be considered to also be able to determine the market return before and after a certain corporate scandal is disclosed. The main intention behind the timeframe from 2009 to 2019 was to exclude the drastic effects of - both the financial crisis and COVID-19 Pandemic from the analyses, considering only the yearly periods of economic expansion and high market returns, which in the end buffered the overall effect corporate scandals can have on market returns (as previously stated in the literature review). For further research, to achieve a higher granularity and a more accurate result, a longer time frame including more, and different variables should be considered to additionally determine the long-term as well as short-term effects corporate scandals can have on market returns.

6. Conclusion and Outlook

To answer the research question of this paper on how corporate scandals affect the yearly market returns of publicly listed companies, we can conclude that based on our analysis, there is only little impact of corporate scandals on the market return. However, these results must be interpreted with caution as already explained in chapter four and five. Based on many recent and previous studies, corporate scandal definitely impact the market return on publicly listed companies, however, not to the degree we expected before investigating deeper into this topic. Considering the German and US market and the respective number of corporate scandals and penalty fees it leads to the conclusion that there is no significant negative correlation between the two presented variables. However, this result is due to the limitations given and presented in chapter five. Based on the research conducted by Bonini (2010), there is a strong market reaction when a corporate scandal is disclosed, especially in times of economic downturn. Since our analysis considers the timeframe of 2009 to 2019, leaving out the impact of the major economic crisis in 2008 and the major impact of the Covid-19 pandemic, our results confirms the results presented by the paper of Bonini, since we do not consider a time of economic downturn but a time of high economic growth and thus only a little market reaction is shown in this timeframe when it comes to the disclosure of corporate scandals. Additionally, our investigation showed a higher negative correlation between market returns and corporate scandals in the US than in Germany. This can be explained by the higher level of conservatism and regulations on the US market than in Germany when

it comes to corporate scandals. This also refers to the example of the corporate scandal by “Wirecard” briefly described in the introduction of this paper, where the scandal has spotlighted several gaps in the German financial governance system and increasingly raised attention towards stronger regulations. To conclude, even though our analysis does not explicitly state a strong market reaction related to corporate scandals, we still believe there is a negative correlation, which is confirmed by other conducted researches, such as the paper by Bonini et al. (2010) or Murphy et al. (2009), who showed a decrease in equity after the disclosure of corporate scandals. Our research must be adapted by a longer and more detailed timeframe, giving higher granularity to our models in order to find more accurate results. Furthermore, the short- as well as long-term effect of corporate scandals on market reactions should be analyzed in the future as well, however, it was neglected in this paper given our time and resource constraints. To find a more explicit answer to our research questions it must be investigated whether the disclosure of a corporate scandal only has a short- term effect on the market return, and thus bouncing back to previous levels or if it has a rather long-term effect.

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Appendix 1. Descriptive Statistics for overall Sample Size

This represents a summary of key statistics for the whole sample, including all 60 firms (30 from the DAX and 30 from the DJI) for the periods of 2009 to 2019.

Descriptive Statistics							
	Mean	Std Dev	Min	25%	50%	75%	Max
Returns	0,1514	0,1317	-0,0063	0,0731	0,1138	0,2128	0,4482
Number of Scandals	59,0333	86,8287	0,0000	7,7500	32,5000	67,0000	526,0000
Penalty Fee Amount	1 667 345 355	5 713 017 380	-	9 300 845	91 273 743	553 411 972	32 657 814 509
GDP (Germany)	3 318 961 181 818	203 316 696 065	2 961 527 000 000	3 214 069 000 000	3 313 162 000 000	3 477 335 500 000	3 606 188 000 000
GDP (US)	17 826 472 727 273	1 299 596 074 279	15 950 960 000 000	16 826 675 000 000	17 726 250 000 000	18 718 370 000 000	19 925 430 000 000
Momentum Factor (Germany)	7,5109	20,7867	-49,7800	5,5750	9,2400	16,7250	29,6700
Momentum Factor (US)	-4,3218	28,0531	-83,1600	-0,3950	4,6200	7,3300	20,6400
# Observations	600						

Appendix 2. Coefficient for each Quartile for independent variable “Number of Scandals”

It reports information regarding coefficients for each quartile, with all 4 regressions with just “number of scandals” as the independent variable.

Quartile Analysis (Model 1)				
	Q1	Q2	Q3	Q4
β	-0,13	0,03	0,009	0,01
Average Return	0,1488	0,1487	0,1508	0,1634
# Observations	600			

Appendix 3. Coefficients for each Quartile for independent variable “Penalty Fee”

It reports information regarding coefficients for each quartile, with all 4 regressions with just “penalty fee amount” as the independent variable.

Quartile Analysis (Model 2)				
	Q1	Q2	Q3	Q4
β	-0,0025	-0,0030	-0,0009	-0,0010
Average Return	0,1384	0,1759	0,1956	0,1086
# Observations	600			

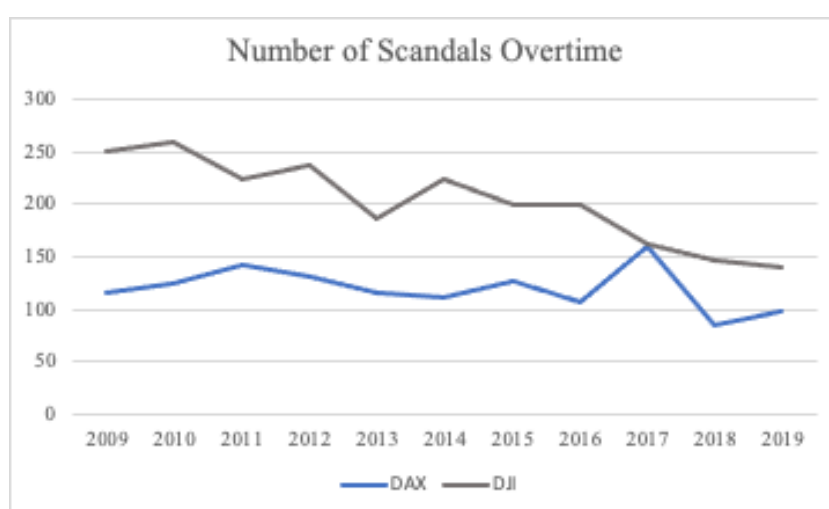
Appendix 4. Regression Output for the Primary Model

This table illustrates the results for the OLS estimation of our third and primary model (which includes the version for Germany and US). They assume a 5% significance level and respective t-stat values are presented in between parenthesis.

	Dependent Variables	
	Returns (Germany)	Returns (US)
Intercept	1,3437 (2,1145)	1,5885 (-1,9987)
# of Scandals	-0,0312 (0,3186)	-0,2227 (3,5881)
Penalty Fee Amount	-0,0039 (0,3279)	0,0004 (1,4286)
GDP	1,2290 (2,3188)	2,5266 (4,1124)
Momentum Factor	-0,1845 (-3,0479)	-0,0031 (-4,8247)
Significance F	0,0071	0,2243
R-squared	0,3798	0,8765
Adjusted R-squared	0,1950	0,7942
# Observations	300	300

Appendix 5. Evolution of the Number of Scandals

Shows the evolution of the number of corporate scandals in Germany and in the US of publicly listed companies (included in the DAX and DJI Indexes) from 2009 to 2019.



Appendix 6. History of Wirecard's stock price

Source: McCrum, D. (2020, June 5). Wirecard: The timeline. Retrieved from: <https://www.ft.com/content/284fb1ad-ddc0-45df-a075-0709b36868db> (accessed on October 26)

