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DISSERTATION

REPUTATIONAL RISK OF BANKS – A STUDY ON THE EFFECTS OF REGULATORY SANCTIONS FOR MAJOR BANKS IN EUROPE

BY DOMINIK LINDER

JULY - 2016

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Abstract

This study analyses the effect of sanction announcements on the stock price of major mainland European Banks, and computes the associated reputational effects. In order to analyse the effects, an event study is performed where the cumulative abnormal return (CAR) is tested on its significance of being different from zero. Thereby, the situations where: (1) The impact of fine on the stock price is not considered, and; (2) the financial impact is considered are differentiated. In the first situation the abnormal loss around sanction announcements is computed while in the latter situation, the effect on the stock price is a proxy for the reputational effect of the sanction. This study conducts a classical event study methodology, using the Single Index Model (SIM) as the expected return model, and the Stoxx Europe Banks Index (ESTXX) for underlying the OLS regression. Using the CAR as a measure of the effect on the stock price, the results provide no evidence of a significant effect of a sanction announcement on the stock price of a bank. Moreover, the results are robust when dividing into subsamples, and when analysing different periods. In light of the results, the study concludes that there is no significant measurable effect at the time of the announcement of a sanction.

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Abbreviations

AAR	Average Abnormal Returns
AR	Abnormal Returns
BBVA	Banco Bilbao Vizcaya Argentaria
BNP	Banque Nationale de Paris Paribas
CAAR	Cumulative Average Abnormal Returns
CAR	Cumulative Abnormal Returns
ESTXX	Stoxx Europe Banks
ESTXX 600	Stoxx Europe 600 Banks
EU	European Union
EUR	Euro
FSA	Financial Supervisory Authority
ING	International Netherlands Group
LIBOR	London Interbank Offered Rate
MEH	Market Efficiency Hypothesis
pp	Percentage Points
SEC	Security and Exchange Commission
SIM	Single Index Model
UBS	Union Bank of Switzerland
UK	United Kingdom
US	United States of America

1. Introduction

"A company's reputation is a vital asset in building stakeholder trust; a resource that, given the risk of public scandal threatening every enterprise in today's information society, is nothing less than existential." (Forstmoser & Herger, 2006, p.1)

As a result of the financial crisis, the banking sector substantially lost its reputation within society, as vast amounts of money were spent to guarantee the stability of the banking system. Especially in Europe, people find it increasingly unfair that banks have been bailed out using public money, whilst at the same time social welfare programmes have been cut. Nowadays, numerous scandals, such as the manipulating of the London Interbank Offered Rate (LIBOR), or the support of tax evasion, exacerbate the view of banks as being greedy, and that they pursue maximal profits as their top priority, no matter what it takes. Consequently, the reputation of the banking sector suffers. This is especially problematic, as Walter (2013) argues, in that having a good reputation is more vital for the financial service sector than for other sectors. The reason is the special character of financial services, namely the fact that they deal with other people´s money. Ruiz et al. (2014) argue that a bank's reputation is determined by numerous existent, but hardly quantifiable factors, such as reliability, social strength, the satisfaction level of customers, and trust or integrity. Especially, a bank's trust and integrity is affected if it is penalised by a regulatory sanction, and thus the reputation of a bank suffers. The sanction is a response of a regulatory institution to the commitment of a wrongdoing by the bank, which is often fraudulent. Consequently, fraud triggers reputational risk. Nevertheless, nowadays many people get the feeling that fraud seems to be the rule, rather than an exception in the banking area: rigging reference rates, circumvention of sanctions, or helping customers to evade taxes are only the most well-known examples. Some fraudulent actions trigger tremendous fine, such as, for instance, a sentence of 725 million Euros (EUR) for Deutsche Bank for rigging the

LIBOR, or 553 million EUR for helping Americans evade taxes, using Swiss accounts (Rhodes and Wolde, 2010; Foo, 2013).

Although the monetary fine is sometimes extremely high, it is just one component of the sanction. The second component is the reputational loss associated with a monetary fine. The latter can easily exceed the pure monetary fine. Karpoff and Lott (1993) explain that the sum of the court imposed fines and other charges represent only 1.4% of the total loss due to the fraud committed. Similarly, Armour et al. (2015) find that for banks headquartered in the United Kingdom (UK), reputational loss was, on average, nine times higher than the monetary fine itself.

Given the importance of the topic, it is crucial to investigate the reputational effects in more detail. However, the overall reputational effect, especially over a long period, is difficult to quantify, as the longer the period under investigation, the higher the likelihood of it having confounding effects. Thus, the present study focusses only on the period before the announcement and the immediate effect when banks are sanctioned. Reputational effect is measured via the abnormal stock return of the banks at the time of the announcement of the sanction. This approach makes sense, insofar as the abnormal stock price reaction and corresponding change in the bank´s market value can be directly attributed to the announcement of the fine. Besides, the measurement of the stock price reaction, and several model specifications for variables that affect the strength of the reputational damage are introduced. Such variables are the aggrieved party of the fraud, and the type of fraud itself.

The remaining sections are structured as follows. Section 2 reviews the theory about corporate fraud, presents two possibilities for defining the categories of fraud, provides a concept for finding optimal sanctions, and combines fraud and corporate reputation with the concept of reputational risk. In Section 3, the research hypotheses are presented. Section 4 presents the data, reviews the event study methodology, and describes the expected return

model. In Section 5, the results are summarised, and a robustness test is conducted. Section 6 discusses the results, while the final section concludes.

2. Theory and Prior Literature

2.1. Corporate Fraud

Fraud, which is defined as being "the use of one's occupation for personal enrichment through the deliberate misuse or misapplication of the employing organisation's resources or assets" (Association of Certified Fraud Examiners, 2014), came into the spotlight with the big scandals of the early 2000s. Enron, or WorldCom, are the most famous examples from the United States of America (US), and Parmalat within the European Union (EU). However, these scandals are just the tip of the iceberg. Dyck et al. (2013) estimate the number of firms engaging in fraud over all sectors[1] to be approximately 14.5%. This is stunning, since this percentage only includes important frauds of three types: misrepresentations, concealment, and nondisclosure. As fraud can occur in several ways, a precise definition which is applicable to every kind of fraud is not available.

For this study, the exact definition of fraud is not greatly important, as the legal basis for the fine itself is not questioned. Important is the existence of a sanction, and therefore all penalizing actions in this study are labelled as either fraud, or as a wrongdoing. Hence, fraud is used as a collective term for all non-law-compliant, pursuable, and already penalised actions committed by an individual or a group of individuals within a company, or its subsidiaries. It means that it is assumed that - since there are only penalised actions in our sample of regulatory sanctions - all fines have a legal foundation and that there was a wrongdoing on the side of the bank that was prosecuted. The types of fraud considered are,

[1] The number presented is for the US.

for example: the support of tax evasion, the circumvention of sanctions, or a lack of internal control mechanisms.

2.2. Categories of Fraud

The categorisation of fraud is usually conducted along two dimensions: the aggrieved party of the fraud, and the type of fraud itself.

The first possibility for grouping frauds is the separation between the aggrieved or affected parties of the fraud. This study follows the aggrieved party approach developed by Armour et al. (2015). Accordingly, the two types of aggrieved parties that can be harmed by fraudulent actions of banks are separated. First, there are the customers and investors of the banks who can be victims of the fraud. These are consolidated in one group, and are labelled as second parties. Examples of fraud against second parties are the mis-selling of products, or the distribution of misleading guidance for customers. The second type of aggrieved parties are those that do not have a contractual relationship with the bank, yet are also hurt by its fraudulent actions. Examples are states or countries in the case of non-compliance with sanctions, or the support of tax fraud. For the present study, the approach of Armour et al. (2015) is applied, in order to separate the frauds. All cases for which more than one aggrieved party is indicated, or the aggrieved party is non-detectable, are summarised in a third group, named “unclear”. An overview of the number of single cases in each category can be found in Appendix A.1.

The second possibility is to categorise by the type of fraud. This approach is developed by Dyck et al. (2009), and they define four categories of fraud: (1) self-dealing; (2) failure of disclosure; (3) financial misrepresentation, and; (4) non-accounting-related illegal activity. However, this kind of separation is not optimal for this study. It is found that a difficulty arises when differentiating between categories (2) and (3), as they often go hand in hand. Thus, the categories of “failure of disclosure” (2) and “financial misrepresentation” (3) are

summarised within category (2) - "failure of disclosure & financial misrepresentation". Furthermore, since the sample for the present study does not focus on a differentiation between accounting and non-accounting-related illegal activities, the approach of Dyck et al. (2009) is adapted, insofar as all cases that cannot be attributed to either category (1) or (2) are categorised in Section (3) - "others". Cases for which it is unclear which category is to be applied when several violations are penalised are removed.

Regardless of the aggrieved party, or the type of fraud, a fraudulent action is followed by a criminal sanction if the fraud is detected and is considered to be severe enough by the authorities to be fined. However, there is no clear rule about the extent of the fine.

2.3. Optimal Sanctions

If a fine is imposed, then it is critical for the regulators to find the optimal volume of the fine, i.e. the fine should neither be too low, nor too high. In the first case, there is an incentive to further commit fraud and to accept the associated fine and not change behaviour, and in the latter, the company may face bankruptcy, or at least financial distress. Karpoff and Lott (1993) state that for an optimal penalty, the fine should be equal to the total social costs of the crime. However, it is found that the monetary part of the fine only represents a fraction of the total social costs (Karpoff and Lott, 1993). Karpoff and Lott's results show that the monetary fine only represents one part of the total fine, and that it comes simultaneously with a reputational loss of the penalised banking institution. Karpoff and Lott (1993) find that the sum of court-imposed fines and other charges represent only 1.4% of the total loss due to the commitment of a fraud measured by its effect on the company´s market value. Similarly, Armour et al. (2015) find that for banks headquartered in the UK, the reputational loss is on average nine times higher than the pure monetary fine. The result shows that committing a fraud damages the relation between the bank and its stakeholders, and therefore it adversely affects the bank´s reputation. For example, future

business opportunities disappear, due to customers' preferences to buy products from competitors, or because permissions are revoked by officials. This is the so-called "reputational risk" that companies in general, and banks in particular face.

2.4. Corporate Reputation

Reputation is a brand image that can be seen as the "picture in one's head", which is created when thinking about a product or a company (Lippmann, 1922). The reputation of a corporate entity is becoming increasingly important, especially in the financial service sector, as financial services have a special character (Walter, 2013). It is argued that, since they deal with other people´s money, that there is a higher awareness of the customers involved. Simultaneously, problems in the banking sector easily spread to the whole economy, which encourages officials to be more conscious about them. Hence, it is more crucial to maintain a high reputation in the banking sector, than in other sectors. A lack in reputation leads to, for example, more difficulties when hiring qualified staff, lower customer loyalty, and, due to worse market perceptions, the cost of debt increases, and the market value decreases (Eccles, 2007; Roberts & Dowling, 2002). However, for the purpose of this study, reputation is defined from a second perspective, which is the so-called "accountancy perspective". In the accountancy perspective, reputation is a measurable part of a company´s value (Fombrun and van Riel, 1997). This perspective is necessary, as the effect of being fined is quantified by measuring the difference in market value before and after the announcement of a fine. Both definitions provide the basis for the risk associated with a bank´s reputation, the so-called "reputational risk".

2.5. Reputational Risk

The Basel Committee on Banking Supervision defines reputational risk as being "the risk arising from negative perception on the part of customers, counterparties, shareholders,

investors, debt-holders, market analysts, or other relevant parties or regulators that can adversely affect a bank's ability to maintain existing, or establish new, business relationships and continued access to sources of funding" (Basel Comitee on Banking Supervision, 2009; p. 19). Karpoff & Lott (1993) argue that, besides the monetary component of a sanction, there is also an associated reputational effect. Therefore, the amount of the fine is only an indicator of the strength of a fine, but not a proxy for the total cost. Reputational loss can far exceed the pure monetary loss. Thus, it is sufficient to fine a corporate fraud by a relatively low monetary penalty, as the reputational loss triggered by the fine is already large. Karpoff & Lott (1993) find that the cost of fines and other charges imposed by the court is only 1.4% of the total loss due to the commitment of fraud. If the result is true, then there needs to be a second way of sanctioning, in addition to the court-imposed fines and charges. This is the decrease in the market value of a bank at the time of the announcement of a fine, which exceeds the decrease due to the pure negative impact of the fine. The difference between the total decrease and the decrease due to the impact of the fine can be attributed to the reputational loss. Thereby, reputational loss is measured by the abnormal rate of return of the stock price at the date of the event. The approach is based on Fama et al. (1969), who use the same approach to investigate the effect of the announcement of stock splits and dividends on stock prices. Similarly, Peltzman & Jarrell (1985) investigate the effect of recalls in the automobile and drug sector on the stock price. Karpoff & Lott (1993) analyse the effect of committing fraud on the stock price in the US. It is found that committing fraud leads to a significantly negative effect on the stock price on firms, which exceeds the pure financial effect of the fine, and thus conclude that a reputational risk exists.

3. Research Hypotheses

The goal of this study is to investigate whether an abnormal stock price reaction and a reputational effect is associated with the announcement of a criminal sanction for major European Banks.

A common observation from the stock market, is that the stock price reacts to new information. In the moment, a new and important information about a listed company is revealed to the public, the corresponding stock price reacts positive or negative. The adjustment of stock prices to new information was first studied by Fama et al. (1969), using the example of stock split and dividend announcements on the stock price. Their work was the basis for further research. Peltzman & Jarrell (1985) investigate the effect of product recalls on stock prices, and Fiordelisi et al. (2014) analyse the effect of the announcement of operational losses on stock prices. Furthermore, Karpoff & Lott (1993) investigate the effect of committing fraud on the stock price, while Armour et al. (2015) conduct a study in which they focus on fraud committed in the UK´s banking sector. Both find a negative reaction of the stock price to sanction announcements. Sanction announcements are new and important information, which are revealed to the market, and are consequently the stock price adjusts. The first reason is the monetary fine and additional compensation payments associated with the sanction. Thus, money leaves the bank, which has a negative impact on the market value, and thus on the stock price. The second reason is the reputational risk associated with the sanction described in Section 2.5. Accordingly, there should be an abnormal loss in the stock price at the date when a sanction is announced. The following hypothesis summarises the reasoning:

> H1: Abnormal losses do exist from sanctions announcements in the banking sector.

The existence of abnormal losses, as described in Hypothesis H1, can be due to two different effects, such as the financial impact of the fine itself and reputational risk. The financial impact of the fine occurs as the market value decreases as money leaves the bank when paying the fine. The reputational component is less clear. A sanction reduces the reputation of a company, such as the implicit or explicit commitment of a wrongdoing and its revelation to the public. Simultaneously, Walter (2013) argues that reputation is a vital asset for a bank, and that it partly accounts for its market value. As a sanction reduces the reputation of a bank and as reputation accounts for a part of the market value of a company, the stock price should decrease when a sanction is announced (Armour et al., 2015; Karpoff & Lott, 1993). In other words: the effect on the stock price, from Hypothesis H1 is corrected with the impact of the fine itself, in order to find the reputational effect. The aforementioned reasoning is summarised in the following hypothesis:

> H2: Reputational losses, measured as the abnormal loss corrected for the impact of the fine, are related to sanction announcements.

The next two hypotheses deal with the different categories of fraud described in Section 2.2. Hypothesis H3 introduces a relationship between the strength of the reputational damage, and the aggrieved party of the fraud. Frauds affecting second parties, i.e. on shareholders or customers who are harmed by the wrongdoing, trigger higher losses, as they directly harm trading partners (Armour et al., 2015). If, for example, misleading guidance is offered to customers, then the effect should be higher than that for tax evasion, where “only” the State is harmed. The reason for this is that frauds against second parties directly affect investment decisions by investors, or customer decisions. In contrast, frauds against third parties only have an indirect effect on customers and investors alike, and thus they are less likely to have a significant negative effect. Consequently, shareholders value the strength of a

wrongdoing differently, depending on the aggrieved party. Hypothesis H3 summarises the reasoning.

> H3: Wrongdoings committed against second parties trigger a higher reputational loss than wrongdoings committed against third parties.

Hypothesis H4 introduces a relationship between the strength of the reputational damage, and the type of fraud committed. Self-dealing activities, such as price fixing, inside trading, or forming an illegal cartel are all seen to be more severe by the broader public than a failure to submit accurate data, or a failure in reporting (Dyck et al., 2009). Self-dealing activities imply an intention to do something wrong, and the awareness of doing something incorrect is given. In the case of failure of disclosure and financial misrepresentation, intention and awareness is not necessarily implied, and hence this is seen as being less severe.

> H4: Wrongdoings arising from self-dealing, trigger a higher reputational loss than wrongdoings from the failure of disclosure and financial misrepresentation.

4. Data and Methodology

4.1. Sample of Frauds

The ideal sample for evaluating the reputational losses arising from the criminal sanctions of European banks would include all frauds committed by all banks in Europe (Dyck et al., 2009). However, including all the sanctions of every bank in Europe would lead to an impracticably high number of incidents. Therefore, the sampling is restricted in three ways.

First, only the major banks in Europe[2] are included, in particular the Top 25 banks in terms of assets. Second, four Banks headquartered in the UK are disregarded, as the study focusses solely on mainland European banks. This parameter was chosen, as Armour et al. (2015) have already conducted a comparable study for the UK. Third, four more banks were discarded, as they are not listed on the Stock Exchange, and thus the development of the stock price cannot be computed as a way of assessing reputational effect.

For the remaining 17 banks, press releases using the search term "bank name" and "fine" for the period of the 1st of January 2009 until the 31st of December 2015 were hand collected from the Lexis-Nexis database. Thereby, only penalised frauds with a fine larger than 100.000 EUR are included. The threshold was chosen, as it is not practicable to include a large amount of small fines. The dataset is complemented by fine announcements listed in the 'regulatory issues' section of the Thomson Reuters Investor Brief. An additional eleven cases were found that match the selection criteria mentioned above, and thus they were added to the sample. The combined dataset consists of 89 cases. From the sample, seven cases were removed, due to conflicting news in press right before the announcement of the fine. The final sample consists of 82 wrongdoings committed by eleven banks[3, 4].

Within the sample, the highest number of sanctions were applied to the Swiss Union Bank of Switzerland (UBS), accounting for 16 cases. In contrast, the French Society General Bank was only sanctioned once. The highest fine imposed by US officials was almost 8 billion (bn) EUR, on BNP Paribas, for violating the Iran embargo. The highest fine imposed by EU officials was 725m EUR on Deutsche Bank, for forming an illegal cartel to manipulate reference rates.

[2] Please note that European in this case does not imply being a member of the European Union.
[3] An overview presenting all banks included in the study can be found in Appendix A.2.
[4] An overview of all variables from this study and their respective sources can be found in Appendix A.3.

The summary statistics for the fine amounts, including compensation payments are presented in Table I.

Table I: Five Number Summary of Fines, including Compensation	
Minimum	160,150 €
Lower Quartile (25%)	3,216,000 €
Median	11,500,000 €
Upper Quartile (75%)	85,133,000 €
Maximum	7,930,497,000 €
Table I summarizes the fine amounts of all 82 included sanction announcements in a five number summary.	

As can be seen from Table I, the maximum value of a single fine is quite high. Therefore, a robust method for countering the problem of outliers is applied, as described in Section 4.3.

4.2. Empirical Method

4.2.1. Event Study

This study uses an event study to investigate the effect of sanctions on banks' reputations. An event study is an empirical analyisis of the impact of a certain occurrence on the stock price of the involved parties, such as filing bankruptcy, or announcing a merger. The concept underlying an event study is the Market Efficiency Hypothesis (MEH). Accordingly, the MEH in its semi-strong form is applied, i.e. all public information is considered in order to determine a stock's current share price (Dimson and Mussavian, 1998).

The classical event study methodology introduced by Fama et al. (1969) is presented later on in the section. For a more detailed overview, see, for example, MacKinlay (1997) or

Kothari and Warner (2007), and in particular, Brown and Warner (1985), who use daily stock returns.

First, the event of interest is defined, which, in this study is the announcement of a regulatory sanction, then for the day of the announcement, the abnormal return (AR) is computed.

$AR_{i,t}$ is calculated by subtracting the expected return, computed using a forecasting procedure, which assumes no interference, and the actual ex post return for the stock prices. Equation (1) states the relationship mathematically:

$$AR_{i,t} = R_{i,t} - \hat{R}_{i,t}\,, \tag{1}$$

where $R_{i,t}$ is the logarithmic stock return of bank i at time t, and $\hat{R}_{i,t}$ is the forecasted logarithmic stock return, respectively. The logarithmic stock return, $R_{i,t}$, is computed via

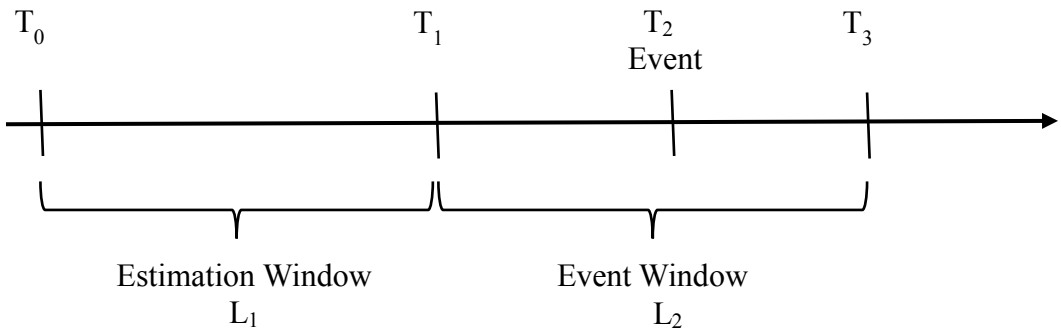
$$R_{i,t} = \ln(\frac{P_{i,t}}{P_{i,t-1}}) \tag{2}$$

where $P_{i,t}$ is the stock price of stock i at time t. In order to forecast $\hat{R}_{i,t}$, the forecasting procedure elaborated in section 4.2 is performed. As the AR is only a one day return, there is the problem of having adjustments before or after the day of the announcemnts. One example in which such adjustments are likely, is the leakage of information into the market before the fine is officially made public. Therefore, the ARs of one company for one sancion are summed over the so-called event window, from T_1 until T_3, which provides the CAR, which is matheamtically expressed as:

$$CAR(T_1, T_3) = \sum_{T_1}^{T_3} AR_t. \tag{3}$$

The timeline of an event window can be found in Figure 1, which shows the main dates and timespans of an event study.

Figure 1: Timeline of an Event Study (adopted from Mc Kinlay (1997))



The CAR, computed over the event window L_2, is the variable which is tested in order to determine the exsitence of abnormal effects. In order to guarantee the significance of observed effects, the CARs are tested on the null hypothesis of the CARs being equal to zero, i.e. there is no abnormal effect over the event window observed. If the null hypothesis is rejected, then this implies that there is evidence for abnormal effects, and therefore an abnormal or reputational effect can be assumed. If there is no indication that the CAR is different from zero, then the hypothesis of an abnormal loss and hence a reputational damage due to the announcement is rejected. The applied hypothesis tests, the standard t-test, and the Wilcoxon Test, are presented below in Section 4.3.

Besides, the cumulative average abnormal return (CAAR) is computed for descriptive reasons. The CAAR is computed by:

$$CAAR = \frac{\sum_i^N CAR_t}{N}, \tag{4}$$

where N is the number of firms for which sanctions are revealed at day t. The CAAR indicates how the CAR develops over time by revealing the distribution of the AR over the event window and presents possible adaptation processess when approaching the event day.

4.2.2. Expected Return Model

The necessary data to compute $R_{i,t}$ from Section 4.2.1. is easily available, using daily stock closing prices provided by, for instance, Datastream. However, the challenge is to compute the forecast of $\hat{R}_{i,t}$, which is a consistent estimator for the behaviour of $R_{i,t}$, if there is no fine announcement. The literature provides a standard option to compute expected returns, the so-called Market Model. Thereby, firm-specific abnormal returns are specified that separate the general development of banking-related stocks from the specific stock price development of the penalised firm. The SIM is used to compute the expected returns in the subsequent sections of the present study.

The SIM, as a form of market model, is applied to provide estimates for the expected returns $\hat{R}_{i,t}$, by introducing a linear relationship between the stock return and a market index, i.e. that the stock has a co-movement with the index (Elton et al., 2010).

The mathematical expression is:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + e_{i,t}\,, \tag{5}$$

where:

$R_{i,t}$ = the logarithmic stock return of firm i on day t

α_i = the component of security i's stock return that is independent of the market performance (intercept)

β_i = constant that measures the effect of $R_{m,t}$ on $R_{i,t}$ (systematic risk)

$R_{m,t}$ = return of the market index

$e_{i,t}$ = random error, $E(\epsilon_{i,t}) = 0$ and $SD(\epsilon_{i,t}) = 1$.

The coefficients α_i and β_i are estimates from an ordinary least squares regression of $R_{i,t}$ on $R_{m,t}$, using the period estimation window L_1. In other words, L_1 covers the period from the first day of the estimation window until the last day of the estimation window, which ends

one day before the first day of the event window. The setting is chosen, as the expected abnormal effect during the event window does not bias the analysis. $R_{m,t}$ is the reference index ESTXX, which is one of the leading European banking indices. It consists of 30 European banking stocks, and satisfies the requirement of being correlated with the stock prices of the single banks. After computing the CAR for the event period, the significance of the observed results needs to be assessed. In order to analyse the CAR, a parametric and a non-parametric hypothesis test is performed which is described in the following section – Section 4.3.

4.3. Hypothesis Testing

The null hypotheses, H_0, which is tested in order to determine the existence of abnormal effects and reputational losses due the announcement of regulatory sanctions is as follows:

H_{null}: CAR is equal to zero

$H_{alternative}$: CAR is not equal to zero

If the null hypothesis is rejected, the CAR is not equal to zero, and thus there is evidence for abnormal effects. Simultaneously, a reputational effect can be assumed if the CAR is still not equal to zero, after correcting for the effect of the fine. However, if there is no indication that the CAR is different from zero, then the hypothesis of reputational damage due to the announcemnt of a fine is rejected. In order to test the abovementioned hypothesis, the classical t-test is performed. The t-test is the standard option provided by the literature, due to its simplicity.

T-Test Statistic

The test statistic of the t-test for the AR (single time points) is computed by:

$$t_{AR_{i,t}} = \frac{AR_{i,t}}{SD_{AR_{i,t}}}, \tag{6}$$

where $SD_{AR_{i,t}}$ is the standard devation of the abnormal returns for the estimation window. Thereby the $SD_{AR_{i,t}}$ is computed by:

$$SD^2_{AR_i} = \frac{1}{M_i - 2} \sum_{t=T_1}^{T_3} (AR_{i,t})^2, \tag{7}$$

where M_i is the number of non-missing returns. Likewise, for the CAR, the test statistic is:

$$t_{CAR_{i,t}} = \frac{CAR_{i,t}}{SD_{CAR_{i,t}}} \tag{8}$$

with a standard deviation of:

$$SD^2_{CAR_i} = L_2 SD^2_{AR_i} \tag{9}$$

where L_2 is the length of the event window. The problem about solely using the parametric t-test statistics is that it is not robust to outliers. Moreover, Fama and French (1993) argue that in the case of daily data, fat tails can be expected when conducting an event study. Therefore, the assumption of a normal or t distribution as underlying is doubtful. To satisfy the fat tails and the outlier problematic, an additional non-parametric testing procedure is carried out, the so-called Wilcoxon-Test Statistic.

Wilcoxon-Test Statistic

The Wilcoxon Rank Sum Test is an extension to the classical generalised sign test, which additionally considers the magnitude of the abnormal return. The general test statistic is computed by:

$$z_{wilcoxon,t} = \frac{W_t - N(N-1)/4}{\sqrt{\left(\frac{N(N+1)(2N+1)}{12}\right)}}, \tag{10}$$

where N is the number of observations in the sample, and W_t is the sum of positive ranks of the absolute value of abnormal returns:

$$W_t = \sum_{i=1}^{N} rank(AR_{i,t})^+ \tag{11}$$

5. Results and Robustness Check

5.1. Abnormal Returns

The financial consequences for the banks involved were severe: The average fine, including compensation associated with conducting the fraud, was 257m EUR. The amount represents on average 0.66% of the firms' market value at the day of the announcement of the fine. However, this huge value is partly driven by several outliers. The highest fine, of almost 8bn EUR, is more than three times the amount of the second highest fine, and is more than 800 times the median penalty, which is about 11.5m EUR. The median penalty is only equal to 0.02% of the banks' market value.

Table II reports the CARs and the corresponding test statistics for the complete sample over the indicated event windows, while neglecting the impact of the fine. The estimation window started 120 days before the first day of the event window, and it ended one day before the first day of the event window. From the total of 82 cases, 40 stocks show an immediate negative reaction on the day of the announcement, and 42 a positive reaction. As can be seen in row one of Table II, the average immediate stock reaction is positive at a rate of 0.17% when considering just the day of the announcement.

Table II: CAR for selected Event Windows

	(1)	(2)	(3)
Event window	CAR (%)	t-Statistic	z-Statistic
(0/0)	0.17	0.90	0.75
(-55/5)[5]	-0.29	0.46	0.51

Table II summarizes the CAR for the complete sample for the single event day and an event window of length 61 days, while using an estimation window of 120 days..

As mentioned in Section 4.2.1, there may be a leakage of information into the market before the official announcement, and thus the full impact is not reflected instantaneously in the

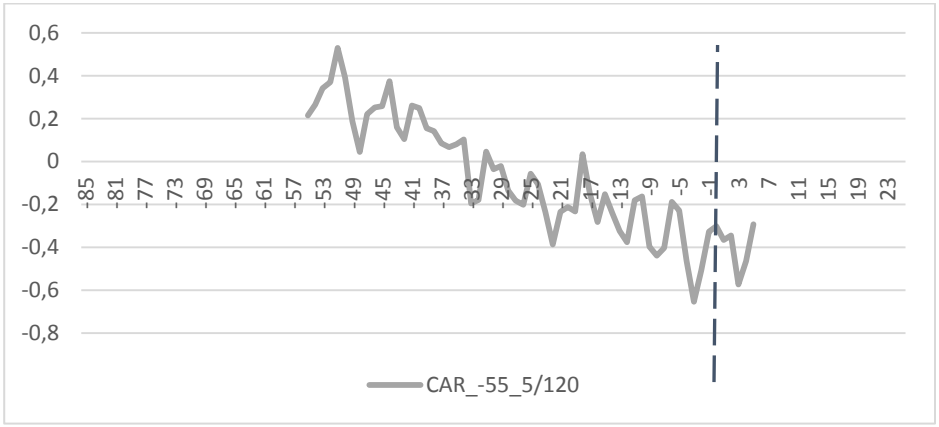
[5] (-55/5) means an event window of length 61, starting 55 days before the announcement of the fine, and ending 5 days after it.

stock price on the event day. The announcement presents just one stage of the adjustment process, and consequently it needs to be extended to several days. Prior to this stage, there are for example, the announcement of investigations, or the opening of a trial. Therefore, it is logical to assume that the loss associated with the wrongdoing occurs in the period before, rather than after the announcement[6]. Thus, the study focusses on an event window duration of sixty-one days, following Karpoff and Lott (1993). However, rather than using the 61 days symmetrically around the event day, a longer pre-event time period is chosen, by using 55 days before, and only five days after the announcement. As a first analysis, a relatively long event window is chosen to capture the majority of the adaptation process and to account for an overreaction of the markets before and after the announcement. The results can be observed in Row Two of Table II. Using the event window specification (-55/5), a negative CAR of -0.29% is found (median: -1.70%). The development of the CAAR, which presents the distribution of abnormal effects over the event window (-55/5) can be found in Figure 2.

[6] The VW scandal is an example of such an adaptation process. Up until now, no fine has been announced, but the stock price suffered heavily when the first announcements and official statements were made.

The horizontal axis represents the days relative to the event day (dashed line) in days, and the vertical axis presents the CAAR in percent.

Figure 2: CAAR for Event Window of size 61 days



The CAAR starts at around 0.2%, and reaches its absolute peak at day -52 relative to the event day. Up until day -33, the CAAR stays positive, but the development is negative. On day -33, the first negative CAAR is observed. Besides two slightly positive CAARs observed on day -31 and day -18, all remaining CAARs are negative. The highest negative CAAR can be observed between days -6 and -3, relative to the event window. The fall amounts to more than 0.4 percentage points (pp) from -0.2% to -0.6%.

Overall, there is a negative trend for the CAAR during the event window. However, only the overall effect for the CAAR is negative, as some single days having positive ARs. In order to verify the intuition that there exists an abnormal negative return, the Wilcoxon Ranks Sum and the t-Test are performed. The results are presented in Column Three and Four of Table II. For the one-day and 61 days' event window, neither the t-statistic, nor the z-statistic indicate a statistically significant deviation of the CAR from zero. The one-day t-statistic is 0.90, and the z-statistic is 0.75, while the values for the 61 days event window are 0.46 and 0.51. Therefore, H1 is rejected, as there is no significant effect, which indicates the existence of abnormal losses arising from the announcement of sanctions.

As the goal of this study is to assess the existence of reputational losses, solely using CARs is not sufficient. With each fine, there is a monetary loss, which is associated with the financial component of the fine itself, which needs to be considered when analysing abnormal returns. This is crucial, as the fine itself has an effect on the market value of the company, which the CAR does not account for. Up until now, research had only been carried out to see whether announcement of a fine has a significant effect on stock price. In the following section, the reputational effect is explored.

5.2. Reputational Effects

The reputational effect is assessed by using the "residual approach" developed by Peltzman and Jarrell (1985) and Karpoff and Lott (1993). In this approach, the reputational loss is a function of the change in the market value over the event period ΔMV, minus the amount of the fine and compensation payments, F. This can be written as:

$$Repuational\ Loss = \Delta MV - F \tag{13}$$

where ΔMV is usually calculated as being the change in market value over the event period, $MV_{T3} - MV_{T1}$. However, in this study, the real changes in market value are neglected, as the interest is to determine the abnormal effects associated with the change in market value. Therefore, the research is not focussed on the ΔMV in absolute terms, but rather the CAR is now used as a proxy. Consequently, the fine F, is presented as a percentage of the market value of the company. Subtracting the fine as a percentage of the market value from the CAR yields the residual that represents the reputational loss. Using the model described above ensures that the reputational effect is independent from the impact of the fine itself. The results are presented in Table III. The results for the reputational effects for the complete sample, dealing with Hypothesis Two, are presented in Table III, Column One.

Columns Two and Three break down the reputational effects into two second and third parties, thus addressing Hypothesis H3[7].

Table III: Separation due to Aggrieved Party

	(1) Total	(2) Second Party	(3) Third Party
CAR (%)	-0.29	-0.87	-0.54
Fine (%)	0.66	0.11	0.78
Reputational Loss (%)	0.37	-0.76	0.24
t (t-Stat)	0.46	-0.64	0.19
z (Wilcoxon)	0.51	-0.76	0.30
No. Observations	82	33	36

Table III summarizes the CAR and the fine as a percentage of the market value of the bank for different types of aggrieved parties over the event window of length 60 days. Outweighing the CAR with the fine amount yields the reputational loss a bank suffers from the sanction`s announcement.

After assessing the reputational loss for the complete sample (Hypothesis H2), it is found that the CAR increases from -0.29% (before) to 0.37% (after considering the impact of the fine), and even changes sign. Consequently, on average, there is a positive reaction of the stock price when a fine is announced, and the financial impact of the fine is considered. Analysing the corresponding t and z-statistic shows that there is no significant effect which indicates a reputational loss. Thus, one can draw the conclusion that there is no evidence for reputational losses across the sample, and therefore Hypothesis H2 is rejected, too.

Turning to Hypothesis H3, one can see that the CAR for wrongdoings against second parties is higher than the CAR for wrongdoings against third parties. At the same time, the fines are substantially higher for the latter (0.11% vs. 0.78%). Correcting the CAR for the effect of the fine reveals that wrongdoings against second parties trigger a negative reaction

[7] An overview of the sample sizes of the subsamples grouped by the aggrieved party and along the types of fraud can be found in Appendix A.1.

of -0.76%. In contrast, the assumed reputational loss for wrongdoings against third parties is not a loss, but a gain, as the effect is positive at a rate of 0.24%. Testing the reputational losses and gains of their significance indicates that there is no evidence for significance at a 1%, 5%, or 10% level. Consequently, Hypothesis H3 is rejected, too. Nevertheless, the results support the basic intuition that reputational losses for wrongdoings against second parties are higher than for wrongdoings against third parties, but that there is no statistical significance.

Table IV presents the results regarding the separation by the type of fraud, addressing Hypothesis H4.

Table IV: Separation by the Type of Fraud

	(1) Self dealing	(2) Failure of disclosure & financial misrepresentation	(3) Other
CAR (%)	-0.42	-0.14	-0.85
Fine (%)	0.41	0.01	1.11
Reputational Loss (%)	-0.01	-0.13	0.26
t (t-Stat)	-0.01	0.09	0.20
z (Wilcoxon)	0.11	-0.03	0.36
No. Observations	38	14	25

Table IV summarizes the CAR and the fine as a percentage of the market value of the bank for different types of fraud over the event window of length 60 days. Outweighing the CAR with the fine amount yields the reputational loss a bank suffers from the sanction`s announcement.

When analysing the CAR, one can see that the highest negative CAR reaction occurs for wrongdoings of type “other”, followed by “self-dealing”, and lastly “failure of disclosure & financial misrepresentation”. Despite the high negative CAR for wrongdoings listed under the section “other”, reputational effects become positive, as the group “other” incurs by far the highest fines. For the groups “self dealing” and “failure of disclosure & financial misrepresentation”, reputational loss is slightly negative. However, none of the three reputational losses provide statistical evidence for being different from zero, neither on a

parametric nor on a non-parametric basis. Furthermore, the order, originally proposed by Hypothesis H4, is not supported by the results, and thus Hypothesis H4 is rejected, too.

5.3. Robustness Check

In order to guarantee the robustness of the results presented in Sections 5.1 and 5.2, several robustness checks are performed. The goal is to verify the results, by using different set ups, such as applying a different length of the estimation and event window, or using a different market index when forecasting the predicted returns.

First, the event window is changed, as there is great uncertainty in the literature about choosing the "correct" window length for predicting the returns. The option was made to change the event window to (-85/5) and to (-25/25). The first length extends the original event window by 30 days. Thereby, the abnormal effects which occur before the original event window are covered. The latter length (-25/25), follows Micocci et al. (2009), and it uses an event window which is symmetrically distributed around the event date. By using the symmetric set up, it is guaranteed that adjustments in the stock price that occur after the announcement are also covered.

The results are presented in Table V.

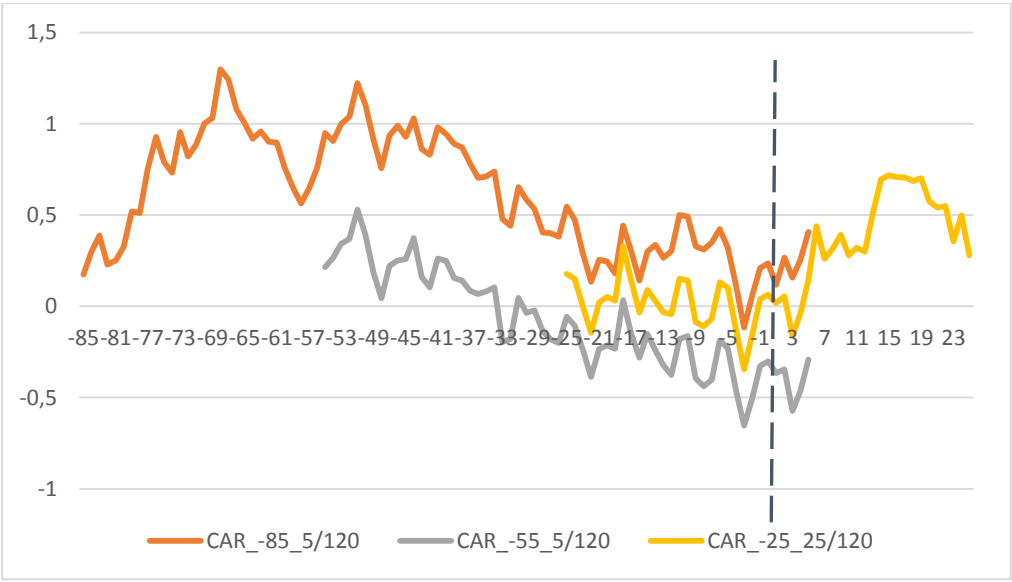
Table V: CARs for Event Windows of size (-85/5) and (-25/25)

Event window	(1) CAR (%)	(2) t-Statistic	(3) z-Statistic
(-85/5)[8]	0.40	-0.28	0.28
(-25/25)	0.06	0.10	0.27

Table V summarizes the results for the CAR for an event window of length 90 and 50 days. The first extends the original event window by 30 days backwards to capture effects occurring before the original event window. The focusses in the same manner on effects occurring before and after the event since it is distributed symmetrically around the event day.

As can be seen from Table V, the CAR remain relatively close to zero. A comparison of the CAARs of the three event windows can be found in Figure 3.

Figure 3: Comparison of CAARs for selected Event Windows



As can be seen in Figure 3, downward development is observable for the original event window, as well as for the adjusted event window of size (-85/5). The developments for the

[8] One case was removed from the sample, due to insufficient data for the estimation period.

original and the adjusted event window are almost identical. There are only two main differences between them. First, the level, and second, the variance. The level is explained by the different starting points, which leads to a higher or lower accumulated gain before initiation of the downward processes. The difference in variance can be explained by the decrease of forecasting accurateness for longer prediction periods.

For the event window of size -25/25, neither a clear downward, neither an upward trend is observable. There is no trend, as the downward process starting at day 50 relative to the event is already reflected in the regression results, which affect the predicted returns. When testing the CARs of both event windows, (-85/5) and (-25/25) on their significance, as presented in Table V, neither the parametric, nor the non-parametric test suggests that an abnormal loss is observable. Thus, Hypothesis H1 is still rejected.

After using different event windows, the estimation window is now adapted. It is extended from 120 days to 200 days, following Karpoff and Lott (1993), and to 260 days following Armour et al. (2015).

Extending the estimation window reduces the influence of each single observation during the estimation window and it confirms that the original estimation is not biased by abnormal effects when forecasting the predicted returns. The results are presented in Table VI.

Table VI: Reputational Losses for Estimation Windows of Length 200d and 260d

	(1)	(2)	(3)
Estimation window	Reputational Loss (%)	t-Statistic	z-Statistic
200d	-0.09	-0.08	-0.09
260d	-0.83	-0.64	-0.63

Table VI summarizes the results for the CAR for an estimation window of length 200 and 260 days. The first extends the original estimation window by 80 and the second by 140 days to reduce the influence of each single stock return occurring during the estimation window.

When using the 200 days' estimation window prior to the announcement, ceteris paribus, the reputational effect is slightly below zero, at a rate of -0.09%. For the longer of the estimation window adaptations, the reputational loss is higher at a rate of -0.83. Both results indicate that there is no evidence of a significant deviation from zero, and that therefore the same results hold. Therefore, Hypothesis H2 - the existence of reputational losses - is still rejected.

Another possibility for checking robustness is to change the underlying market for calculating the predicted returns. First, the ESTXX is replaced by the Stoxx Europe 600 Banks (ESTXX 600). While the first market consists of 30 banks, whereby all banks in the sample are listed, with the exception of UBS and Credit Suisse, the latter consists of 43 banks and includes all the same banks as for the ESTXX, but in smaller portions. By using the ESTXX 600, the risk of a direct impact of stock price occurring on the market index, which biases the regression results, is reduced.

The results are shown in Table VII.

Table VII: Reputational Loss using ESTXX 600 as Underlying

	(1) Total	(2) Second Party	(3) Third Party
Reputational Loss (%)	-0.45	-0.10	-1.46
t (t-Stat)	-0.27	-0.04	-0.53
z (Wilcoxon)	-0.26	-0.09	-0.62

Table VII summarizes the results for the reputational loss for an estimation window of length 120 days, an event window of length 60 days. Thereby, the underlying Index of the OLS regression is changed from the ESTXX to the ESTXX 600 to reduce the correlation between the stock price of the bank and the underlying index.

When computing the usual test statistic, it is found that there is no significant different effect from the one observed when the ESTXX was used as the underlying one for the OLS regression. Hence, it is concluded that, despite the existence of correlation between the stock return and the underlying asset - which is used to calculate the predicted return via the SIM - the rejection of the null hypothesis holds.

Second, the ESTXX is replaced, ceteris paribus, by the lead index of the respective country in which the bank is headquartered. This is a natural robustness check to control for country specific effects. The results are presented Table VIII.

Table VIII: Reputational Loss using the Country Lead Index as Underlying

	(1) Total	(2) t-Statistic	(3) z-Statistic
CAR (%)	-2.41	-1.09	-1.18
Reputational Loss (%)	-2.07	-0.94	-0.99

Table VIII summarizes the results for the reputational loss for an estimation window of length 120 days, an event window of length 60 days. Thereby, the underlying Index of the OLS regression is changed from the ESTXX to the specific country lead index of the respective country to reduce the correlation between the stock price of the bank and the underlying index.

The results show a higher loss in terms of CAR and reputational losses when using the country indices as compared to the ESTXX as underlying market (-2.41% and -2.07% respectively, compared to -0.29% and 0.37%). The result makes sense, insofar as the banks have a lower correlation with the country index than with a European banking index, due to the increased diversity of the latter index. The robustness of the results obtained is highlighted when applying the methodology presented. However, there are also possibilities to further develop this study which are provided in Section 6.

6. Discussion

One aspect, which may be adjusted, is that only the period regarding the official announcement of the fine is under analysis. However, there are several stages of a sanction, such as the announcement of an investigation, or the start of a trial. A recent example is the VW scandal, where the stock had already faced heavy losses before any official statement about the fine was made. Therefore, it is not sufficient to assume only one event window in which the returns behave abnormally. Rather, it is reasonable to use several stages of the

announcement, and to expand the analysis to multiple event windows, as shareholders have already priced in the expected reputational loss, at least partially, on the day of the official announcement. Thus, on the day of the announcement, there is only a relatively small reaction is observable for the stock price, which is due to the unexpected component of the sanction. However, the unexpected effect does not necessarily have to be negative. As almost 50% of positive reactions are observed on the day of the fine announcement, it can even be expected that shareholders and market participants expect almost half of the fines to be higher than those actually announced. A possibility for overcoming the problem of multiple adaptation phases of the stock prices is the approach chosen by Karpoff and Lott (1993). They sum the abnormal returns over multiple event windows in their analysis. A second possibility is developed by Armour et al. (2015), who focus on those sanctions announcements for which they are sure that the day of the sanction`s announcement is the first day of the revelation to the market of any kind of information about the wrongdoing.

Another starting point to improve is the lack of information provided by the press articles. Several press articles do not fully summarise the wrongdoing or fraud, and hence the division into subsamples can be incomplete, or even incorrect. This effect increases as penalties are often announced for more than one wrongdoing at a time. However, only the most severe are mentioned in the press statement. If, for example, a bank is sanctioned for helping customers to evade taxes, then the latter is the reason for penalising the firm. Nevertheless, there is also a lack of control mechanisms, as without them, tax evasion would have been almost impossible. This aspect can only be addressed by using statements from a single database of a government agency, such as the ones from the Security and Exchange Commission (SEC), or the Financial Supervisory Authority (FSA), which fully summarise sanctions in a similar manner for all cases, stating exactly each single wrongdoing.

Moreover, the bigger the size of the event window, the higher the probability of having confounding news or other incidents, which can lead to a bias in the results. A search was conducted to eliminate confounding news regarding the main types of event, which are: joint venture announcements, splitting of stocks and fundamental changes, dividends, administration changes, earnings declarations, and merger or acquisition activities (Nageswaru Rao and Sreejith, 2014). However, there is still a chance of not accounting for other types of information that is released to the market and which influences the stock price. If, for example, a bank faces the announcement of a fine and an event window of size (-55/5) is used, then the basic idea suggests that no other effects exist which influence the stock price during the event window. However, this assumption is relaxed, as other effects exist which do not affect the stock price significantly. Consequently, the longer the event window, the higher the probability of having confounding effects and of therefore having a biased result. A possible solution is to reduce the event windows as far as possible, in order to reduce a possible bias by confounding effects. Armour et al. (2015) for example reduce the event window steadily until an event window of (-1/1) is reached. Thereby they are able to reduce confounding effects and simultaneously check whether they are losing crucial information.

An assumption, which may also be revised, is that reputation can be solely approximated by the monetary reaction of the stock prices at one point in time. In fact, reputation is much more complex. In particular, the stock price reaction is only a proxy for the expected reputational damage assessed by its investors at the time of the penalty. The long run effect of committing fraud can be substantially different from the expected damage at the time of the announcement. Consequently, the residual approach should only be regarded as a rough approximation for the reputational loss. One example, for which it is difficult to differentiate the reputational loss from associated effects, is the case of a business partner

who stops negotiating for the business with the sanctioned bank. There is a greater decrease in foregone profits than reputational damage, which causes the change in the market value. However, this is accounted for in the market value of the bank, as the market value is the sum of expected future cash flows, discounted at the proper discount rate *r*.

Furthermore, this study does not make a separation regarding the part of the bank that is sanctioned. The big banks are mainly organised along corporate group lines. Wrongdoings of certain entities within the group are likely to trigger a higher effect on the stock prices than others. If, for example, a subsidiary of Deutsche Bank, such as Postbank (which is highly engaged in retail banking and is well known in Germany), was sanctioned, then the reputational effect would probably be higher than the case of a small broker of Deutsche Bank being sanctioned for violating short selling restrictions, where only a small number of traders are even aware of the problem.

Finally, yet importantly, there is a lack in the performance of the test statistics for particular sample characteristics. The cross correlation, or the serial correlation of returns, is not taken into account in this study. Kolari and Pynonnen (2011) provide a solution to the problem by introducing the so-called “accumulative event day”, which captures the abnormal returns over the event window in just one day. Moreover, the accumulative event day is standardised, and it thus accounts for the event-induced volatility. The setting solves the problem that higher volatility implies a higher standard deviation, which consequently leads to an over-rejection of the true null hypothesis.

7. Conclusion

This study analyses the effect of sanction announcements on the stock price of major mainland European Banks, and computes the associated reputational effects. In order to analyse the effects, an event study is performed where the CAR is tested on its significance of being different from zero.

Analysing the development of the CAAR, a negative adaptation process in the 60 days before the event can be observed (Figure 2). Such an existence of an adaptation process would suggest that investors include the forthcoming information in their expectations before the actual announcement of the fine. However, by testing the CAR on its significance, neither parametric nor non-parametric tests provide evidence for the existence of a CAR. Thus, it is concluded that there are no abnormal effects in the event window of size (-55/5).

In a second step, the fine amount itself is considered to have a negative effect on the stock price due to the associated monetary loss. It is found that the CAR is no longer negative, but that it changes sign, and becomes positive, i.e. the stock price of the banks, increases on average when a fine is announced. The increase of the CAR is in line with that which can be expected, as the fine has a negative impact on the stock price. The amount of the fine leaves the company, and thus the market value decreases. However, the change in sign of the reputational effect opposes the initial intuition presented in Hypothesis H2. Originally, a negative effect of the sanction on the reputation was expected. However, splitting the sample along two dimensions - the aggrieved party and the type of fraud - and performing similar testing procedures for the subsamples shows that the reputational effect for wrongdoings against second parties is negative, whereas the one against third parties is positive. Simultaneously, the fines for wrongdoings against third parties are higher than those for wrongdoings against second parties. A reason for this discrepancy is that investors care less about harm to third parties, but rather worry about their own losses. However, for neither wrongdoings against second or third parties, nor the complete sample, can a significance effect be found, i.e. no reputational effect is observable. The same is true for the type of fraud, “self-dealing”, and “failure of disclosure and financial misrepresentation”. Furthermore, there is no evidence that supports the originally-proposed assumption that

frauds from “self-dealing” cause a stronger effect than those listed under “failure of disclosure and financial misrepresentation”.

In summary, one can say that either reputational loss does not exist or, which is more likely, that it occurs at a point in time that is not captured by this analysis. As argued in Section 6, the period of the announcement captures only a part of the whole adaptation process. Therefore, the introduction of several adaptation phases for which the CAR is computed is a beneficial extension of the current study. Thereby, one interesting field for future research could be the definition of several adaptation phases which make it easier to for researchers to know which periods are of interest. One could use the very recent example of the VW Scandal, and then define the single stages of the adaptation process from the first rumours that occurred in September 2015, up until the final settlement of the case in the distant future.

Another aspect that might be of great interest is the analysis of stock reactions, not only of the primary or original stock exchange, but also looking at the cross listing of the respective bank abroad. The discrepancy between the impacts on different stock exchanges could be assessed, and thus a country specific component is introduced. Using the aforementioned approach, country-specific reputational effects could be assessed in detail, and the reputational loss might be attributed to a certain region, or even to a single country.

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Appendix

A.1. Subsample Properties

Subsample Aggrieved Party

Wrongdoing vs. second party	Wrongdoing vs. third party	Unclear	Total
33	36	13	82

Subsample Type of Fraud

Self dealing	Failure of disclosure & financial misrepresentation	Other	Total
38	14	25	77[9]

[9] Five cases were removed from the sample, as more than one category of fraud was mentioned in the press article.

A.2. Banks Identification

Bank	Thomson DS Code	Abbrevi-ation	Stock Exchange	Country	ISIN	Country Index
Banco Bilbao Vizcaya Argentaria (BBVA)	779090(P)~E	E:BBVA	Mercado Continuo Espanol	Spain	ES0113211835	IBEX
Banco Santander	702853(P)~E	E: SCH	Mercado Continuo Espanol	Spain	ES0113900J37	IBEX
Banque Nationale de Paris Paribas (BNP)	309449(P)~E	F:BNP	Euronext.liffe Paris	France	FR0000131104	CAC 40
Commerzbank	902189(P)~E	D:CBK	Deutsche Boerse AG	Germany	DE000CBK1001	DAX 30
Credit Agricole	14866R(P)~E	F:CRDA	Euronext.liffe Paris	France	FR0000045072	CAC 40
Credit Suisse	950701(P)~E	S:CSGN	SIX Swiss	Switzerland	CH0012138530	SIM
Deutsche Bank	905076(P)~E	D:DBK	Deutsche Boerse AG	Germany	DE0005140008	DAX 30
International Netherland Group (ING)	531865(P)~E	A: ING	Euronext Amsterdam	Netherlands	NL0000303600	AEX Amsterdam
Nordea	671068(P)~E	W:NDA	Nasdaq OMX Stockholm AB	Stockholm	SE0000427361	OMX Stock-holm
Societe Generale	755457 (P)~E	F:SGE	Euronext.liffe Paris	France	FR0000130809	CAC 40
UBS	9215N3(P)~E	S:UBSN	SIX Swiss	Switzerland	CH0024899483	SIM

A.3. Overview Variables

Variable	Description	Source
Wrongdoing/Fraud	Press Statements hand-collected for the period between 01.01.2009 and 31.12.2015, using the search term bank name & fine.	Lexis Nexis Database
Value of fine	The value of the fine was taken from related press article. If there was a related compensation payment, then the value of the fine is taken to be the sum of the penalty and the compensation. However, if there was no monetary amount identifiable, then the sanction was dropped from the sample.	Lexis Nexis Database
Type of Fraud	The type of fraud was identified by reviewing the collected press articles. Subsequently the methodology introduced by Dyck et al. (2009) was used.	Lexis Nexis Database
Aggrieved Party	The aggrieved party was identified by reviewing the collected press articles. Subsequently the methodology introduced by Armour et al. (2015) was used.	Lexis Nexis Database
Confounding News	The confounding news were identified by a second stage screening process. The dates of the identified wrongdoings are used to perform an additional screening around this date. If there are any press statements that might abnormally affect the stock price, then the selected cases are dropped so as to not bias the analysis.	Lexis Nexis Database
Stock Prices	Daily[10] stock prices for the period 01.07. 2008 to 31.12.2015 were collected using DataStream. An overview of the banks under consideration, together with trading places (i.e. market exchange) and the official ISIN number are attached.	Reuters DataStream

[10] The stock prices are already adjusted for stock splits or dividend payments, etc.… .