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Does Reputation matter for Creditors?

Term paper

Direction 38.04.08 Finance and Credit

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Contents

1 Introduction

The most interesting situations are born after a simple question "What if ...?" Everything is started from a simple idea that leads to the action. This simple question always helps: in everyday life, in research and in boring thesis.

Market share price may be affected by many factors and the one of the main of them information signal like piece of news from social media, in Bloomberg terminal or newspaper. According to EMH, such a piece of information is the main source of price fluctuations. All news that are presented in the World can be roughly divided into three large groups: financial news, inter market news and non financial news. In this research the last group of information signals will be analyse as there is hidden operational risk which involves reputation risk implicitly.

For many years reputation risk was a part of operation risks that was not examined in a proper way. There were several reasons for it: first of all operational risk was a form of one that present all kind of risks with exception of market and credit ones. In 2013 Henry Ristucci told "reputational risks can damage the most well-crafted business strategies" and there is a simple reason for it. After several years of social media rocketing development it becomes obvious that the mass media report tone has a significant impact in share price dynamics an may directly affect to company's market value. This happens due to asymmetry of information which appears because news verification is often not mandatory for social networks and some online media. If mass media with forming public opin-

ion about particular company can change its intangible asset's price that leads to idea that traditional risk-management approach face a challenge right now to develop an accurate approach to reputation risk estimation.

That is why reputation and how it affect financial indicators of the company is still stays relevant for academic society. The main idea of this research is to test hypothesis that companies with a high reputation level on financial market are more susceptible to operational risk than companies with low reputation level securities and construct a parsimonious model for reputation losses estimation not only for investors but also for creditors of the company. This hypothesis is supported with EMH as the negative non financial news like for example fraud is unexpected event for investors and creditors and became a strong signal for downgrade shareholders and bondholders expectation about financial health of the company.

In this research paper there is a try of review existing definition of corporate reputation risk [1], review several classic and modern approaches of its estimation and choose a parsimonious one to estimate reputation power affects American banking sector from investor and creditor sides.

Tasks for this paper are:

- Analyse the results of previous researches in this theme
- Choose the most informative operational risk realisation event for American banking sector
- Choose factors that affects reputation the most

[1] There and below under reputation risk in context of corporate reputation risk

- Construct a model to evaluate reputation losses for investors and creditors
- Test results robustness

The work is constructed as follow. First of all, there is a discussion about reputation definition. Secondly, there is a reasoning about methodology. After defining reputation and choose methodology there is a part of data analysis and result discussion.

2 Literature Review

In this chapter reputation will be defined, than the estimation methods evolution will be presented with a short discussion. When the reader will have a sufficient understanding the link between reputation phenomena and financial market will be presented. At the end of the chapter hypothesises will be formulated.

Reputation systematically affects not only company's behaviour in order to form desired social attitude for its products and services but also its financial statement. That was one of the main reason for Basel Committee to include reputation risk in its recommendations for risk management.

2.1 What is reputation in a nutshell?

It is a common practise to draw an analogy of finance market with a grocery shops that was described by Anderson and Smith (2006). Everyone of us has some preferences in such a place that formed on history of

visits. Some people apply this logic to finance market which is not correct as here is a classic mistake appears - people confuse great company with a great stock. Such an irrational belief in EMH [2] may lead to overpricing of stocks with a low return . For example, company may have a good stocks characteristics while have a bad reputation as an employer. [3] This is a story that teach not to use a simple induction as it may play a sad joke with investor's money. Reputation as every company's intangible asset is a delicate thing that need an accurate analysis and reputation risk disposal become one of the most difficult task for risk manager.

Reputation asis is difficult to define in a comprehensive way as in academic literature there is a variety of definitions from different sides of the research groups. All in all, most of the studies agree that the main difficulty in define reputation risk is its multidimensional essence that concerns not only finance markets but also every single customer. This fact means that reputation is more about trust or credibility and the image that is formed in social by historical data of company behaviour. It means that reputation risk is somehow may be a part of a strategic risk as it was illustrated in Hall (1992). As it was said by Mitic (2018) that reputation as an occurrence in risk management has in own negative reputation due to the difficulties of quantifying it accurate without quite radical and strong assumptions.

All in all, reputation risk become an important for companies due to

[2]EMH - efficient market hypothesis

[3]Red Hat, LTC CEO Linus Torvalds is famous with sexist jokes. Overall, Linux OS is still popular and Red Hat was successfully bought by IBM Inc.

rocketing spread of information spread in social media.

First of all, following Gatzert (2015) before discuss any quantitative methods there is a need to recognise main factors affected reputation and their interconnections. Reputation phenomena mostly is determined by historical company's finance performance, product's quality and ESG factors that become quite popular way of investments that is also affects the importance of taking into account the reputation factor of the company and its business sphere. And there is a direct link between the "amount" of reputation and the amount of loses after negative reputation event. That is why reputation can be as well as benefit and liability for the company.

Fiordelisi et al. (2013) one of the first scientist that arise a problem that estimation of extent of reputational losses as share price fluctuation has been done many times while there is a lack of evidence of high importance of reputational risk in financial service. One pf the fundamental issues is there is no understanding what is a driver in company's characteristics for reputation losses in banking sphere.

Need to analyse operating events like frauds as as bad reputation events that become a strong signal for investors.

2.2 Why reputation is important for investors?

Here there is a need to say that most of scientific literature assume that there is a link between level of corporate reputation and financial statement of the company according to logic that corporate reputation is a

part of market value that fluctuates due to investor's expectation and animal spirit on financial markets. That is why when something happened and has hit corporate reputation that is read by investors as a market signal to change expectations and affect company's performance on market Shapiro (1983). Even if investors do not immediately receive such informational signals that they will observe its from media or personal interconnections. For example, Bartikowski et al. (2011) et al has shown a statistically significant positive interconnection between customer-based reputation and company performance on market in different spheres and this relationship as stronger as important trust become for clients - it means that for banking sphere those interconnection is stronger that for retail it is. All in all, as most of such researches based on interviews base there is a strong assumption that played a huge role - that only reputation is important for customers while there are other factors that affect customer choice as a lack of knowledge about competitors for example.

Sánchez and Sotorrío (2007) shows in the article how the birth of belief that social strategy of the company influence on corporate social responsibility that affects corporate social performance that finally changes financial performance of the company.

2.3 Why reputation may be important for creditors?

As it was already mention reputation has not a unique definition and one of the reasons is in the fact that it affects not only one particular side of finance market but all participants feel the effect of reputation

level changes. Creditors that use corporate bonds as an financial instrument claim more strict demands to company's financial characteristics but exposed to same risks with shareholders and that is why Plunus et al. (2012) considered that debt market provides better recognition of reputation losses that share market. This strict demands prevent overreaction to the news that can be seen in the stock market. The main argument by Plunus et al. (2012) and Gillet et al. (2010) is constructed on the fact that reputation loss that is a part of operation one should not affect expected cash flow as shareholder's equity does not directly depreciate under those circumstances.

2.4 Methodology evolution

Despite the difficulty to identify and measure reputational risk there is a strong demand from business side to perform researches focused on reputation and financial statement relationship.

Sánchez and Sotorrío (2007) show that depends on indicators for company valuation there are two methods to estimate the dependence between reputation and financial statement.

First of it is a classical way of financial market analysis is to analyse reputation impact to company financial with event study by finding abnormal returns in company market capitalisation. This method is intuitive and quite evident but there is no possibility to construct forecast or test robustness of the results according to the results due to the initial prerequisites. Endogenous appears when researches assume that particular

event is significant without any prove.

Second method is a business method where interconnections between corporate reputation markers and financial indicators from accounting. Usually it is done through regression analysis which is more accurate but is not perfect as there appears another problem - there is no unified theory of how reputation is linked with finance statement as different studies came to controversial results. Also there is no unified measure of reputation as most of the researches tried to find a marker that is comfortable for its aims. One of the ways to solve this problem is to construct a continuous business index that is include several sources of corporate reputation without linkage to news as a trigger signal.

A modern way to measure reputation risk is to construct an index with a data mining process to summarise public attitude through neuron nets. Trostianska and Semencha (2019)

3 Hypothesises

From the academic literature it become clear that reputation is a strategically important intangible assets for companies with a large customer base and private investor part in capital.

For the analysis below there is a need to introduce a number of restrictions and assumptions into the research.

3.1 Restrictions

1. As it was already discussed here and below reputation is used as a corporate reputation as corporate reputation can be presented as a part of intangible asset and it can be measured quantitatively.

2. Reputation is about trust mostly that is why there is a need to use companies which business is build on trust. In this study banking and insurance will be used for analysis as client trusts the most precious things to such companies - life, home, money. That is why reputation for such companies is more important assets than for other sectors.

3. Due to the aim to measure reputation losses in a ST period of time daily frequency data is required so in this research Damodaran methodology of reputation measurement cannot be used. The only way to get the result is an event study methodology with all its prons and cons.

4. In this research shares and CDS rate of return changes more or equal to 1% can be called as expected result.

3.2 Hypothesises

Assumptions for hypothesis are based on Fiordelisi et al. (2013) paper.

1. Age of the company and reputation has a direct relation. The reason is clear: if company can work for a long time on the market than

it could be partly explain by honesty and customer focus as way of working that expected by clients.

2. The higher reputation company has, the lower CDS and share rates of return are. This hypothesis is simply explain by risk theory. Investor and Creditor believe in finance health of the company that have been trusted by the society. The probability of default or loss of the business is lower than for company with low reputation.

3. Accept the logic of previous point high profitability must be followed by high probability of reputation losses as high profitability requires the company to take more risks to manage. If a company fails in risk management, it will be considered as a strong negative signal because no one on the market expects such an event from a company with high public trust. Investor and creditor will penalize harder companies with a high reputation in such cases.

4. Investor's part of financial market has higher level of fluctuation formed with news signals than the debt market but reputation is important for both sides. That is why the main hypothesis is that reputation losses measured on debt market is more accurate than on share market.

4 Methodology

Here there is a necessary to assume interconnections between the main factors. According to Fiordelisi et al. (2013) and common economic sense there is an assumption that reputation losses are higher is spheres where the main basis for business is a relationship of trust between the company and the client. There is a limited number of such a business branches and finance and IT are on the top of this list as the client trusts these companies with the most important thing that can be in the 21st century - their personal data and money. In this particular research banking sphere will be examined.

Following Gillet et al. (2010) and Fiordelisi et al. (2013) positive relations assumed between reputation and profit and between reputation losses and riskiness. This logic is born from the the knowledge that without risk there is no profit but if riskiness is higher than optimal level than the probability of losses increases that is why higher profit means higher riskiness that leads to higher potential risks and losses driven by changes in investors and creditors expectations. Negative relationship is supposed to be between reputation losses and level of intangible assets, reputation losses and invested capital. This relations are quite obvious as reputation is a part of intangible assets and if the client's confidence is lost than intangible asset price decrease as share price decrease on finance market.

The first stage of the research is a classical event study where it is assumed that news about fraud, problems with IT security and violation of law and ethics by the company can be a strong informational signal

for the investors and creditors to change expectations about corporate reputation value.

Event study for investor side was presented by Sharpe (1963) and this method is still solid. Abnormal returns are simply the difference between observed market return of the share in period t_j and fair return in t_j of those particular share.

$$AR_{i,t} = R_{i,t}^{Obs} - (R_{i,t}^{rf} + \beta \times (R_{i,t}^{Market} - R_{i,t}^{rf})) \tag{1}$$

where $R_{i,t}^{Obs}$ is an observed in period t rate of return of i company, $R_{i,t}^{rf}$ is a risk free rate of return, β is a company beta, $R_{i,t}^{Market}$ is a market return (index rate of return).

To measure boldholder's reaction for reputation losses methodology by Plunus et al. (2012) is used. this methodology is also consist of two steps. The first step is event study for the same events that was described above for bond market using bond rates of returns in order to catch "pure" reputation effect. Second stage for the bond market research is an OLS regression that will be discussed below with the same regressors for both shareholers and bondholders.

To test significance of the event study for share market reaction z-test is used following Boehmer et al. (1991). Z-test is

$$Z = \frac{\overline{SR_t}}{\hat{\sigma}(SR_t)} \sim N(0, \sigma^2) \tag{2}$$

where $SR_{i,t}$ is a standardized abnormal return on share i-company from N of them at time t, calculated follow Mikkelson and Partch (1988).

Cumulative abnormal return is used in order to be able to use logit-regression.

$$CAR_{t_1,t_2} = \sum_{j=t_1}^{t_2} AR_{i,t_j} \tag{3}$$

Before the second stage of the research methodology there is a need to satisfy author's curiosity. In order to show the red line between investor and creditor the cointegration test for CARs will be constructed and visualised. This step is required to demonstrate a LR dependence of two markets and their interrelated changes under particular information signals (events) or same factors of risks.

The easiest way to estimate how reputation losses are affected with bank financial characteristics is OLS:

$$CAR_{t_1,t_2} = \alpha + \sum_{j=1}^{J} \beta_j \times Determ_j + \sum_{b=1}^{B} \gamma_b \times BSphere_b \tag{4}$$

1. J is a total number for all reputation losses determinants according to Fiordelisi et al. (2013):
   - bank size (capitalisation and total assets),
   - bank age as it is,
   - bank profitability (ROA, EBITDA and P/B ratio as proxy of intangibles)
   - bank's risk level (β as systematic risk, leverage as insolvency risk, st.deviation of returns as market risk)
2. B is a number of bank's operating sphere according to Bloomberg.

In such studies the control variables usually used but in this research it is not necessary as only one country is analysed and period of analysis is more or less economically stable.

5 Data Analysis

Due to pandemic there is a reason to describe the way how data was collected.[4] This study is based on open source data as most of the databases cannot be used at full capacity due to the limit's existence and restrictions on database functionality, which varies depending on the operating system of the machine where the study is conducted.

First of all, the list of companies was formed with Bloomberg EQS instrument. To get in the list company must be public and listed on American exchanges, be part of American banking sector and has S&P LT Credit Rating not less that BBB- in order not to be in junk part of the sector. This manipulation formed a list from 119 companies.

Events for the companies from the list was parsed through Google from the Bloomberg news portal with a help of key words: "fraud", "IT security", "law violation" and "ethic violation". At least 780 news abstracts could be used for the research but in order to make the data collection more accurate sentimental analysis was performed with NLTK Python package. News articles that has positive compound grades were excluded from the analysis and only 332 events for 110 companies were finally used for the data analysis.

[4] mostly to show off how the author building up skills in data collection.

Publicly listed companies is easy to analyse as one of the obligations of such a company is to publish their financial reports open to everyone that is why parsing data sets of financial ratios and company performance was only technical issue. All data used for research from 2009 to 2020 was found on Yahoo and Macrotrends sites. As a risk free rate was used rate of T-Bills return and as market rate of return NYK index's rate of return was used.

The only data that was parsed from EIKON terminal was CDS 5Y rates. CDS rate is a closed data that required special instruments for data collection. 10Y rates were chosen as in present a credit health of the company which this research is interested in for time period of 10 years as it was chosen for event study period. Gatzert (2015)

6 Results

According methodology upwards the Event Study was prepared for Share and CDS markets with EventStudyTools and on pictures the results are presented.

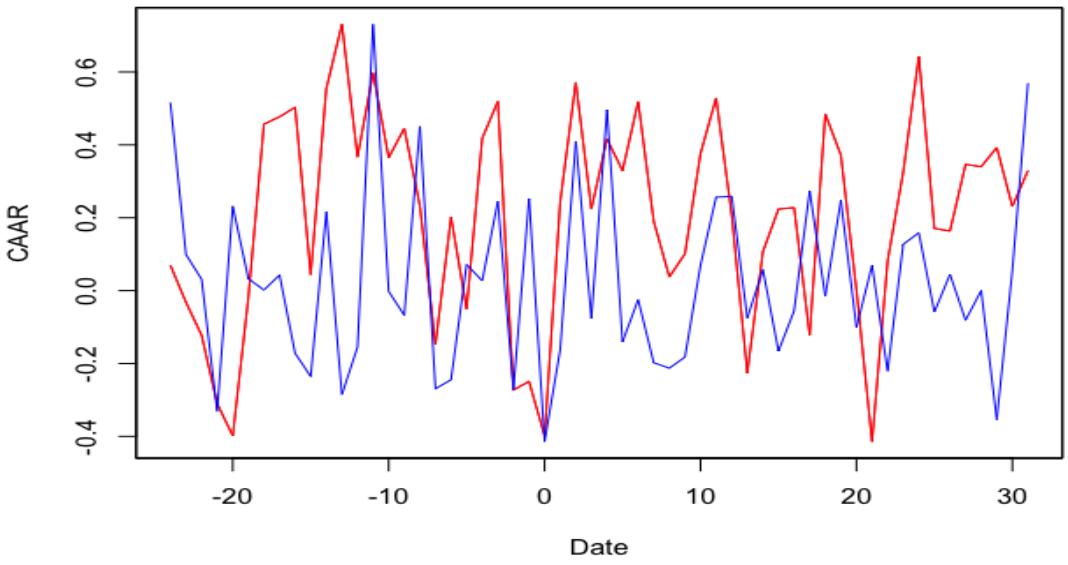

Figure 1: CAAR lines

As it cab be seen from 1 both share (red line) and bond (blue line) markets have shown a negative reaction to news about fraud from companies side. As it can be seen both graphs looks familiar that may allow to suggest a causality between two time series.

	Res.Df	Df	F	Pr(>F)
1	43			
2	47	-4	2.18	0.0869

Granger test shows that the line between two markets exists but it is not strong enough but it can be explain with different aims of investors and debtholder. Both of them are interested in company financial sustainability but investors wants to be involved in management while debtholderes believe that company will be able to pay back their money.

Both markets show reaction to news but the interconnection between them is low.

The next finding that is interesting to discuss is Average CAR. Share market shows high level of information noise as only in window (-1:1) market shows a slight reaction to fraud news and that in one week practically come back to initial level while bond market shows a significant fall and slow recovery.

Window	Average CAR	CAAR	Patell Z	
(-1:1)	-0.05	-0.0011	-2.5398	***
(-2:2)	-0.0002	-0.0002	-2.9418	***
(-5:5)	0.012	0.0109	-3.0252	***
(-30:30)	0.008	0.0079	0.3044	

Table 1: Event Study (Invest)

Window	Average CAR	CAAR	Patell Z	
(-1:1)	-1.012	-1.0124	-2.0332	**
(-2:2)	0.063	0.0626	-0.0135	
(-5:5)	0.34	0.3401	0.17	
(-30:30)	0.65	0.8449	1.2693	*

Table 2: Event Study (Debtholder)

Both market shows that Event study results are significant at least for (-1:1) and (-2:2) windows that is why all ANOVAs for windows except (-1:1) is presented in Appendix.

Before regression analysis there is a need to glimpse at raw data distribution. For analysis CAR data is used as this is regressant for the model.

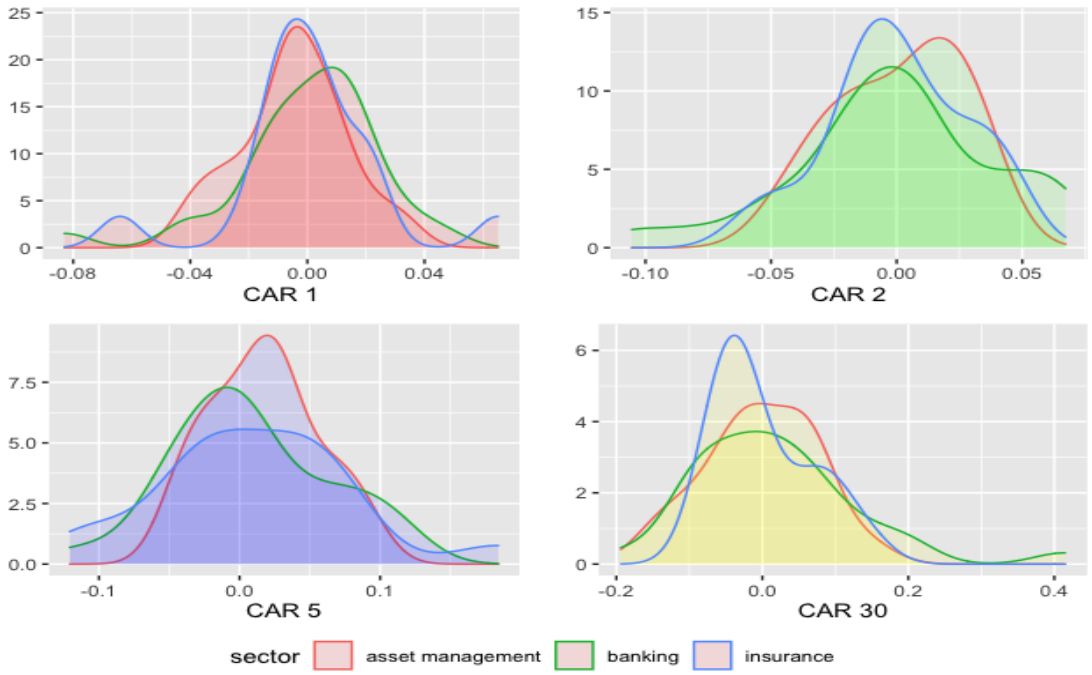

Figure 2: CAR Density (Inv)

```
        Pearson chi-square normality test

data:  inv_car1$`CAR Value`
P = 794, p-value < 2.2e-16
```

Figure 3: Pearson Chi test (Inv)

Share price demonstrate normality at every window, that is mean regression analysis is possible. As it can be seen from the density plot mean CAR fluctuates from window to window, the interesting fact is that banking react at first days quite weak and the effect become recognisable at (-5:5) window while insurance demonstrates a significant return

decreasing from (-1:1) to (-30:30). Strange behaviour is expressed by asset management firms that react as strong as insurance sector but than demonstrate increase of returns.

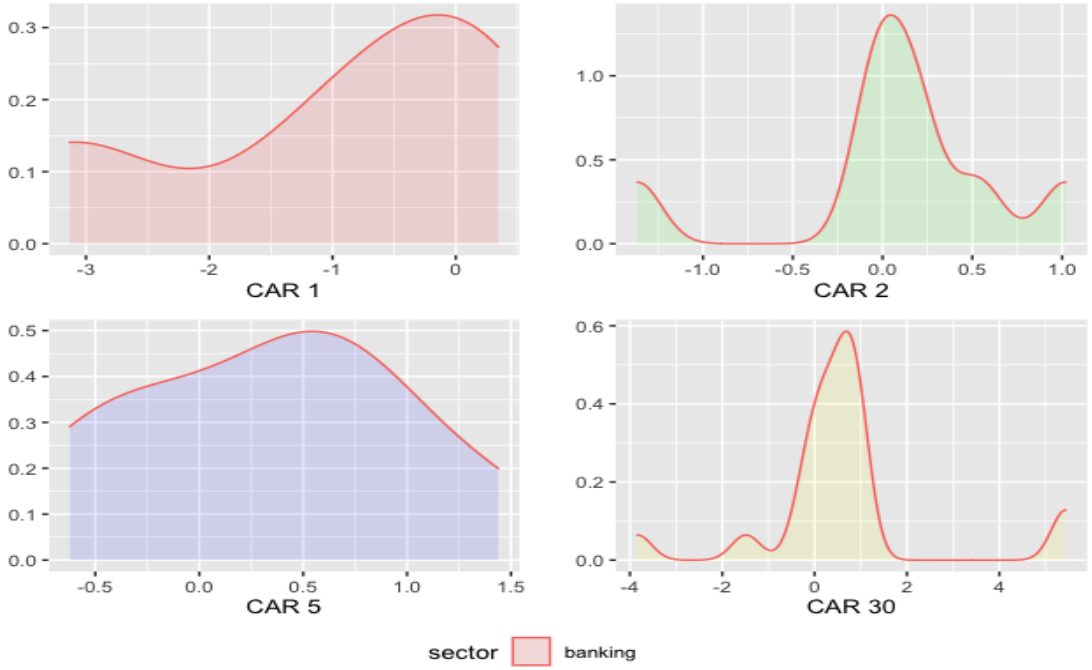

Figure 4: CAR Density

```
        Pearson chi-square normality test

data:  cred_car2$`CAR Value`
P = 9.5, p-value = 0.008652
```

Figure 5: Pearson Chi test (Cred)

Bond market shows abnormal structure in all windows except (-2:2) due to lack of data. All in all, CAR2 can be used for regression analysis.

The most interesting part of research is regression analysis. The first model was not successful as only 5 regressors was at least on 80% significant (more info in B). It can be explain with the fact that mostly

Fiordelisi et al. (2013) include factors that directly can be affected by operation losses while it may be not a good idea to mix ratios with financial fundamentals as ratios may include effect of financial indicators and duplicate them that can lead to model degradation.

In order to modify the model Total Asset and Market Capitalisation were excluded from the model and EPS was include in order to save bank size approximation and include investment appeal. Modified model use following regressors:

1. EBITDA - it shows real earning of the company without any corrections.

2. EPS $=\frac{NetIncome-Dividends}{Numberofshares}$ - profitability index that measure investment attractiveness.

3. ROA $= \frac{NetIncome}{AverageAssets}$ - index that shows company's return on investments

4. P/B $= \frac{MarketCapitalisation}{BookValue}$ - ratio that give an opportunity to investors to understand how much he or she is overpaying from the book value of the company.

5. β 0 measure of company risks

6. leverage $=\frac{TotalDebt}{Shareholders'equity}$ - measure for credit health of the company.

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0159	0.0290	0.55	0.5954
sector		asset management		
age	-0.0007	0.0009	-0.76	0.4645
beta	0.0008	0.0018	0.46	0.6564
EBITDA	0.0000	0.0001	0.04	0.9652
leverage	-0.0097	0.0111	-0.87	0.4013
MCap	-0.0008	0.0006	-1.53	0.1552
PB	0.0361	0.0237	1.52	0.1563
ROA	-0.4963	0.6455	-0.77	0.4582
TAssets	0.0007	0.0008	0.84	0.4161
sector		banking		
age	-0.0041	0.0028	-1.45	0.1743
beta	0.0099	0.0112	0.88	0.3959
EBITDA	0.0003	0.0002	1.42	0.1845
sector		insurance		
age	-0.0002	0.0006	-0.36	0.7242
beta	0.0022	0.0025	0.89	0.3939
EBITDA	-0.0001	0.0000	-1.69	0.1196
leverage	-0.0053	0.0078	-0.69	0.5064
MCap	-0.0002	0.0002	-0.85	0.4120
PB	-0.0002	0.0089	-0.02	0.9853
ROA	1.1937	1.4307	0.83	0.4218
TAssets	0.0006	0.0004	1.33	0.2113

Classic Model for CAR2 (Investor)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-0.1417	0.0726	-1.95	0.0698
sector		asset management		
log(EBITDA)	0.0395	0.0175	2.25	0.0397
EPS	0.0086	0.0130	0.66	0.5194
ROA	-0.5447	0.4706	-1.16	0.2652
log(BV)	-0.0150	0.0152	-0.99	0.3370
Beta	-0.0001	0.0013	-0.04	0.9669
log(leverage)	-0.0409	0.0181	-2.26	0.0389
sector		banking		
log(EBITDA)	0.0272	0.0137	1.99	0.0655
EPS	-0.0646	0.1798	-0.36	0.7243
ROA	2.6044	4.8813	0.53	0.6015
sector		insurance		
log(EBITDA)	0.0087	0.0067	1.30	0.2124
EPS	-0.0378	0.0111	-3.42	0.0038
ROA	0.3403	0.4682	0.73	0.4785
log(BV)	0.0392	0.0152	2.58	0.0209
log(leverage)	-0.0224	0.0151	-1.49	0.1575
Beta	0.0032	0.0014	2.24	0.0406

Table 3: New Model for investor's CAR1

For bond market regression analysis cannot be accurate enough due to the lack of data. All in all, there is a possibility to envistigate hypothesis checking.

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-20.3518	0.0000	-8.34	0.0000
age	1.2023	0.0000	1.61	0.0000
beta	0.1289	0.0000	1.59	0.0000
leverage	-0.8817	0.0000	-7.36	0.0000
MV	0.0842	0.0000	1.58	0.0000
PB	-5.4501	0.0000	-1.91	0.0000
ROA	141.2614	0.0000	6.28	0.0000

Table 4: Classic Model for CAR2 (Debtholder)

For all models hypothesis can be suggested to be checked. [5] The logic is follow. CAR measure cumulative abnormal return that in average is negative in this research that is why it demonstrate reputation losses, it means here CAR is inverse to reputation as it is.

[5]Due to some problems with Terminal access there was an extreme need to parse data from the Internet from open sources. The algorithm of parsing provides as much info as it was able to provide but open sources are not famous for being accurate with data bases. Author did her best to prepare datasets but there are still problems with such a jagget data.

Hypothesis	Model 1	Model 2	Model 3
		Asset management	
Age ↑↑ *Reputation*	+		-
Return rate (beta) ↓↑ *Reputation*	+	+	-
Profitability (ROA) ↓↑ *Reputation*	+	+	-
		Banking	
Age ↑↑ *Reputation*	+		-
Return rate (beta or EPS) ↓↑ *Reputation*	+	+	-
Profitability (ROA or EBITDA) ↓↑ *Reputation*	+	-	-
		Insurance	
Age ↑↑ *Reputation*	+		-
Return rate (beta) ↓↑ *Reputation*	+	-	-
Profitability (ROA) ↓↑ *Reputation*	+/-	-	-

Table 5: Hypothesises

7 Conclusion and Policy Implications

As it can be seen from this research fundamental for success in Event Studies is complete, highly frequency data that was accurately collected. In this case data was collected without specific sources due to specific conditions but all in all despite problems with data collection estimators are quite alike with what previous researchers has.

Event Study is a powerful instrument that with high likelihood will spread across researches in Finance due to its parsimonious models. In order to help future researchers in NRU HSE there is an advice - offer an ALGO OpData by IBM that will help a lot in such researches.

References

Jeff Anderson and Gary Smith. A great company can be a great investment. *Financial Analysts Journal*, 62(4):86–93, 2006.

Boris Bartikowski, Gianfranco Walsh, and Sharon E Beatty. Culture and age as moderators in the corporate reputation and loyalty relationship. *Journal of business research*, 64(9):966–972, 2011.

Ekkehart Boehmer, Jim Masumeci, and Annette B Poulsen. Event-study methodology under conditions of event-induced variance. *Journal of financial economics*, 30(2):253–272, 1991.

Franco Fiordelisi, Maria-Gaia Soana, and Paola Schwizer. The determinants of reputational risk in the banking sector. *Journal of Banking & Finance*, 37(5):1359–1371, 2013.

Nadine Gatzert. The impact of corporate reputation and reputation damaging events on financial performance: Empirical evidence from the literature. *European Management Journal*, 33(6):485–499, 2015.

Roland Gillet, Georges Hübner, and Severine Plunus. Operational risk and reputation in the financial industry. *Journal of Banking & Finance*, 34(1):224–235, 2010.

Richard Hall. The strategic analysis of intangible resources. *Strategic management journal*, 13(2):135–144, 1992.

Wayne H Mikkelson and M Megan Partch. Withdrawn security offerings. *Journal of Financial and Quantitative Analysis*, pages 119–133, 1988.

Peter Mitic. Reputation risk: measured. *International journal of safety and security engineering*, 8(1):171–180, 2018.

Séverine Plunus, Roland Gillet, and Georges Hübner. Reputational damage of operational loss on the bond market: Evidence from the financial industry. *International review of financial analysis*, 24:66–73, 2012.

José Luis Fernández Sánchez and Ladislao Luna Sotorrío. The creation of value through corporate reputation. *Journal of business Ethics*, 76 (3):335–346, 2007.

Carl Shapiro. Premiums for high quality products as returns to reputations. *The quarterly journal of economics*, 98(4):659–679, 1983.

William F Sharpe. A simplified model for portfolio analysis. *Management science*, 9(2):277–293, 1963.

Karyna Trostianska and Ilona Semencha. Reputational risk management in conditions of credibility gap in the banking system. *Journal of Financial Economic Policy*, 2019.

A Descriptive Analysis

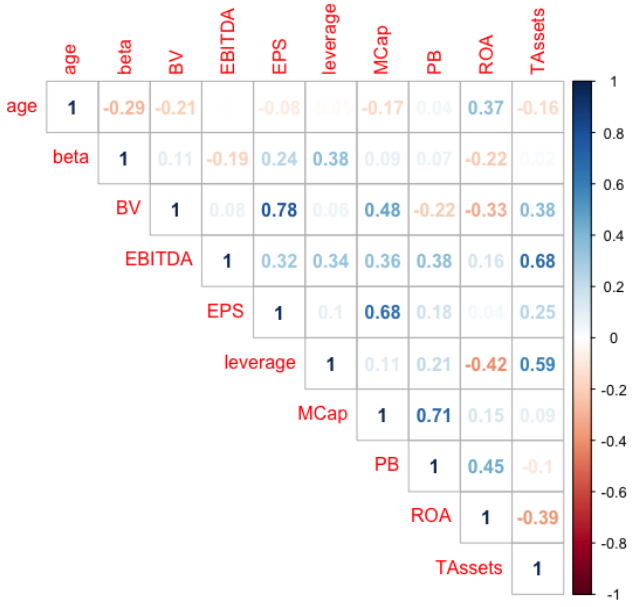

Figure 6: Correlation Matrix

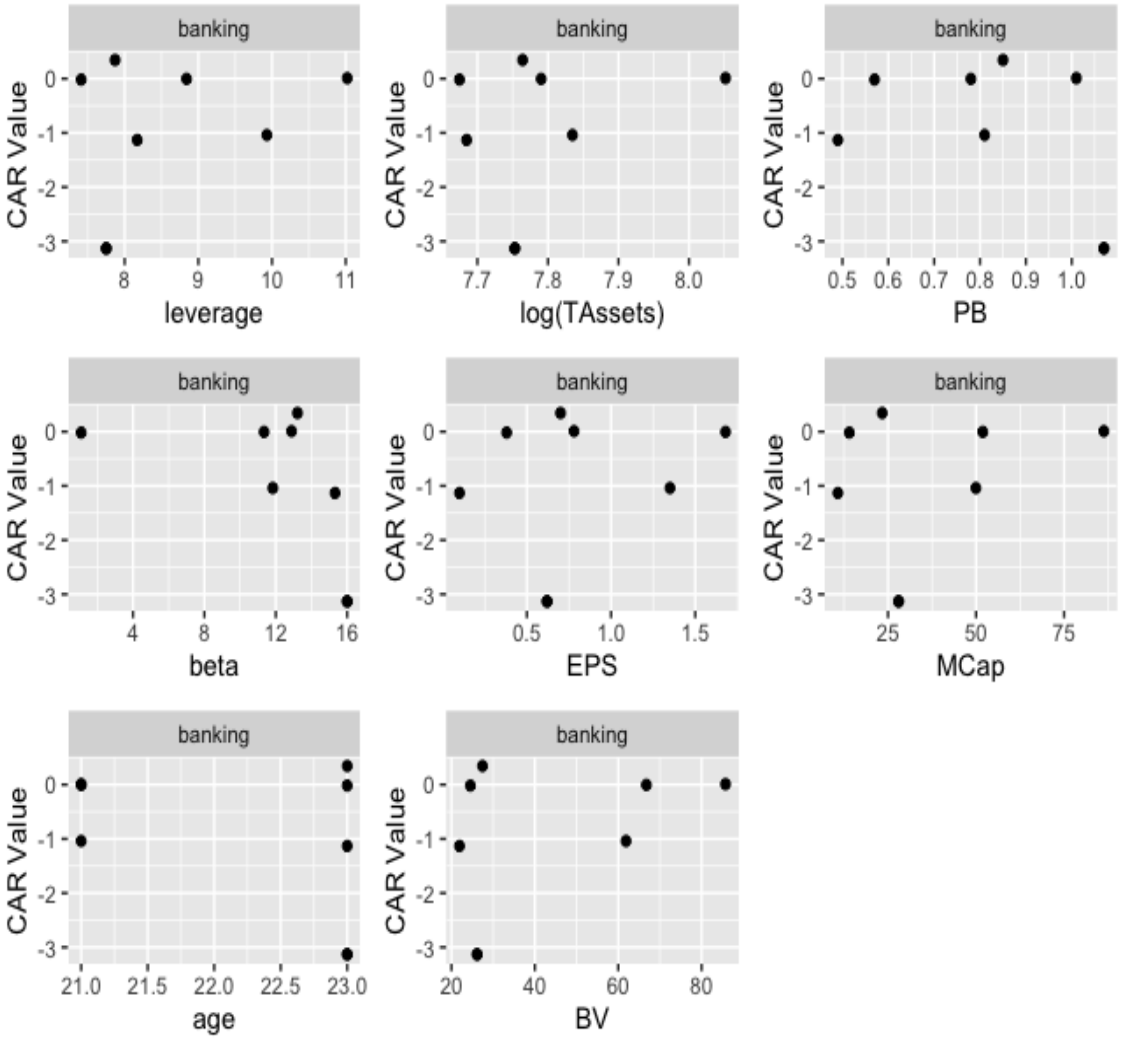

Figure 7: Creditor CAR-regressor interconnections per sector

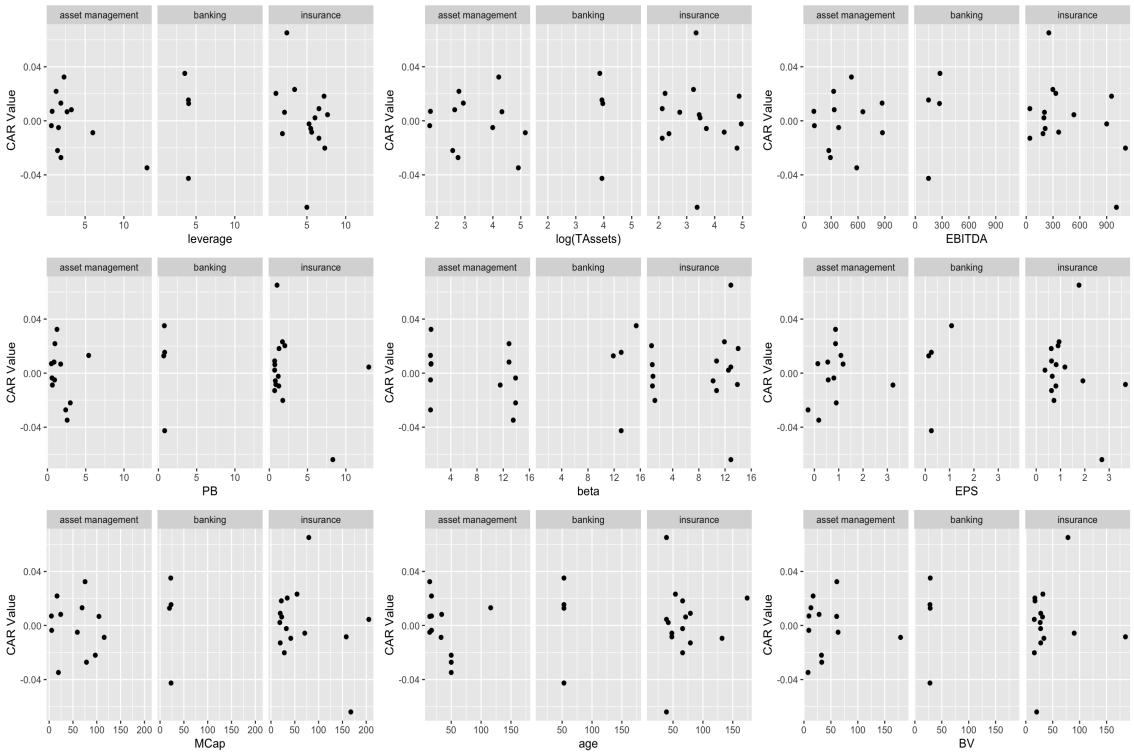

Figure 8: Investor CAR-regressor interconnections per sector

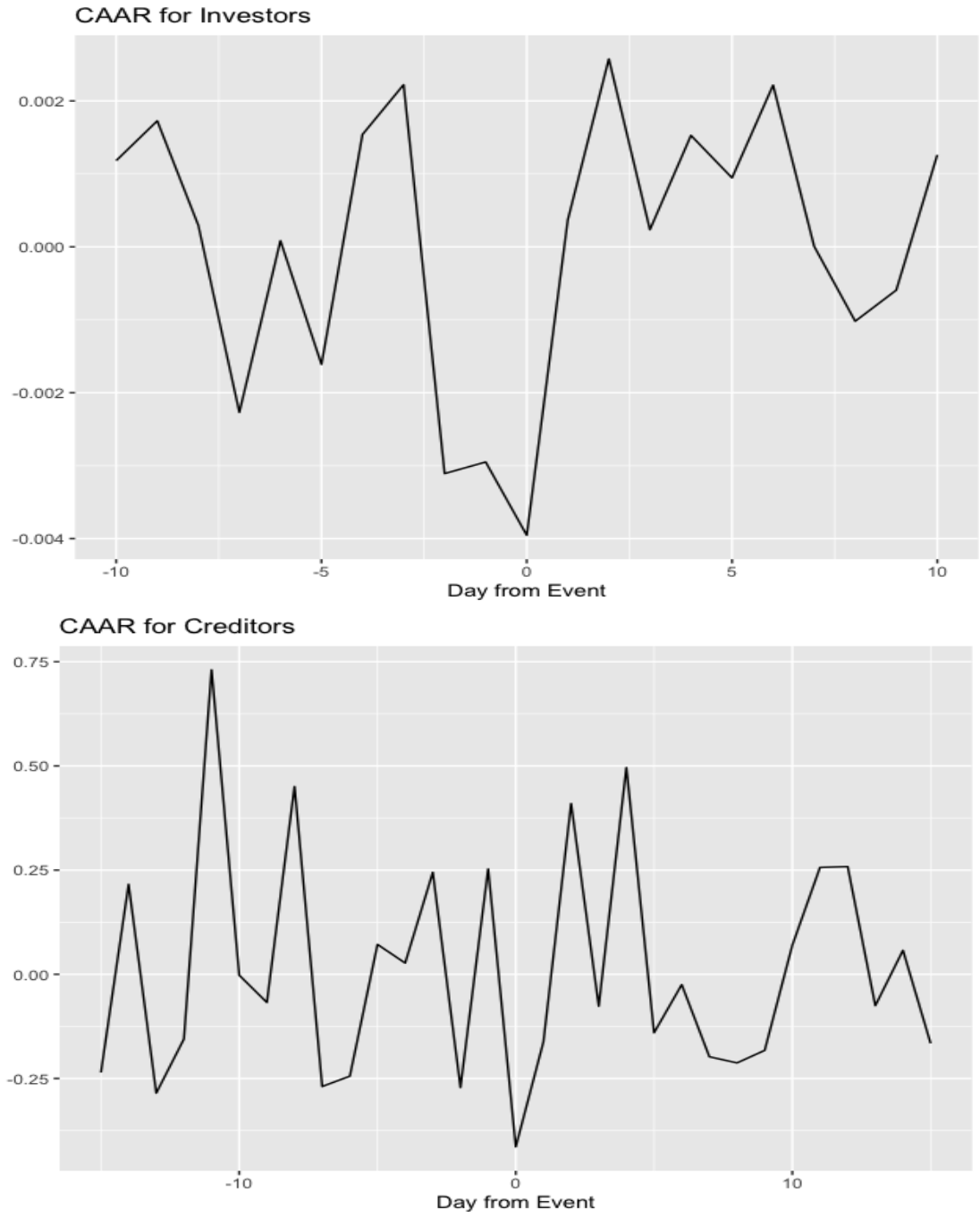

Figure 9: CAARs

B ANOVA

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-0.0862	0.0803	-1.07	0.3001
sector		asset management		
log(EBITDA)	0.0405	0.0194	2.09	0.0541
EPS	0.0131	0.0144	0.91	0.3780
ROA	-0.6781	0.5204	-1.30	0.2122
log(BV)	-0.0360	0.0168	-2.14	0.0489
log(leverage)	-0.0244	0.0200	-1.22	0.2408
beta	-0.0003	0.0014	-0.23	0.8210
sector		banking		
log(ebitda)	0.0153	0.0151	1.01	0.3264
EPS	-0.1183	0.1989	-0.60	0.5607
ROA	4.6424	5.3983	0.86	0.4033
sector		insurance		
log(ebitda)	0.0028	0.0074	0.38	0.7094
eps	-0.0284	0.0122	-2.32	0.0348
ROA	0.4617	0.5177	0.89	0.3867
log(BV)	0.0307	0.0168	1.82	0.0882
log(leverage)	-0.0218	0.0167	-1.31	0.2101
beta	0.0025	0.0016	1.56	0.1404

Table 6: New Model for CAR2 (Investors)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-0.1739	0.2240	-0.78	0.4498
sector		asset management		
log(EBITDA)	0.0016	0.0541	0.03	0.9763
EPS	-0.0504	0.0402	-1.25	0.2294
ROA	0.9556	1.4526	0.66	0.5206
log(BV)	0.0468	0.0468	1.00	0.3335
log(leverage)	0.0150	0.0558	0.27	0.7914
beta	0.0049	0.0039	1.27	0.2238
sector		banking		
log(EBITDA)	0.0362	0.0422	0.86	0.4043
EPS	-0.3082	0.5551	-0.56	0.5869
ROA	7.8599	15.0674	0.52	0.6095
sector		insurance		
log(EBITDA)	-0.0071	0.0206	-0.35	0.7337
EPS	-0.0361	0.0341	-1.06	0.3069
ROA	0.2001	1.4451	0.14	0.8917
log(BV)	0.0630	0.0470	1.34	0.1993
log(leverage)	0.0168	0.0466	0.36	0.7231
beta	0.0030	0.0044	0.68	0.5042

Table 7: New Model for CAR5 (Investor)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.6132	0.1604	3.82	0.0019
sector		asset management		
log(EBITDA)	-0.1289	0.0501	-2.57	0.0222
EPS	0.0014	0.0284	0.05	0.9618
ROA	2.1681	1.3440	1.61	0.1290
log(BV)	0.0041	0.0402	0.10	0.9211
log(leverage)	0.1472	0.0560	2.63	0.0198
beta	-0.0084	0.0028	-3.04	0.0087
sector		banking		
log(EBITDA)	-0.1026	0.0299	-3.44	0.0040
EPS	-0.5626	0.3610	-1.56	0.1414
ROA	21.2260	9.8193	2.16	0.0485
sector		insurance		
log(EBITDA)	-0.0324	0.0136	-2.38	0.0320
EPS	0.0315	0.0232	1.36	0.1953
ROA	-3.5653	0.9685	-3.68	0.0025
log(BV)	-0.0864	0.0329	-2.63	0.0199
log(leverage)	-0.0329	0.0305	-1.08	0.2996
beta	-0.0018	0.0029	-0.61	0.5490

Table 8: New Model CAR30 (Insurance)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0159	0.0290	0.55	0.5954
sector		asset management		
age	-0.0007	0.0009	-0.76	0.4645
beta	0.0008	0.0018	0.46	0.6564
EBITDA	0.0000	0.0001	0.04	0.9652
leverage	-0.0097	0.0111	-0.87	0.4013
MCap	-0.0008	0.0006	-1.53	0.1552
PB	0.0361	0.0237	1.52	0.1563
ROA	-0.4963	0.6455	-0.77	0.4582
TAssets	0.0007	0.0008	0.84	0.4161
sector		banking		
age	-0.0041	0.0028	-1.45	0.1743
beta	0.0099	0.0112	0.88	0.3959
EBITDA	0.0003	0.0002	1.42	0.1845
sector		insurance		
age	-0.0002	0.0006	-0.36	0.7242
beta	0.0022	0.0025	0.89	0.3939
EBITDA	-0.0001	0.0000	-1.69	0.1196
leverage	-0.0053	0.0078	-0.69	0.5064
MCap	-0.0002	0.0002	-0.85	0.4120
PB	-0.0002	0.0089	-0.02	0.9853
ROA	1.1937	1.4307	0.83	0.4218
TAssets	0.0006	0.0004	1.33	0.2113

Classic Model for CAR2 (Investor)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0712	0.0795	0.90	0.3898
sector		asset management		
age	0.0024	0.0024	1.01	0.3353
beta	0.0024	0.0048	0.49	0.6318
EBITDA	0.0000	0.0002	0.05	0.9591
leverage	-0.0073	0.0305	-0.24	0.8152
MCap	-0.0002	0.0015	-0.14	0.8920
PB	-0.0253	0.0650	-0.39	0.7046
ROA	-1.6216	1.7702	-0.92	0.3793
TAssets	-0.0003	0.0021	-0.12	0.9030
sector		banking		
age	-0.0004	0.0077	-0.05	0.9643
beta	-0.0120	0.0307	-0.39	0.7037
EBITDA	0.0004	0.0006	0.66	0.5251
sector		insurance		
age	-0.0004	0.0017	-0.25	0.8060
beta	0.0008	0.0068	0.11	0.9113
EBITDA	-0.0001	0.0001	-0.73	0.4819
leverage	0.0015	0.0213	0.07	0.9443
MCap	0.0001	0.0007	0.14	0.8895
PB	-0.0005	0.0244	-0.02	0.9829
ROA	-0.3955	3.9235	-0.10	0.9215
TAssets	0.0001	0.0012	0.13	0.9021

Table 9: Classic Model CAR5 (Investors)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0851	0.0606	1.41	0.1901
sector		asset management		
age	0.0006	0.0017	0.36	0.7276
beta	-0.0025	0.0045	-0.55	0.5936
EBITDA	0.0002	0.0002	1.11	0.2914
leverage	0.0020	0.0248	0.08	0.9368
MCap	-0.0016	0.0013	-1.17	0.2675
PB	-0.0104	0.0507	-0.20	0.8422
ROA	-0.8208	1.4773	-0.56	0.5907
TAssets	-0.0007	0.0015	-0.48	0.6383
sector		banking		
age	-0.0125	0.0051	-2.46	0.0338
beta	0.0398	0.0201	1.98	0.0758
EBITDA	0.0006	0.0004	1.43	0.1841
sector		insurance		
age	0.0012	0.0011	1.07	0.3086
beta	0.0001	0.0046	0.02	0.9821
EBITDA	0.0000	0.0001	0.34	0.7416
leverage	-0.0041	0.0140	-0.29	0.7745
MCap	-0.0006	0.0004	-1.30	0.2235
PB	0.0213	0.0160	1.33	0.2118
ROA	-5.2250	2.5842	-2.02	0.0708
TAssets	-0.0005	0.0008	-0.70	0.5001

Table 10: Classic Model for CAR30 (Investor)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-14.1305	0.0000	-9.52	0.0000
age	0.8023	0.0000	1.78	0.0000
beta	0.0728	0.0000	9.83	0.0000
leverage	-0.3268	0.0000	-4.45	0.0000
MV	0.0763	0.0000	1.94	0.0000
PB	-11.1493	0.0000	-3.06	0.0000
ROA	463.2922	0.0000	3.75	0.0000

Table 11: Classic Model for CAR1 (Debtholder)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-1.5717	0.0000	-1.80	0.0000
age	0.4346	0.0000	6.17	0.0000
beta	0.1262	0.0000	1.25	0.0000
leverage	-1.0094	0.0000	-1.00	0.0000
MV	0.0734	0.0000	1.00	0.0000
PB	-2.4748	0.0000	-8.44	0.0000
ROA	-158.1222	0.0000	-1.86	0.0000

Table 12: Classic Model for CAR5 (Debtholder)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	35.6882	26.2228	1.36	0.3066
age	-1.1373	1.1476	-0.99	0.4261
beta	-0.3319	0.1289	-2.57	0.1235
leverage	-2.1999	0.9077	-2.42	0.1363
MV	0.0338	0.0755	0.45	0.6978
PB	20.9183	4.3100	4.85	0.0399
ROA	-672.1749	256.5522	-2.62	0.1200

Table 13: Classic Model for CAR30 (Debtholder)

C P.S.

The life is a bliss. We forgot that we born to enjoy and explore our environment.