

Progress Report Presentation

# Has Bankruptcy Become a Crisis in Poland?

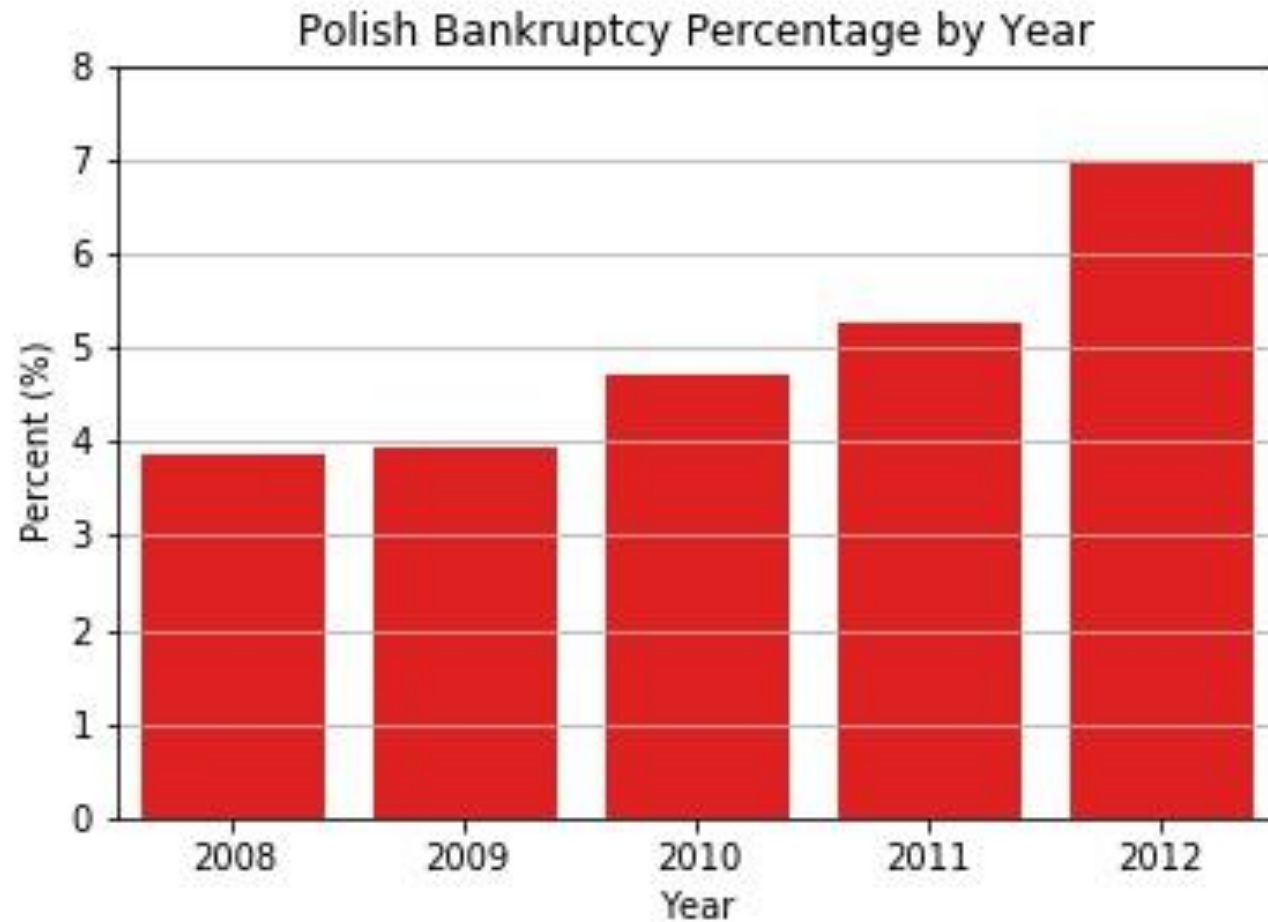
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# Questions to Consider

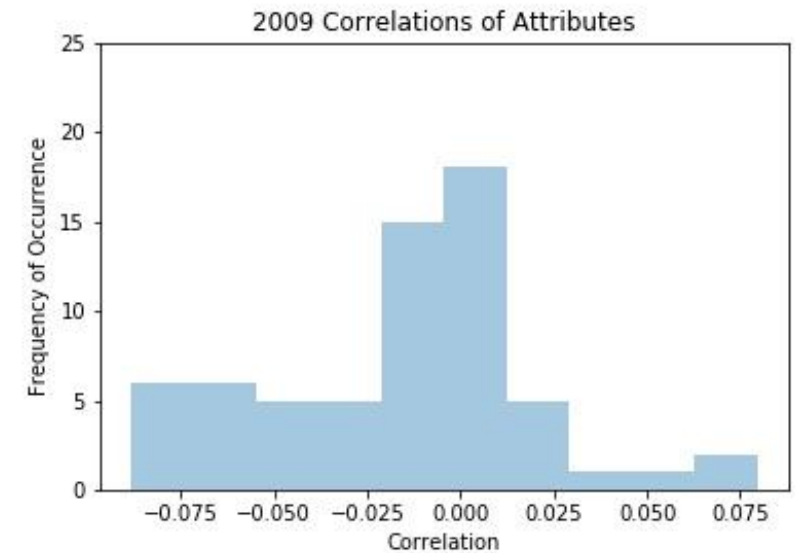
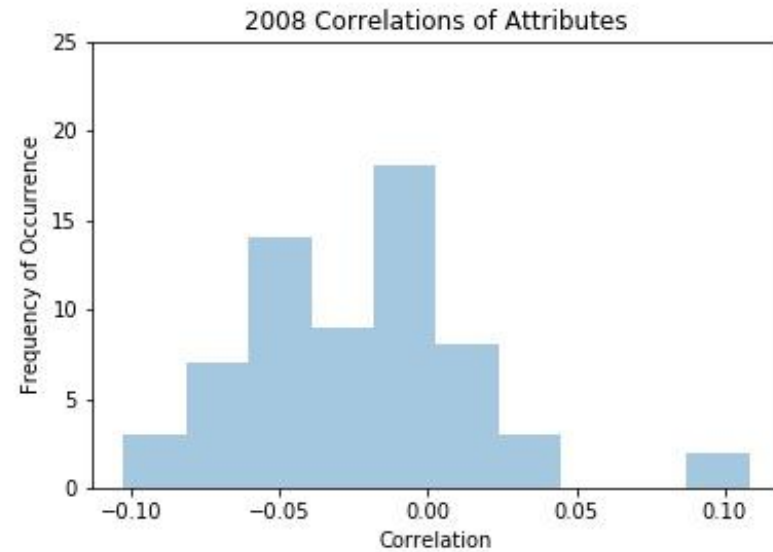
- Is it really true that the bankruptcy rate in Poland has increased over the five-year period from 2008-2012?
- If so, what factors may be causing the increase in the bankruptcy rate in Poland?
- Could accurate reporting of financial records provide significant information to help some businesses from not declaring bankruptcy?

# 1. Is There an Increase In Bankruptcy?

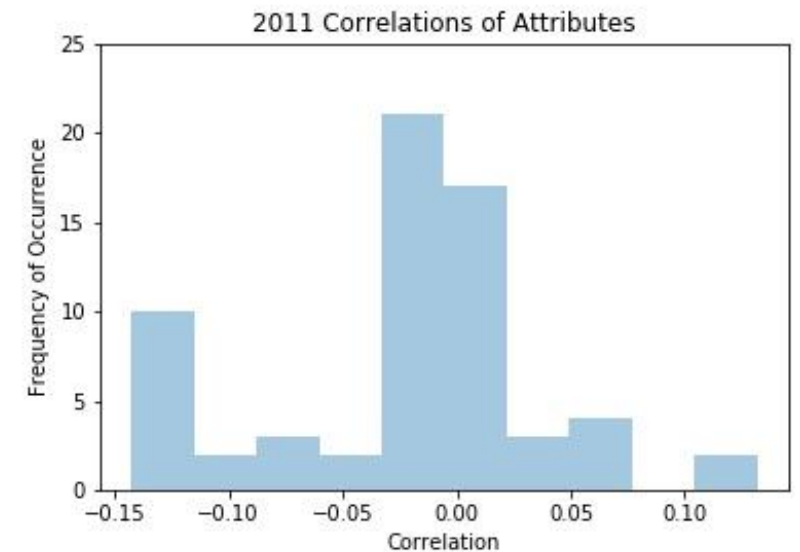
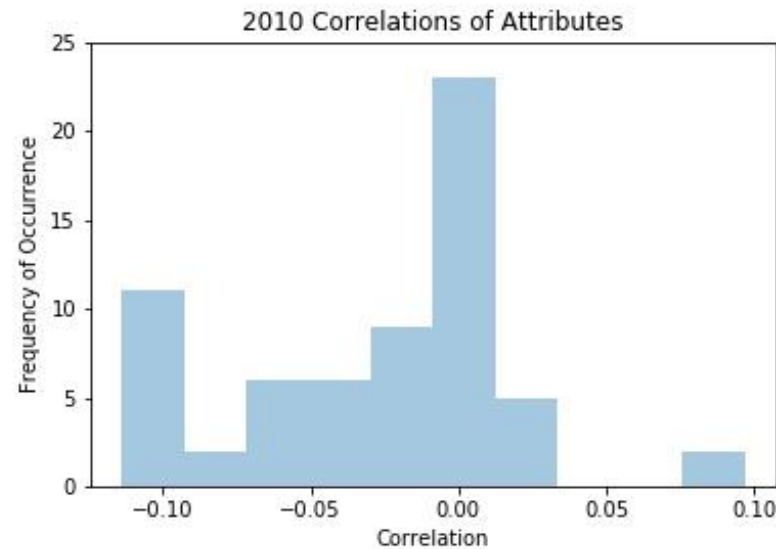


Early signs may point to an increase in bankruptcy of Polish companies from 2008-2012.

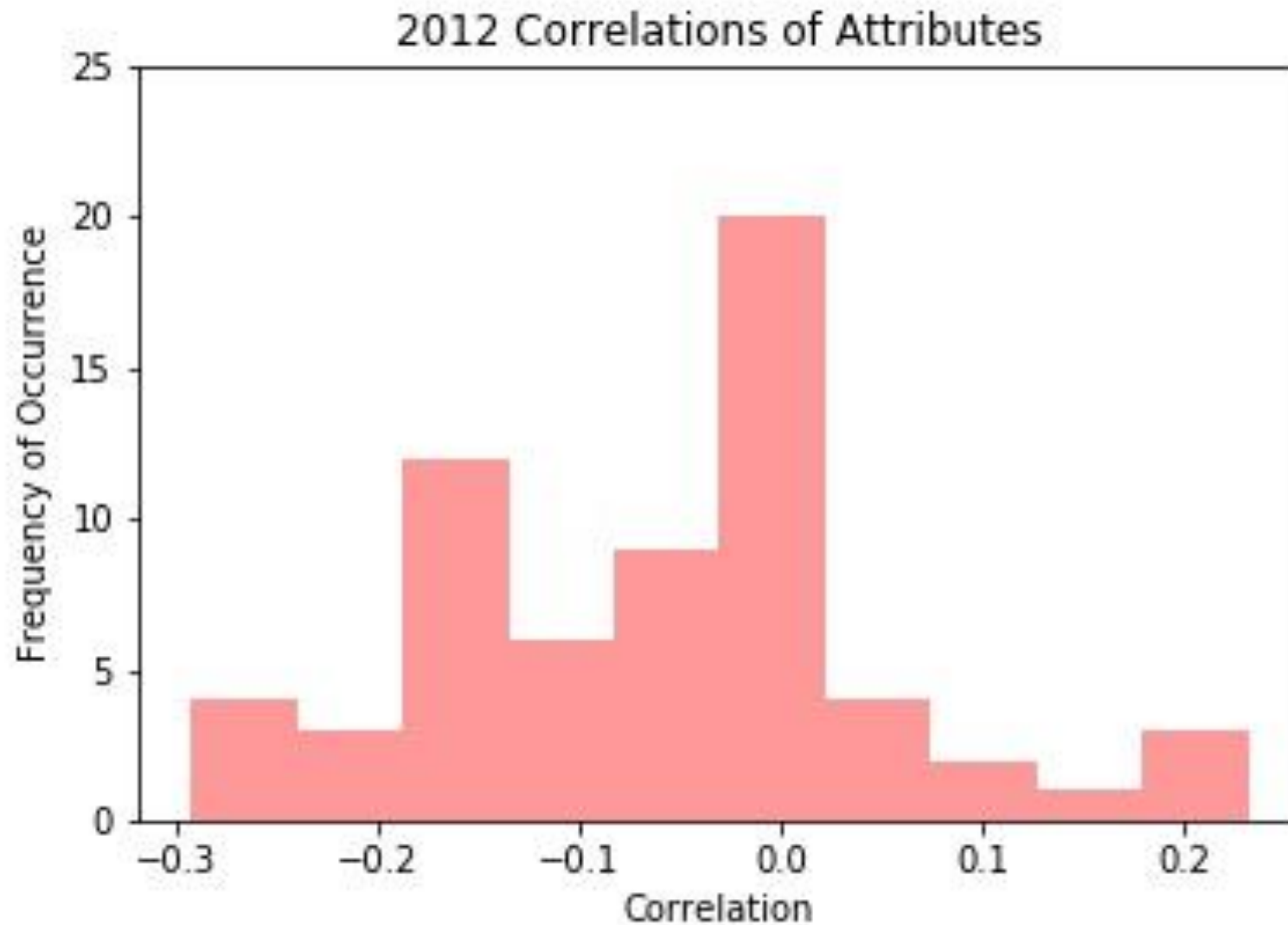
- Correlation Distribution of how a company's bankruptcy filing decision is correlated with the reported financial attributes



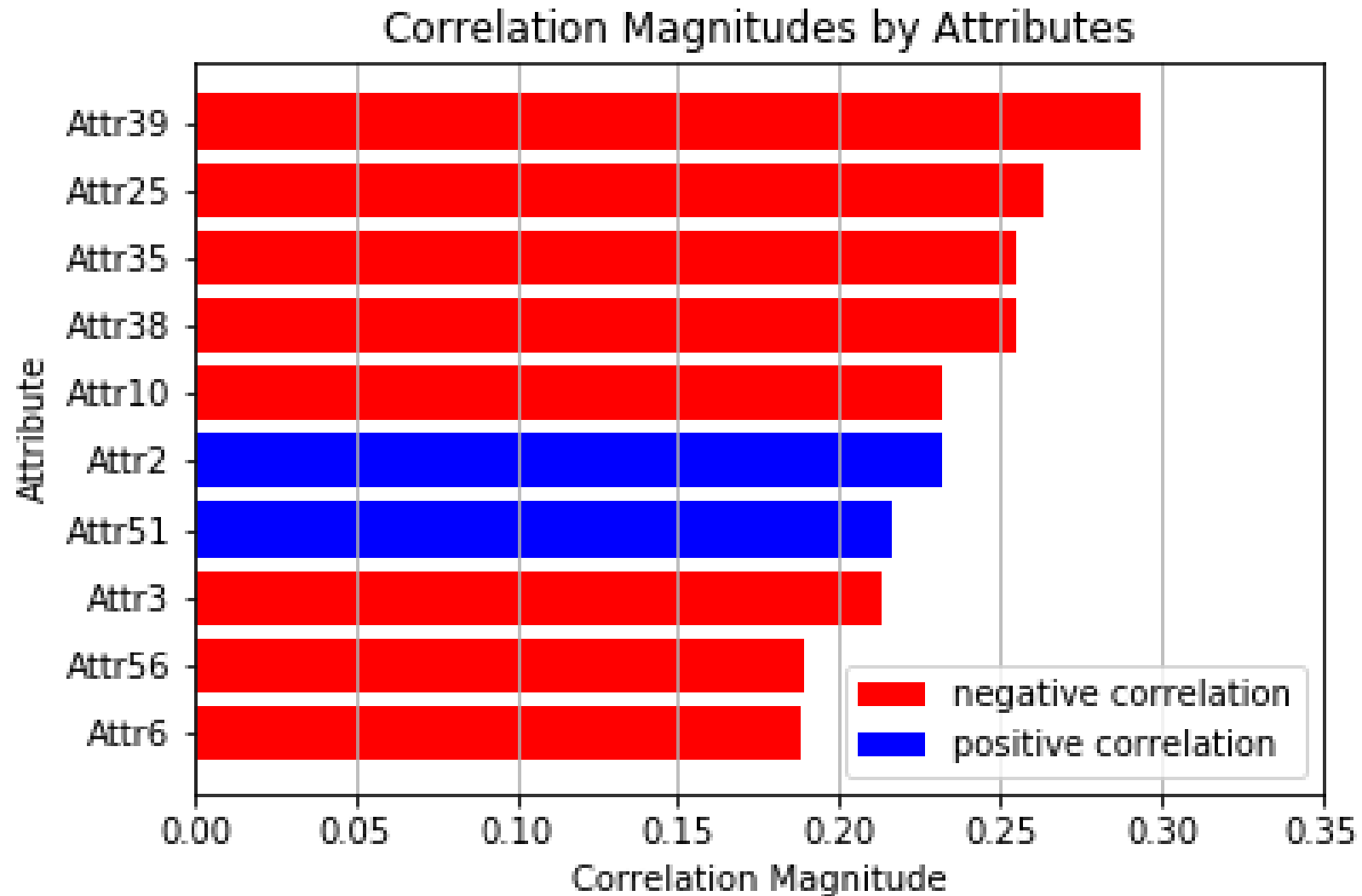
- Tails of distribution show relatively low correlations (2008-2011)



The larger magnitude of tails of the 2012 distribution shows that there may be some factor(s) contributing to a company's bankruptcy decision.



## 2a. What Factors May Be Contributing to This Increase?



## Definitions of the Top Ten Reported Financial Attributes

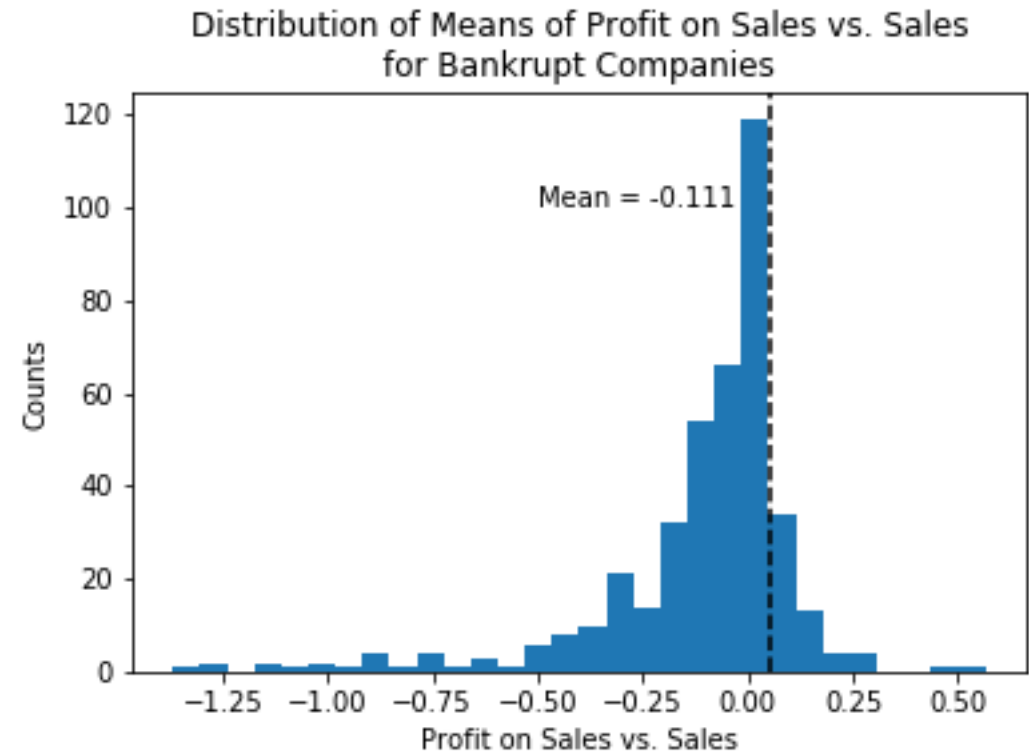
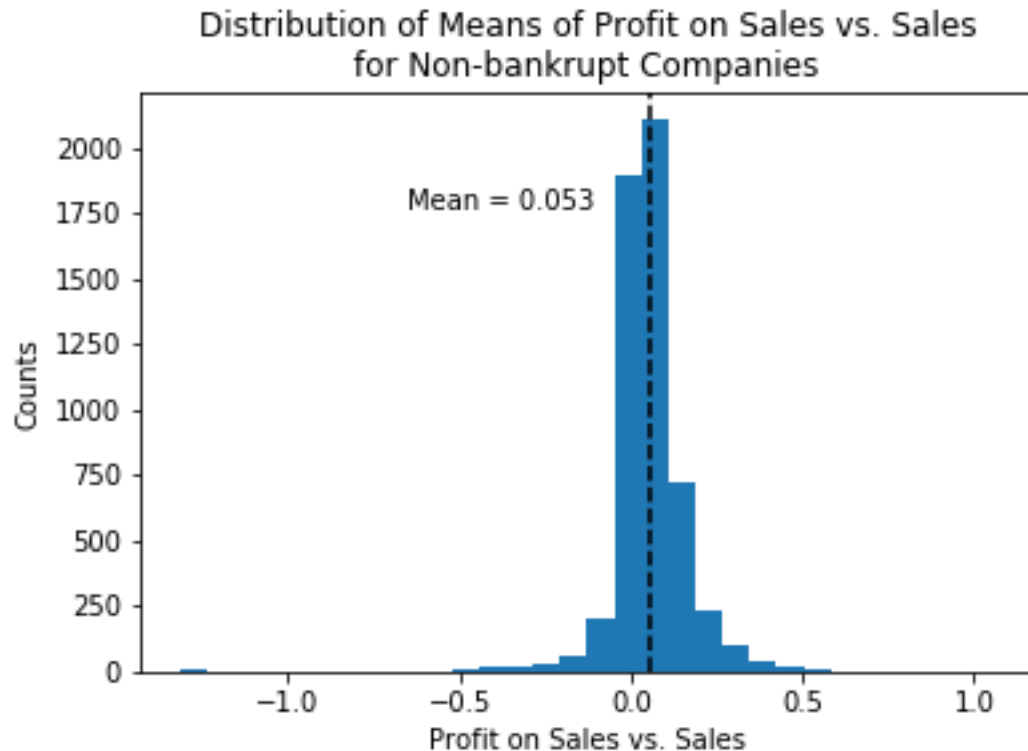
Index	Definition
Attr39	$\text{profit on sales} / \text{sales}$
Attr25	$(\text{equity} - \text{share capital}) / \text{total assets}$
Attr35	$\text{profit on sales} / \text{total assets}$
Attr38	$\text{constant capital} / \text{total assets}$
Attr10	$\text{equity} / \text{total assets}$
Attr2	$\text{total liabilities} / \text{total assets}$
Attr51	$\text{short-term liabilities} / \text{total assets}$
Attr3	$\text{working capital} / \text{total assets}$
Attr56	$(\text{sales} - \text{cost of products sold}) / \text{sales}$
Attr6	$\text{retained earnings} / \text{total assets}$

80% are inversely proportional to total assets, while the other 20% are inversely proportional to sales.

Thus, total assets and sales may be important factors to predicting bankruptcy decisions.

## 2b. Further Analysis of Attr39 (Profit on Sales / Sales)

An initial investigation of this attribute when split into two samples (bankruptcy and no bankruptcy) show a difference in means of 0.164.



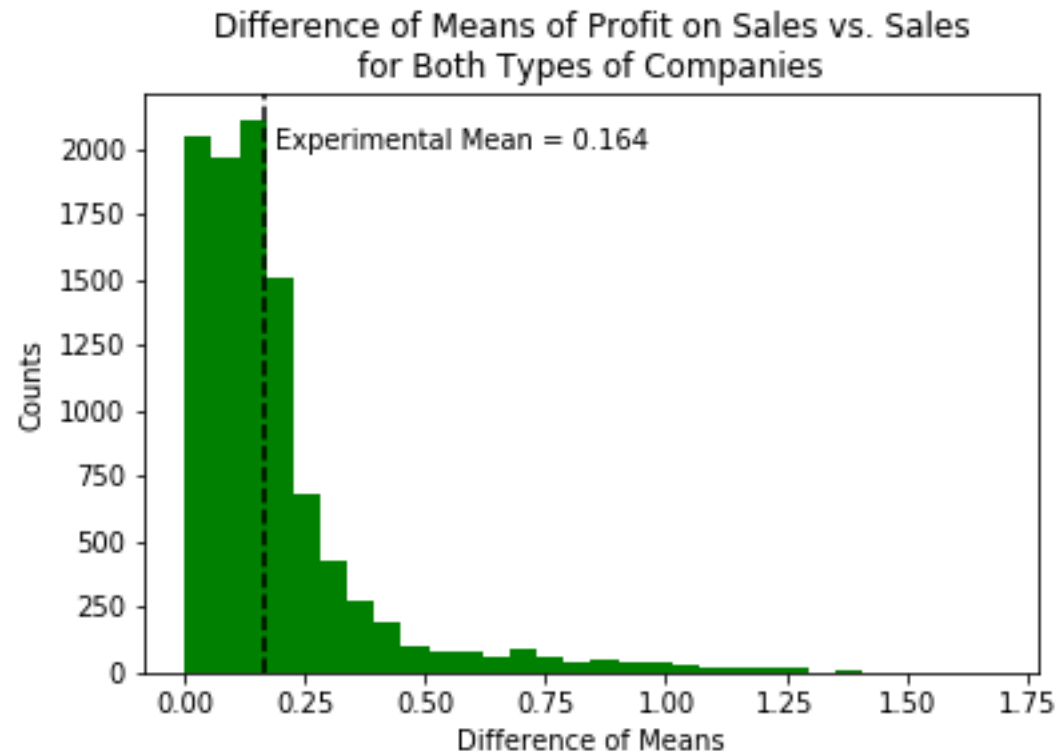
**BUT** are the true means really different?



Null Hypothesis (H0): the means are different

Alternative Hypothesis (H1): the means are the same

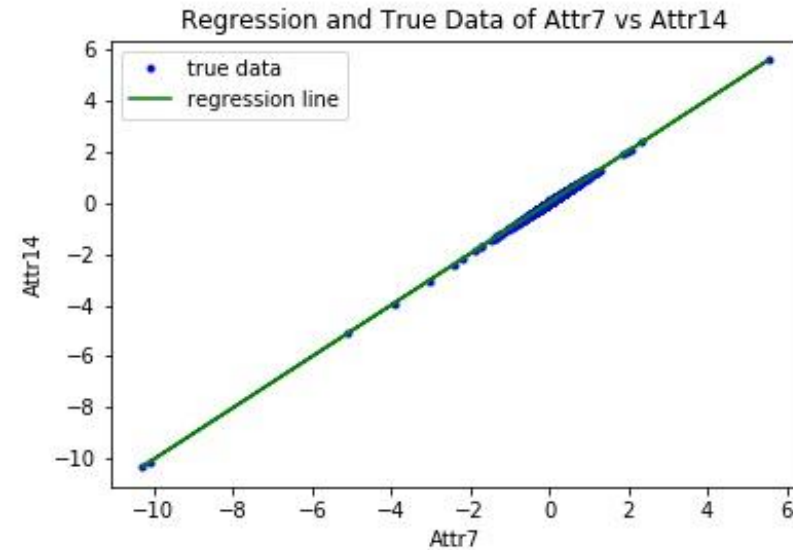
Bootstrap inference method was used to get 10,000 samples of the difference of means of bootstrapped Attr39 bankrupt and non-bankrupt samples.



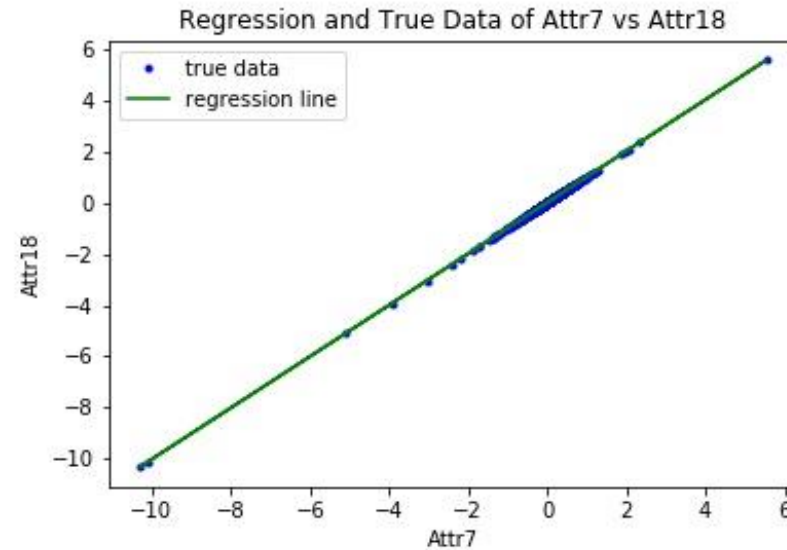
- **p-value:** 0.4
- **Implication:** 40% chance that we would see a mean as extreme as 0.164; thus, we must accept the null that the means are different.

### 3. Is Data Being Reported Accurately?

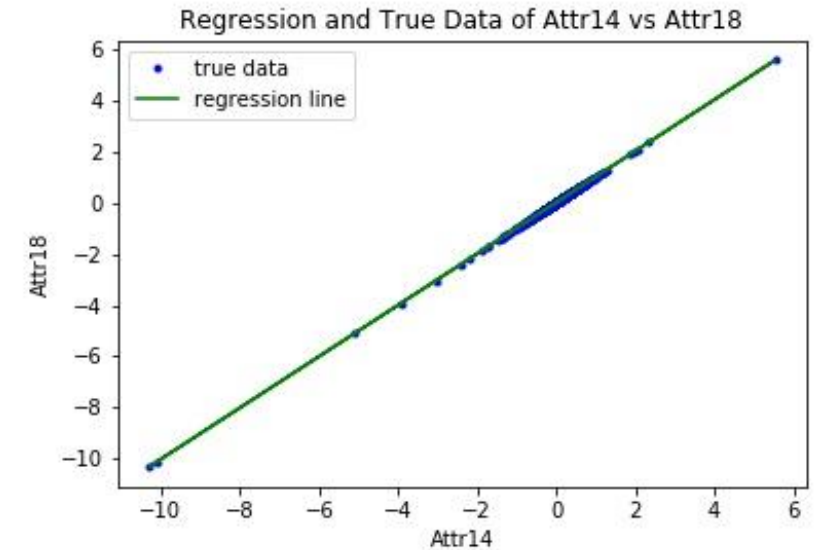
Attr7, Attr14, Attr18 seem to have the same data. 5901 of 5910 entries have the same data.



slope = 0.9999847768361899  
intercept = 2.623950924899314e-05



slope = 0.9999945803259087  
intercept = 9.341657898464208e-06



slope = 0.9999822669729542  
intercept = -1.525488991409506e-05

- Slopes  $\approx 1$ , Y-Intercepts  $\approx 0$  seem to provide support to above statement.
- What does this suggest?

Index	Definition
Attr7	EBIT / total assets
Attr14	(gross profit + interest) / total assets
Attr18	gross profit / total assets

**EBIT = Gross profit – Operating expenses – SG&A – Depreciation(Amortization)**

- If Attr7, Attr14, and Attr18 are the same for almost every instance, then it is possible that companies are not accurately reporting interest, operating expenses, SG&A, and depreciation (and/or amortization).
- This could significantly impact the decision of whether a company files for bankruptcy.

# Conclusions

- Early indications point to an increase in the bankruptcy rate in Poland.
  - However, more thorough statistical analyses can confirm this hypothesis.
- The inversely proportional relationship of total assets and sales may be important factors that influence the increase.
- Accurate reporting of financial data could be significant in determining if a company files for bankruptcy.