

Earnings Management Score

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What is Earnings Management

- “Earnings management occurs when managers use judgment in financial reporting and structuring transactions to alter financial report to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers.” Healy and Wahlen (1998).
- “Earnings management occurs when firm management has the opportunity to make accounting decisions that change reported income and exploit those opportunities”-Roman(2009)

Is Earnings Management Illegal?

- There are multiple ways a company can manage earnings.
- Some are not illegal, while the others include both illegal and fraudulent accounting activity.
- The accounting principle allows the firm management to use their discretion and judgment at the time of preparing financial report
- Managers can use their discretionary power to manage earnings accordingly.

Incentives of Earnings Management

- Firm management try to meet and beat market expectation of earnings.
 - Companies that successfully meet and beat earnings forecast enjoy reputation premium and lower cost of capital.
 - The stock market rewards a steadily growing and predictable earnings stream rather than a volatile one.
- The incentive to manage earnings arises from the need to increase personal bonuses and remunerations
- Earnings management may be aimed to benefit the controlling shareholders
- Managing Leverage Ratio to 'satisfy' lender's covenant/risk assessment requirement

Common Earnings Management Techniques

- Cookie jar accounting : The firms create reserve from undisclosed payment to inflate profits during lean years
- Big bath: When firm management makes performance of a poor year even poorer to make future earnings better
- Improper revenue recognition: management's effort to inflate profit by misstating source of income mostly at the expense of future earnings

Literature Review on Detection of Earnings Management

- The key problem in detecting earnings management rises from the fact that it's impossible to measure what would be the earnings in absence of manipulation.
- Most of the researchers consider unexpected accrual as measurement of earnings manipulation.
- To obtain an estimate of unexpected accrual, first total accrual is computed and then normal accrual, required for working capital maintenance, is subtracted from it
- Jones suggests firm-specific time series model where total accrual is regressed on plant and equipment and change in sales to find out normal accrual
- But as number of observations of a firm is very low, researchers mostly rely on cross sectional version of this model

Literature Review on Ownership Impact

- Alignment hypothesis posits that managerial shareholdings lead to a convergence of interests between management and stakeholders which guides the managers to decrease manipulation
- However, the entrenchment hypothesis states stock ownership give managers greater power to achieve their objective without fear of punishment which increase managerial opportunism (Fama & Jensen,1983)
- The efficient monitoring hypothesis posits institutional investors possesses greater resources to detect earnings management and thus inhibits opportunistic management
- Contrary to this, Duggal & Millar points out- Institutional investors are passive investors who are more likely to sell their holdings in poorly performing firms and hence their presence will put pressure on management to meet short term earnings expectation.

Our Approach

- We have developed a self-exciting model where earnings management is detected purely based on data. It is not a rule based measure.
- Our model uses structured data presented in the financial statements.
- Our model tests propensity of earnings management at the firm and sector level.
- We find earnings management practice is followed by stressed as well as (financially) healthy firms.

Methodology

- As accrual allows the firm management to record expenses or revenues which is expected to be realized in the future, accrual basis of accounting can be exploited by the management for the purpose of earnings manipulation. Hence our first aim is to calculate accrual for each firm-year.
- Balance Sheet approach: In balance sheet approach accrual is calculated as the change in non-operating asset. Total accrual (TA) is calculated by the following formula,
 - $TA_t = NOA_t - NOA_{t-1}$
 - Where Non-operating asset is difference between operating asset and operating liability.
 - $NOA = Operating Asset - Operating Liability$

Methodology(Cont.)

- After calculating BS and CF accrual for the available firm-years, we look for discrepancies in the financial elements for the firms belonging to high accrual buckets.
- It is observed that for these firms the following financial entries investments, long term investments, depreciation, selling and distributive expenses and deferred tax liability – differ significantly from the expected Benford's distribution.

This motivates us to categorize firms based on accrual ratio.

Methodology(Cont.)

- For each of the 12 years of study(2004-2016) the firms are ordered based on their accruals.
- Each firm is put into one of the six buckets- A,B,C,D,E,F- based on absolute level of accrual, where the firms with lowest level of accrual is put into bucket A and highest level of accrual is put into bucket F.
- Similarly each firm is put into one of the six buckets- A*,B*,C*,D*,E*,F*- based on absolute value of correlation between accrual and profit.

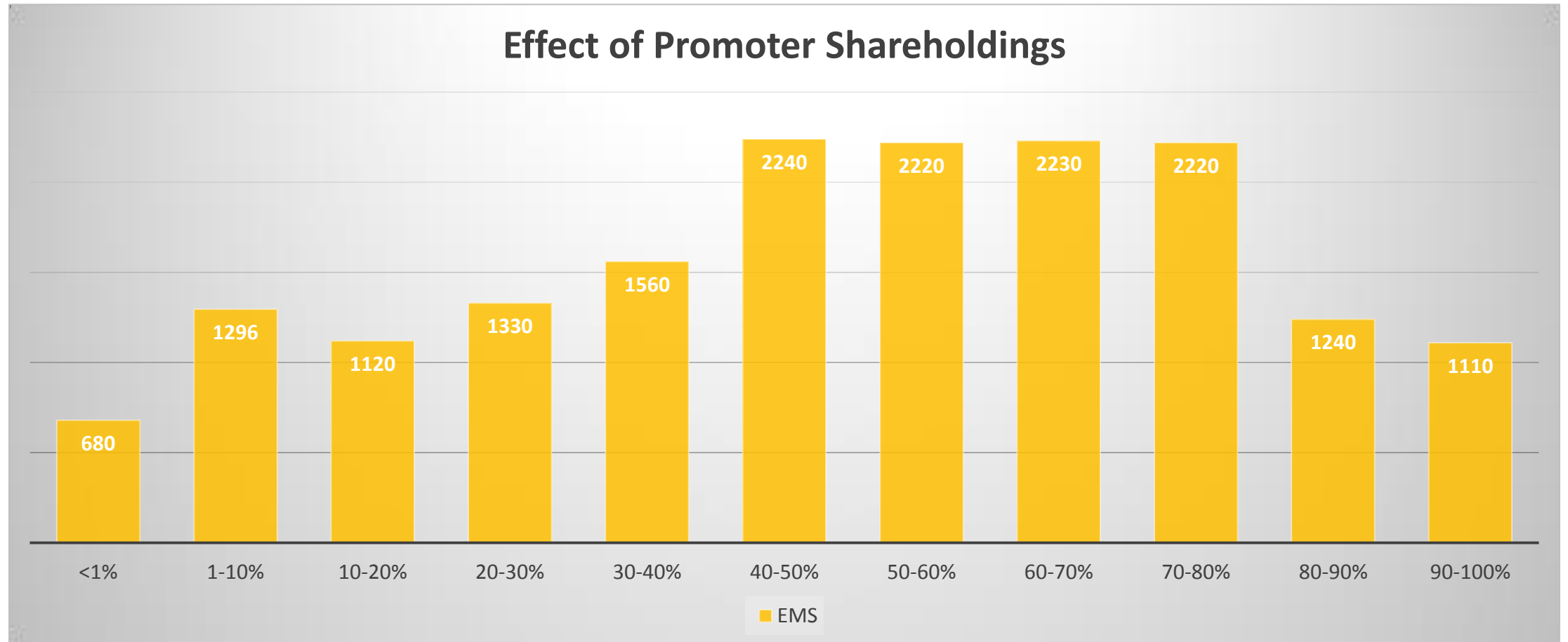
Methodology(Cont.)

- A cross-sectional version of Jone's model is used to calculate discretionary part of the accruals.
- For this purpose we first estimate Non-discretionary component of accrual (NDA) by regressing TA(total accrual) on PPE(plant purchase equipment), $\Delta(\text{REV}-\text{REC})$ [change in revenue less receivables], CFO[operating cash flow].
- $$NDA_t = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta \text{REV}_t - \Delta \text{REC}_t}{A_{t-1}} + \alpha_3 \frac{\text{PPE}_t}{A_{t-1}} + \alpha_4 \frac{\text{CFO}_t}{A_{t-1}}$$
- Finally discretionary part of the accruals is calculated by subtracting Nondiscretionary accrual from total accrual.
- $$DA_t = TA_t - NDA_t$$
- Discretionary accrual points to the magnitude of earnings management.

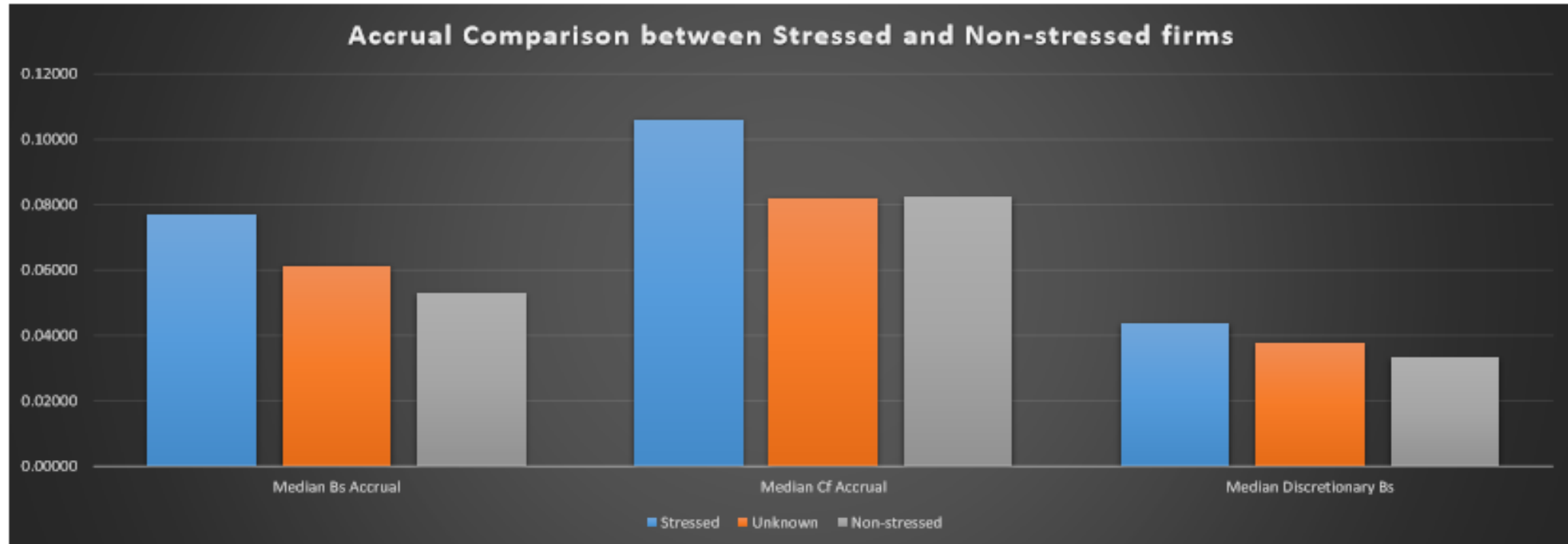
Data

- For the analysis, we've considered companies from the following 29. Industry classification has been done based on 2-digit NIC code industries
- Balance sheet and income statement of last 12 years(2005-2016) of 1270 companies with at least 20 companies in each industries has been used for model building purpose.
- For each firm correlation between profit and accrual(both BS & CF) is calculated by considering a moving window of 5 years . For instance for the year 2011 the profit accrual correlation is calculated by considering observation from 2006-2010
- Thus we have 4 variables BS and CF accrual, profit-BS accrual correlation, profit-CF accrual correlation .For each of the variables a company is allotted a score based on where it lies amongst all company set and the industry it belongs.
- A composite score for a firm-year is calculated by a transformation function for individual scores.
- Higher score indicates greater earnings management.

Effect of Promoter Holdings



Exploratory Analysis between Stressed and non-stressed firms



As the results indicate total accrual, discretionary accrual higher for stressed firms than that of non-stressed ones.

Results with all companies

	Companies with low EMS	Mid Range Companies	Companies with high EMS
Promoter Holdings	75.32%	66.24%	65.84%
Institutional Holdings	2.19%	3.54%	3.22%
FII holdings	0.31%	1.14%	0.98%

Wilcoxin test for equality of mean for good range and bad range companies		
Promoter Holdings	Institutional Holdings	FII Holdings
≈ 0	≈ 0	≈ 0

Results with all companies

	Companies with low EMS			Mid Range Companies			Companies with high EMS		
	1 st quantile	2 nd quantile	3 rd quantile	1 st quantile	2 nd quantile	3 rd quantile	1 st quantile	2 nd quantile	3 rd quantile
Total BS accrual Ratio	2.82%	4.93%	9.82%	4.77%	6.27%	11.77%	6.32%	7.40%	12.06%
Total Discretionary accrual ratio	0.4%	3.77%	7.54%	4.04%	7.40%	10.34%	4.89%	9.29%	14.24%

The gradual rise of both total accrual and discretionary accrual is discernible.

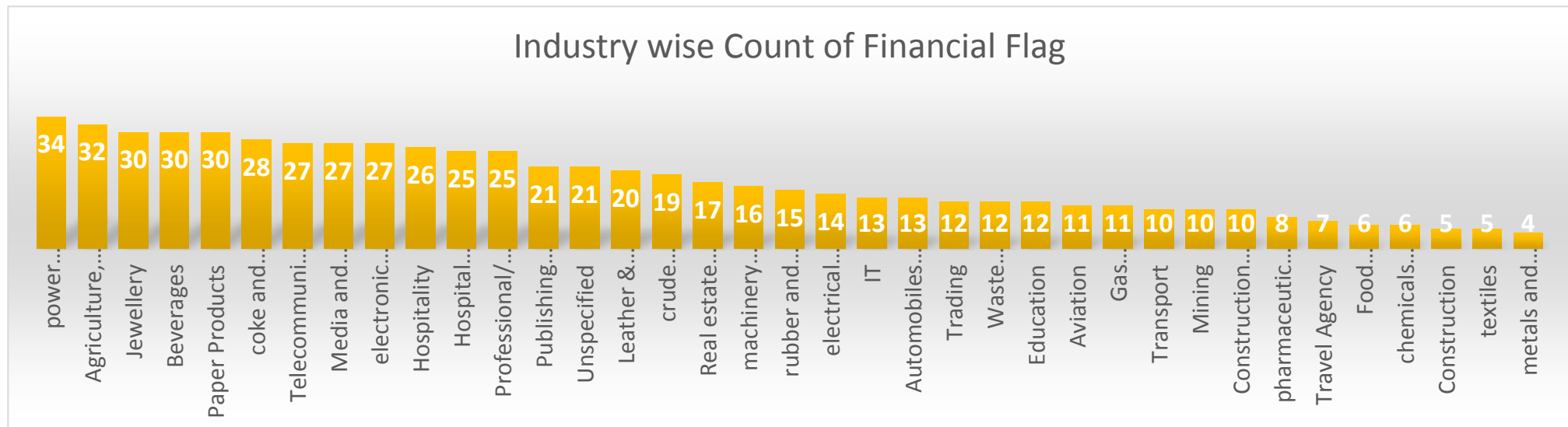
Earnings Management and Distress probability

10 companies with highest score			
Company Name	Industry	Overall score	P.D
Usher Agro Ltd.	FMCG	6100	19.41%
Mahalaxmi Seamless Ltd.	Metals	5690	35.33%
SPL Industries Ltd.	Textiles	5570	29.98%
Foundry Fuel Products Ltd.	Crude Oil Petroleum Gas	4580	35.84%
Cantabil Retail India Ltd.	Textiles	4560	17.40%
Samtel Color Ltd.	Electrical & Electronics Equipment	4550	70.04%
Ricoh India Ltd.	IT	4470	12.25%
Priyadarsini Ltd.	Textiles	4440	47.42%
Rei Agro Ltd.	FMCG	3800	42.25%
Euro Ceramics Ltd.	Construction Materials	3580	87.70%

10 companies with lowest score			
Company Name	Industry	Overall score	P.D
21St Century Constructions Ltd.	Realty	0	22.91%
Aricent Technologies (Holdings) Ltd.	IT	0	18.6%
DLF Telecom Ltd.	Telecommunication	0	9.3%
Central Railside Warehouse Co Ltd..	Transport & Logistics	0	12.31%
National Informatics Centre Services Inc.	IT	0	24.07%
Nirma Ltd.	Chemicals	0	17.73%
Pearl Beverages Ltd.	Alcohol & Breweries	0	44.82%
Sri Vishnu Shankar Mill Ltd..	Textiles	0	50.22%
Sterling Add-life India Ltd	Hospital Activities	0	33.91%
Twenty First Developers Pvt Ltd.	Realty	0	52.35%

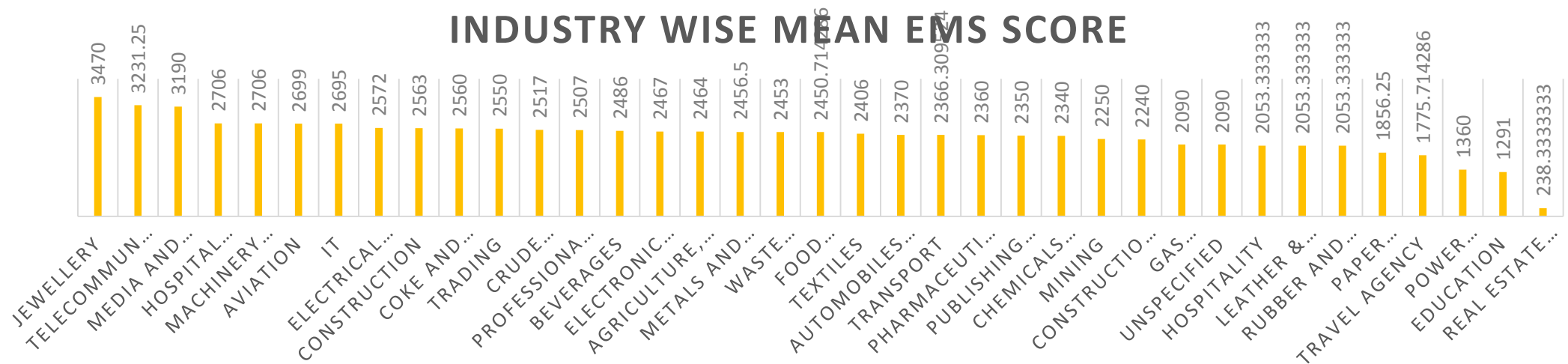
Industry level analysis using Benford's Law

- We carry out an industry level analysis of Benford's Law to identify possible flag variables for each industry
- Formally, we conduct a Chi-square test for each financial variable and identify a variable as flag if it deviates from Benford's distribution in 10% significance level.



Industry wise Median EMS Score

- We calculate industry wise median EMS score
- Then we find *Spearman* rank correlation coefficient of 0.1526.
- So we calculate a rank correlation coefficient for top 10 industries with high EMS score. In this case we find Spearman rank correlation coefficient to be 0.5061.



Identifying variables most vulnerable to Earnings Management

- We try to identify financial variables managed most by managed firms
- we test of Benford's law validity on financial variables of companies having high EMS score.

EMS Range	Score	Financial elements denoted as flag
>4500		Unsecured Loans, Deferred Tax Assets, Short Term Borrowings, Long Term Investment, Long Term Loans & Advances, Currents Investments, Sundry Debtors, Cash and Bank, Depreciation
3000-4500		Secured Loans, Unsecured Loans, Deferred Tax Assets, Long Term Investment, Currents Investments, Cash and Bank, Investments, Total Debt, Sales Turnover, Net Sales, Power & Fuel Cost, Miscellaneous Expenses, Cash from Financing Activities
2500-3000		Unsecured Loans, Deferred Tax Assets, Long Term Investment, Currents Investments, Inventories, Investments. Net Sales, Selling and Distribution Expenses, Depreciation, Cash from Financing Activities
2000-2500		Unsecured Loans, Long Term Investment, Currents Investments, Inventories, Investments, Total Debt, Net Sales, Power & Fuel Cost, Employee Cost, Cash from Financing Activities

THANK YOU!

Appendix

Accrual

- Earnings is the sum of cash flows and accruals.
- Accruals are amounts yet to be realized but owing at the subsequent accounting period.
- Accrual reduces the volatility of earnings by adjusting cash flows over time and present a smooth version of earnings.
- In the absence of accruals earnings would have frequent bumps and dips which would make it difficult for investors to assess the firms' performance.
- Accrual based of accounting is called efficient manipulation

Discretionary Accrual

- Accrual is necessary.
- But accrual estimation is in the hands of firm management
- The question is- What proportion of total accrual is subject to management's discretion?
- For that first we've to find out the normal level of accrual called non-discretionary accrual
- The non-discretionary component of accrual vary from industry to industry

Literature Review

- First significant work in discretionary accrual model is done by Healy (1985). He considers the mean total accruals from the estimation period as measure of non-discretionary accrual.

- $$NDA_{\tau} = \frac{\sum_t \frac{TACC_t}{TA_{t-1}}}{T}$$

- DeAngelo (1986) uses first-difference of total accrual as non-discretionary accrual. So this is a special case of Healy's model where length of estimation period is 1.

- $$NDA_{\tau} = TACC_{\tau-1}$$

Literature Review

- The most widely used accrual model is proposed by Jones (1991). He estimates non-discretionary accrual by regressing total accrual on some accounting variables which controls for firm's performance.
- $$\frac{NDA_t}{TA_{t-1}} = \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{PPE_t}{TA_{t-1}} + \beta_3 \frac{\Delta REV_t}{TA_{t-1}}$$
- The parameters $\beta_1, \beta_2, \beta_3$ are estimated by regressing $TACC_t/TA_{t-1}$ on the control variables.
- The model proposed by Jones was a firm-specific model where the parameters are separately estimated for each firm from its past financial data in the estimation period

Literature Review

- Lately a cross-sectional version of Jones' model, where the parameters are estimated for a specific industry and year is preferred.
- To mitigate the issue that revenues can be discretionary a modified version is proposed where the regressor change in revenue is replaced by change in revenue less change in credit sales.
- This modified version assumes that all credit sales are discretionary and hence this part is removed from revenue
- Dechow et al. (1995) reports companies with higher revenues are showing higher accrual
- Sloan (1996) finds negative correlation between accrual and CFO.
- Hence recent studies include CFO and ROA as control variables in the Jones' model.