

# Earnings Manipulation among the main industrial sectors. Evidence from Italy.

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## Abstract

This paper examines the risk of earnings manipulation among the Stock Italian Companies (“*Società per Azioni*”) in the main industrial sectors. The companies have been selected from the leading industrial sectors (textile, food, clothing, automotive and metallurgic) which have been generating relevant revenue streams over the past decades. These industry sectors have considered the ones who have driven the Italian Economy. By collecting financial data from AIDA database, we test the existence of Earnings Manipulation within Stock Italian Companies using the Beneish Model (Manipulation Score). The analysis conducted to those companies shows that the application of the model brings to the following interpretation: by using the threshold-limit of -1.78 (Beneish, 2013) a half of the companies analyzed has a low probability of manipulating income.

Keywords: Financial Accounting, Earnings Management, Earnings Manipulation, Performance Measurement.

## Introduction

Various tools have been developed over the past decades in order to assess the existence of Earnings Manipulation. One of the most important tool is the model of Messod D. Beneish from Indiana University (Bloomington, Indiana, USA), also known as Manipulation Score. This model has been applied among U.S. listed companies in order to investigate the existence of income manipulation.

The result of extensive research has led, in its practical application, at the very convincing remark which makes the model reliable to calculate the probability of accounting fraud.

However, the Italian scenario has mainly different in the economic structure as well as the accounting rules. The purpose of this research is based on the study of Beneish in order to create a template to be applied to Italian stock companies. We deeply analyze the following steps:

- (a) the phenomenon of Earnings Manipulation;
- (b) the diagnostic tools used by Beneish to identify the manipulation;
- (c) the sample of companies to be included for the statistical research;
- (d) the arrangements for the practical application of the model;
- (e) the final results with comments and future suggestions.

The research was conducted in order to achieve a reliable model that can be used by anyone who wants to verify the reliability of the financial statements of Stock companies. It especially helps banks and other lending institutions in order to have one more tool enables to defend themselves from deception and accounting preventing, in some cases, even the phenomena of fraudulent bankruptcy.

Through a statistical study on a sample of more than a thousand companies belonging to the main industrial sectors, we built a set of eight indicators (DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI and TATA) which allow us to identify the probability of earnings manipulation.

These indicators were entered into a regression model in order to assess the Manipulation Score for each industry sectors.

## Literature Review

The field of “Accounting Manipulation” is widely debated in the world of business as well as in international literature; it consists in the process of altering data of Income Statement and Balance Sheet, which deeply modify the company’s situation from the reality. According to Stolowy and Breton (2003), Accounting Manipulation is defined as the management discretionary decisions in order to make accounting choices that may affect the transfer of wealth between companies, between the company and capital providers, and, finally, between the company and managers.

The development of these illegal practices derived from the “Theory of Inefficient Markets” (Sharpe, 1964, Macey and Miller, 1990, Aboody, Hughes and Liu, 2002). An efficient market means that all the information can circulate quickly, correctly and without biases among all the operators in the market. In this condition, managers have no incentive to implement and manipulate accounting practices but, in condition of inefficiency characterized by asymmetry information, the information does not circulate quickly and may be distorted by the operators.

The main reason that push managers to adopt manipulating accounting practices is the fear of reaching a result that does not meet the stakeholders’ expectations. The general field of Accounting Manipulation can be distinguished into separate groups:

1. The *Creative Accounting* which means keeping the accounting practices into the limits of legality (*Earnings Management*);
2. The *Accounting Fraud* which means violating the accounting rules and principles (*Earnings Manipulation*).

The two fields of research (*Earnings Management & Earnings Manipulation*) belong to the same literature since many scholars have found methods and models that are useful in both cases. Earnings Manipulation can be considered as a branch of the general field of Earnings Management (EM).

The last decades have seen significant growth in academic research on the topic of Earnings Manipulation. The first Schipper’s contribution (1989) defined EM as a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain. Many scholars highlighted the role of EM in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the economic performance of the company (Healy and Wahlen, 1999). In this sense EM appears an active manipulation of earnings towards a predetermined target (Mulford and Comiskey, 2002).

According to Bartov (1993), Earnings Management can be obtained by using accounting methods and estimates (i.e., an accrual-based manipulation) or by undertaking

transactions that make reported income closer to some target number than it would otherwise be, rather than maximize the firm's discounted expected cash flows (i.e., a real manipulation) (Roychowdhury, 2006).

Earnings reporting choices are reflected in different measures of earnings (Walker, 2013). The Accruals are the accounting adjustments that explain the difference between free cash flows and operating income:

$$\text{Accruals} = \text{Operating Income} - \text{Free Cash Flows} \quad [1]$$

Walker (2013) defines “Free Cash Flows” as Cash Flows from Operations minus Net Cash Investment in operations. The relation between Earnings Management and Accruals Estimates has been widely examined in accounting literature. Healy (1985) and De Angelo (1986) used applying accrual methodology and their research findings demonstrated the evidence of income manipulation in a different setting, adopting non-discretionary accruals.

There has seen a significant growth in academic research on relationship between Earnings Management (EM) and Accruals Estimates driven by the advent of readily calculable EM metrics (Jones 1991, Dechow et al. 1995) and policy concerns raised by influential accounting standard setters. Jones (1991) used a linear regression approach and controlled for non-discretionary accrual factors including sales revenue and property, plant and equipment. Dechow et al. (1995) introduced the Modified Jones Model, which has become one of the most widely-used models in earnings management research. The Modified Jones Model includes an adjustment to sales based on the change in the amount of receivables. Moers, Peek, Meuwissen and Vanstraelen (2013) have recently provided a contribution by comparing abnormal accruals across different countries. By using the two accruals estimation models, the Modified Jones and the model of Dechow and Dichev (2002), they found that accruals model exhibit considerable cross-country variation in predictive accuracy and power to detect earnings management.

Other studies have explored real earnings manipulation in the context of early debt retirements (Hand 1989; Hand et al. 1990). Many scholars (Ronen and Sadan 1981, Dye 1988; Trueman and Titman 1988) suggested that managers are more likely to manipulate earnings through asset sales for several reasons: (1) accounting income from asset sales affects income from continuing operations, whereas income from early debt retirements is reported as an extraordinary item; (2) investors employ income from continuing operations, rather than net income, in their decision making and (3) managers manipulate earnings to affect investors' perceptions.

Before Beneish's contribution, there was a need of a more accurate analysis to find out in which way earnings can be manipulated through performance indicators. Beneish's study extends this literature by focusing on a model built on performance ratios, and demonstrating its ability to identify and predict fraud cases. He built up a model for identifying cases of Earnings Manipulation.

### **The Beneish Model**

In 1999, Beneish analyzed U.S. firms that manipulate earnings and developed a statistical model to discriminate manipulators from non-manipulators. This M-Score (Manipulation Score) model relies exclusively on Key Performance Indicators based on financial statement data and it is useful in monitoring fraud potential among firms.

According to Beneish et al. (2013), the model has been discussed in financial statement analysis textbooks (Fridson 2002, Stickney et al. 2003), in articles directed at

auditors, certified fraud examiners, and investment professionals (e.g. Cieselski 1998, Merrill Lynch 2000, Wells 2001, Harrington 2005).

The model includes eight performance indicators which defining the profile of a “typical earnings manipulator”. The indicators capture financial statements distortions that result from earnings manipulation (DSR, AQI, DEPI and TATA) as well as indicate a predisposition to engage earnings manipulation due to certain economic conditions (GMI, SGI, SGAI and LEVI). As defined by Beneish (1997), a firm manipulator is the one that:

1. *Growing extremely rapidly.* Sales Growth index (SGI) shows the past growth trend. An increasing means a reasonable predisposition to engage in manipulative behavior.
2. *Experiencing deteriorating fundamentals.* Manipulators are hypothesized to have deteriorating gross margin (GMI) and increasing SG&A expenses (SGAI). Furthermore, their debt-to-asset ratio is increasing as well as the greater proportion of their total assets reflect non-current and non-PPE investments (AQI).
3. *Adopting aggressive accounting practices.* An increasing Days in Sales Receivables (DSRI) shows an unusual build-up in receivables despite the rapidly increasing sales. Depreciation index DEPI shows that manipulators tend to slow down their depreciation percentage. Finally, the Accruals (TATA) indicates that reported accounting profits of manipulators are less supported by cash profits that those of non-manipulators.

The eight variables are the following<sup>1</sup>:

1. *DSRI (Days Sales in Receivables Index).*

A large increase in days’ sales in receivables may be the result of a change in credit policy in order to support sales, but a “not proportionated” increasing in receivables for sales can be a clear symptom of an "adjustment" of the profits. Beneish expected that a large increase of the index would be associated with a greater likelihood that revenues and the profits are overstated.

$$\text{DSRI} = \frac{(\text{Receivables } t) / (\text{Sales } t)}{(\text{Receivables } t-1) / (\text{Sales } t-1)}$$

2. *GMI (Gross Margin Index):*

When the GMI greater than 1, gross margins have deteriorated. The deterioration of gross margin is anegative signal about a company's prospects. This could drive managers to manipulate earnings. Consequently, there is a strong correlation between the index of the gross margin and the probability of manipulation.

$$\text{GMI} = \frac{(\text{Sales } t-1 - \text{Cost of Goods Sold } t-1) / \text{Sales } t-1}{(\text{Sales } t - \text{Cost of Goods Sold } t) / \text{Sales } t}$$

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<sup>1</sup> In Appendix B there is the legend of all the data included on indicators. Since the original indicators were tested within U.S. companies, we reclassified the Income Statement and the Balance Sheet in order to test the model within Italian companies that have a different classification.

3. AQI (Asset Quality Index):

When AQI is greater than 1, the company has potentially increased its involvement in cost deferral. An increase in asset realization risk indicates an increased propensity to capitalize and defer costs, which is a sign of earnings manipulation. Therefore, Beneish expected to find a positive relationship between the AQI.

$$\text{AQI} = \frac{[1 - (\text{Current Asset}_t - \text{PPE}_t) / \text{Total Assets}_t]}{[1 - (\text{Current Asset}_{t-1} - \text{PPE}_{t-1}) / \text{Total Assets}_{t-1}]}$$

4. SGI (Sales Growth Index):

“Growth does not imply manipulation, but growth companies are viewed by professionals as more likely than other companies to commit financial statement fraud, because their financial positions and capital needs put pressure on managers to achieve earnings targets” (Beneish, 1999). An SGI greater than 1 indicates that sales are growing over the previous year. If growth companies face large stock price losses at the first indication of a slowdown, they may have greater incentives than non-growth companies to manipulate earnings. Beneish expected a positive correlation between the SGI and the probability of earnings manipulation.

$$\text{SGI} = \frac{\text{Sales}_t}{\text{Sales}_{t-1}}$$

5. DEPI (Depreciation Index):

“A DEPI greater than 1 indicates that the rate at which tangible assets are being depreciated has slowed-raising the possibility that the company has revised upward the estimates of assets' useful lives or adopted a new method that is income increasing” (Beneish, 1999). Beneish hypothesized a positive correlation between DEPI and the likelihood of earnings management.

$$\text{DEPI} = \frac{\text{Depreciation}_{t-1} / (\text{Depreciation}_{t-1} + \text{PPE}_{t-1})}{\text{Depreciation}_t / (\text{Depreciation}_t + \text{PPE}_t)}$$

6. SGAI (Sales, General and Administrative Expenses Index)

A GAI greater than 1 means that the cost of selling, general and administrative expenses increased proportionally more than sales. According to Lev and Thiagarajan (1993), analysts interpret a non-proportionate increase in sales as a negative signal about a company's prospects. Beneish expected to find a positive relationship between the SGAI and the probability of manipulation.

$$\text{SGAI} = \frac{(\text{SGA expenses}_t) / (\text{Sales}_t)}{(\text{SGA expenses}_{t-1}) / (\text{Sales}_{t-1})}$$

7. LVGI (Leverage Index)

A LVGI greater than 1 is equivalent to an increase in financial leverage (leverage). This index is useful to capture the incentives in debt covenants that can lead to manipulate earnings. Once the debt is at risk of violation is easier than managers artificially increase profits to avoid the effects of a breach, an increase in the portion of debt.

$$\text{LVGI} = \frac{(\text{LTD}_{t+1} + \text{Current Liabilities}_{t+1}) / \text{Total Assets}_{t+1}}{(\text{LTD}_{t-1} + \text{Current Liabilities}_{t-1}) / \text{Total Assets}_{t-1}}$$

8. TATA (Total Accruals to Total Assets)

Total Accruals was used in prior researches to assess the extent to which managers make discretionary accounting choices to alter earnings (Healy, 1985). The value of the TATA is used to proxy for the extent to which cash underlay reported earnings. may be negative, when the operating cash flow greatly exceeds the net profits and, therefore, there are negative accruals, or reach unity, which means that all assets are made up of accruals. Beneish expected a strong positive association between accruals (less cash) and the higher likelihood of earnings manipulation.

$$\text{TATA} = \frac{[(\text{Current Assets}_{t+1} - \text{Cash}_{t+1}) - ((\text{Current Liabilities}_{t+1} - \text{Current matur. Of LTD}_{t+1} - \text{Income tax payable}_{t+1}) - \text{Depr. \& Amort.}_{t+1})]}{\text{Total Assets}_{t+1}}$$

Not all variables are individually important, but they collectively create a “composite sketch” of a potential earnings manipulator.

The Earnings Management literature provides two alternatives of the Beneish model to identify the propensity of a company to manipulate earnings. The first one (the full model – the 8M Score) that involves all the eight variable. On the other hand, the second alternative (the simple model – the 5M Score) picks only five variables up, omitting those are less relevant and meaningful.

### **Data Collecting, Sampling and Model Testing**

In this paper, we investigate the risk of manipulating earnings among the Stock Italian companies (“*Società Per Azioni*”) in the main traditional industry sectors. According to the analysis, we have selected the leading industrial sectors in Italy, which they have been characterized from huge revenue streams as well as they have always driven the Italian economy over the past decades. The relevant industry sectors are the following:

- “Textile Industry”
- “Food Industry”
- “Clothing Industry”
- “Automotive Industry”
- “Metallurgic Industry”

The sample of Companies (“*Società per Azioni*”) has been selected from the database of financial information for Italian companies (*AIDA Bureau Van Dijk*) and it covers the time period from 2005 to 2012, included. Since several financial data were not available on the

database, we achieved the percentage coverage for each industry sectors, by calculating the companies with data available divided by all data required (*Table A*).

	Textile	Food	Clothing	Automotive	Metallurgic	TOTAL
Companies (from AIDA)	608	803	378	454	512	2755
Companies in Liquidation Sale	46	24	34	30	23	157
Companies selected	562	779	344	424	489	2598
Companies with data available	407	522	236	274	370	1809
<b>% Coverage</b>	<b>72,42%</b>	<b>67,01%</b>	<b>68,60%</b>	<b>64,62%</b>	<b>75,66%</b>	<b>69,66%</b>

*Table A – Sample of Companies with data available*

As we have already mentioned, there are many differences between U.S. and Italian Accounting principles so that we propose a reclassified model in order to identify the Earnings Manipulation within Italian Stock Companies. The original model has been adapted to the Italian scenario with a reclassification of the Income Statement and the Statement of Financial Position.

According to the Italian Accounting principles, the “Selling, General and Administrative expenses” data are not present on financial statements, since this item would result from a classification of expenses by function (provided by US GAAP), while Italian financial statements, which follow the Civil Code, classifies expenses and revenues for nature. When financial data are not available, Beneish assumes that all indices remain constant over the years, except for TATA index. In this analysis, we use the neutral value equal to 1 for SGAI index.

In this paper, we use the “full version” of Beneish Model (8M-Score) in order to test whether each industry has affected by earnings manipulation.

The eight indicators were entered into a regression model in order to achieve the Manipulation Score. By applying the model, we are able to categorize the companies in two different groups: the one with a low probability of Earnings Manipulation and the other with high probability of manipulation.

Industry Sectors	Company's type	Beneish Model (1999)	Threshold
Textile	ITALIAN STOCK COMPANIES	$\text{Manipulation Score} = -4,840 + 0,920 * \text{DSRI} + 0,528 * \text{GMI} + 0,404 * \text{AQI} + 0,892 * \text{SGI} + 0,115 * \text{DEPI} - 0,172 * \text{SGAI} - 0,327 * \text{LVGI} + 4,679 * \text{TATA}$	Threshold < -1.78 → Low Probability of Earnings Manipulation Threshold > -1.78 → High Probability of Earnings Manipulation
Food			
Clothing			
Automotive			
Metallurgic			

*Table B – Research Design of EM*

The Final Manipulation Score for each company is obtained from the formula (*Table B*) and it is computed by the average scores of the past years (2005 to 2012). The companies with available financial data are considered the ones with no more than two missing values within the time-period 2005-2012<sup>2</sup>. After computing the value for each company and for each year, we have calculated the final value by doing the average of all the values among the period 2005-2012.

## Findings

The research aims to identify whether Stock Italian Companies have manipulated earnings over the past decade. In this field, the Model of Beneish was used in discriminating companies, which have a risk in manipulating earnings and companies do not.

The overall result seems to identify that the half of Stock Italian Companies have a high probability of manipulating risk (by using the threshold of 1-78).

<b>THRESHOLD -1.78</b>	<b>TOTAL</b>	
Companies with High Probability of EM	<b>929</b>	<b>51.4%</b>
Companies with Low Probability of EM	<b>880</b>	<b>48.6%</b>
Total	<b>1809</b>	<b>100.0%</b>

*Table D – Overall results with the -1.78 threshold*

According to *AIDA Bureau Van Dijk* database, the Italian Stock Companies belonging to the main industrial sectors (Textile, Food, Clothing, Automotive and Metallurgy) are 2755 of which 157 are in liquidation sale and, thus, out of the sample. The remaining 2598 Companies have been covered with a percentage of 70% since the companies with data available are 1809.

The findings show that, using a threshold of -1.78, the 51,4% of companies have a high probability of manipulating earnings while the 48,6% not. By going in the details of industrial sectors, the results are the following<sup>3</sup>:

- **Textile Industry**

The Textile Stock Companies are 608 of which 46 are in liquidation sale and, thus, out of the sample. The remaining 562 have been covered with a percentage of 72% since the companies with data available are 370. The results show that the 56,51% have a high probability and 43,49% not.

- **Food Industry**

The Food Stock Companies are 803 of which 24 are in liquidation sale and, thus, out of the sample. The remaining 779 have been covered with a percentage of 67% since the companies with data available are 522. The findings show that the 41.00% have a high probability and 59% not. This means that two different threshold bring to two different results.

- **Clothing Industry**

The Italian Stock Companies belonging to the Clothing Sector are 378 of which 34 are in liquidation sale and, thus, out of the sample. The remaining 344 have been

<sup>2</sup> An example is provided in the Appendix C.

<sup>3</sup> The tables and graphs related to the industrial sectors are showed in the Appendix D.

covered with a percentage of 69% (236 have been the companies with data available). The results show that the 66,95% have a high probability and 33,05% not.

- **Automotive Industry**

The Automotive Stock Companies are 454 of which 30 are in liquidation sale and, thus, out of the sample. The remaining 424 have been covered with a percentage of 65% since the companies with data available are 274. The results show that the 55,84% have a high probability and 44,16% not.

- **Metallurgic Industry**

The Italian Stock Companies belonging to the Metallurgic sector within Automotive Sector are 512 of which 23 are in liquidation sale and, thus, out of the sample. The remaining 489 Companies have been covered with a percentage of 76% since the companies with data available are 370. The findings show that the 47.03% have a high probability and 52.97% not.

### **Concluding Remarks**

From the results obtained for each industrial sector, this what emerged: the “*Food Industry*” is the one with a higher percentage of “low probability of manipulation” (59%) versus 41%, followed by the “*Metallurgic Industry*” where the analysis leads to a result of low probability of manipulation, amounting to 52.7%, compared to a high of 47.03%.

In the “*Automotive Industry*”, on the other hand, the percentages are reversed in favor of the “high probability of manipulation” (55.84%) against a low of 44.16%. In the “*Textile Industry*”, there has been a result of “low probability” of 43.49%, compared to a high of 56.51%. Finally, the “*Clothing Industry*” is the one with the higher percentage of “high probability”, 66.95%, compared with a low of 33.05%<sup>4</sup>.

The overall result shows a substantial equality of the companies analyzed between the low and the high probability of manipulating earnings.

### **Suggestions for future contributions**

The suggestions for future contributions are based on expanding the data in terms of further industry sectors. It would be useful considering EU-nations as well as no EU-nations in order to make a cross-country analysis and compare the results.

Furthermore, in relation with the -1.78 threshold (Beneish et al., 2013), however, the “professional practice” sets a different threshold, equal to -2.22. It would be appropriate to carry out a comparative analysis between the two thresholds. Finally, it would be even useful analyzing the findings related to the variance between the two results.

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<sup>4</sup> The Appendix D shows all the results within each industrial sector.

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## Appendix A – Industry Sectors Classification from AIDA

### **Textile Industry (Classification product from AIDA: 13)**

1. Preparation and spinning of textile fibers
2. Weaving/webbing
3. Finishing
4. Other textile industries (knitted fabrics, textile articles (except apparel ), other technical and industrial textiles, carpets and rugs, cordage, rope, twine and netting, other textiles non classified)
  - Manufacture of knitted fabrics
  - Manufacture of textile articles (except apparel )
  - Manufacture of carpets and rugs
  - Manufacture of cordage, rope, twine and netting
  - Manufacture of textiles, non-wovens and articles made from these materials and articles, (except apparel)
  - Manufacture of other technical and industrial textiles
  - Manufacture of other textiles

### **Food Industry (Classification product from AIDA: 10)**

1. Processing and preserving of meat and production of meat products
2. Processing and preserving of fruit and vegetables
3. Processing and preserving of fish, crustaceans and mollusks
4. Production of vegetable and animal oils and fats
5. Production of milk and dairy products
6. Production of grain mill products, starches and starch products
7. Production of bakery and farinaceous
8. Production of other food products ( cocoa, chocolate, candy, confectionery, tea, coffee, condiments, spices, prepared meals, homogenized food preparations, dietetic food, other foods no classified)
9. Production of prepared animal feed (pets and farm animals)

### **Clothing Industry (Classification product from AIDA: 14)**

1. Manufacture of wearing apparel (except fur apparel) (Pack of leather clothes, work wear, other outerwear, underwear, other wearing apparel and accessory)
2. Manufacture of articles of fur apparel
3. Manufacture of knitted and crocheted articles (knitted and crocheted hosiery, other knitted and crocheted)

### **Automotive Industry (Classification product from AIDA: 29 e 30)**

1. Manufacture of motor vehicles, trailers and semi-trailers (motor vehicles, bodies for motor vehicles, manufacture of trailers and semi-trailers, parts and accessories for motor vehicles).
2. Manufacture of other transport equipment
  - Building of ships and boats
  - Manufacture of railway locomotives and rolling stock tramway
  - Manufacture of air and spacecraft and related machinery
  - Manufacture of spacecraft and related machinery
  - Manufacture of combat vehicles

- Manufacture of transport equipment nec (motorcycles, batteries and invalid carriages, others)

**Metallurgic Industry (Classification product from AIDA: 24)**

1. Steel Activities
2. Manufacture of tubes, pipes, hollow profiles and related fittings, of steel and other products of first processing of steel.
3. Cold drawing of bars, cold rolling of strips, forming or cold forming, Cold drawing.
4. Manufacture of basic precious and other non-iron metals, aluminum, lead, zinc, tin, copper and other non-iron metals.
5. Processing of nuclear fuel, activities foundries, iron casting, steel casting, casting of light metals, Casting of other non-iron metals.

## Appendix B – Indicators legend

**Receivables** consist of a series of short and long-term accounting transactions dealing with the billing of a customer for goods and services they have ordered. In AIDA they named as “Crediti vs Clienti entro 12 mesi ed oltre 12 mesi”.

**Sales** are the act of selling a product or service in return for money or other compensation. In AIDA they named as “Ricavi di Vendite e Prestazioni”.

**Cost of Goods Sold** is computed as “cost of beginning inventory + cost of goods purchased (net of any returns or allowances) – cost of ending inventory”. In AIDA they named as “Costo del Venduto = Rimanenze Iniziali + Costo delle materie prime – Rimanenze Finali”

**Current Assets** consists of any asset reasonably expected to be sold, consumed, or exhausted through the normal operations of a business within the current fiscal year or operating cycle. In AIDA, they named as “Attivo Circolante”.

**PPE** (Property, Plant and Equipment) consists of “Tangible Assets” that are included in Fixed Assets. In AIDA they named as “Immobilizzazioni Materiali”.

**Total Assets** is computed as the sum of Current Assets and Fixed Assets. In AIDA, they named as “Totale Attivo”.

**Depreciation** is the decrease in value of Tangible Assets (Property, plant and equipment) while “Amortization” is the decrease of Intangible Assets. In AIDA, they named as “Ammortamento dei beni materiali”.

**SGA expenses** (Selling, General and Administrative expenses) is the sum of all direct and indirect selling expenses and all general and administrative expenses of a company. AIDA doesn't show this cost category. We assume the value of 1

**LTD** (Long Term Debts) is the sum of all long term borrowings of a company. AIDA doesn't show this cost category. In AIDA, the named as “Totale Debiti oltre l'esercizio”.

**Current Liabilities** consists of all debts or obligations that are due within one year. In AIDA, they named as “Passivo Corrente”.

**Cash** consists of Legal tender or coins that can be used in exchange goods, debt, or services. In AIDA, they named as “Totale Disponibilità Liquide”.

**Current Maturity of LTD** consists of the amount of LTD that expired within one year. This item is included in the general area of “Passivo Corrente”. So that, “Passivo Corrente = Current Liabilities + Current Maturity of LTD”.

**Income Tax Payable** comprised of taxes that must be paid to the government within one year. In AIDA, this is computed as “Imposte Correnti + Imposte Differite – Imposte Anticipate”.

**Depr.&Amort.** are decrease in value of both Tangible and Intangible Assets. From AIDA, this is computed as “Ammortamento beni materiali + Ammortamenti beni immateriali”.

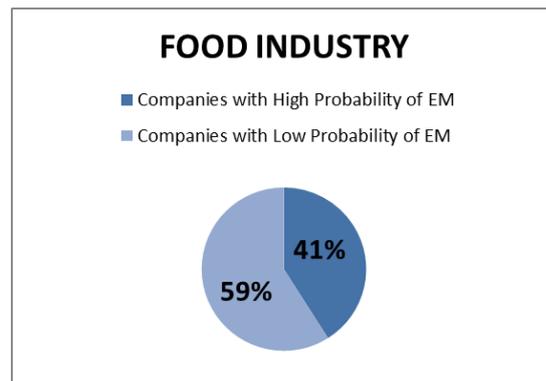
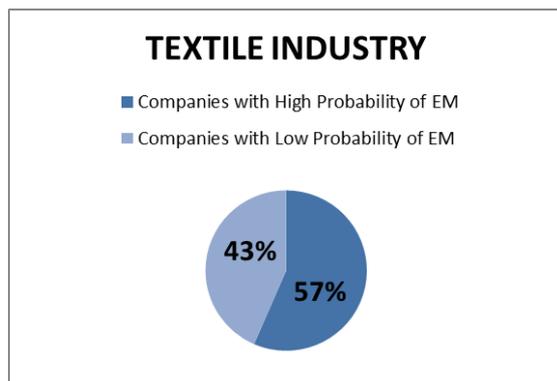
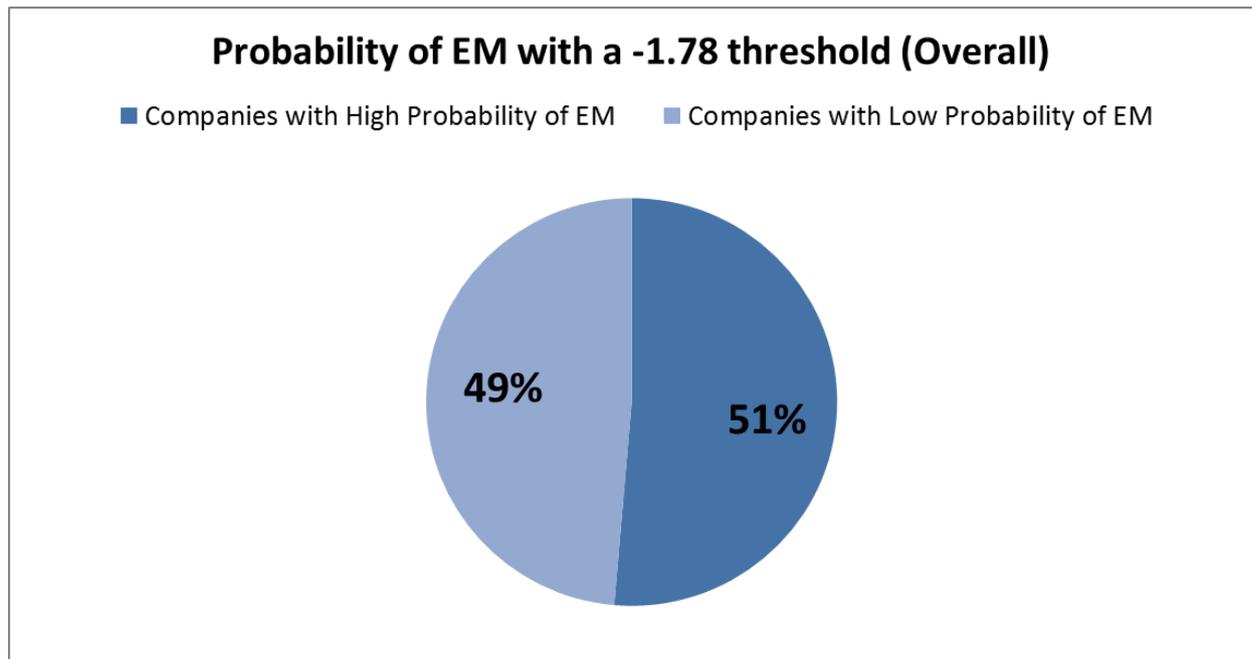
*Appendix C – Example of M-Score computation (Textile Industry)*

	Ragione sociale	RISULTATI								Average
		2012	2011	2010	2009	2008	2007	2006	2005	
1.	LORO PIANA S.P.A.	-1.29	-1.23	-1.31	-1.80	-1.15	-1.49	-1.21	-1.48	-1.37
2.	IN.CO - INDUSTRIA CONFEZIONI S.P.A.	-1.71	-1.72	-1.82	-2.61	-2.00	0.05	-0.57	-1.48	-1.48
3.	FULGAR S.P.A.	-0.89	-1.02	-0.64	-0.22	-2.03	-2.10	-1.59	-0.64	-1.14
4.	MANIFATTURA LANE GAETANO MARZOTTO & FIGLI S.P.A. O PIU' BREVEMENTE MARZOTTO O GMF	-3.91	-4.09	-4.67	-2.80	-2.84	-1.92	.	.	-3.37
5.	LIMONTA - SOCIETA' PER AZIONI	-1.89	-1.62	-2.02	-2.56	-1.46	-1.98	-2.09	-1.85	-1.93
6.	UNION INDUSTRIES - S.P.A.	-1.69	-1.61	-1.12	-1.26	-0.94	-0.86	-0.88	-1.09	-1.18
7.	OLIMPIAS SPA	-0.40	-0.69	-1.28	-0.98	-0.94	-1.24	-1.21	-1.65	-1.05
8.	COTONIFICIO ALBINI SPA	-1.14	-1.53	-1.23	-1.42	-1.14	-0.93	-0.57	-0.87	-1.11
9.	TESSILQUATTRO S.P.A.	-2.50	1,178.31	0.33	-2.66	-0.95	-2.36	-0.44	5.41	146.89
10.	VITALE BARBERIS CANONICO - S.P.A.	-1.08	-1.07	-1.73	-1.41	-1.58	-1.82	-1.05	-1.81	-1.44
11.	TENACTA GROUP S.P.A.	-1.64	-1.59	-1.52	-1.56	-1.32	-1.58	-1.57	-1.41	-1.52
12.	ALCANTARA SPA	-1.38	-1.59	-1.59	-1.36	-1.81	-1.13	-1.60	-1.98	-1.55
13.	RATTI S.P.A.	-2.49	-2.35	-2.76	-4.12	.	.	.	.	.
14.	CARIAGGI LANIFICIO - SOCIETA' PER AZIONI	-1.79	.	.	.	.	-1.51	-1.96	-1.48	.
15.	CANDIANI S.P.A.	0.29	-0.15	0.01	-0.59	-1.40	-0.61	-0.47	-1.62	-0.57
16.	CARVICO - S.P.A.	.	.	-1.63	-2.41	-0.18	-1.60	-1.65	-1.88	-1.56
17.	SAATI S.P.A.	-0.37	-0.95	0.05	-0.40	-0.06	0.01	-0.48	-0.34	-0.31
18.	LISA S.P.A.	.	.	0.29	-0.09	-0.03	-0.27	-0.39	-0.87	-0.23
19.	ZEGNA BARUFFA LANE BORGESIA S.P.A.	.	-1.59	-1.68	-1.49	-1.72	.	.	-1.88	.
20.	SAFIL S.P.A.	-1.71	-1.41	2.91	0.24	-0.50	-1.57	-1.46	-0.72	-0.53

The companies with available financial data are considered the ones with no more than two missing values within the time-period 2005-2012. In the example of “Textile Industry”, companies with available data are all except for n. 13, 14 and 19 since they have more than two missing values. For example, numbers 4,16 and 18 have two missing values so they were included in the analysis.

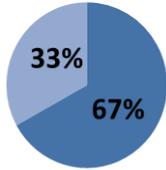
*Appendix D – Results of each industrial sector*

<i>THRESHOLD -1.78</i>	Textile		Food		Clothing		Automotive		Metallurgic		TOTAL	
Companies with High Probability of EM	230	56,5%	214	41,0%	158	66,9%	153	55,8%	174	47,0%	929	51,4%
Companies with Low Probability of EM	177	43,5%	308	59,0%	78	33,1%	121	44,2%	196	53,0%	880	48,6%
Total	407	100,0%	522	100,0%	236	100,0%	274	100,0%	370	100,0%	1809	100,0%



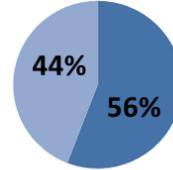
### CLOTHING INDUSTRY

- Companies with High Probability of EM
- Companies with Low Probability of EM



### AUTOMOTIVE INDUSTRY

- Companies with High Probability of EM
- Companies with Low Probability of EM



### METALLURGIC INDUSTRY

- Companies with High Probability of EM
- Companies with Low Probability of EM

