The Impact of the Financial Crisis on Earnings Management: Empirical Evidence from the Top 5,000 Non-Listed Stock Italian Companies

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Abstract

Account manipulation has been the subject of accounting discussions not only in the U.S. but across the world, especially during times of financial crises. This paper investigates the impact of the recent financial crisis on account manipulation probability by adopting the Beneish Model (1999, 2013) of eight performance ratios. The analysis has been conducted using the Top 5,000 Non-Listed Stock Italian Companies (Società Per Azioni) ranked by revenues during the time period 2005-2012. We use the AIDA Bureau Van Dijk database. We test the existence of earnings management (EM) within the Top Non-Listed Stock Italian Companies through a comparison between the pre-crisis period (2005-2008) and the crisis period (2009-2012). Our findings show that the number of firms with a higher likelihood of earnings manipulation decreases by 4.53% from the pre-crisis to crisis period. As a consequence, we argue that EM increases when the crisis is weak while EM decreases during the crisis period.

1 Introduction

Company managers engage in account manipulation, including earnings management, to meet stakeholders' expectations resulting in financial reporting that may not fairly present the firms' operations. Moreover, Stolowy and Breton [28] contend that account manipulation can lead to inefficient capital markets. Extant accounting research [8], [3], and [16] states that executives' acknowledge the importance of meeting earnings to achieve targets (i.e. loss avoidance or analysts' forecasts) as well as recognize that earnings attainment represents a relevant motivation for accounting manipulation [29]. Stolowy and Breton [28] define account manipulation as management's discretionary decision to make accounting choices that may affect the transfer of wealth between companies, the company and capital providers, the company and managers or managers. One form of account manipulation is earnings management (EM).

The objective of this paper is to assess whether managers do manipulate accounts more often during the time of financial crisis than otherwise.

To this end we study the group of about Top 5,000 Non-Listed Stock Italian Companies, and we compute the eight ratios as defined by Beneish [5]. Beneish [4] finds that his eight ratios capture financial statement distortions and provide timely assessments of the likelihood of distortions[1] especially when considered in conjunction with management incentives. So, for each firm-year from 2005 to 2012, we compute the Beneish ratios and consider management's incentive. Then we group these observations as pre-crisis or crisis-period in order to assess whether companies have a high probability of EM or with a low probability for EM. That is, we compare the final scores across two different time periods: pre-crisis (2005-2008) and crisis-period (2009-2012), assuming 2009 as the year of financial crisis in the U.S. and worldwide.

Findings show that within the Top 5,000 Stock Italian companies (non-listed on the Italian financial markets), the number of firms with a higher likelihood of earnings manipulation decreased by 4.53% from pre-crisis to crisis periods. This means that financial crisis has had a positive impact by lessening earnings manipulation of the Top Stock Italian Companies. We believe that Italian firms have a greater propensity to manipulate and hide wealth creation during non-crisis periods to obtain tax savings and restrain the distribution of wealth. From the opposite point of view, it does not make sense for firms to

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[1] We intend distortions as financial statement distortions which capture unusual accumulations in receivables (DSRI, indicative of revenue inflation), unusual growth of Sales (SGI), unusual growth of Selling, General and Administrative Expenses (SGAI), unusual capitalization and declines in depreciation (AQI and DEPI, both indicative of expense deflation), unusual propensity to borrow money (LVGI), deterioration of Gross Margin (GMI) and the extent to which reported accounting profits are supported by cash profits (TATA).

manipulate earnings in times of financial crisis, because there is less earnings in general.

Our analysis is conducted by adopting a reliable model of the likelihood of manipulation of accounts in order to assess the impact of the financial crisis on non-listed Italian stock companies' accounts. Moreover, this study is useful in assessing the reliability of the financial statements of Italian Stock companies. This analysis could also be helpful to banks and other lending and investing entities as it represents an additional tool useful to detect account manipulation and accounting fraud, and to reduce information asymmetry during the period of financial crisis. Finally, the results have implications for future researchers that study managements' incentives concurrently with security offerings.

We assess the impact of the financial crisis (by assuming year 2009 as the trigger point) on EM for the top non-listed Italian Companies sample ranked by sales revenues. We use the Beneish model [5] of eight performance ratios to predict the probability of fraud cases of these Italian companies. In explaining our analyses, the remainder of this paper proceeds as follow. Next we present a literature review of EM studies during the financial crisis followed by an identification of the performance indicators used to determine EM probability as developed by Beneish. Then we present our empirical analyses results of the Top Stock Italian Companies ranked by sales revenues and tests of these probabilities pre-crisis and during the financial crisis. We conclude with comments on our main findings and provide suggestions for further research.

2 Prior Literature and Hypothesis

2.1 Earnings Manipulation

Many accounting scholars have defined and associated earnings manipulation with accrual accounting. Earnings management (EM) has been defined by Schipper [27] as "a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain." Many scholars have debated the role of EM as resulting in misleading stakeholders about a firm's performance [16]. In this context, EM is an active manipulation of earnings towards a predetermined target [22]. However, our objective is not to argue the merits of accrual accounting. Rather we study EM as a means of achieving a target during non-financial crisis vs financial crisis times.

According to the prior literature, "accruals" are used as a means for EM adjustments that may result in adverse consequences. Accruals may be explained as the difference between cash flows and operating income and is computed as follows [15], [9]:

Accruals = Reported earnings – Cash flows from operations

Healy [15] and De Angelo [28] have used the above model to find evidence of income manipulation in a different setting, adopting non-discretionary accruals. Many accounting scholars have analyzed the relation between EM and accruals estimates driven by the advent of readily calculable EM metrics [18], [11], and policy concerns raised by influential accounting standard setters [24]. The relevant contribution provided by Jones [18] is based on a linear regression approach that uses non-discretionary accrual variables including sales revenue and property, plant and equipment.

Many studies have improved upon EM measurement models. Dechow et al. [11] updated the Jones model by providing 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 receivables. Peek et al. [23] have recently contributed by comparing abnormal accruals across different countries. By using the two accruals estimation models, the Modified Jones model and the Dechow and Dichev [10], they found that the accruals models exhibit considerable cross-country variation in predictive accuracy and power to detect earnings management.

Other authors stated that EM can be achieved by using accounting methods and estimates (i.e., an accrual-based manipulation) [1] or by undertaking transactions that make reported income closer to some target numbers, rather than maximizing the firm's discounted expected cash flows [26]. In addition, several studies have explored real earnings manipulation in the context of early debt retirements [14]. Some [25], [12], [30] have contributed to this literature by showing that EM can be undertaken through asset sales. In this context, Beneish [5] provides a contribution by concentrating on eight financial indicators (performance ratios), and demonstrating their ability to categorize companies in two different groups: potential and non-potential earnings manipulators.

2.2 Financial Crisis and Earnings Manipulation

One issue of the financial crises in general is the increase of uncertainty among lenders and investors about fundamental values of assets, which leads to a greater volatility in the market prices of assets [29]. According to Trombetta and Imperatore [29], a financial crisis can be defined as a sudden or gradual interruption in the ongoing functioning of financial markets. This situation of uncertainty increases the asymmetry of information and lenders progressively lose confidence in the accuracy of the information they have about borrowers [21], [13].

Under the conditions of financial crises, financial and capital market participants are more skeptical and the investors are willing to sell off their securities, sending a negative signal to the markets as well as to new potential investors who may be reluctant to invest. These investors could also require a higher return as a consequence of the higher levels of capital market risks. Both investors and creditors might have a less propensity to invest or lend money because of the higher probability of the counterpart's default.

Many scholars have discussed the impact of the financial crises on EM. Kasznik and McNichols [19] and Matsumoto [20] have provided a significant contribution by analyzing how executives carry out earnings manipulation policies in order to attain firms' targets and avoid, at the same time, the communication of bad earnings news to markets.

Bartov et al. [2] described how managers manage earnings in order to alter market's evaluation of firm's likelihood to survive and, hence, reduce the average cost of capital. Willekens and Bauwhede [31] and Huijgen and Lubberink [17] state that managers are less likely to manipulate earnings in a situation of stronger litigation risk in order to reduce the external exposure of the litigation. These results imply that during times of financial crisis, regulatory bodies may be more likely to closely regulate firms than in times of non-financial crisis. Therefore firms may be more likely to not manage earnings in financial crisis periods. In considering extant accounting literature, several possibilities are equally likely and we could expect either more or less EM during a financial crisis. Consequently, we consider it relevant for this debate to conduct an analysis of this relationship specifically within the Italian market. We apply the reclassified Beneish Model, also known as Manipulation Score [4], [5], [6], [7], in order to verify whether the impact of the financial crisis on EM is positive or negative during the time-period from 2005 to 2012. Hypothesis for our empirical analysis is stated as follows:

H1: On the one hand, on average, more firms will have a high probability of EM manipulation before the financial crisis: 2005-2008 than otherwise: 2009-2012. On the other hand, on average, fewer firms will have a high probability of manipulation during and immediately after the financial crisis: 2009-2012 than otherwise: 2005-2008.

3. The Beneish Model

The Manipulation Score [4], [5], [6], [7], is a mathematical model based on eight financial ratios used to identify whether a company has a significant likelihood of managing and manipulating its earnings. The variables are obtained from the firms' financial statements and linked together within a score

that describes the rate of earnings manipulation and, consequently, the profile of a company as a "potential earnings manipulator." Beneish suggests using the value of -1.78 as a threshold to distinguish which firms have manipulated their earnings. The variables of the model follow (see the respective extended formulas in Appendix 1):

1. DSRI (Days Sales in Receivables Index). It is the indicator of revenue inflation that measures the days' sales in receivables compared to the prior year. A significant increase in days' sales in receivables means a disproportionate increase in receivables relative to sales that suggest revenue inflation. The higher increase in the DSRI the greater likelihood that revenues and earnings are overstated.

2. GMI (Gross Margin Index). The decrease of Gross Margin value can be a negative signal about a company's health and future incomes. A value higher than 1 suggests a deterioration of gross margin and can force managers to manipulate earnings. To sum up, the Gross Margin is related to the change in inventories and other production that can increase the likelihood of manipulation. Thus, Beneish assumes this variable specifically related to production costs and changes in inventory, which can cause earnings manipulation practices.

3. AQI (Asset Quality Index). The Asset Quality indicator is the ratio of non-current assets other than property, plant, and equipment (PPE) to total asset and measures the proportion of total assets for which future benefits are less certain. Beneish expects a positive relationship between AQI and earnings manipulation practices. The higher value of AQI the greater the propensity in deferring and capitalizing costs in order to increase earnings.

4. SGI (Sales Growth Index). "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" [5]. There would be a strong positive relationship between the growth of Sales and the likelihood of EM because managers may be more incentivized to manipulate earnings.

5. DEPI (Depreciation Index). The DEPI measures the ratio of the depreciation rate in year t-1 to the corresponding rate in year t. If the index is greater than 1, it indicates that the tangible assets are being depreciated at a slower rate. This suggests that the firm might be revising useful asset life assumptions upwards in a way to increase income. There would be a positive correlation between DEPI and the earnings manipulation.

6. SGAI (Sales, General and Administrative Expenses Index). This ratio shows the SGA Expenses in year t relative to the previous year. If there is a disproportioned increase in Selling, General and Administrative expenses compared to Sales Revenues, there would be a negative signal about a

company´s prospects. Beneish expects a strong positive association between the index and the likelihood of manipulation.

7. LVGI (Leverage Index). This ratio shows the Total Debt (Current and Long-term) in year t relative to the previous year. Beneish stated that LVGI was included to capture incentives in debt covenants for earnings manipulation.

8. TATA (Total Accruals to Total Assets). The value of Total Accruals, normalized by Total Assets, is a proxy used to assess the discretionary accounting choices undertaken by managers in order to practice manipulations. There would be thus a positive correlation between Accruals and the EM.

In summary, these ratios have a predictive function and focus on financial statement distortions which capture unusual accumulations in receivables (DSRI, indicative of revenue inflation), unusual growth of Sales (SGI), unusual growth of Selling, General and Administrative Expenses (SGAI), unusual capitalization and declines in depreciation (AQI and DEPI, both indicative of expense deflation), unusual propensity to borrow money (LVGI), deterioration of Gross Margin (GMI) and the extent to which reported accounting profits are supported by cash profits (TATA).

4. Data Collection and Model Reclassification

The analysis was conducted using the Top 5,000 Non-Listed Stock Italian Companies ranked by Sales Revenues during the time period 2005-2012. These companies have been selected based on meeting a sales revenue threshold of € 50 million and the resulting sample is exactly made of 4,898 companies.

Stock Italian Companies (with Sales Revenues > € 50 mln)	4,898	*100%*
Companies in liquidation sale and Companies with no more than 2 missing values	1,126	*23%*
Observed companies	**3,772**	*77%*

Table 1: Top Stock Italian Companies with Available Data 2005-2012

Table 1 illustrates the sample selection process. We gathered accounting data from the AIDA Bureau Van Dijk database of firm-year observations from 2005 to 2012. Since several financial data variables were not available from this database and some companies were in liquidation sale during the observation period, we eliminated all the firms with more than two years of missing values and those in liquidation sale during the above mentioned period. Then we

attained the coverage percentage by dividing the number of companies included in the study (3,772) by the number of the entire sample (4,898) with sales revenue of at least € 50 million. The coverage is shown as shown in Table 1 is about 77%.

Beneish model has been developed within the US environment and given that there are many differences between U.S. GAAP and Italian Accounting standards, we propose a reclassification of the Beneish model by adapting the financial accounting data to the Italian scenario (see Appendix 2 - Indicators legend and Reclassification).

According to the Italian Accounting principles, "Selling, General and Administrative expenses" do not appear separately on financial statements, since their value would result from a classification of expenses by function (as provided for by U.S. GAAP), while Italian financial statements, according to the Civil Code, classify expenses and revenues by nature. For this reason, in this analysis, we use the neutral value equal to 1 for SGAI index since the Income Statement Reclassification, which follows the Italian GAAP, does not show Selling, General and Administrative Expenses .

We use the "full version" of the Reclassified Beneish Model (8M-Score) in order to monitor the impact of the financial crisis on EM before and after the financial crisis periods. Therefore, we expect for Italian firms a negative correlation between the financial crisis and the number of non-listed stock companies with a high probability of being manipulated.

The eight diagnostic tools have been reclassified according Italian GAAP (see Appendix 2) into the M-Score formula in order to achieve the final score that will be later compared to the threshold of -1.78 [7]. By applying the reclassified model, it is possible to categorize companies into two different groups: firms with a low probability of EM, and firms with a high probability of EM.

Manipulation Score = -4.840 + 0.920*DSRI + 0.528*GMI + 0.404*AQI + 0,892*SGI + 0.115*DEPI – 0.172*SGAI – 0.327*LVGI + 4.679*TATA

The final manipulation score for each firm is obtained by computing the average scores separately between the pre-crisis period (2005-2008) and the crisis period (2009-2012).

5 Main findings

Using on the list of available companies from the AIDA Bureau Van Dijk database, the Top 5,000 Italian Stock Companies ranked by Sales Revenues (see

Table 1) are 4,898 and among them 3,772 report the variables needed to develop the manipulation score.

	PRE-CRISIS (2005-2008)	CRISIS (2009-2012)
high probability of EM (N° of Companies)	1,929	1,758
low probability of EM (N° of Companies)	1,843	2,014
Total Companies	3,772	3,772
High probability of EM (% of Companies)	***51.14%***	***46.61%***
Low probability of EM (% of Companies)	***48.86%***	***53.39%***

Table 2: Probability of EM Pre-crisis and Crisis Periods

Table 2 illustrates the probability of EM during the pre-crisis and crisis periods. Using a threshold of -1.78 [7], 51.14% of companies have a high probability of manipulating earnings while the 48.86% have a low probability of EM in the pre-crisis period. With the starting of the financial crisis in 2009, there is a decrease in the percentage of companies with a high probability of EM (from 51.14 % to 46.61%) and an increased percentage of companies with low probability of EM (from 48.86% to 53.39%). That is the number of firms with a higher likelihood of earnings manipulation decreased from the pre-crisis to crisis period similar to our overall findings.

	BOTH PRE-CRISIS AND CRISIS PERIODS	% OF TOTAL COMPANIES
Companies with LOW probability of EM	1,426	***37.80%***
Companies with HIGH probability of EM	1,341	***35.55%***

Table 3: Number of companies with the same probability (high or low) before and after crisis

Table 3 highlights the number of companies with the same probability of EM consistently (either high or low) throughout the database period. Within the observed sample (3,772 companies) there are 1,426 companies that always have a low probability of EM both in the pre-crises and crisis periods (a percentage of 37.80% of the total companies), and 1,341 companies which have high probability of EM in both periods (a percentage of 37.80% of the total companies). This means that for these companies the financial crisis had no impact on increasing or decreasing their probability of EM.

	Pre-Crisis 2005-2008	Crisis 2009-2012	% OF TOTAL COMPANIES
Companies which manipulate only in PRE-CRISIS period	588		**15.59%**
Companies which manipulate only in POST-CRISIS period		417	**11.06%**

Table 4: Number of companies which changes probability (from high to low and vice-versa) from pre-crisis to crisis period

Table 4 illustrates EM results for those other companies of the sample that consistently manipulate accounts in the pre-crisis period different from the crisis period. Table 4 highlights that there are 588 companies which have a high probability of performing manipulated accounting data but only in the pre-crisis period (15.59% of the total companies) while 417 with a high probability of account manipulation only in the crisis period (11.06%). This means that for these 1,005 (588+417) or 26.64% of the companies studied, hypothesis H1 is confirmed.

Appendix 3 and 4 show the range of EM scores which is vast. Therefore we provide additional descriptive statistics both for the set of top 100 firms ranked by sales revenues and for the set of worst 100 firms based on sales revenues.

5.1 Top 100 and Worst 100 Firms ranked by Sales Revenues in the pre-crisis and crisis periods.

	Pre-Crisis 2005-2008	Crisis 2009-2012
Number of top 100 firms with a high probability of EM	**42**	**36**
Number of top 100 firms with a low probability of EM	**58**	**64**
Total number of top 100 firms	**100**	**100**

Table 5: Manipulation Scores on Top 100 by Sales

	Pre-Crisis 2005-2008	Crisis 2009-2012
Number of worst 100 firms with a high probability of EM	**51**	**52**
Number of worst 100 firms with a low probability of EM	**49**	**48**
Total number of worst firms	**100**	**100**

Table 6: Manipulation Scores on Worst 100 by Sales

Table 5 presents the EM scores of the Top 100 firms ranked by sales revenues and Table 6 presents the manipulation scores of the worst 100 firms ranked by sales revenues (included to the Top 5,000) in the pre-crisis and crisis periods. See Appendix 3 and 4 for more details on Tables 5 and 6.

The Top 100 Firms included in Table 5 show a decrease in the number of potential manipulators by 14.29% (from 42 to 36) but regarding the Worst 100 Firms (Table H) the number of companies with a high probability of being manipulated increases by 1.96% (from 51 to 52). These findings show that the average reducing percentage of potential manipulators between pre-crisis and crisis period has been impacted by financial crisis stronger for companies with higher level of revenues than for companies performing lower revenues.

We believe and discussed previously that during the pre-crisis period (2005-2008), there is a greater propensity for manipulating earnings in the Italian Market which has a tendency to hide the wealth creation through the income boost years to obtain tax savings and to restrain the distribution of wealth. From the opposite point of view, the EM policy has a tendency to decrease because the tax burden tends to decrease based on the natural reduction of earnings as a result of the crisis itself. This is to say that it does not make sense to manipulate earnings in times of financial crisis, because there are less earnings in general.

On the other hand, while the results of the specific analysis on the top 100 companies (by sales revenues) confirms our hypothesis, the results regarding the worst 100 companies showing a slight increase of the likelihood of EM during the crisis period, could be explained as a necessity of those firms to keep constant values of their main performance indicators, compared with those of previous periods, after that the crisis may have impacted too negatively on firm revenues and financial equilibrium.

6 Suggestion for further research

Suggestions for future contributions are based on expanding the data in terms of number of companies. For example, future studies could include analyses of all the Limited Italian Companies (*Società a Responsabilità Limitata*) as well as Partnerships (*Società di Persone*), and assessing the difference in EM between the two types of companies. It would be useful to focus on a multiple country-setting (EU-nations as well as no EU countries) in order to analyze the impact of crisis on EM in different contexts. Furthermore, it would be useful to consider other parameters in addition to sales revenues and ranking firms. For example, the sample could be analyzed base on differences in legal origin, whether IFRS or some other accounting standard is used, culture, market infrastructure or whether tax and financial reporting regulations are similar.

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Appendix 1: The Eight Indicators of Beneish Model

$$DSRI = \frac{(Receivables_t)/(Sales_t)}{(Receivables_{t-1})/(Sales_{t-1})}$$

$$GMI = \frac{(Sales_{t-1} - Cost\ of\ Goods_{t-1})/Sales_{t-1}}{(Sales_t - Cost\ of\ Goods_t)/Sales_t}$$

$$AQI = \frac{1 - (Current\ Asset_t + PPE_t)/Total\ Assets_t}{1 - (Current\ Asset_{t-1} + PPE_{t-1})/Total\ Assets_{t-1}}$$

$$SGI = \frac{Sales_t}{Sales_{t-1}}$$

$$DEPI = \frac{Depreciation_{t-1}/(Depreciation_{t-1} + PPE_{t-1})}{Depreciation_t/(Depreciation_t + PPE_t)}$$

$$SGAI = \frac{(SGA\ Expenses_t)/(Sales_t)}{(SGA\ Expenses_{t-1})/(Sales_{t-1})}$$

$$LVGI = \frac{(LTD_t + Current\ Liabilities_t)/Total\ Assets_t}{(LTD_{t-1} + Current\ Liabilities_{t-1})/Total\ Assets_{t-1}}$$

$$TATA = \frac{(Cur.\ Ass._t + Cash_t) - (Cur.\ Liab._t - Cur.\ Matur.of\ LTD\ t - Income\ Tax\ t) - Depreciation\&Amortization\ t}{Total\ Assets_t}$$

Appendix 2: Indicators legend and Reclassification

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 Disponibilitá 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 3: Ranking of Top 100 Stock Italian Companies based on Sales Revenue

# rank Sales	Companies' List (TOP 100 by SALES REVENUES)	code	MANIPULATION-SCORE per year									
			CRISIS PERIOD				Average	PRE-CRISIS PERIOD				Average
			2012	2011	2010	2009		2008	2007	2006	2005	
1	GESTORE DEI MERCATI ENERGETICI S.P.A.	8299	-2,54	-2,41	-2,74	-2,80	-2,62	0,46	-2,36	-2,32	5,26	0,26
2	GSE S.P.A.	3510	-2,35	-2,20	-2,79	-2,54	-2,47	-3,93	-2,17	5,24	-3,89	-1,19
3	KUWAIT PETROLEUM ITALIA S.P.A.	1920	-3,19	-2,10	-3,33	-3,04	-2,92	-3,70	-3,45	-3,11	-3,01	-3,31
4	ENEL ENERGIA S.P.A.	3511	-1,65	-1,68	-1,87	-2,49	-1,92		-2,06	-2,09	-4,68	-2,95
5	AU S.P.A.	3510	-2,28	-2,49	-2,14	-2,33	-2,31	-2,80	-2,75	-2,57	-1,90	-2,50
6	ENEL PRODUZIONE S.P.A.	3511	-3,46	-3,27	-3,52	-3,49	-3,43	-3,18	-3,36	-2,71	-2,58	-2,96
7	ENEL DISTRIBUZIONE S.P.A.	3510	-2,25	-2,96	-2,74	-2,87	-2,71	-4,23	-2,94	.		-3,58
8	ESSELUNGA SPA	4711	-3,16	-3,15	-3,65	-4,17	-3,53	-4,18	-3,80	-2,64	-2,09	-3,18
9	KRI S.P.A.	1920	-2,32	-3,08	-3,41	-3,60	-3,10	-3,22	-3,44	-3,86	-1,53	-3,01
10	GDF SUEZ ENERGIA ITALIA S.P.A.	7112	-2,81	3,44	-0,59	227,40	56,86	-3,84	-3,48	.	.	-3,66
11	TAMOIL ITALIA S.P.A.	1920	-3,37	-3,71	-3,92	-3,62	-3,66	-3,42	-3,21	-2,65	-2,18	-2,87
12	TRENITALIA S.P.A.	4900	-2,90	-3,37	-2,64	-2,21	-2,78	-2,83	-2,98	-1,89	-2,40	-2,53
13	WIND TELECOMUNICAZIONI S.P.A.	6100	-3,28	-3,13	-2,98	-3,15	-3,13		-3,01	-2,90	-2,45	-2,79
14	VERSALIS S.P.A.	2010	-2,19	-1,97	-0,87	-1,54	-1,64	-2,35	-1,80	-1,44	-1,59	-1,79
15	ENOI S.P.A.	3510		-1,69	-0,33	-1,75	-1,26	0,62	-0,15	-0,52	-0,67	-0,18
16	IREN MERCATO S.P.A.	3510	.	.	-2,17	-2,67	-2,42	-2,13	-1,26	3,08	-0,57	-0,22
17	AUTOSTRADE PER L'ITALIA S.P.A.	5221	-3,09	-2,82	-3,00	-2,43	-2,84	-3,11	-2,89	-2,60	-2,73	-2,83
18	GS SPA	4711	.	.	-3,51	-4,10	-3,80	-3,86	-4,19	-4,19	-3,53	-3,94
19	MARCEGAGLIA - S.P.A	2420		.	-1,45	-2,32	-1,89	-1,82	-0,99	-0,63	-1,11	-1,14
20	NUOVO PIGNONE S.P.A.	2829	-2,24	-2,71	-1,93	-1,80	-2,17	-2,93	-3,14	-3,14	-1,66	-2,72
21	IES ITALIANA ENERGIA E SERVIZI S.P.A.	1920		.	-3,32	-3,58	-3,45	-3,04	-2,74	-2,46	-2,33	-2,64
22	COSTA CROCIERE S.P.A.	4669	-3,67	-3,88	-3,84	-2,99	-3,59	-2,07	-2,19	-2,50	-2,49	-2,31
23	LOGISTA ITALIA S.P.A.	4635	-2,63	-2,75	-2,72	-2,55	-2,66	-2,63	-2,59	-3,16	-1,02	-2,35
24	AUCHAN S.P.A.	4791	.	-4,20	-3,74	-4,45	-4,13	-4,34	-3,07	-4,28	-3,70	-3,85
25	SEVEL-SPA	2910	.	2,59	-4,08	-2,47	-1,32	-4,00	-3,63	-3,75	-3,63	-3,75
26	SORGENIA S.P.A.	3510	.	-2,43	-1,73	-2,05	-2,07	-1,27	-2,05	-2,14	-1,15	-1,65
27	SAMSUNG ELECTRONICS ITALIA S.P.A.	4643	-0,02	-0,80	-1,02	-0,76	-0,65	.	.	-0,86	-0,74	-0,80
28	FERRERO - SOCIETA' PER AZIONI	1082	-2,89	-2,84	-3,05	-3,15	-2,98	-3,39	-3,05	-2,86	-1,88	-2,80
29	RAI - RADIOTELEVISIONE ITALIANA SPA	6020	-3,13	-2,58	-3,43	-2,27	-2,85	-2,55	-2,75	-2,66	-2,35	-2,58
30	CNH INDUSTRIAL ITALIA S.P.A.	2830	.	-2,69	-3,32	-2,58	-2,86	-3,19	-2,59	-2,42	-3,23	-2,86
31	BARILLA G. E R. FRATELLI - S.P.A.	1073	-2,22	-2,10	-2,86	-2,83	-2,50	-3,81	-2,77	-2,50	-2,89	-2,99
32	IBM ITALIA S.P.A.	6201	-2,33	-2,35	-2,32	-2,03	-2,26	-2,53	-3,36	-3,12	-3,34	-3,09
33	RFI S .P.A.	4900	-1,99	-1,98	-2,63	-2,80	-2,35	-2,39	-2,80	-2,66	-2,20	-2,51
34	AGUSTAWESTLAND S.P.A.	3030	-1,86	-2,08	-1,58	-2,06	-1,89	-1,51	.	.	-1,56	-1,53
35	MEDIAMARKET SPA	4719	-3,15	-3,39	-3,58	-3,61	-3,43	-3,64	-4,49	-4,00	-4,27	-4,10
36	SMA S.P.A.	4711	.	-3,62	-4,11	11,63	1,30	3,16	-4,71	-4,24	-4,18	-2,49
37	ACEA ENERGIA SPA	3510	-2,73	-2,18	-2,03	-2,39	-2,33	-1,98	9,18	4,77	-2,03	2,49
38	ABB S.P.A.	2790	.	.	-1,71	-1,73	-1,72	58,43	2,89	1,05	0,07	15,61
39	MERCEDES-BENZ ITALIA S.P.A.	4511	-2,65	-1,97	-2,15	-1,81	-2,15	-1,91	-1,72	-1,46	-1,51	-1,65
40	FERRARI S.P.A.	2910	-0,83	-1,49	-1,32	-2,76	-1,60	-1,82	-2,15	-2,11	-1,85	-1,98
41	A2A ENERGIA S.P.A.	3514	.	-0,48	-2,13	-1,32	-1,31	-0,84	-0,87	-1,62	-1,16	-1,12
42	COMIFAR DISTRIBUZIONE S.P.A.	4646	.	-1,66	-1,94	-1,87	-1,82	-1,96	-1,85	-1,90	1,65	-1,01
43	PUBLITALIA 80 S.P.A.	7312	-2,07	-1,58	-1,65	-2,21	-1,88	.	.	-1,23	-1,20	-1,22
44	PAM PANORAMA S.P.A.	4711	-3,16	-3,68	-3,78	-2,82	-3,36	-3,14	-2,80	-3,26	-3,01	-3,05
45	FIAT POWERTRAIN S.P.A.	2932	.	-4,36	-3,88	-3,68	-3,97	-5,23	-3,72	-3,16	-3,14	-3,81
46	BURGO GROUP S.P.A.	1712	-2,69	-2,52	-2,35	-2,51	-2,52	-2,40	-2,33	-2,98	-2,88	-2,65
47	BMW ITALIA SPA	4500	-1,78	-0,73	-1,45	-1,75	-1,43	-0,72	1,10	-0,21	0,01	0,04
48	IPLOM S.P.A.	1920	-2,63	-3,23	-2,04	-1,72	-2,41	-1,24	-2,62	-2,21	-2,30	-2,09
49	MICHELIN ITALIANA S.A.M.I.	2211	-3,41	-3,31	-2,14	-2,56	-2,86	-2,56	-2,70	-2,40	-2,13	-2,45
50	ITALPREZIOSI S.P.A.	4672	-3,12	-3,23	-3,01	-1,59	-2,74	-1,60	-5,08	-0,78	-3,17	-2,66

51	IPER MONTEBELLO S.P.A.	4711	-2,81	-2,94	-2,93	-3,08	**-2,94**	-4,35	-4,79	-4,49	-4,22	**-4,46**
52	METRO ITALIA CASH AND CARRY S.P.A.	4690	-2,43	-2,13	-3,02	-3,54	**-2,78**	-4,35	7,68	-2,56	-2,26	**-0,37**
53	GREEN NETWORK S.P.A.	3513	-2,71	-2,95	-1,04	-4,41	**-2,78**	-2,15	-3,42	-3,99	1,17	**-2,10**
54	CHIMET - S.P.A.-	2440	0,53	0,51	1,08	0,44	**0,64**	0,18	-0,81	-0,63	-1,06	**-0,58**
55	ACCIAIERIA ARVEDI S.P.A.	2430	-4,01	-3,99	-3,35	-3,39	**-3,69**	-3,56	-2,91	-2,97	-3,26	**-3,17**
56	BENNET S.P.A.	6810	-3,03	-3,02	-4,27	-3,89	**-3,55**	-3,08	-3,03	-3,39	-3,06	**-3,14**
57	FASTWEB SPA	6100	-2,70	-2,67	-3,18	-2,78	**-2,83**	-2,94	-2,79	-3,58	-2,26	**-2,89**
58	GIORGIO ARMANI S.P.A.	7410	-0,76	-1,24	-0,61	1,72	**-0,22**	-2,73	-2,55	-2,15	-2,30	**-2,43**
59	SIEMENS S.P.A.	2562	0,94	-0,58	-0,96	-1,24	**-0,46**	-1,37	-2,01	47,06	28,70	**18,09**
60	MERCK SERONO S.P.A.	2120	.	.	-1,46	-1,94	**-1,70**	0,53	0,13	0,92	-0,30	**0,32**
61	GDF SUEZ ENERGIE S.P.A.	3510	-2,70	-2,51	-2,90	-2,55	**-2,67**	-1,46	1,42	-0,94	-0,39	**-0,34**
62	REPSOL ITALIA S.P.A.	4730	-1,81	-1,53	-1,26	0,84	**-0,94**	-2,25	-0,15	-1,36	.	**-1,25**
63	ALPHA TRADING S.P.A.	4321	-2,84	-2,13	-2,76	-2,62	**-2,59**	-2,09	-2,54	-2,76	-2,23	**-2,41**
64	SHELL ITALIA E&P S.P.A	0620	-0,10	1,35	-2,27	-1,68	**-0,67**	-1,05	-0,87	-0,98	-1,32	**-1,05**
65	RENAULT ITALIA S.P.A.	4511	-2,19	-2,05	3,44	-3,03	**-0,96**	-2,08	-0,96	-0,47	-1,94	**-1,36**
66	SASOL ITALY S.P.A.	1920	-1,40	-0,72	0,02	-1,54	**-0,91**	5,62	-3,17	-2,61	-1,47	**-0,41**
67	CARLO COLOMBO S.P.A.	2400	-3,29	-3,28	-3,63	-0,90	**-2,78**	-3,19	-3,22	-1,93	-2,18	**-2,63**
68	SANOFI-AVENTIS S.P.A.	2120	-0,19	-0,12	-1,71	-1,17	**-0,80**	-2,37	0,49	0,90	1,06	**0,02**
69	ALSTOM FERROVIARIA S.P.A.	3020	.	-1,96	-1,83	-1,85	**-1,88**	-1,53	-2,09	-1,82	-0,75	**-1,55**
70	ERICSSON TELECOMUNICAZIONI - S.P.A.	2630	-1,78	-1,52	-1,74	-1,45	**-1,62**	-1,32	0,44	-0,10	0,21	**-0,19**
71	CALZEDONIA S.P.A.	4642	-1,83	-1,66	-1,10	-1,83	**-1,61**	-1,31	-1,70	-1,53	-1,18	**-1,43**
72	SPESA INTELLIGENTE S.P.A.	4711	-4,59	-3,49	-5,30	-4,70	**-4,52**	-4,32	-4,50	-3,92	-4,47	**-4,30**
73	SATA S.P.A.	2910	-1,61	-2,13	.	.	**-1,87**	-2,06	-2,23	-1,87	-1,15	**-1,83**
74	ALPIQ ENERGIA ITALIA S.P.A.	3510	-0,82	-1,45	-1,36	-1,85	**-1,37**	-1,01	-1,18	-1,77	-0,90	**-1,22**
75	SOCIETA' ITALIANA PER IL GAS PER AZIONI	3521	-2,56	-3,06	-0,26	-3,18	**-2,27**	.	-3,82	-3,58	-2,18	**-2,61**
76	E.ON ENERGIA S.P.A.	3523	-1,20	-2,41	-2,73	-0,72	**-1,77**	-2,25	-2,67	-1,94	.	**-2,29**
77	ITALIA MARITTIMA S.P.A.	5000	-3,11	-3,46	-3,83	-3,85	**-3,56**	-2,95	-3,84	-3,96	-3,53	**-3,57**
78	REPOWER ITALIA S.P.A.	3511	-1,10	-1,28	-1,77	-1,45	**-1,40**	-2,44	-0,69	.	.	**-1,56**
79	DALMINE SPA	2420	-1,14	-1,23	-1,29	-1,87	**-1,38**	-1,69	-1,48	-0,35	-1,10	**-1,15**
80	FORD ITALIA S.P.A.	4511	-0,55	0,18	-2,50	.	**-0,96**	.	-1,64	-0,23	-0,81	**-0,89**
81	NE.IT. S.P.A.	1000	-2,23	.	.	-1,62	**-1,93**	-1,87	-1,95	-1,77	-2,45	**-2,01**
82	TI SPARKLE S.P.A.	6100	-2,30	-2,62	.	.	**-2,46**	-0,76	-0,64	-1,00	-1,36	**-0,94**
83	TECNIMONT S.P.A.	7110	.	1,84	-1,50	-2,30	**-0,66**	4,90	-0,61	65,43	6,12	**18,96**
84	ACCENTURE S.P.A.	6201	-1,18	0,16	-0,27	-0,52	**-0,46**	0,68	0,07	-0,02	0,09	**0,21**
85	E.ON PRODUZIONE S.P.A.	7010	-0,47	-2,03	-1,49	-3,03	**-1,76**	-2,25	-2,89	-2,76	-1,86	**-2,44**
86	ARVAL SERVICE LEASE ITALIA S.P.A.	7711	-4,16	-4,31	-4,35	-4,11	**-4,23**	-4,37	-4,36	-3,84	-4,07	**-4,16**
87	UNICO LA FARMACIA DEI FARMACISTI S.P.A.	4646	.	-2,14	-2,01	-2,12	**-2,09**	-0,18	-1,68	-1,97	-1,86	**-1,42**
88	LAVAZZA S.P.A.	1083	-1,79	-1,51	-1,65	-1,76	**-1,68**	-1,36	-1,50	-1,25	-0,61	**-1,18**
89	BENIND S.P.A.	5229	-2,01	-1,86	4,19	-2,48	**-0,54**	-2,27	-1,87	0,07	-2,17	**-1,56**
90	HENKEL ITALIA S.P.A.	2010	-2,59	-2,11	-1,44	-2,00	**-2,04**	-1,01	-1,09	-1,39	-0,91	**-1,10**
91	BRT S.P.A.	4941	-2,69	-2,62	-3,11	-3,06	**-2,87**	-3,02	-2,98	.	.	**-3,00**
92	P.A.I. S.P.A.	4511	.	-3,56	1,49	-1,96	**-1,34**	-3,51	-1,21	-3,12	-2,59	**-2,61**
93	INDESIT COMPANY S.P.A.	2751	-2,87	-2,48	-2,41	-2,31	**-2,52**	-2,37	-2,92	-0,72	-3,05	**-2,27**
94	CITROEN ITALIA S.P.A.	2910	-3,39	-2,12	-2,51	-2,21	**-2,56**	-2,89	-2,29	-2,59	-3,00	**-2,69**
95	CONFIRMEC S.P.A.	4614	-2,06	-2,37	-2,36	-2,50	**-2,32**	-1,69	-1,71	-2,02	-1,92	**-1,83**
96	SOCIETA' AGRICOLA LA PELLEGRINA S.P.A.	0147	0,04	-1,46	-1,69	-2,10	**-1,30**	8,52	-0,29	12,38	3,56	**6,04**
97	ACEA ENERGIA HOLDING S.P.A.	3510	5,76	17,54	-2,26	-2,74	**4,57**	-3,60	-0,96	.	.	**-2,28**
98	NOVARTIS FARMA SPA	2120	-1,74	-1,26	-0,83	-0,59	**-1,10**	-0,71	-1,11	-1,07	-1,17	**-1,02**
99	TECHINT S.P.A.	7490	2,14	2,79	14,81	57,60	**19,33**	-4,41	-1,79	-1,95	-2,14	**-2,57**
100	MAGNETI MARELLI S.P.A.	2931	-2,97	-2,63	-2,49	-2,51	**-2,65**	22,47	-2,54	-1,71	-2,43	**3,95**

Specifications:

- Code values represent the industry in which each company operates according to the UK Standard industrial classification of economic activities (SIC) as updated in 2007;
- Values represents the Beneish score for each year while the average value is introduced separately for the pre-crises period (2005-2008) and for the crises period (2009-2012);
- Score values expressed in red font represent those higher than the Beneish threshold for high probability of EM (-1.78)

Appendix 4: Ranking of Worst 100 Stock Italian Companies based on Sales Revenue

# rank Sales	Companies' List (TOP 100 by SALES REVENUES)	code	MANIPULATION-SCORE per year									
			CRISIS PERIOD				Average	PRE-CRISIS PERIOD				Average
			2012	2011	2010	2009		2008	2007	2006	2005	
1	HONDA AUTOMOBILI ITALIA S.P.A.	4511	.	-2,81	48,07	-1,96	14,43	-2,10	-1,16	-2,33	-0,68	-1,57
2	ABC - ACQUA BENE COMUNE NAPOLI	3600	.	-1,81	-1,96	-2,07	-1,95	-2,03	-1,93	-2,29	-2,62	-2,22
3	SACER PETROLI S.P.A.	4671	.	.	-2,71	-2,62	-2,67	-2,19	-2,75	-1,74	-2,07	-2,19
4	V.AR.VIT. - VESCOVINI ARISTIDE VITERIE - BULLONERIE S.P.A.	4674	.	.	0,50	-1,53	-0,51	0,06	-0,02	-1,56	-0,62	-0,54
5	DURST PHOTOTECHNIK SPA % DURST PHOTOTECHNIK AG	2670	.	-0,77	-0,11	-1,38	-0,75	-0,93	-0,39	-0,39	-0,16	-0,47
6	HOSPAL S.P.A.	2660	.	.	-0,45	-1,09	-0,77	-1,13	-1,67	-1,70	-0,57	-1,27
7	ALESSI S.P.A.	2599	.	-0,95	-1,51	-1,90	-1,45	-1,57	-0,75	-0,55	-1,46	-1,08
8	KERSELF S.P.A.	4674	.	7,01	-5,53	-3,71	-0,75	-2,36	-0,52	0,00	-1,71	-1,14
9	RIVA FIRE S.P.A.	7010	.	-3,21	-3,37	-4,04	-3,54	-3,00	-4,02	-5,29	-2,46	-3,69
10	PROGETTO S.P.A.	4520	.	.	-2,95	-3,23	-3,09	-2,52	-2,48	-2,91	-2,57	-2,62
11	SIFER SPA	4672	.	-1,43	-0,78	-1,18	-1,13	-2,14	-2,40	-0,57	9,37	1,07
12	DOTT. FORMENTI - S.P.A.	2120	.	.	-1,84	-1,66	-1,75	-2,13	-1,77	-2,25	-2,22	-2,10
13	PROMATECH S.P.A.	2894	.	.	-3,77	-3,98	-3,87	-3,55	-3,48	-3,06	-2,35	-3,11
14	D.G.S. S.P.A.	4771	.	.	-3,23	-3,26	-3,24	-4,79	-4,53	-2,38	-3,92	-3,90
15	ABBOTT PRODUCTS SPA	2120	.	-3,08	-1,97	0,21	-1,61	-0,30	-0,67	5,19	-0,24	0,99
16	MONDADORI FRANCHISING S.P.A.	4649	.	.	-1,12	-0,63	-0,87	-0,64	-0,94	-0,05	-1,58	-0,80
17	OMVP S.P.A	2815	.	.	-2,46	-2,10	-2,28	-2,58	-1,85	-3,06	-2,88	-2,59
18	FITT S.P.A. SOCIETA' UNIPERSONALE	2016	.	-1,34	-1,31	-1,38	-1,34	-0,84	-0,36	-1,48	-1,90	-1,14
19	SONEPAR ITALIA SUD S.P.A.	4647	.	.	-2,40	-1,71	-2,05	-2,10	-1,72	-1,51	-1,50	-1,71
20	YKK ITALIA S.P.A.	3299	.	-0,56	1,20	2,02	0,89	-0,78	-0,03	-0,69	-0,50	-0,50
21	IGAP S.P.A.	3291	.	-1,91	-1,77	-1,88	-1,85	-1,23	-1,84	-1,57	0,58	-1,01
22	CENTOSTAZIONI S.P.A.	5221	.	-1,56	2,36	-2,05	-0,42	-2,83	-1,87	-1,69	-0,27	-1,66
23	OTIS SPA	6420	.	.	-3,92	-2,48	-3,20	-2,48	-2,97	-2,94	-2,53	-2,73
24	RAGALL S.P.A.	2453	.	.	-1,25	-1,11	-1,18	-1,71	-1,58	-0,13	-0,20	-0,91
25	CANESSA SPA	2562	.	-4,16	-4,82	-0,24	-3,07	-3,77	-1,67	-1,79	-1,83	-2,26
26	SALUMIFICIO FRATELLI RIVA S.P.A.	1013	.	.	-1,46	-1,62	-1,54	-1,72	-1,77	-1,84	-2,15	-1,87
27	MONDOLIBRI S.P.A.	4791	.	.	-1,17	-2,49	-1,83	-2,06	-1,73	-1,99	-1,25	-1,76
28	CELLULAR ITALIA S.P.A.	4652	.	.	-0,68	-1,17	-0,93	-1,53	-1,12	-0,71	-2,08	-1,36
29	OVIESSE FRANCHISING SOCIETA' PER AZIONI	7740	.	-1,53	-2,11	-1,58	-1,74	-2,41	-1,30	-1,24	-1,58	-1,63
30	CALCE S PELLEGRINO SPA	2352	.	-2,41	-2,03	-2,19	-2,21	-2,18	-1,89	-1,80	-2,09	-1,99
31	PASTIFICIO GUIDO FERRARA SPA	1073	.	-2,16	-2,66	-2,49	-2,44	-2,49	-2,21	-2,86	-3,53	-2,77
32	FONDERIE E OFFICINE MECCANICHE TACCONI S.P.A.	2450	.	-1,63	-1,82	-1,28	-1,58	-1,67	0,23	-0,58	-1,60	-0,90
33	SUMITOMO CORPORATION ITALIA S.P.A.	4619	.	.	-0,25	-1,02	-0,64	-2,16	-1,85	-1,39	0,98	-1,11
34	ESTEL OFFICE SPA	3101	.	-2,26	-1,85	-3,20	-2,44	-0,74	-1,24	-3,01	.	-1,66
35	INGEGNERIA BIOMEDICA SANTA LUCIA S.P.A.	2660	.	-2,08	-2,43	-2,49	-2,33	-2,14	-0,45	-2,21	-1,13	-1,48
36	JAGUAR ITALIA S.P.A	4511	.	.	-0,59	-1,65	-1,12	8,59	-0,49	-3,23	-3,03	0,46
37	BSL SPA	5229	.	-1,51	-1,87	-2,25	-1,88	-2,15	-2,76	-2,84	-1,58	-2,33
38	IN.CAM. S.P.A.	2592	.	.	-0,36	-0,79	-0,57	-0,35	-0,90	-1,37	-0,53	-0,79
39	FTM S.P.A.	4321	.	-2,50	-3,16	-2,93	-2,86	-2,21	-0,36	-2,19	-2,83	-1,90
40	FARMACEUTICI RINALDI SPA	4646	.	-0,03	-0,91	-0,79	-0,58	-0,22	6,28	-0,57	-0,26	1,31
41	SAINT - GOBAIN ISOVER ITALIA S.P.A.	2311	.	.	-1,83	-2,84	-2,33	-2,51	-1,48	-2,42	-1,98	-2,10
42	GENERALI REAL ESTATE S.P.A.	6832	.	-2,90	-1,12	-2,91	-2,31	-1,04	-0,64	1,48	10,20	2,50
43	MONTEBOVI SOCIETA PER AZIONI	4636	.	-3,34	-2,72	-3,00	-3,02	-2,26	-2,43	-1,86	-1,88	-2,11
44	ALUBERG S.P.A.	2511	.	-1,76	-1,63	-1,54	-1,64	-1,05	-0,83	-0,72	-0,62	-0,80
45	MAQUET ITALIA SOCIETA PER AZIONI	4646	.	-1,60	-1,47	-0,88	-1,31	-1,30	-1,02	-0,98	1,19	-0,53
46	TREVISANALAT SPA	1051	.	-2,89	-1,87	-1,29	-2,01	-2,21	-2,91	-2,86	-2,52	-2,62
47	DASTY ITALIA S.P.A.	2041	.	.	-0,99	-1,46	-1,23	-1,59	-2,18	-2,64	-1,90	-2,08
48	PAPERNET S.P.A.	1720	.	.	-4,60	-3,82	-4,21	-3,90	-3,58	-3,26	-4,13	-3,72
49	NATIONAL CAN ITALIANA (N.C.I.) - S.P.A.	2592	.	.	-1,70	-1,62	-1,66	-1,72	-2,13	-2,03	-1,84	-1,93
50	VG HOLDING S.P.A.	4778	.	-2,12	-2,20	-2,99	-2,44	-2,49	-2,64	-1,77	-2,25	-2,29

#	Company	Code	2005	2006	2007	2008	Avg 05-08	2009	2010	2011	2012	Avg 09-12
51	YKK MEDITERRANEO - S.P.A.	3299	.	-1,41	-0,14	3,98	**0,81**	-3,87	-3,57	-2,98	-3,58	**-3,50**
52	CONCERTA S.P.A.	5629	.	-1,81	-1,26	-0,79	**-1,29**	-0,94	-1,66	-2,55	-2,23	**-1,84**
53	OPERA21 S.P.A.	6202	.	-2,73	-2,52	0,03	**-1,74**	-2,05	-1,57	-2,31	-2,06	**-2,00**
54	ALDINET SPA	4643	.	-0,32	-1,80	-2,31	**-1,48**	-2,27	-3,55	-1,51	-2,02	**-2,34**
55	INNSE-BERARDI S.P.A.	2840	.	.	-2,63	-0,55	**-1,59**	-2,95	-2,07	-2,18	-3,10	**-2,57**
56	ISOGAS SPA	3523	.	-0,19	-0,93	-1,61	**-0,91**	-1,69	-2,02	-1,69	1,23	**-1,04**
57	CARL ZEISS SPA	4643	.	-1,38	-1,16	-1,39	**-1,31**	-1,22	-0,98	-1,33	-1,05	**-1,15**
58	BEAUTY POINT S.P.A.	4775	.	.	-2,96	-2,85	**-2,91**	-2,97	-2,72	-2,63	-2,88	**-2,80**
59	SAIP&SCHYLLER SPA	2220	.	-3,09	-3,16	-4,51	**-3,59**	-1,12	-2,52	-3,52	-4,12	**-2,82**
60	AUTOITALIA S.P.A.	4511	.	-2,75	-16,64	-1,37	**-6,92**	-1,41	-1,69	-3,59	0,88	**-1,45**
61	ALUPRESS SPA	2453	.	-1,08	-0,66	-1,47	**-1,07**	-0,48	-0,88	-1,52	-1,63	**-1,13**
62	INVENSYS SYSTEMS ITALIA S.P.A.	3320	.	-2,87	-3,22	-1,57	**-2,56**	-2,69	-3,38	-3,39	-2,63	**-3,02**
63	GOZZO IMPIANTI SOCIETA' PER AZIONI	2790	.	-2,29	-1,64	-2,66	**-2,20**	-1,97	-1,51	-1,71	-2,22	**-1,85**
64	SICES SPA	2820	.	-2,77	-2,60	-2,88	**-2,75**	-2,91	-3,52	-2,40	.	**-2,95**
65	CASA DOLCE CASA S.P.A	4673	.	.	-1,07	-1,35	**-1,21**	-1,82	-1,79	-1,35	-2,22	**-1,80**
66	OFFICINE FERROVIARIE VERONESI S.P.A.	3020	.	-1,78	-1,64	-3,00	**-2,14**	-1,63	-0,82	-1,54	1,75	**-0,56**
67	CAMAR S.P.A.	4511	.	.	-0,18	-1,85	**-1,02**	-2,76	-2,14	-2,26	-1,58	**-2,19**
68	SEPSA SPA SOCPER L ESERCIZIO DI PUBBLICI SERVIZI	4910	.	.	-2,68	-3,02	**-2,85**	-2,16	-2,19	-2,09	-1,89	**-2,08**
69	BIOMASSE ITALIA S.P.A.	3511	.	-4,04	-1,11	-6,03	**-3,73**	-4,29	-4,43	-2,89	-2,34	**-3,49**
70	MARZOLI S.P.A.	2894	.	.	-3,13	-3,48	**-3,30**	-4,03	-2,05	-2,48	-3,57	**-3,03**
71	REGGIANA ALIMENTARI SPA ABBREVIABILE IN REAL SPA	4711	.	-4,64	-4,02	-4,05	**-4,23**	-4,06	-4,93	-4,50	-4,04	**-4,38**
72	MALAVOLTA SPA	2511	.	-1,85	-0,83	-2,13	**-1,61**	-1,80	-1,35	-1,42	-1,83	**-1,60**
73	MIGLIORE SONEPAR S.P.A. - UNIPERSONALE	4669	.	.	-2,25	-2,63	**-2,44**	-2,66	-2,32	-2,42	-2,26	**-2,41**
74	FINI S.P.A.	2813	.	-2,43	-2,50	-2,18	**-2,37**	-2,80	-2,52	-2,46	-2,25	**-2,51**
75	FIN. AL - S.P.A.	2442	.	.	-1,40	-2,29	**-1,84**	-1,46	-1,79	-1,42	-1,83	**-1,62**
76	ANTICA FARMACEUTICA MODENESE S.P.A.	6420	.	35,33	0,47	-0,31	**11,83**	-0,32	-0,09	-0,30	-0,44	**-0,29**
77	COSTRUZIONI DONDI SPA	4311	.	-0,21	-2,05	-1,74	**-1,33**	-2,12	-0,60	-1,16	-1,28	**-1,29**
78	SADA SPA	4941	.	-3,27	-2,99	-3,35	**-3,20**	-2,86	-2,37	-2,38	-2,63	**-2,56**
79	EMERSON INDUSTRIAL AUTOMATION ITALY S.P.A.	2790	.	1,27	1,22	0,43	**0,98**	1,00	1,99	1,54	1,44	**1,49**
80	ISTITUTO GENTILI S.P.A.	2120	.	.	4,41	-0,57	**1,92**	-2,70	-0,56	1,27	-2,12	**-1,03**
81	FEP RIMONDI S.P.A.	4647	.	.	-1,01	-1,63	**-1,32**	-1,19	-1,53	-1,17	-1,31	**-1,30**
82	MOTIA COMPAGNIA DI NAVIGAZIONE S.P.A.	5000	.	-2,98	-2,71	-0,55	**-2,08**	-2,94	-3,17	-2,46	-1,40	**-2,49**
83	PIRCHER OBERLAND S.P.A.	1610	.	-1,25	0,02	0,54	**-0,23**	0,66	-0,07	0,41	0,08	**0,27**
84	DESMET BALLESTRA OLEO S.P.A.	2562	.	.	-2,77	-3,18	**-2,98**	-0,73	2,78	-0,13	-0,05	**0,47**
85	ITALEASE GESTIONE BENI S.P.A.	6810	.	-4,69	-1,77	-5,14	**-3,87**	-4,08	-5,87	-3,53	-1,45	**-3,73**
86	MAIR RESEARCH S.P.A.	3320	.	.	-1,61	-1,83	**-1,72**	-3,15	-2,61	-1,64	-1,08	**-2,12**
87	PARKER HIROSS S.P.A.	2829	.	.	-0,38	-1,08	**-0,73**	-0,58	0,10	0,24	-1,24	**-0,37**
88	TECHINT CIMIMONTUBI SPA	2562	.	.	-0,06	-1,16	**-0,61**	-1,10	-1,66	-3,78	-1,46	**-2,00**
89	M & Z RUBINETTERIE S.P.A. ABBREVIABILE IN	2814	.	-1,81	-1,93	-1,89	**-1,88**	-2,48	-2,29	-1,82	-1,98	**-2,14**
90	LI.SIT. S.P.A.	6201	.	.	-4,39	-4,36	**-4,37**	-5,33	-4,07	-2,83	0,39	**-2,96**
91	GRUPPO BONIFACI SPA	6810	.	-4,62	-2,81	3,38	**-1,35**	-3,83	43,82	9,91	.	**16,63**
92	ZIMMERHOFER SPA % ZIMMERHOFER AG	4100	.	.	-2,93	-2,71	**-2,82**	0,37	-2,17	-2,94	-0,94	**-1,42**
93	RODRIQUEZ CANTIERI NAVALI SPA	3011	.	-1,20	-2,13	-2,92	**-2,08**	-2,78	-3,48	-3,54	-0,63	**-2,61**
94	SIEMENS HOLDING S.P.A.	7010	.	.	-4,47	-4,02	**-4,25**	-4,52	2,24	-4,01	-1,86	**-2,04**
95	SEMPLICE SPA	7740	.	-2,85	4,66	-1,47	**0,11**	-2,19	0,84	-0,86	-0,69	**-0,72**
96	I CASTELLANI S.P.A.	2331	.	.	1,52	-3,13	**-0,81**	-1,33	-1,72	-1,84	-1,92	**-1,70**
97	ORECCHIA S.P.A.	6499	.	.	-2,82	19,01	**8,09**	-0,39	-1,98	-2,14	-2,08	**-1,65**
98	CALA CONTAINER SHIPPING S.P.A.	6820	.	.	-0,48	-1,23	**-0,86**	13,93	-1,39	-3,43	-4,90	**1,05**
99	ORSI MACCHINE TESSILI - S.P.A.	4660	.	-2,44	-3,90	4,30	**-0,68**	4,98	-3,32	-4,23	-0,35	**-0,73**
100	BINDA SPA	7010	.	.	-3,31	-2,14	**-2,73**	-3,82	8,93	-1,33	-1,54	**0,56**

Specifications:
- Code values represent the industry in which each company operates according to the UK Standard industrial classification of economic activities (SIC) as updated in 2007;
- Values represents the Beneish score for each year while the average value is introduced separately for the pre-crises period (2005-2008) and for the crises period (2009-2012);
- Score values expressed in red font represent those higher than the Beneish threshold for high probability of EM (-1.78)