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"VALUATION OF COMPANIES IN DISTRESS: THE CASE OF ZUCCHI GROUP"

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INTRODUCTION

The shrinkage in firm's lifespan experienced in the last decades have made decline and distress a more and more ordinary setting for firm valuation. As pointed out by a study conducted by Foster (2012) and updated by Anthony et al. (2016), which investigates firm's longevity in terms of permanence of the American companies in the index S&P 500, company's lifespan, averaging around 61 years in 1958, significantly decreased to 25 years in 1980 and to 20 years in 2005 and it is forecasted to further shrink to 14 years by 2026. Despite the fluctuations reported in company's lifespan, indeed, the overall trend line, from more than 50 years of data, points out a downward sloped average firm's longevity. This trend, even if partially driven by factors beyond the control of managers, such as technology shifts and economic shocks, is frequently determined by company's inability to adapt and take advantage of environmental changes. Whenever a company fails to promptly capture and react to warning signals by progressively reinventing itself, indeed, a value destruction process is activated and fomented until putting into question the firm's survival in the long term. When the firm starts to show the first signals of decline, however, its distressed features and the high uncertainty underlying its future prospects make the valuation of the firm's economic value a complex task, in a context in which firm's value itself is a key determinant of company's future. Whenever default is involuntary or strategically triggered, indeed, claimholders will decide whether favor the company's continuation as a going concern or support its liquidation on the basis of the firm's value, and claimholders' expected recovery, under each scenario. In a distress setting, however, traditional valuation methods, when applied according to the common practice, result, most of the times, in misleading outcomes, since they are generally designed for healthy firms with stable growth prospects. Adjustments, therefore, have to be introduced in order to correctly capture the effects of distress on firm's value and to allow traditional valuation methods to produce results that are generally unbiased also in a distress context.

After having provided an overview of the crisis phenomenon, having analyzed the main limitations of traditional valuation techniques and option pricing models in a distress setting and having reviewed the potential solutions, the thesis aims to propose a practical approach to distressed firm valuation based on a combination and integration of different valuation techniques, appropriately adjusted to incorporate distress. This approach is developed and tested in the framework provided by a real case of a company facing prolonged economic and financial distress: the case of Zucchi Group. Zucchi Group is a medium-size Italian company

operating in the household linen industry that started to reveal the first signals of decline in the early 2000s and has never experienced a stable performance recovery since that date, despite the several restructuring attempts implemented. First of all, in order to build a basis for the development of the assumptions underlying the valuation, an in-depth analysis of Zucchi Group's crisis path was conducted through the comparison of key financial ratios over time and with comparable companies, detecting, in this way, the causes and the signals of the crisis, but also the group's current strengths and weaknesses. Secondly, Zucchi Group's external environment was scanned in order to identify opportunities and threats and to verify whether they have been appropriately captured and managed in the current restructuring attempt. On the basis of the strategic guidelines of the latter, then, future cash flows were forecasted and valued through a mixed version of the APV method, managing the uncertainty underlying the future performance through a scenario analysis, first, and the inclusion of a distress premium in the discount rate, then. The accuracy and reliability of the estimates were then tested by means of the application of the method of multiples in the continuing value formula and the comparison with Zucchi Group market capitalization.

A second analysis was finally conducted in order to face another critical issue of distressed firm valuation: the estimation of debt market value. In particular, two different approaches were adopted, based on the use of the option pricing model and the application of the DCF model to cash flows to debt, to value Zucchi Group total debt as if it would have not been subjected to write-off according to the last debt restructuring agreement. Even if the practical applicability of these models comes at the expense of their comprehensiveness, the resulting estimates confirm that Zucchi Group would have never been able to repay its debt obligations despite the performance improvement expected from the implementation of the strategic plan, justifying the choice of creditors to grant a debt forgiveness.

CHAPTER 1: Corporate crisis status

1.1 Introduction

Corporate crisis has been one of the most debated topics in corporate finance for a long time. The crisis is a typical phenomenon of firms' life cycle that mature companies will face if they are not able to innovate and rediscover their growth roots. On the other hand, the recent financial crisis and the increasing complexity of the competitive environment in which firms operate, strongly impact companies' value generation process and often question their ability to continue as a going concern, renewing the interest toward this topic both in corporate finance literature and practice. For a distressed company, indeed, the analysis of the corporate crisis characteristics, causes and signals is the starting point for understanding how the crisis would impact on its ability to generate cash flows in the future and for designing valuation methods that would deal with the criticalities and uncertainties which are typical of the crisis status.

For this reason, the first chapter will provide an overview of the corporate crisis phenomenon, by recalling, first of all, various definitions of "crisis" that can be found in the literature and focusing on the distinction between decline and distress, but also between the related concepts of economic and financial distress (*paragraph 1.2*). Corporate crisis causes, then, will be investigated at three different levels (i.e., macro-economic, industry and company analysis) and adopting two different approaches (i.e., subjective and objective approach). At last, however, it will be recognized that companies fall into crisis as a consequence of the combination and interaction between internal and external factors *(paragraph 1.3*).

The identification of the crisis causes, but also the analysis of the stages of firm's crisis development, to which *paragraph 1.4* is dedicated, start from the detection of the signals of decline and distress through the adoption of different methods based on intuition, ratio analysis or models for the prediction of the probability of default (*paragraph 1.5*). Recognizing the signals and the causes of the crisis on a timely basis, then, allows managers to promptly intervene by selecting and implementing the best strategy to break the company's downturn. This topic will be discussed in the last paragraph of this chapter (*paragraph 1.6*), which analyzes liquidation, divestment and restructuring as alternative solutions for overcoming the distress, at a macro level, by focusing also on how restructuring efforts are interpreted by the market as soon as they are announced by the firm. Finally, for the sake of completeness, the tools available to overcome the crisis status will be investigated also from a

juridical point of view by ending the chapter with a brief description of the legal instruments available in Italy to support companies dealing with crisis.

1.2 Concept and definition

As stated by Pratt and Grabowski (2010), there is no universal definition of corporate crisis. Scholars and academics, in fact, have been more focused on identifying and classifying the components, causes, consequences and solutions of this phenomenon, without taking special care to universally identify the concept of crisis (Pozzoli & Paolone 2017).

Zanda et al. (1994) defined as "at loss firms" those companies which report negative margins in the income statement, showing their inability to adequately reward the factors that, directly or indirectly, participate to the management of the business. The economic loss suffered by these companies, however, has to be systematic and irreversible (if restructuring actions will not take place), in order to determine a corporate crisis status (Falini 2011).
First of all, in fact, it is necessary to distinguish decline by distress or crisis situations, to clearly understand the concept of corporate crisis.

As summarized by Weitzel and Jonsonn (1989), the various definitions provided in the past conceive "decline" as: "(1) a reduction in some organizational size measure (e.g., workforce, market share, assets), (2) a stage in the organization's life cycle, (3) internal stagnation, or inefficiency, (4) a failure to recognize warning signals (internal or external) about changes needed to remain competitive, and, (5) a failure to adapt or change to fit external environmental demands." (Weitzel & Jonsonn 1989, p. 94).
In particular, Guatri (1995), in accordance with the previous definitions, describes the decline as the phase of the company's life cycle in which first imbalances and inefficiencies appear, causing the deterioration of economic value over time. During this phase, as stated by Damodaran (2009), the company is generally characterized by:

- stagnant or declining revenues: the firm is unable to increase revenues over an extended period of time, even when market conditions are positive;
- shrinking or negative margins: the loss of bargaining power and the price reduction, carried out in order to prevent a further decrease in revenues, lead to declining operating margin;

- payment of large dividends and stock repurchase: given the few investment opportunities, cash flows generated by the existing assets or by asset divestitures are used to pay out large dividends and buy back stocks, if the debt is not enough for distress to be a concern;
- frequent asset divestitures: declining company's assets may worth more to other companies that are able to optimize their use. Furthermore, as the debt burden increases, there is a stronger need to divest assets in order to fulfill debt payments and avoid the default;
- overwhelming debt burden: the firm's inability to meet the terms of debt agreements, signed in the past, makes the debt refinancing more complicated, since lenders will ask more stringent provisions.

The crisis, instead, consists in a further deterioration of the decline conditions and results in a serious instability status in which the company survival is at risk (Guatri 1995). During the crisis, indeed, external shareholders are aware of the firm distressed situation and this negatively impacts their level of trust in the company. As a consequence, for the distressed company, it becomes more difficult to access to bank lending, to obtain deferred payments from suppliers and to maintain a strong and positive reputation in front of clients.
Therefore, even if the distinction is not so clear in practice, the decline can represent a physiological phase in the firm lifecycle, where decline moments and voluntary restructuring actions alternate (Sirleo 2009), while the crisis is a further development of the decline that appears as an irreversible situation without a significant external intervention.

Another side from which the concept of corporate crisis can be investigated consists on the distinction between economic and financial distress. According to Correia and Poblaciòn (2015), a firm is economically distressed when the operational cash flows generated by the company are not sufficient to fund the reinvestments required to maintain production capacity. Without such reinvestments, the company net present value as a going concern might finally be lower than the value of its assets if broken up from the business and sold separately (Crystal & Mokal 2006). In this case, the business is no longer viable and liquidation becomes the most likely solution to distress (Nigam & Boughanmi 2017).
However, it could be that the troubled company is only in a situation of financial distress. In this case the business is still viable and the company's assets might be in their best value in use. The assets, however, are illiquid and the firm's capital structure is such that the company is unable to pay back its debts when come due (Crystal & Mokal 2006).

According to Outecheva (2007), it is possible to group the various definition of financial distress provided in the literature by classifying them into three main categories:

- Event-oriented definitions. Within the scope of this group, financial distress is interpreted as the crucial event whose occurrence determines the end of firm's financial health time and the beginning of a financial illness period, requiring to adopt corrective measures in order to overcome the troubled situation. In particular, according to Beaver (1966, p. 71), financial distress can be defined as "the inability of a firm to pay its financial obligations as they mature" and can occur under different forms such as bankruptcy, bond default, an overdrawn bank account, nonpayment of a preferred stock dividend, but also as an attempt to restructure the debt in order to prevent the default on debt contract (Andrade & Kaplan 1998).
- Process-oriented definitions. Definitions within this class suggest that financial distress is an intermediate phase between solvency and insolvency (Purnanandam 2005). A company is financially distressed when it doesn't fulfill debt covenants or it doesn't meet its debt obligations (in term of both interest and principal payment), and, consequently, the yield on its bonds is materially higher than the interest rates at which banks are willing to grant credit to otherwise similar companies (Gordon 1971). The company will shift from a solvent to an insolvent state, however, only at the maturity date if the firm value is below the face value of debt. A company, therefore, can be distressed without defaulting. On the other hand, in any case, default and bankruptcy cannot take place without being preceded by a period of financial distress (Outecheva 2007).
- Technical definitions. The body of literature falling within this last group defines financial distress in quantitative terms. Empirical studies investigating matters such as financial distress prediction or distressed companies' performance and restructuring, indeed, use several indicators to identify a situation of financial distress. In particular, Whitaker (1999) defines financial distress as the first year in which the company's cash flows are not sufficient to meet obligations and the firm experiences a negative rate of growth in market value. Similarly, Pindado et al. (2008) consider the fall of firm's market value between two consecutive years as one of the characteristic defining financial distress, in combination with an EBITDA lower than financial expenses for two consecutive years (or, according to Asquith et al. (1994), EBITDA lower than 80% of interest expenses in any other year).

Anyway, regardless of the chosen definition, while economic distress is the consequence of difficulties arising from company's operating inefficiencies, financial distress is directly connected with firm's leverage decisions (Senbet & Wang 2012) and it is a typical result of high debt burden, combined with a difficult access to capital markets (Pratt & Grabowski 2010). Nonetheless, isolating the effects of economic and financial distress is not straightforward in practice, since the two concepts generally result to be highly correlated. Indeed, operating inefficiencies, which are typical of economically distressed firms, make the company not being able to generate sufficient cash flow from its operating activities to satisfy its current obligations. This, in turn, has a negative impact on market and stakeholders' assessment of the firm, leading to a decline in company market value (Ross et al. 1996) and causing the firm to suffer the negative effects of financial distress until the improved economic conditions are recognized again (Pindado et al. 2008).
The connection between firm's economic and financial dynamics, therefore, is so strong that, regardless the causes of the crisis, both dimensions result generally involved, simultaneously (Davydenko et al. 2012) or as consecutive phases of the corporate crisis path (Luerti[1] 1992).

The concept of crisis, lastly, can be investigated from a juridical point of view. Unfortunately, however, the Italian legislator doesn't provide a precise definition of corporate crisis. The article 160 of the Italian Bankruptcy Law only specifies that "crisis status" refers also to insolvency which, according to the art. 5, consists on the debtor's inability to meet its current obligations on a regular basis. As stated by Disegni (2014), however, the insolvency status is only the final signal of the crisis, which encompasses different situations, starting from reversible economic and financial disequilibria, that can be managed and solved through a firm's restructuring, until the irreversible insolvency status where the only solution is the liquidation of the company's assets.

In conclusion, the various perspectives adopted to analyze the phenomenon lead to several definitions of crisis, focusing on different aspects of the distress situation. Specifically, from a corporate finance perspective, the crisis is generally interpreted as the process of deterioration of financial and economic equilibria which leads, in turn, to the deterioration of economic

[1]According to Luerti (1992), the economic phase, characterized by the absence of profitability and efficiency and by firm's inability to generate cash flows sufficient to meet the investment needs, is followed by the financial phase, in which a prolonged negative profitability and the loss of support from banks, shareholders, clients and suppliers lead the firm to default. Luerti (1992), then, identified also a third phase of corporate crisis, the juridical phases, in which the company files for bankruptcy or initiates other legal procedures aimed at restructuring the firm capital structure.

value for shareholders, creditors and other firm's stakeholders (Aldrighetti & Savaris 2008). In this context, an in-depth investigation of the crisis phenomenon, starting from the identification of the causes originating the company's downward turn until the assessment of the feasibility of proposed solutions, is the starting point to value the company's ability to generate cash flows in the future and to continue as a going concern and provides, therefore, the basis for distressed firm valuation.

1.3 Corporate crisis causes

The identification of the causes leading the company to a crisis situation is fundamental to promptly act on the crisis by developing an appropriate strategic turnaround plan and/or a financial restructuring plan aimed at breaking the firm's downward turn and the value deterioration process.

Particularly, the investigation of the corporate crisis causes should encompass three different levels of analysis (Danovi & Indizio 2008):

- Macro economic analysis
- Industry analysis
- Company analysis

The first two levels of analysis allow to identify the external causes of the crisis, which consist on factors that are out of the firm control and are related to the environment in which the company operates. Among these factors, it is possible to distinguish macroeconomic variables by which all firms in all industries are affected, such as a demand shortage, the dynamic of the inflation rate, the volatility of the exchange rate or the interest rate level, from factors that impact only companies operating in a specific industry, such as changes in customers' preferences and needs, technology shocks, regulation changes or the redefinition of the sources of competitive advantage.

From a deterministic perspective and in accordance with classic industrial organization and organizational ecology theories, the environment plays the main role in determining the organization failure, since managers are constrained by exogenous factors reducing the scope for strategic choices at a minimum level (Mellahi & Wilkinson, 2004). The deterministic approach, however, is not able to explain why some companies in the same industry fail while others succeed, even though they are all exposed to the same external factors. In addition, as stated by Falini (2011), changes in the external environment, notwithstanding their

unpredictable nature and pervasive effects on the company, generally cannot cause the corporate crisis by themselves. More often, instead, internal inefficiencies and managers' deficiencies in detecting the signals of decline make the company unable to promptly react to the changing environment, leading to distress situations.

Thus, along with macroeconomic and industry analysis, a further investigation has to be conducted at the company level in order to identify the internal causes of crisis. As suggested by Guatri (1995), the analysis can be performed by adopting two different approaches:

- Subjective approach
- Objective approach

The subjective approach traces the origins of the crisis back to the inabilities and misbehaviors of individuals working in the company, in particular the managers. According to this approach, as suggested by Whitaker (1999, p. 123), "more firms enter financial distress as the result of poor management rather than economic distress". Indeed, from a voluntaristic perspective, firms' internal inadequacies in dealing with external threats are mainly due to the management misperception of environmental factors (Mellahi & Wilkinson 2004), that leads to inadequate operating, investment and/or financial decisions with a negative impact on the company performance. In accordance with the subjective approach, different researches have been conducted to identify the characteristics of the management team, e.g. cultural background, management skills, concentration of power and responsibility, which are frequently present in distressed companies, in order to determine their contribution to the crisis generation and development[2]. In addition, alongside managers, the supporters of the subjective approach criticize also the behavior of other individuals involved in the organization, such as employees or shareholders, which inefficiencies, wrong decisions and risk aversion can prevent the company to promptly react to environmental changes (Sirleo 2009).

However, the subjective approach shows different limitations in describing a complex phenomenon such as the corporate crisis, mainly because it doesn't consider the role played by factors beyond the management control. For this reason, it is generally preferred to use an objective approach to the analysis of the company's crisis, based on which five main causes of decline and distress can be identified (Guatri 1995):

[2] For further details see Fallini (2011) and Danovi and Indizio (2008)

1. Inefficiency: one or more firm's business units generate lower returns than competitors. Production is generally the function more prone to inefficiencies. In particular, production costs above the competitors' average may be determined by assets obsolescence, lack of skills, low employees' commitment and ineffective incentive plan. However, inefficiencies can concern other functions of the firm, such as:
    a. the commercial area: failure to achieve the marketing campaign objectives leads to excessive marketing costs;
    b. the financial area: unskilled CFO or firm's low bargaining power against lenders determine a higher cost of capital compared to the competitors' one;
    c. administrative function: deficiencies of the IT systems and excessive degree of bureaucratization lead to a discrepancy between the cost increase and the results obtained.

2. Overcapacity/rigidity: the firm operates under conditions of production overcapacity due to:
    a. market share loss;
    b. permanent decline in the market demand;
    c. actual revenues that are lower than the expected ones, on which basis fixed investment decisions were made;
    d. increase in costs not offset by an equivalent increase in prices subjected to public control.

    In addition, the company overcapacity might be exacerbated by the rigidity of the cost structure, namely the high proportion of fixed costs on total costs, that prevents the firm to promptly adapt to the changing market conditions.

3. Product deterioration: the product offering of the company is not aligned with the customers' needs or cannot tackle the competition of other firms' products and services anymore, leading to a decrease in product margin that falls below the level required to cover the fixed costs and to ensure a sufficient level of profit. Product deterioration can be due to insufficient investments in R&D, unsuccessful marketing campaign, achievement of maturity or decline phases in the product lifecycle or entry of a new competitor with a very effective or more innovative product mix.

4. Lack of innovation and planning: the company's inability to anticipate, interpret and adapt to environmental changes creates serious obstacles to its innovation process. The lack of planning ability results into a focus on short term objectives as well as in a limited commitment of managers and employees. The lack of innovation, instead, consists on firm's inability to exploit new growth opportunities leading to an inevitable weakening of its competitive position.

5. Financial imbalances: companies characterized by excessive leverage, significant short term debt in respect to other forms of borrowing, low shareholders' equity or insufficient liquidity reserves, are exposed to a larger risk of failing into a crisis. A strong and flexible capital structure, both in quantitative and qualitative terms (as pointed out by Halpern et al. (2009), debt composition plays a key role in influencing the firm's probability of financial distress and bankruptcy), indeed, is a powerful resource to face the decline emerged at the operating/strategic level, since it gives time to implement corrective actions and delay the financial distress. On the contrary, an unbalanced capital structure further contributes to the deterioration of company's profitability, by requiring the payment of higher interest expenses in respect to competitors.

However, as stated by Fedele and Antonucci (2015), the financial imbalances might be generated from other causes of the crisis. For example, excessive debt can be the result of over investments, trade receivables collection problems, loss of customers due to product decay or ineffective marketing campaigns. All these factors gradually undermine the company survival as a going concern, finally weakening the firm from a financial perspective as well.
In addition, as supported by Vance (2009), a firm is seldom in trouble for a single reason. The corporate crisis is generally the result of a combination of different causes that, acting together, reciprocally amplify their effect on the company performance and survival. Thus, the deterministic and voluntaristic perspectives to the analysis of the crisis should be combined and integrated with each other in order to understand how external and internal factors interact to cause the crisis. This interaction, in fact, can bring to "significant differences in the outcomes of the same internal factors across firms in different business environments and vice versa" (Mellahi & Wilkinson 2004, p. 34).
Furthermore, the complexity of the phenomenon makes very difficult to develop an exhaustive and comprehensive list of all the possible causes that can originate the corporate

crisis. For this reason, as suggested by Danovi and Indizio (2008), it is preferable to adopt an entity based approach, which consists in investigating the different causes of the crisis according to their impact on the company's KSFs and sources of competitive advantage.

1.4 Stages of the crisis path

As previously mentioned, a corporate crisis may occur at different levels of severity, starting from signals of reversible decline until reaching highly distressed situations in which the only solution might be liquidation. Even if it is not so easy in practice, the identification of the phase of the corporate crisis path in which the company is in, becomes fundamental for managers, to design and implement appropriate corrective actions, but also for other stakeholders to clearly understand the degree of risk connected with their position in the company.

An examination of the corporate crisis path can be conducted by analyzing the frameworks proposed by Hambrick and D'Aveni (1988), Weitzel and Jonsson (1989) and Outecheva (2007), and by combining and re-elaborating them in order to obtain a more in-depth analysis of the crisis stages, as proposed in *Figure 1.1*.

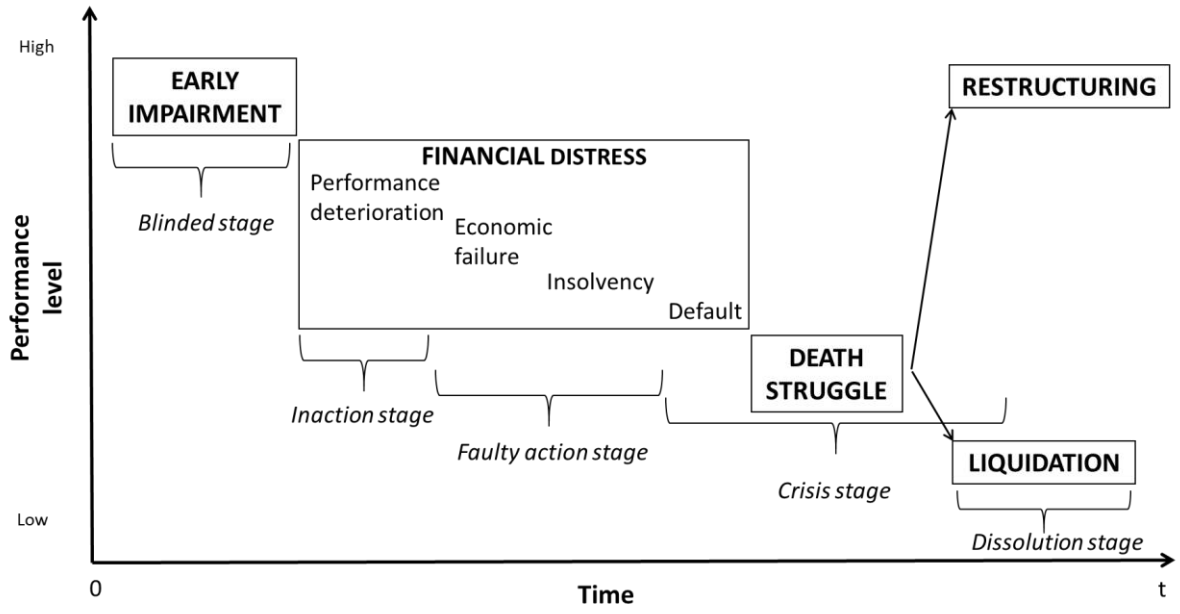

Figure 1.1 - The stages of company's downturn. (*Personal elaboration from Hambrick and D'Aveni (1988), Weitzel and Jonsson (1989) and Outecheva (2007))*

The first phase of the corporate crisis path is the so-called "early impairment". During this phase, the company fails to identify internal or external factors that may result into impending

losses. At this "blinded stage", in fact, internal and external challenges are likely to be qualitative in nature and not yet reflected on the firm's financial reports, since, for instance, the company may still be able to generate positive operating cash flows, or changes may occur in an environment that still appears supportive and stable. "At this early stage, however, it is still possible that decline can be reversed at relatively little cost by improving communications and monitoring, boosting employee morale, and other remedial steps." (Dark 2007, p. 219).

The second phase of the crisis path is the financial distress. When external and internal factors, such as a drop in sales and internal inefficiencies, start to impact company's profitability, the signals of performance deterioration come into light. As reported by Whitaker (1999), the operating income falls to 46.32% below the industry average during the early stages of financial distress. Managers, however, can judge the threat as temporary or be committed to the current strategy, therefore deciding to delay in taking corrective actions that generally are costly and disruptive.

This "inaction stage" comes to an end when the overt indicators of declining performance continue to multiply and the company starts to take some corrective actions which, however, may result ineffective or inappropriate. So, during the "faulty action stage", the increasing pressure encourages managers to examine different alternative options but, at the same time, it pushes the decision makers to favor easier and less expensive solutions, rather than pursuing costlier but required changes.

This behavior leads the company to economic failure, a situation in which "the realized rate of return on invested capital, with allowances for risk consideration, is significantly and continually lower than prevailing rates on similar investments" (Altman & Hotchkiss 2006, p. 4) or the company cost of capital. In addition, the company's inability to generate sufficient revenues to cover costs gives rise to a permanent reduction in cash flows and cash shortage problems.

If the firm is not able to break the downward spiral, failure rapidly evolves into insolvency. At this stage the company has a negative equity value, since its enterprise value is lower than the face value of its debt (stock-based insolvency) and the operating cash flows are insufficient to meet current obligations (flow-based insolvency; Ross et al. 1996).

When the company is still insolvent at the debt maturity date, the firm defaults, being unable to honor the agreements with creditors. This stage, called "crisis stage", is characterized by the explosion of the crisis, since the default represents an explicit signal of the company severe distressed situation. Indeed, with the default, insiders, but also public, investors and

other stakeholders become aware that "the balance sheet of the company cannot absorb the decline in performance because financial resources have been completely exhausted" (Outecheva 2007, p. 33).

Even though defaulted, the company can still fight for maintaining itself as a going concern, entering in a phase called "death struggle" (Hambrick & D'Aveni 1988). During the crisis stages, indeed, the company has the last chance for reorganization and turnaround. Revolutionary changes in strategies, structure, management and ideology, accompanied by a debt restructuring, are necessary to avoid entering in the "dissolution stage".

At the "dissolution stage", the crisis is irreversible and the company has no choice but to find buyers for its assets or file for bankruptcy. Capital depletion, loss of markets and reputations and the exodus of experienced personnel are only some of the factors that may prevent the company from continuing as a going concern and managers, once acknowledged the irreversible situation, should focus on effectively managing the company liquidation.

Distressed restructuring, however, can also be implemented before the company defaults, in order to break the downward spiral of financial distress. The possible strategies and legal solutions to deal with the crisis are more deeply analyzed in *paragraph 1.6*.

Another analysis of the crisis path can be performed by adopting the framework suggested by Buttignon (2008), which distinguishes three different phases on the basis of the following quantitative variables: company's operating free cash flow, going concern value, face value of debt and liquidation value (*Figure 1.2*).

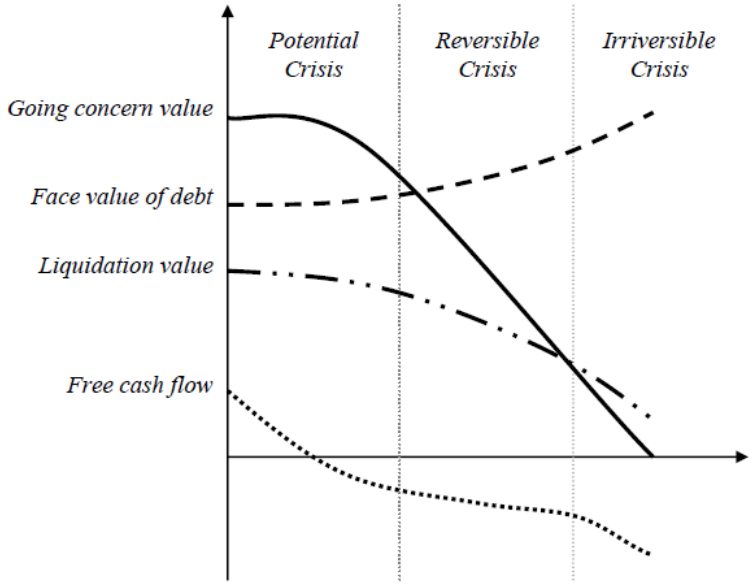

Figure 1.2 – The firm crisis path. *(Buttignon 2008)*

Particularly, in the first phase the crisis is only potential: the going concern value is decreasing because of the negative trend registered on operating free cash flows, but it is still higher than the face value of debt, that is assumed to increase, since negative operating free cash flows give rise to the need of external funds. In order to invert the trend of free cash flows, it is critical to identify the causes of decline and to promptly take corrective actions, by developing and implementing business turnaround plan and acting on the financial structure, through debt rescheduling requests or new debt instruments for refinancing.

If corrective actions are not taken or the solutions implemented are not effective, the company difficulties to meet financial obligations, due to its inability to generate positive cash flows, can have a negative impact on the company's relationships with customers, suppliers and employees, accelerating the decline in the company's enterprise value.

When the going concern value decreases until surpassing the level of the nominal value of debt, the crisis is no longer potential, but it is still reversible. This second phase is called by Kash and Darling (1998) as "chronic crisis stage" and it is a period of "make or break". In fact, more radical strategic turnaround and financial restructuring plan are required to avoid the company liquidation, and they should be aimed to solve what appear to be company's chronic problems by adopting solutions that go beyond "quick-fixes" and "band-aid" approaches. In particular, it is fundamental to find efficient solutions to restructure the current capital structure in order to reduce the debt level and make it less overwhelming. This result, for instance, can be obtained by asking creditors a debt write-off in exchange of equity rights or quasi-equity rights, such as warrants, options or convertible bonds.

The crisis becomes irreversible when the liquidation value is higher than the company's going concern value. At this stage, the company liquidation is the most efficient alternative, but hybrid solutions can also be carried out. Alongside the liquidation of some no firm-specific assets, which may worth more under liquidation than as employed in the company, there could be some assets' subgroups whose business enterprise value is higher than the proceeds deriving from the sale on individual basis of the assets which compose the subgroup. In this case, a possible solution consists on splitting these business units from the company, through a spin-off. This solution may or may not be accompanied by a transfer of control over the business unit to a new ownership group.

In conclusion, even though they analyze the crisis path from different perspective, all the proposed frameworks recognize the importance of the time variable in the company downward turn. The biggest challenge during the evolution of the distress, indeed, is to

recognize adverse dynamics as early as possible: earlier the decline situation is identified, less expensive and more effective are the available tools to restore the company performance and going concern value.

1.5 Signals of crisis and methods to detect them

The possibility to prevent or resolve the corporate crisis, before it results into the liquidation of company's assets, depends on the management's ability to detect the signals of decline and distress in a prompt and deepened manner. This requires managers to identify companies' operating and financial difficulties as early as possible and to correctly classify them as either causes or symptoms of decline, in order to fully capture the underlying cause-effect relationships, which represent a critical starting point for the design of a successful turnaround strategy (Vance 2009).

The investigation of signals of decline and distress, however, responds to the needs of stakeholders outside the management of the company as well, such as shareholders and creditors, to anticipate and recognize factors that can negatively affect the company health, in order to take the necessary measures to minimize the impact of such phenomena on their positions.

Different methods can be adopted to detect signals of decline and distress, which are generally grouped by the literature in three categories[3]:

- Methods based on intuition
- Methods based on ratio analysis
- Methods based on models

1.5.1 Methods based on intuition

The first group of methods is based on the recognition of the external manifestations of crisis factors (which are mainly qualitative in nature), often based on a simple intuition rather than as a result of the application of a formalized model. Given the impossibility to compile a comprehensive and universal list, *Table 1.1* indicates an example of the elements which can reveal a decline situation.

[3] This classification is proposed by several authors, such as Guatri (1995), Sirleo (2009), Fedele and Antonucci (2015) and Fiori (2016).

TYPE OF SIGNAL	CRISIS SIGNAL	EXTERNAL RECOGNIZABILITY	POSSIBILITY OF INTERVENTION
Market-related signals	Belonging to mature or declining industries	High	Low
	Belonging to industries characterized by declining demand	High	Low
	Loss of market shares	Medium	Medium
Operating/ Strategic signals	Production inefficiencies	Low	High
	Sales/Marketing inefficiencies	Medium	High
	Administrative and organizational inefficiencies	Low	High
	Rigid cost structure	Medium	Medium
	Low products innovation and shift toward lower margin products mix.	Medium	Medium
	Lack of planning/scheduling	Low	High
	Low R&D investments and resulting productivity deterioration	Medium	High
	Exodus of managers and high qualified personnel	Medium	Medium
	Troubled relations with clients and suppliers	Medium	Medium
Balance sheet/ Financial signals	Financial imbalances and inefficiencies: - Deterioration of financial structure - Huge debt increase accompanied by a significant liquidity decrease - Difficulties in fulfilling debt payments and worsening of the relations with financial community	High	Medium
	Balance sheet imbalances: - Liabilities far greater than assets	High	Medium

Table 1.1 – Signals of crisis and possibility to detect and act on them. (*Personal elaboration from Guatri (1995), Sirleo (2009), Usdin and Bloom (2012))*

In addition to the listed signals, negative net income is another evident sign of company downturn. However, when losses in the income statements are significant and persistent, the crisis prediction is obvious by now indicating that the decline has already turned into distress and started to show negative effects also toward creditors (Sirleo 2009).

1.5.2 Methods based on ratio analysis

A more in-depth investigation of the signals of the crisis can be conducted through the analysis of the company's financial statements and the calculation of key ratios. The ratio analysis allows to identify potential critical issues which may lead the company to decline, by questioning the differences resulted from the comparison of key ratios for a firm over several years (time series comparison), with other firms in the industry (cross-sectional comparison) or to some absolute benchmarks.

A first area of investigation, on which the ratio analysis should focus, concerns the company's profitability. A downward trend in revenues and a reduction in productivity, expressed by a declining EBITDA margin, represent the first signals of decline. The decrease in operating results makes the coverage of structural fixed costs and the payment of financial expenses more difficult, thus negatively affecting the company profitability, as captured by ratios such as ROE, ROA, ROS and ROIC.

As suggested by Koller et al. (2015), ROIC is a better tool for understanding company's performance, in respect to the other ratios. While the ROE mixes operating performance with capital structure and the ROA includes non-operating assets and ignores the benefits of operating liabilities (as account payables) in reducing the capital required from investors, the ROIC focuses solely on company's operations. Thus, declining or below industry average ROIC can provide a signal of company's operating inefficiencies, that is economic distress.

Another dimension through which the signals of decline can come into light is the company's liquidity. In particular, short term liquidity deficit or insufficiency, which generally characterizes distressed companies, can result from the analysis of ratios such as:

- the current ratio: it measures the firm's ability to pay its current liabilities;
- the quick (or acid test) ratio: it captures the firm's ability to cover its current liabilities from liquid assets, which are "quick" sources of cash;
- operating cash flow ratio: it focuses on the company's ability to cover its current liabilities with cash generated from operations.

For these ratios, it is difficult to identify a generally accepted threshold below which the company can be considered as having liquidity problems. For instance, as stated by Branch and Ray (2007), even though, the current ratio should be 2 or greater (according to common wisdom), the optimal level varies from companies to companies, industries to industries and over time. As supported by Palepu et al. (1996) indeed, even when the current ratio is higher than 1, suggesting that the firm can cover its current liabilities with the cash generated by its current assets, the firm can experience short term liquidity problems because some of its current assets are not easy to liquidate (for instance, the industries in which the firm operates can be characterized by a slow collection of accounting receivables).

In addition, the assessment of the company's liquidity should encompass the analysis of the firm's working capital, generally performed through the calculation of ratios such as account receivables turnover, account payables turnover, inventory turnover or day's receivables, day's payables, day's inventory. The negative trend in revenues, which characterizes a company in decline, lead to an increase in inventory due to unsold goods, while the delay in payments create tensions with the suppliers, which ask more stringent conditions. On the other hand, the need to maintain or increase sales can lead the company to decrease its attention on the selection of clients, increasing the account receivables collecting period. As a consequence, signals of decline situation can result into slow accounts receivables turnover and slow inventory turnover that put a strain on the company short term liquidity and may indicate excessive bad debt losses or obsolete inventory, which are signs of a poor working capital management[4] (Pratt et al. 2000).

Finally, the ratio analysis should also focus on the company's capital structure in order to verify the presence of issues related to the company's long term solvency, which may trigger financial distress. In this context, commonly used ratios are debt-to-equity ratio, debt-to-capital ratio and equity-to-capital ratio. High values of the first two ratios indicate aggressive leverage practices, generally associated with high level of risk that may result in volatile earnings because of the additional interest expenses.

Judgments about the suitability/sustainability of the company's capital structure can also be based on the insights provided by:

- the interest coverage ratio, which indicates the company ability to pay interests on outstanding debt with its earnings;

[4] On the other hand, also fast account receivables turnover and inventory turnover are not desirable, since they may indicate that sales are limited by an overly stringent credit policy or insufficient inventory.

- net debt to EBITDA ratio, which shows how many years it would take for a firm to pay back its debt if net debt and EBITDA are held constant.

As well as for liquidity ratios, also for capital structure ratios it is very difficult to identify absolute benchmarks, since they can widely vary among industries. Nonetheless, as reported by Fazzini (2011), analysts usually use some parameters for judging the level of financial independence on the basis of the equity-to-capital ratio. In particular, equity-to-capital ratios below 33% signals risky areas, ratios from 33% to 50% signal less risky situations which should be closely monitored in any case, while ratios above 66% reveal a scarce recourse to financial leverage.

The main ratios previously mentioned are listed in the *Table 1.2*. Alongside the ratio analysis, further signals of decline can be captured trough a cash flow analysis. By providing further insight into the firm's operating, investing and financing policies through the examination of cash flows, this type of analysis allows, for instance, to assess how much strong is the firm's internal cash flow generation and whether the firm is able to meet its short term financial obligations from its operating cash flows (Palepu et al. 1996).

Profitability ratio	$ROE = \frac{Net\ income}{Shareholders'Equity}$
	$ROA = \frac{Net\ Income}{Total\ Assets}$
	$ROS = \frac{Net\ Income}{Sales}$
	$ROIC = \frac{NOPLAT}{Invested\ Capital}$
Liquidity ratio	$Current\ ratio = \frac{Current\ Assets}{Current\ Liabilities}$
	$Quick\ (Acid\ Test)\ ratio = = \frac{Cash\ and\ Equivalents + Marketable\ securities + Accounts\ Receivables}{Current\ Liabilities}$
	$Operating\ Cash\ Flow\ ratio = \frac{Cash\ Flow\ from\ Operations}{Current\ Liabilities}$
Capital Structure ratio	$Debt\ to\ Equity\ Ratio = \frac{Debt}{Shareholders'Equity}$
	$Debt\ to\ Capital\ Ratio = \frac{Debt}{Debt + Shareholders'Equity}$
	$Equty\ to\ Capital\ Ratio = \frac{Shareholders'Equity}{Debt + Shareholders'Equity}$
	$Interest\ Coverage\ Ratio = \frac{EBIT}{Interest\ Expenses}$
	$Net\ Debt\ to\ EBITDA = \frac{Net\ Debt}{EBITDA}$

Table 1.2 – Financial ratios as signals of firm decline. (*Personal elaboration from Branch and Ray (2007), Pratt et al. (2000), Palepu et al. (1996))*

1.5.3 Methods based on models

Financial ratios, then, can be combined in different models with the purpose of predicting the company's probability to going into bankruptcy. In this context, a first contribution was provided by Beaver (1966), whose study aimed to investigate the predictive ability of 30 financial ratios through a univariate analysis. By considering 79 failed firms and 79 healthy firms and by comparing each firm of the first group with a firm of the second group operating in the same industry and with equal size, Beaver (1966) concluded that cash flow to total debt ratio presented the highest discriminatory and prediction power for as long as five years before actual failure. This result was confirmed and corroborated by Deaklin's study (1972), which, similarly to Beaver's analysis, was aimed to identify those ratios able to capture the differences between failed and healthy firm some years before the failure actually occurs.
However, since the models of Beaver (1966) and Deaklin (1972) were based on univariate statistics, they presented the shortcoming of not considering the relationships between ratios in predicting bankruptcy.

This limitation was overcome by Altman (1968), that developed a multivariate discriminatory model through which a score could be assigned to each publicly traded firm considered in his analysis. The score is calculated by weighting and adding up 5 different ratios describing company's profitability, liquidity, leverage and solvency, which resulted to be the most explanatory ratios of company distress in Altman's analysis of historical data (*Figure 1.3*).

$$Z = 1{,}2\,X_1 + 1{,}4\,X_2 + 3{,}3\,X_3 + 0{,}6\,X_4 + 0{,}999\,X_5$$

$$X_1 = \frac{Working\ capital}{Total\ assets} \qquad X_4 = \frac{Market\ value\ of\ equity}{Book\ value\ of\ total\ liabilities}$$

$$X_2 = \frac{Retained\ earnings}{Total\ assets} \qquad X_5 = \frac{Sales}{Total\ assets}$$

$$X_3 = \frac{EBIT}{Total\ assets}$$

Figure 1.3 – The Z-score model. *(Altman 1968)*

Then, the obtained score allows to classify the firm as economically and financially healthy (if the Z score is higher than 2.99) or as in distress and so at high risk of bankruptcy (if the Z score is lower than 1.8). Z score levels between 1.8 and 2.99, instead, determine a grey area in which the results can be ambiguous and a further in-depth investigation is required.
In the following years, this model was revised by Altman himself, in order to adapt it to private firms (Altman, 1993), and to non-manufacturers and emerging markets (Altman et al.,

1995; 1997), but also by other authors in different countries, such as, for instance, Alberici (1975) and Appetiti (1984) in Italy, Taffler (1979; 1982; 1991) in the United Kingdom, Edmister (1972) and Blum (1974) in the USA[5].

The discriminatory model developed by Altman, however, merely allows to classify a company as healthy or distressed, without providing any quantification of the firm's probability to going into bankruptcy. In order to overcome this limit, a new model was developed by Ohlson (1980), i.e. O-score model. This model, by adopting a probabilistic approach, allows to calculate a value between 0 and 1 representing the company's probability of default, on the basis of an O-score computed for each company by considering 9 coefficient-weighted financial ratios (*Figure 1.4*).

$$O_1 = log\frac{Total\ assets}{GNP\ price\ level\ index} \qquad O_2 = \frac{Total\ liabilities}{Total\ assets} \qquad O_3 = \frac{Working\ capital}{Total\ assets}$$

$$O_4 = \frac{Current\ liabilities}{Current\ assets} \qquad O_5 = \begin{matrix}1\ if\ total\ liabilities > total\ assets \\ 0\ otherwise\end{matrix} \qquad O_6 = \frac{Net\ income}{Total\ assets}$$

$$O_7 = \frac{Funds\ from\ opeations}{Total\ liabilities} \qquad O_8 = \begin{matrix}1\ if\ net\ income < 0\ for\ the\ last\ 2\ years \\ 0\ otherwise\end{matrix} \qquad O_9 = \frac{Net\ income_t - Net\ income_{t-1}}{|Net\ income_t| + |Net\ income_{t-1}|}$$

$$O - Score = -1{,}32 - 0{,}407O_1 + 6{,}03O_2 - 1{,}43O_3 + 0{,}0757O_4 - 1{,}72O_5 - 2{,}37O_6 - 1{,}83O_7 + 0{,}285O_8 - 0{,}521O_9,$$

$$Probability\ of\ bankruptcy = \frac{\exp(O - Score)}{1 + \exp(O - Score)}$$

Figure 1.4 – The Ohlson's model. *(Ohlson 1980)*

Alongside these accounting-based measures for the calculation of probability of default, market-based measures which rely on information available in the market about firms' bonds and stocks prices, can also be adopted. A more detailed analysis of these methods is provided in Chapter 2, *paragraph 2.2.1*.

1.6 Strategies for dealing with the crisis

Once detected the signals of company decline or distress and recognized the internal and external factors that cause the crisis situation, the manager has to focus on the identification of the best solution to deal with and overcome the crisis. The different peculiarities of each company and of the industry in which it operates, make impossible to define an "universal

[5] For further information about the literature review in the field of corporate bankruptcy prediction models see Comuzzi (1995) and Lin et al. (2011).

recipe" to deal with the crisis, requiring to adopt an entity-based approach for the selection of the best strategy to get out of the economic and/or financial distress. As pointed out by the empirical analyses presented in the literature, indeed, several factors influence the choice. Among these determinants there are, for instance: the debt structure (Asquit et al. 1994), the lenders monitoring (Lai & Sudarsanam 1997), the ownership structure (Kang & Shivdasani 1997), the stage of firm's lifecycle (Koh et al. 2015), the company's size (Datta 1995), the severity of distressed state and the resource slack available (Smith & Graves 2005).

Nonetheless, it is possible to identify some common principles that should drive the management of the crisis and the strategic assessment of the best solution to exit the distress situation: efficiency, timeliness and fairness (Buttignon 2008). Focusing on efficiency means, first of all, to reflect upon the best use of the distressed firm's assets. From this perspective, the optimal solution is the one which envisages the allocation of assets to the most productive configuration, that is the configuration under which they generate the highest value, taking into consideration not only the value of the assets on individual basis, but also the value generated as a result of their combined use in the company. Secondly, the manager should intervene on the crisis in a timely manner, according to the timeliness principle, in order to block the deterioration process before it results into a fall in the firm's value, as either enterprise value or liquidation value. The ongoing decline situation, in fact, may have negative effects on the company reputation giving rise to a decrease in the value of the company's assets, in particular for the intangible ones (such as goodwill and brands), and it may prevent the investments needed for the maintenance and strengthening of internal resources and competencies fundamental for the value generation. Finally, efficiency and timeliness should be combined with the fairness principle, which should drive the allocation of costs and benefits of the selected crisis solution among the different stakeholders.

Based on the combination of these principles, the firm shall select one of the following alternatives as the solution of the crisis[6]:

- Liquidation
- Divestment or going concern sale
- Restructuring

Liquidation should be considered as the last resort strategy, when other alternatives are not applicable or not efficient (Benson 2010). Under this solution the company's assets are sold on individual basis and the firm ceases to operate. This alternative can be very attractive for

[6] Actually, the company can decide to choose different options among liquidation, divestment and restructuring for different SBUs (Strategic Business Unit).

creditors when the company assets are liquid and the firm's operating conditions are critical, reducing the creditors confidence on the success of a possible restructuring. In this context, the distribution of equity rights (such as shares, options, warrants) to creditors, by giving them the opportunity to participate to the potential upside of the restructuring plan, can be a solution to weak the creditors pressure toward liquidation. On the other hand, when the tangible assets are firm-specific, so that their asset value outside the company is very low, and/or when the crisis situation makes it difficult or impossible to monetize firm's intangible assets, the liquidation results into a further deterioration of value and in the transfer of the losses suffered by the insolvent firm on creditors (Guglielmucci 2015).

Divestment (or going concern sale), instead, consists on the transfer of the control over the company to a new ownership group which will become responsible for the costs and benefits of the restructuring plan. The acquirer can be a strategic buyer, e. g. another company looking for synergies, or a financial buyer, such as a private equity fund, which can exploit its skills and competencies to revitalize firms with poor performance, in distress or experiencing trading difficulties, with a subsequent return on its investment through a sale or an IPO. In both cases, the creditors can benefit from the improved company's performance that can lead to an increase in the cash flows available to repay the debt. However, creditors often end up accepting a debt restructuring and its related costs and sacrifices, since creditors' approval of capital structure changes are often a condition dictated by the buyer for its intervention in the distressed firm.

Restructuring, at last, consists in a fundamental organizational change aimed to restore and improve company efficiency and profitably (Chalos & Chen 2002). This solution is implemented with the purpose of maintaining the company's as a going concern under current ownership and can involve different corporate dimensions (Schweizer & Nienhaus 2017):

- Managerial restructuring. It is generally recognized that company's top management team plays a key role in driving the firm outside the distress situation (Lohrke et al. 2004). Managers whose poor and inefficient planning and decision making abilities are considered as causes of the crisis, therefore, are generally replaced with new teams that, by usually including managers with acknowledged expertise in business turnaround, are believed more skilled in defining and implementing strategies for restructuring (Koh et al. 2015). Moreover, a change in the management team is a tangible evidence for bankers and investors that something is being done in the attempt to improve company's performance, even when the factors originating

company crisis might have been beyond management's control (Sudarsanam & Lai 2001).

- Operational restructuring. This kind of restructuring aims to restore profitability by minimizing operating inputs and maximizing output through the adoption of cost cutting strategies, revenues generating strategies, asset reduction strategies or combination effort strategies (Hofer 1980). In particular, operating assets reduction strategies include, for instance, the closure of surplus plants, the sale of unused machineries or the reduction of inventory, with the purpose of enhancing operations' efficiency through an optimization of assets utilization, while combination effort strategies consist on a simultaneous implementation of cost cutting, revenues generating and asset reduction strategies. Operational restructuring, however, mainly has a fire-fighting nature, since it is primarily designed to generate cash flow in the short term, and may be for many companies a necessary but not sufficient action for recovery if used as a stand-alone strategy, as showed in their survey by Grinyer et al. (1988, ch.4) [7].
- Portfolio restructuring. Distressed firms can opt for selling unprofitable or non-core lines of business with the purpose to halt cash drain and refocus the business portfolio on core competencies, but also forming strategic alliance, joint venture and licensing agreement with companies that present best fit in terms of relatedness and impact on market position (Shleifer & Vishny 1992, Sudarsanam & Lai 2001). Asset sales, in addition, rise cash that can be used to repay debtors and fund restructuring.
- Financial restructuring. It consists on the reworking of firm's capital structure in order to reduce the debt payment pressure by adopting equity based and debt based strategies (Koh et al. 2015). Equity based strategies generally include equity issues and entail the reduction or omission of dividends as consequence of liquidity constraints, restrictions regulated in debt agreements or strategic consideration, such as enhancing the firm's bargaining position with trade unions (DeAngelo & DeAngelo 1990). Debt based strategies, instead, involve the restructuring of firm debt through covenants waiver, interest reduction, debt rescheduling and/or extension, debt-equity swap or debt write-off, depending on the severity of the crisis.

[7]From Grinyer et al. 's study (1988), in particular, it emerges that sharpbenders, after having experienced a decline relative to competitors, achieved a significant and sustained performance improvement by adopting cost reduction strategies in combination with the implementation of strategic changes with a long term focus (product diversification, acquisition, new market focus, …).

Given the different interests of stakeholders involved, however, the choice of the best solution among liquidation, divestment and restructuring is not so easy in practice. As a general principle, the firm should opt for the alternative that generates the highest value for stakeholders as a whole, further analyzing how to fairly distribute this value among creditors and shareholders, in the attempt to equitably counterbalance, at least partially, the costs connected with the selected solution suffered by each category. However, claimholders not only frequently disagree about how allocating value and pain deriving from the selected solution, but they also have different opinions about company's worth under each alternative. A common solution to bridge such disagreement over value consists on including in the deal insurance policy or earn-out payment provisions, which regulate the payment from one party to another of a sum linked to the future realized value of the firm (Gilson 2010).

1.6.1 Market reaction to restructuring announcement

Several empirical researches have been conducted to study how the solution selected to exit the crisis is interpreted by the stock market. A large part of this line of literature, in particular, focuses on the market reaction to restructuring announcement, producing mixed findings. While some studies point out a positive response to restructuring announcement (Brickley & VanDrunen, 1990, Markides 1992, Bunsis 1997, Khurana & Lippincott 2000), other researches identifies a negative (Blackwell 1990, Bens 2002, Lin & Rozeff 1993, Poon et al. 2001) or statistically not significant stock price reaction (Strong & Meyer 1987, Lin & Rozeff 1993). According to Chaney (1999), this lack of consistency in the empirical results may be explained by three main reasons. First of all, corporate restructurings are difficult to interpret for markets, since they require to balance the loss in profitability caused by restructuring costs in the short term with the expectation of improved cash flows further ahead. By creating discontinuities with the past, in addition, restructuring increases the level of uncertainty about future earnings and can impair analysts' ability to forecast firm's performance. Chaney's research (1999), particularly, pointed out that, on average, analysts' overestimation of future profits results to be higher in the year following the restructuring announcement than in the year prior to it.

Secondly, markets may or may not anticipate the restructuring announcement. The time window selected for analyzing the stock market reaction, therefore, can significantly affect the results. For example, Bartov et al. (1998) identified a very small stock price response (-1%) to the announcement of assets write-off for significant amounts (around 20% of firm's total market value). According to the author, this finding can be explained by the fact that the

market had already recognized the firm's troubles and an adjustment had already taken place in the stock price before the write-off announcement. On the other hand, the prolonged price correction experienced by the stock in the following years, reveals that investors fail to fully incorporate all the relevant information in the market values in a timely basis, even if they partially anticipate the assets write-off.

Thirdly, the mixed findings in the literature can be often explained by the different type of restructuring analyzed by the empirical studies, even though in some cases contrasting evidences also result from researches examining similar restructuring choices.

A first line of research in this field of the literature focuses on the analysis of market reaction to the announcement of top management change, and, therefore, on managerial restructuring. In particular, while Warner et al (1988) reported no significant price reaction at the management change announcement date, Furtado and Rozeff (1987) detected significant positive returns. On the contrary, Khanna and Poulsen (1995) observed a significant and negative market response to managerial turnover, regardless of whether the new manager comes from inside or outside the firm, suggesting that the managerial replacement is not interpreted by the market as a cure to financial distress. According to Bonnier and Bruner (1989), the lack of consistency in the results of previous mentioned studies arises from a "cofounding information effect" connected with the managerial change announcement. The final stock price reaction, indeed, is the sum of two opposite components: an information effect, that can be negative if the change suggests a worse than anticipated management performance, and a real effect, that would be positive if the change is believed in the shareholders' interest. The component with the large absolute value, therefore, will determine the sign of the market response.

A second line of research, then, investigates market interpretation of operational restructuring strategies, in particular cost cutting and asset reduction strategies. These strategies, which aim to optimize marginal productivity and downscale firm's capacity, frequently involve sizeable layoff in troubled firms. As reported by Chen et al. (2001), layoff announcements are associated on average with a significantly negative stock market reaction. This finding, which is supported by several empirical researches (see Worrell et al. 1991, Lin & Rozeff 1993, Ursel & Armstrong-Stasse 1995, Iqbal & Shetty 1995, Lee 1997), points out that the market generally negatively interprets the announcement of workforce downsizing because of concerns that losses in valuable human capital, a resource that is critical to achieve and sustain the competitive advantage, will exceed the benefit deriving from costs reduction (Nixon et al. 2004). In addition, for financially distressed firms, the layoff announcement

reinforces the market knowledge about the firm financial difficulties, signaling that they are real and long-lasting (Wertheim & Robinson 2004). In this case, the layoff is mainly reactive in nature, responding to loss making activities and declining demand. Differently, when the layoff decision derives from pure-efficiency cost cutting actions aimed to maintaining competitiveness and enhancing performance, thus having a proactive nature, the stock market reaction to the workforce downsize announcement is observed to be less negative, if not positive (Palmon et al. 1997, Hahn & Reyes 2004, Hillier et al. 2007).

Thirdly, investors interpretation of restructuring announcement has been also investigated in the literature for portfolio restructuring strategies, which are undertaken by the company with the purpose of eliminating no more profitable lines of business and refocusing on core competencies. In particular, Markides (1992) observed that refocusing announcements are associated with significant positive returns, while Bunsis (1997) detected a positive market reaction to assets write-off when the decrease in total assets value is a consequence of company's exit from unprofitable segments. According to these findings, the market perceives divestiture as a value enhancing type of restructuring, since it is assumed to reverse, at least partially, the value destruction caused by prior unsuccessful diversification strategies (Berger & Ofek 1999). In particular, in a comprehensive review study, Eckbo and Thorburn (2008) identified an average abnormal return to divestment announcement for firms analyzed in 18 empirical researches of 1,2% (ranging from 0,3% to 3,4%). Even more interestingly, Lasfer et al. (1996) showed that excess returns at the sell-off announcement are far higher for financially distressed firms. Troubled firms, indeed, benefits from divestments not only because they can lead to a performance improvement by eliminating out of focus businesses that give rise to negative synergies, but also because the sale of assets can reduce the cost of financial distress. Therefore, by generating cash that can be used to meet debt obligations, divestments can steer the firm out of potential bankruptcy and associated direct and indirect costs. According to this finding, Powell and Yawson's study (2012) over 1699 restructurings undertaken by UK firms during the period 1992-2002, pointed out that divestiture really improves the firm's survival likelihood, differently from layoff actions, which resulted to be less likely to protect the company from exiting the market. This empirical research suggests that the market, which generally negatively reacts to layoff announcement and positively responds to divestiture announcement, seems to correctly value the consequences of these restructuring strategies on firm performance and survival.

Finally, regarding the last type of restructuring strategies, i.e. the financial restructuring, empirical studies' results seem to be consistent with each other about the market reaction to

financial restructuring announcement. In particular, by focusing mainly on dividends cut or omission and equity-for-debt swaps, they point out a significant negative stock price reaction to both announcements. According to the "dividend signaling theory", the announcement of dividends payments helps to alleviate the informational asymmetry between managers and investors about the firm's future prospects (Jensen & Johnson 1995). In particular, announcements of decrease or omission of dividends suggest that managers are pessimistic about firm's future earnings and they don't expect a recovery of company's financial conditions in the short term. Therefore, managers, who are aware of the negative signal sent to the capital market, tend to defer dividends cut and omission until company's poor prospects make them imperative (Ghosh & Woolridge 1991). Investors, on the other hand, understand managers' strong reluctance in reducing dividends and, thus, interpret the announcement of dividends cut as a very informative decision and a more critical event than dividend increase, as supported by empirical evidences which point out a stronger market reaction to downward adjustments in dividend payment than to upward adjustments (Ghosh & Woolridge 1991).
A negative stock market reaction is then documented in the literature also in relation to debt-equity swap announcements (Kalra et al. 1996). When undertaken by financially healthy firms, indeed, these leverage-decreasing transactions can cause debt to equity ratio to fall below the optimal level, i.e. the one maximizing the firm's value. Investors, however, frequently interpret debt-reduction exchange offer as negative, also when implemented by distressed firms. Even if this solution signals the management's efforts to stave off further financial distress and, therefore, to protect the shareholders' value, the announcement also conveys information that company's financial conditions are more critical than otherwise indicated by other publicly available information (Lie et al. 2001). Thus, the effects of the latter signal prevail on the former's one, causing negative stock price reaction around debt-equity swap announcement.

In conclusion, for some types of restructuring, the literature seems to broadly agree upon the market reaction to their announcement. Empirical analyses conducted at a higher degree of granularity, however, point out that market interpretation of restructuring efforts strongly depends on firm's characteristics and on the announcement's information content (Ponn et al. 2001). Therefore, the market can react differently to similar types of restructuring, depending on whether the restructuring announcement reveals more or less unfavorable information about the conditions of the company and future cash flows, than the market previously realized. Furthermore, company turnaround generally involves more than one corporate

dimension at the same time. Interaction between the different types of restructuring, therefore, can lead to stock market responses which are different from what it is generally expected for that kind of restructuring. As showed by Chalos and Chen (2002), for instance, investors tend to positively interpret layoff announcements when related to firm's refocusing strategies, but not when connected to plant closing decisions, which generally signal expected decline in sales. Finally, the overall economic circumstances surrounding the announcement and the related investors mood are other elements that can further lead to differential responses to corporate announcements (Hahn & Reyes 2004).

1.6.2 Legal tools in Italy for managing the crisis

In order to efficiently and effectively manage the crisis, the macro-level analysis of the possible solutions to the crisis (liquidation, divestment, restructuring) should be fine-tuned by considering the legal tools provided by the bankruptcy law of the jurisdiction in which the company operates for the purpose of dealing with the financial distress.
In particular, In Italy, the Bankruptcy Law *(Legge Fallimentare – l.f.*) provides different legal options to assist the firm to overcome the distress, which are mainly focused on the maintenance of the company's as a going concern and can be classified in two macro categories:

- out-of-court workouts, which generally entail the drafting of a private agreement between the firm and its creditors and, in any case, consists in a no court-assisted process;
- in-court resolutions, which imply the court intervention and assistance in the process for solving distress.

Generally, the out-of-court workouts is preferred to the in-court solutions, since the latter are more expensive and have a larger impact on company reputation and credibility, given the implied higher outside knowledgeability and externalization of the crisis situation (Guglielmucci 2011). In addition, out-of-court legal options increase the flexibility of the restructuring process, by involving a direct communication and discussion between the management and the company's stakeholders. On the other hand, out-of-court restructuring agreements, such as the debt restructuring agreement (art. 182 bis l.f.), are binding only for creditors that participate in the agreement, since based on a private arrangement, while the dissenting creditors must be paid in accordance with their terms if their credits are not already due and payable. Non-participating creditors can gamble that the restructuring will take place

despite the lack of their approval, potentially assuring them to receive a full recovery at the maturity date, since at that date the company should be financially stronger, having been subjected to the restructuring. This dynamic is known as holdout problem and, by creating the risk that not enough creditors will participate to significantly reduce the firm's debt burden, it is one of the most common reasons why voluntary restructuring fail to occur (Moyer et al. 2012). This problem, instead, doesn't exist in case of court-assisted resolutions, which are able to bind also the dissenting creditors to the agreement. The court intervention and supervision, in addition, facilitate the success of the agreement, by blocking the creditors' enforcement actions and protecting the payments made or the transactions carried out under the agreement from clawback actions in case of company subsequent failure.

For the sake of completeness, a brief description of the institutions regulated by the Italian Bankruptcy law, illustrated in *Figure 1.5*, is provided in the following pages.

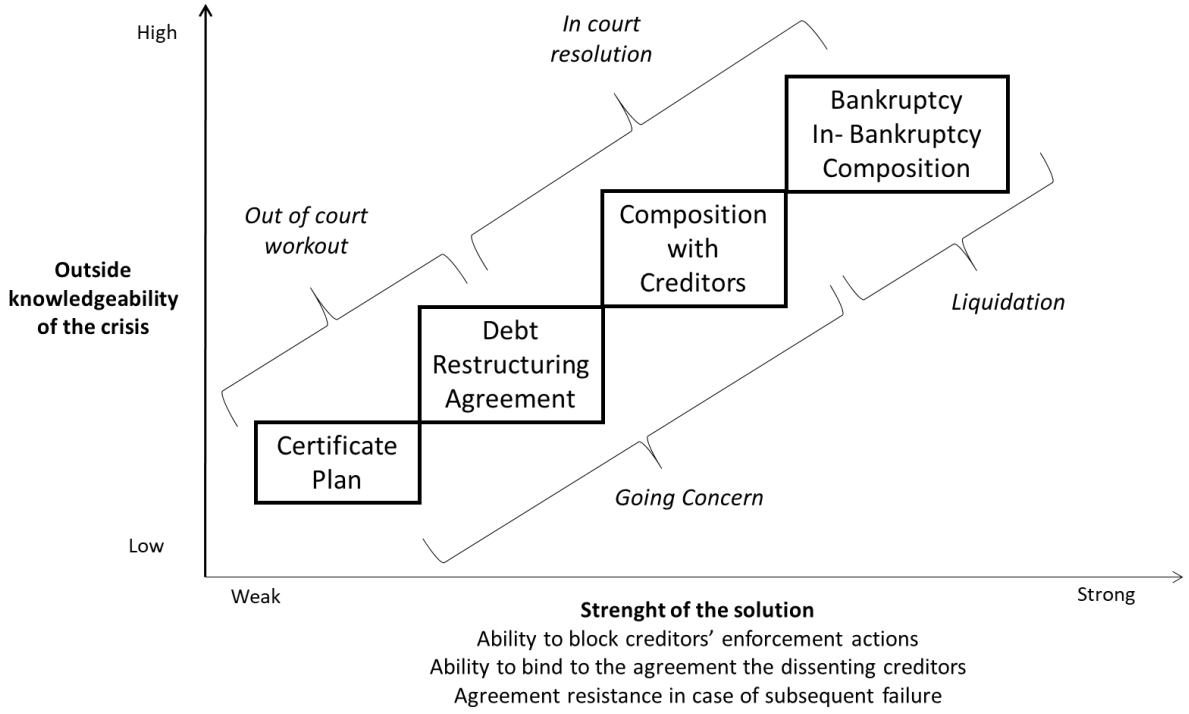

Figure 1.5 – Legal tools in Italy for dealing with the crisis. *(Buttignon 2016)*

Certificate Plan – *Piano attestato di risanamento (art 67, co. 3, lett. d, l.f.)*

The Certificate Plan consists in a plan developed by the entrepreneur which describes the actions he intends to undertake in order to restore the company financial health and recover

the financial equilibrium, in the attempt of ensuring the company's continuity as a going concern.

The adoption of this legal instrument presupposes a "crisis status", such as insolvency or at least debtor's financial distress, including a temporary illiquidity or inability to pay its debts, and requires the preparation of a plan by the entrepreneur of the distressed firm. The plan is a unilateral act of the debtor, not subjected to any control by the court and not necessarily requiring creditors' approval. Frequently, however, it is built on an agreement with current or new creditors (moratorium agreement, debt write-off, debt refinancing or rescheduling) and it may also include an agreement with partners different from creditors and unilateral initiatives of the entrepreneur, such as an equity increase or the contribution of new assets.
Concerning the content of the plan, as summarized in the 2014 AIDEA-IRDCEC report and then more in-depth described in the new principles for the drafting of Certificate Plan (issued in October 2017), the plan shall be structured in three main part:

- in the first part, the entrepreneur shall provide information about the company historical and current financial data, besides describing the crisis situation and performing an analysis of the causes;
- in the second part, the entrepreneur shall present the strategy designed to overcome the crisis and the relative actions to be undertaken (action plan);
- in the third part, a forecast about the progress and results of the plan from an economic and financial perspective, shall be provided, highlighting the expected impacts on the company's competitive position.

The truthfulness of the accounting data and the feasibility of the plan, then, have to be verified by a third party expert, which has to certificate the plan. The third-party expert shall be appointed by the debtor and shall be a registered auditor independent from the company and those bearing an interest in the restructuring to not compromise its independency of judgment. Since no court intervention is provided by the art 67, co. 3, lett. d l.f., the plan might remain unknown to creditors. However, the plan can be published in the competent Companies' Register upon request of the debtor, to gain certain tax benefits connected with the debt write-off.

Debt restructuring agreement – *Accordo di ristrutturazione del debito (art. 182 bis, l.f.)*

The debt restructuring agreement consists in an agreement for debt restructuring with creditors representing at least the 60% of the outstanding debt claims. The adoption of this legal tool presupposes a crisis status, including insolvency, while its main purpose, according to the case law, is to recover the company's solvency. The procedure for the formation and implementation of the debt restructuring agreement can be articulated in three phases:

- First of all, the agreement is negotiated with the creditors through an out-of-court process. The debtor can offer different conditions to each creditor and he is not obliged to respect creditors' classes and the *pari passu* principle. The restructuring plan underlying the agreement must be certified by an independent expert, who validates the truthfulness of the company's figures and the feasibility of the plan, evaluating, in particular, the firm's ability to entirely satisfy non-participating creditors. The latter, indeed, must be paid within 120 days from the date of the validation of the agreement by the court, for credits already due and payable at that date, or from the expiry date, for credits not due and payable at the validation date. The agreement, then, is published in the competent Companies' Register. From this date, for the next 60 days, the creditors are prevented from starting or continuing precautionary or enforcement actions against the debtor. This protection can also be obtained before the publication in the Companies' Register, during the negotiation of the agreement, by filing a petition for suspension (*istanza di sospensione*) to the competent court, which consists in an agreement proposal accompanied by a declaration certifying that the creditors involved in the negotiation represent at least the 60 % of the outstanding claims, and other required documentation.
- Secondly, the court, after having decided on eventual oppositions, that must be filed within 30 days from the publication, validates the agreement. With the validation decree *(decreto di omologazione)*, there is no risk of clawback for actions, transactions and payments carried out under and in performance of a debt restructuring agreement and the agreement produces the benefits of the pre-deduction of new financing.
- Finally, the debtor must implement the debt restructuring agreement without any further intervention of the court.

Given the characteristics of this legal instrument, the debt restructuring agreement is particularly suitable for restructuring plan of distressed firms in which the debt is concentrated on a limited number of creditors, so that it is easier to obtain the required approval of creditors representing at least the 60% of the outstanding debt (Bonfatti & Censoni, 2013). On the other

hand, the payment of dissenting creditors may require high liquidity, scarcely available for distressed firms.

Composition with creditors – *Concordato preventivo (art. 160 l.f.)*

Composition with creditors consists on a settlement approved by creditors representing the majority of the claims. Differently from the debt restructuring agreement, court intervention and supervision over the entire process assure creditors more protective rights and bind all the creditors. The objective prerequisite for the application of this legal instrument is the "crisis status" of the firm, a broad concept including not only insolvency but also any temporary difficulties to fulfill debt obligations.

The procedure of composition with creditors is initiated by filing a petition with the court with many supporting documents, including the restructuring plan. This latter has to be certified by an independent expert appointed by the debtor, confirming the truthfulness of the debtor's figures and the feasibility of the plan. Moreover, the debtor may file a petition for composition with creditors simply by attaching the latest three financial statements and the list of creditors and related credits, while reserving the right to file the proposal to creditors, the plan and the other supporting documents within a term to be set by the court (*concordato in bianco* or *concordato con riserva*). This term is usually between 60 and 120 days, with the possibility to extend it by a maximum of 60 additional days. During this period, creditors are prohibited to start or continue enforcement actions and foreclosure proceedings over the debtor's assets (automatic stay). These effects will be extended for the entire period of the procedure if the debtor is admitted to the composition with creditors.
In addition, within the same term for the presentation of the plan and other required documents, the debtor can decide to deal with the crisis by negotiating and filing a debt restructuring agreement (art. 182 bis l.f.).
Then, the court, after having determined that all the required conditions are met, starts the procedure by appointing a delegated judge and a judicial commissioner and scheduling a creditors' meeting within 120 days. The proposal must be approved by creditors with voting rights representing the majority of the outstanding claims, while, where creditors have been dividend in classes, a majority must be reached in most of the classes. The approved composition with creditors, then, is validated by the court, and its correct application is monitored by the judicial commissioner, which supervises the management of the company, to which the debtor remains entitled (except for extraordinary administration acts, that have to be authorized by the delegated judge).

In addition, if the approved plan provides liquidation of company's assets, one or more liquidators are appointed by the court. However, liquidation is only one of the possible solution to the crisis status provided by the composition with creditors tool, differently to what affirmed by the case law in the past. This legal instrument, indeed, can also be adopted to favor the firm restructuring and going concern, under the debtor or a third-party purchaser management, as pointed out by the recent reform introducing the "going-concern composition" *(concordato con continuità aziendale*, art. 186-bis l.f.*)*. In this case, a certification from an independent expert is required to attest that the continuation of the business would maximize creditors' satisfaction.

For both type of compositions, however, any payments made or transactions carried out under a court-confirmed settlement are exempted from clawback actions. They are also protected from criminal charges and the risk of civil liability if the debtor subsequently becomes insolvent.

If the debtor, indeed, doesn't fulfill the obligations deriving from the plan or in case of fraud, the composition with creditors may be terminated or nullified, triggering bankruptcy.

Filing for bankruptcy - *Dichiarazione di fallimento (Title II, Chapter I l.f.)*

Bankruptcy consists in a court-supervised procedure for the liquidation of insolvent firm's assets and the distribution of the proceeds to creditors. This procedure is initiated by a petition filed by creditors, the public prosecutor or the insolvent debtor himself, and requires the presence of an insolvency state, that consists in the debtor's inability to meet its current obligations on a regular basis. In addition, bankruptcy cannot be declared if the company's overdue debts amount to less than 30.000 € and it applies only to business undertakings that are not state entities or small businesses.

During the proceedings, the authority to manage and dispose of the company's assets is delegated to a bankruptcy administrator, that operates under the direction and supervision of the delegated judge and with the power to undertake clawback and other actions aimed at increasing the value of the estate. Upon completion of the bankruptcy procedure, the firm will cease to exist.

Bankruptcy proceedings can also be closed as result of an in-bankruptcy composition (or bankruptcy agreement, *concordato fallimentare*, art 124 l.f.*)*. With the purpose of speeding up the bankruptcy proceedings, during the course of bankruptcy, any creditor, the debtor or a third party may propose a bankruptcy agreement which provides for restructuring of debts and payment of claims by any possible means. The proposal can include the division of creditors

into different classes that may be subjected to different treatments, the sales of assets or the acquisition of all assets included in the bankruptcy estate and the assumption of the relevant liabilities by a third party or by one or more creditors, thereby taking the role of assignee (*assuntore*). The proposal, then, has to be approved by the majority of the creditors entitled to vote on it, counted according to the amount of the claims.

In conclusion, the different legal options provided by the Italian Bankruptcy Law support the company dealing with distress and can result into the preservation of the company's as a going concern or in the liquidation of the company's assets. Regardless of the solution implemented, however, earlier the crisis status is detected, higher is the negotiation power toward creditors and the probability of success of the solution adopted, while lower are the costs and efforts required for overcoming the crisis. The importance of acting on the crisis in a timely manner has been particularly stressed by the legislator in recent times, who has introduced the so called "alert procedure" near the end of 2017. The purpose of this new legal instrument is to anticipate the emergence of the crisis signals in order to promptly fix them by favoring the negotiation between the firm and its creditors. This new procedure requires the creation of a new body in each Chamber of Commerce, which will be responsible for nominating three experts whose main task would be identifying a crisis solution to be agreed by debtor and creditors, and can be activated by the debtor, the supervisory body or the qualified creditors in presence of well-founded crisis clues.

CHAPTER 2: Valuation methods for distressed firms

2.1 Introduction

Despite the valuation of companies in distress has been a highly debated and investigated topic in the last decades, building a comprehensive and, at the same time, concrete model for valuing distressed firms still remain an open challenge and an alluring venture. Academic and professional contributions in this field of corporate finance literature, in fact, have focused mainly on stating critical issues and designing complex solutions with little practical applicability. Distressed firm's features and, above all, the high uncertainty underlying its future prospects, indeed, pose several challenges in valuation, making the estimation process of distressed firms' economic value very complex and less precise. In troubled companies, valuation's strategic factors, probability of default and related consequences in terms of additional costs suffered by the firm, or, in the worst case, in terms of net proceeds deriving from assets liquidation, significantly affect the firm's value. Estimating such variables, however, is not straightforward and strongly influences the accuracy of the model. These critical issues are discussed in *paragraph 2.2*.

The most used corporate valuation methods are then analyzed, with the purpose of identifying strengths and limitations, as well as possible solutions and adjustments, of each technique when applied in distress setting. Specifically, while the asset approach (*paragraph 2.3*) results to be particularly useful in liquidation scenarios, the income approach is preferred whenever firm's continuation as a going concern is expected, but with uncertainty about the degree of firm' recovery in future prospects. This latter approach, in particular, encompasses three main techniques: the Discounted Cash Flow method (*paragraph 2.4.1*), the Adjusted Present Value method (*paragraph 2.4.2*) and the Capital Cash Flow method (*paragraph 2.4.3*). The different treatment of debt tax shields makes these models more or less appropriate to measure distressed firm's enterprise value depending on the company's debt strategy. A market check on the value estimate resulting from the application of the asset approach and income approach, then, is provided by the market approach or relative valuation, whose suitability to distress setting is discussed in *paragraph 2.5*. However, when these traditional valuation approaches result in an estimate of firm value under a going concern or liquidation scenario lower than outstanding debt face value, erroneously suggesting that the equity is worthless, a practical solution might be to consider the equity as a call option on firm's assets and compute its value through the option pricing model (*paragraph 2.6*).

2.2 Critical elements in distressed firm valuation

Valuation plays a key role in a distress scenario since it provides what should be the criteria for the selection of the best strategy to overcome the crisis, i.e. the value generated under each alternative solution for the stakeholders as a whole. The characteristics of distressed firms, however, make firm valuation, that is a difficult task at the best of times, even more complex. Traditional valuation methods, indeed, are built for firms with positive growth rates and operating margins, which are implicitly assumed to continue as a going concern in the future. Declining revenues, shrinking operating margins and high leverage levels, however, can cast significant doubts about the firm's survival causing traditional valuation techniques to produce misleading results, if not adequately adjusted in order to reflect the consequences of distress, among which the possibility of firm's liquidation.

In particular, when estimating firm's intrinsic value, the valuation of distressed firms requires to face several issues that make the valuation process more challenging than for healthy firms (Damodaran 2009):

- First of all, existing assets, by earning less than the cost capital, can be value destroying, leading the firm to opt for asset divestitures, which in turn give rise to further estimation issues. Divestitures, indeed, make forecasting more difficult by creating discontinuity with past data and requiring an estimation of the expected proceeds.
- Secondly, reinvestment rates can be negative in future years (because of assets divestiture), leading to negative growth rates, when the declining company continues to invest in new assets ignoring that reinvestment will lower the firm value since these assets may actually earn less than the cost of capital.
- Thirdly, distress significantly impacts discount rates. Dividends and buybacks which can characterize declining firms at the early stages of crisis path, when debt is not enough for distress to be a concern, reduce the market value of equity leading to an increase in debt ratio (if debt is not proportionally repaid). In addition, the increase in default risk and the dissipation of debt tax benefits, due to negative operating profits, rise the after-tax cost of debt, while the higher earnings volatility leads to an increase in the cost of equity.
- Finally, distressed firms may cease to exist during or at the end of the explicit forecast period or they can reach a steady state but with a negative growth rate expected in perpetuity, giving rise to issues in computation of the terminal value.

Given these issues, assumptions of positive growth rates, cost of capital equal to cost of capital of healthy firms in the same industry, but also margin and excess return in line with historical averages, which usually drives the valuation of healthy firms, result to be overoptimistic and lead to an erroneous estimation of firm's value when using traditional valuation methods to estimate the intrinsic value of declining and distressed firms. These issues, in addition, cannot be solved by focusing on firm's relative value, instead of firm's intrinsic value, since the firm's distressed conditions, by resulting into negative and, therefore, meaningless earnings multiples and by making the identification of comparable firms more difficult, cause estimation challenges also when adopting relative valuation techniques (Damodaran 2009).

2.2.1 Strategic factors

When applied to distressed firms, therefore, traditional valuation methods require to be adjusted in order to adequately reflect the consequences of distress on firm's value. In this way, as supported by Gilson et al. (2000), these valuation techniques will produce estimates of value that are generally unbiased. The same authors, however, by comparing values estimated through comparable companies and capital cash flows techniques, on the basis of the forecasts contained in their reorganization plan, to the market value observed for distressed companies emerging from firm restructuring, found that the ratio of estimated value to market value varies from less than 20% to more than 250%. This indicates that even if the valuation methods, appropriately adjusted to capture the effects of distress, produce unbiased results, the estimated values are not very precise. According to Gilson et al. (2000), however, these large valuation errors cannot be totally attributed to the models selected for the valuation or to potential errors in underlying assumptions.

As suggested by Crystal and Mokal (2006), indeed, valuation uncertainty is largely due to the so called "strategic factors". Since the output of the valuation process "determines the size of the pie to be divided among firm's claimants and drives projected payout and recoveries" (Altman and Hotchkiss 2006, p. 103), the estimate of the firm value will be influenced not only by the different information held by corporate insiders and outside stakeholders, but also by the conflicting interests of the parties involved in the negotiation of the restructuring plan. In particular, junior claimants tend to push for upwardly biased estimates of firm value because this increases the probability and the amount of their recovery after senior payments are fulfilled. On the opposite side, senior claimants favor downwardly biased estimates, since this allows them, thanks to the priority rule, to maximize their share and, therefore, to gain a

greater portion of the firm in case of a subsequent performance improvement. Similar incentives drive estimates supported by managers, who tend to value the firm above its liquidation value to save their position, but below the real value (if it is higher than the liquidation value), so that they can delivered "abnormally" good stock performance after the firm's restructuring (Senbet & Wang 2012). In addition, when they receive stocks or stock options in the restructured firm as incentive compensation, a downwardly biased estimate of firm value makes their compensation to appear lower and leads to the determination of lower exercise price, given that options are generally issued at-the-money (Gilson et al. 2000).

In a distress setting, however, strategic behavior can influence firm's enterprise value and, therefore, corporate securities price, not only though "bargaining in default", which determines how the firm's value will be split among different claimholders, but also through the "strategic default decision" (Davydenko & Strebulaev 2007). A large part of the approaches to corporate securities valuation inspired by the Merton's model (1974), to which *paragraph 2.6.1* is dedicated, indeed, agrees on attributing a significant portion of the premium on risky debt (from 30% to 40%, according to Mella-Barral and Perraudin's study (1997)) to strategic debt service. This notion, firstly introduced by Hart and Moore (1989), refers to the opportunity of equity holders, when liquidation is costly, to voluntary underperform their debt contractual obligations in order to extract concessions from creditors, without triggering liquidation. Upon default, indeed, creditors will be willing to renegotiate debt contract provisions whenever rejecting the equity holders' offer and liquidating the firm would leave debt holders even worse off. This strategic behavior of shareholders is anticipated by bondholders and reflected on higher credit spreads and, therefore, lower debt values. Specifically, as pointed out by Davydenko and Strebulaev (2007) and Mella-Barral (1999), the effects of shareholders strategic actions on corporate bonds price and spreads appear to be higher for firms whose creditors are particularly vulnerable to strategic threats. This includes firms with few tangible assets and/or largely specifics investments, high managerial equity ownership and simple debt structures.

According to Gilson et al. (2000), in addition, the strategic behavior of claimholders is highly likely when the market valuation process is substituted with an administrative bankruptcy process, as typically happens for distressed firms. The administrative bankruptcy process, indeed, may limit the amount and quality of available information, creating rooms for strategic valuation. As suggested by Crystal and Mokal (2006), when the company becomes distressed and formally files for bankruptcy, there would be fewer investors interested in acquiring company's stocks and, therefore, fewer analysts have the incentive to collect

information about the bankrupt firm. Since the evidence shows that estimated values based on analysts' forecasts are more in line with market values than the estimates based on management's forecasts, the lack of this superior analysis ends up with exacerbating the uncertainty underlying the estimated value.

In conclusion, the strategic use of valuation and the lack of market information strongly affect the dispersion of valuation errors and, thus, the accuracy of the estimated value of distressed firms. The starting point for a more precise valuation of distressed companies, therefore, should be a critical analysis of the management forecasts, in order to verify whether they are the expression of a feasible restructuring plan or the result of a strategic use of valuation, and the development of assumptions and projections which allow to adequately capture the effects of distress situations and attempted solutions. In particular, this requires to focus the attention on the following valuation elements, usually ignored in the valuation of healthy companies, that significantly affect the value of distressed firms and make its valuation more complex:

- Probability of default
- Liquidation value
- Costs of distress

2.2.2 Probability of default

The probability of default[8] is the degree of likelihood that a firm will be unable to meet its promised debt obligations (interest or principal). In particular, the default risk is a function of three main variables: firm's ability to generate cash flows from operations, financial obligations terms and amounts, degree of liquidity of firm's assets (Damodaran 2006). All things being equal, higher the size of cash flows relative to firm's financial obligations, greater the stability of cash flows and more liquid the assets of the firm, lower is the default risk. On the contrary, default becomes an actual risk when, as it happens for troubled firms, operating inefficiencies make the company unable to generate sufficient cash flows to service its debt, triggering or contributing to financial distress, which, in turn, negatively affects the firm's relations with suppliers, customers, creditors and other third parties, increasing the cost of financing and lowering firm's bargaining power in asset sales. Troubled companies' characteristics, therefore, make the default highly likely and require that default scenario and

[8] In this dissertation probability of default, probability of distress and probability of bankruptcy are considered interchangeable terms, according to Damodaran (2002, 2006, 2009). Actually default doesn't necessarily trigger bankruptcy and, as stated by Pindado et al. (2008), default, as defined by credit rating agencies, can be a more limited concept than financial distress.

associated probability are carefully taken into account in valuation. In fact, as pointed out by Jennergren (2013), a small annual probability of default brings to a noticeable decrease in firm's value.

As regards the estimation of probability of default, the literature provides different methodologies which can be grouped into two main classes (Altman & Hotchkiss 2006, Resti & Sironi 2007):

- Credit scoring models
- Capital market models

The first group refers to statistical models mainly based on accounting data and measures which are used as an input in order to assess the company financial health. It comprises linear discriminant analysis, such as the "Z score model" first developed by Altman (1968) and described in *paragraph 1.5.3*, and regression models (linear, logit and probit), including the "O-score model" (Ohlson 1980) illustrated in the same paragraph.

As already discussed, differently from the Altman's model, the Ohlson's model allows to derive a probability of default for the company being valued starting from the obtained score. Nonetheless, this model presents several limitations which are common for credit scoring models and affect the reliability of the estimated probability of default. First of all, as stated by Resti and Sironi (2007), the weights and, therefore the meaningfulness, of the economic/financial indicators used to predict default are not fixed as suggested by the models, but they can change over time because of the effect of the economic cycles, financial markets variables and other determinants. Secondly, a large part of credit scoring models ignores qualitative factors, such as the company reputation, the quality of the management and the stage of economic cycle, which significantly affect the company performance and likelihood of default. In addition, accounting-based models fail to incorporate a measure of asset volatility, that is crucial in assessing the firm's probability of default since it reflects the likelihood that the firm's assets value will decrease to such an extent that the company will be unable to meet its financial obligations (Hillegeist et al. 2004).

Volatility, alongside prices and returns observed in bond and stock market, instead, is used as an input in capital market models to estimate the likelihood of default of the issuing company. Among these models, it is possible to distinguish approaches based on corporate bonds price and spread from structural models.

The first subgroup includes the approach proposed by Damodaran (2009) which involves the computation of bond price by discounting at the risk-free rate the expected cash flows, which

differ from promised cash flows because of the probability of default. Assuming constant annual probability of default ($\pi_{Distress}$), the price for a bond with fixed coupon maturing in N years can be derived as follow:

$$Bond\ price = \sum_{t=1}^{t=N} \frac{Coupon\ (1-\pi_{Distress})^t}{(1+r_f)^t} + \frac{Face\ value\ of\ bond\ (1-\pi_{Distress})^N}{(1+r_f)^N}$$

When corporate bonds are traded in the market and the appraiser knows bond's maturity, face value and coupon rate, the previous equation can be solved for the unknown variable, that is the probability of default.

An alternative approach, instead, is proposed by Resti and Sironi (2007), which use bonds spread to compute the cumulative probability of default for a period of *T* years (p_T), that is the probability that the issuer will default between today and the end of the Tth year. This model, which expresses interest rates as continuously compounded rates and assumes investor's risk neutrality, requires two main input:

- the spread (d) between the yields of the zero-coupon corporate bonds and the zero-coupon yields of risk-free securities (r), and
- an estimate of the expected recovery rate (k) on firm's bonds in case of default.

If the investor in corporate bonds is assumed risk neutral, he should be indifferent to the two alternative investments when the final value of one euro invested in the corporate bond is equal to the value of one euro invested in the risk-free bond. Analytically:

$$(1-p_T)e^{(r_T+d_T)T} + p_T k e^{(r_T+d_T)T} = e^{r_T T}$$

From this equation it is possible to compute the cumulative probability of default as:

$$p_T = \frac{1-e^{-d_t T}}{1-k}$$

which shows that the cumulative probability of default increases when the time horizon increases, since it takes into account the default risk of the previous periods plus the risk in year T.

Cumulative probability of default, however, can also be derived in an easier way starting from the company rating and looking at the associated probability of default estimated by rating agencies on the basis of historical default rates of bonds in each rating class. This approach, however, by delegating the computation of default probabilities, takes for granted that rating agencies accurately and correctly estimate them (Damodaran 2009). The probabilities of default identified by adopting this approach, in addition, are based on past default experiences

and assume that no shifts in rating standards occur over time. Regarding this aspect, the approach based on bonds spread is preferable to the use of credit rating since it is a forward–looking model which is able to estimate the default rates expected by the market in the future (Resti & Sironi 2007). However, this approach presents some limitations too. First of all, it assumes that all the spread between the yield of corporate bond and the yield of risk-free security can be attributed to default risk, while it frequently depends on different elements, such as a liquidity premium. In addition, this model assumes the investor as risk neutral, while, in reality, the investor asks a premium to trade a risk-free investment for a risky one. When the investor is risk averse, the result of the last presented equation, which represents the risk-neutral probability of default, overestimates the real-life probability of default. An overestimation of this measure, however, also results from the adoption of the approach based on bond price when a partial payment of either the coupon or the debt face value occurs in default, since this approach assumes that the coupon is either entirely paid or not at all (Damodaran 2009).

Finally, a limitation common to all the models based on bond price and spread is their inapplicability to firms that do not issue bonds listed in the market, as well as to bonds with special features such as convertibility.

The second subgroup of capital market models for the estimation of default probability is composed by methodologies generally referred as structural models. These models, indeed, focus on the structural traits of a firm which determine its probability of default (the asset value and the debt value) and the volatility of assets value, measuring, in this way, both financial and business risk.

A first structural model was developed by Merton in 1974, which first applied the Black and Scholes' options pricing model (1973) (described in *paragraph 2.6*) to default risk.

The Merton's model assumes that a firm has one single liability, a zero coupon debt, with a market value equal to *B* that requires the repayment of the principal (*F*), in a lump sum upon maturity (at time *T*). In addition, since the market value of firm's assets (*V*) fluctuates in a partially unpredictable way, the instantaneous percentage change in the firm's value (*dV/V*) is assumed to be described by a geometric Brownian motion (Resti & Sironi 2007):

$$\frac{dV}{V} = \mu d_t + \sigma_v dz = \mu d_t + \sigma_v \varepsilon \sqrt{dt}$$

where:

- μ is the expected instantaneous yield on the assets;

- dz is a random disturbance, calculated as the product of a standard normally distributed term ε and the square root of time;
- σ_v is the variability rate of the geometric Brownian motion.

The stochastic evolution of assets percent changes and the uncertainty underlying their future path, which increases with the time horizon, are described in *Figure 2.1*.

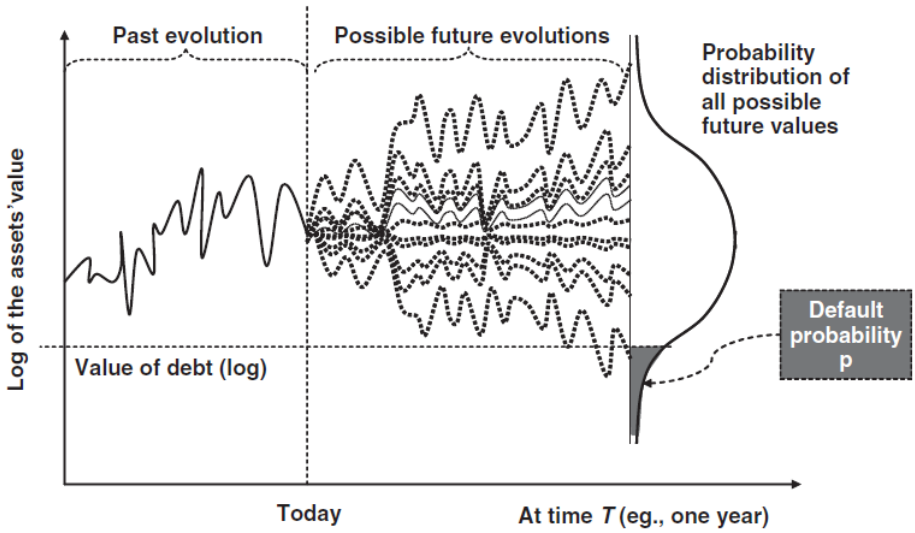

Figure 2.1 – Default probability in the Merton's model. *(Resti & Sironi 2007)*

As shown in *Figure 2.1*, the probability of default is equal to the area under the normal distribution which reflects all negative assets yields that are big enough to cause the asset value to be lower than the repayment value of the debt at maturity, i.e. $V_T < F$.

In the latter case ($V_T < F$), shareholders, thanks to the limited liability principle, have the option of defaulting and leaving the company in creditors' hands, rather than repaying the debt. This can be interpreted as a put option granted by company's creditors to shareholders on the value of the firm's assets, with a strike price equal to the face value of debt (F) at maturity (T).

According to the Merton's model, therefore, the probability of default can be computed starting from the Black and Scholes formula for calculating the value of a put option:

$$P_0 = Fe^{-rT}N(-d_2) - N(-d_1)V_0$$

$$d_1 = \frac{\ln\left(\frac{V_0}{F}\right) + \left(r + \frac{1}{2}\sigma_V^2\right)T}{\sigma_V\sqrt{T}}$$

$$d_2 = d_1 - \sigma_V\sqrt{T}$$

where $N(.)$ is the standard normal cumulative density function, $N(d)$ indicates the probability associated with a value less than or equal to *d* and *r* the risk-free rate.

Since the probability of default expresses the probability that the market value of firm's assets will be less that the repayment value of debt at maturity, it is equal to the probability of exercising the put option implicit on debt, which can be calculated through the Black and Scholes model as:

$$p = \Pr(V_T < F) = N(-d_2) = 1 - N(d_2)$$

The resulting probability (p) is a risk-neutral probability of default, since the expected return on assets (μ) was replaced by the risk-free rate (r) in the formula for computing the put option value.

In particular, as illustrated by the previous formulas, all other things being equal, the probability of default increases as:

- the beginning market value of assets (V_0) decreases;
- the nominal value of debt (F) increases;
- the volatility of the market value of assets increases (higher σ_V, indeed, makes the distribution more "squashed" and the tails thicker);
- the debt maturity (T) increases.

The Merton's model, however, even though it is effective in showing the determinants of default probability, presents several limitations when turning from theory to actual use (Resti & Sironi 2007):

- the assumption of a single zero coupon liability where interest and principal are repaid in a lump sum upon maturity is too simplistic in real life, where firms have complex capital structure and can default at any time, regardless of the debt maturity;
- the assumption of normally distributed assets returns may not be realistic;
- some inputs of the model, in particular the market value of assets and the volatility of asset returns, are not directly observable on the market and difficult to estimate;
- risk-free interest rates are assumed constant and this doesn't allow for an analysis of the relation between interest rate risk and equity risk.

Another model belonging to the structural models class was developed, starting from Merton's intuitions, by KMV, a provider of quantitative credit analysis tools acquired by Moody's Corporation in 2002. This model, known as the KMV model, estimates the probability of default on the basis of the firm's distance to default (*DD*). The estimation

process starts with the definition of the default point, that is the critical default threshold computed as the sum of all short-term debt (*STD*) and 50% of long-term debt (*LTD*):

$$DP = STD + \frac{1}{2}LTD$$

This model recognizes that firms have a more complex capital structure than the one assumed in Merton's model, and they usually finance their activities with both short term and long term debt. Even if it is fundamental that the firm is able to meet its short term obligations, which have to be fulfilled in the near future, the firm doesn't necessarily become insolvent when its asset value falls below the total level of debt, since the long term debt need to be reimbursed in the more distant future.

Once calculated the default point, the distance to default is then computed as the difference between the value of assets and the default point, divided for the product of asset value and assets standard deviation:

$$DD = \frac{V_0 - DP}{V_0 * \sigma_V}$$

Starting from the empirical link between the distance to default and past rates of default, a probability of default, defined in the KMV model as the expected default frequency (EDF), is then associated to the computed distance to default.

By adopting this estimation procedure, differently from rating agencies, the KMV model provides probabilities of default that are highly reactive to changes in the financial conditions of the firm being valued and expected default frequencies that don't significantly swing as economic cycles change (Resti & Sironi 2007). On the other hand, this model presents all the limitations common to capital market models. The use of markets data as an input brings the benefit of basing the estimation on data, by nature, more objective than the accounting data, which can be manipulated by managers and other individuals in the firm, and makes the resulting estimates internationally comparable, since input data are not affected by national accounting rules (Hillegeist et al. 2004). On the other hand, the use of market data gives rise to models' limitations, since it makes them not applicable to unlisted firms or listed firms which bonds are not traded in the market. In addition, if capital markets are illiquid, inefficient or unable to adequately reflect all available information, market data become unreliable and the estimate of default probability misleading (Resti & Sironi 2007).

Finally, for the sake of completeness, it is necessary to point out that in addition to credit scoring models and capital market models, there is a third group of models for computing the

probability of default which combine both accounting data and market information, such as the Moody's RiskCalc v3.1 model. The latter, allows to assign a credit rating to unlisted firms on the basis of a score calculated using company's financial ratios but also the average distance to default for a group of comparable listed companies, as inputs. By combining financial statement ratios with distance to default measures, the model outputs, such as the default probability, become more reactive and forward looking than the traditional credit scoring models' outputs, since this hybrid measure takes into account the sentiment of the capital market about the prospects of the industry in which the company operates (Resti & Sironi 2007).

In conclusion, several approaches can be applied in order to compute the probability of default, bringing to different outcomes. Each of them, however, presents its own limitations and is anchored on a specific interpretation of the definition of default, making it difficult to universally identify the best method to be adopted when estimating the default likelihood.

2.2.3 Costs of distress

Another element that cannot be ignored when valuing a distressed company, then, is the cost in which the firm incurs when it falls into distress. The estimation of these costs, indeed, plays a key role not only for the definition of the optimal capital structure, but also for a complete valuation of the effects of high leverage on firm's value. According to the literature, among costs of distress, it is possible to distinguish between:

- Direct costs of distress: they include legal, accounting and administrative costs in which distressed firm incurs when it attempts to solve the crisis through firm restructuring or liquidation. These costs mainly consist in quantifiable out-of-pocket expenses for lawyers, accountants, turnaround specialists, financial advisers, expert witnesses and other professionals assisting the troubled firm.
- Indirect cost of distress: they include unobservable opportunity costs and lost profits caused by the firm's deteriorating financial conditions. Drop in sales, indeed, can result from customers' reluctance to deal with firms failing into distress, while working capital increase and cash flows reduction may be the consequences of stricter terms asked by suppliers in the attempt to protect themselves against possible company default. Key employees, in addition, may decide to leave the firm while managers may fail to exploit growth opportunities because of a loss of management focus on running the business and the presence of financial constraints. All these

elements cause the company to further lose market share in favor of competitors and force the firm to sell assets at depressed prices finally leading to a decrease in firm's value additional to the one caused by economic distress.

Direct and indirect costs of distress, however, impact the firm's value to a different extent.

Direct costs of distress are easier to identify and measure, since they are directly observable, and their estimation represents the main objective of different researches in the literature, which finally point out that these costs are relatively low, even though not negligible. Warner (1977), by studying bankruptcies in the railroad industry, concluded that direct distress costs amount to 4% of market value of firm one year prior to default. Altman (1984) estimated, for 12 retailers, direct costs of distress equal to 2.8% and 4% of firm's value five years prior and just prior bankruptcy[9], respectively. Weiss (1990) studied 37 cases collecting documents from 7 bankruptcy courts and he estimated average direct cost of distress of 3.1% of the market value of equity plus the book value of debt at the year prior to the bankruptcy filing, within a range from 1% to 6.6%. Lubben (2000) used a sample of 22 large corporate bankruptcy filed in 1994 and calculated that the professional fees for legal advice amount on average to 1.8% of the distressed firm's total assets. Several other studies, then, as pointed out by Altman and Hotchkiss's review of the literature (2006), report average direct costs within the range identified in Weiss's research, providing further evidence of the little, but not trivial, impact of distress direct costs on the firm's value prior to bankruptcy.

Indirect costs of distress, on the contrary, even though more difficult to estimate because not directly observable, are expected to amount for a higher percentage of firm's value. Altman (1984), for instance, found that indirect costs average to 10% of firm value just prior to bankruptcy. Indirect costs, however, were calculated by comparing expected and actual profits, assuming the resulting difference as a consequence of financial distress and without considering, instead, that the performance worsening might have been the result of the same economic factors that had brought the company into financial distress.

Opler and Titman (1994) recognized and investigated this reverse causality problem by analyzing companies in industries that experience economic distress. Their study showed that companies with higher leverage ratio prior to the onset of economic distress, experience greater market share losses and lower operating profits than their less leveraged competitors, consistent with the theory that financial distress is costly. These results were then corroborated by Andrade and Kaplan's study (1998), which, by investigating 31 financially

[9] Note that the studies cited in this paragraph analyze firm's distress in the framework provided by the US bankruptcy law, according to which filing for bankruptcy can involve firm's liquidation (Chapter 7) or restructuring (Chapter 11).

but not economically distressed highly leveraged transactions, estimated the net costs of financial distress to amount between 10% to 20% of firm value. Distressed firms, indeed, are forced to curtail capital expenditures, sell assets at depressed price and delay restructuring in a way that appears to be costly. More recently, Davidenko et al. (2012) concluded that the average cost of default is approximately equal to 21.7% of the market value of assets. Their analysis started from the observation of debt and equity market prices before and after the default, and then required to adjust the price reaction to default in order to neutralize the effects of the partial anticipation of default by investors on the pre-default prices. These effects indeed, without proper adjustments, lead to price reaction that captures only a fraction of the total distress costs, since firm's value prior to default already incorporates some of these costs.

Despite the presence of differences in estimation results, which can be attributed to factors such as the industry in which the firms operate and the type of legal procedure to which the analyzed firms are subjected, all the previous mentioned studies provide evidence about larger impact on firm value of indirect costs of distress than direct costs.

Almeida and Philipson (2007), however, suggested that many past studies incorrectly estimate the present value of distress costs. A standard method for calculating ex-ante distress costs consists in multiplying ex-post estimates of these costs (as the ones resulted from Andrade and Kaplan's study (1998)) by historical probability of default. This method, however, ignores discounting and capitalization. Altman (1984), instead, proposed to compute the present value of distress costs by assuming risk neutrality and discounting the product of value losses due to default and historical probabilities by a risk-free rate. As suggested by Almeida and Philipson (2007, p. 2558), however, this method doesn't take into account the fact that distress is more likely to happen in bad times and, therefore, "risk-averse investors should care more about financial distress than is suggested by risk-free valuations". Given the limitations of these methods, Almeida and Philipson (2007) decided to develop a new methodology to estimate the present value of distress costs, which takes into account the systematic component in the risk of distress through the use of risk-adjusted probability of default derived from corporate bond spreads. According to this method, the NPV of distress costs (Φ), expressed as percentage of firm assets, can be computed as (Almeida & Philipson 2008):

$$\Phi = \frac{q}{q + r_f}\phi$$

where ϕ are the costs of financial distress when they occur and r_f the risk-free rate. q, instead, is the risk-adjusted probability of default calculated starting from the spreads at which bonds

with the same rating of the firm being value trade in the market. The spread between corporate and government bonds is then adjusted in order to eliminate risk premiums additional to the default premium, such as liquidity premium, incorporated in the spread. The spread, therefore, is reduced by its part that is not likely to reflect default risk, which can be derived from the spreads between short maturity AAA bonds and Treasuries.
By applying this method, Almeida and Philipson (2007), starting from the ex-ante cost of distress estimated by Andrade and Kaplan (1998), compute a risk-adjusted NPV of distress costs of 4.5% of pre-distress value for a firm with BBB ratings, which is higher than the output (1.4%) obtained by using a historical default probability and, therefore, ignoring risk premia.

In conclusion, as pointed out by the above mentioned studies, the magnitude of distress costs is far too substantial to be ignored in valuation. In addition, the estimation of distress costs, plays a key role in optimal capital structure determination. Briefly describing this topic, since it goes beyond the purpose of this dissertation, it is important to notice that firms decide the optimal level of debt on the basis of the trade-off between tax benefits and distress costs which maximize the firm's value. A more complete valuation, however, should also take into account other advantages and disadvantages of debt financing, as suggested by Damodaran (2014). Alongside distress costs, indeed, higher leverage increases agency costs deriving from conflicts of interests among debtholders and equityholders, which finally result into higher interest rate on debt and decreasing financial flexibility. On the other hand, borrowing adds discipline to management, since, by creating the commitment to make principal and interest payments, it forces managers to use cash flows more efficiently.

2.2.4 Liquidation value

As already discussed in the first chapter of this dissertation, distressed firms can decide to adopt different strategies in order to overcome the crisis, among which firm's assets liquidation. When there is no hope for rehabilitation and the firm's prospects appear so weak as to make it unreasonable to invest further efforts, time and money in the attempt to restore profitability and financial health, the only solution might be to liquidate firm's assets and use the resulting proceeds to repay company's obligations. Whether proposed by distressed firm's shareholders or forced by its creditors, firm's liquidation represents the preferable alternative to exit the crisis when the company value as a going concern is lower than its liquidation value. The estimation of the liquidation value, therefore, becomes fundamental when judging

whether the firm's assets are "worth more dead than alive" (Altman and Hotchkiss 2006, p 21), on which basis the most valuable strategy for overcoming the crisis is selected, but also when valuating distressed firms subjected to restructuring plan which feasibility and cash flow projections are characterized by high uncertainty. In the latter case, the possibility that the restructuring plan is not successfully implemented or reveals itself as ineffective should be taken into account when valuing distressed firms, either by including liquidation scenario in the scenario analysis (*paragraph 2.4.1.1*) or by calculating the firm's value as weighted average between going concern and liquidation value, where weights are based on the probability of default (*paragraph 2.4.1.4*).

Liquidation value reflects the expected proceeds resulting from the sale of assets of the firm as it steps out of business and ceases to operate and it sets a floor for the value of the entity, below which the estimate cannot fall (Guatri & Bini 2009, Rosen et al. 2011). Since liquidation cannot be pursued without additional costs, however, the amount that can be recovered from assets sale should be computed net of legal and professional fees, litigation costs and asset disposal expenses that the company usually faces when subjected to liquidation process. The resulting value represents the amount available for satisfy the firm's claimants, according to the priority rule.

There are different approaches that can be adopted when estimating firm's liquidation value. Gabehart and Brinkley (2002) and Tham and Pareja (2004) suggest to adjust the company's assets book value to their corresponding fair value in secondary markets, following an asset-based approach. Damodaran (2002), instead. proposes to base the estimation of the liquidation value on the book value of the assets, adjusted for any inflation during the period. Both approaches, however, present some limitations, in particular when valuing distressed firms. As argued by Crystal and Mokal (2006, p. 2), assets will be disposed at market value "when assets are individually exposed to the relevant markets through a suitably lengthy and extensive process of advertising, where reasonable efforts are made to identify potential purchasers, and where an appropriate level of negotiations is carried on with the identified parties in order to obtain the best price." Liquidation in distressed scenario, however, frequently takes on the features of forced liquidation, which occurs quickly, often through an auction sale, and without a great deal of marketing for the firm's assets, leading to low realization of assets' value far from their market values. Valuations based upon accounting book value, instead, by reflecting what the firm has invested in the assets, don't take into account that frequently, for distressed and declining firms, existing assets earn a return lower

than their cost of capital, leading to assets intrinsic value well below their book value (Damodaran 2009).

An alternative approach proposed by Damodaran (2009) consists on estimating the company's liquidation value on the basis of the earning power of the existing assets by considering the cash flows from existing assets as a perpetuity without growth, assuming that no buyer will pay for future investments in distress sale.

However, also this approach might lead, at the end, to an overestimation of the proceeds received in case of liquidation since it doesn't take into consideration some important factors that affect the firm's liquidation value. First of all, when the asset specificity is high and the secondary market for assets is thin, the liquidation value will be lower than in circumstances in which assets are easily redeployable and frequently traded in liquid markets (Altman & Hotchkiss 2006). Secondly, the liquidation value will result as depressed when the other firms in the industry, which often represent the highest valuation potential buyers of firm's assets, are distressed as well (Shleifer & Vishny 1992). When the shock that causes the seller's crisis is industry-wide or antitrust regulation prevents buyers from acquiring the liquidated assets of competitors, indeed, assets might have to be sold to players outside the industry. The latter, however, don't have a deep knowledge on how to manage and value these assets, and, fearing to overpay, they will finally push prices of assets in liquidation well below their value in best use. In addition, the firm highly distressed situation negatively affects the seller's bargaining power and increase the urgency to sell, finally leading to a fire sale in which the firm's assets are sold at heavily discounted prices, far below from the value reflecting the asset's earning power.

When estimating firm's distress sale or liquidation value, therefore, a solution might be to compute it by assuming that the distress sale will generate only a portion of the assets' book value or of the present value of the expected cash flow in a DCF model (Damodaran 2009). The discount on firm's book or DCF value, however, is not easy to compute. This percentage, indeed, can be estimated starting from the proceeds received by other distressed firms in the industry subjected to liquidation, but it then requires to consider all the previously mentioned factors and firm's characteristics that impact on the liquidation value, making necessary a case by case analysis.

Once recognized the importance of the role played by strategic factors in distressed firms valuation and understood the different solutions (and corresponding limitations) that can be adopted to estimate probability of default, costs of distress and liquidation value, which are

critical determinants of value in a distress setting, the analysis now focuses on how these elements can be incorporated in the most used valuation methods. The latter are generally classified into three groups, depending on whether they estimate the firm's enterprise value starting from the value of individual assets (asset approach), the stream of expected future cash flows (income approach) or a sample of comparable companies (market approach).

2.3 Asset approach

The asset approach estimates the company value as the sum of the values of the individual assets (included not booked intangibles) owned by the firm. In particular, individual assets value can be determined by adjusting the book value of each asset to its fair market value (adjusted book value method) or by estimating the cost to replace the company's assets in the balance sheet (replacement cost method). There is, however, a key difference in valuing a collection of assets and a business (Damodaran 2005). When a company is expected to continue to operate as a going concern, indeed, its value is determined not only by existing assets but also by expected future investment and their profitability. For such reason, asset approach is best used when a business is non-operating or has generated losses which put its survival into question. One special case of asset-based valuation, indeed, is liquidation valuation. As already discussed in *paragraph 2.2.4*, however, while determining the replacement costs is not so straightforward in most cases, estimating the value at which assets can be sold is particularly complex in a distress setting, since the urgency of the liquidation can depress the negotiated asset price well below the fair market value.

2.4 Income approach

As discussed in *paragraph 1.6*, however, liquidation is not the only possible solution to corporate crisis but, instead, it is often the last resort strategy which is frequently undertaken only after repeated restructuring attempts reveal themselves to be unsuccessful. In particular, whenever creditors are asked to judge equity holders' proposal of restructuring, they will decide whether support or not the continuation of company's activity on the basis of the comparison between the firm's value, and expected recovery, under liquidation scenario and the firm's value expected from the proposed restructuring plan. While the asset approach can be reasonably adopted to estimate liquidation value, the income approach results to be more

suitable to value the company under a going concern hypothesis, by focusing on future stream of cash flows and allowing to take into account different potential future scenarios in the valuation.

The main valuation methods falling under this approach are:

- Discounted Cash Flow method (DCF)
- Adjusted Present Value method (APV)
- Capital Cash Flow method (CCF)

2.4.1 Discounted Cash Flow method

The discounted cash flow (DCF) method is a widely used technique in corporate valuation since it is considered by many experts to be the most useful methodology to measure an asset's intrinsic value (Altman and Hotchkiss 2006). By estimating future cash flows and discounting them at the weighted average cost of capital (WACC), the DCF method correlates the firm's value to its capacity to generate a cash flows stream sufficient to adequately satisfy the return expectation of investors (Borsa Italiana 2004).

Valuing a company's equity through the DCF method requires to implement a four steps process (Koller et al. 2015, Borsa Italiana 2004):

1. Valuation of company's operations: it involves the calculation of the present value of operating free cash flows explicitly forecasted for a specific period of time (n) and the estimation of the present value of a terminal value (V_T), which captures the value generated by future cash flows beyond the explicit forecast period, by discounting operating free cash flows ($OFCF_t$) and the terminal value at the WACC. The sum of these two components determines the business enterprise value.

$$Business\ enterprise\ value = \sum_{t=1}^{n} \frac{OFCF_t}{(1+WACC)^t} + V_T$$

2. Identification and valuation of non-operating assets: equity investments or nonconsolidated subsidiaries, non-operating receivables and other non-operating assets are expected to generate cash not included in the operating free cash flows calculation. The value of these assets, in fact, has to be estimated separately and added to the business enterprise value in order to obtain the firm's enterprise value:

$$Firm's\ enterpise\ value = Business\ enterprise\ value + Nonoperating\ assets$$

3. Determination of the market value of net financial position (NFP) and other non-equity claims such as debt equivalent (unfounded pension liabilities and restructuring provisions), employee options and preferred stocks.
4. Equity value calculation: it requires to subtract the market value of net financial position, other non-equity claims and minority interests from the enterprise value.

$$Equity\ value = Enterpise\ value - NFP - Other\ nonequity\ claims - Minority\ interests$$

Given its dependence on expected cash flows and discount rates, the DCF method is designed, and thus easier to use, for firms which generate positive cash flows that can be reliably estimated for future periods and whose underlying risk and uncertainty can be appropriately assessed (Damodaran 1994). In addition, this valuation method implicitly assumes that the firm is a going concern with a potentially infinite life.

Negative cash flows, high and not stable debt to equity ratio and the possibility to going into liquidation, therefore, are only some of the features of distressed firms that make the DCF method more difficult to be implemented when valuing firms in trouble, giving rise to misleading valuations. The traditional DCF model, indeed, will continue to produce reliable estimate of value, despite the failure to incorporate distress in valuation, only if the following conditions are met (Damodaran 2009):

1. there is no possibility that the firm will file for bankruptcy;
2. the company is able to fund its investment and financing needs, even during bad times, thanks to the ease of access to capital markets, thus avoiding to be forced to a distress sale;
3. expected cash flows and discount rate are adjusted in order to reflect the probability and the risk associated with distress, while the proceeds received in case of distress sale should be equal to the present value of the firm's expected cash flows as a going concern.

In practice, however, these conditions hardly hold and the application of traditional DCF valuation results into an overestimation of the distressed firm value. First of all, indeed, the recent global crisis not only casts into doubt the survival of a greater number of firms, including larger and more established companies for which the probability of distress is generally lower, but also dries up the access to capital, making bankruptcy a more and more ordinary setting for valuation. In addition, even if the distress effects can be reflected in higher cost of capital and lower expected cash flows as the probability of default increases,

the most significant risk of distress, that is the loss of all future cash flows, is not appropriately considered in the DCF valuation. The DCF method, indeed, still assumes that the company will be able to generate cash flows in perpetuity, strongly contributing to the determination of the business enterprise value through the terminal value, or, in any case, that, if subjected to a distress sale in the future, the firm will obtain proceeds equal to the present value of expected cash flows as a going concern. This assumption, however, is quite unrealistic, since, generally, distress negatively affects the firm bargaining power to ask for the fair market value of its assets, that result to be even lower in case of forced liquidation, in which the sale occurs quickly and without a great marketing effort (Gabehart & Brinkley 2000).

Other solutions, therefore, have to be identified in order to avoid that the DCF model leads to misleading estimate of firm's value when the company is distressed. The study of the possible solutions starts from a more in-depth analysis of the difficulties associated with valuing distressed firms through the DCF technique, focusing in particular on the most challenging components of the model, i.e. the estimation of the expected cash flows and terminal value and the calculation of the cost of capital.

2.4.1.1 Expected cash flows and terminal value estimation

Free cash flows are the cash flows generated by the firm that are available to all investors after having met all operating expenses, investments and taxes. FCFs are computed starting from the Net Operating Profit Less Adjusted Taxes (NOPLAT), that is the after tax-profit generated from core operations available to all investors, in the following way (Koller et al. 2015):

$$FCF = NOPLAT + Noncash\ Operating\ Expenses - Investments\ in\ Invested\ Capital$$

As it is possible to deduce from the formula, FCFs exclude flows generated by non-operating assets and financing items, making the FCFs independent from the firm's capital structure.

Valuing a company through the DCF method, requires, first of all, to forecast the free cash flows that the company is expected to generate during the explicit forecast period. This task is particularly challenging for firms in distress. Starting point for the estimation of future cash flows, indeed, is generally the analysis of the historical performance in order to identify the key value drivers and try to predict how they will evolve in the future. The projection of cash flows for distressed firms, however, cannot strongly rely on past performance, since the difficulties recently faced by the firm create discontinuities in historical data (Damodaran

2009). For instance, assets that earn less than the cost of capital and the inability to meet its financial obligations with operating cash flows are some of the characteristics of distressed firms that push them to divest existing assets. Depending on the stage in the crisis path which the company is in, more asset divestitures may be expected in the future in respect to the past, making the estimation of expected cash flows more difficult. Analysts, indeed, should not only be able to identify the assets that will be sold and estimate the proceeds that the firm expects to receive, but also to reflect the effects of the divestiture on operating revenues and earnings, since the divested assets will not contribute anymore to the earnings generation.

Nonetheless, an in-deep analysis of the historical performance results to be useful also when valuing distressed companies, since it allows to identify the main determinants of decline and verify whether they have been adequately captured and proposed to be solved also in the restructuring plan. In addition, by comparing the company's historical financial results with the management projections at the basis of the restructuring plan, it is possible to express a first judgment about the plan feasibility, on which analyst's estimation of future cash flows should be based (Massari & Zanetti 2008). The company's history, finally, affects the financial statements as of the valuation date, that is the starting point for the application of the DCF valuation (Buttignon 2014). When the distress erupts and becomes known to public, the firm actual situation should be fairly disclosed to third parties. This may require to make some adjustment on trade receivables and inventories, but also on liabilities, in the financial statement, while accounting tricks such as deferring expenses to report improved earnings should be stopped, showing the real income or losses realized by the firm.

The firm distressed situation and the company attempts to face the crisis through isolated asset divestitures or structured restructuring plans, therefore, by creating discontinuity with past data, not only increase the level of details required for the assumptions made about the cash flows expected during the transaction period from distress to financial health, but also amplify the uncertainty about the actual realization of cash flow forecasts in the future.

One solution to deal with these critical issues and, at the same time, to reflect the effect of distress on the projected cash flows, consists on the implementation of a scenario analysis. By adopting this technique, as proposed by Damodaran (2009) in his "Modified discounted cash flow valuation" model, the expected cash flows can be estimated for each year as:

$$Expected\ cash\ flow = \sum_{j=1}^{j=n} \pi_{jt} * (Cashflow_{jt})$$

where $\pi_{jt}$is the probability of scenario j in period t and $Cashflow_{jt}$ is the cash flows forecasted under that specific scenario in that period.

As suggested by the formula, the scenario analysis requires to consider all possible scenarios, reflecting different assumptions, from the most optimistic to the most pessimistic ones, about macroeconomic factors, competitors' reactions, implemented strategies and financial policies, and to attribute probabilities to each scenario. In this way, the modified DCF valuation, differently from the traditional DCF valuation that, in practice, rarely considers different potential outcomes, takes into account also the possibility that the firm will not be able to successfully restructure its business and will cease to exist. In practice, however, the scenario analysis is frequently adopted in a simpler version involving the investigation of three scenarios - a best case, a most likely case and a worst case- or two scenarios - the going concern scenario and the distress scenario (Damodaran 2002, 2006). In the latter case, the expected cash flows for each year are estimated as:

$$Expected\ cash\ flow_t =$$

$$(Cashflow_{Going\ concern,t}) * \pi_{Going\ concern,t} + (Cashflow_{Distress,t}) * (1 - \pi_{Going\ concern,t})$$

where $Cashflow_{Going\ concern}$ represents the cash flows estimated in the going concern scenario, by assuming that the firm will return financially and economically healthy, $Cashflow_{Distress}$ represents the cash flows estimated in the distress scenario, assuming that the company will be liquidated and $\pi_{Going\ concern,,t}$ is the cumulative probability that the firm will continue as a going concern in period *t*. It can also be calculated as:

$$\pi_{Going\ concern,t} = \prod_{n=1}^{n=t}(1 - \pi_{distress,n})$$

where $\pi_{distress,t}$ is the probability that the company will fail into distress in period *t*.

Anyway, the application of the scenario analysis to modify the DCF model in order to incorporate the probability and the effects of distress into valuation presents several limitations. First of all, estimating the cumulative probability of distress for each year is quite complicated and it is often the result of analyst's subjective choices (Massari & Zanetti 2008). In addition, the sometimes contradictory assumptions at the basis of the different scenarios, make it difficult to combine the going concern and the distress firm assumptions in the same model (Damodaran 2009). Finally, scenario analysis is generally a more useful tool for dealing with risk that results into discrete outcomes, such as the restructuring plan approval or

rejection by creditors, than for continuous risk, such as sales or debt to equity ratio changes (Damodaran 2009a).

Another critical issue related to the free cash flow projections consists on the determination of the length of the explicit forecast period. According to Koller et al. (2015), the explicit projection period should be long enough for the firm to reach a steady state in which the firm reinvests a constant percentage of its operating profits into the business each year, growing at a constant rate, and earns a constant rate of return on both its existing and new invested capital. The explicit forecast period, therefore, should incorporates "all the changes in the cash flows that cannot be assumed to follow a smooth pattern, such as significant lumpy capital expenditures and asset disposals, reductions of operating expenses, turnaround consequences and/or atypical growth, and the effect of the economy cycle" (Arzac 2005, p. 15). Thus, for distressed firms undertaking a restructuring process, free cash flows should be explicitly forecasted for the entire transition period during which the company is expected to shift from distress to financial health (Damodaran 1994), that generally consists, at least, on the duration of the restructuring plan.

The value generated by the free cash flows expected beyond the explicit forecast period, instead, is captured by another important component of the DCF model: the terminal value. Two different methods are commonly used to calculate the terminal value (Altman and Hotchkiss 2006):

1. A comparable company approach, that frequently involves the application of an EBITDA multiple to the free cash flows projected immediately after the explicit forecast period.
2. A growing perpetuity formula applied to the FCF expected in the first year after the forecast period (t+1):

$$Terminal\ value_t = \frac{FCF_{t+1}}{WACC - g}$$

where FCF_{t+1} should reflect the firm's normalized operating performance that is expected to be sustained indefinitely and g is the cash flows long term growth rate[10].

Although the first method is less correct from a theoretical point of view, since it mixes intrinsic and relative valuation, the comparable company approach can provide a market support to the valuation, making references to the multiple at which comparable companies

[10] Alternatively, the terminal value can be calculated by using the value driver formula:

$$Terminal\ value_t = \frac{NOPLAT_{t+1}\left(1 - \frac{g}{RONIC}\right)}{WACC - g}$$

trade. If the DCF assumptions are not in line with the industry averages, however, the two methods can lead to different estimates of the terminal value, significantly affecting the overall firm's intrinsic value. The terminal value, in fact, often accounts for a very large portion of the enterprise value and it approximately represents the 70.5% of the total value for firms undertaking a restructuring process, as showed by Gilson et al. (2000).

The computation of the terminal value becomes even more complex for declining and distressed firms. Focusing on the second method proposed[11], the calculation of the terminal value requires, first of all, the estimation of cash flows long-term growth rate, i.e. the growth rate that the firm is expected to sustain indefinitely, which therefore cannot be higher than the economy growth rate. This task can be very challenging when valuing a distressed firm, since it becomes necessary to consider the possibility that the firm might never reach a stable growth, being subjected to liquidation during the explicit forecast period. In addition, even if the firm is expected to reach the steady state, the continuous loss in market share experienced by the distressed company can lead to very low or even negative expected growth rate in perpetuity (Damodaran 2009). Secondly, lower return on capital, compared to the cost of capital, that frequently characterizes declining companies, gives rise to further estimation issues. If there are no reason for expecting improvements in the future, the most reasonable assumption might be that the firm will continue to earn a return on capital below the cost of capital in perpetuity. This assumption, however, will have significant consequences for the estimation of the reinvestment rate and the terminal value (Damodaran 2009). Finally, the application of the growing perpetuity formula for the calculation of the terminal value requires the estimation of a discount rate whose risk parameters should reflect the more stable firm's situation. When restructuring plans are effective in improving the distressed firm's financial and economic conditions, therefore, it is inappropriate to use a discount rate based on the high cost of debt and equity to which the company is subjected at the valuation date and it can cause terminal value to implode.

2.4.1.2 Discount rate calculation

Free cash flows and terminal value, then, are discounted at a rate that not only takes into account the time value of money, but reflects also the risk and uncertainty underlying future cash flows. This discount rate is the Weighted Average Cost of Capital (WACC), defined as the opportunity costs and, at the same time, the return for all company's investors deriving

[11] Criticalities concerning the application of the comparable company approach in distressed firm valuation will be analyzed in *paragraph 2.5*.

from “investing their funds in one particular business instead of others with similar risk” (Koller et al. 2015, p. 283). In its simplest form, the WACC is computed as:

$$WACC = k_e \frac{E}{E+D} + k_d(1 - T_m)\frac{D}{E+D}$$

where

- k_e is the cost of equity
- k_d is the pre-tax cost of debt
- $\frac{E}{E+D}$ is the target level of equity to enterprise value
- $\frac{D}{E+D}$ is the target level of debt to enterprise value
- T_m is the company’s marginal income tax rate

As showed by the formula, cost of equity, cost of debt and the firm’s target capital structure are the primary components of the WACC. When valuating distressed firm, each of these components has to be deeply analyzed in order to capture and try to incorporate the effects of distress on the cost of capital.

Cost of equity

The cost of equity, which expresses the rate of return required by investors to make an equity investment in the firm (Damodaran 1994), is the trickiest component of the WACC calculation, since it is not directly observable. Differently from debt, that the company has to pay in the form of prescheduled interests, indeed, equity has not an explicit and concrete price that the firm must pay.

A commonly used approach to estimate the cost of equity is the Capital Asset Pricing Model (CAPM), on which basis the cost of equity can be determined as follows:

$$k_e = r_f + \beta\,(r_m - r_f)$$

where

- r_f is the risk-free rate and it is defined as the return expected by an investor from a risk-free investment. The latter is an asset whose returns are known with certainty by the investor over a specific period of time. Risk-free rate is commonly computed on the basis of the return of long term government default-free bonds;
- β is a measure of the volatility or systematic risk of the investment. It captures how a firm’s stock price responds to movements in the overall market;

- $(r_m - r_f)$ is the market risk premium expressed as the difference between the expected return of the market and the risk-free rate. It measures the excess return required by investors to move from risk-free securities to risky investments.

While the risk-free rate and the market risk premium are common to all companies, beta varies across firms. Type of business, operating leverage and financial leverage, indeed, are the variables that determine this measure of risk (Damodaran 1994). In particular, cyclical, rigid cost structure and highly leveraged business are generally characterized by more volatile earnings and, therefore, higher beta. As a consequence, the application of a uniform beta for healthy and distressed companies, frequently characterized by a high degree of operating and financial leverage, is not appropriate in most valuation cases. As stated by Meitner and Streitferdt (2014, p.157), indeed, "using a uniform beta implies very strange risk patterns for the distressed company that – in most cases – cannot be observed in reality."

The calculation of beta for distressed firms, however, is not free from estimation issues. As suggested by Damodaran (2009), betas commonly determined through a regression analysis are not able to adequately capture the risk in the equity of a financially distressed firm. Referring to historical returns, often over long period of time reflecting, to some extent, firm's healthier situations, the regression beta finally understates the true beta. In addition, rumors about company restructuring or impeding bankruptcy, can result into an increased stock price volatility but frequently with no relation to the market. Thus, regression betas might actually decrease during financial distress, since they reflect how a stock moves with the market. This result, however, is not necessarily misleading. The likelihood of shareholders' recovery upon financial distress, indeed, can fundamentally affect the riskiness of equity as default probability increases. As demonstrated by Garlappi and Yan (2011), at high levels of default probability, all else being equal, the possible debt renegotiation and consequent asset redistribution actually reduce the equity risk and de-lever the beta equity. At low levels of default probability, instead, higher leverage results into an increase of the equity beta. As suggested by Garlappi and Yan (2011, p. 790), therefore, "in the presence of shareholder recovery […], equity beta and expected returns are hump shaped in default probability."

Damodaran (2006) proposes two solutions to overcome the limitations of using regression beta when estimating the cost of equity for distressed firms.

According to the first approach (CAPM beta adjusted for distress), the beta adopted in the CAPM to compute the cost of equity is calculated using the firm's current market debt to equity ratio (D/E) and the bottom-up unlevered beta (β_U), computed as shown in *Table 2.1*,

depending on the expected evolution of debt dollar level and on the risk attributed to the tax shields.

	Dollar level of debt fluctuates	Dollar level of debt is constant and debt is risky	Debt is risk free
Tax shieds have same risk as operating assets	$\beta_e = \beta_u + \frac{D}{E}(\beta_u - \beta_d)$	$\beta_e = \beta_u + \frac{D}{E}(\beta_u - \beta_d)$	$\beta_e = \left(1 + \frac{D}{E}\right)(\beta_u)$
Tax shieds have same risk as debt	$\beta_e = \beta_u + \frac{D - V_{txa}}{E}(\beta_u - \beta_d)$	$\beta_e = \beta_u + (1 - T_m)\frac{D}{E}(\beta_u - \beta_d)$	$\beta_e = \left[1 + (1 - \mathrm{T_m})\frac{\mathrm{D}}{\mathrm{E}}\right]\beta_u$

Table 2.1 – Levered Beta. *(Koller et al. 2015)*

In particular, the bottom-up unlevered beta is the weighted average of unlevered betas of the businesses which the company operates in. Its calculation requires the identification of comparable firms operating in the same businesses of the company being valued and the computation of the respective levered regression betas. Since comparable firms present different capital structures from the company being valued, their levered betas have to be transformed into unlevered beta by reverse engineering the formulas contained in *Table 2.1*.

The bottom up unlevered beta is then calculated as the weighted average of comparable companies unlevered betas, where the weights are based on the contribution of each business to the generation of value, and used to estimate the levered beta of the firm being valued. Since distressed firms are characterized by high debt to equity ratio and frequently generate negative operating incomes that prevent to exploit the debt tax advantages, levered beta may be higher than regression beta. The tax rate (*t*) and the debt to equity ratio, in addition, have to be re-assessed whenever expectations about the firm's future change.

It is worth noting, however, that even if supposing the debt as risk-free for the computation of levered and unlevered beta (as in the last column of *Table 2.1*) is a commonly used simplified practice, this assumption (i.e. $\beta_D = 0$) might actually not be realistic, in particular for distressed firms. As summarized by Ang (2017), indeed, several studies report debt betas different from zero for different rating class: Cornell and Green (1991), for instance, reported debt beta of 0.25 for high-grade bonds and of 0.29 for low grade bonds, while Groh and Gottschalg (2011) measured beta debt of 0.296 and 0.410, respectively. In addition, according to these findings and as demonstrated by Klein and Steller (2014), the systematic risk of corporate debt, expressed by β_D, is expected to be higher the longer the time to maturity and the lower the credit quality. β_D for a distressed firm, therefore, might be different from 0, given its higher risk of default. Estimating this measure of systematic risk, however, is quite complex. Regression betas, indeed, can be computed only for a limited number of firms, since

many companies' bonds are not listed in the financial market and, anyway, as for equity regression betas, being based on historical returns, they can reflect past situations which were healthier than the current one. A commonly used solution to this estimation issue consists on estimating β_D on the basis of the firm's rating class or, in case of not rated debt, synthetic rating class.

The second approach for the estimation of the cost of equity (distress factor model) proposed by Damodaran (2009), instead, involves the use of the average beta computed from comparable healthy firms in combination with an extra premium reflecting the distressed situation.

$$k_e = r_f + \beta_{Healthy} * (Equity\ risk\ premium) + Distress\ premium$$

According to Damodaran (2009), the distress premium can be obtained on the basis of the historical returns earned by investing in the equity of firm in distress or as the difference between the distressed firm's higher pre-tax cost of debt and the industry average cost of debt.

In particular, the idea of an extra premium over CAPM was firstly modelled by Fama and French (1992), who described stocks return by adding to the market risk factors a size factor (based on market capitalization) and a value factor (based on book-to-market equity ratio), in the attempt to justify the outperformance tendency reported by small-cap and value stocks in respect to high-cap and growth stocks[12]. Specifically, according to Fama and French (1992), distress risk plays a key role in justifying the observed value premium and size premium. First of all, indeed, as argued by Chan and Chen (1991), the size premium resulted to be primarily driven by "marginal firms", i.e. firms with high leverage and cash flows problems that have lost market value because of their poor performance, which result to be more sensitive to adverse economic fluctuations. Secondly, high ratios of book-to-market equity signal that poor firm's future prospects are expected by the market and, therefore, higher expected stock returns are demanded by investors to compensate for the firm's risk of distress.

The conjecture at the basis of this model, according to which investors require positive premium for holding stocks of firms that face high default probability, however, was not confirmed in the subsequent empirical researches. In particular, Dichev (1998), using Altman Z-score (1968) and Ohlson O-score (1980) to proxy for the probability of default, found an inverse relation between the likelihood of default and stock returns. This result was further corroborated by Griffin and Lemmon's research (2002), which pointed out the absence of

[12] Differently from CAPM, however, the Fama and French model is not theoretically based, but empirically driven. Therefore, while CAPM is rooted on solid theory about risk and return, the Fama and French model is based purely on empirical evidences. Since, as suggested by Koller et al. (2015) it takes a better theory to kill an existing theory, it was decided, in this dissertation, to continue to rely on the CAPM model.

evidence about positively priced default risk in stocks return. Similar conclusions were reached by Campbell et al. (2008) as well, who, by combining a comprehensive set of accounting and market measures in a dynamic logit model, found anomalously low returns for stocks with high risk of default, confirming the existence of a strongly negative relation between default risk and stock returns. Therefore, these empirical evidences, which are supported by the large part of the literature on the distress risk issue, differently from what expected, indicate that returns are lower for companies with greater distress intensities, giving rise to the so-called "distress risk puzzle". A first interpretation, however, attributes this distress anomaly to market mispricing, according to which investors make valuation errors, failing to fully assessing the prospects of companies with high probability of default and, therefore, to ask a sufficient premium to compensate for the distress risk. Another possible explanation, instead, according to Campbell et al. (2008), lies in the features of distress stocks, such as increased opportunities to extract private benefits of control or positive skewness of returns, that can appeal to certain investors.

On the other hand, however, some empirical researches in the literature came to different results, supporting the theoretical intuitions about the relation between distress risk and stocks return. In particular, Chava and Purnanandam (2010) observed that the distressed stocks' underperformance documented by Dichev (1998), Griffin and Lemon (2002), and Campbell et al. (2008) was specific to the 1980s and it disappeared when this decade was eliminated from the sample. Vassalou and Xing (2004), instead, found that, for small value stocks, distressed stocks with low distance to default do report higher returns. Similarly, Friewald et al. (2014) showed a stock returns increase with company's credit risk premia, while Duff&Phelps (2016) reported the existence of a premium over CAPM for high-financial risk of 5,31% and 7,53% for manufacturing firms, and of 12,78% and 17,77% for service firms, depending on whether the company stays in a grey zone or distress zone as defined by the Altman's Z-score model.

According to Garlappi et al. (2008), however, these contrasting results can be justified by the key role played by shareholder advantage in determining the link between stock returns and default probability. Their empirical findings, indeed, showed that returns decrease in expected default frequency for firms with large asset size, low R&D expenditure and high asset specificity. In particular, large asset base, by making shareholders more powerful in renegotiation, and low R&D expenditures, by reducing, ceteris paribus, the probability of liquidity shortage, can be considered as a proxy of shareholders' high bargaining power, while high asset specificity (in terms of low assets tangibility or high industry-specificity), as a

measure of liquidation costs, by giving creditors stronger incentives toward renegotiation, represents a proxy for high shareholder bargaining surplus. The relation between default probabilities and stock returns, therefore, resulted to be negative in presence of higher shareholder bargaining power and higher efficiency gained through bargaining, which define a strong shareholder advantage. As stated by Garlappi et al. (2008, p. 2715), indeed, "the ability of shareholders with a stronger advantage to extract more value from renegotiation leads to lower risk for equity—relative to the risk of the assets—and hence lower expected returns, as the probability of default increases." On the other hand, for firms whose equity holders have a weak advantage, the original conjecture that distress risk should be compensated by a positive return premium is proved by the resulting positive relationship between default probability and equity returns.

Cost of debt

The cost of debt is the cost of borrowing funds, currently bore by the firm, to finance projects (Damodaran 1994) and it is multiplied by $(1-T_m)$ in the WACC formula in order to compute the after-tax cost of debt, which is determined by three components:

1. the interest rates current level, whose increase brings an increase in the cost of debt for firms;
2. the firm's default risk: higher the default risk, higher the cost of borrowing;
3. the debt tax advantage: as the tax rate increases, the tax benefit deriving from paying interest will also increase leading to an after-tax cost of debt lower than pre-tax cost of debt.

The last two components, in particular, should be carefully examined when dealing with distressed firms, in order to appropriately reflects the effects of distress on the cost of debt.

For investment grade companies, the yield to maturity of company's long term option free bonds is generally used to estimate the cost of debt. Even if it is a promised, and not expected, rate of return on company's debt, in fact, the yield to maturity is a good proxy of the cost of debt since for investment grade firms the probability of default is negligible (Koller et al. 2015). For below investment grade debt, instead, this approximation leads to erroneous results, since the promised yield to maturity overestimates the true cost of debt by the default risk premium (Arzac 2005). The lower cash flows received by the debt holders in case of default in respect to promised payments, indeed, cause the expected yield to maturity to be lower than the promised one.

Thus, for distressed firms, a more suitable alternative to the use of promised yield to maturity may be calculating the cost of debt by adopting standard asset pricing models as the CAPM. Even if the application of such model to risky debt is expected to result into a yield lower than the promised one, it requires to estimate the beta debt, that, as already explained, is a quite difficult task when the debt is not traded and, therefore, regression beta cannot be computed.

A second possible solution consists, instead, on computing the cost of debt as the sum of a risk-free rate and a default spread, as suggested by Damodaran (2009):

$$k_d = r_f + Default\ spread$$

where the default spread is based upon the firm's bond rating or, for not rated debt, synthetic rating determined using financial ratios such as the interest coverage ratio. When the probability of default is significant, even this calculation will result in a cost of debt that is still high but lower than the promised yield to maturity of debt issued by the firm. Being based solely on historical data about default spread, however, this method is not forward-looking and, therefore, it can give rise to misleading estimates when the future economic and market conditions are likely to significantly differ from those in the past.

A third alternative approach for the computation of the cost of risky debt, finally, is provided by Cooper and Davydenko (2007) and is rooted in the Merton's model (1974) for the pricing of corporate securities. As stated by the authors, the expected yield on risky debt is somewhere between the promised yield and the riskless interest rate. In particular, the spread between this two boundary rates[13] (the promised yield spread) is composed of two parts: the first part captures the expected default losses while the second part is due to the expected return premium, which compensate debtholders for the undiversifiable risk of the debt.

Since the expected losses from default are not part of the expected return, the cost of debt turn to be equal to the promised yield adjusted for the expected default losses:

$$Cost\ of\ debt = Promised\ yield - Yield\ equivalent\ of\ expected\ default\ loss$$

According to Cooper and Davydenko (2007), this second determinant of the cost of debt can be easily derived from the Merton's model (1974)[14]. Being based on the latter, however, the Cooper and Davydenko's approach suffers from the limitations underlying the Merton's model that, as empirically tested by Anderson and Sundaresan (1996, 2000), cause the implied yield spreads to underestimate the ones observed in the market.

[13] Assuming that risky debt and riskless debt have the same maturity, liquidity and tax characteristics.

[14] $Yield\ equivalent\ of\ expected\ default\ loss = -(1/T)ln[e^{(\pi-s)T}N(-d_1 - \pi_E\sqrt{T}/\sigma_E)/p_D + N(d_2 + \pi_E\sqrt{T}/\sigma_E)]$ where T is the debt maturity, π the risk premia on assets, s the promised yield spread, π_E the risk premia on equity, σ_E the equity volatility, p_D the firm's leverage. See Cooper and Davydenko (2007) for detailed computations.

Regardless the method adopted to compute the expected cost of debt, however, the use of an expected yield will result into an overestimation of the firm's enterprise value if it is not combined with cash flow projections that attribute appropriate weights to the downside realizations (Arzac 2005). In addition, Arzac (2005) highlights that the adoption of expected yield, that is lower than the promised yield as the probability of default of distressed firm increases, assumes a proportional reduction in the tax shield. Actually, the tax shield may be different when the probability of tax shield utilization (p) multiplied for the promised yield (r_P) is not equal to the tax shield of the expected yield (r_E). So, the expected after-tax cost of debt, that is $r_E - p * t * r_P$ equals $(1 - t)\, r_E$ only if $pr_P = r_E$. These difficulties, in addition to the fact that operating losses may prevent or reduce the tax benefit of debt, make the use of WACC for discounting free cash flows less suitable when the probability of default is significant. In this case, the adoption of the Adjusted Present Value method which relies on the unlevered cost of equity and separately manages the tax shields value, can result more appropriate (see *paragraph 2.4.2*).

Debt to equity ratio

The last determinant of the WACC formula is the firm capital structure, which is reflected in the debt to enterprise value and equity to enterprise value weights. In common practice, these weights are determined on market value basis and refer to the firm target capital structure. Using target debt to equity ratio for the entire valuation period, however, can lead to misleading estimates when the firm is financially distressed, since debt write-off or rescheduling, undertaken in the attempt to overcome the crisis, can alter the market value of debt and equity year by year. Damodaran (2009), therefore, suggests to start from the current market debt to capital ratio, which might be very high for firms in distress, and adjust it toward more reasonable levels on the basis of the restructuring plan implementation, and consequent profitability improvements, forecasted in future years. This suggestion is in accordance with the recommendation of Koller et al (2015) to use a different WACC each year, reflecting the capital structure at that time, when the firm is not expected to move toward its target capital structure over a short period of time. Even in this case, however, the analyst faces the difficulty of estimating the market value of debt, which is a very challenging task, considering also that this value is a typical valuation result rather than an input.

Modified WACC

In alternative to the incorporation of the distress effects in each determinant of the WACC, some models suggest to take into account the firm's default risk directly in the WACC formula.

In particular, Koziol (2014) identified two new components, the default probability $(1-p)$ and the bankruptcy costs (α), that need to be included in the WACC formula as follows:

$$WACC = \frac{E}{V} * k_e + \frac{D}{V} * k_d - p * \tau * \frac{D}{V} * c + (1-p) * \alpha$$

According to Koziol (2014), indeed, the pre-tax WACC has to be incremented for the bankruptcy costs, which are higher as the default probability increases, and to be reduced for the tax shields ($\tau * D * c$, where c is the nominal interest rate), which, however, decrease or disappear as the firm faces incremental default probability.

Saha and Malkiel (2015), instead, suggest adjusting the traditional discount rate (WACC) in the DCF model for the probability that cash flows stream completely ceases in the future (cessation probability, d), which is assumed finite and constant in each period. Starting from the Gordon model, Saha and Malkiel (2015) finally derive a modified discount rate, computed as follows:

$$WACC^* = \frac{d + WACC}{1 - d}$$

This formula, then, can be further adjusted to account for the probability d that future cash flows are reduced of a fraction f:

$$WACC^* = \frac{df + WACC}{1 - df}$$

Cash flows cessation, therefore, is implied when f=1

Despite their simplicity, however, these models present several limitations. First of all, they require to estimate the bankruptcy costs and the probability of default, that, as discussed in *paragraph 2.2.2* and *paragraph 2.2.3*, is not so straightforward in practice. Secondly, most of the times, they hardly work in real cases, since their underlying assumptions are not so reliable. As pointed out by Lahmann and Schwetzler (2014), for instance, Koziol's proposed adjustment to WACC (2014) implicitly relies on the assumptions that current and next period company value without default and including default are equal to each other. But if this is true and, therefore, firm's value is not affected by potential default, no adjustments are necessary. Thirdly, these models still required to estimate the target debt to equity ratio. As already explained, however, assuming a target capital structure in line with the industry average will

lead to overvalue the firm when it is highly leverage in respect to competitors. On the other hand, using the current debt to equity ratio, which is generally very high for distressed company, will cause the appraiser to underestimate the firm value, since the company financial structure is expected to adjust toward more reasonable levels as the restructuring process will be implemented. In both cases, however, assuming the debt to equity ratio constant over the entire valuation period will lead to misleading valuation when the company, in the attempt to exit the crisis, undertakes a restructuring at both strategic and financial level, which is expected to significantly affect the market value of equity and debt year by year.

In presence of changing capital structure, therefore, it can result easier to compute the firm's value by discounting the operating cash flows at the unlevered cost of capital, rather than at the WACC, and by isolating the effect of debt from the value generated by firm's assets: this consists on applying the APV model. Before describing more in details such valuation method, however, other two reworked versions of the traditional DCF model are analyzed. These solutions, that are alternative to the previously described Modified DCF valuation and proposed by Damodaran (2009) in the attempt to provide a more precise estimate of distressed firm value, are known as:

- DCF model with Monte Carlo Simulation
- Going concern DCF adjusted for probability of default

2.4.1.3 DCF model with Monte Carlo Simulation

A possible solution to deal with the uncertainty underlying the main inputs of the DCF model, which is particularly significant in case of distress, consists on the application of Monte Carlo simulation to the DCF method. While scenario analysis generally considers a limited number of combinations of variables to which predefined values are assigned and, therefore, it is more appropriate when the underlying risk is discrete, simulations represent a useful tool when dealing with continuous risk (Damodaran 2002). By replacing deterministic values with probabilistic values, simulations examine the effects of all possible combinations of variables and their realizations, overcoming, in this way, the limitations of scenario analysis (Clark 2010).

The use of probabilistic distribution for each factor affecting cash flows enables simulation techniques, and in particular Monte Carlo simulation, to accurately reflect the uncertainty underlying cash flows forecasts, that strongly characterizes distress situation, on the firm

enterprise value. The latter, as a consequence, will result in a distribution of possible outcomes, rather than in a single discrete value (Kelliher and Mahoney 2000).

The combination of Monte Carlo simulation with the DCF model for the valuation of distressed firm involves five steps (Damodaran 2006, Brealey 2011):

1. Analyze the past performance as well as the current situation and the future prospects of the firm being valued and the industry in which it operates to identify the key value drivers whose expected value will be replaced by probabilistic distributions.
2. Select a probability distribution for each critical variable. The selected probability distribution should adequately reflect the uncertainty associated with the considered factor and best fit the dynamic of the critical variable which emerges from the analysis of historical data.
3. Estimate the parameters of each selected distribution. This task is generally performed starting from the historical sample, as suggested by Resti and Sironi (2007). At this step, in addition, it is also necessary to determine the circumstances that constitute distress and its consequences, in order to identify whether the simulations outputs reflect the firm's distress sale or going concern value.
4. Run the simulations. After having check for correlation across variables, it is necessary to pick a random outcome from each distribution, that is the value that the variable is assumed to take for that particular simulation. The randomly picked outcomes of the critical variables are then used to calculate the expected cash flows. If the previously defined distressed constrains are not triggered, the firm enterprise value is determined through traditional valuation methods under the going concern assumption, otherwise specific valuation methods for distressed firm, which involve the computation of the distress sale value, are adopted. This step should be repeated several times. The greater the number of critical inputs to which probability distributions are assigned, the diversity of the distributions selected and the potential range of outcomes on each variable, the larger will be the number of simulations to run.
5. After repeated simulations, a distribution of the firm enterprise value is obtained from the going concern and distress sale values resulting from the performed simulations. The mean of the distribution is then computed and it represents the expected value of the output of the DCF model, that is the firm enterprise value. From the resulting distribution of the firm's enterprise value, in addition, the default probability and the consequences of distress on firm value can be assessed.

Even though Monte Carlo simulation allows to deal with uncertainty in DCF model in a more accurate and flexible way than scenario analysis, this technique presents several limitations. First of all, the simulations outputs strongly depend on the difficult task of selecting the distribution probability that best fit the dynamic of the critical inputs. Furthermore, the common practice of assigning probability distribution only to a reduced number of inputs and assuming independence across critical variables, in the attempt to simplify the implementation of the technique, can result into an underestimation of important aspects, originating misleading conclusions. In addition to these informational limitations, Monte Carlo simulations are also characterized by computational difficulties, since they are very time consuming and resource intensive. These constrains, however, have eased in recent years thanks to the development of dedicated statistical software.

2.4.1.4 Going concern DCF adjusted for probability of default

An alternative to the Modified DCF model that involves the performance of scenario analysis and the discount rate adjustments described, respectively, in *paragraph 2.4.1.1* and *paragraph 2.4.1.2*, consists on dealing with the effect of distress on the firm's value by separating them from the going concern assumptions. As suggested by Damodaran (2009), by adopting this model, the firm's enterprise value can be calculated as follows:

$$Firm\ value = Going\ concern\ value * (1 - \pi_{Distress}) + Distress\ sale\ value * \pi_{Distress}$$

where the cumulative probability of distress ($\pi_{Distress}$) and the firm distress value are computed according to the techniques discussed, respectively, in *paragraph 2.2.2* and *paragraph 2.2.4*.

The going concern value, instead, can be derived through two different approaches (Damodaran 2009):

1. the first approach consists on considering only the scenarios where the company is expected to survive and estimating the expected cash flows under those scenarios;
2. the second approach involves to value the company as if it were a healthy firm at the valuation date. A solution to easily estimate the present value of cash flows that the company would have realized if it were a healthy firm, consists on using the industry average discount rate and the average operating margin reported by healthy firms operating in the same business of the company being valued.

The last approach, however, even if simpler to implement, is less precise and can result into an overestimation of the firm value by incorrectly assuming that the firm will return to be financially healthy quickly and without costs.

The main advantage of the adoption of this particular variation of the DCF model to separately dealing with distress is that it takes into account the possibility that even distressed company can revert to financial health. Furthermore, it provides a more precise valuation of the traditional DCF models, even if the limited number of considered scenario makes the valuation results less accurate than the ones obtained through the Modified DCF or the DCF with Monte Carlo simulation. In addition, estimating the distress sale value and the probability of default still remains a challenging task.

2.4.2 Adjusted Present Value method

Despite the adjustments proposed, the DCF method, being based on the use of WACC as discount rate, still requires to define a target capital structure. As already discussed, this task is quite complicated for distressed firms. The latter, indeed, may undertake financial restructuring plan providing for debt write-off and rescheduling, which significantly impact the value of debt. In addition, when strategic turnaround plans are successfully implemented and result to be effective, higher cash flows will be available to repay debt, lowering the debt to value ratio. In the latter case, the adoption of a constant WACC would overstate the value of the tax shields deriving from interest payments (Koller et al. 2015), while the solution of yearly adjusting the WACC in order to reflect the changing capital structure is quite complex to implement, given the high degree of uncertainty surrounding the evolution of the debt to equity ratio. Given this limitation of the DCF model, therefore, when valuating companies whose capital structure is expected to or is planned to significantly change over the valuation period, it results more appropriate to adopt an alternative model, that is the Adjusted Present Value (APV) Model

The APV model was first introduced by Myers (1974) in the context of studying the interactions between financing and investment decisions, starting from the contributions of Modigliani and Miller (1958, 1963) that first attempted to isolate the tax benefit of debt in firm valuation. In a first version of Modigliani and Miller theorem (1958), the authors, assuming the absence of taxes, security issue costs and bankruptcy costs, stated that firm capital structure has no impact on its enterprise value, which depends only on the company's earning power and the risk of its underlying assets. In 1963, however, the authors revised their

analysis by moving to a world where there are taxes, and concluded about the important contribution of debt tax shields in lowering the cost of debt and increasing the firm value, which can be calculated as follows:

$$V_L = V_U + t_c * D$$

The formula suggests that the value of the levered firm (V_L) can be obtained as the sum of the value generated by firm's operations (V_U) and the value created by financing through the fiscal deducibility of interests paid on debt, computed by multiplying the corporate marginal tax rate (t_c) for the value of debt (D) (assuming the debt as perpetual).

In accordance with this formula, the APV method computes the firm' value by separating the value generated by the firm as if it were all equity financed from the value of the tax shield deriving from debt financing (Koller et al. 2015, Altman & Hotchkiss 2006):

$$Firm's\ adjusted\ present\ value = \sum \frac{Free\ cash\ flow}{1 + WACC_{Unlevered}} + \sum \frac{Tax\ shields}{1 + r_{Tax\ shields}}$$

When dealing with distressed firms, however, a complete estimation of the firm's enterprise value through the APV technique, should capture also capital structure effects representing the other side of high leverage. On the one hand, indeed, the use of debt to fund firm's operations generates tax benefits that increase the firm's value, but on the other hand, the increasing leverage leads to higher bankruptcy risk and, consequently, to distress costs. A more completed APV formula, therefore, should explicitly take into account the decrease on firm's value due to bankruptcy costs as well, as proposed by Damodaran (2002):

$$Firm's\ value =$$

$$= Unlevered\ firm\ value + PV(Expected\ tax\ benefits) - Expected\ bankruptcy\ costs$$

According to this formula, the valuation process through the APV model can be split in 3 steps, in each of which the analysis focuses on the estimation of one of the firm's value determinants.

The first step involves the computation of the firm's value as if it had no debt, by discounting the expected cash flows at the unlevered cost of equity which can be computed:

- according to Modigliani and Miller's theorem, as suggested in the *Table 2.2,* on the basis of the expected evolution of debt dollar level and on the risk underlying the tax shields
- according to the CAPM, $k_u = r_f + \beta_U (r_m - r_f)$

	Dollar level of debt fluctuates	Dollar level of debt is constant
Tax shieds have same risk as operating assets	$k_u = \frac{D}{D+E} k_d + \frac{E}{D+E} k_e$	$k_u = \frac{D}{D+E} k_d + \frac{E}{D+E} k_e$
Tax shieds have same risk as debt	$k_u = \frac{D - V_{txa}}{D - V_{txa} + E} k_d + \frac{E}{D - V_{txa} + E} k_e$	$k_u = \frac{D(1-T_m)}{D(1-T_m)+E} k_d + \frac{E}{D(1-T_m)+E} k_e$

Table 2.2 – Unlevered cost of equity. *(Koller et al. 2015)*

When valuing distressed firms, however, both approaches still present the estimation issues related to the computation of betas and cost of debt and equity discussed in *paragraph 2.4.1.2*.

As regards the terminal value, instead, the unlevered cost of equity can be substituted by the WACC when discounting the value generated by firm's operations beyond the explicit forecast period, combining, in this way, the APV technique, applied in the explicit projection period, with the DCF model, adopted in the computation of the terminal value. This particular version of the APV model is justified by the assumption that the debt ratio will reach its target value at the end of the explicit projection period, date in which the currently distressed firm is expected to return to normal operations, thanks to the successful implementation of the restructuring plan (Arzac 2005).

The second step of the valuation process requires to estimate the expected tax benefit of borrowing, generated by the possibility to deduct interest expenses from taxable income. As suggested by Damodaran (2009a), the tax benefit is a function of the corporate tax rate and it is discounted at a rate reflecting the riskiness of these cash flows:

$$Value\ of\ tax\ benefits = \sum_{t=1}^{t=\infty} \frac{Tax\ rate_t * Interest\ rate_t * Debt_t}{(1+r)^t}$$

When tax rate and debt are viewed as constants and tax saving, therefore, results in a perpetuity, and the tax shields are assumed to have the same risk of debt, justifying the use of the cost of debt as discount rate, the previous formula can be simplified as follows:

$$Value\ of\ tax\ benefits = \frac{Tax\ rate * Cost\ of\ debt * Debt}{Cost\ of\ debt} = Tax\ rate * Debt = t_c * D$$

The assumption of constant debt, however, is quite unrealistic in distress scenario, making necessary to perform a more detailed analysis of tax shields value which points out several

estimation issues. A first issue regards the discount rate that should be adopted to calculate the present value of the tax savings. While some authors, such as Myers (1974) and Cooper and Nyborg (2006), propose to use the cost of debt as discount rate, arguing that the tax savings have the same risk of debt, since they arise from the use of borrowings, other authors, such as Harris and Pringle (1985), Ruback (2002) and Kaplan and Ruback (1995), suggest to adopt the unlevered cost of equity assuming that the interest tax shields have the same systematic risk as the company's underlying cash flows and operating income that make the tax benefits possible. Fernandez (2004, p. 163), instead, states that the term ''discounted value of tax shields'' is meaningless in itself since the tax savings should be computed as "the difference between the present value of the taxes of the unlevered company and the present value of the taxes of the levered company, which represent two separate cash flows each with their own risk".

In the corporate finance literature, therefore, there is a lack of consensus about which rate is theoretically correct for discounting the tax benefits of interests (Copeland et al. 2000). If the unlevered cost of equity, rather than the cost of debt, is chosen as discount rate, the tax shields value will result lower (and the APV method coincide with the CCF method). This difference, according to Guatri and Bini (2009), reflects the costs of distress that, therefore, are not required to be directly estimated when using the unlevered cost of equity (see the CCF method, *paragraph 2.4.3*). Several authors, in addition, argue that the choice of the discount rate to adopt should be made on the basis of the firm's debt strategy. Ruback (2002) indicates that tax saving should be discounted at the cost of debt when the debt dollar level is assumed fixed and, therefore, independent from the firm's value, while Miles and Ezzell (1980) suggest to use the cost of debt for the first year[15] and the unlevered cost of equity for later years when the firm targets a constant debt to value ratio and adjusts to its target ratio once a year. When the company, instead, continuously adjusts to its target debt ratio, the unlevered cost of equity should be used, as suggested by Harris and Pringle (1995).

In case of distressed companies, therefore, a reasonable choice could result in the adoption of the unlevered cost of equity as discount rate for tax savings, as proposed by Buttignon (2014) and Arzac (2005). In presence of high leverage, indeed, debt fluctuations are usually a function of uncertain cash flows, that, in turn, makes the tax shields less certain and predictable. Another estimation issue concerning the value of the tax benefits, consists, in fact, on the prediction of future tax shields. This task is particularly challenging for distressed

[15] In the first year, in fact, the debt to value ratio is constant by definition and therefore, giving that there is no the requirement to rebalance the capital structure, the cost of debt can be used to discount the tax benefits generated in that year.

firms. While the capitalized tax benefit of interest deductions is about 10% of a typical firm value (Graham 2000, Kemsley & Nissim 2002), in troubled companies decreasing revenues and rigid cost structure can result into low or negative operating income which prevent to exploit the tax benefits deriving from the use of debt. In addition, highly leveraged firms might realize, in the future, lower tax shields than the ones estimated on the basis of the promised interest payments, because of their significant probability of default (Koller et al. 2015). When valuing a distressed firm, therefore, the tax benefits should be carefully estimated, reducing the promised tax shields by the cumulative probability of default and also considering possible tax loss carry-forward, tax credits and other tax shield items.

Lastly, the third step of the APV method involves the determination of the decrease in firm value caused by the expected bankruptcy costs which are computed as follows (Damodaran 2002):

$$PV\ of\ Expected\ bankruptcy\ cost\ = \pi_a * BC$$

where π_a is the probability of default, calculated according to the techniques proposed in *paragraph 2.2.2*, and BC the bankruptcy or distress costs. The latter, since difficult to estimate directly, can be derived looking at their magnitude in actual bankruptcies, which were investigated in the studies presented in *paragraph 2.2.3* or, in a simpler way, as the difference between the firm value as a going concern and the distress sale value (Damodaran 2009).

Finally, the firm's value is computed by summing up the amounts estimated in each steps of the valuation process. By decomposing the firm value in its main determinants, however, the APV method allows to isolate the effect of debt and to adopt different discount rates for each components. Differently from the traditional DCF model, which incorporates the tax benefit of debt in the after tax cost of debt and the bankruptcy costs in both the pretax cost of debt and the levered beta (Damodaran 2009a), the APV model forces the analysts to explicitly estimate the consequences of distress on value and represents an easier solution to the computation of different WACC for each year in case of changing capital structure. In addition, the APV model allows to assess the impact of debt on firm valuation in absolute terms that, as suggested by Damodaran (2009a), is easier and more precise than focusing on debt to value ratio, since firms generally state their target debt in dollar value term rather than as a proportion of market values. On the other hand, the adoption of the APV model still

requires the computation of firm's probability of default and bankruptcy costs, that, as already mentioned, is quite complex.

2.4.3 Capital Cash Flow method

As discussed in the previous paragraph, the tax benefit of borrowing can be discounted by either the cost of debt or the unlevered cost of equity, depending on the firm's debt policy. While the original version of the APV method proposed by Myers (1974) relies on the adoption of the cost of debt as discount rate, a modified version of the model, developed by Ruback (2002) and known as Capital Cash Flow method (CCF) or compressed APV method (Arzac 2005), suggests the use of the unlevered cost of equity when calculating the present value of tax savings generated by interest payments.

According to the CCF method, when a company actively balances its capital structure to maintain a fixed debt to value ratio, the interest tax shields have the same risk as the firm and, therefore, both interest tax shields (ITS) and free cash flow (FCF) should be discounted at the unlevered cost of equity (k_u), according to the following formula (Altman and Hotchkiss 2005, Koller et al 2015):

$$Firm's\ value = \sum_{t=1}^{\infty} \frac{FCF_t}{(1 + k_u)^t} + \sum_{t=1}^{\infty} \frac{ITS_t}{(1 + k_u)^t} = \sum_{t=1}^{\infty} \frac{FCF_t + ITS_t}{(1 + k_u)^t} =$$

$$= \sum_{t=1}^{t=1} \frac{Capital\ cash\ flow_t}{(1 + k_u)^t}$$

where capital cash flow measures the after-tax cash generated by the assets and available to all capital providers, including the interest tax shield. As suggested by Ruback (2002) and illustrated in *Figure 2.2*, CCFs can be computed starting from either net income (NI) or earnings before interests and taxes (EBIT).

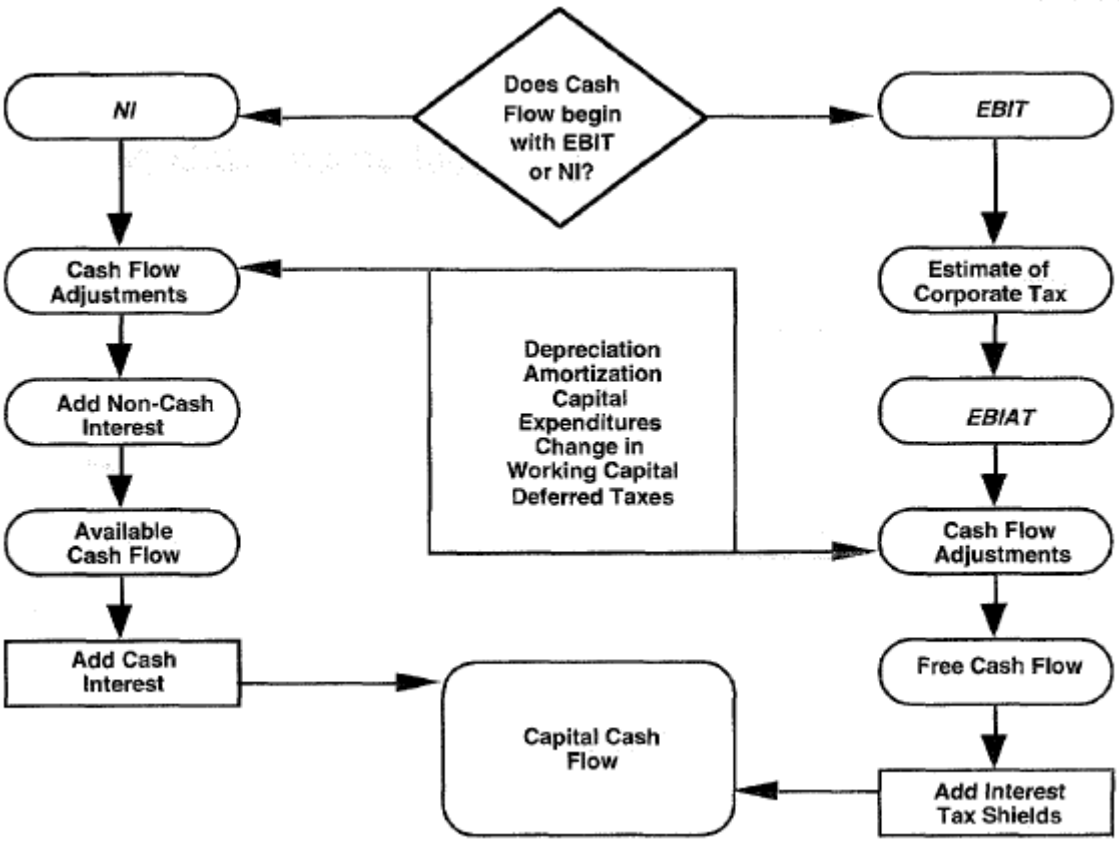

Figure 2.2 – Capital Cash Flows calculation. *(Ruback 2000)*

When estimating the firm's value after the explicit forecast period, however, the assumption that the capital cash flows grow at a constant rate in perpetuity, starting from the last year of projections, can be uncorrected when dealing with distressed firms. In this regard, Gilson et al. (2000), analyzied 63 firms emerged from corporate restructuring and valuated them on the basis of the cash flows forecasted in the reorganization plan. They observed that 79% of the sample firms reported unused net operating loss carryforward (NOLs) at the end of the explicit forecast period and, therefore, they proposed to estimate the terminal value in two parts:

- in the first part the explicit projections are extended and the use of NOLs by the firm is forecasted until the NOLs are used up or expire;
- in the second part, a growing perpetuity formula is adopted to estimate the value generated by capital cash flows in the years following the extended projections period.

As suggested by Altman and Hotchkiss (2006) and Gilson et al (2000), the CCF method can be very helpful when valuating distressed firms. Even though Ruback (2002) demonstrated that, when based on the same information and assumptions, DCF and CCF models give rise to equivalent results, the CCF method is easier to implement when the firm's capital structure is

expected to change. While the unlevered cost of equity depends on the riskiness of the firm's assets, and, therefore, is independent from capital structure variations, the WACC adopted in the DCF model would have to be recalculated each year. In addition, by allowing to explicitly model tax shields, the CCF method is better suited for dealing with complex tax situations that generally characterize firms subjected to restructuring or going into bankruptcy. By adding tax shields to the cash flows generated by the company in each year, however, the valuation of the firm's operating performance over time and across competitors is less straightforward when using CCF model rather than DCF model (Koller et al. 2015). The latter, indeed, by keeping NOPLAT and FCF independent of leverage, allows to better understand whether the distress condition results from operating inefficiencies, overwhelming debt burden, or a combination of both.

By comparing the CCF model with the first version of APV model, instead, it results that the choice of the more appropriate method depends on the firm's debt policy (Ruback 2002). The APV model, by discounting the interest tax shields at the cost of debt, assumes that the debt is fixed and independent from the firm's value. Therefore, it should be adopted when the firm doesn't plan to change the dollar value of debt in the future, e.g. given the presence of tax or regulatory restrictions on debt, and it will result into a higher firm's value in respect to the output of the CCF models, since it treats the interest tax shields as less risky than firm's assets. The capital cash flow method, instead, assumes that debt is proportional to value and, therefore, it is more appropriate when financial forecasts are made in term of target debt to value ratio.

2.4.4 From Enterprise Value to Equity Value

Once estimated the business enterprise value, that is the value generated by firm's core operations, through one or more of the above mentioned methods, enterprise value can be calculated by adding to business enterprise value the value of non-operating assets. Debt, other non-equity claims and minority interests are then subtracted from the enterprise value in order to arrive to equity value.

When estimating equity value starting from the computation of enterprise value, therefore, it becomes necessary, among other things, to determine the market value of debt. If the debt instrument is not traded or an observable market value is not readily available, the book value of debt can be considered as a reasonable approximation of market value, when no significant changes have occurred in default risk and in interest rate, since debt issuance (Koller et al. 2015). When the company is financially distressed, however, default risk is significantly

higher than at the time in which debt was issued, and, thus, the debt trades or is valued at a discount to the book value. In case of companies in financial distress, therefore, other approaches should be used for estimating the market value of debt, which needs to be frequently updated, given that default risk can change substantially from period to period (Damodaran 2009).

Unfortunately, however, as argued by Bohn (2000), empirical analysis in the field of risky debt valuation are few and far between, since most corporate finance studies have focused on the development of complex theoretical models with little practical applicability, as it will be described in *paragraph 2.6.1*. Even though building a simple, yet comprehensive, model for risky debt valuation remains, therefore, an open challenge and "an elusive and alluring venture" (Bohn 2000, p. 53), there are some practical solutions that can be adopted to estimate debt economic value in distressed firms.

The first approach consists on applying a DCF model to cash flow to creditors (FCD), by discounting interest payments and principal repayments at a rate that reflects the riskiness of the debt (Arzac 2005, Koller et al. 2015). While cash flow to debt can be estimated on the basis of the debt reimbursement schedule forecasted in the restructuring plan, the quantification of the market cost of debt is more complex, since it may be different to the rate of return agreed with creditors in the plan. It is typical in financial maneuvers, indeed, to negotiate with creditors a favorable condition for the firm to foster its recovery as a going concern (Buttignon 2014).

In order to solve this estimation issue, Buttignon (2014) suggests to adopt the following iterative process:

1. Start from the operating income (EBIT) forecast in the reorganization plan
2. Calculate the financial expense by multiplying the market cost of debt, which is computed in point 5, to the average debt amount, calculated as the average between the debt level at the beginning of the year and the debt level at the end of the year.
3. Calculate the debt coverage ratio (EBIT/interest expenses).
4. Forecast the debt rating class, on the basis of the previously computed debt coverage ratio, and the associated credit default spread.
5. Estimate the market cost of debt by adding to previously found credit default spread the risk-free rate.
6. Multiply the market cost of debt for the debt being restructured in order to compute the financial expenses.

Once estimated, the market cost of debt is then used to discount the FCD forecasted in the plan, obtaining, in this way, the economic value of debt. If the latter is lower than debt nominal value, the difference represents the sacrifice asked to creditors to foster business continuity and, at the same time, the benefit generated by debt restructuring plan for shareholders.

An alternative approach relies, instead, on the option pricing model developed by Black and Scholes (1973). In this case, the equity is viewed as a call option on firm's assets, or, from an alternative perspective, but with equal estimate results, the risky debt is conceived as the combination of default-free debt and a put option implicitly sold to shareholders by creditors[16] (Bohn 2000). Indeed, as better explained in *paragraph 2.6*, if at the debt maturity the enterprise value is lower than the face value of debt, the shareholders can leave the company in the creditors' hands, which is equal to exercise a put option consisting on divesting assets at a strike price equal to the debt nominal value. In distressed firms, the conditions granted to shareholders by creditors in the restructuring plan can give rise to a value of this put option, that is positive for shareholders but negative for creditors (Buttignon 2014). Anyway, creditors are willing to bear this sacrifice when they recognize the firm's continuation as a going concern as the solution, among other alternatives (as firm's liquidation), giving rise to the highest debt value.

By applying the Black and Scholes formula for pricing a call option (see *paragraph 2.6*), an estimate of the firm's equity value is derived and then used to compute the market value of debt, by subtracting the equity value to the enterprise value. Or, equivalently, the market value of debt can be directly computed by adopting the pricing formula for a put option, and subtracting the put option value from the face value of debt.

Also this approach, however, is not free from limitations and estimation issues, which are more in depth discussed in *paragraph 2.6*. Limitations, indeed, are inevitable when attempting to capture the often complex debt structure of distressed firms through simplified, but practical, valuation approaches. When option pricing model simplified assumptions are attempted to be overcome in more complex theoretical model (an overview of which is offered in *paragraph 2.6.1*), indeed, the tractability of the valuation technique results, finally, to be sacrificed at the altar of realism (Bohn 2000).

Another difficult challenge that has to be faced when moving from enterprise value to equity value consists on the estimation of claims that are neither straight bonds nor common stocks.

[16] Shareholders, indeed, pay the cost of the put option in the form of higher cost of debt due to the increase in default spread.

Creditors of distressed firms, involved in the negotiations for debt restructuring, indeed, can finally decide to favor the firm continuation as a going concern, by accepting, for instance, a write-off of their debts. In exchange of this concession, however, creditors usually obtain equity rights or quasi-equity rights such as convertible bonds and warrants, which contribute to make the firm's capital structure even more complex, giving rise to further valuation issues. The valuation of hybrid securities, indeed, is not straightforward since they share some characteristics with equity and some with debt. For convertible bonds, for instance, the above mentioned method of applying the DCF model to cash flows to creditors doesn't give rise to a good proxy of convertible bonds value, since this method doesn't capture the value of the option to convert them into common equity at a predetermined conversion ratio (Koller et al. 2015). Alternative approaches can consist in assuming that all convertible bonds are immediately exchange for equity (conversion value approach) or in using the market value of such bonds (market value approach). While the first approach ignores the time value of the option, the second one is inapplicable when convertible bonds are not traded and inappropriate when, as happens in case of distressed firms, the company is expected to undertake operating change that will modify the firm's enterprise value, on which the value of such securities depends. According to Koller et al. (2015), a recommended solution consists, instead, on disaggregate the value of convertible bond into a straight debt component and an option to convert which value is estimated through the Black and Scholes' option pricing model.

The latter is also usually adopted for the estimation of the value of warrants, which are securities giving to the holder the right to buy or sell firm's shares at fixed price before expiration. Unlike standard options, even though they are like options on many aspects, warrants exercise dilutes the equity claims of existing stockholders. Their exercise, indeed, involves the issuance of new stocks by the firms, leading to an increase in the number of shares outstanding and a reduction of stock price. As a consequence, adjustments in the Black and Scholes formula are required in order to adequately reflect the dilution effect on the current value of the stock price due to the exercise of warrants.

In conclusion, moving from enterprise value to equity value can be quite a tough task when valuing distressed firms, since the implementation of financial restructuring plan frequently results into a more complex debt structure and creates a gray line between debt and equity.

2.5 Market approach

The third approach that can be used to value distressed firms is the market approach or relative valuation, which involves the computation of firm's value (enterprise value or equity value) by comparing the analyzed company to the value assessed by the market for similar or comparable firms, through the use of multiples. The main assumptions underlying this valuation technique, as stated by Gabehart and Brinkley (2002, p. 39), is that companies considered similar in terms of factors such as revenues, cash flows and risk and operating in the same industry, "should react in the same way to market forces and enjoy a definite if not strong correlation in business value". By measuring relative and not intrinsic value, therefore, valuation based on multiples is more likely to reflect the current mood of the market, in respect to the income approach. This characteristic explains the widespread use of this technique, alongside the increasing availability of information about market prices resulting from the rise in M&A transactions and the possibility to easily apply this valuation method also in context in which making forecasts is complicated, since it requires fewer assumptions than DCF method.

Concerning its application. the multiple valuation method involves a three-steps process (Monti 2005, Ratner et al. 2009).

1. Select the comparable firms.

This is the most critical aspect of the analysis, given the impossibility to identify companies identical in terms of risk and growth to the firm being valued. For this reason, the comparability of firms forming the peer group has to be based on quantitative factors, such as ROIC, size, sales growth, assets composition, capital structure and financial risk, and qualitative factors, such as competitive position, business model, and stage in the firm's lifecycle (Borsa Italiana 2004). In addition, comparable firms should operate in the same industry of the firm being valued and can be identified on the basis of the SIC codes. However, if the firms belonging to the industry are not comparable in term of the above mentioned factors, peers can also be identified in different sectors, as long as their risk-return profile is similar to the one of the firm being valued. This second solution is generally adopted for valuing a distressed firm when the firms operating in the same industry of the company being valued are healthy and growing. Troubled firms operating in different industries, however, can be in a different position, in terms of proceeds generated from a distressed sale, justifying, therefore, differences in their multiples (Damodaran 2009). In addition, regardless the industry to which the peer belongs to, whenever competitors are

classified as distressed or not distressed in order to identify a group of comparables, there is the risk to select firms at a different stage of the crisis path, without considering the differences in valuation implied by the different levels of crisis. Finally, distressed firm multiples often have an inappropriate sign and are subjected to sharp changes over short time periods, making them not reliable for valuation purpose (ABI, 1999).

2. Select the most significant multiples and calculate them for comparable firms.

The most meaningful multiples are the ones that best represent the company's capacity to generate value. According to Guatri and Bini (2009), multiples can be grouped in:

a) Equity side multiples, in which the numerator is the share price or the company's market capitalization, such as P/E, P/S, P/B.
b) Asset side multiples, in which the numerator is the firm's enterprise value, such as EV/EBIT, EV/EBITDA, EV/S.

Pros and cons can be identified in the adoption of each multiple. P/E, for example, is widely used because it is easy to calculate and it represents a good approximation of the company's profitability. Furthermore, it can be computed with respect to the last twelve months earnings (trailing P/E) or to the earning forecasted for the next year (forward P/E). This multiple, however, is affected by the firm's capital structure, accounting policies and non-operating items, making preferable to use the EV/EBITDA multiple which neutralizes the differences in terms of accounting, fiscal and financial policies across firms (Koller et al. 2015, Arzac 2005).

The negative earnings, margins and book value that generally characterize declining companies, however, make impossible and meaningless the use of such multiples for the computation of the distressed firm value.

A first possible solution to this problem, may be the adoption of revenues multiples, since revenues cannot be negative. These multiples, however, ignore valuable information about firm's operating efficiency, frequently leading to misleading valuation (Damodaran 1994). A second alternative to circumvent the problem of negative multiples could be the calculation of forward multiples or the application of multiples, based on healthy comparable firms' current data, to future measures of the target company's value, such as future earnings. As suggested by Altman and Hotchkiss (2006) indeed, in case of firm restructuring, it is more useful to apply the multiple to the firm measure of value at the first projected year that reflect normalized operations, then discounting the resulting firm's value at the valuation date. This solution however, takes the success of the restructuring plan and the firm continuation as a

going concern for granted, assumption that shoud be deeply investigated when dealing with distressed companies.

Regardless of the type of multiple chosen, however, the multiple has to be consistently defined, which means that both the numerator and the denominator should refer to the same claimholders in the company, and be uniformly estimated across comparable firms (Damodaran 2002).

Once selected the most significant multiples, they need to be calculated for all the firms in the sample.

3. Apply the multiple to the target firm.

This step generally involves the calculation of the mean or median of the multiples computed for comparable firms in order to determine the multiple that is then applied to the key measure of the target firm to estimate its equity or enterprise value. This multiple is often obtained through a weighted average where higher weights are applied to the multiples of those companies judged more similar to the firm being valued (Monti 2005). When valuing a distressed firm, however, the higher value resulting from the multiples method in respect to the market capitalization may not be interpreted as a signal of the fact that distressed firm's stock are undervalued by the market. Analysts, indeed, may conclude that the firm trades at a significant discount on the industry average because it has a higher default risk than the average firm (Damodaran 2009). A way to limit the subjectivity implied in valuation by this particular interpretation, consists, according to Damodaran (2009), on explicitly incorporating the possibility of distress by computing the firm value as follows:

$$Firm\ value = Going\ concern\ relative\ value * (1 - \pi_{Distress}) + Distress\ sale\ value * \pi_{Distress}$$

where going concern relative value is estimated by applying the average or median multiple calculated from healthy companies comparable to the distressed firm, while the probability of default and the distress sales value should be calculated according to the techniques proposed in *paragraph 2.2.2* and *paragraph 2.2.4*, respectively.

Finally, another commonly used relative valuation model is the comparable transaction approach, which is similar to the comparable company approach, but it derives the value of the firm from the prices paid in recent acquisitions of comparable companies. This approach, therefore, requires that comparable firm acquisitions have recently taken place under the same market conditions prevailing at the date of the company valuation. In addition, the acquisition price generally also reflects other elements than the stand alone value of the target firm, such as a control premium. No control premium, however, should be considered in distressed firm

valuation when the equity interests will be dispersed as a result of the restructuring plan implementation (Crystal & Mokal 2006). If included, indeed, control premium and other elements of the purchase price additional to the stand alone value, will lead to a higher estimate of firm value, while Altman and Hotchkiss (2006) suggest that the acquisition of bankrupted firms generally occurs at a discount in respect to the price paid for similar non-bankrupted companies.

To the limitations arising from the adoption of the market approach in a distress setting, however, it is necessary to add the shortcomings of the method itself. First of all, its ease of use can lead to applying the valuation technique in a superficial way, conducting to erroneous conclusions. Secondly, being a market based valuation, relative valuation can be inaccurate when the market is incorrectly pricing the comparable firms. Thirdly, subjectivity is involved in the selection of firms forming the peer group. Despite these limitations, however, Koller et al. (2015) suggest that relative valuation can be used to triangulate the DCF results, providing a useful market check on the forecasts at the basis of the DCF.

2.6 Option pricing model

When the face value of debt is higher than the firm's enterprise value estimated through asset approach, income approach or market approach in a going concern or liquidation scenarios, someone may incorrectly suggest not only that the equity is worthless, but also that the shareholders should pay out of their pockets what the company still owes to creditors. This suggestion, first of all, is in contrast with the limited liability principle which provides that equity investors are liable only to the extent of capital that they have invested in the company, avoiding, therefore, that they lose more than their investment. Secondly, as suggested by Damodaran (2009), even when the firm's value is lower than the debt value, the equity is not worthless since it is possible that the assets value increase above the debt value before payments become due. To capture the equity value in highly leveraged company, therefore, the only solution might consist on viewing the equity as a call option on the distressed firm. The limited liability principle and shareholders' possibility to liquidate the firm's assets and repay creditors at any time, indeed, gives to equity the features of a call option.

A call option is a security giving its owner the right to buy the underlying asset at a given (exercise or strike) price on or before the expiration date (Merton 1973). If the asset value is

higher than the strike price, the option is exercised and the buyer of the option earns a (gross[17]) profit equal to the difference between the asset value and the strike price. On the contrary, if the asset value is lower than the strike price, the contract expires worthless, since the option is not exercised, and the buyer of the option only loses the price paid for the call. Similarly, the call option dynamic applies to equity investment in case of firm's liquidation. The overwhelming debt level and covenants, combined with the firm's inability to eliminate or cut operating inefficiencies, indeed, can force the equity holders to liquidate the distressed firm's assets. If the firm value (i.e. the value of the underlying asset) is higher than the face value of debt (i.e. the strike price), the equity holders receive the remaining cash, after all other claimholders have been satisfied, while, if the firm value is lower that the value of the outstanding debt, the equity investors payoff is zero, since they cannot lose more than the capital they have invested in the firm, given the limited liability principle.

In case of liquidation, therefore, the payoff to equity can be schematized as follows (Damodaran 2009):

$$\textit{Payoff to equity on liquidation} = \begin{cases} V - D & \text{if } V > D \\ 0 & \text{if } V \leq D \end{cases}$$

where V = Firm value
D = Face value of firm's outstanding debt and other non-equity claims

and it replicates the payoff structure of a call option, as shown in *Figure 2.3*.

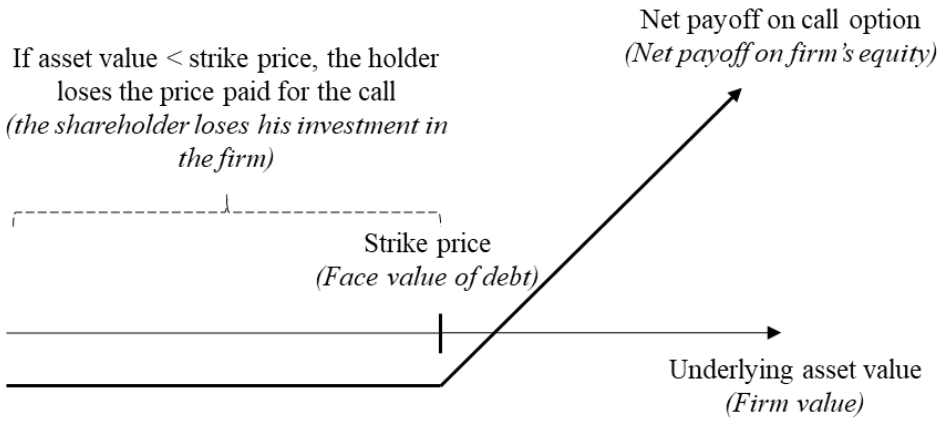

Figure 2.3 – Payoff of equity as call option on firm value. *(Personal elaboration from Damodaran 2009)*

[17] The gross profit has to be reduced of the price initially paid for the call in order to compute the net profit of the investment.

Equity, thus, can be viewed as a call option on the firm and its value can be computed by applying the pricing formula for a call option developed by Black and Scholes (1973):

$$C = SN(d_1) - Ke^{-rt}N(d_2)$$

$$d_1 = \frac{ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

where $N(d_1)$ and $N(d_2)$ are probabilities estimated on the basis of a cumulative standardized normal distribution and the values of d_1 and d_2 obtained for an option. These probabilities, accordingly to Damodaran (2002), yield the likelihood that an option will generate positive cash flows for its holder when exercised, i.e. when S>K in the case of a call option.

As captured by the Black and Scholes formula, the determinants of the call option value are (Damodaran 1994, Resti and Sironi 2007):

- the current value of underlying asset (S), that is equal to the value of the firm when valuing equity as an option. An increase in the value of the asset will rise the value of the call, since it gives the right to buy the asset at a fixed price;
- the volatility (standard deviation) of the underlying asset value (σ). Higher the standard deviation, greater is the value of the option, since its owner can potentially earn significant return from large price fluctuations and cannot lose more than the price paid for the call;
- the strike price of option (K), which is equal to the face value of debt when the firm's equity is viewed as an option. Higher the strike price, lower is the call option value;
- the time to expiration of the option (t), which coincides with the residual maturity of the debt when valuing firm's equity as an option. The longer the time to expiration, the greater the value of the call option since as this period of time increases, more is the time for the underlying assets value to rise above the strike price;
- the risk-free interest rate corresponding to the life of the option (r). For the buyer of the option, the payment of the purchase price for the contract option involves an opportunity costs, which depends on the level of the risk-less interest rate. In particular, the higher the risk-free rate, the greater the value of the call option.

The application of the Black and Scholes model to valuing firm's equity, however, is based on the following assumptions (Damodaran 2009):

1. there are only two groups of claimholders in the firm: shareholders and debtholders;
2. there is only one issue of debt and it can be retired at face value;
3. the debt is a zero coupon debt with no special features as convertibility or put clauses;

4. firm's enterprise value and its volatility can be estimated.

The main purpose of these assumptions is not only to simplify the valuation process, but also to make the determinants of equity value more in line with the features of a call option. On the one hand, assuming that the debt has a zero coupon and that no more than one debt issue is outstanding prevents the firm liquidation before the debt maturity date because of the firm's inability to meet its earlier coupon obligations. In this way, these simplifying assumptions make possible to apply the Black and Scholes model when valuing the firm's equity, since this model, in its original version, can be used only for European option, which can be exercised only at expiration. In addition, Arzac (2005) suggests that assuming that equity holders cannot default on their debt prior to the date at which they come due implies that the firm can refinance interim cash shortfalls. This is not unrealistic as long as "HLFs [high leverage firms] can tap credit lines or additional subordinated financing in order to cover temporary cash shortfalls" (Arzac 2005, p. 103).

On the other hand, the first three assumptions reveal the inability of the model to deal with the complex capital structure that generally characterizes distressed firms. The restructuring plan implemented in order to overcome the crisis, indeed, frequently involves debt write-off in exchange of quasi-equity rights, such as convertible bonds or warrants, but also the creation of different debt layers.

Some solutions, however, can be adopted in order to value the company's equity through the Black and Scholes formula when the firm's capital structure is more complex than the one designed by the simplifying assumptions surrounding the model. When the firm has multiple debt issues and much of the debt requires coupon payments, Damodaran (2009) suggests to calculate the residual maturity of the firm's debt by computing the weighted average of the durations or maturities of each debt issue, using the debt issues face value as weights. In case of multiple issues, the face value of the debt, which represents the option strike price, instead, can be computed by adopting one of the following solutions (Damodaran 2009):

1. Adding up the principal due on all of the firm's debt.
2. Summing interest and coupon payments with principal payments.
3. Considering only the principal payments on debt, while the interest payments, expressed as percentage of the firm yield, take the place of the dividend yield in the option pricing formula.

All these approaches, however, present some limitations. While the first approach doesn't consider interest and coupon payments, underestimating the true value of debt, the second approach mixes cash flows arising at different point in time and the third approach requires to

adopt a variation of the original Black and Scholes formula (1973) that considers dividend payments.

An alternative solution which takes into account the timing of cash flows, even if in a simplified way, is proposed by Buttignon (2014) and involves:

a) the calculation of the present value of the cash flows to creditors forecasted in the restructuring plan, by discounting them at the risk-free rate and assuming this as the debt's initial value;
b) the estimation of the weighted duration of debt;
c) the calculation of the debt face value upon maturity by assuming it as equal to the initial debt (computed in point *a*) capitalized at the risk-free rate over a period equal to the duration of debt.

Concerning the fourth simplifying assumption of the model, instead, Damodaran (2009) proposes different approaches to estimate both firm's value and its variance.

As regard the firm's value, it can be computed through one of the following methods:

1. Summing the market value of debt and equity. This approach, however, will lead, through the application of the option pricing model, to market values different from the initial ones, and therefore, it is internally inconsistent.
2. Discounting expected cash flows at the cost of capital through the DCF model by considering only existing investments, since the firm value in an option pricing model should reflect the firm's liquidation value.
3. Applying a revenues multiple estimated for healthy firm in the same business to the firm's revenues.
4. Summing the value of firm's assets. This approach can be adopted only when the assets are individually traded in the market.

The variance in the firm's value, instead, can be directly estimated if firm's bonds and stocks are traded in the market, according to the following formula:

$$\sigma_{firm}^2 = w_e^2\sigma_e^2 + w_d^2\sigma_d^2 + 2w_e w_d \rho_{ed}\sigma_e\sigma_d$$

where w_e and w_d are the market value weights of equity and debt, respectively, σ_e^2 and σ_d^2 are the variance in the stock and bond price, respectively and ρ_{ed} the correlation between the stock and bond price.

When the firm's bonds are not traded, the variance in the firm's bonds and the correlation between the stock and bond prices can be estimated on the basis of similar rating bonds.

When the firm is distressed, however, stock and bond prices become more volatile, leading to misleading results and making more appropriate to use the average variance in firm value for

other firms operating in the same industry or to estimate firm value volatility through the application of Monte Carlo simulation to DCF model (Buttignon 2014).

Alongside its limitation, however, the adoption of the option pricing model to value corporate securities (Merton 1974) presents different strengths.

First of all, the application of this model, produces a very interesting output that is the risk neutral probability of default:

$$Risk\ neutral\ probability\ of\ default = 1 - N(d_2)$$

where $N(d_2)$ is the risk neutral probability that the firm's assets value is higher than the face value of debt.

Secondly, even though it is based on simplifying assumptions that require to make some compromises when dealing with distressed firms, valuing the equity as an option through the Black and Scholes model still remains a helpful valuation method when the face value of debt is higher than firm value, as it frequently happens for financially and economically distressed firms. The option pricing model, indeed, is able to capture the value generated by the time premium of equity. The firm value volatility and debt time to maturity, indeed, might lead the firm's enterprise value to exceed the face value of debt in the future, giving rise to a positive equity value.

Finally, by directly valuing the equity, the option pricing model doesn't require to the analyst to estimate the market value of no traded debt, task that can be very challenging in particular in case of distressed firms, where the implementation of subsequent financial restructuring plans, as attempts to overcome the crisis, frequently results into complex debt structure.

2.6.1 Incorporating strategic factors: further developments in the option pricing framework

In the years following the publication of the Merton's model (1974) for the valuation of corporate securities though the option pricing theory, several academics and researchers started to propose some revised versions of the original model with the aim of increasing its applicability to real-world cases, by releasing some of its underlying assumptions.

The first important contribution in this field of the literature comes from Black and Cox (1976). These authors, being aware that "actual securities indentures have a variety of conditions that would bring new features and complications into the valuation process" (Black and Cox 1976, p. 351), first postulated that default can occur before debt maturity date, at the first time that the firm's assets value fall below a specific time-dependent barrier. This happens when debt contract includes safety covenants giving to the bondholder the right to

liquidate the firm whenever it is performing poorly according to some standards. Such right, according to Black and Cox's findings, positively impacts the bond's price, since it provides a floor value for the bond which limits the stockholders' gains deriving from somehow circumventing the other contractual restrictions.

Black and Cox (1976), in addition, dealt with the presence of subordinated arrangements in debt valuation, by identifying junior debt special characteristics in respect to senior debt. First of all, differently from senior bonds, which are always a concave function of firm's value, junior bonds become a concave function only for larger firm's value (and it is convex before). In addition, higher volatility in firm value increases junior debtholders chances to get a higher reimbursement, since it is subordinated to senior claimants' repayment. Furthermore, since junior debt may result to be worthless at the maturity, when such a development is imminent, it will be in the junior claimholders' interest to try to extend the maturity date of the entire bond issue. Unlike senior bonds, therefore, junior bonds' value is increasing on volatility and time to maturity. As a consequence, under some circumstances, whenever managers propose projects which are expected to affect the riskiness of firm's investment policy, these different features of junior and senior bonds may give rise to conflicts of interest among bondholders.

The results of Merton (1974) and Black and Cox (1976) were then extended by Leland (1994) to include taxes and bankruptcy costs in the valuation of debt, which is instrumental for the determination of the optimal capital structure in Leland's study. In particular, Leland (1994) came back to Black and Cox's realistic assumption of possible firm default before debt maturity date, suggesting that bankruptcy can be triggered endogenously by managers, who are assumed to act in the shareholders' interests, when they believed it is optimal for equity holders not to service debt anymore, on the basis of shareholders' equity upside and expected recovery rate (if any) in case of default. As highlighted by Charitou and Trigeorgis (2004), indeed, default can have a voluntary or involuntary nature, and, in both cases, be triggered at an intermediate stage, before debt maturity. According to their model, developed in a compound option framework, equity holders can decide to voluntary/strategically default, just before the next payment is due, if their option value deriving from continuing as a going concern is not sufficient to cover the next interest and debt repayment. On the other hand, default may also be involuntary triggered at an intermediate stage because of the presence of liquidity issues, which is signaled, according to Charitou and Trigeorgis (2004), by lower than 1 cash flow coverage ratio (CFC), computed as the ratio between cash flows from operations and the difference between debt to be serviced and available cash and cash equivalent.

The above mentioned models, however, even if they relaxed some of the Merton's model simplified assumptions, share two main limitations affecting their applicability in the real cases. First of all, they explicitly model only the behavior of managers/shareholders, without any choice left to other players, and, secondly, they assume liquidation as the only consequence of default, even if a renegotiation of claims often occurs in distress setting.

These limitations were firstly overcome by Anderson and Sundaresan (1996), which studied debt contracts valuation and design in an extensive form game framework. According to the game, at any given time the debtor chooses the amount of debt service, which can assume values from 0 to the amount of cash flows available at that time. If the chosen debt service level is equal or higher than the contracted debt payment, the game moves forward to the next step. Otherwise, the creditor can decide whether to reject the debt service and initiate a legal action, thus obtaining the liquidation value less the liquidation costs, or to accept the debt service and let the game continue to the next date. Differently from the previous approaches, therefore, default does not necessarily imply liquidation and the creditors can decide to renegotiate the debt contract in an out-of-court workout. In particular, as found by Anderson and Sundaresan (1996), the equilibrium value of this game frequently results into claims renegotiation with a deviation from absolute priority rule in favor of equity holders. The costliness of liquidation, indeed, often induces creditors to accept deviation from promised payments and, therefore, provides greater scope for opportunistic debt service.

Similar results were achieved also by Mella-Barral and Perraudin (1997) which extended the Anderson and Sundaresan's model (1996) into a continuous time framework. Their study shows that when equity holders are able to make debt holders take-it-or-leave-it offers of coupon payments, strategic debt service will persist until the firm either is liquidated or recovers sufficiently to force shareholders to repay the full promised interests and debt installments (otherwise the liquidation value will be so high that creditors will surely wish to cease firm's operations if given the opportunity). Their analysis, in addition, stressed the key role played by bankruptcy costs and scrapping values in favoring equity holders' strategic behavior in debt service. When bankruptcy costs are substantial and assets liquidation values low, indeed, equity holders can extract concessions from debt holders even in time in which the firm is making significant profits. This insight was further corroborated by the study of Fan and Sundaresan's (2000), who provided a framework of debt renegotiation which allows to take into account variation in equity holders and debt holders bargaining power. Their findings, indeed, point out that higher bankruptcy costs, as well as higher equity holders'

bargaining power, provide an incentive for the company to reorganize early and with greater deviations from absolute priority rule.

A third consequence of default, alternative to the liquidation and private workout solutions analyzed in the models of Anderson and Sundaresan (1996), Mella-Barral and Perraudin (1997) and Fan and Sundaresan (2000), then, consists on filing for court-supervised restructuring. This solution differs from liquidation and out-of-court reorganization in several dimensions, among which the treatment of claimholders in default, that affects equity holders' incentive to default and, therefore, corporate securities values. In particular, in-court reorganization was firstly analyzed in a contingent claim framework by Francois and Morellec (2004), whose model accounts for the possibility that default can lead to either immediate liquidation or debt renegotiation under court protection according to Chapter 11. As pointed out by the authors, Chapter 11 filings lie in between liquidation, under which no renegotiation takes place and firm's assets are liquidated, and private workout, which allows for claims renegotiation without any time constraints. Under Chapter 11, indeed, claimholders can renegotiate their claims but for a limited period of time (observation or exclusivity period) granted by the court. During this time period, the court guarantees the firm's continuation as a going concern, also thanks to the automatic stay of assets that prevents creditors from enforcing legal actions on firm's assets. Then, after having valued the feasibility and validity of the reorganization plan proposed by the debtor, also by verifying whether the firm has shown signals of recovery during the observation period, the court, at the end of this period, will decide whether to liquidate the firm or let it continue to operate. In particular, Francois and Morellec (2004)'s study pointed out that the length of the observation period affects the endogenously determined default threshold and, therefore, the corporate securities value. Indeed, the default threshold associated with Chapter 11 filing results to be greater, i.e. it occurs early in time, than the default threshold associated with liquidation, but lower than the default threshold associated with private workout. If the default is followed by immediate liquidation, in fact, the decision to default is irreversible and, therefore, it will represent the optimal solution only when equity is worthless. Claim restructuring, instead, allows the firm to continue to operate and, at the same time, to extract concession from creditors, incentivizing, in this way, shareholders to default earlier. Particularly, since the Francois and Morellec's model presumed excursions of firm's assets value below the default boundary as associated with implicit forgiving of contractual obligations, the authors found that longer observation period decreases the probability of firm's liquidation at the end of the period and, therefore, drives up equity holders' incentive to default early to extract more surplus from

creditors. This will result in a maximization of firm's equity, which, however, is no longer consistent with the maximization of firm's total value, as suggested by Broadie et al. (2007). Even if debt renegotiation may be also in the interest of the creditors and the firm as a whole by making possible to avoid costly liquidation, firm value maximization generally requires to file for Chapter 11 later in respect to equity value maximization, since this prolongs the period in which complete contractual payments are performed by the debtor. Specifically, Broadie et al. (2007) stated that this issue can be solved by giving to creditors the right to choose the length of the observation period, after having shown that strategies aimed at debt maximization are qualitatively very similar to the first best strategy, i.e. the strategy that maximizes firm total value subject to the limited liability of equity and debt.

In conclusion, several studies in the literature were dedicated to the development of theoretical models that, starting from Merton's model (1974) insights and shortcomings, attempt to incorporate the strategic interaction between equity holders and debt holders in the valuation of corporate securities. These works, however, are only a small part of the consistent literature arising with the purpose to overcome Merton's model limitations in real world cases. Other lines of research in this field of the corporate finance literature, for instance, focus on incorporating interest rate risk (Brennan & Schwartz 1978, Longstaff & Schwartz 1995) or multiple creditors renegotiation (Hege & Mella-Barral 2005, Dumitrescu 2007) in the pricing of corporates securities, overcoming other simplistic assumptions underlying the first version of the option pricing model.

The main drawback common to all these models rooted in the BSM approach, however, still remains their complexity and scarce applicability in practice, as indicated by the few empirical results. Among the latter, Anderson and Sundaresan's empirical study (2000) seems to suggest that models incorporating endogenous default barriers are somewhat superior to Merton's model, since they provide default probabilities and yield spreads more in line with the historical experience reported by Moody's than Merton's model does. Nonetheless, the limited amount of empirical researches testing in real world cases the different approaches developed starting from Merton's model underlying intuitions and limitations, still make judging their reliability, as well as choosing the best model among them, a very difficult task.

Summing up, different techniques are available to estimate the enterprise value and equity value of a distressed firm. The selection of the most appropriate method, in term of accuracy of the resulting estimate, will depend on the information available, as well as on the characteristics and degree of severity of the firm's crisis. When there is a light at the end of the tunnel, and, therefore a real chance that the firm will survive the crisis period, approaches based on cash flows analysis (DCF, APV and CCF models), with the related precautions and adjustments, are better suited to combine potential positive outcomes of firm's restructuring with its potential inefficiency in ensuring firm's continuation as a going concern. When the distress, instead, is mainly attributed to external causes and it is severe enough to be terminal, the firm value should be determined under a liquidation scenario adopting an asset approach. If the liquidation value, however, is lower than the value of debt, the only approach left to value distressed firm's equity is the option pricing model, which, by capturing the possibility that the highly volatile assets value may increase above the face value of debt before the maturity date, can lead to positive equity value also in highly distressed situations.

Since each of these methods presents some limitations, due to the attempt to capture the complexity of real cases into simple and practical solutions, the use of different techniques and the comparison of the resulting estimates is encouraged in order to assess the accuracy of models' outputs and underlying assumptions. In this context, also the easiest valuation approach, that is the market approach, by reflecting the current mood of the market, provide a useful check on intrinsic valuation results.

CHAPTER 3: The case of Zucchi Group

3.1 Introduction

After having investigated the definition of company in distress and its peculiarities, as well as having explored the valuation techniques applicable to this type of firm, the focus of the dissertation shifts now from theory to practice and involves the analysis of a real case: the case of Zucchi Group.

Zucchi Group is an Italian group operating in the household linen industry, that in the early 2000s started to reveal the first signals of decline. The absence of a prompt reaction to the increasing industry competitiveness, indeed, led to a progressive deterioration of group economic performance from 2004, then exacerbated in 2008 by the outbreak of the global financial crisis. The lacking recovery from economic distress, in turn, ultimately brought the group to a severe financial distress, despite the several restructuring actions undertaken at both the strategic and financial level since 2006.

This chapter starts with the presentation of Zucchi Group and a brief description of the historical milestones of its expansion process undertaken from 1920 to 2006 (*paragraph 3.2*). Starting from 2006, instead, the description of the major events characterizing the group history is combined with an in-depth analysis of the group economic and financial results and ratios, involving also the comparison with the performance of three companies considered as Zucchi Group's peers (*paragraph 3.3*). This analysis allows the study of the evolution of the group crisis and to recognize its main signals, as well as to identify the causes of distress and assess the effects of the restructuring actions undertaken on group performance. In *paragraph 3.4*, then, the focus shifts from past to Zucchi Group current situation through a description of the economic and financial results achieved in 2016 (the last available financial statement is the one contained in the 2016 Annual Report) by the group as a consequence of the current attempt to exit the crisis articulated in the 2015-2020 Restructuring Plan. The main guidelines of the new strategic plan and elements of the connected financial maneuver are then combined with the analysis of the household linen industry performed in *paragraph 3.5*, in order to identify the group's current strengths and weaknesses, opportunities and risks that can drive and affect the future performance and, therefore, the current intrinsic value of Zucchi Group.

3.2 Zucchi Group: structure and history

Zucchi Group is a medium size Italian company operating in the manufacturing and distribution of household linen products. Its product range includes:

- Bedroom products (such as sheets, duvet covers, bedspreads)
- Bathroom products (such as towels, bathrobes, bath mats)
- Living room products (such as sofa covers, table and kitchen products)
- Outdoor products (such as travel robes, travel sheets and beach towels)
- Cotton yarns and unbleached woven fabrics

In addition, it provides dyeing and print works services on behalf of third parties.
The group outsources the main part of the production function, by relying on a wide network of national and international suppliers, and sells its products in domestic and international markets (mainly in European countries), through 2.500 commercial clients operating in the retail and mass distribution channels, 140 shops (both directly managed or by franchisers, among which 100 located in Italy, 8 in Germany and 5 in Switzerland) and 300 shops in shops or located inside department stores. The entire supply chain and in particular the production and logistics steps, however, are directly managed and supervised by the group, granting, in this way, that the offered products and services meet the high quality standards characterizing the group value proposition. The group mission, indeed, is "To produce, distribute and promoting good quality household linen products, with high interior design contents, in order to allow western women (but not only), to decorate their houses in a creative and comfortable way, by investing reasonable financial resources."
Vincenzo Zucchi S.p.a, whose ownership structure is represented in *Figure 3.1*, is the parent company of the group, that is constituted by 9 firms (*Figure 3.2*).

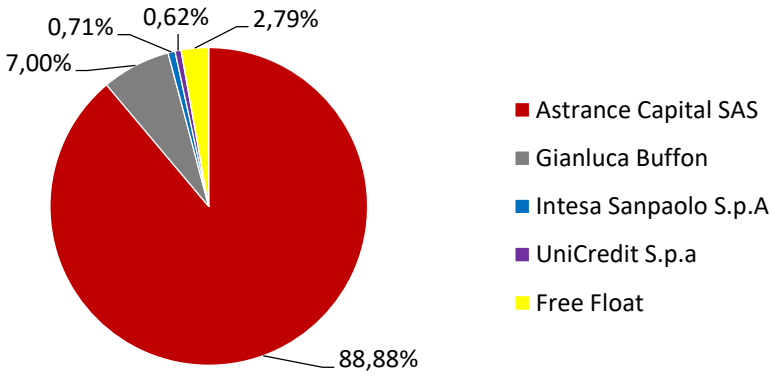

Figure 3.1- Vincenzo Zucchi S.p.a's ownership structure. *(Source: Capital IQ)*

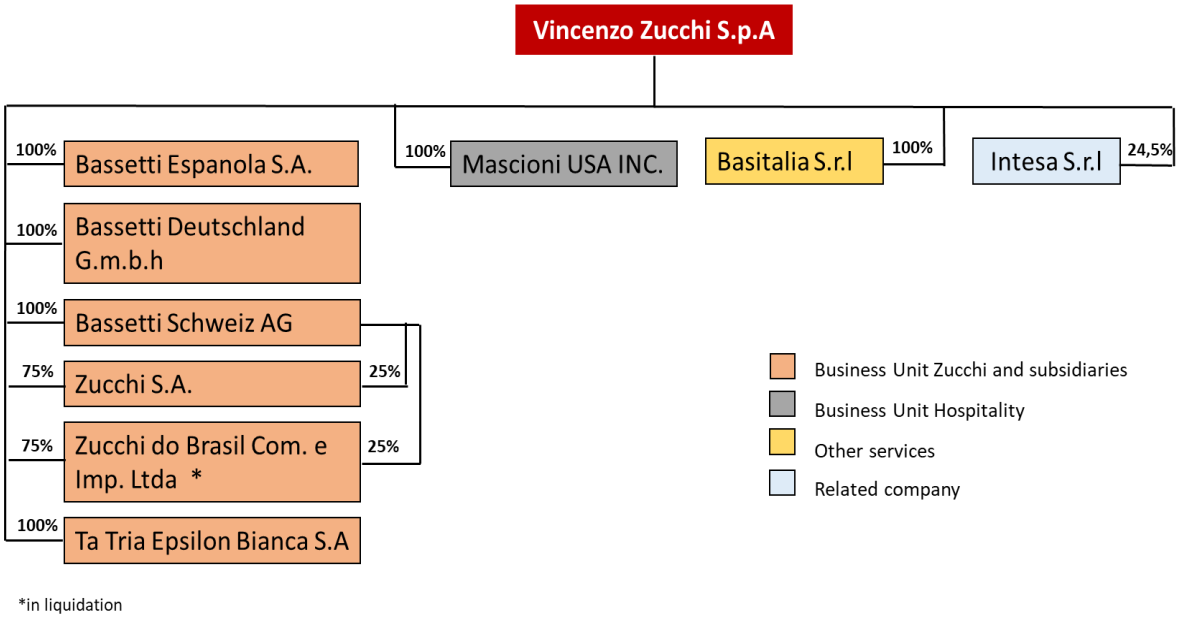

Figure 3.2 – The structure of Zucchi Group. *(Source: 2016 Consolidated Financial Statement)*

In particular, the group activity is carried out through two Strategic Business Units:

- "Zucchi and subsidiaries" Business Unit, which deals with the commercialization of household linen products through the two owned-brand Zucchi (premium segment) and Bassetti (medium-high segment), and a number of licensed brands such as Lacoste, Laura Ashley, Diesel and Tommy Hilfiger. The products are distributed mainly through retailers, mono-brand shops (both directly managed or by franchisers) and mass distribution channels.
- "Hospitality" Business Unit, which handles the sale and marketing of articles for hotels and communities, through Mascioni USA Inc, a company operating in the American market.

Basitalia S.r.l., instead, manages the network of leased and proprietary shops, mainly on behalf of the parent company, while Intesa S.r.l produces fabrics for apparel and household linen industry.

The current group structure is the result of Zucchi Group strategy of growing through acquisitions, pursued in Italy from '60s and abroad in '90s, and of the downsizing and restructuring process to which the group has been subjected since 2005, given the evident signals of decline, then evolved into economic and financial distress, appeared in the early 2000s.

In particular, the origins of Zucchi Group date back to 1920, when Vincenzo Zucchi and a business partner established their first company for the production of linen and cotton linen sheets and tablecloths. Some years later, Vincenzo Zucchi acquired the Casorezzo facility and parted with his business partners, creating in 1953 the company Vincenzo Zucchi S.p.A. In the '60s, the firm started an expansion process by acquiring and merging with companies operating at different stages of the production cycle, with the purpose of increasing Vincenzo Zucchi S.p.A's degree of vertical integration and entering into new markets. In particular, among acquired companies there are B.C.A F.lli Tosi and Manspugna, both specialized in the sponge industry, Bera, firm active in the production of bed linen and Mascioni (55% ownership), worldwide leader in the printing and finishing of wide fabrics. In 1982 Vincenzo Zucchi S.p.a was listed in the Milan Stock Exchange and four years later it acquired 100% of Bassetti, its direct competitor and market leader in Italy. In the '90s, the group started to expand toward foreign markets, by acquiring the French companies Jalla, Descamps (famous in Europe for its single brand stores) and Dorma France (thus acquiring the license on the Laura Ashley brand). In 2000 Vincenzo Zucchi S.p.a created a joint venture with an Indian company (Welspun) for the production of sponge bathrobes and in 2002 it entered into license agreements with Armani, Ferrari, Philippe Starck, while in 2006 Bassetti and Standardtela (which produced standard fabrics for bed sheets) were merged into the parent company Vincenzo Zucchi.

The main pillars of Zucchi Group history from 1920 to the early 2000s are summarized in *Figure 3.3*. The crisis path and the restructuring actions implemented from 2006 to 2015, instead, are in-depth analyzed in the following paragraph.

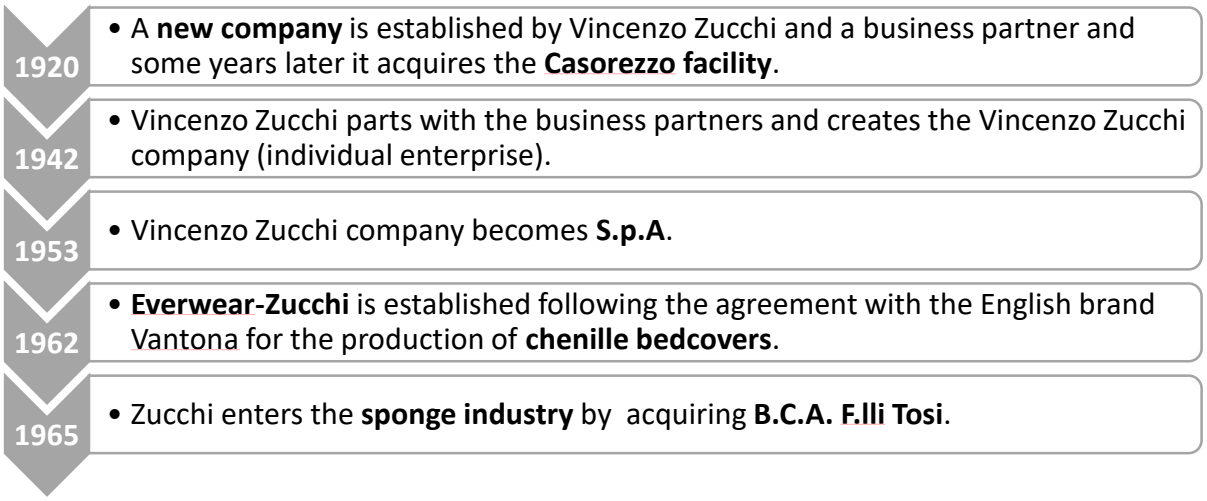

Figure 3.3 Milestones of Zucchi Group expansion.

3.3 The crisis path

The origins of the crisis are rooted in the strategy implemented by Zucchi Group in the '90s that consisted in growing through acquisitions by maintaining unchanged the production and organizational structure of each acquired company. The consequent lack of integration

between the group and the target firms, indeed, not only didn't allow the full value realization of potential synergies, but also resulted into an inefficient and rigid group corporate and production structure. In particular, at the beginning of 2000, the group production structure was articulated in 15 industrial plants located in Italy and France and its industrial logic consisted in supporting and implementing the business of its own brands as well as an intensive production of yarns and fabrics for third parties. When in the early 2000s competitors started to delocalize their production sites in low wage countries, however, Zucchi Group business model entered into crisis. The rigid cost structure, indeed, couldn't allow the group to remain competitive while continuing to earn attractive margins. In the absence of prompt reactions of company's management to the new competitive threat, therefore, the first signals of crisis started to come to light. The increase of imports in textile products from low wage countries, such as Pakistan, India and China, and the weak dollar, which negatively affected the competitiveness of exports toward the U.S. market, caused in 2003 a decline in consolidated sales (-4.15%), determining the beginning of a negative trend in revenues that has characterized Zucchi Group performance until today. In addition to these events, the unexpected decrease in consumption experienced in Italy brought to an even worse sales reduction in 2004 (-8.65%) and strongly contributed to the significant loss of about 17 million suffered by the group in that year. The signals of the crisis became even more alarming in 2005, when the declining sales were just enough to cover operating costs and the loss in the income statement reached about 51 million. In the attempt to break the downward trend, Zucchi Group undertook the first restructuring actions in 2005. These interventions aimed to adapt the group structure to the changes occurred in the household linen industry (the intense competitiveness of imports from low wage countries) and, therefore, entailed the disposal and the closure of some production plants, dedicated to spinning and weaving, in Italy and in France, in favor of an increasing production outsourcing. The restructuring process, then, became more intense in the following years through the continuation of the production structure transformation, which started to reveal its effects in 2006, accompanied by important changes in both commercial area and group structure.

The evolution of the crisis and the connected restructuring actions are analyzed in the next paragraphs by articulating the major events that have characterized the group history from 2006 to 2015 in two different phases:

- Crisis and downsizing (2006-2010). During this phase Zucchi Group concluded its industrial transformation, that entailed the outsourcing of large part of the production function. Despite the restructuring actions undertaken, however, Zucchi Group signals

of crisis became more and more evident, aggravated in 2008 by the outbreak of the global financial-economic crisis. In 2010, instead, the first signals of recovery seemed to appear at the operating level.

- Relaunch and international development (2011-2015). This phase is characterized by two attempts to exit the crisis by boosting revenues, reducing operating costs and making the debt burden less overwhelming: the 2011-2015 Restructuring Plan and the 2013-2017 Restructuring Plan. Despite the latter entailed more radical restructuring actions, that consisted on a debt reduction through a debt-equity swap and on the adoption of a new business model involving, among other things, a group expansion in international markets, the group operating performance continued to deteriorate and financial distress became more and more severe.

For each phase, the group operating and financial performance is analyzed by comparing Zucchi Group results with key ratios of peer companies (calculated in *Appendix 2*), in order to capture the signals of the crisis, to better identify its causes and to assess whether they had an internal or external nature. The companies selected as comparables are:

- Caleffi, an Italian based company operating in the household linen industry and the only Italian listed competitor of Zucchi Group. Similarly to Zucchi, Caleffi is positioned in the Home fashion segment and distributes its products in Italy and abroad through its own brands, such as Caleffi and Scaldotto, as well under licensed brand names.
- Gabel, an Italian industrial group operating in the textile industry and specialized in the production of household linen products. As Zucchi Group, Gabel manages and controls the entire supply chain, but, differently from Zucchi Group, the production function is not outsourced and maintained in Italy.
- Springs Global, a Brazil-based company engaged in the textile industry and founded in 2006 as the result of the merger between Companhia de Tecidos Norte de Minas, with operations in South America, and Springs Industries, with operations in North America. The company focuses on spinning, weaving, finishing, manufacturing and commercialization of home textile products, mainly bed and bath textile articles and it offers its products under various brand names, targeting customers of different socioeconomic profiles. It distributes, as well as in others, in Argentina and Canada, but also in Brazil and United States, countries involved in Zucchi Group international development projects. By considering this company as Zucchi Group comparable,

despite its larger size, it is possible to better take into consideration in the analysis the dynamic of foreign markets targeted by Zucchi Group.

3.3.1 Downsizing phase

3.3.1.1 Major events

The first phase of the crisis path is characterized by a worsening of the decline situation and the implementation of a group downsizing process. This phase can be further divided into two periods:

- From 2006 to 2007, during which the restructuring actions undertaken started giving rise to an improvement in Zucchi Group operating performance;
- From 2008 to 2010, during which the difficult macroeconomic context exacerbated the group crisis situation, requiring the implementation of new restructuring actions.

As just mentioned, during the first period of the downsizing phase, the restructuring actions undertaken by the group in response to the decline signals started to produce positive effects on the group's operating margin and net financial position. These interventions were mainly focused on the reduction of structural costs, objective pursued through:

- the rationalization and simplification of the group structure, in particular by means of the merger of Standartela and Bassetti, entities already under the control of Vincenzo Zucchi S.p.a, in Zucchi, concluded in 2006. This merger significantly contributed not only to improve the control over group activities, but also to reduce the administrative costs;
- the reorganization of the management structure in order to make it more reactive and flexible;
- the strengthening of the management accounting system.

These actions were carried out together with a downsizing of the workforce, the disposal of non-strategic assets and a deep transformation of the commercial area achieved through:

- the rationalization and repositioning of Zucchi Group's shops network, through the elimination of shops (both direct and in franchising) with negative margins and without growth potential (new shops with revised format, instead, would be opened from 2008);
- a selective reduction in the private label business;

- the rationalization of the license portfolio, by eliminating those with low growth potential and focusing on the development of the more strategic ones.
- the drastic reduction of industrial sales (yarns and fabrics).

During this period, in addition, the group laid the foundation for the relaunch and strengthening of the main brands (Zucchi, Bassetti, Descamps and Jalla) through a revision of the product offering and positioning.

Thanks to the restructuring actions implemented, the group reached in 2006 and 2007 operating results in line with the 2006-2008 Strategic Plan, according to which a return to positive net income was expected in 2008. The outbreak of global economic-financial crisis in 2008, however, made this objective impossible to achieve. Zucchi Group, which operates in one of the industry that most suffered the consequences of the difficult macroeconomic scenario, was hit by the crisis during a delicate period of transaction. This made the effects of the global crisis even more heavy. The deterioration of the group performance in 2008-2009, indeed, was larger than the one experienced by main competitors in the same years (as better discussed in *paragraph 3.3.1.2*), suggesting that the causes of the crisis are more internal than external. Surely, external events as the increasing competition and the global financial-economic crisis played an important role in determining the economic results of companies operating in the textile industry, but they cannot be considered the primary causes of the Zucchi Group crisis. These environmental changes simply made more evident and amplified the effects of company's internal inefficiencies and rigid cost structure, which were not recognized in a timely manner by managers. The restructuring actions, indeed, started to be implemented only in 2005, while evident signals of decline, such as decrease in revenues and operating margin, had already appeared in 2003. The continuing worsening performance suffered by the group during 2008 and 2009, therefore, pointed out that further restructuring actions were required to made the organization more flexible and reactive to changing market conditions, at least as much as its competitors. As a consequence, a new Strategic Plan was developed for the 2009-2013 period aimed at further reducing the breakeven point and rationalizing the group's organization and processes, as well as strengthening the commercial area and distribution network. Restructuring actions focused, first of all, on the supply chain with the purpose of reducing the response time and align it with the best worldwide practice in the textile industry, granting, in this way, an increase in the group's flexibility and competitiveness. In order to achieve this objective, Zucchi Group believed it was fundamental to increase its stake in Mascioni, a company specialized in the finishing treatment of textile products and qualifying component of the group's supply chain, from 55% to 65.57% in 2008

and from 65.57% to 71.65% in 2009 paying a total price of 11.9 million. In addition, particular attention was devoted to the logistic area, which represented a key factor not only for the internalization process that the group forecasted to undertake during its development phase, but also for the selection of new suppliers of final products. The high competitiveness of imports from low wage countries, as well as the rise of raw material costs, indeed, forced the group to revise its "make or buy" decisions in favor of an increasing volume of final products purchased from third parties. The increasing production outsourcing entailed the cessation of the production line of some plants, among which was the factory situated in Notaresco, dedicated to the spinning and weaving of basic undyed fabrics.

Furthermore, in the second period (from 2008 to 2010) of the "downsizing phase", the group restructuring continued to entail the disposal of non-strategic assets and the reduction of the workforce, in particular in the production, logistic and administrative functions, as well as a revision and reinforcement of the group governance and organization, through the hiring of a new general manager.

Regarding the commercial area, instead, the 2009-2013 Strategic Plan aimed to recover sales volume through the following actions:

- the strengthening of international distribution, in particular in new markets such as USA, South America, Asia and North Europe, also by adopting new distribution channels (such as the company website for Zucchi and Bassetti brands and commercial promoters for Descamps and Jalla brands);
- the strengthening of the direct channels of distribution through the development of a franchising network and by looking for potential partnerships;
- the completion of the relaunch and repositioning process of the proprietary brands initiated in 2006.

The restructuring actions started to show their positive effects on company operating results in 2010. During this year, in addition, the business unit Descamps was classified as a Discontinued Operation. In particular, given its inability to repay the accumulated fiscal and social security debts, on 29th June 2010 Descamps was admitted to a reorganization and restructuring procedure (*Rédressement Judiciaire*) by the Tribunal de Commerce de Paris. Furthermore, the relevant losses suffered by this business unit, equal to 23 million in 2009 and to 21 million in 2010, encouraged the parent company Vincenzo Zucchi S.p.A to accept, on 17th September 2010, the offer received by Astrance Capital S.A.S, a French private equity fund, which, in February 2011, acquired 80% of the parent company's stake in Descamps at a price of 2 million.

During the 2010, moreover, a new company, Hospitality.it S.r.l., was established in Rescaldina, whose business consisted on the production, sale, rent, import and export of fabrics, textile products and furniture for hotels, restaurants, catering, shipping companies and communities. On January 2010, Hospitality.it S.r.l acquired from Mascioni S.p.a its stakes of Mascioni Hospitality Inc., together with the brand "Hotel Collection". Both stakes and brand were then sold to the parent company Vincenzo Zucchi S.p.a.

The group restructuring, then, continued with the liquidation of the no longer strategic subsidiary Mascioni USA Ltd, an American company providing commercial services and post sales assistance to North American clients on behalf of its parent company Mascioni S.p.a., and the establishment of a new firm, Zucchi S.A., in Belgium, dedicated to the commercialization of the group products.

3.3.1.2 Financial analysis

In order to better understand the causes of the corporate crisis and capture the effects of the restructuring actions undertaken during the downsizing phase on Zucchi Group performance, the evolution of Zucchi Group's key financial measures and ratios are now analyzed and compared with peer companies' results.

The starting point for the analysis of the group performance is the evolution of sales. *Figure 3.4* shows that, after years of positive growth, from 2003, Zucchi Group consolidated sales started to decrease.

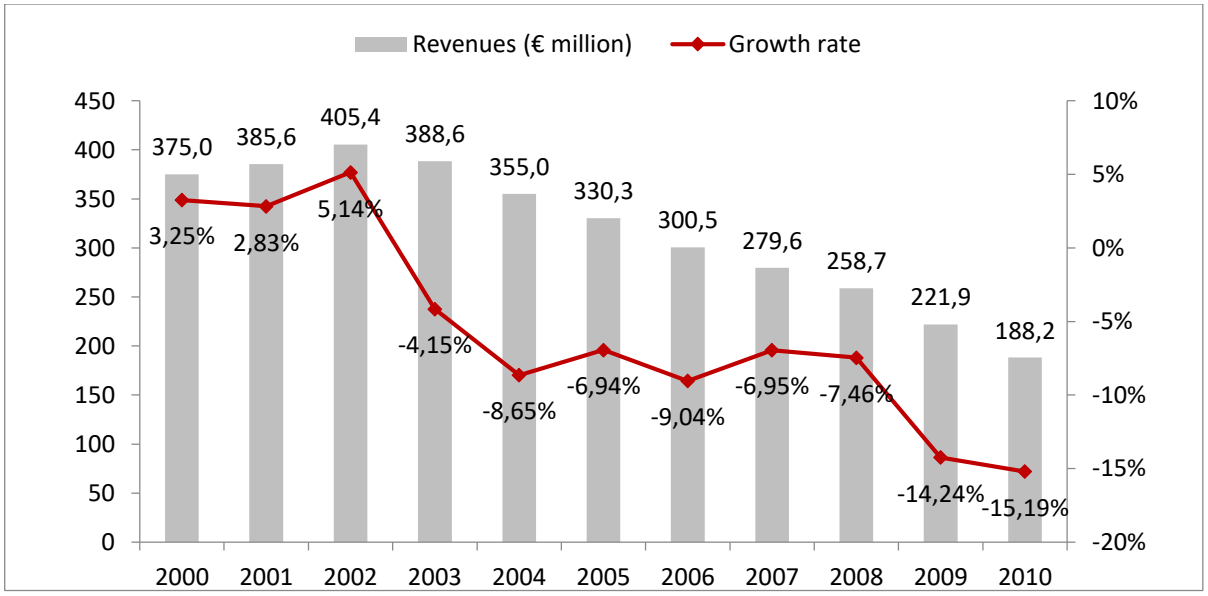

Figure 3.4 – 2000-2010 Consolidated sales.

In particular, the negative growth rates experienced from 2003 to 2006 can be partially explained by the substantial reduction in the sales of semi-finished products. In 2005, indeed, after the already mentioned disposal of some plants located in France and the closure of some factories located in Italy, all dedicated to the weaving activity, the group substantially exited the business of semi-finished products, whose price didn't allow the company to gain positive margins. The drop in the final consumers' spending power, and the consequent decrease in the consumption level, caused by the outbreak of the global economic crisis in 2008, instead, strongly contributed to the huge sales reduction suffered by the group in 2009, equal to -14.24%. In particular, the drop in sales was significant for Descamps, because of the severe crisis scenario faced in Spain and United Kingdom, countries in which a large percentage of the business unit sales were realized, and for Mascioni, for which the negative effects of the global crisis on the textile industry were amplified by the weak dollar. As regards the sales segmentation according to distribution channels, all the distribution channels, and in particular the private label segment, suffered the consequences of the difficult macroeconomic scenario. Indeed, even if the restructuring actions implemented in the commercial area and aimed at the relaunch of Zucchi Group main brands, produced in 2008 positive results in terms of an increase in the volume sold through direct distribution channels, they were insufficient to halt the drop in consolidated sales.

In 2010, the group started to report the first signs of recovery. Even if the *Figure 3.4* shows an extremely negative growth rate also in 2010, indeed, actually in 2010 sales grew at a rate of 9%, if compared with 2009 re-determined revenues computed considering Descamps as discontinued operation.

By analyzing sales growth rates experienced by top comparables (Caleffi and Gabel) in the same years (*Figure 3.5*), instead, a high volatility emerges probably as a consequence of the radical changes occurred in the industry and companies' attempts to face them through immediate actions that often produce only short term effects. As for Zucchi Group, also for Caleffi the crisis significantly affected sales growth rate in 2009, during which Caleffi reported a negative growth of -5.01%. Gabel instead, after having suffered a slightly negative sales variation in 2008 (-0.69%), was able to achieve a positive growth rate in 2009 (5.37%). Probably, its positioning on a lower price segment represented a competitive advantage in respect to Caleffi and Zucchi during a period of decreasing final consumer budget. Despite the changing macroeconomic and industrial environment, however, both Caleffi and Gabel sales, different from Zucchi Group, never fell below the 2006 level, as shown in *Figure 3.6*, pointing to a greater competitors' ability and promptness on adapting their value proposition

to the change in customer needs. The global economic crisis, finally, significantly affected also Springs Global revenues[18], delaying the achievement of soft synergies expected from the merger.

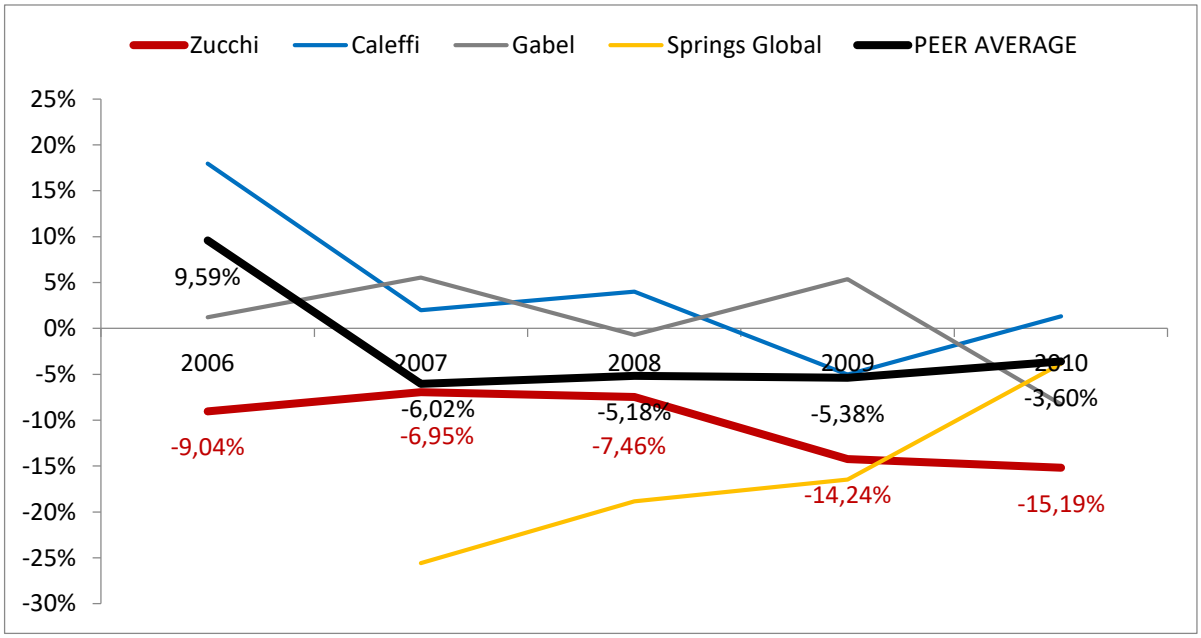

Figure 3.5 – Sales growth rates comparison.

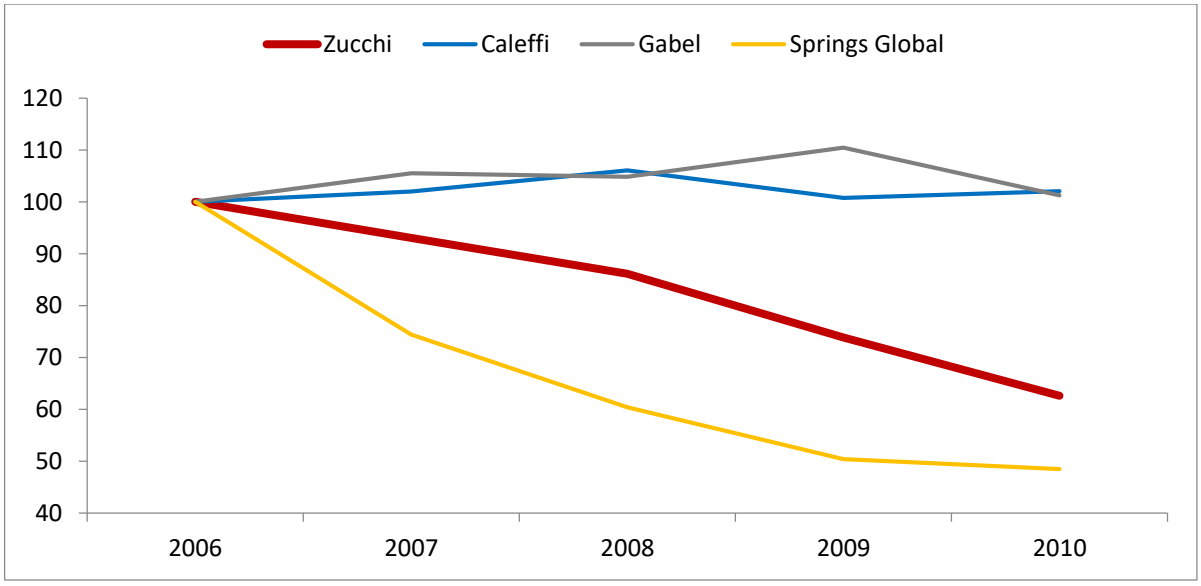

Figure 3.6 – Sales evolution comparison.

Zucchi Group's inability to adapt to the changing market conditions, that negatively affected its sales growth rates, became clearly evident when EBITDA, equal to 47 million in 2000,

[18] For Springs Global, the growth rate between 2005 and 2006 cannot be calculated, since the company born as result of the merger occurred in 2006.

decreased to 4.8 million in 2005 and reached negative levels in 2008 and 2009 (-7.5 million and -1.9 million, respectively). As shown in *Figure 3.7*, the restructuring actions implemented according to the 2006-2008 Strategic Plan and aimed at the reduction of structural costs, as well as the increasing recourse to production outsourcing, revealed their effectiveness in 2006 and 2007, allowing a recovery of EBITDA and EBITDA margin. These results encouraged Zucchi Group, in 2008, to go forward with the implementation of the strategic plan, which entailed the opening of new shops as part of the restructuring actions aimed at the recovery of sales volume through the strengthening of the direct channels of distribution. The consequent increase in operating costs, in particular distribution and structural costs, however, was amplified by the unexpected further drop on sales caused by the worsening of the macroeconomic scenario. The implied higher incidence of fixed costs on sales resulted in negative EBITDA margins equal to -2.90% in 2008 and -0.85% in 2009. These results are particularly negative when compared with EBITDA margins of peers (*Figure 3.8*). The drop in this operating measure suffered by Caleffi (in 2008) and Gabel (in 2008 and 2009), indeed, is more limited than the one experienced by Zucchi Group, pointing out the higher flexibility of top comparables' cost structure. In 2010, however, Zucchi Group's operating performance indicator appears in line with the peer average. The restructuring actions implemented according to the new 2009-2013 Strategic Plan, indeed, produced positive effects on both revenues side, in terms of sales volume and mix, and costs side, leading to a positive EBITDA margin of 6.26%. This result, as come to light from the analysis of the 2011-2015 period discussed in *paragraph 3.3.2*, however, was only temporary and not a sign of actual recovery.

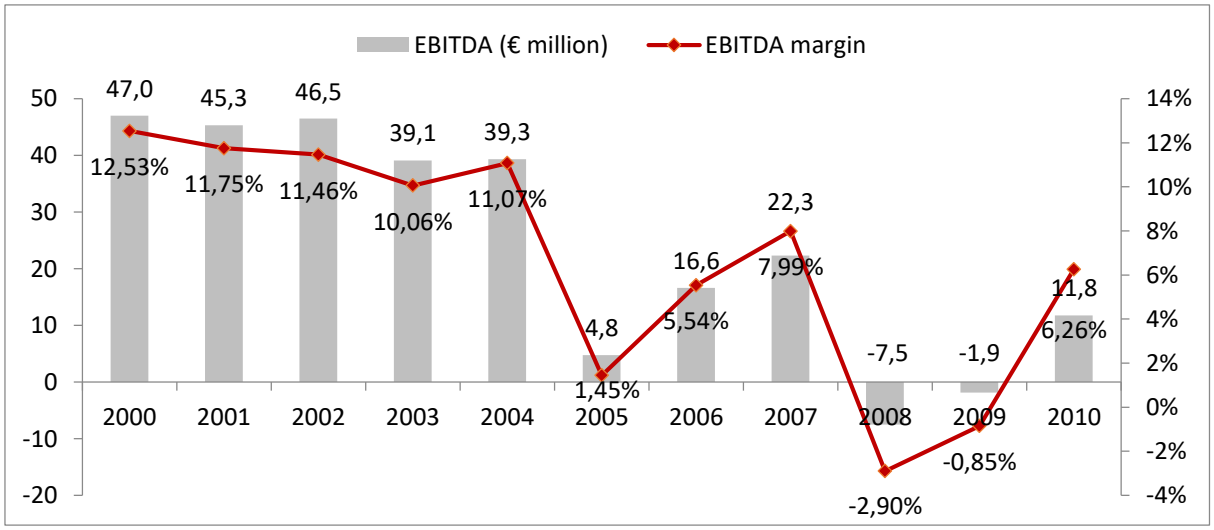

Figure 3.7 – 2000-2010 EBITDA and EBITDA margin.

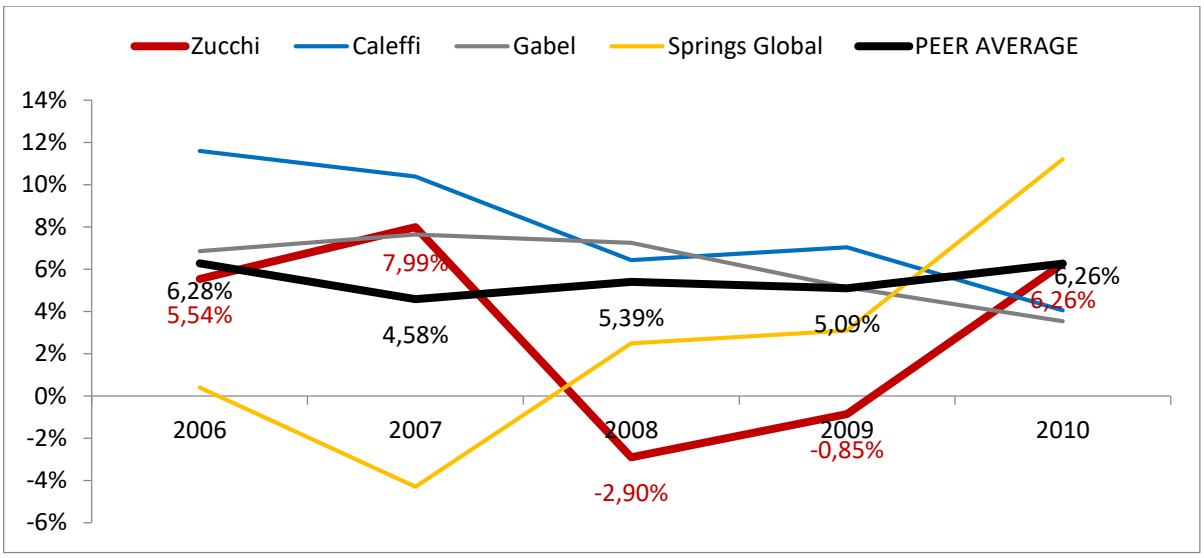

Figure 3.8 – EBITDA margin comparison.

Further signals of Zucchi Group operating difficulties, then, emerge from revenues per employee and EBITDA per employee ratios, which, as shown in *Figure 3.9*, are generally lower than top comparables ratios (in particular Caleffi's ratios), despite the significant workforce reduction experienced during the downsizing phase, pointing out Zucchi Group lower productivity and higher inefficiency in using its human resources to generate revenues and operating profit.

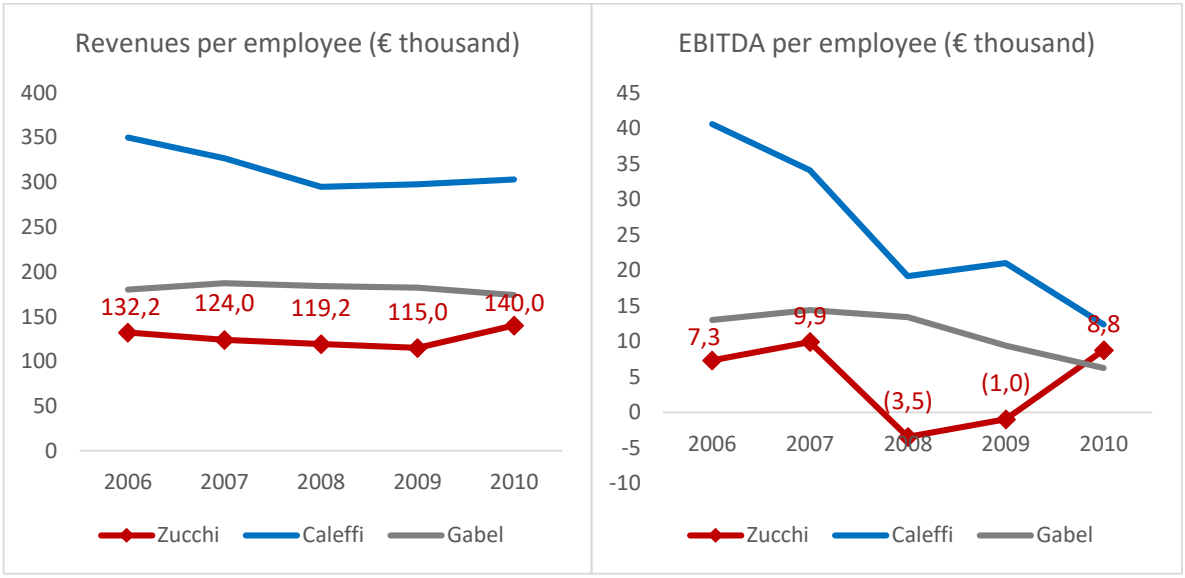

Figure 3.9 – Revenues per employee and EBITDA per employee: comparison with top comparables

The significant deviation of Zucchi Group from average performance of comparable companies during the global financial-economic crisis, however, is observable also by analyzing the evolution of net margin during the downsizing phase. As shown by *Figure 3.10*,

Zucchi Group net margin in 2008, 2009 and 2010 is well below peer average, even if the latter is close to zero, signaling difficulties in converting revenues into profits common to all the firms operating in the textile industry. *Figure 3.11* better shows the negative trend in terms of net income and net margin experienced by Zucchi Group starting from 2004. The poor operating results, indeed, were worsened by restructuring costs, largely constituted by expenses connected with the management of excess personnel, and impairment losses of the production plants subjected to disposal or closure during the restructuring period. These extraordinary items reached the highest levels in 2005 (32.2 million), the year that had already recorded the effects, in terms of impairment losses and expenses connected with workforce reduction, of the closure of some production sites concluded in 2006 according to 2006-2008 Restructuring Plan, and in 2009 (8.2 million), during which new restructuring actions were required in order to face the difficult macroeconomic scenario. Alongside these extraordinary items, the operating results were further deteriorated by interest expenses, that reported a considerable increase from 2006 to 2008, moving from 4.2 million in 2005 to 10.6 million in 2008, mainly due to an interest rate (Euribor) increase and the higher spread applied by the banking system. Starting from 2009, instead, the interest rate decrease and slightly positive exchange rate differences led to a net financial expenses reduction. Nevertheless, the 2009 and 2010 group net income resulted significantly negative (-48.8 million in 2009 and -20.2 million in 2010), strongly affected by the poor performance of the business unit Descamps, which reported losses for 23.1 million in 2009 and 20.8 million in 2010.

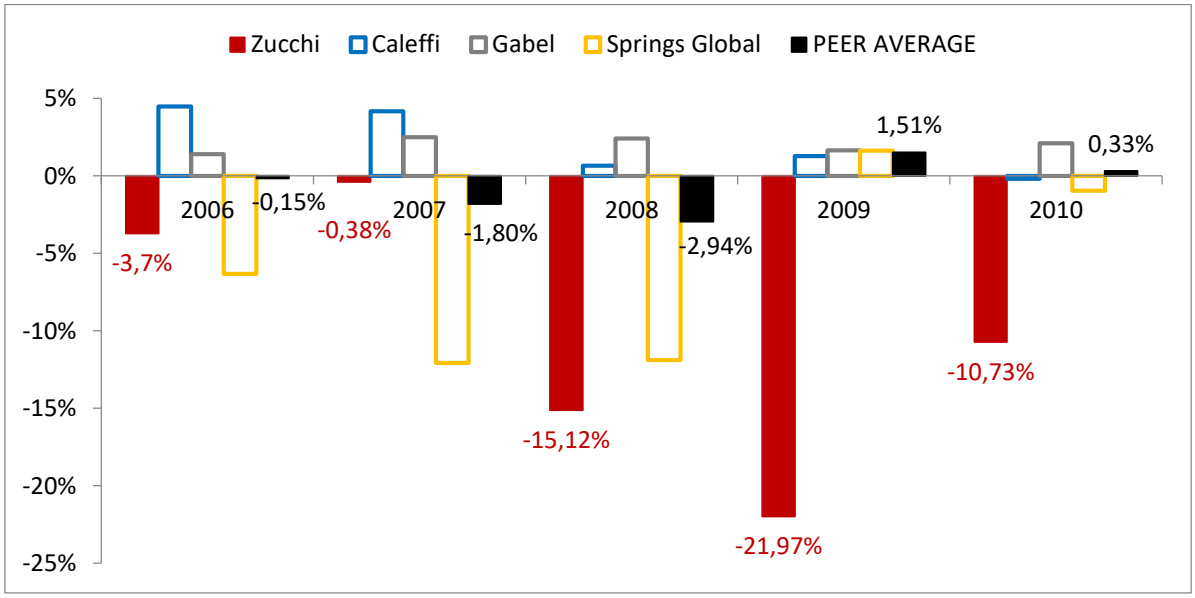

Figure 3.10 – Net margin comparison.

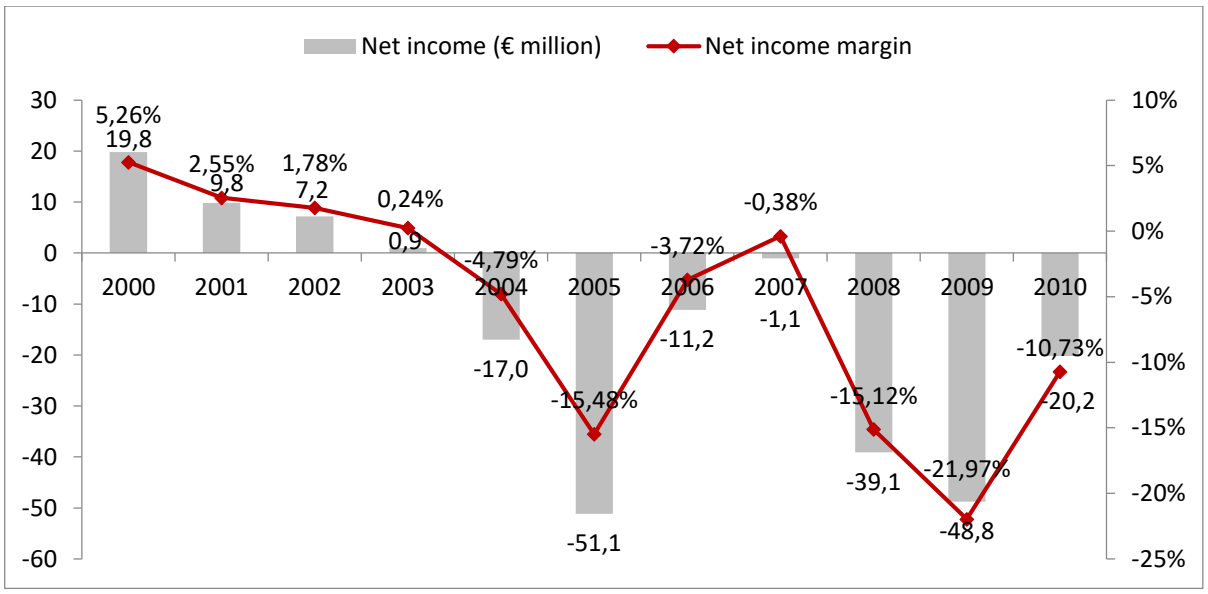

Figure 3.11 – 2000-2010 Group net result and net margin.

Shifting the analysis of the restructuring effects from income statement to balance sheet items, it is possible to observe a progressive reduction in invested capital during the downsizing phase (*Figure 3.12*). This trend, completely opposite to the one experienced by Zucchi Group between 2000 and 2005, as well as the evolution of the invested capital on sales ratio, can be better examined by splitting the invested capital in its main components: the operating fixed capital and the net working capital.

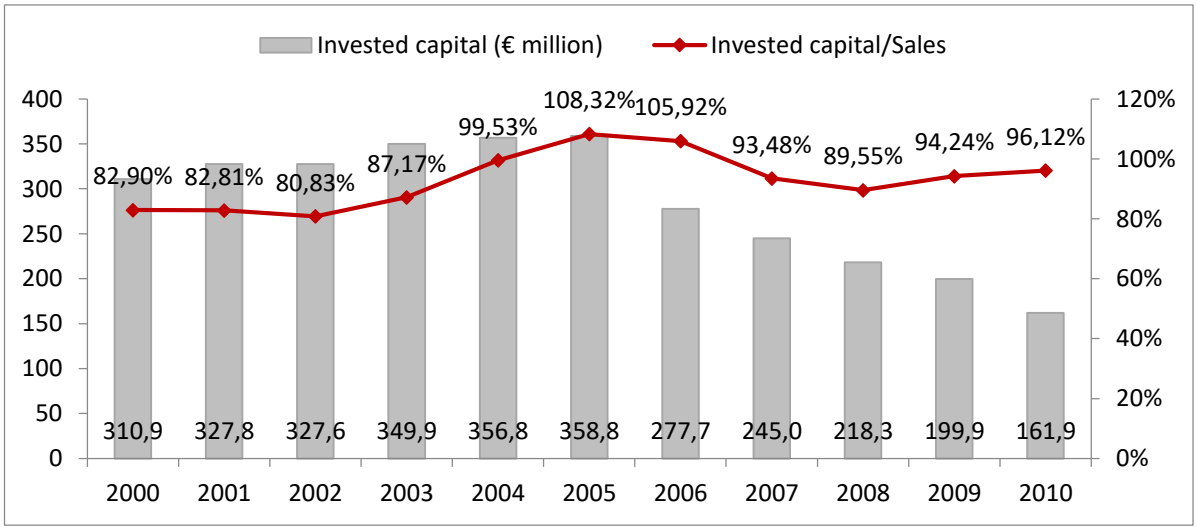

Figure 3.12 – 2000-2010 Invested capital.

As shown by *Figure 3.13*, operating fixed capital remained quite stable from 2000 to 2004[19] and started to experience a progressive decrease from 2006. This is attributable to the

[19] The increase in operating fixed capital showed by *Figure 3.12* in 2005 in respect to 2004 is actually due to the adoption of the IFRS, applied for the first time by Zucchi Group in the 2005 financial statements.

downsizing effects of the restructuring plan that entailed the disposal of assets became no longer strategic (33 million of assets are intended for sale in 2007), in particular following the increasing production outsourcing, as well as to assets depreciation not counterbalanced by new investments. During the downsizing phase, indeed, investments were limited to plants and machinery renewal and shops set up, and approximately amounted to less than half of the asset value reduction recorded each year as a consequence of depreciation. Despite the restructuring actions undertaken, however, the group structure was still very rigid, in particular in respect to comparable companies (*Figure 3.14*). The incidence of operating fixed capital on sales for Zucchi Group, equal on average to 37.46%, is higher than the competitors average, equal to 21.99%. In particular, Caleffi presented the most flexible structure, having been able to maintain the operating fixed capital on sales ratio close to 5% despite the sales fluctuation experienced, while Springs Global larger size was extremely penalized by the huge decrease in revenues suffered during the global financial crisis.

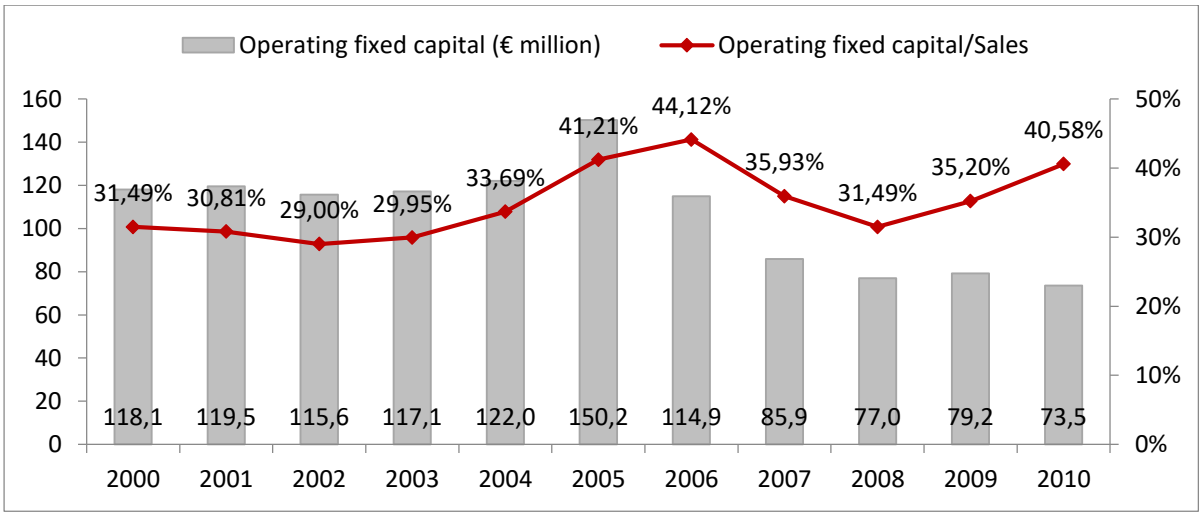

Figure 3.13 – 2000-2010 Operating fixed capital.

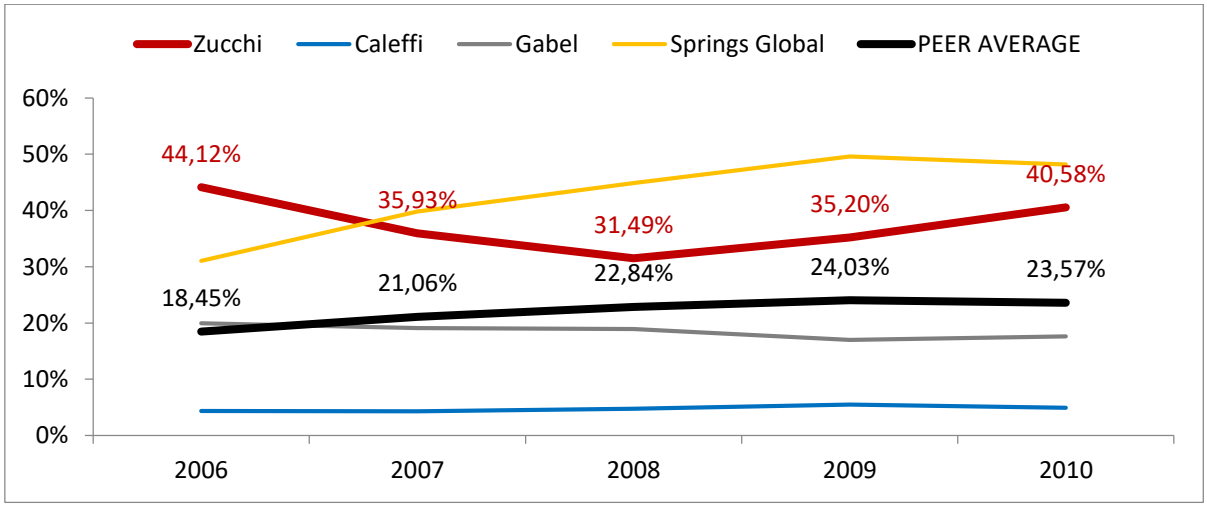

Figure 3.14 – Operating fixed capital on sales comparison.

Zucchi Group net working capital follows a path similar to the evolution of operating fixed capital, reporting a progressive reduction from 208.6 million in 2004 to 92.8 in 2010 (*Figure 3.15*). The drop in revenues experienced by Zucchi Group, indeed, caused a decrease in trade receivables and inventories (combined with the closure and disposal of some production sites) but only a slight reduction of trade payables, given the increasing amount of past due payables. The group, in addition, suffered an extension of the commercial cycle in respect to the pre-crisis situation, reporting an increase on both trade payables days in revenues (from 57 in 2000 to 99 in 2010) and trade receivables days in revenues (from 119 in 2000 to 148 in 2010). The latter points to the loss of bargaining power toward clients typically experienced by declining companies. Further evidence of Zucchi Group inefficient working capital management emerges from *Figure 3.17*, which shows that while competitors net working capital turnover ratio is on average close to 3.45, the group is able to generate (on average) only 1.78 euro of sales for each euro invested in its net working capital.

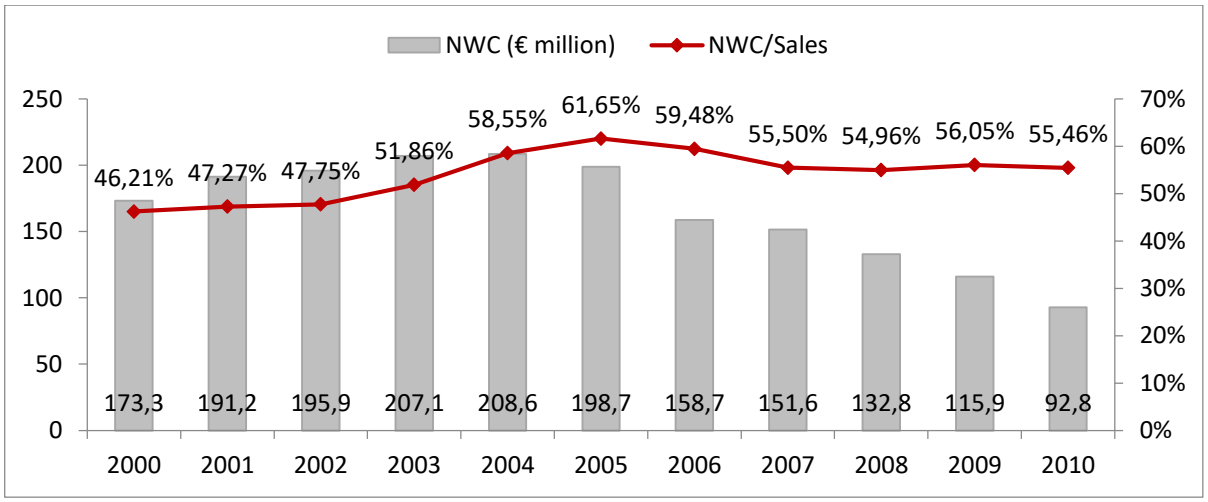

Figure 3.15 – 2000-2010 Net working capital.

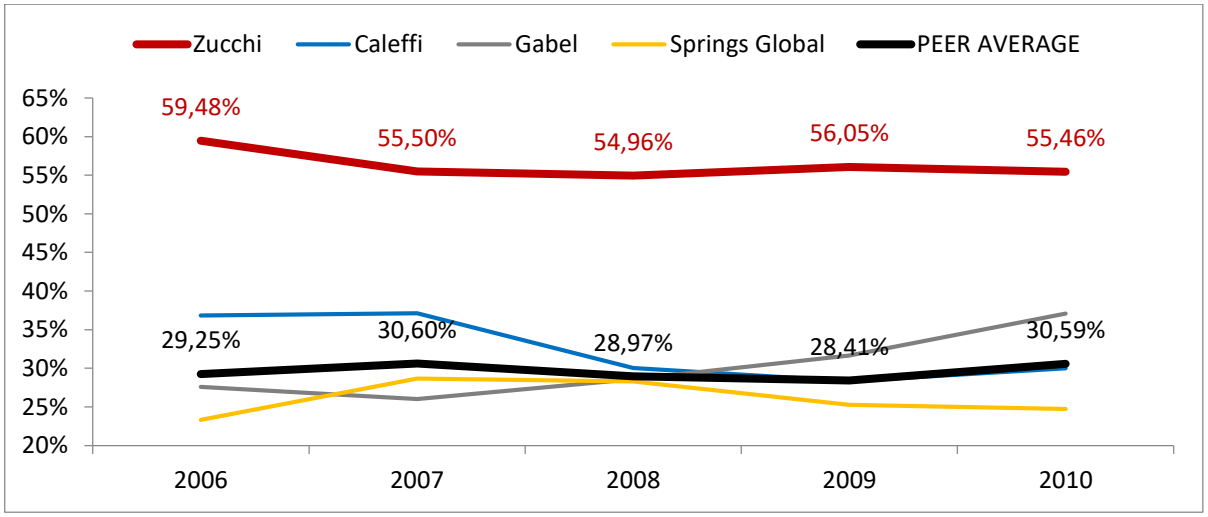

Figure 3.16 – Net working capital on sales comparison.

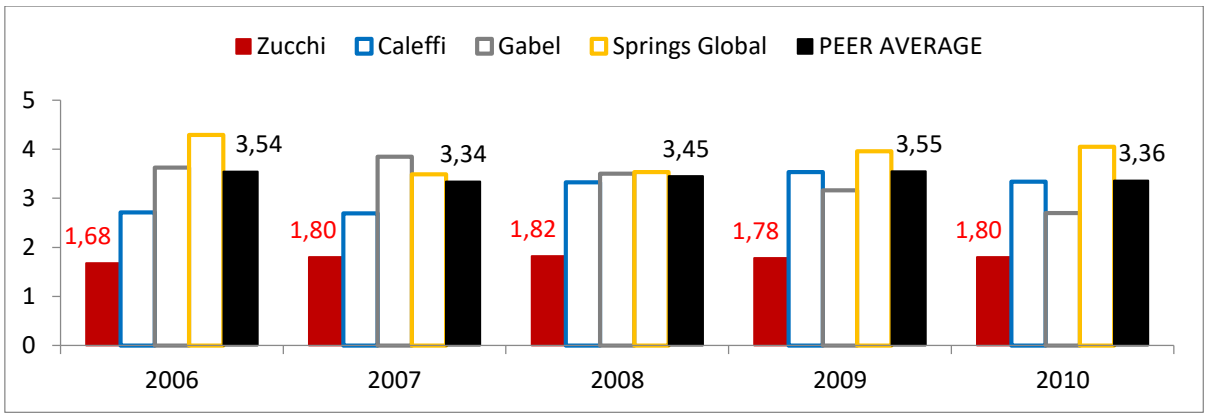

Figure 3.17 – Net working capital turnover comparison.

The inverse of net working capital turnover ratio, that is the net working capital to sales ratio (*Figure 3.16*), provides then a useful insight on another dimension strongly impacted by the corporate crisis: liquidity. An average working capital to sales ratio of 56%, means that 56% of Zucchi Group turnover was frozen in inventory and trade receivables, signaling that the group could have had greater difficulties in meeting current obligations in respect to competitors, whose net working capital on sales ratio was on average equal to 30%.

This evidence is confirmed by the analysis of the evolution of current ratio and quick ratio in respect to comparable companies, shown in *Figure 3.18* and *Figure 3.19*, respectively.

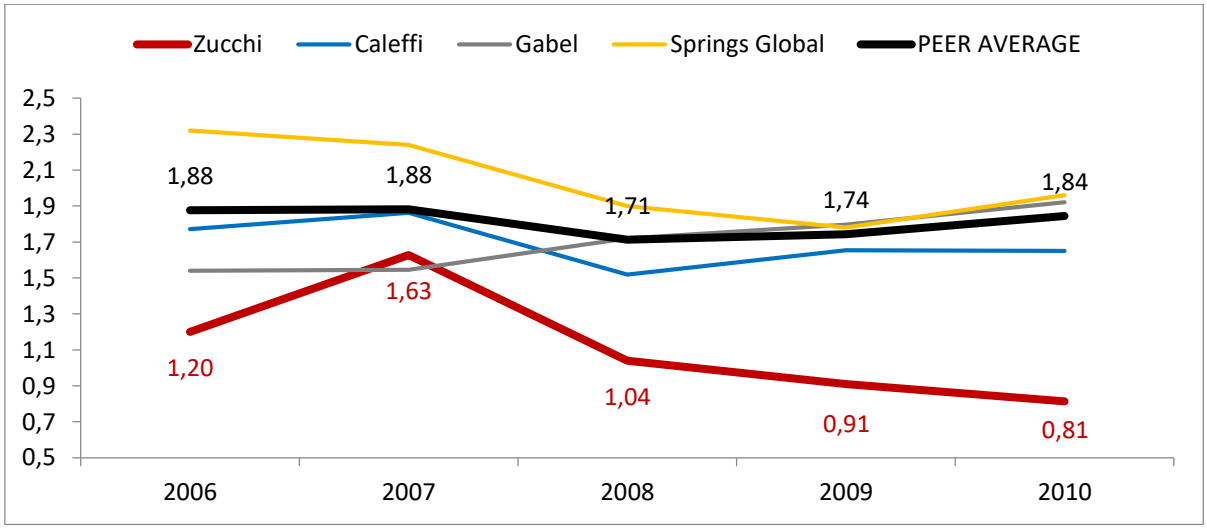

Figure 3.18 – Current ratio comparison.

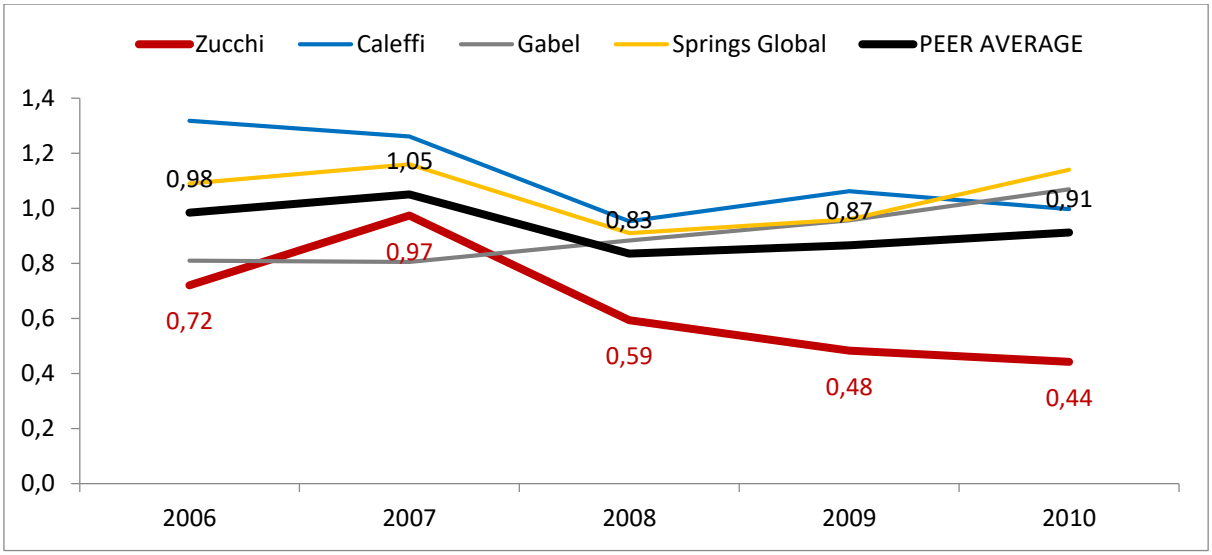

Figure 3.19 – Quick ratio comparison.

Figure 3.18 points to an increasing disequilibrium between Zucchi Group current assets and current liabilities, in particular in respect to comparable companies, captured by the progressive decrease in the group current ratio until reaching a level below 1 in 2009. *Figure 3.19* instead, not only provides evidence about a decreasing and below peer average trend also in Zucchi Group quick ratio, but reveals also the significant role played by inventories when judging the degree of liquidity of companies operating in the household linen industry. In 2010, for Zucchi Group, as well as for competitors average, the quick ratio is about half of the current ratio (0.81 and 0.44, respectively, for Zucchi Group and 1.84 and 0.91, respectively, for competitors average) pointing out the importance of an efficient inventory management, for firms operating in this industry, in determining the company's ability to pay current liabilities The short term liquidity problems suffered by Zucchi Group, lastly, clearly emerge also from the analysis of the operating cash flows on current liabilities ratio (*Figure 3.20*). This ratio is always below the unit and it reaches a negative level in 2008 (-0.01) and 2009 (-0.04).

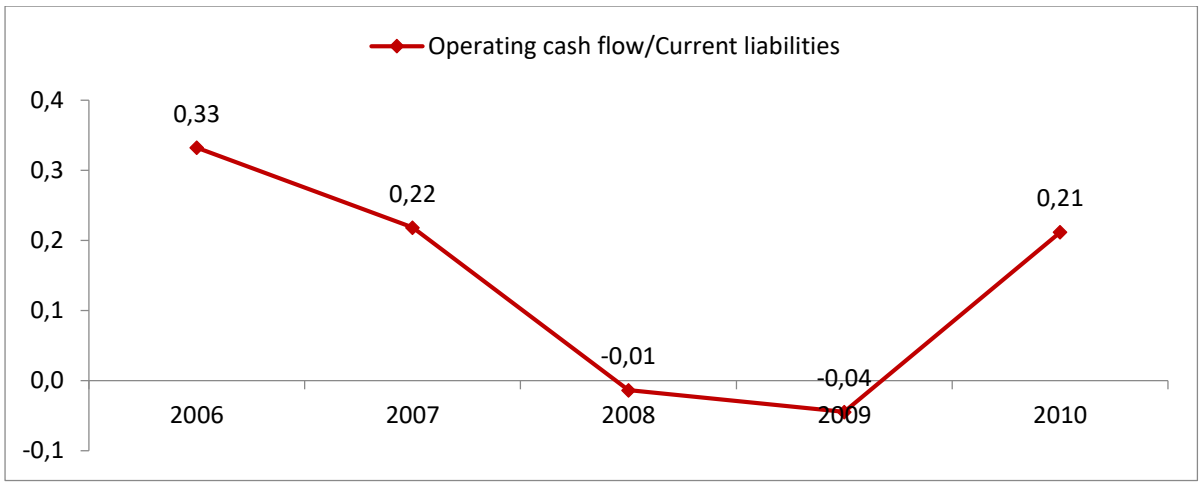

Figure 3.20 – 2006-2010 Operating cash flow on current liabilities ratio.

Focusing only on financial debts, instead, *Figure 3.21* and *Figure 3.22* further prove that Zucchi Group experienced greater difficulties than comparables in meeting its financial obligations, both in terms of interest expenses and debt payments.

Zucchi Group EBITDA/Interest expenses, indeed, is negative in 2008 (-0.71) and in 2009 (-0.29) and, in any case, lower than its top comparable ratio[20] during all the 2016-2010 period, pointing out Zucchi Group poorer abilities to cover interest expense through EBITDA (*Figure 3.21*).

The NFP/EBITDA ratio, instead, indicates how many years it would take for a company to pay back its debt on the basis of its operating profit before interest, tax, depreciation and amortization. The group ratio in 2006 (9.82) and in 2007 (5.61) assumes positive level, that, despite the NFP reduction and EBITDA increase experienced in 2007, are still higher than NFP/EBITDA ratio for top comparable companies (*Figure 3.22*). Springs Global ratio instead, reports considerable fluctuations from 2006 to 2008, because of the combination of a high NFP and decreasing, if not negative, operating profit, but it aligns to top comparables ratio in the following years, thanks to the recovery of profitability and the halving of the debt burden. In 2008, Zucchi Group NFP/EBITDA ratio reaches a negative level (-19.59), which becomes even worse in 2009 (-84.10), due to the combined effect of a NFP increase and a EBITDA reduction. In 2010, instead, the positive operating profit achieved by the group brings back the group ratio to a positive level (11.91), that is still higher than the competitors average (4.69). From *Figure 3.22*, however, emerges that both Caleffi and Gabel have

[20] For Gabel and Springs Global it is not possible to calculate this ratio. The net financial result is not separated by income/expense from investment in the available financial statements (downloaded by AIDA and EIKON database, given that Gabel is not listed and therefore its financial statements are not publicly available, while the English version of Springs Global annual report is available on its website only from 2010).

experienced an increase in their ratios from 2006 to 2010 (from 2.61 to 4.59 for Caleffi and from 4.28 to 7.24 for Gabel), pointing out that the global financial-economic crisis and its impact on company operating profitability significantly affected the ability to repay debt obligations through operating cash flows (approximately measured by EBITDA) for all companies operating in the household linen industry.

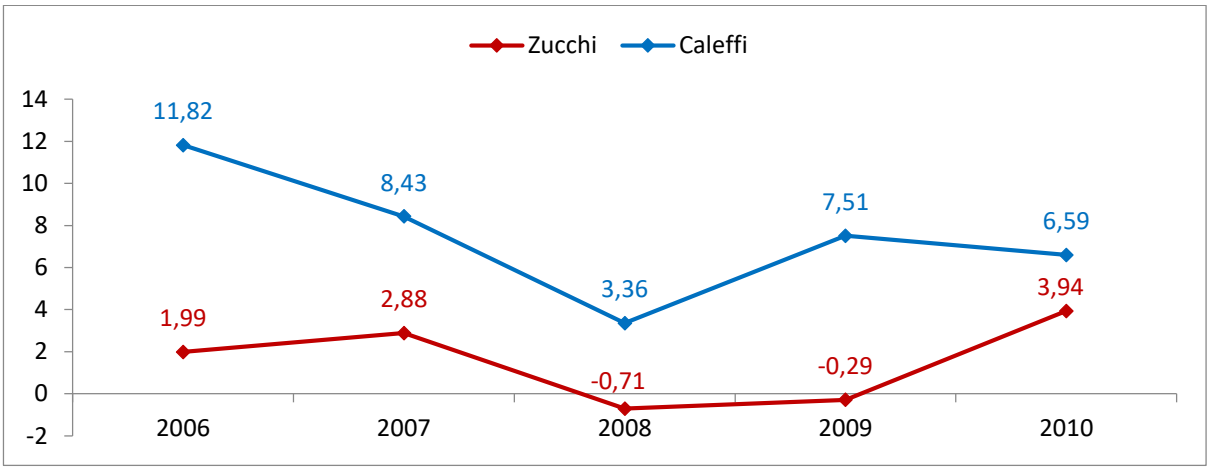

Figure 3.21 – EBITDA/Interest expenses comparison.

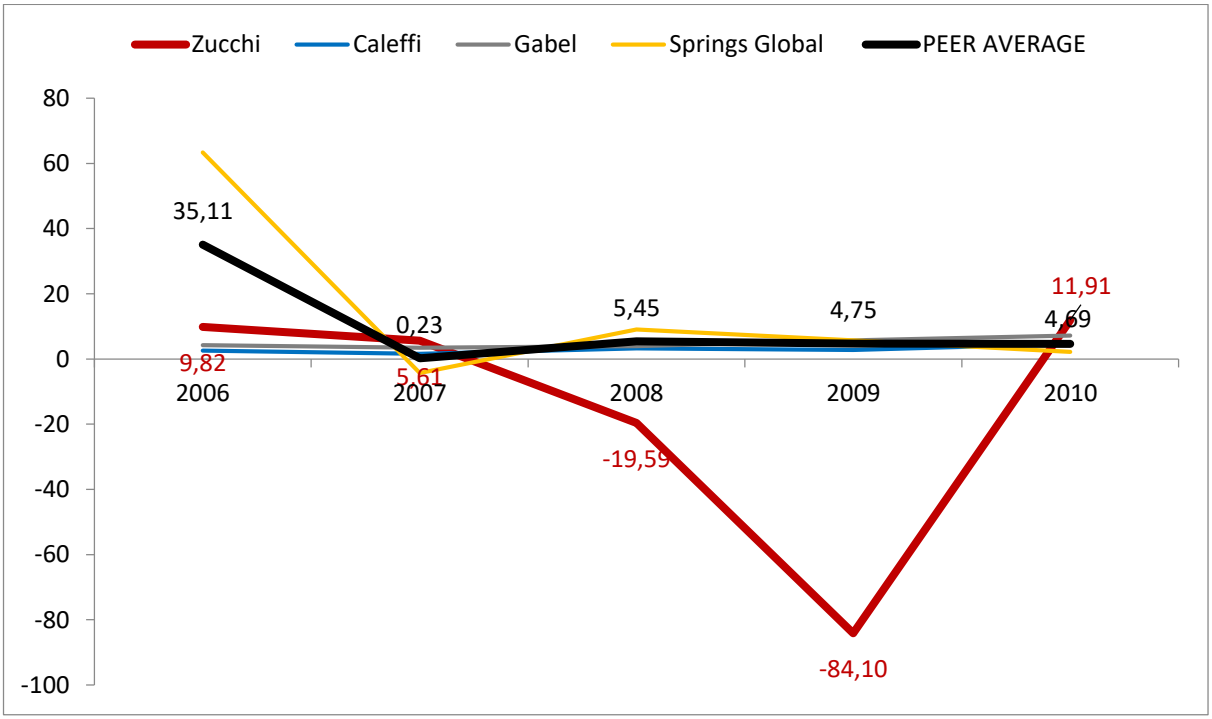

Figure 3.22 – NFP/EBITDA comparison.

In particular, the first signs of Zucchi Group financial difficulties became evident for its creditors in 2005, when the breach of some financial covenants, to which the long term debt was subjected, entailed the beginning of a negotiation process between the group and its lenders. The negotiation ended in January 2007 with the signing of a debt rescheduling

agreement. The agreement provided the consolidation and rescheduling in biannual payments, in part linked with the disposal of no more strategic assets, of medium-long term debt for a total amount of 64 million (expiring in 2012), as well as the re-financing of short term debt for 87 million to fund net working capital needs until 31st December 2009. The agreement was subjected to financial covenants breached at the end of 2008 because of the extremely negative results reported by Zucchi Group, hit in that year by the global economic crisis. Given that the missing fulfillment of financial covenants could trigger the early repayment of the credit lines, Zucchi Group immediately contacted banks in order to renegotiate the debt and to make it more aligned with the financial needs of the restructuring process. On 18th September 2009 Zucchi Group and a pool of six banks signed a new debt rescheduling agreement, which involved:

- Short term debt: the maximum amounts of the self-liquidating loan and of the cash facility were increased, leaving the total available amount unchanged at 87 million.
- Long term debt: the 46 million mortgage repayment was rescheduled as 8 half-yearly postponed payments starting from 30th June 2010 (the 19.5 million bullet reimbursement due by 30th June 2009 was eliminated). The company was bound to repay the debt with 60% of the cash-in obtained from the disposal of real estate assets.

The credit facilities had been negotiated until 2013 and loans were not secured by any collateral.

During the 2010, however, the group was not able to pay the debt instalments (scheduled in June and December), as well as to fulfill the financial covenants regulated in the debt rescheduling agreement. This forced the group to submit to the banks requests of waiver in the application of the obligations concerning the loans, and to sign several moratorium agreements during the 2010.

As shown by *Figure 3.23* and *Figure 3.24*, indeed, the group presented a highly leveraged capital structure, with a NFP/Equity ratio (6.32 in 2010) highly above the peer average (0.55 in 2010), which cannot be sustained by the cash flow generated from operations.

As observable in *Figure 3.23*, the 2010 capital structure is the result of a transformation process characterized by a progressive decrease in group equity and an increasing weight of debt. In particular, the group equity had dropped from 210 million in 2000 to 22 million in 2010, mainly eroded by the income statement losses that in 2009 determined the existence of the preconditions of art. 2446 of Italian Civil Code regulating capital reduction for losses.

The NFP, instead, had been progressively increasing from 2000 to 2005. The negative operating cash flows generated by the group in that period (except for 2002), indeed, point out

that additional external financing were required to maintain and grow Zucchi Group operations. The adoption of a new industrial approach, based on cutting in-sourced production, and the consequent disposal of no more strategic assets, instead, strongly contributed in 2006 and 2007, to a NFP reduction. In 2008 and 2009, instead, the NFP went back to growing because of the financial resources absorbed by the restructuring process, which, among other things, entailed the payment of severance indemnities to exiting workers for 50 million from 2005 to 2010, and the acquisition of further stakes in Mascioni (for a total price of 11.9 million).

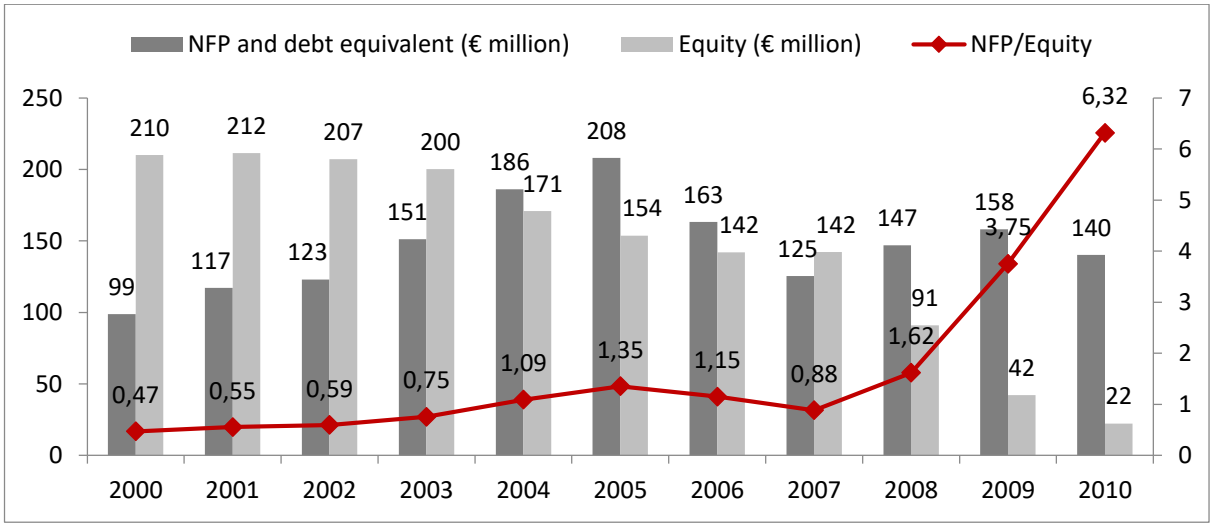

Figure 3.23 – 2000-2010 Group capital structure.

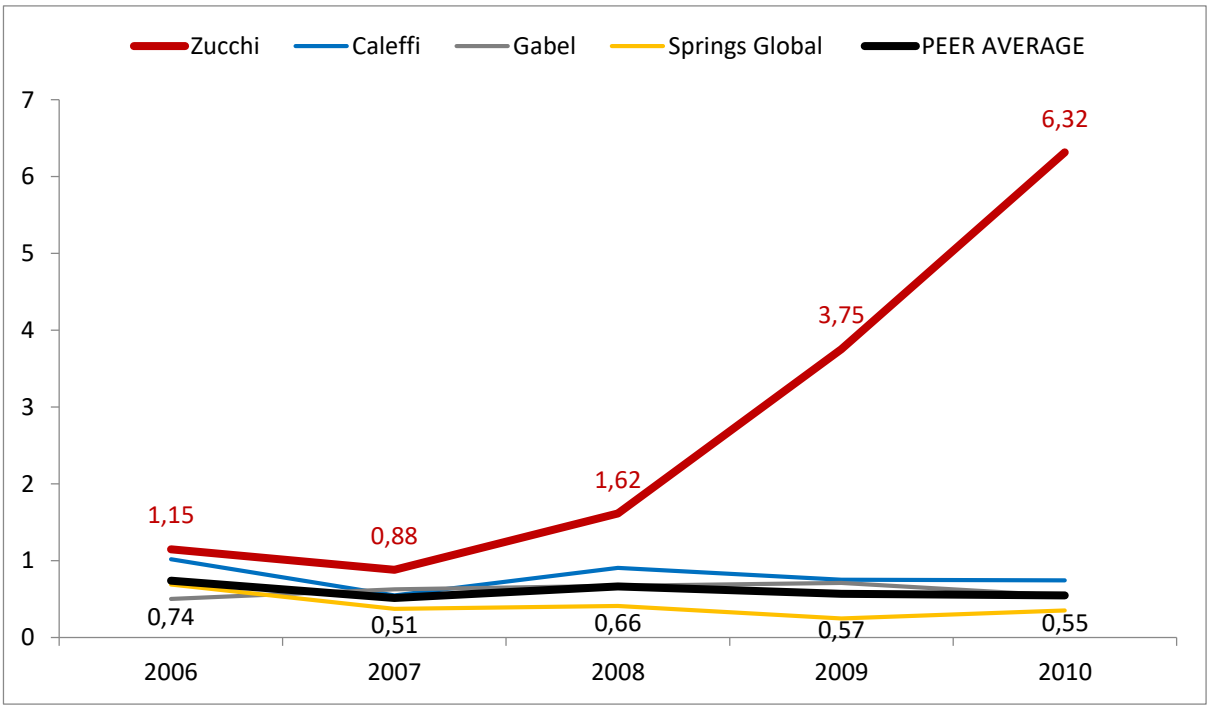

Figure 3.24 – NFP/Equity comparison.

Summing up, the restructuring process undertaken in the 2006-2010 period, whose main actions are recapped in *Figure 3.25*, led to radical changes in Zucchi Group industrial organization and commercial and corporate structure. Despite the restructuring actions implemented seemed to have aligned Zucchi Group operating profitability, in terms of EBITDA margin, to the average performance of comparable companies, showing an apparent initial recovery from economic distress, in 2010 the group still presented severe financial difficulties. The group debt burden, indeed, was characterized not only by past due payments (10 million), but also by debt installments that would come due in the near future (6 million on 30th June 2011 and 6 million on 31st December 2011) and that could not be fulfilled by the cash flows expected to be generated from operations according to the 2009-2013 Strategic Plan.

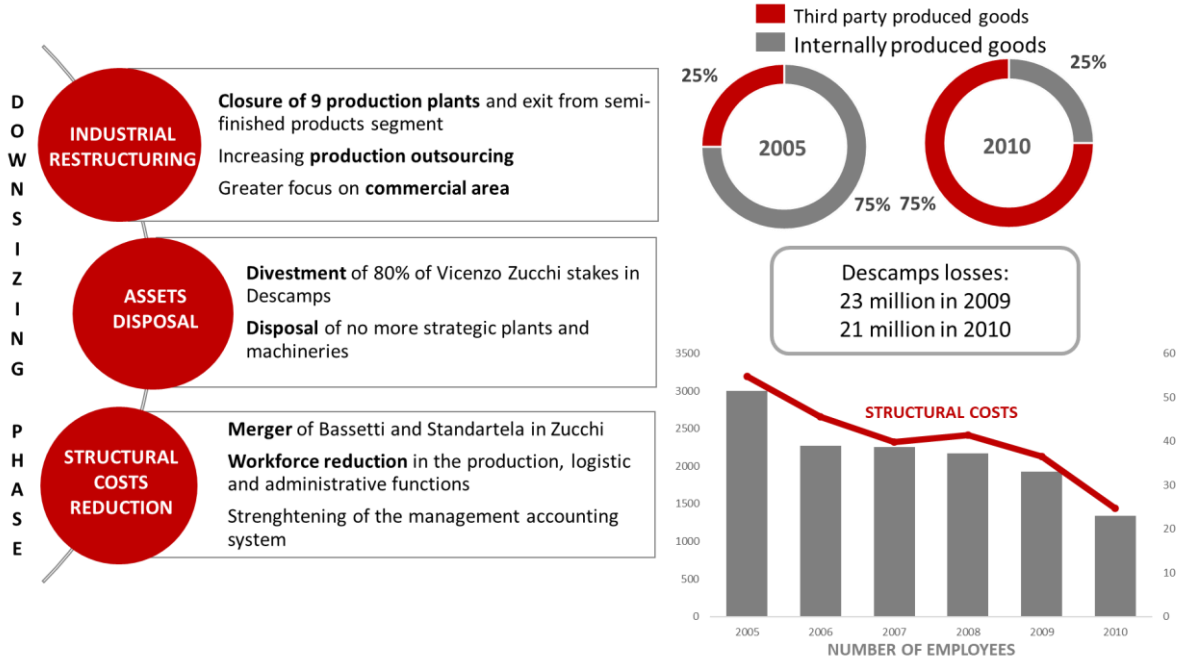

Figure 3.25 – Main restructuring actions of the downsizing phase (2006-2010). *(Personal elaboration from Zucchi Group Small Cap Conference)*

3.3.2 Relaunch and international development phase

3.3.2.1 Major events

Once downsized, the group started to undertake restructuring actions aimed to boost revenues, reduce operating costs, rebalance the capital structure and, therefore, bring back Zucchi Group performance to the pre-crisis level. A first attempt to relaunch the group was proposed by

managers in 2011, through a new Restructuring Plan to be implemented in the 2011-2015 period and providing for interventions both at the operating/strategic and financial level.
In particular, the 2011-2015 Strategic Plan forecasted the achievement of positive revenues growth rates (1.85% CAGR 2010-2015) as result of:

- the strengthening of Zucchi and Bassetti brands, realized through a product restyling and new marketing campaigns (focused on TV spots and trade shows);
- the increase in products price (equal to 16% in 2011), price policy expected to be undertaken by all competitors in response to the higher price of raw materials;
- a distribution strategy which continued to focus on direct channels through a new retail format.

These interventions on the commercial area, in combination with operating costs reduction to be achieved through the optimization of the outsourcing process, the simplification of product portfolio and the continuous monitoring of structural costs, were expected to result in a positive and increasing EBITDA in all the 2011-2015 period.
The strategic plan, in addition, forecasted a working capital reduction as a result of the adoption of new commercial policies. The rationalization of the product portfolio and the improvement in purchase planning, in particular, were expected to lead to an inventory decrease, while a more restrictive selection and closer monitoring of clients should have resulted into a reduction of days in trade receivables.
Even though the actions on revenues, costs and working capital were expected to bring to positive cash flows, however, the latter would not have been sufficient to meet the scheduled debt payments and to repay the past due trade receivables. Financial measures, therefore, were required to bring back the group indebtedness to a sustainable level and to guarantee to Zucchi Group the adequate degree of flexibility required to face cash need peaks (generally observed between May and September) caused by the business seasonality. These objectives should have been achieved, according to the financial plan, through the following actions:

1. the disposal of non-strategic assets, generating proceeds for a total amount of about 48.8 million;
2. the recapitalization of Vincenzo Zucchi S.p.a through a capital increase and the issuance of warrants;
3. the negotiation of a debt restructuring agreements (art. 182 bis l.f.) with the pool of banks.

According to the financial plan, therefore, the financial maneuver was supported, first of all, through the disposal of non-strategic assets, which were subjected, starting from 2010, to a value enhancement process. In order to facilitate the disposal of plants and buildings located in Casorezzo (Milan), for instance, this industrial area was transformed and partially designated to commercial use, with the support and approval of the municipal administration of Casorezzo. In 2011, the sales of plants and buildings located in Casorezzo, Viggiù (VA) and in the industrial area of Isca Pantanelle gave raise to proceeds for a total amount of about 3.5 million.

As regards the interventions on shareholders' equity, instead, on 24th January 2011, given the existence of the conditions expressed by art. 2446 Civil Code, the extraordinary shareholders' meeting decided to reduce the share capital of the group from 27.804 million to 7.215 million and to cancel the nominal value of ordinary shares and saving shares. On the same date, a capital increase was approved, articulated into:

- a capital increase for a maximum amount of 15,014,268 through the issuance of 150,142.680 new shares offered on pre-emptive basis to Vincenzo Zucchi S.p.a's shareholders at a price of 0.10, according to the ratio of 27 new shares every 5 owned old ordinary or saving shares. The new shares were subscribed for the total (maximum) amount of 15,014,268 by the 31st December 2011.
- a capital increase of 15,014,268 connected to the issuance of 150,142,680 warrants distributed to shareholders acquiring the new shares (one warrant for each share bought). Warrants gave to shareholders the right to buy, within 31st December 2014, one ordinary share every 2 warrants at a price of 0.20.

In addition, the shareholder Gianluigi Buffon and the members of Zucchi's family, on 9th May 2011 signed a recapitalization agreement (*accordo di ricapitalizzazione*) in order to guarantee the subscription of a portion of the capital increase equal to 7 million, of which 5.510 million were anticipated to the parent company in the form of debt financing. The latter, as well as the total capital increase, generated financial resources mainly used by the group to repay past due trade payables. Only a residual part, instead, was addressed to support the restructuring actions undertaken on commercial area, while no resources were used to reduce the group net financial position.

Finally, the last component of the financial maneuver planned in the 2011-2015 Restructuring Plan, consists on a debt restructuring agreement (art 182 bis l.f.), signed on 13th June 2011 by Zucchi Group parent company and the pool of banks and providing for:

- the consolidation of long term debt, for a total amount of 44.312 million, and its rescheduling in line with the evolution of cash flow forecasted in the Restructuring Plan;
- the performance of mandatory early repayments of long term debt through the proceeds deriving from the planned disposal of non-strategic assets;
- the renewal of short term credit line (expiring on 31st December 2011) until 31st December 2015, for a maximum available amount of 87 million;
- the revision of interest rates;
- the fulfillment of some financial covenants, represented by the adjusted NFP[21]/EBITDA ratio, by both Zucchi Group and the parent company Vincenzo Zucchi S.p.a.

As well as the capital increase, the debt restructuring agreement aimed at supporting the realization of the Restructuring Plan and, therefore, the continuation of Zucchi Group as a going concern.

Alongside the approval of the 2011-2015 Restructuring Plan, other important 2011 events include the acquisition of 80% of Vincenzo Zucchi's stakes in Descamps by Astrance Capital, through Astinvest. The sale and purchase agreement, in particular, regulated:

- a put option and a call option exercisable respectively by Astinvest on the residual 20% of Zucchi's stakes in Descamps and by Vincenzo Zucchi S.p.a on the Astinvest's just acquired stakes in Descamps,
- a capital increase in Descamps performed by Astinvest for the amount of 4 million and by Vincenzo Zucchi S.p.a for the amount of 1 million.

The liquidity resulting from the capital increase and the 1 million interest-bearing financing issued by the parent company in Descamps, will be used to support the restructuring of the company in the context of the *Rédressement Judiciaire* procedure.

In addition, on 14th January 2011, following a new contractual agreement with Polo Ralph Lauren, a new subsidiary of Mascioni S.p.a, Mascioni America Inc., was established in New York, in order to strengthen the group presence in the American market.

Despite the restructuring actions undertaken, however, the group economic and financial performance in 2011 and 2012, which was strongly affected by the drop in consumption registered in Italy in that years, in particular in the household linen industry, didn't reach the

[21] Calculated by subtracting from the net financial positon reported in the financial statement the portion of long term debt that would have been reimbursed though the planned assets disposal.

levels forecasted in the 2011-2015 Strategic Plan. This determined, on 30th June 2012, the breach of the financial covenants regulated by the 2011 debt restructuring agreement and the consequent request of a moratorium period, sent by Zucchi Group to banks in order to avoid the early dissolution of the debt restructuring agreement and, therefore. the early debt reimbursement.

The lack of success of the 2011-2015 Restructuring Plan in aligning the Zucchi Group capital structure to the cash flows generated from operations, can be attributed to several factors. First of all, the Strategic Plan didn't take into account the effects of the economic crisis, already in place in 2011, on group performance, incoherently forecasting positive and increasing revenues growth rates in a stagnant domestic market. The turnover increase, in addition, was expected to derive mainly from sales to Italian costumers while an expansion and strengthening of group international presence in growing markets, such as China, Brazil and USA, might have partially counterbalanced the effects on group performance of the drop in consumption suffered in Italy. Investments for support the growth in foreign markets, indeed, were not forecasted in the 2011-2015 Strategic Plan, according to which the financial resources raised through the financial maneuver, and in particular through the capital increase, had to be mainly used to repay past due trade receivables, and, for a residual part, to fund maintenance capital expenditure.

Furthermore, another element that could explain the deviation of Zucchi Group performance from the 2011-2015 Strategic Plan targets, consisted of the failed relaunch and development of direct channels of distribution, which presented higher potential than indirect channels in term of profitability and improvement in the working capital management. Despite the actions undertaken, indeed, the group distribution strategy continued to highly rely on retail and wholesale channels, which were particularly affected by the negative economic scenario. Lastly, the Zucchi Group product offering, whose price positioning was often not aligned with the market needs and perceptions, further corroborated the inadequacy of Zucchi Group business model to the changes occurred in the reference market.

Starting from the limitations and flaws of Zucchi Group business model and 2011-2015 Strategic Plan, the new CEO Riccardo Carradori, (appointed in May 2012), proposed in 2012 a new business model aimed to transform Zucchi Group from "industrial producer of traditional household linen, operating mainly in the domestic market" to "international player in the market of medium-high quality household products" in both business to business and business to consumer channels.

In particular, central elements of the new business model, then declined in the 2013-2017 Strategic Plan, were the following:

1. Product portfolio. Brand restyling and price repositioning were believed necessary to differentiate the main brands in terms of image, style, products and clients. The rationalization of product portfolio, which entailed the elimination of sub-brands and the focus on top seller, instead, were expected to improve the inventory management.
2. Distribution strategy. New retail format, new factory store model and new franchising strategy were adopted in order to favor the relaunch and development of direct channels of distribution and they were combined with a more accurate and restrictive selection of wholesale and retail clients, in order to reduce the reliance on channels with lower potential.
3. Supply chain. A reduction in production overcapacity and seasonality were pursued through the rationalization of production line and an increasing focus on product and process innovation.
4. Internalization. The new business model, lastly, aimed to realize 50% of Zucchi Group turnover outside Italy in 2017, by promoting the unquestioned value of Italian lifestyle in foreign markets. In particular, the internationalization process should have involved markets such as Germany, Austria and Switzerland, in the attempt to generate more value from markets in which the group already successfully distributed its products, and markets with high growth potential in the household linen industry such as China, Brazil and USA.

The relaunch of Zucchi Group and its international development, involved all the three Strategic Business Unit on which Zucchi Group business model was based, as showed in *Figure 3.26*.

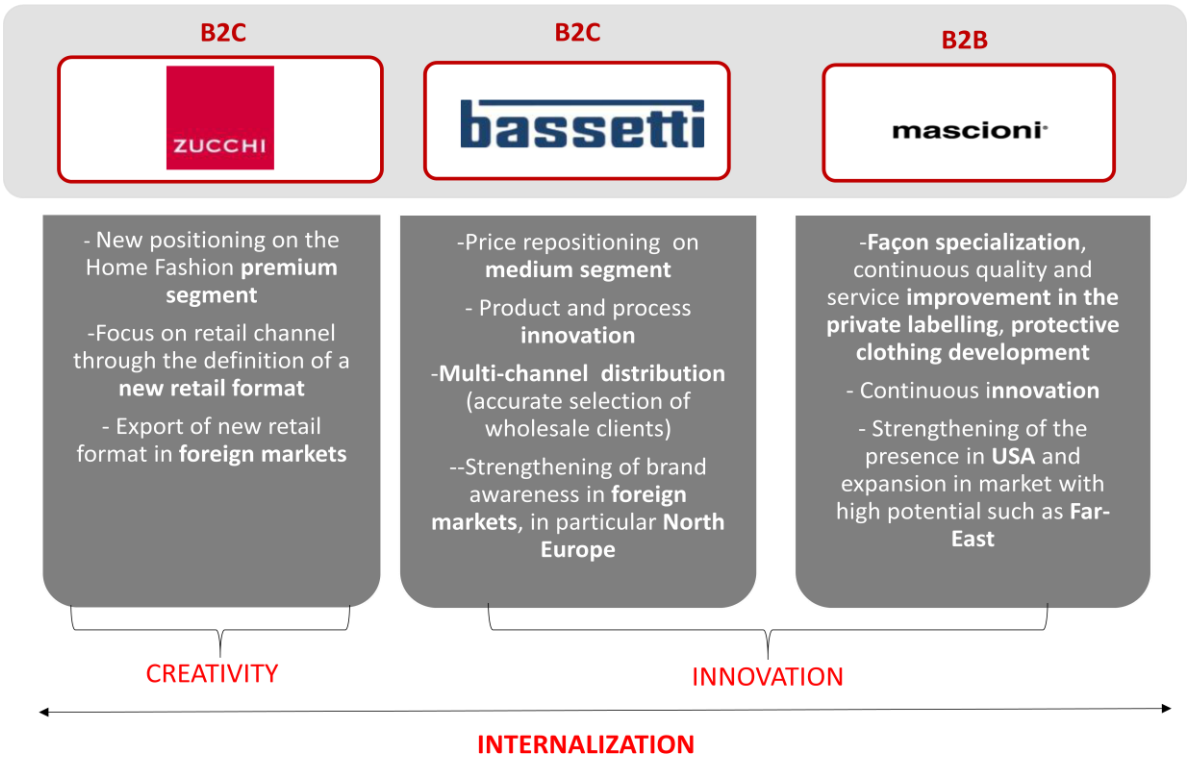

Figure 3.26 – The new business model at the strategic business unit level. *(Personal elaboration from Zucchi Group 2012 presentation "New business model and strategic guidelines")*

The 2013-2017 Strategic Plan, approved in December 2012 by the board of directors, represented an integral part of the debt restructuring agreement (art 182 bis l.f.) negotiated with a pool of banks, which, despite the group inability to fulfill the covenants regulated by the 2011 debt restructuring agreement, still believed the continuation of Zucchi Group as a going concern as the solution granting the higher return for creditors. The debt restructuring agreement was signed on 21st March 2013 and it provided for:

- a capital increase to be subscribe for the total amount of 20 million, through the issuance of ordinary shares offered on pre-emptive basis to all shareholders;
- the confirmation of short term credit line (self-liquidating loan and cash facility), with the possibility to use in 2013 and 2014 a higher amount of cash facility within the total amount of 87 million;
- the reduction of medium-long term debt (which amounted to 42.6 million) for about 15 million through a debt-equity swap and the repayment of the residual debt (27.6 million) by means of proceeds deriving from assets disposal (*Figure 3.27*);

- the fulfillment of some financial covenants by the parent company Vincenzo Zucchi S.p.a expressed in term of sales, EBITDA, NFP and adjusted equity[22].

	Actual debt (€ million)	Debt portion (%)	Debt write-off / Conversion	Forecasted proceeds from assets disposal (annualized, € million)				Total proceeds
				2014	2016	2017	2017	
Unicredit	15.067	35.38%	5.307	1.521	5.827	0.460	1.952	**9.760**
Intesa Sanpaolo	11.049	25.94%	3.892	1.116	4.273	0.337	1.432	**7.158**
Banca di Legnano	8.035	18.87%	2.830	0.811	3.107	0.245	1.041	**5.204**
Banca Popolare Bergamo	3.616	8.49%	1.274	0.365	1.398	0.110	0.469	**2.342**
Banca Popolare Novara	3.616	8.49%	1.274	0.365	1.398	0.110	0.469	**2.342**
BNL	1.205	2.83%	0.424					
TOTAL	**42.588**	**100%**	**15.001**	**4.178**	**16.003**	**1.262**	**5.363**	**26.806**

Figure 3.27 – Debt write-off/conversion and reimbursement schedule according to the 2013-2017 Financial Plan. *(Source: Attachment H of 2013 debt restructuring agreement)*

In accordance to the debt restructuring agreement negotiated with banks, which would expire on 31st December 2017, on 28th June 2013 the Board of Directors, after having reduced share capital (for the amount of 21,684,405.51 euro) and reserves (for the amount of 244,401.08 euro) to cover the cumulated losses, ratified a capital increase articulated in two different tranches:

- tranche A, reserved to shareholders. The 26.1% of the new issued shares (which totally amounted to 284,740,112) was subscribed by new shareholders (0.79%) and by existing shareholders (25.31%), which received 8 new shares every 5 old shares owned, at a share price of 0.072. In accordance with the recapitalization agreement signed on 21st March 2013, then, the shareholder Gianluigi Buffon bought further 203,460,482 shares (providing capital for 6,698,568.65 euro to be deposited by 31st December 2014), in order to allow the full subscription of the capital increase for a total amount of 20 million.
- tranche B, reserved to banks. The capital increase entailed the issuance of 67,486,109 shares to be offered to banks at a price of 0.216 (0.072 recorded as share capital and 0.144 as extraordinary financial income). The resulting capital increase of 4,859,000 euro were realized through debt offsetting for 14,577,000 euro.

[22] Equity adjusted is calculated as the group equity net of capital gains realized from assets disposal and possible accounting adjustments.

According to the 2013-2017 Restructuring Plan, the financial maneuver would provide the financial resources required to implement the group strategic transformation entailed by the adoption of the new business model, contributing at the same time to reduce the group debt burden.

First preparatory actions to the implementation of the new business model were undertaken in 2012. In this year, indeed, Zucchi Group reviewed its product portfolio and brands style, developed a new retail format and implemented actions aimed to reduce the breakeven point. In order to incentivize managers to increase the group value by pursuing long term growth objectives, then, a stock option plan was approved on 2nd August 2012 by the ordinary shareholder's meeting which assigned 6,600,000 option rights (strike price 0.076 euro) to the new CEO Riccardo Carradori. In the same year, in addition, a new subsidiary Zucchi France S.a.r.l was established in order to recover sales volume in France, that had significantly decreased since 2010 as a consequence of the divestment of Descamps, concluded in 2012 with the acquisition of the residual 20% of Zucchi's stakes in Descamps by Astinvest. The internationalization process, instead, started in 2013 with the incorporation of a new subsidiary in Brazil, Zucchi do Brasil Comércio e Importaçao Ltda, and the renewal of the distribution agreement with the Chinese company Luolai Home Textile, according to which further 132 Zucchi and Bassetti branded shops will be opened in China by the end of 2018.

The group, in addition, signed an important licensing agreement with Pantone LLC, the global authority on color, which allowed Zucchi Group to produce and distribute home linens and furnishings, in Italy, Germany and Austria, with the Pantone Universe TM brand with a sector exclusive. The brand image and philosophy are aligned to the characteristics of the brand Bassetti Home Innovation, that, being based on values such as creativity and imagination, uses colors to attract and engage new and existing customers.

Despite the restructuring actions undertaken, however, Zucchi Group wasn't able to reach the 2013 and 2014 performance targets forecasted in the 2013-2017 Strategic Plan. The group, indeed, reported more and more negative net income (-9.4 million in 2013 and -13.8 million in 2014) and confirmed its inability to restore operating profitability. Even if the group continued to be the leader in the Italian household linen industry, indeed, the still too rigid cost structure created great difficulties in dealing with the shrinking domestic market. On the other hand, the turnover realized in foreign markets, even if increasing, still didn't represent a significant percentage able to compensate the decline in sales caused by the negative macroeconomic context and the reduction of Italian consumer spending power.

The negative economic results reported in 2013 and in the first semester of 2014, made clear that the group would not have been able to fulfill some financial covenants regulated by the 2013 debt restructuring agreement and to repay the debt installment due on 31st December 2014. Zucchi Group, therefore, in order to avoid the early termination of the agreement with banks, on 30th October 2014, asked to its creditors a standstill. In particular, banks agreed to grant a moratorium period, confirming the credit lines regulated in the debt restructuring agreement and committing not to enforce any termination clause. Once again, in addition, banks decided to support Zucchi Group continuation as a going concern by being open to negotiate with the group a new debt restructuring agreement, finally signed on 23rd December 2015. The latter is part of the current attempt of Zucchi Group to exit the crisis through a new 2015-2020 Restructuring Plan. As better explained in *paragraph 3.4*, a new financial maneuver is combined with a new Strategic Plan which focuses on the group development into international markets only after a reorganization of group structure has taken place.

In particular, actions aimed to cutting costs and inefficiencies through group restructuring had already started to be undertaken in 2014. In this year, indeed, Hospitality.it S.r.l and Zucchi France S.a.r.l went into liquidation, while a local distributor was entrusted for the commercialization of group products in the French market. The closure of shops opened through Zucchi do Brasil Ltda, instead, was concluded in 2015, given the losses reported by the subsidiary (whose revenues were negatively affected by the economic and political crisis erupted in Brazil in 2014) and the absence of growth prospective. In 2014, in addition, Vincenzo Zucchi S.p.a divested its stakes in Welspun Zucchi Textile Limited and, in 2015, transferred controlling interest on Mascioni S.p.a (at a total price of 150,000 euro, of which 100,000 euros were granted to advisor as success fee), alongside the brand Mascioni Hotel Collection (purchase price of 200,000 euros), to a fund managed by PHI Asset Management Partners and specialized in the acquisition of troubled company. In particular, PHI committed to support Mascioni S.p.a composition with creditors (art 161 l. fall.), to which the company was admitted in 2015, given that the continuous losses suffered in previous years had determined the firm's inability to meet its debt obligation.

The group restructuring, furthermore, involved, once again, a workforce reduction. In particular, in 2014 and 2015, as provided in the agreement negotiated in 2013 with the labor union, Vincenzo Zucchi S.p.a resorted to the use of government social support scheme *(Cassa Integrazione Guadagni Straordinaria)* to lessen the impact of the restructuring process on employees' life condition. In the same years, in addition, the group was subjected also to

management changes, with the appointment of a new Board of Directors and a new CEO, Giovani Battista Vacchi, following the resignation of Riccardo Carradori for personal reasons.
As regards the group capital structure, instead, a first attempt to increase financial structure flexibility to operating cash flows dynamic, which is significantly affected by business seasonality and by the business cycle, is represented by the "GEM Contract", signed by Vincenzo Zucchi S.p.a, Gianluca Buffon (and GB Holding s.r.l.u) and GEM Global Yield Fund Limited, a private equity firm, on 11th April 2014. According to the GEM Contract, GEM committed to subscribe a capital increase in the form of equity line of credit for a maximum amount of 15 million, within 5 years, whenever asked by Vincenzo Zucchi S,p.a.
In compliance with the GEM contract and art 2446 of Italian Civil Code, therefore, on 12th June 2014, the extraordinary shareholders' meeting approved:

- a share capital reduction for 17,862,545.05 euro to cover 2013 losses and the further losses reported on 31st March 2014;
- a capital increase reserved to GEM, for a maximum amount of 15 million;
- the issuance of maximum 46 warrants to be attributed to GEM, giving to GEM the right to subscribe 46 million new shares at the conditions regulated in the GEM contract.

The capital increase approved in 2013, as part of the 2013-2017 Restructuring Plan, instead, brought in 2015 financial resources for 5 million, following the enforcement of the guarantee provided by Gianluca Buffon which had not performed the payment of the amount due for the subscription of new shares within the term of 31st December 2014, as regulated by the recapitalization agreement.
During 2015, in addition, Vincenzo Zucchi S.p.a. continued the debt negotiation with banks started in 2014. In order to create the conditions for the formalization of a new debt restructuring agreement, on 23rd April 2015 the parent company filed a petition for composition with creditors (art 161 l.f). On 24th April 2015, the Busto Arsizio Court set a term of 120 days, then delayed of further 60 days, to file a petition for debt restructuring agreement (art 182 bis l.f.) or the proposal to creditors, the plan and the other supporting documents required by art 161 l. f. During this period of time, art. 2447 and art. 2484 of Italian Civil Code, regulating, respectively, capital reduction and company winding-up when the share capital falls below the minimum required by law, are inapplicable. Since the company failed to file the documentation within the agreed term, however, on 27th October 2015 the Busto Arsizio Court declared the recourse to composition with creditors as inadmissible. As a consequence, on 22nd December 2015, the public prosecutor notified to

Vincenzo Zucchi S.p.a. a bankruptcy petition, since its confirmed inability to meet financial obligations as they become due determined the insolvency status.

3.3.2.2 Financial analysis

The failed recovery of Zucchi Group profitability and financial equilibrium, despite the restructuring actions undertaken during the 2011-2015 period and aimed at the relaunch of the group, is now more in depth investigated, also for this phase of the crisis path, through the analysis of the evolution of Zucchi Group key ratios and its comparison with its main competitors.

As already mentioned, the performance of Zucchi Group during the 2011-2015 period was significantly influenced by the negative macroeconomic scenario and the drop of Italian consumer spending power. The potential effects of the several restructuring actions undertaken in the commercial area and aimed at a turnover recovery, indeed, were nullified by the continuing shrinkage of the domestic market. The latter was not appropriately taken into account in the 2011-2015 Strategic Plan, which, also given the positive growth rate achieved in 2010, forecasted a constant increase of Vincenzo Zucchi S.p.a. revenues. The 2013-2017 Strategic Plan, instead, predicted that the adoption of the new business model would allow the parent company to gain additional market shares and to record positive revenues growth rates. The reduction of household income, however, significantly modified the buying behavior of consumers, that, despite they confirmed their preference toward branded products in respect to unbranded or private label products, were more and more oriented toward convenience. In this context, the repositioning of Zucchi Group brands entailed by the new business model, allowed the group to confirm its leadership in Italy, but not also to increase its market share. Keeping constant the market share (18% in 2012, 18.5% in 2013) in a shrinking market inevitably led to decreasing revenues, and, therefore, to the missing achievement of the 2011-2015 and 2013-2017 Strategic Plan targets[23] in terms of sales (*Figure 3.28*).

[23] 2011-2015 Strategic Plan and 2013-2017 Strategic Plan are contained in the 2011 Debt Restructuring Agreement and 2013 Debt Restructuring Agreement, respectively. Both documents were downloaded from www.registroimprese.it

Figure 3.28 – Comparison between actual sales and revenues forecasted for the parent company in the 2011-2015 period.

Revenues from foreign markets, instead, reached in 2013 the 39% of consolidated revenues. As already mentioned, however, this percentage was too low to compensate for the decline in revenues experienced in the domestic market and it decreased in the following year when the group reorganization proposed in the new 2015-2020 Restructuring Plan entailed the closure of shops in Brazil and the divestment of no more strategic subsidiaries located abroad.

During all the relaunch and internalization phase, therefore, as shown by *Figure 3.29*, Zucchi Group recorded negative sales growth rates[24] (-15.8% CAGR 2011-2015). As Zucchi Group, however, also Italian comparable companies suffered the effects of the shrinking domestic market. In particular, Gabel was not able to halt the revenues decline during all the 2011-2015 period (-5.94% CAGR 2011-2015), while Caleffi sales growth rates swung between positive and negative levels (-0.01% CAGR 2011-2015), showing that the actions implemented by the company in the attempt to recover the turnover had short term effects at best. Springs Global, instead, after the huge drop in revenues suffered in 2011 (-39%) as a consequence of the decline of both domestic demand and exports (because of Real continuing appreciation), had implemented several actions which successfully allowed the group to recover positive growth rates in 2012 (20%) and to maintain positive rates in the following years despite of the shrinking Brasilian market and the slowdown of American economy. Springs Global brands and products, indeed, are strategically positioned in different market segments and, therefore,

[24] The 2014 negative peak is due to the classification of Mascioni Business Unit as discontinued operation. If compared with 2013 re-determined revenues computed considering Mascioni Business Unit as discontinued operation, the group suffered in 2014 a negative sales growth rate equal to -13.76%

they target customers of different socioeconomic profiles, lessening, in this way, the effects of sudden changes in consumer buying behavior on consolidated sales.

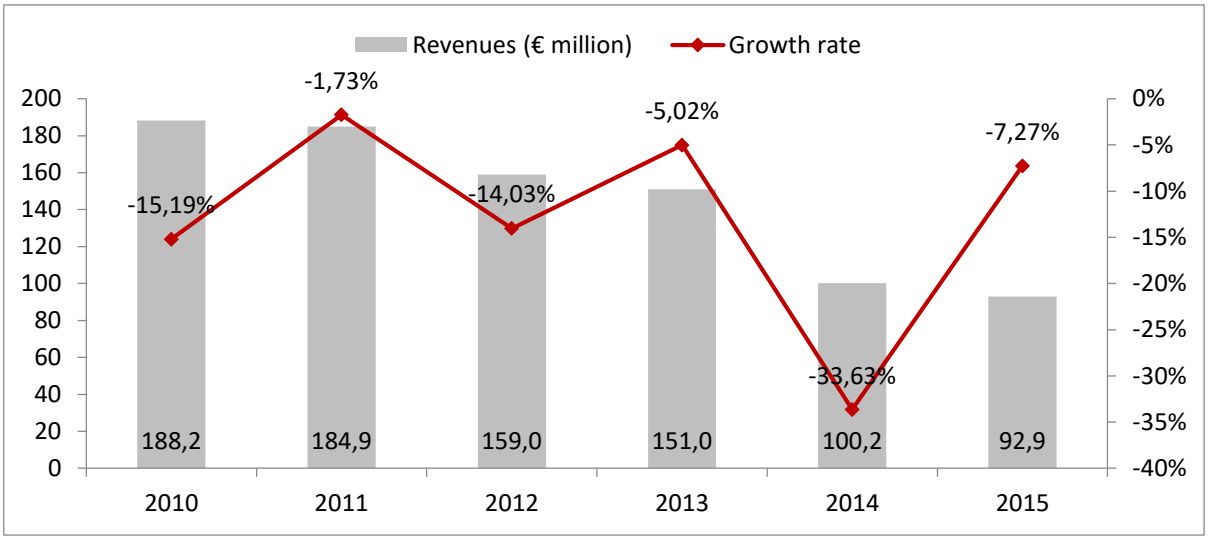

Figure 3.29 – 2010-2015 Consolidated sales.

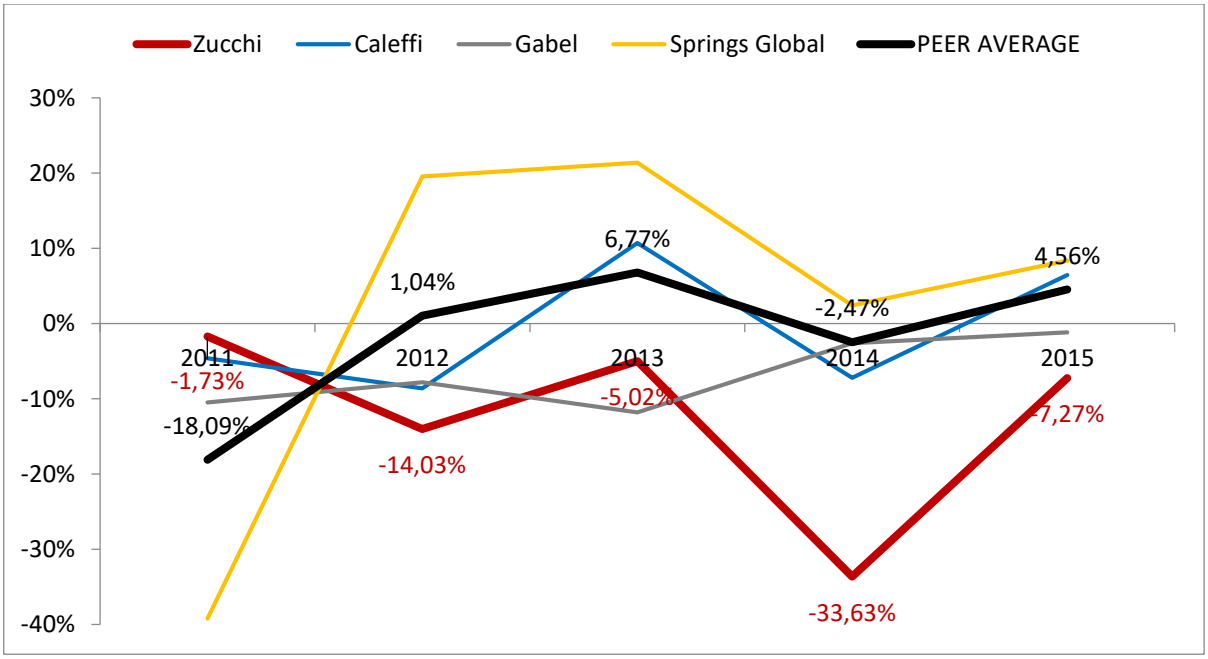

Figure 3.30 – Sales growth rates comparison.

The unexpected drop in revenues, strongly affected Zucchi Group ability to generate positive operating result before depreciation and amortization (EBITDA), that instead seemed to be recovered in 2010, making impossible for the parent company to reach the EBITDA level forecasted in the 2011-2015 and 2013-2017 Strategic Plan (*Figure 3.31*).

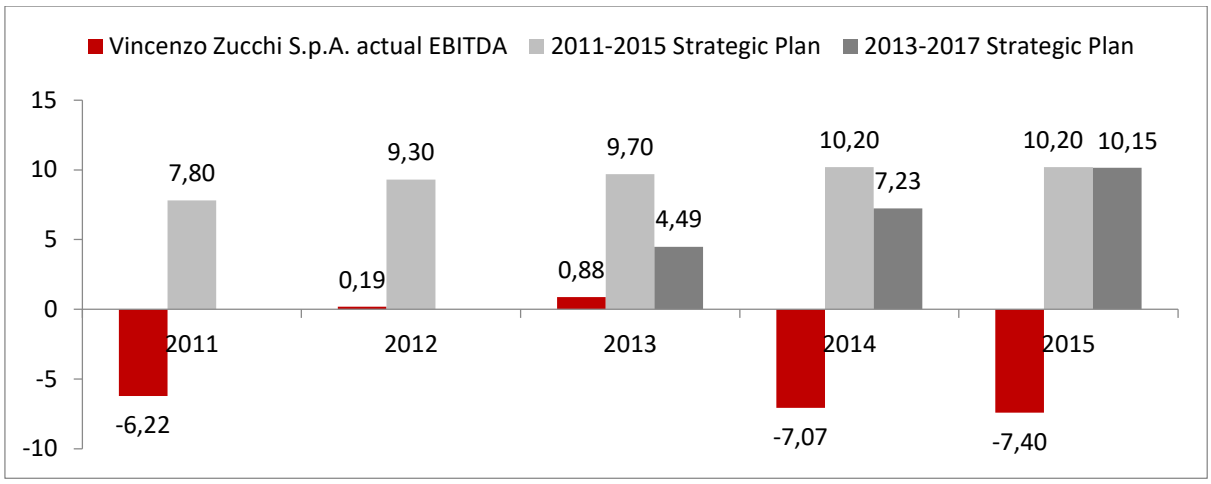

Figure 3.31 - Comparison between actual EBITDA and EBITDA forecasts for the 2011-2015 period.

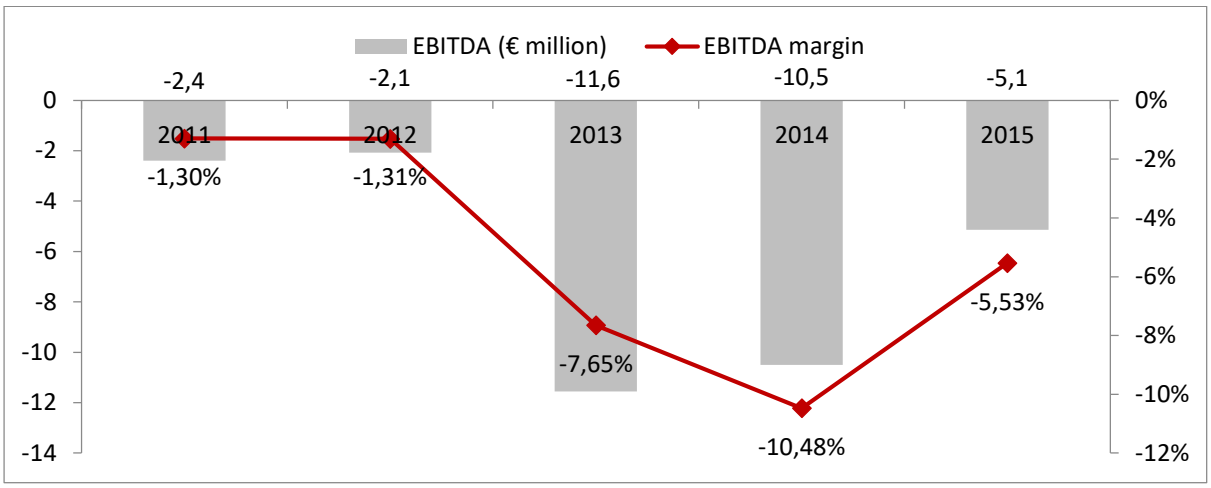

Figure 3.32 – 2011-2015 EBITDA and EBITDA margin.

As shown in *Figure 3.32*, indeed, in 2011, Zucchi Group came back to a negative EBITDA (-2.4 million) and EBITDA margin (-1.30%), as a consequence of the combination of declining revenues and increasing operating costs. The less favorable sales mix, the expansion of the B2B activity of Mascioni S.p.a to new clients operating in the American fashion industry, through its subsidiary Mascioni America Inc., and the implementation of new marketing campaigns, caused, respectively, an increase in cost of goods sold, sales and distribution costs and marketing costs. These negative effects on EBITDA were amplified by the absence of actions aimed to a consistent reduction of structural costs. In 2012, instead, the actions undertaken according to the new business model, such as the review of product portfolio and the more accurate selection of suppliers, produces a slight positive effects on EBITDA (+0,3 million in respect to 2011), maintaining the EBITDA margin close to the 2011 level despite the decline experienced in sales. The internationalization process started in 2013, however,

alongside a less favorable sales mix and a production mix different from the one forecasted in the strategic plan (and characterized by increasing volume of internally produced goods and declining volume of final products bought from third parties), caused in that year a slight increase in operating costs (in particular on sales and distribution costs), leading, in combination with declining revenues, to a huge drop of EBITDA (-11.6 million in 2013) and EBITDA margin (-7.65%). Given the negative operating result achieved in 2013, Zucchi Group decided in 2014 to slow down the internationalization process in favor of a greater focus on internal inefficiencies. Starting from 2014 and according to the new 2015-2020 Strategic Plan, indeed, new restructuring actions aimed at the reduction of operating costs, in particular structural costs, were implemented, allowing the group to reach less negative EBITDA levels (-10.5 million in 2014 and -5.1 million in 2015), despite the continuous decline in revenues. Nevertheless, Zucchi Group still presented greater difficulties than main competitors in managing the effects of sales drop on operating performance, as shown in *Figure 3.33*. The lower flexibility of Zucchi Group cost structure, indeed, caused Zucchi Group to report EBITDA margin below the peer average and the EBITDA margin of Gabel (except in 2012), despite the fact that the latter had started to show signals of economic distress since 2012.

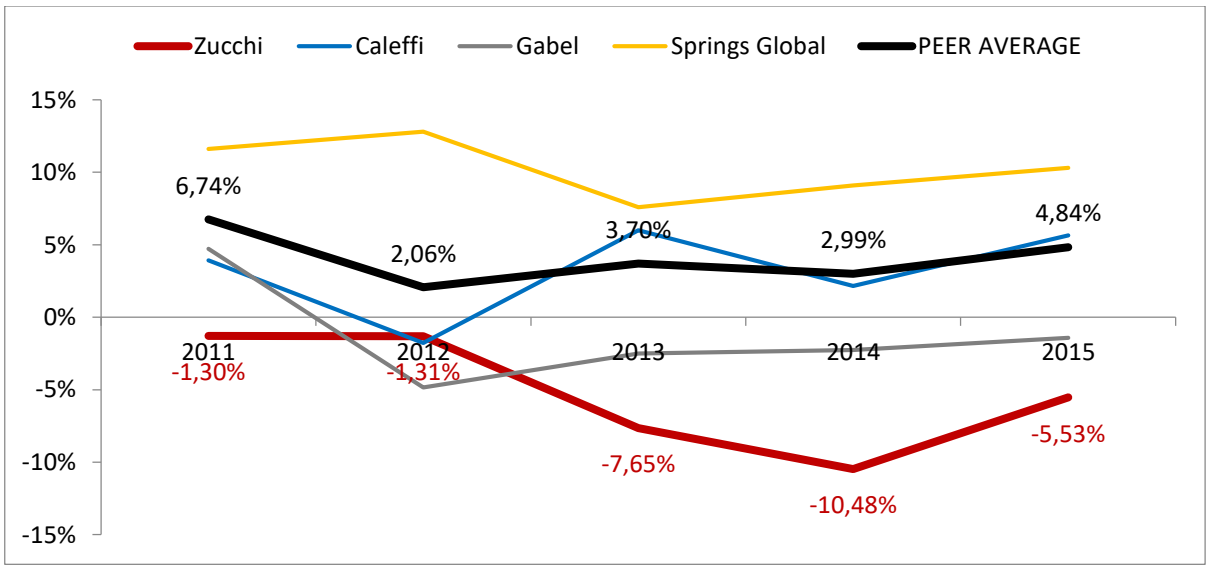

Figure 3.33 – EBITDA margin comparison.

The already negative EBITDA was then worsening by the depreciation of operating assets and extraordinary costs connected with the corporate and financial restructuring process. Operating assets depreciation, however, as pointed out by the decreasing difference between EBITDA and EBIT observable in *Figure 3.34*, had gone down during all the 2011-2015 period, since the depreciation plans of several assets came to an end and investments were

limited to plants and machinery renewal and shops set up. An important role in explaining the difference between EBITDA and Net income, instead, is played, in particular in 2011, 2014 and 2015, by income statement items connected with the restructuring process. The disposal of no more strategic assets, that was realized according to the 2011-2015 Restructuring Plan, generated capital gain for 0.4 million in 2011 and 0.1 million in 2012, while the closure of shops located in Italy and Brazil, carried out according to the new 2015-2020 Restructuring Plan, which aimed to reduce costs and internal inefficiencies, determined impairment losses for 2.8 million in 2014 and 1.5 million in 2015. The financial restructuring, on the other hand, generated costs connected to the debt negotiations with banks but also positive effects on net interest expenses. As shown in *Appendix 1*, indeed, interest expenses have decreased during all 2011-2015 period thanks to the combination of a progressive NFP reduction and lower Euribor. In particular, the debt-equity swap (involving debts for 15 million) and the waiver granted by the Banca Nazionale del Lavoro (0.424 million), regulated by the 2013 debt restructuring agreement, not only positively impacted Zucchi Group NFP, but also it gave rise in 2013 to interest income for 10.1 million (8.0 million net interest income). In 2015 instead, the interest rate decreased mainly because of the suspension of self-liquidating loan decided by banks following the petition art 161 l.f. filed by the parent company in 2015.

All this items contributed to worsening the already negative EBITDA and led the income statement loss to reach the highest levels in 2014 (-39.4 million, of which -18.7 million attributable to discontinued operations) and 2015 (-19.5 million).

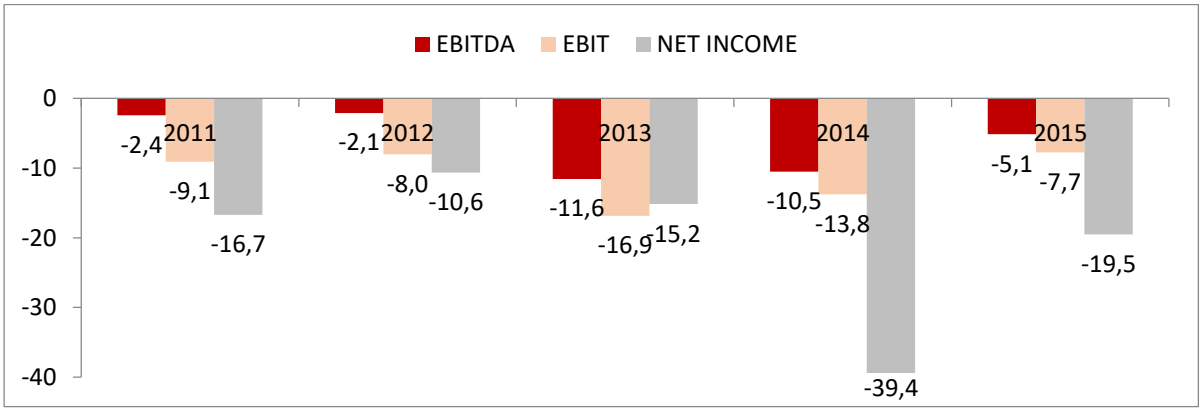

Figure 3.34 – 2011-2015 Consolidated EBITDA, EBIT and Group net income (data in € million).

Alongside turnover and operating costs, another dimension involved in the restructuring process during the relaunch and internalization phase was net working capital and its main components (trade receivables, inventories and trade payables). First of all, as already mentioned, in 2011 past due trade payables were repaid by means of the financial resources collected through the capital increase (15 million). This reduction on trade payables, however,

was compensated, in 2011, by a decrease in trade receivables, caused by a turnover decline, finally leading to a 2011 NWC (92.4 million) approximately stable at the 2010 level (92.8 million). Since 2012, instead, restructuring actions undertaken according to the new business model and the 2013-2017 Strategic Plan started to reveal their effects. The rationalization of product offering, the disposal of lower turnover stocks (no moving and slow moving stocks) and a more careful monitoring of clients, indeed, finally resulted into a decrease of both trade receivables days in revenues (from 120 in 2011 to 90 in 2015) and inventories days in revenues (from 140 in 2011 to 84 in 2015). Trade payables days in revenues, instead, had increased since 2012, until reaching in 2015 the 2010 level (99 in 2010 and 98 in 2015), pointing out that past due trade payables had become so significant that, as happened in 2011 through the capital increase, new financial resources were required to repaid them.

As shown in *Figure 3.35*, net working capital has progressively decreased during the relaunch phase, as a consequence not only of the sales decline suffered in that years, but also of the restructuring actions implemented. In 2015 indeed, Zucchi Group experienced a reduction in NWC (-65%) more than proportional to the sales decrease suffered in that year (-7%), reaching a NWC/Sales level (30.05%) in line with competitors average (30.4%) (*Figure 3.36*).

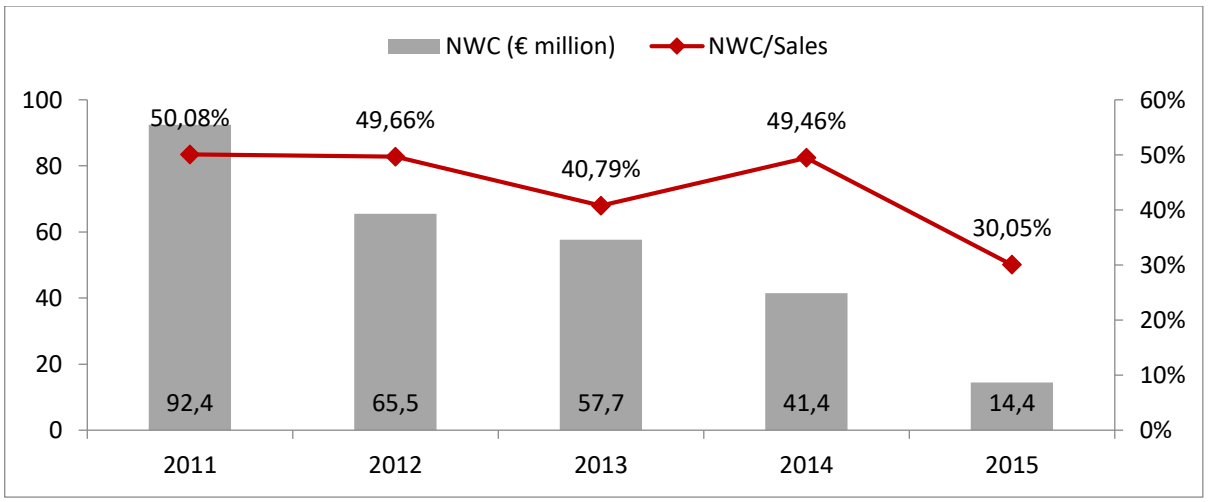

Figure 3.35 – 2011-2015 Net working capital.

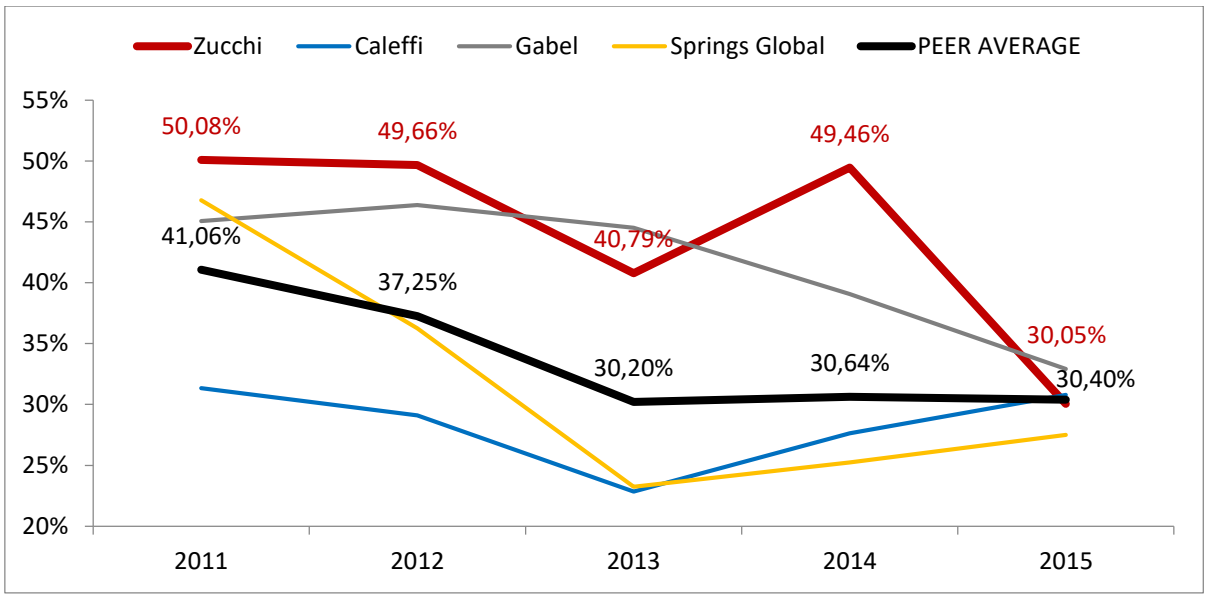

Figure 3.36 – Net working capital on sales comparison.

Lastly, the corporate restructuring process undertaken by Zucchi Group during the 2011-2015 period was accompanied by two financial maneuvers aimed to strength the group capital structure through share capital increases and debt rescheduling and reduction. In particular, as shown by *Figure 3.37*, the group NFP and debt equivalents decreased from 138.8 million in 2011 to 84.6 million in 2015, mainly as a consequence of:

- the improved management of NWC;
- the debt-equity swap negotiated with banks in 2013, which gave rise to a NFP decrease of about 15 million, partially offset by a credit line increase of about 6 million to finance the opening of new shops;
- the suspension of self-liquidating loan decided in 2015 by banks following the petition art 161 l.f. filed by the parent company in that year;
- the decrease in provision for employee benefits, due to the payment of severance indemnity to exiting employees.

On the other hand, group equity reported a downward trend, too, reaching in 2015 a negative level of about 40 million. The huge losses suffered by the group indeed, more than offset the capital increase of about 15 million performed in accordance to the 2011 Financial Plan and the capital increase of about 24.9 million deriving from the issuance of new shares to shareholders (for 20 million) and the debt/equity swap (for 4.9 million) negotiated with banks in the 2013 debt restructuring agreement. This dynamic didn't allow the parent company, as well as the group, to reach the 2013-2017 Financial Plan targets, as shown in *Figure 3.38*. The negative effects on NFP/equity ratio of lower than expected decrease in NFP, indeed, was

exacerbated by a trend in equity completely opposite to the one expected in the 2013-2017 Financial Plan which forecasted the achievement of positive net results and the progressive decrease of debt-to-equity ratio until reaching, in 2017, 0.71. On the contrary, as shown in *Figure 3.39*, the group NFP/Equity ratio continued to report the increasing trend observable since 2006, and reached in 2012 the highest level (12.02). In 2013 instead, the combined effects of equity net increase (2 million) and NFP decrease, reduced the ratio to 9.52, a still extremely high level, in particular if compared with the NFP/Equity ratio of top comparables, equal on average to 0.77. In addition, it is noteworthy that Gabel, despite the economic distress suffered in those years, differently from Zucchi Group, was able to maintain its debt to equity ratio close to 0.50, that is the level reported by the company before the economic distress had resulted into negative EBITDA. This level is below the NFP/Equity ratio reported by Zucchi Group in 2003 (0.75) and 2004 (1.09), when the first signals of decline appeared through downward trends in revenues and EBITDA, pointing out the importance of firm debt capacity as powerful resource to delay the financial distress.

The group NFP/equity ratio, then, resulted in 2014 and 2015 into negative levels because of the negative amount reached by group equity, which has been progressively corroborated by the losses suffered by the group since 2004.

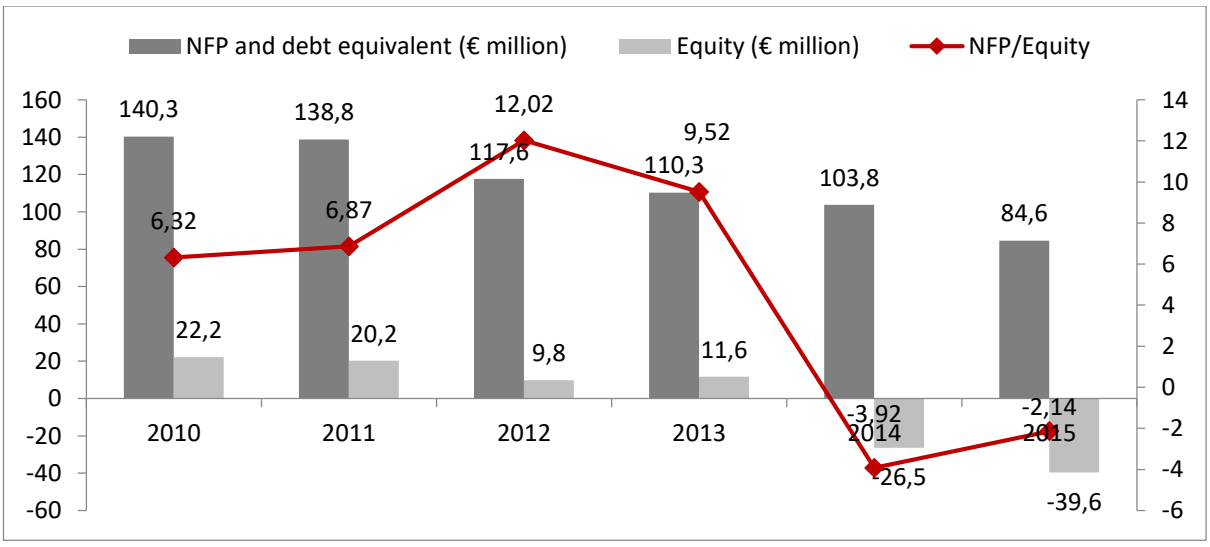

Figure 3.37 – 2010-2015 Group capital structure evolution.

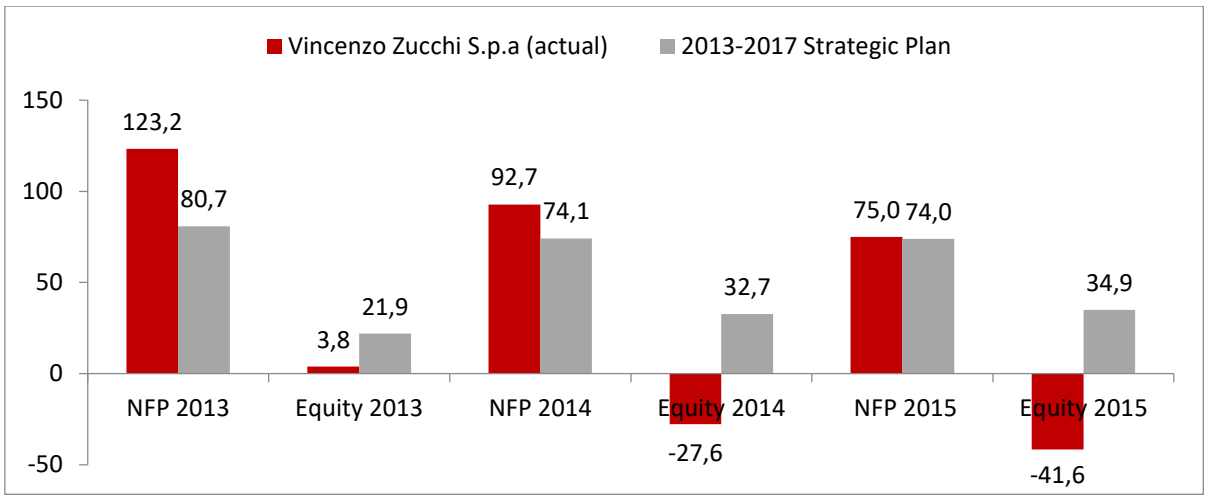

Figure 3.38 – Vincenzo Zucchi S.p.a. NFP and Equity: Actual VS Forecasted.

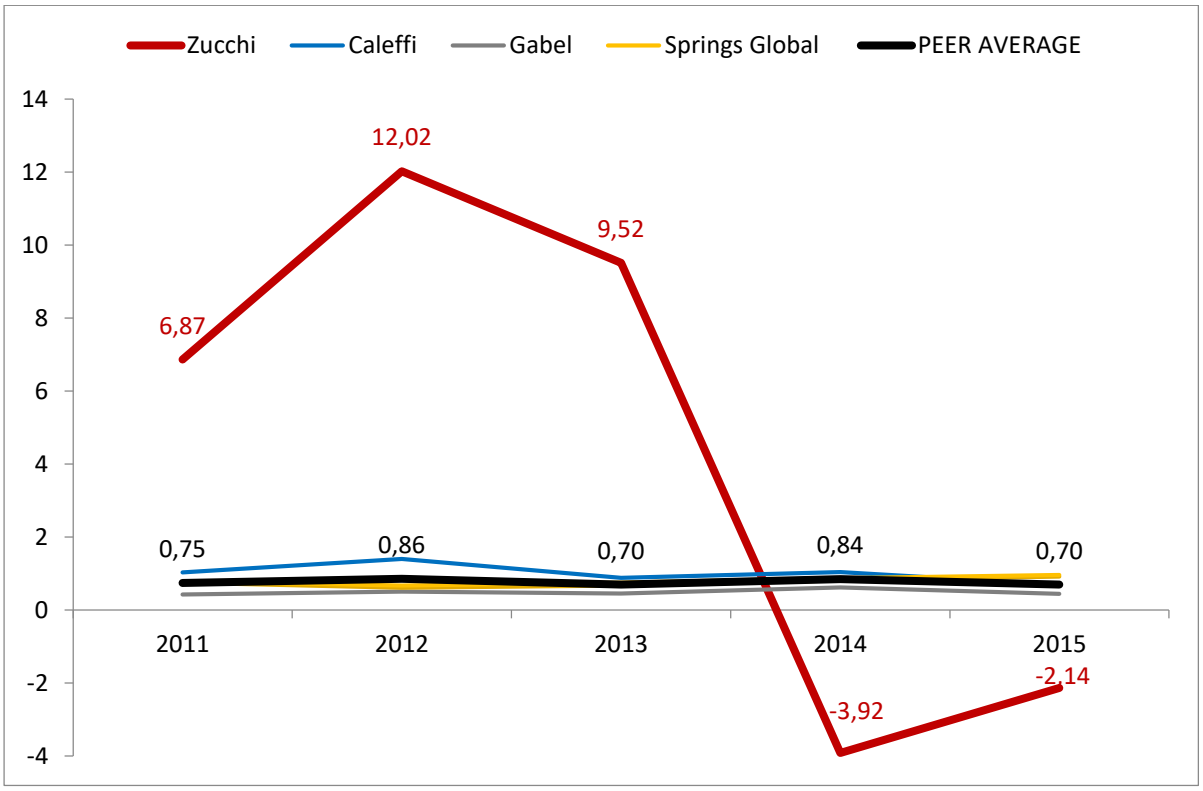

Figure 3.39 – NFP/Equity comparison.

Summing up, according to 2011-2015 Restructuring Plan and the 2013-2017 Restructuring Plan, which main guidelines are recapped in *Figure 3.42* and *Figure 3.41*, respectively, Zucchi Group was expected to exit the crisis through a relaunch and international development process, that entailed, from a strategic point of view, the adoption of a new business model and the opening of new subsidiaries outside Italy. The restructuring actions implemented, however, even if they resulted into an improved working capital management, were not sufficient to allow a turnover recovery and the achievement of positive operating

margin. The group's inability to face the unexpected shrinkage in domestic market, indeed, was exacerbated by costly commercial projects in Brazil, which finally resulted into a failure.
The trend of NOPLAT clearly captured the renewed group difficulties at the operating level. As shown by *Figure 3.40*, NOPLAT remained negative during all the relaunch and development phase, signaling that core operations were consuming, rather than generating, resources. The high volatility of operating cash flows, then, suggests that the restructuring actions implemented in the attempt to exit the crisis have only short term effects at best.

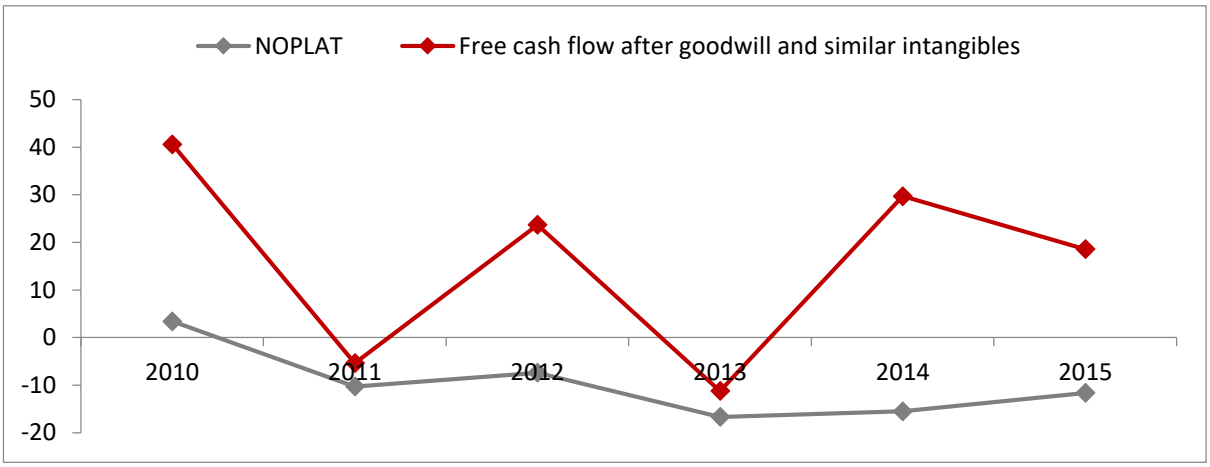

Figure 3.40 – 2010-2015 NOPLAT and free cash flow evolution.

The persisting economic distress, in addition, determines the group inability to meet its financial obligations and to fulfill the financial covenants regulated by the debt restructuring agreements. Even if the financial maneuvers undertaken in 2011 and 2013 brought new financial resources and made the debt burden less overwhelming, Zucchi Group financial distress reached a peak level in 2014. At the end of 2014, indeed Zucchi Group was insolvent and its survival extremely at risk when on 22nd December 2015 the public prosecutor notified to the group a petition for bankruptcy. Zucchi Group, however, could still fight for maintaining itself as a going concern, given the creditors willingness to negotiate a new restructuring agreement with the group. The latter is part of the new 2015-2020 Restructuring Plan, which combines a new financial maneuver with a new strategic plan, whose first preparatory actions had already been undertaken in 2014 and started to reveal some slightly positive effects (in term of less negative EBITDA) in 2015.
Lastly, the lack of success of group relaunch and international development project is clearly captured also by the trend of Vincenzo Zucchi S.p.a share price. As shown by *Figure 3.41*, indeed, the share price, after a slight increase in 2011, remained stable in the following years at levels even lower than the one reported during 2009, after share price plummeted in 2008, when the group was hit by the global financial crisis. In particular, the slight improvement of

Zucchi Group stock performance observed in 2011, especially in correspondence with the sale of Descamps and the approval of the Restructuring Plan, seems to suggest that the market had positively interpreted the announcement of divestiture of the no longer profitable French business and of the refocusing strategy driving the restructuring actions, in accordance with the findings in the literature about market reaction to restructuring announcement discussed in *paragraph 1.6.1.* No particular price reaction, instead, is detected around the signature date (assuming it as an approximation of the announcement date) of the 2013 debt restructuring agreement, even though, according to the literature, a negative stock reaction to the debt-equity swap announcement was expected[25].

In conclusion, Vincenzo Zucchi's stock price trend, which, despite some slightly positive peaks, has been mainly negative since the early 2000s, when the first signals of decline appeared, clearly reflects the group's prolonged poor economic and financial performance and further points out the ineffectiveness of restructuring attempts undertaken in 2011 and 2013 in steering Zucchi Group out of the financial and economic distress.

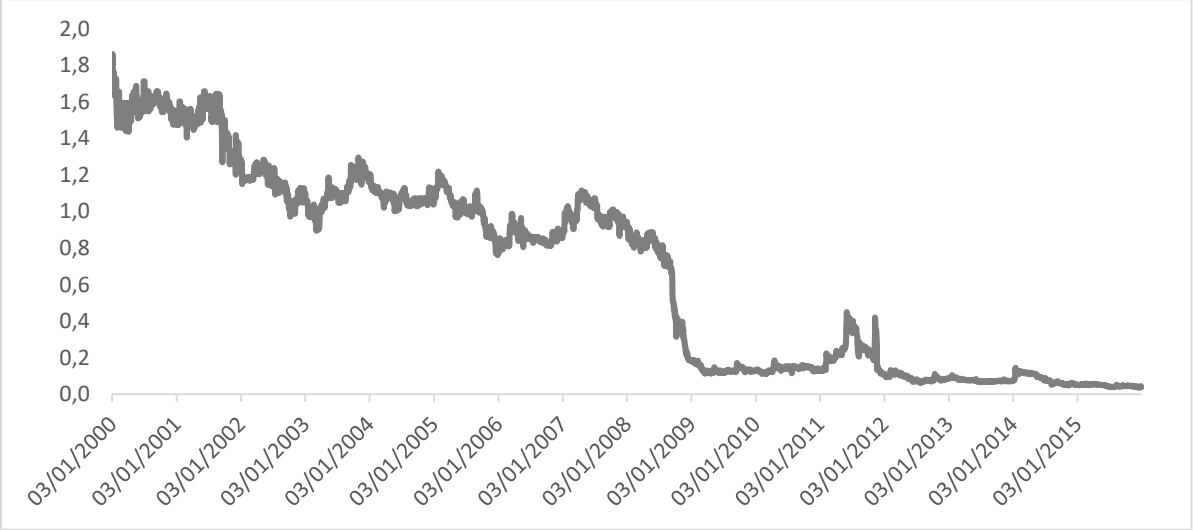

Figure 3.41 – Evolution of Vincenzo Zucchi S.p.a's share price in the 2000-2015 period. *(Source: Yahoo Finance)*

[25] A possible explanation is that at the announcement date, the stock price had already adjusted to restructuring rumors and, therefore, the announcement didn't reveal more unfavorable information about company situation than the market had already realized.

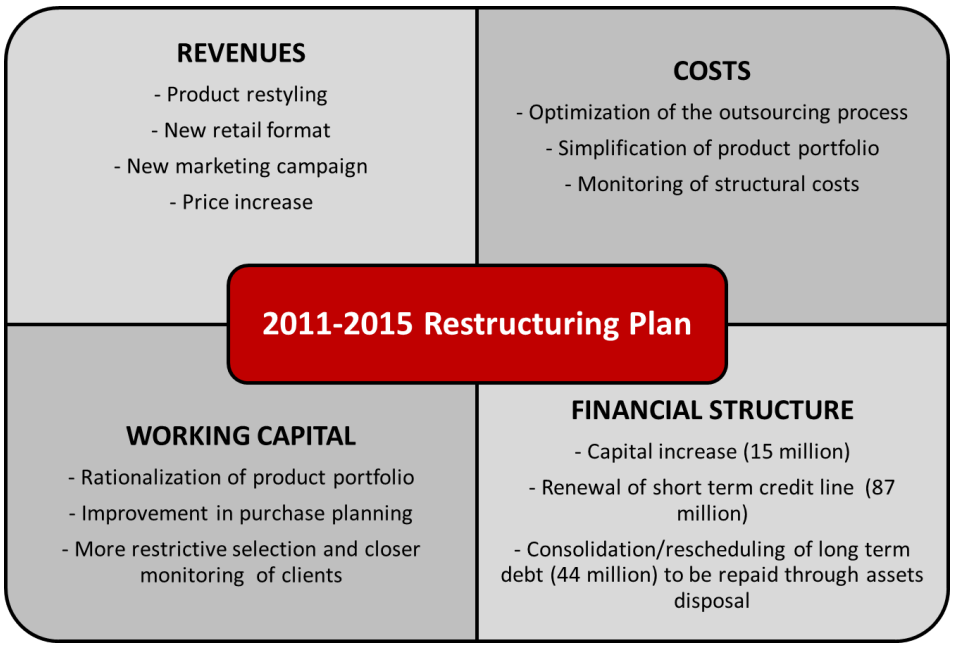

Figure 3.42 – Areas of intervention of 2011-2015 Restructuring Plan.

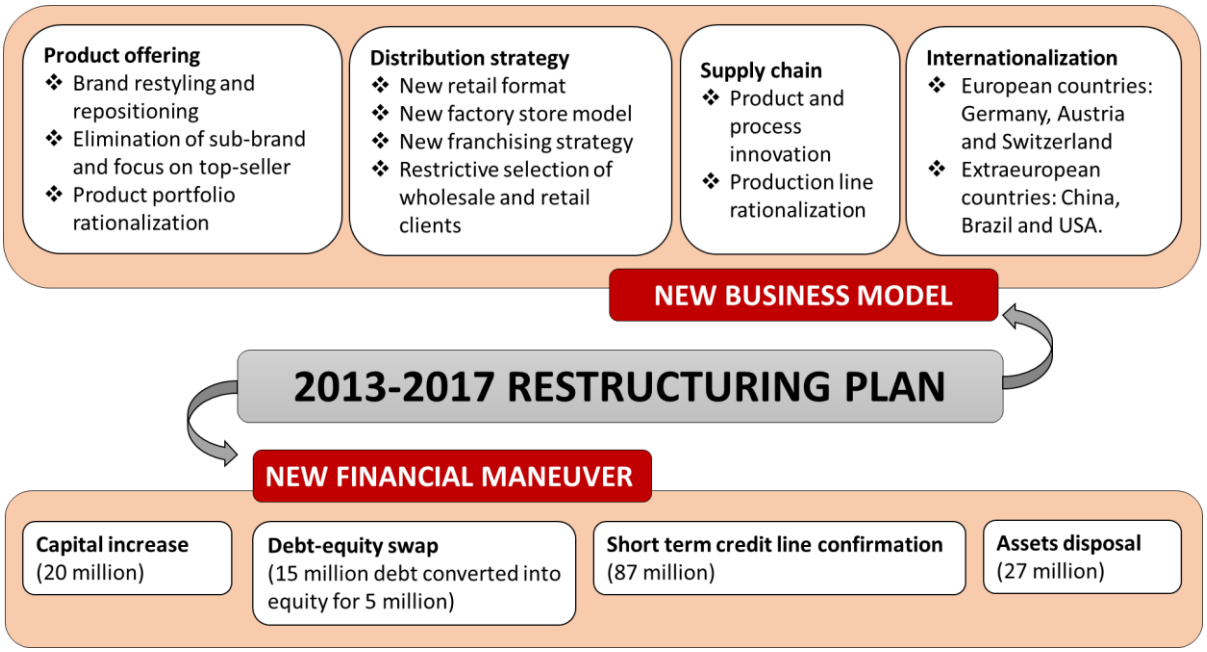

Figure 3.43 – Main guidelines of 2013-2017 Restructuring Plan.

3.4 From past to today performance

The first signals of recovery from the crisis appear in 2016, when the restructuring actions undertaken according to the 2015-2020 Restructuring Plan allow the group to reach positive EBITDA and net income.

As already anticipated, the 2015-2020 Restructuring Plan combines new strategic guidelines (2015-2020 Strategic Plan) with a financial maneuver involving new investors.

In more details, the 2015-2020 Strategic Plan aims to recover profitability by adopting a "power of one" strategy which combines the strengths of group main brands by means of brands repositioning in a complementary perspective and shops conversion from mono-brand to double sign ("Zucchi Bassetti - Casa dal 1830"). The objective is to attract a wider range of clients by selling not only household linen products, but also examples of interior design which suggest to clients how to use and combine products to obtain suggestive atmospheres, providing, in this way, a new buying experience in line with the *Zara Home* model. In particular, Zucchi Collection of Antique HandBlocks, the most important collection of hand-printing woodblocks in the world, can be opened to new license agreements outside the household linen industry (such as furnishing and fashion industry). On the other hand, the group will also attempt to strengthen its e-commerce channel, given the increasing weight of on-line sales on household linen industry turnover.

In particular, the Restructuring Plan is articulated into two phases:

- Turnaround phase (2015-2017), characterized by the simplification of product portfolio, the rationalization of shops (many of which reported negative results), the closure of Brazilian subsidiary (occurred in 2015) and restructuring actions aimed to a steady reduction of operating costs.
- Development phase (2017-2020), during which the group will undertake actions aimed to strengthening brands complementarity, by eliminating price overlapping, and to repositioning Zucchi on premium-luxury segment of the household linen industry, by exiting the promotional channel. In particular, even if the brands will continue to target different customer segments, Zucchi and Bassetti products will be integrated into designated corners inside the double sign shops, in order to recreate living rooms, bathrooms and bedrooms expressing the art of Italian home décor. During this phase, in addition, the group aims to increase its turnover generated in foreign markets by means of new trade relationships with local distributors and license agreements. The objective is to strength the group presence in the European market (in particular in Spain, France and Switzerland) and to implement group development projects in the Chinese market, where the group is already present as best performer (Bertoletti 2016), and in the American market, where the group actually operates though the subsidiary Mascioni USA Inc, which is active in the hospitality segment.

The 2015-2020 Strategic Plan, approved by the board of directors on 17th December 2015, therefore, in its first phase, provides for a slowdown of the internationalization process started in 2013, which revealed itself to be very costly and ineffective until that moment, in favor of actions aimed to eliminate inefficiencies (in particular in the commercial area) and to increase the flexibility of Zucchi Group cost structure. Only when the group restructuring will result in a higher group responsiveness to the possible evolution of uncertainties connected with the expansion in foreign markets, the focus will come back on the internalization process, which will be instrumental in order to strengthen Zucchi Group's brands positioning and complementarity.

Through these restructuring actions, the group is expected to recover profitability and, in combination with a new financial maneuver, to generate cash flows sufficient to meet its debt obligations. The financial maneuver, in particular, consists on a new debt restructuring agreement (art. 182 bis l.f.) negotiated with banks and supported by the intervention of the investor Astrance Capital SAS ("Astrance"), French private equity fund to which Vincenzo Zucchi S.p.a sold its stakes in Descamps in 2010 and 2012.

On 8th December 2015, indeed, Astrance signed an agreement with Gianluca Buffon ("GB") and GB Holding S.r.l. ("GBH"), according to which Astrance will indirectly acquire the control of Vincenzo Zucchi S.p.a. In particular, the agreement provides for:

- Astrance commitment to establish a new company ("NewCo"), regulated by Italian law and directly owned by Astrance;
- GB commitment to sold its shares in Zucchi (equal to 22.28% of share capital) to Astrance (that will acquire the shares directly or through the Newco)[26];
- GBH commitment to sold its shares in Zucchi (equal to 33.98% of share capital) to Astrance, in exchange of 15% stake in NewCo;
- a put option exercisable from 30th June 2020 to 31st December 2020 by GBH on the owned stake in NewCo;
- a call option exercisable at any time by Astrance on the GBH's stake in NewCo;
- Astrance commitment to provide new financial resources to GBH, in the form of a 10 million non-interest-bearing financing, in order to allow GBH to subscribe the capital increase in Zucchi regulated by the debt restructuring agreement.

The execution of the agreement is subordinated to the validation of the debt restructuring agreement, occurred on 2nd March 2016. The latter aimed to significantly reduce the Zucchi

[26] This provision was revised in May 2016 and the percentage of total share capital to be transferred from GB to Astrance was set equal to 16,11% (rather than 22,28%).

Group debt burden by ensuring, at the same time, a creditors' return higher than their recovery in case of liquidation. This objective is pursued through the following actions and conditions:

- the transfer of the business unit constituted by 30 million of Vincenzo Zucchi's debt ("transferred debt"), the properties located in Isca Pantanelle, Notaresco, Casorezzo, Vimercate and Rescaldina and the contracts with 5 employees, to a Special Purpose Vehicle (SPV). Or, alternatively, the transfer of the above mentioned properties to an alternative investment fund, whose profits are entitled to banks. The fund will assume all the obligations associated with the transferred debt;
- a debt waiver granted by banks and concerning the portion of transferred debt not reimbursed through assets disposal;
- a debt waiver granted by banks and concerning the residual debt, that includes the difference between Vincenzo Zucchi S.p.a total debt at 30th September 2015 and the transferred debt, as well as the connected interests. The banks, however, will receive an earn-out payment computed on the basis of the IRR (Internal rate of return) earned by Astrance on its 10 million investment;
- the confirmation or grant, depending on the cases, by banks of self-liquidating credit lines for a maximum amount of 17.538.000 euro, subordinated to the stipulation of insurance policies which guarantee that trade receivables are valid and collectables;
- the issue of guarantees and declarations and the fulfillment of some financial covenants (in term of equity and net financial position) by Vincenzo Zucchi S.p.a., starting from 31st December 2016;
- a real estate earn-out payment equal to 75% of the proceeds deriving from the disposal of the properties and exceeding the transferred debt, paid by the SPV to banks;
- the drafting of a rental agreement involving the plant located in Rescaldina, according to which an annual rent of 1 million has to be paid by Vincenzo Zucchi S.p.a to the SPV;
- a capital increase in Zucchi for cash consideration equal to 10 million, reserved to GBH and performed through the NewCo (since GBH shares in Zucchi are transferred in NewCo according to the agreement between Astrance, GB and GBH).

The debt restructuring agreement, which will expire on 31st December 2020, was signed on 23rd December 2015 by Vincenzo Zucchi S.p.a and the pool of banks composed by Unicredit S.p.a., Intesa Sanpaolo S.p.a., Banca Popolare di Milano S.c.a.r.l., Banca popolare di

Bergamo S.p.a., as well as by Banca Nazionale del Lavoro S.p.a., Astrance Capital S.A.S., GB Holding S.r.l and Gianluca Buffon.

After the validation by Busto Arsizio Court (2nd March 2016), the agreement comes into effects on 18th May 2016, making the petition for bankruptcy, notified by the public prosecutor on 23rd December 2015, impossible to pursue.

According to the debt restructuring agreement, on 1st July 2016, the NewCo subscribed the capital increase of 10 million, providing new financial resources for 5 million on that date and for the residual 5 million by 15th September 2016, that is a later date than the one regulated by the agreement with banks. Since this delay could cause the early termination of the agreement, Vincenzo Zucchi S.p.a asked to banks not to enforce the termination clause. The waiver request was accepted by banks on 26th June 2017.

The financial resources collected through the capital increase were partially used to repay creditors not participating into the debt restructuring agreement. In particular, Vincenzo Zucchi S.p.a negotiated with suppliers that claimed credits higher than 10 thousand, a write off equal at least to 20% of existing debts and a reimbursement schedule for the residual debt. A debt repayment in installments was also agreed with fiscal and social security entities, for the reimbursement of the respective debts.

The payment of past due trade payables for about 14.5 million, only partially counterbalanced by a slight decrease in inventory and trade receivables, however, determined in 2016 a trade working capital increase of 12.6 million, which, in turn, caused operating free cash flow to be negative for the same amount.

Alongside the capital increase financed by Astrance, Zucchi Group further attempted to strength its capital structure in 2016 by asking GEM to subscribe a first tranche of the capital increase approved in 2014, according to the Equity Line of Credit agreement signed with GEM on 11th April 2014. The request, which regarded 5,807,299 shares to be subscribed at a minimum share price of 0.0245, however, was suspended at a later date.

As regards the effect of debt restructuring agreement on Zucchi Group net financial position, instead, it is necessary to notice that the 2016 financial statements still include as short term borrowings the debt subjected to write-off. In particular, properties for 26.5 million (book value) and debt for 30 million will be transferred to the SPV only after the group will have received the outcome of the Revenue Agency analysis (contacted on 12th June 2017) concerning the fiscal implications of the provisions regulated by the 2015 debt restructuring agreement. As a consequence, the 2016 NFP (without debt equivalent) is equal to 72.9 million and has still not benefited from the effects of debt restructuring agreement, even if, from a

legal point of view, the Group has the right not to pay the debt subjected to write-off since the agreement effective date (18th May 2016). The financial covenants check on 31st December 2016, therefore, requires the creation of a pro-forma financial statement taking into account the above mentioned debt write-off, from which emerges the compliance of Vincenzo Zucchi S.p.a's equity and NFP to the financial parameters regulated by the 2015 debt restructuring agreement.

While the group capital structure still doesn't reflect the effects of the financial maneuver at the basis of the 2015-2020 Restructuring Plan (except for the new financial resources deriving from the capital increase subscribed by GBH), the restructuring actions undertaken according to the 2015-2020 Strategic Plan continue to positively affect the group operating performance in 2016, leading to a positive EBITDA of 4.6 million, despite the sales decrease experienced in that year (-13.47%).

In particular, consolidated revenues in 2016 amount to 80.4 million and they were mainly generated in Italy by the business unit "Vincenzo Zucchi and subsidiaries" (*Figure 3.44*). The decrease in consolidated sales, indeed, can be mainly attributed to the turnover reduction suffered by the parent company (-17.5%), which had adopted in 2015 a retail policy based on significant trade discounts that negatively affected sales to final consumer in 2016. The closure of no-more profitable shops and the deterioration of Zucchi Group reputation in front of B2B and B2C clients, as a consequence of the petition for composition with creditors filed by the group in April 2015, then, further contributed to Zucchi Group turnover decline.

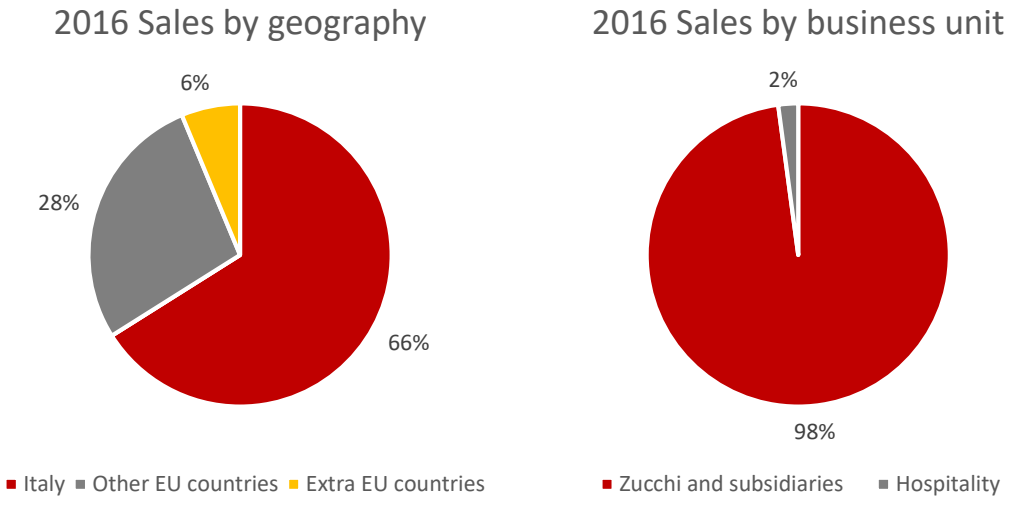

Figure 3.44 – 2016 Consolidated sales segmentation.

Nonetheless, the simplification of product portfolio and the rationalization of shops, that have already resulted in a lower incidence of operating costs on sales in 2015 (106% in 2015, 111%

in 2014), led in 2016 to an operating cost cut (-22.3%) higher than the sales decline suffered by the group (-17.5%), allowing Zucchi Group to reach an EBITDA of 4.6 million after five years of negative operating profits. The cost cutting policy involved mainly marketing costs and structural costs, and resulted, once again, into a workforce reduction.

As shown in *Figure 3.45*, indeed, the number of Zucchi Group employees has progressively decreased during all the restructuring period at a 2005-2016 CAGR of -13.44%, reaching in 2016 613 units. In 2016, however, in the attempt to break this negative trend, Vincenzo Zucchi S.p.a signs a job-sharing agreement with trade unions, expiring on 31st August 2018. Thanks to the transformation of full-time contracts into part-time contracts, the group expected to achieve a reduction on personnel costs avoiding further layoffs.

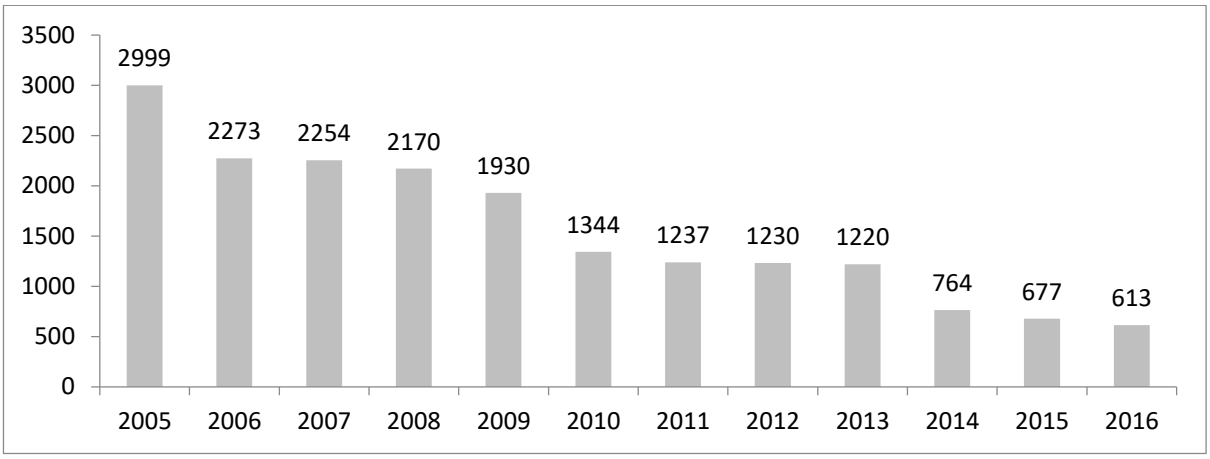

Figure 3.45 –Number of employees in the 2005-2016 period.

A positive result, then, is achieved in 2016 also at the net income level, that, after twelve years of losses, amounts in 2016 to 4.5 million, only 0.1 million lower than EBITDA. This is mainly due to the extraordinary income deriving from the partial write-off of trade receivables (2.5 million), that compensate, for a large part, the effects of negative items such as depreciation (1.5 million), interest expenses (0,58 million accumulated on self-liquidating loan, since the debt portion subjected to write-off is not interest-bearing) and taxes (1.1 million).

Signals of recovery of Zucchi Group performance are also captured by ROIC (*Figure 3.46*), a profitability ratio which focuses only on company's operations. In 2016, indeed, ROIC reaches a positive level (6.12%), after having been negative during all the relaunch and development phase.

By splitting ROIC into its main drivers (*Figure 3.47*), it is possible to notice an approximately increasing trend in capital turnover (revenues/invested capital) since 2006, thanks to the group downsizing occurred between 2006-2010 and the improvement in working capital

management achieved between 2011-2016. The operating margin, however, after some signals of recovery in 2007 and 2010, reported negative levels during all the group relaunch phase, reaching in 2014 the negative peak of -13.28%. The effects of declining sales on operating margin, in fact, were exacerbated by the costs connected with the internationalization process, and finally resulted in a negative ROIC of -14.07%. Zucchi Group, indeed, despite the negative ROIC reported in the previous years (-5.37% in 2011 and -5.45% in 2012), decided in 2013 to focus on growing into foreign markets before improving returns. This caused the growth to destroy value.

The ROIC went back to positive level only in 2016, during the turnaround phase of the new 2015-2020 Restructuring Plan, when the internationalization process was slowed down in favor of a greater focus on actions aimed to reduce internal inefficiencies and improve costs structure flexibility.

The resulting ROIC recovery, then, is a fundamental premise for the creation of value through the expansion in foreign markets pursued by the group in the second phase of the 2015-2020 Restructuring Plan.

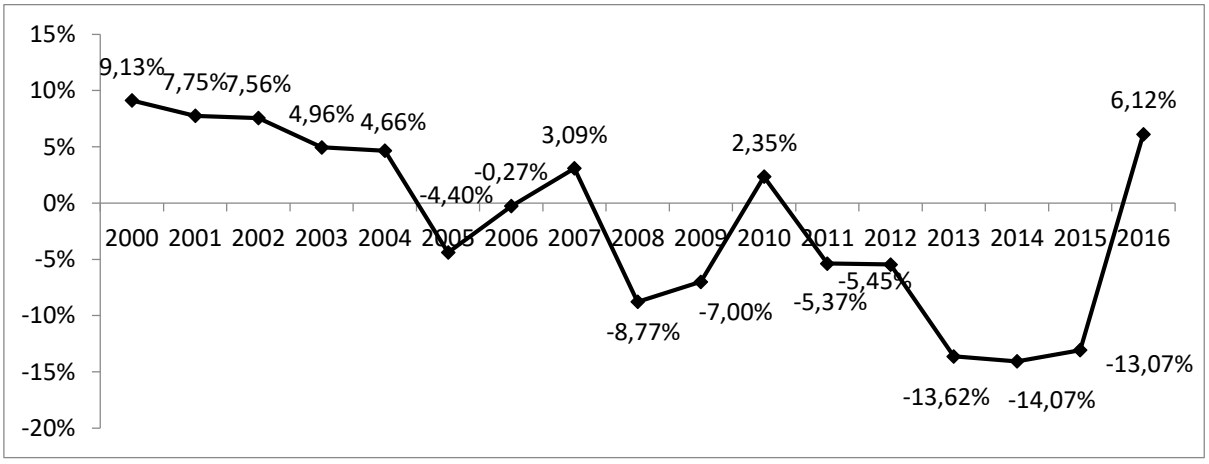

Figure 3.46 – Group (pre-tax) ROIC evolution.

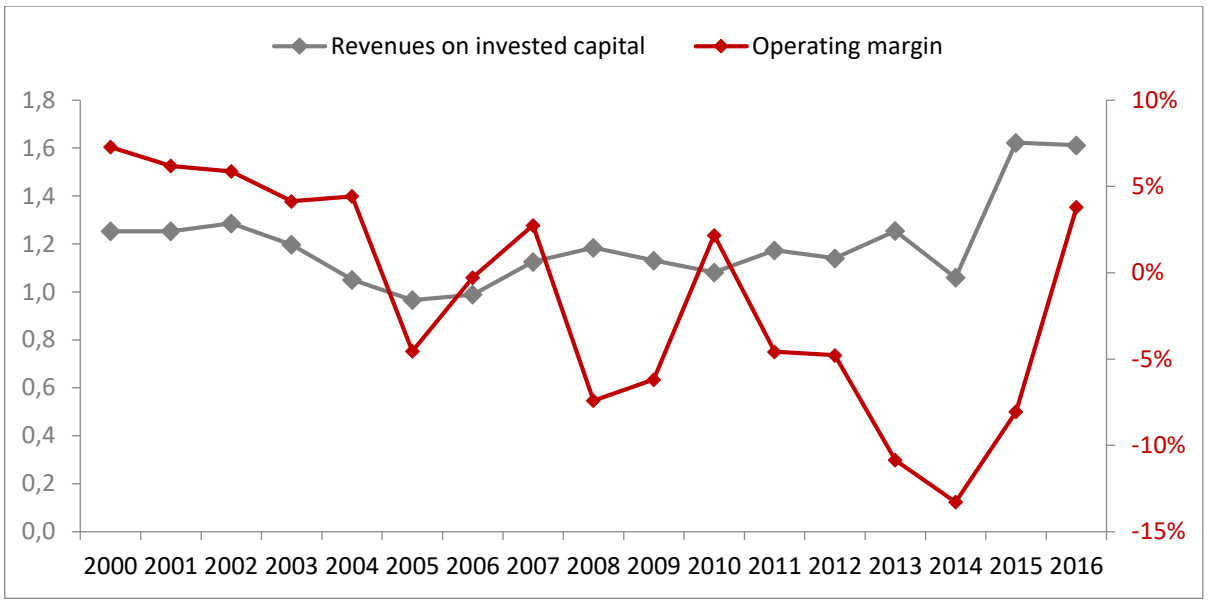

Figure 3.47 –Evolution of ROIC's drivers.

As regards Zucchi Group profitability in terms of ROE, instead, the negative equity reported by the group in 2014, 2015 and 2016 makes this ratio meaningless. In the previous years, however, the ratio reached extremely negative levels in respect to industry average, despite all comparable companies (except for Caleffi in 2013) had experienced decreasing and/or negative ROE from 2011 to 2013 (*Figure 3.48*).

The negative or close to zero ROE observable in 2015 and 2016 for peer companies, in addition, suggests that, also in more recent time, reaching good profitability level is quite challenging for companies operating in the household linen industry, as emerged from the industry analysis conducted in the next paragraph.

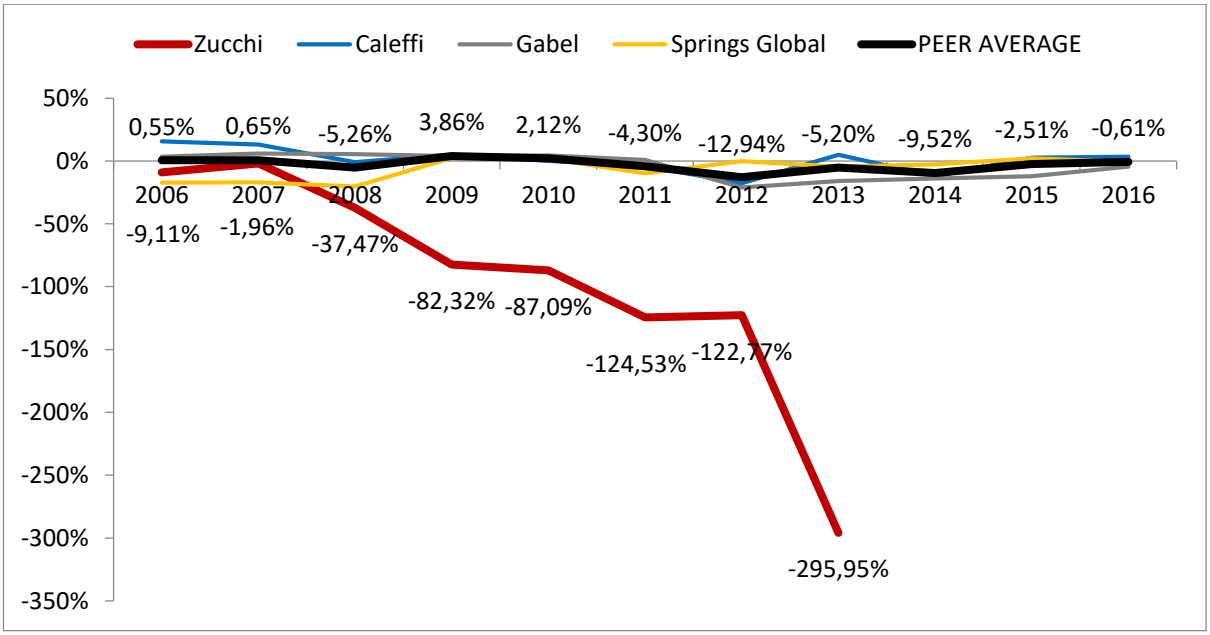

Figure 3.48 – ROE comparison.

3.5 The household linen industry

From the analysis of the crisis path performed in the previous paragraphs, it emerges that the causes of Zucchi Group crisis are mainly internal and connected to wrong management choices such as the lacking integration of companies acquired by the group during its expansion period (from 60's to 90's), which resulted in an over-rigid group corporate and production structure, and the Brazilian gamble, that finally revealed itself as an ineffective and expensive attempt to exit the crisis though the expansion in foreign markets. The resulting deterioration of the group performance, however, was accelerated and amplified by factors connected to the external environment, such as the 2008 financial crisis and its repercussions on real economy in the following years.

As shown in *Figure 3.49*, indeed, the Italian textile industry suffered negative turnover growth rates in 2008 (-2.20%) and in 2009 (-15.40%), in correspondence with the outbreak of the financial crisis, and in 2012 (-3.18%) and in 2013 (-0.72%), because of the renewed macroeconomic and geopolitical uncertainties. The resulting decrease in consumer spending power and increase in unemployment rate, in particular, caused in 2012-2013 a huge drop in the consumption levels of Italian households, which significantly cut, among other things, their average monthly expenditure in household articles both in absolute term (from 145€ in 2006 to 93€ in 2013, as shown in *Figure 3.50*) and as percentage on total monthly average expenditure (from 5.9% in 2006 to 4.6% in 2013).

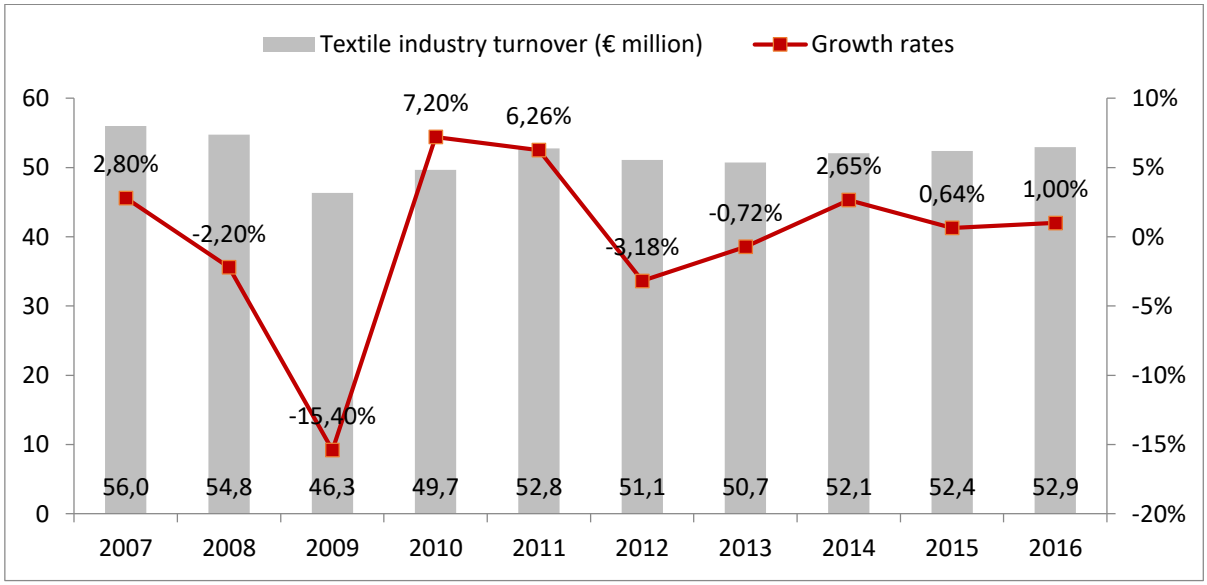

Figure 3.49 – Evolution of textile industry turnover in 2007-2016 period. *(Personal elaboration of data collected by Sistema Moda Italia - SMI)*

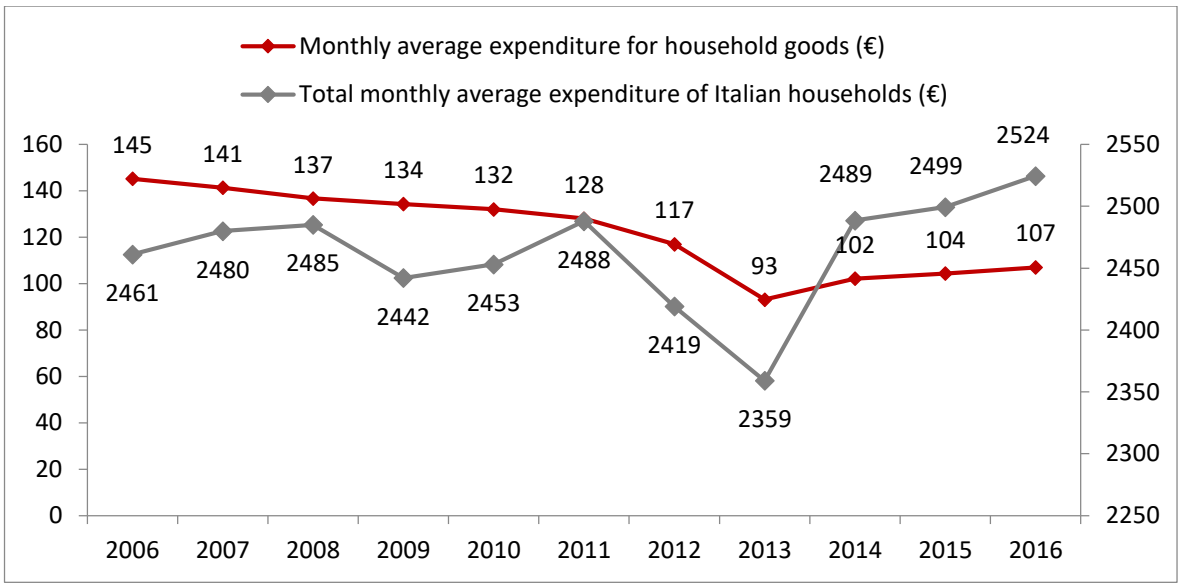

Figure 3.50 – Consumption expenditure of Italian households in the 2006-2016 period. *(Personal elaboration of data provided by ISTAT)*

Given the shrinking domestic market, therefore, different players in the textile industry started to looking for new customers in foreign markets able to appreciate the value of Italian textile products. The incidence of exports on total industry turnover, indeed, grew from 50% in 2007 to 55.1% in 2015. While exports grew of about 3% in the 2007-2014 period, however, imports recorded a 13% increase. This resulted in an even more negative balance of trade in some sectors of the textile industry, among which the household linen sector (-243,307 thousand € in 2007 and -275,350 thousand € in 2015), signaling the high competitiveness of lower cost production of foreign players suffered by Italian companies.

Focusing on more recent times, the few data freely available from SitaRicerca, point out that the household linen industry is a mature market with a value equal to 1.38 billion in 2016, substantially in line with the 2015 data (1.39 billion). The industry maturity and medium concentration (in 2016 the market share of the first three brands Zucchi-Bassetti, Caleffi and Ikea amount to 25.9%), in combination with the intermittent over capacity caused by demand seasonality and the absence of switching costs for customers, make the competitive rivalry in the household linen industry quite intense. Zucchi Group, indeed, has to compete with other brands specialized in its industry (as Gabel and Caleffi), department stores (such as Coin) and, to some extents, fast fashion giants that have expanded its product offering to household linen sector (such as Zara Home and H&M Home). In particular, the actual possibility that other fast fashion giants can opt for a brand extension similar to the one successfully adopted by Zara (as happened for H&M, that in 2009 launched H&M Home, whose first shop in Italy was opened in 2016), given the potential synergies achievable in the production and

distribution area and the absence of legal barriers, can significantly impact the profitability of companies currently operating in the household linen industry. Indeed, even if these brands don't compete directly with Zucchi and Bassetti brands, that, by providing high-quality products, are positioned in the medium-high segment of the household linen industry, their value proposition (style at affordable price) was significantly appreciated by Italian consumers during the economic crisis, since they didn't want to give up decorating their houses with style despite the reduction suffered in their income. While fast fashion products can represent a potential substitute of higher quality products, however, buyer's propensity to switch to totally unbranded household linen is generally quite low, in particular in the Italian market. The threats of substitutes, therefore, exercise a medium pressure on industry profitability, as well as the bargaining power of buyers. On one hand, indeed, B2B clients are likely to negotiate on price, given the higher volume acquired and the low switching costs. On the other hand, however, for B2C clients, despite the null switching costs, the volume per buyer is very small and the number of customers is almost incalculable.

Finally, a weak impact on industry's profitability is exercised by the bargaining power of suppliers. The number of suppliers, indeed, is high (especially from low-wages countries), the input differentiation is crucial in limited circumstances and switching costs for companies are quite low.

Summing up, from Porter's Five Forces analysis, illustrated in *Figure 3.51*, it emerges that industry competitive forces exercise a medium/high pressure on industry profitability. Achieving a good level of profitability in the household linen industry, therefore, is challenging, in particular in the last years, which have been characterized by a severe economic crisis, and for companies as Zucchi Group, whose critical financial situation has exacerbated the crisis at the strategic/operating level by impeding a prompt reaction to the intensification of industry rivalry between existing firms and with potential new entrants.

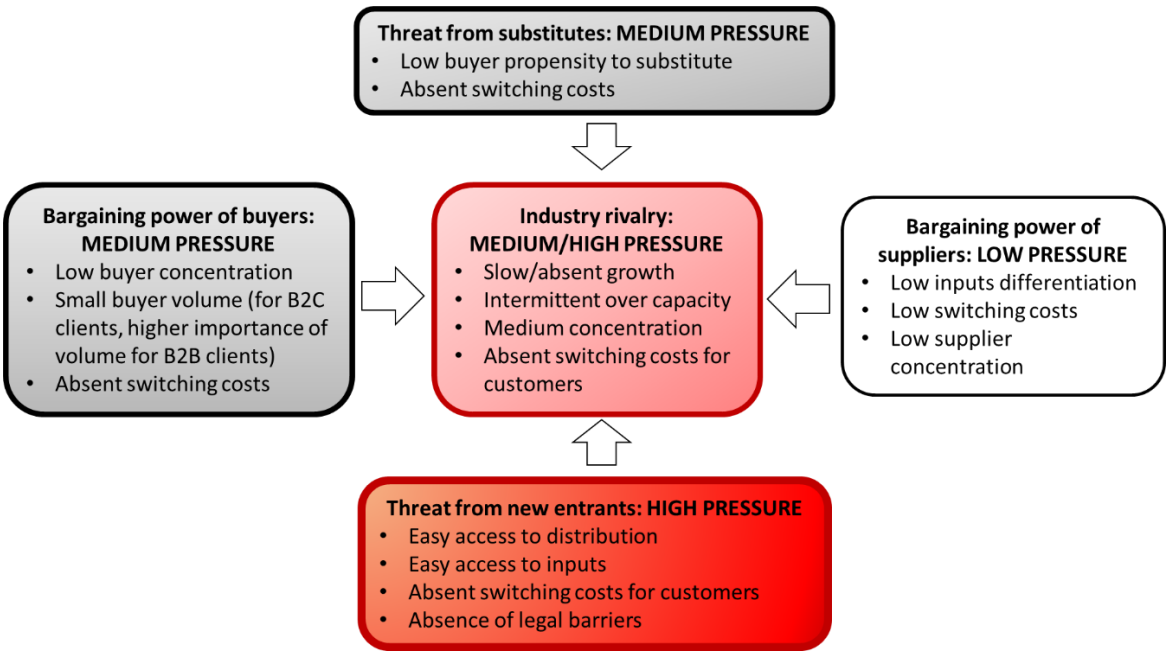

Figure 3.51 – Porter's Five Forces analysis applied to the household linen industry.

To conclude the chapter, Zucchi Group specificities are now linked with the characteristics of the competitive environment in which it operates through the application of the SWOT analysis (*Figure 3.52*). This tool allows to identify the strengths that Zucchi Group should use as a basis for developing a competitive advantage and the opportunities for growth and profit, but also the weaknesses that the group should overcome and the threats that could cause further troubles for the business.

First of all, Zucchi Group benefits from a strong brand awareness both in Italy and abroad. The brand image and consumer's perception of products, however, is planned to be further enhanced in the future by exploiting the value of "being an Italian brand", which is recognized at the international level as a synonymous of style and quality. In particular, even if Zucchi Group production is actually not totally "Made in Italy", since it is largely outsourced to foreign suppliers, the group accurately selects and monitors its suppliers in order to ensure the compliance with the stringent quality and stylistic standards set by the group and expected by an Italian brand. This strength, in particular, will be further exploited by the group, according to the 2015-2020 strategic guidelines, by recreating in the shops living rooms, bathrooms and bedrooms that represent an expression of the Italian home décor art. By offering examples of Italian style in the field of interior design, indeed, the group aims to enhance the customer experience, attract new customers, and, therefore, recover its turnover. Other strengths of Zucchi Group are then its widespread distribution network and its strong know-how deriving from about two centuries of experience in the household linen

industry, which is acknowledged by several players in the fashion industry that have decided to rely on Zucchi Group for the development of their household linen segment. The continuation and renewal of these commercial relationships, however, is jeopardized by the persistent financial distress suffered by Zucchi Group, that negatively affected the group reputation in front of clients, suppliers and creditors. In particular, on 31st December 2016, the group still presents a highly leveraged capital structure, given that the debt write-off regulated by the 2015 debt restructuring agreement, even if effective, has still not occurred. In addition, the operating cash flows forecasted in the 2015-2020 Strategic Plan are not sufficient to repay the portion of debt subjected to write-off. This means that in the case of occurrence of termination events, such as the breach of financial covenants, creditors, that might not be willing to further negotiate the debt, are highly likely to force the company to liquidation.

Focusing on the operational level, instead, another weakness of Zucchi Group is the continuous decline of consolidated revenues, which, if persistently experienced also in the future, could lead to a deterioration of the operating margin. Even if the restructuring actions undertaken showed a positive effect on the EBITDA in 2015 and in 2016, indeed, the resulting costs structure could reveal itself as not sufficiently flexible to absorb further huge drop in sales.

In order to invert this negative trend in revenues, the group can exploit different opportunities offered by the external environment. First of all, it can undertake development projects in international markets, such as China, that has proven to have great potential in terms of demand, but it can also expand into new industries, through license agreement regulating the use of Zucchi Collection of Antique HandBlocks in the fashion or furnishing industries. Other opportunities for growth and profit consists in the strengthening of the e-commerce network, given the increasing popularity of online sales among consumers, and the consolidation on the premium segment of the household industry, that, if successfully implemented, will allow the group to earn higher margin.

These opportunities are recognized by Zucchi Group and, indeed, their exploitation will drive the second phase (development phase) of the 2015-2020 Strategic Plan, according to the attempt currently undertaken by the group to exit the crisis through a new group restructuring at both the operating and financial level. The effectiveness of the 2015-2020 Restructuring Plan, however, will be strongly influenced by the possible occurrence and connected magnitude of events beyond the company control that have the potential to harm the business. The absence of legal barriers and the potential for synergies in the production and distribution area, as already mentioned, may encourage, for instance, players of the fashion industry, as

fast fashion giants, to enter the household linen markets, further increasing the already high level of competition in the industry. The household linen sector, in addition, is sensitive to the business cycle. Lower revenues, indeed, are generally realized in period of economic downturn and contraction, since consumers tend to prioritize expenses and cut out some that are believed less essential, as the expenses for household linen. The household linen industry, indeed, rises and falls according to the trend of macroeconomic factors such as unemployment rate, interest rate, exchange rates, raw material price and GDP. Prolonged economic downturn, in addition, may cause changes in consumers' preferences toward low-cost branded products or unbranded products, making more and more complex for companies operating in the premium segment to maintain their market share. Lastly, the household linen industry experiences higher sales during cold seasons and lower sales during hot seasons. Thus, the possibility that above average winter temperature may cause a delay in winter sales, strongly affecting the turnover of the entire year, and, therefore, the company profitability, is another risk to which firms operating in this industry are exposed.

STRENGTHS	WEAKNESSES
• Strong brand awareness • Italian historic brand • Strong distribution network • Know-how deriving from a long experience and tradition in the high quality segment of household linen industry	• Continuous top line contraction • Highly leveraged capital structure • Inability to generate sufficient cash flows to meet debt obligations in case of early termination of 2015 debt restructuring agreement
OPPORTUNITIES	**THREATS**
• International development • Strengthening of E-commerce • Consolidation on premium segment • Expansion in new industries (such as furnishing and fashion industry) through license agreements	• Entry of big international players • Business seasonality • Sensitiveness to business cycle

Figure 3.52 – Zucchi Group's SWOT analysis.

In conclusion, in this chapter the causes of the corporate crisis, as well as the effects of past restructuring actions, have been identified through the analysis of Zucchi Group historical performance. In addition, company internal and external environment has been scanned to recognize strengths and weaknesses, as well as opportunities and threats, that can positively or negatively affect or drive Zucchi Group business in the future. All this information constitutes the starting point for building accurate forecasts about the effects of the 2015-2020 Restructuring Plan on Zucchi Group main value drivers and, therefore, it represents a fundamental input for the valuation of Zucchi Group performed in the next chapter.

CHAPTER 4: Zucchi Group valuation

4.1 Introduction

Once revised Zucchi Group's historical performance and potential future prospects, which could be more or less favorable depending on the internal and external environment evolution, the main goal of the analysis is now to provide an estimate of Zucchi Group economic value.

First of all, as described in *paragraph 4.2*, a mixed version of the APV model was selected to perform the valuation. By computing the enterprise value as if the firm is totally equity-financed and, therefore, discounting the free cash flows at the unlevered cost of capital, indeed, this technique overcomes the difficulties connected with the estimation of a dynamic WACC in the DCF model, which is required when the firm's leverage is expected to change substantially from year to year, as it's typical for distressed companies subjected to restructuring. In the long term, instead, the firm's capital structure, also due to the significant debt write-off granted by creditors, is assumed to converge to a target level, in line with the competitors' average, justifying the adoption of the WACC as discount rate at the end of the explicit projection period, when Zucchi Group's operations are foreseen to achieve a steady state.

Before applying the APV model to the case of Zucchi Group, however, 2016 pro-forma financial statements were built in *paragraph 4.3*, in order to capture the effects of the 2015 debt restructuring agreement (art. 182 bis l.f.) on Zucchi Group 2016 financial statements if all its provisions were implemented at the agreement effective date (18th May 2016) and not partially postponed to the outcome of the Revenue Agency analysis about the fiscal treatment to be applied to the operation. Starting from the 2016 pro-forma financial statements, then, the uncertainty about the evolution of Zucchi Group's key value drivers was managed through a scenario analysis (*paragraph 4.4*). After having depicted a base scenario following the 2015-2020 Strategic Plan guidelines, a more optimistic and a more pessimistic scenario were developed supposing more or less favorable assumptions about the competitive dynamics and the success of the restructuring changes. Consolidated financial statements, therefore, were projected under each scenario and the present value of the free cash flows was computed using the unlevered cost of capital obtained in *paragraph 4.5*. Zucchi Group's value beyond the explicit forecast period was then estimated, by applying the key value driver formula and using the WACC as discount rate, and the result checked with the outcome of the analysis based on market multiples. Once computed the unlevered value of operations (*paragraph*

4.7), the focus of the valuation shifted toward the tax benefits arising from the possibility to carry forward accumulated past losses, which can generate significant value for a distressed company subjected to restructuring, as Zucchi Group, given the prolonged negative net income suffered in the past and the reversal in this trend expected in the future years as a consequence of the restructuring (*paragraph 4.8*). Finally, Zucchi Group expected enterprise value was computed by summing up the unlevered value of operations, the tax benefits and the non-operating assets and by attributing different probability of realization to each scenario (*paragraph 4.9*). The value of NFP and debt equivalents was then subtracted from enterprise value to estimate Zucchi Group's equity value. The latter resulted to be in line with company's market capitalization and with the estimate that would have been obtained if the uncertainty about future prospects had been incorporated in the discount rate, through an additional risk premium, rather than managed through the scenario analysis.

The second part of the chapter (*paragraph 4.10*), instead, is dedicated to the valuation of Zucchi Group consolidated debt, as if a debt rescheduling, rather than a debt write-off, had been granted by creditors in the 2015 debt restructuring agreement. Both the methods adopted to estimate the market value of Zucchi Group debt (the BSM model and the DCF model applied to free cash flows to debt) confirmed that the company would have never been able to meet its debt obligation, despite the cash flows improvements expected from the implementation of the strategic plan, justifying, therefore, the creditors decision in favor of a debt forgiveness.

4.2 Valuation premises

The starting point for the valuation of Zucchi Group is the last available consolidated financial statements which capture the first positive effects of the 2015-2020 Restructuring Plan on 2016 group performance. 31st December 2016, therefore, is the valuation date. 2017, instead, was considered as the first year of explicit projection, given that 2017 complete consolidated financial statements are not currently available. Intermediate consolidated results presented by Zucchi Group on 30th June 2017 and 30th September 2017, however, have been taken into consideration to make assumptions about 2017 expected performance.

The evolution of Zucchi Group key value drivers was explicitly forecasted from 2017 to 2021. According to the group managers, indeed, the restructuring process will end in 2020 and the group operations will reach a steady state in 2021. Over this period of explicit forecasts, Zucchi Group enterprise value was computed by adopting the Adjusted Present Value method, according to which:

$$EV = Unlevered\ value\ of\ operations + PV\ of\ expected\ tax\ benefits + Non\ operating\ assets$$

Recapping the main advantages of this method in respect to DCF model, which were analyzed in detail in Chapter 2, the APV technique, being based on the unlevered cost of capital, avoids the computation of the WACC, which is a very challenging task when valuing distressed firms. Assuming a target capital structure over the explicit projection period in line with competitors' overage, as its typical for healthy firms, in fact, is not reasonable for a distressed company, since it is incompatible with its overleveraged current situation. Assuming a target debt to equity ratio in line with its overwhelming current leverage, instead, is not credible, since without restructuring the company will probably cease to exist and, therefore, expected cash flows will never be realized. On the other hand, the implementation of restructuring plans aimed to rebalance distressed company's capital structure, generally causes continuous and significant fluctuations of debt to equity ratio, requiring the estimation of a different WACC for each year of projection. The changing debt to equity ratio, in addition, should be determined at market values, giving rise to circularity problems and estimation issues. The equity value, indeed, is at the same time an input of WACC calculation and an output of the DCF model, since its value depends on the Enterprise Value computed by discounting free cash flows at the WACC. Alongside model circularity, another critical issue consists on the estimation of the market value of debt when debt is not traded. While for healthy companies the nominal value of debt can be considered as a good proxy of its market value, this doesn't hold for financially distressed firms as Zucchi Group. For the latter, indeed, the default risk is

significantly higher than at the time in which the debt was issued and, therefore, the market value of debt is valued at a discount to the book value.

The APV method allows to get around all these problems by discounting operating free cash flows, as well as tax shield flows generated by debt and/or accumulated losses, at the unlevered cost of capital, which can be computed starting from market information of comparable companies.

For the computation of the firm's value beyond the explicit projection period, instead, the WACC was adopted as discount rate, assuming that in the long run Zucchi Group will reach a target capital structure in line with the industry average. According to Koller et al. (2015), indeed, companies operating in the same industry tend to converge to a common debt to equity ratio, since the choice of firm's optimal capital structure and, therefore, the debt/equity trade off largely depend on industry related factors, such as growth, returns and asset specificity.

To deal with the uncertainty typical of future projections, which is even greater for companies subjected to a restructuring process, since the latter creates discontinuities with past data, the components of firm's enterprise value were estimated under three different scenarios to which different probabilities of realization were assigned. Despite the more pessimistic or optimistic nature of the assumptions underlying the different scenarios, all scenarios were elaborated by supposing Zucchi Group continuation as a going concern during and beyond the explicit forecast period.

The going concern hypothesis underlying the valuation process is supported by five main arguments:

1. First of all, Zucchi Group intended strategy seems to be in line with latest market trends and competitors' KSFs. Zucchi Group, indeed, aims to exploit the opportunity deriving from the increasing popularity among consumers of online sales in the household linen sector, by strengthening its e-commerce network. On the other hand, the group intends to boost revenues by enhancing customer experience in shop, key building block of successful business models such as Zara Home's one. These strategic elements, in combination with a steady reduction of operating costs, make the intended strategy to appear as going in the right direction to bring Zucchi Group future performance to healthy competitors' level.
2. The implementation of the strategic guidelines is supported by a financial restructuring which is deeper than in the past. The 2011 debt restructuring agreement, indeed, entailed mainly a banks' loans consolidation and rescheduling, while the 2013 debt

restructuring agreement regulated the write-off of 35% of long term debt. According to the 2015 debt restructuring agreement, instead, 62% of Zucchi Group debt will be written off (49.6 million over a total debt of 80 million), as well as the portion of the 30 million debt transferred to the SPV that will not be reimbursed though assets disposal. If this significant debt waiver had been accounted in 2016 financial statements, Zucchi debt on 31st December 2016 would have been equal to 0.4 million. By substantially eliminating Zucchi past debt, banks give to the company the opportunity to reborn. Cash flows deriving from the implementation of the new strategic plan, indeed, need to be sufficient to allow Zucchi Group to meet its new debt obligations (in the case in which new financing are required to fund investments supporting the group expansion abroad), and not also its overwhelming past debt burden, as it was regulated by previous debt restructuring agreements. This significantly reduces Zucchi Group probability of default.

3. Zucchi Group 2016 financial statements and 2017 half-year financial statements show an improvement in operating results, despite the decline in revenues suffered by the group. This evidence supports the effectiveness of the restructuring actions undertaken by the group and aimed to reduce operating costs incidence on sales.
4. As highlighted in KPMG's audit report[27] on 2016 consolidated financial statements, the cash flows that will be generated according to the 2015-2020 Strategic Plan are not sufficient to meet Zucchi Group debt obligations in case of an early termination of the 2015 debt restructuring agreement, which determines the revocation of the debt write-off. On 31st December 2016, however, an early termination of the agreement with banks is quite unlikely. Financial covenants regulated by the agreements (shareholders' equity must be higher than 5 million and net financial position lower than 12.5 million[28]) were satisfied on that date and resulted not to be breached also on 31st December 2017 and 31st December 2018, according to the group forecasted performance, even in the worst scenario.
5. The group continuation as a going concern is supported by a new investor, Astrance Capital, a French private equity fund specialized in corporate restructuring and turnaround. After having acquired the control over Zucchi Group, Astrance Capital appointed a new manager, Michel Lhoste, which took office on 1st November 2017. Michel Lhoste, differently from Zucchi Group previous managers, has experience in

[27] Available on: http://www.gruppozucchi.it/

[28] Or 42.5 million, if the debt transferred to the SPV (30 million) is still accounted among Zucchi Group consolidated debt.

successful restructuring of companies operating in the fashion industry (he managed the turnaround of Belstaff and Sixty Group) and a twenty-years expertise on fashion brands management and international development. His acknowledged competences could play a key role in Zucchi Group's relaunch and they represent one of the discriminant elements that, by distinguishing Zucchi Group current attempt to exit the crisis from the previous ones, could determine the success of the 2015-2020 Restructuring Plan.

Despite the valuation was conducted under the going concern hypothesis, however, the uncertainties and main risks connected with Zucchi Group restructuring process and external environment were taken into account in making assumptions about key value drivers evolution. In particular, the effects of the materialization of threats, such as the entrance of new competitors in the household linen industry, on Zucchi Group future results were captured by the assumptions at the basis of the worst scenario.

4.3 The financial maneuver

As already mentioned in Chapter 3, Zucchi Group 2016 consolidated financial statements still don't completely reflect the effects of 2015 debt restructuring agreement on group capital structure. As agreed with banks, the debt write-off and the transfer of the business unit to the SPV will take place once received the outcome of Revenue Agency analysis about the fiscal treatment to be applied to the operation. Nonetheless, on 18th May 2016 the debt restructuring agreement came into effects and since that date Zucchi had the right not to pay the debt subjected to write-off. Given that the purpose of the valuation is to capture the effects of both financial and strategic restructuring (the latter indeed is not feasible without the former) on Zucchi Group enterprise value, the 2016 financial statements were subjected to some adjustments in order to simulate the impact of the complete execution of 2015 debt restructuring agreement on group's financial results.

The main provisions of 2015 debt restructuring agreement are summarized in *Figure 4.1*.

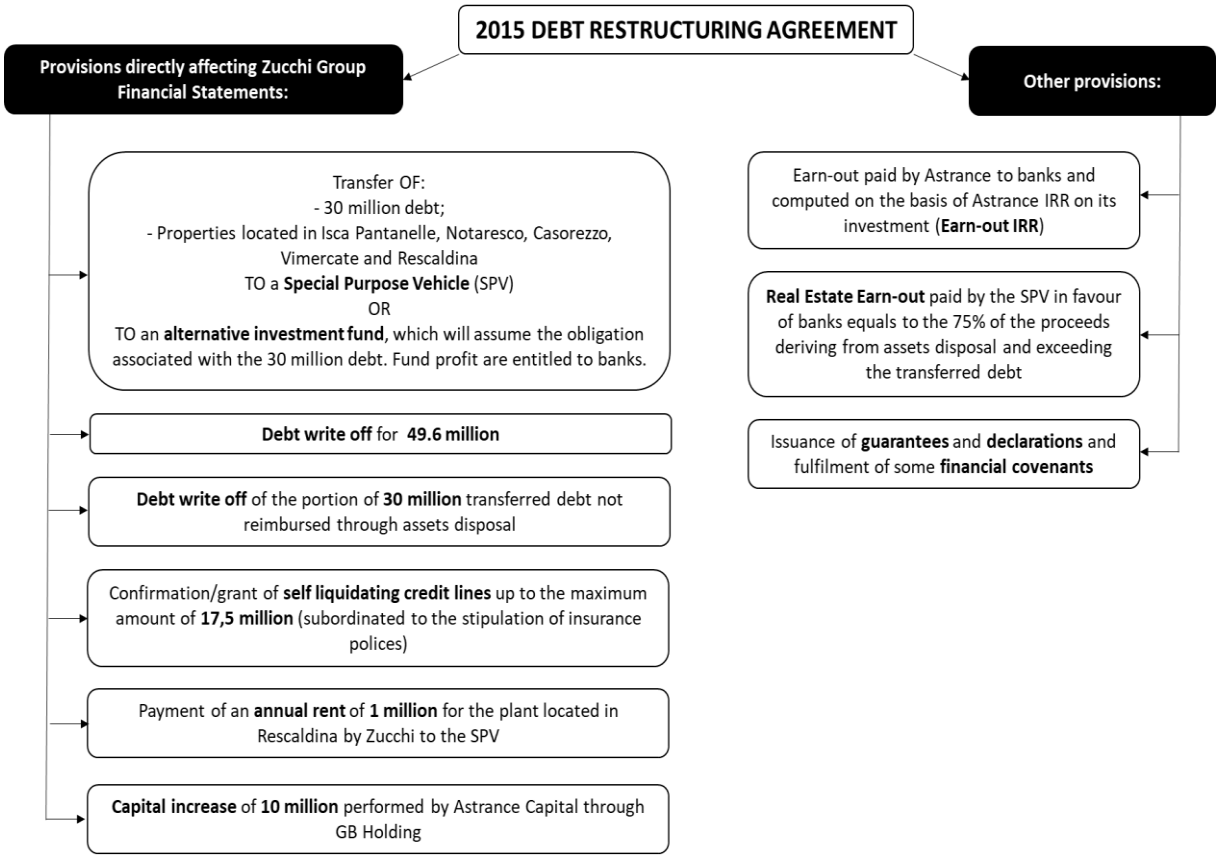

Figure 4.1 – Main provisions of 2015 Debt Restructuring Agreement.

In order to build the 2016 pro-forma financial statements, only the provisions listed on the left side of *Figure 4.1* were considered. The agreement clauses identified as "other provisions" in *Figure 4.1*, instead, were not supposed to have a direct impact on Zucchi Group financial statements[29]. The payment of the Earn-out IRR, indeed, represents a commitment toward banks for Astrance Capital and not for Vincenzo Zucchi S.p.a, and, therefore, it doesn't give rise to any cost increase in the consolidated income statement. On the other hand, in a conservative perspective, the possibility that assets disposal generates total proceeds higher than 30 million was considered as a very optimistic scenario in a distress setting. The SPV (and eventually Vincenzo Zucchi S.p.a, depending on whether the parent company control the SPV, according to the control definition provided by IFRS 10), therefore, is not expected to generate any extra profit from assets disposal.

In order to capture the effects of 2015 debt restructuring agreement on 2016 consolidated results, the 2016 consolidated financial statements were subjected to the following adjustments:

[29] This means that they do not directly determine any increase or decrease of financial statements items. The fulfillment of these provisions, however, is fundamental for the continuation of Zucchi Group as a going concern in the future, since covenants breach or missing earn-out payments will determine the early termination of debt restructuring agreement.

- ADJUSTMENT 1: Properties, plants and equipment were reduced for 26.5 million, which is the total book value of properties transferred to the SPV. It was assumed, indeed, that Vincenzo Zucchi S.p.a opts for the creation of a SPV, rather than allocating assets to an alternative investment fund[30]. In addition, even if the decision to consolidate or not the SPV financial statements should be based on whether the parent company controls the SPV (according to IFRS 10), it was preferred to exclude SPV assets and liabilities from Zucchi Group consolidated financial statements. This avoided to make assumptions about the timing and amount of proceeds deriving from assets disposal, preventing to add further arbitrariness to the valuation. Moreover, the choice is justified by the fact that, in case of realized sales proceeds lower than 30 million, the portion of debt not reimbursed though assets disposal will be subjected to write-off. Vincenzo Zucchi S.p.a. debt, therefore, is reduced for 30 million regardless the banks actual recovery from assets sales (ADJUSTMENT 6);
- ADJUSTMENT 2: Cash and cash equivalents were decreased to 6.9 million, supposing that cash was used to pay the annual rent of 1 million for Rescaldina plant;
- ADJUSTMENT 3: Equity for 49.6 million was assumed to arise as a consequence of the write-off of debt for the same amount. The share capital, instead, was maintained equal to the 2016 level, since it already accounts for the capital increase of 10 million performed by GB Holding (Astrance Capital), according to the 2015 debt restructuring agreement.
- ADJUSTMENT 4: Current payables to banks were reduced for the amount of debt subjected to write-off (49.6 million) and the amount of debt transferred to the SPV (30 million). Since 18th May 2016, indeed, Zucchi Group has had any obligation to repay such debt.
- ADJUSTMENT 5: Operating costs were increased for the annual rent (1 million) paid for continuing to use the plant located in Rescaldina, which was transferred to the SPV[31];
- ADJUSTMENT 6: Restructuring income for 3.5 million was recorded in the profit and loss statement. In fact, by transferring to the SPV assets for 26.5 million (book value) and by entitling banks to proceeds deriving from assets disposal in exchange for a

[30] This assumption has an arbitrary nature. The lack of details about the two alternative solutions, indeed, makes difficult to express a judge about the more convenient alternative from Zucchi Group's point of view.

[31] Actually, the debt restructuring agreement provides also for the payment of the annual personnel expenses connected with the five employees transferred to the SPV. Zucchi, therefore, continues to bear the cost connected with these employees, despite their transfer to the SPV, leaving personnel expenses in the pro forma income statement unchanged at the 2016 financial statement amount.

write-off of debt for 30 million, it would be as if Zucchi Group sells properties to banks at a price of 30 million, realizing an extraordinary gain of 3.5 million, and it uses the sale proceeds to repay the banks loan.

All these adjustments were included in the 2016 pro-forma financial statements, which represent the starting point for forecasting Zucchi Group future performance (*Figure 4.2*).

BALANCE SHEET	2016	2016 PRO FORMA	
NON-CURRENT ASSETS			
Property, plant, equipment and other equipment	32,9	6,4	→ **ADJUSTMENT 1**
Intangible assets	0,4	0,4	
Shareholdings valued using the equity method	0,1	0,1	
Other financial assets	0,4	0,4	
Receivables and other non-current assets	1,0	1,0	
Deferred tax assets	0,0	0,0	
Discontinued operations	0,0	0,0	
Total non-current asset	**34,8**	**8,3**	
CURRENT ASSETS			
Inventories	20,8	20,8	
Trade receivables	22,7	22,7	
Other receivables and current assets	4,6	4,6	
Financial current assets and derivatives	0,0	0,0	
Cash and cash equivalents	7,9	6,9	→ **ADJUSTMENT 2**
Total current asset	**56,1**	**55,1**	
TOTAL ASSETS	**90,9**	**63,4**	
GROUP EQUITY			
Share capital	17,5	17,5	
Other reserves	(47,3)	(47,3)	
Equity from debt write-off	0,0	49,6	→ **ADJUSTMENT 3**
Profit (loss) for the year	4,5	7,0	
Total group equity	(25,3)	26,8	
Total minority interest	0,0	0,0	
Total equity	**(25,3)**	**26,8**	
NON-CURRENT LIABILITIES			
Non-current payables to banks	0,0	0,0	
Other non-current financial payables	0,0	0,0	
Other payables	0,7	0,7	
Provisions	3,5	3,5	
Provisions for employee benefits	5,9	5,9	
Deferred tax liabilities	4,9	4,9	
Discontinued operations	0,0	0,0	
Total non-current liabilities	**15,0**	**15,0**	
CURRENT LIABILITIES			
Current payables to banks	80,0	0,4	→ **ADJUSTMENT 4**
Other current financial payables and derivatives	0,0	0,0	
Trade payables and other current payables	17,9	17,9	
Provisions	2,1	2,1	
Provisions for employee benefits	1,1	1,1	
Total current liabilities	**101,2**	**21,6**	
Total liabilities	**116,1**	**36,5**	
TOTAL EQUITY AND LIABILITIES	**90,9**	**63,4**	

INCOME STATEMENT	2016	2016 PRO FORMA	
Sales of goods and services	**80,4**	**80,4**	
Operating costs	(76,6)	(77,6)	→ ADJUSTMENT 5
Other revenues	4,6	4,6	
Other costs	(1,0)	(1,0)	
Other reveues (costs)	3,6	3,6	
Depreciation and amortization	(1,7)	(1,7)	
Impairment losses	(0,0)	(0,0)	
D&A and impairment losses	(1,7)	(1,7)	
Restructuring income	0,0	3,5	
Restructuring expenses	0,0	0,0	
Restructuring income (expenses)	0,0	3,5	→ ADJUSTMENT 6
Non recurring and extraordinary income (expenses)	0,0	0,0	
EBIT	**5,7**	**8,2**	
Interest income	0,2	0,2	
Interest expense	(0,3)	(0,3)	
Net interest income (expense)	(0,1)	(0,1)	
Interest income from investments	0,0	0,0	
Interest expense from investments	0,0	0,0	
Interest income (expense) from investments	0,0	0,0	
RESULT BEFORE TAXES	**5,6**	**8,1**	
Taxes	(1,1)	(1,1)	
RESULT FROM CONTINUING OPERATIONS	**4,5**	**7,0**	
Result from discontinued operations	0,0	0,0	
RESULT BEFORE MINORITY INTERESTS	**4,5**	**7,0**	
Minority interests	0,0	0,0	
GROUP NET RESULT	**4,5**	**7,0**	

Figure 4.2 – 2016 Pro-forma Financial Statements.

4.4 Scenario analysis

As already explained, a common solution to deal with the uncertainty of future projections, which is particularly high in a distress setting, consists on performing a scenario analysis. This technique allows to combine in the valuation more pessimistic and more optimistic assumptions about the evolution of company's key value drivers by grouping the hypothesis about company future performance into different scenarios with different probabilities of realization. In order to value Zucchi Group, therefore, a reference scenario (base case) was first identified starting from the guidelines provided by managers in the 2015-2020 Strategic Plan. Then, a more optimistic scenario (best case) and a more pessimistic scenario (worst

case) were defined on the basis of more or less favorable assumptions about the success of the restructuring process and the dynamics of the competitive environment.
Unfortunately, however, only qualitative guidelines, and not also detailed quantitative data, are available about the evolution of Zucchi Group performance according to 2015-2020 Strategic Plan. In order to build the base scenario, therefore, it was attempted to translate into numbers the plan's strategic guidelines, which are summarized in *Figure 4.3*.

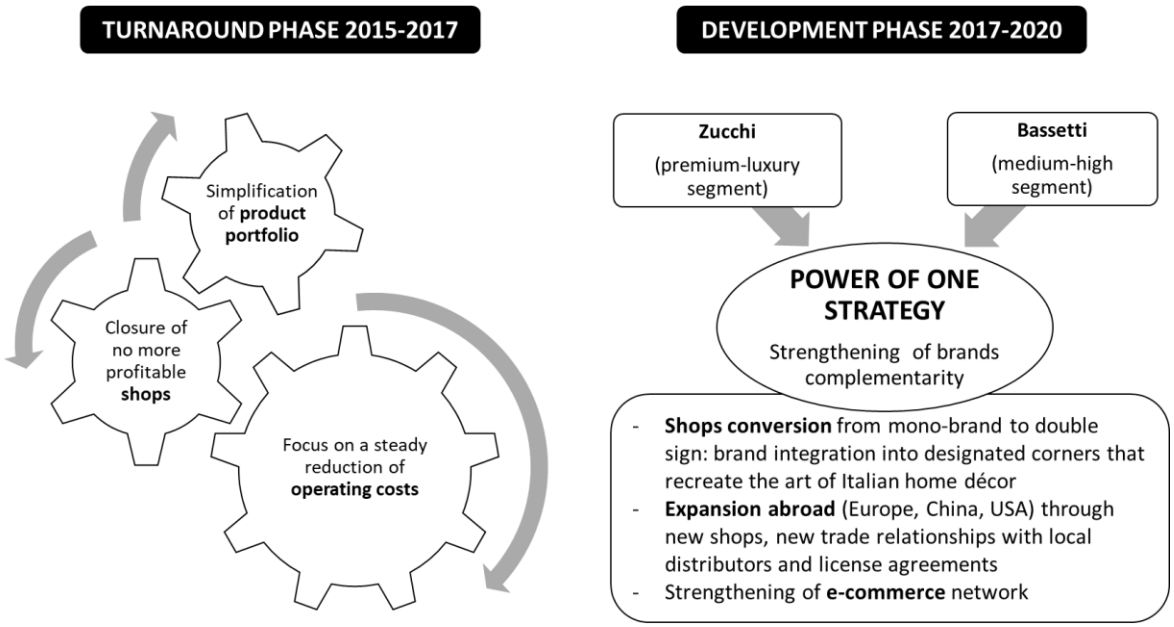

Figure 4.3 – The 2015-2020 Strategic Plan.

First of all, sales growth rate is expected to be negative in the first year of projection (*Table 4.1)*. According to the last available quarterly financial statements, in fact, 2017 revenues are still affected by the retail policy, based on significant trade discounts, adopted by the group in 2015. In addition, during the year, as part of the turnaround strategy, further no more profitable shops will be closed, negatively affecting the total volume sold. These factors cause the sales growth rates to be negative and equal to -5.9% on September 2017. A slight recovery in revenues growth rate is then expected in the last months of the year, given the seasonality characterizing the underlying business, finally leading to a 2017 expected sales growth rate of -5.0%. From 2018, instead, Zucchi Group consolidated sales were assumed to follow a positive trend, as the one experienced in the turnover growth rate of the Italian textile industry, reported since 2014 and confirmed also by the 2017 preliminary data provided by SMI (Sistema Moda Italia). Zucchi Group revenues, therefore, are expected to progressively increase over the remaining period of explicit projections, mainly as a result of the group expansion in foreign markets and the new marketing campaign adopted to strengthen the

brands image and complementarity. The resulting 2017-2021 CAGR (2.05%) is, in any case, more conservative than the revenues CAGR (5.25%), forecasted in the previous Strategic Plan (2013-2017), which, as the ongoing plan, provided for the group expansion abroad, but whose revenues forecasts reveal to be overoptimistic in respect to realized sales growth rates.

The incidence of operating costs on sales, instead, was assumed to only slightly improve in 2017, 2018 and 2019. The positive effects on EBITDA expected from the restructuring actions aimed to structural costs reduction, in fact, will be offset, in large part, by an increase in marketing costs, distribution costs and expenses related to the management of the new shops. In 2020, however, the expected higher revenues increase will reduce the incidence of fixed costs on sales to a larger extent, finally leading to an operating cost on sales percentage of 91.3%. In particular, the evolution of this key value driver during the explicit forecast period (in the base scenario, as well as in the best and worst scenario), was designed by considering the incidence of personnel cost on sales constant at the 2016 level, in compliance with the job-sharing agreement signed with the trade unions. According to the latter, starting from 2016, in order to prevent further layoffs, working hours of each employee will be reduced to a part-time contract, and then progressively increased according to company's turnover evolution and growth prospects, until restoring full-time working hours.

Regarding balance sheet key value drives, investments in operating fixed capital are expected to reach the highest level in terms of incidence on sales in 2018 and 2019 (3.0%). The capitalized costs in which the group will incur starting from 2017 for the renovation of shops and their conversion from mono-brand into double-sign, indeed, will be accompanied, in 2018 and 2019, by a further increase in capital expenditure connected with the opening of new shops in foreign countries, according to the group development projects.

Trade working capital incidence on sales, instead, is expected to progressively decrease during the explicit projection period. In particular, trade receivables days in revenues are expected to slightly decrease from 2019, thanks to a more accurate selection of new clients (especially local distributors) in respect to the past, while the rationalization of product offering in combination with efficiency initiatives undertaken by the group with the purpose to improve the inventory management, were assumed to result into a progressive reduction in inventory days in revenues. Trade payables days in revenues, instead, were forecasted to remain constant at the 2016 level.

BASE CASE	2016 PRO FORMA	2017E	2018E	2019E	2020E	2021E
Sales growth rates	**-13,5%**	**-5,0%**	**1,0%**	**1,5%**	**2,7%**	**3,0%**
Operating costs/Sales	96,2%	95,6%	94,7%	93,5%	91,3%	90,1%
EBITDA MARGIN	**4,4%**	**5,1%**	**5,9%**	**7,1%**	**9,3%**	**10,4%**
CAPEX/Sales	**0,1%**	**0,3%**	**3,0%**	**3,0%**	**1,0%**	**1,0%**
Working cash/Sales	1,0%	1,0%	1,0%	1,0%	1,0%	1,0%
Trade receivables (days in revenues)	103	103	103	102	101	100
Inventory (days in revenues)	95	94	93	91	89	87
Trade payables (days in revenues)	52	52	52	52	52	52
TWC/Sales	**40,9%**	**40,5%**	**40,3%**	**39,4%**	**38,6%**	**37,6%**

Table 4.1 - Base scenario assumptions.

In the best scenario (*Table 4.2*), more optimistic assumptions about Zucchi Group future performance were developed. The hypothesis underlying the best case, however, are only slightly more favorable than base case assumptions, given that restructuring plans have generally a limited upside, in particular for distressed firms. For troubled companies, in fact, the recovery of normal operations at the end of the explicit projected period thanks to the successful implementation of the restructuring plan already represents, to some extent, a quite optimistic assumption if compared with company's historical results, since it entails a significant change of direction in company's performance.

Specifically, in the best scenario, sales were assumed to decrease at a lower rate in 2017, thanks to a higher recovery in sales growth rates experienced in the last months of the year, and to increase more quickly in the following years, also as a consequence of a greater success of e-commerce channel. This will result into a 2017-2020 revenues CAGR of 3.07% higher than the one assumed in the base scenario but, in any case, still lower than the one forecasted in the previous strategic plan.

Operating costs incidence on sales is expected to improve at a faster rate, too. In particular, in the last year, the company was assumed not to pay the annual rent of € 1 million for the plant located in Rescaldina, since the disposal of the assets transferred to the SPV is expected to be concluded in 2020[32]. This will determine a significant improvement in the EBITDA margin also in the last year of the explicit projection period, bringing this operating measure (12% in 2021) back to the pre-crisis level (13% in 2000, 12% in 2001 and 2002).

Assumptions on capital expenditure, instead, were supposed equal to the ones underlying the base scenario. Zucchi Group, therefore, is expected to reinvest back into operating assets

[32] The 2015 debt restructuring agreement, in fact, specifies that assets sale will be completed, on a best effort basis, by the end of 2020.

percentages of sales equal to the base scenario assumptions also in the best case, making investments in accordance with the company's underlying growth prospects.

Finally, a better management of trade working capital will result into a faster decrease in trade receivables and inventories days in revenues, while in 2021 the improved operating performance will allow the company to reduce trade payables days in revenues from 52 to 51, providing a first signal of recovery of Zucchi Group reputation in front of suppliers.

BEST CASE	2016 PRO FORMA	2017E	2018E	2019E	2020E	2021E
Sales growth rates	**-13,5%**	**-3,0%**	**1,5%**	**2,8%**	**4,0%**	**4,0%**
Operating costs/Sales	96,2%	95,4%	94,3%	92,3%	90,5%	88,6%
EBITDA MARGIN	**4,4%**	**5,2%**	**6,3%**	**8,3%**	**10,1%**	**12,0%**
CAPEX/Sales	**0,1%**	**0,3%**	**3,0%**	**3,0%**	**1,0%**	**1,0%**
Working cash/Sales	1,0%	1,0%	1,0%	1,0%	1,0%	1,0%
Trade receivables (days in revenues)	103	103	102	100	98	96
Inventory (days in revenues)	95	94	92	90	87	84
Trade payables (days in revenues)	52	52	52	52	52	51
TWC/Sales	**40,9%**	**40,7%**	**39,7%**	**38,6%**	**37,4%**	**36,0%**

Table 4.2 – Best scenario assumptions.

The worst scenario (*Table 4.3*) gathers more pessimistic assumptions about group performance evolution, by supposing a slower recovery, if not a worsening, in Zucchi Group key value drivers. In particular, sales growth rate is expected to be more negative than in the base scenario in the first year of projections[33], and to remain negative in 2018 as well, assuming the materialization of threats coming from the external environment such as the entrance of new competitors with very attractive value propositions. This will strongly undermine in 2018 the success of the marketing campaign undertaken by the group to promote brands image and complementary and will cause sales to grow at a lower path than base scenario in the following years, finally leading to a 2017-2021 CAGR of -0,19%.

In addition, the positive effects on the EBITDA margin of the restructuring actions undertaken by the group and aimed at operating costs reduction will be minimal in 2017 and more than offset by the increase in fixed costs connected with the marketing campaign and the management of the new shops experienced by the group at the beginning of the development phase. As a consequence, EBITDA margin is expected to decrease in 2018 and, then, to slowly increase in the following years, as the slight recovery in sales will allow to slightly reduce the incidence of fixed costs.

[33] Lower than expected winter sales will cause a reversal in the positive trend (in term of less negative rates) observable by comparing sales growth rates in June 2017 (-9.4%) to revenues growth rates in September 2017 (-5,9%).

Given the greater than expected difficulties experienced at the operating margin level, then, capital expenditures, which are required to implement Zucchi Group development projects, are expected to be lower (in terms of both absolute value and percentage on sales) than in the base scenario in 2018 and 2019, and, therefore, partially delayed to 2020.

Regarding trade working capital, instead, the selection of B2B clients is assumed to result less accurate than expected in the other scenarios, finally resulting into an increase of trade receivables days in revenues. Slower than expected sales recovery, in addition, will determine an accumulation of final products in the warehouses, despite the actions undertaken to improve the management of inventory, and an increase in trade payables days in revenues. The latter partially counterbalances the increase in TWC/sales ratio, but at the same time it sends out a negative signal to suppliers, who can decide to ask more stringent terms and conditions in the near future.

WORST CASE	2016 PRO FORMA	2017E	2018E	2019E	2020E	2021E
Sales growth rates	**-13,5%**	**-9,0%**	**-5,0%**	**1,0%**	**1,6%**	**1,8%**
Operating costs/Sales	96,2%	96,1%	98,5%	98,1%	97,5%	96,6%
EBITDA MARGIN	**4,4%**	**4,5%**	**2,2%**	**2,6%**	**3,2%**	**4,1%**
CAPEX/Sales	**0,1%**	**0,3%**	**2,0%**	**2,0%**	**2,0%**	**1,0%**
Working cash/Sales	1,0%	1,0%	1,0%	1,0%	1,0%	1,0%
Trade receivables (days in revenues)	103	103	104	106	106	105
Inventory (days in revenues)	95	96	99	101	100	98
Trade payables (days in revenues)	52	52	52	52	53	53
TWC/Sales	**40,9%**	**41,2%**	**42,3%**	**43,5%**	**42,9%**	**42,5%**

Table 4.3 – Worst scenario assumptions.

Some assumptions common to all the scenarios were then adopted to conclude the projection of future financial statements. As regards income statements items (*Table 4.4*), depreciation of operating fixed capital on operating fixed capital was assumed to stay constant at the 2016 level, as well as the amortization of intangibles similar to goodwill, given that the 2015-2020 Restructuring Plan doesn't point out any intentions of Zucchi Group to perform acquisitions and/or new investments in non-operating intangibles.

Operating tax rate, instead, was set equal to 30%, while return on cash balance was fixed at 0.01%, in line with the rate at which cash accounts were remunerated in the last historical financial statements. Non-recurring and extraordinary items, then, were supposed to be equal to -0.2 million in 2017, assuming that, as happened in the past, capital losses will arise from the closure of some property shops planned for that year. In the following years, extraordinary items value was set equal to 0, since their extraordinary nature makes it impossible to predict their future evolution.

ASSUMPTIONS COMMON TO ALL SCENARIOS (INCOME STATEMENT)	2016 PRO FORMA	2017E	2018E	2019E	2020E	2021E
Depreciation of op. fixed capital/Op. fixed capital	4,4%	4,4%	4,4%	4,4%	4,4%	4,4%
Operating tax rate	30,0%	30,0%	30,0%	30,0%	30,0%	30,0%
Amortization of goodwill and other similar intangibles	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
Return on cash	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%
Exchange rate (losses) gains	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)
Impairment losses	0,0	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	6,4	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0	0,0
Minority result (income) loss	0,0	0,0	0,0	0,0	0,0	0,0

Table 4.4 – Income statements assumptions common to all scenarios.

Instead, about balance sheet items (*Table 4.5*), among the current assets and liabilities, other than the ones forming part of trade working capital, overdue social security and operating tax payables were separately projected and forecasted to be repaid according to the reimbursement schedule negotiated in 2016 with social security entities and tax authorities. In 2017, therefore, the group is expected to pay debt instalments for a total amount of 1.3 million (0.7 to social security entities and 0.6 million to tax authorities, as in 2016), while the residual part of overdue operating debt will be paid in 2018.

Intangible assets similar to goodwill, instead, will result to be completely amortized in 2021, since new investments are not forecasted, while non-operating assets were assumed to remain constant at the 2016 level, as well as debt equivalents. A large part of the latter, indeed, consists on provisions for employee benefits, which are assumed stable at the 2016 level, given that the job sharing agreement signed with the trade unions is expected to prevent the layoff of further workers.

Finally, no equity increases were forecasted to be subscribed in the future, despite the existence of the GEM Contract, signed in 2014 and according to which GEM will subscribe a capital increase, for a maximum amount of 15 million, whenever asked by Vincenzo Zucchi S.p.a, within 5 years. Astrance Capital, indeed, could be reluctant to accept a capital increase financed by GEM, since it will result into a dilution of Astrance Capital ownership.

ASSUMPTIONS COMMON TO ALL SCENARIOS (BALANCE SHEET)	2016 PRO FORMA	2017E	2018E	2019E	2020E	2021E
Social security payables	(0,9)	(0,2)	0,0	0,0	0,0	0,0
Operating tax payable	(1,1)	(0,5)	0,0	0,0	0,0	0,0
Overdue operating debts	(2,0)	(0,7)	0,0	0,0	0,0	0,0
Other "Other current assets and liabililities"	0,7	0,7	0,7	0,7	0,7	0,7
TOTAL OTHER CURRENT ASSETS AND LIABILITIES	(1,3)	0,0	0,7	0,7	0,7	0,7
Other non-current assets and liabilities	(7,0)	(7,0)	(7,0)	(7,0)	(7,0)	(7,0)
Goodwill and other similar intangibles	0,4	0,3	0,2	0,1	0,1	0,0
Non-operating assets	1,3	1,3	1,3	1,3	1,3	1,3
Debt equivalents	11,6	11,6	11,6	11,6	11,6	11,6
Minority interest	0,0	0,0	0,0	0,0	0,0	0,0
Equity increase (decrease) in cash	0,0	0,0	0,0	0,0	0,0	0,0

Table 4.5 – Balance sheet assumptions common to all scenarios.

On the basis of all these assumptions, financial statements over the explicit forecast period were built (as shown in *Appendix 3*, *Appendix 4* and *Appendix 5*) and FCFs calculated under each scenario, as summarized in *Table 4.6*, *Table 4.7* and *Table 4.8*.

	BASE CASE				
€ million	2017E	2018E	2019E	2020E	2021E
NOPLAT	2,53	3,01	3,65	4,92	5,73
Change in invested capital	0,62	(2,80)	(1,80)	(0,52)	(0,44)
Free cash flow	**3,14**	**0,21**	**1,85**	**4,40**	**5,29**

Table 4.6 – Free cash flows expected in the base scenario.

	BEST CASE				
€ million	2017E	2018E	2019E	2020E	2021E
NOPLAT	2,66	3,31	4,47	5,65	7,07
Change in invested capital	(0,17)	(2,46)	(2,06)	(0,59)	(0,41)
Free cash flow	**2,49**	**0,85**	**2,41**	**5,06**	**6,65**

Table 4.7 – Free cash flows expected in the best scenario.

	WORST CASE				
€ million	2017E	2018E	2019E	2020E	2021E
NOPLAT	2,13	0,88	1,05	1,33	1,77
Change in invested capital	1,42	(1,01)	(2,18)	(1,12)	(0,52)
Free cash flow	**3,54**	**(0,13)**	**(1,13)**	**0,21**	**1,26**

Table 4.8 – Free cash flows expected in the worst scenario.

4.5 Unlevered cost of capital

According to the APV method, then, FCFs require to be discounted at the unlevered cost of capital to calculate the unlevered value of operations.
In order to calculate this discount rate, a modified version of the Capital Asset Pricing Model was adopted, which takes into account a premium associated with country risk and, therefore, computes the unlevered cost of equity as follows:

$$k_u = r_f + \beta_u * ERP + CRP$$

where r_f is the risk-free rate, β_u is the unlevered beta, ERP is the equity risk premium and CRP is the country risk premium.

First of all, the risk-free rate was set equal to 2.50%, in line with the rate used by Banca IMI to evaluate European companies' stocks as of 31st December 2016 (2.00%-2.50%) and with the last 10 years average of 10 years EURIRS (2.56%). In recent times, indeed, massive central bank monetary interventions had resulted into abnormally and artificially low risk-free rates, which, in turn, determine lower cost of capital, just the contrary of what one would expect in periods of relative economic-wide distress and uncertainty (Duff&Phelps 2016). It is common practice for analysts, therefore, to use normalized risk-free rate in the valuation, computed, in the simplest way, as the average of historical rates observed over a period of time considered as a reasonable proxy for the future. In particular, according to Duff&Phelps (2016), when performing valuation as of 2016, the risk-free rate can reasonably be assumed to revert in the future to the last 10 years average rate. The computation of last 10 years average of 10 years EURIRS results into a rate close to 2.50% (2.56%), further justifying the selection of this percentage as risk-free rate.

As regards the equity risk premium, instead, it was assumed equal to 6.25%, according to Damodaran's estimate of risk premium for a mature equity market updated to 1st July 2016 (this is the most updated available estimate at the 31st December 2016). As required by the CAPM, this premium was then multiplied by a measure of systematic risk, i.e. the beta.

To calculate the unlevered beta, a bottom-up approach was adopted. This technique consists on computing the risk parameter as the average of comparable companies' betas and it is generally considered a more reliable approach than de-levering the company's regression beta, given the high standard error frequently associated with the latter. Actually, the bottom up beta presents a standard error as well, since it is obtained starting from the regression beta of comparable companies, then transformed in unlevered beta, but being estimated for a

sample of companies, rather than for a single firm, the standard error of the estimate results to be lower. In addition, for distressed companies, rumors about company restructuring or impeding bankruptcy can cause stock price to be volatile with no relation to the market. The regression beta, therefore, may actually decrease during periods of financial distress, since it reflects how a stock moves with the market (Damodaran 2009).

In order to calculate Zucchi Group unlevered beta, according to the bottom-up approach, a group of comparable companies was first selected. The peer group includes, alongside the listed comparables used as benchmark to analyse Zucchi Group historical performance in Chapter 3, some firms engaged in the manufacturing and/or distribution of home linen both inside and outside Europe, as well as a company (i.e. Fieratex) which provides, as Zucchi Group, dyeing and finishing services on behalf of third parties. For each of these firms, the unlevered beta was calculated according to the following formula:

$$\beta_U = \frac{\beta_L + \frac{D}{E} * \beta_D}{1 + \frac{D}{E}}$$

where:

- β_L is the levered beta computed by Reuters using monthly price close over a period of 5 years;
- $\frac{D}{E}$ is the debt to equity ratio, calculated as the average ratio between company's NFP and market capitalization over the last 5 years, in order to eliminate temporary fluctuations in firm's capital structure;
- β_D is the beta debt computed on the basis of company's synthetic rating class (*Appendix 6*) associated to each firm according to its interest coverage ratio[34]. This is a commonly used practice adopted when the corporate debt, as it is often the case, is not listed in the market (and not rated by rating agencies), making impossible to estimate a debt regression beta.

The calculation of unlevered beta for each comparable company is shown in *Table 4.9*.

[34] Interest coverage ratio was personally computed starting from comparable companies' financial statements.

Comparable Companies	Country	β Unlevered	D/E avg 5Y	β Levered	β Debt	Debt Rating	Interest coverage ratio
Caleffi	Italy	0,22	70%	-0,05	0,61	B+	2,80
Springs Global	Brazil	0,90	189%	0,95	0,88	CC	0,99
U10 SA	France	0,48	43%	0,81	-0,29	AAA	15,71
Yoong Onn Corporation Berhad	Malaysia	1,08	9%	1,2	-0,29	AAA	25,65
Marimekko OYJ	Finland	0,37	7%	0,42	-0,29	AAA	26,25
Linz Textile Holding AG	Austria	0,41	3%	0,43	-0,29	AAA	58,18
Fieratex	Greece	1,42	30%	1,58	0,88	C	0,50
H&M	Sweden	0,92	-3%	0,89	-0,29	AAA	110,29
AVERAGE		**0,73**	**44%**	**0,78**	**0,12**	**BB+**	
ADJUSTED AVERAGE		**0,69**	**27%**	**0,78**	**0,06**	**BBB**	
MEDIAN		**0,69**	**20%**	**0,85**	**-0,29**	**AAA**	

Table 4.9 – Unlevered beta calculation from comparable companies' data.

The average, adjusted average and median of the comparables' unlevered beta was then calculated in the bottom of *Table 4.9*. Among these results, the unlevered beta computed as adjusted average (0.69) was selected in order to calculate the cost of capital. The adjusted average outcome, indeed, by removing the outliers from the sample, whose results largely impact on the mean of small populations, may provide a more reliable estimate of bottom-up unlevered beta. This result, in addition, is in line with the outcome of the median.

Finally, a country risk premium was added to the cost of capital resulting from the application of the original version of the CAPM model. As emerged during the global financial crisis, indeed, correlation among markets has risen, making the country risk not completely diversifiable also for globally diversified investors (Damodaran 2009b) and justifying, therefore, its inclusion in the cost of capital computation. In particular, the country risk premium was assumed equal to 2.36% and it was computed as the weighted average of CRPs (estimated by Damodaran in June 2016) of the countries in which Zucchi operates, where weights are based on the portion of total sales realized by the group in that country in 2016 (*Table 4.10).*

	Country Risk Premium (CRP)	2016 Sales (%)	CRP (weighted average)
Italy	2,13%	66%	1,41%
Other European Countries	3,34%	28%	0,93%
Extra European Countries	0,34%	6%	0,02%
GROUP (Total)		**100%**	**2,36%**

Table 4.10 – Country risk premium calculation.

Adding together all the components of the modified CAPM, the unlevered cost of capital results equal to 9,17%.

$$k_u = r_f + \beta_u * ERP + CRP = 2.50\% + 0.69 * 6.25\% + 2.36\% = 9.17\%$$

4.6 Continuing value

Once calculated the FCFs under each scenario and the unlevered cost of capital, the last element required to compute the unlevered value of Zucchi Group operations is the continuing value. As already mentioned, the value generated by the company over the explicit projection period was calculated by adopting the DCF model, and therefore, using the WACC. In the long run, indeed, the company was assumed to reach a target capital structure, in line with the industry average. This assumption appears not to be overoptimistic for Zucchi Group given the significant debt write-off granted by banks that positively affected its debt to equity ratio. Thanks to the debt forgiveness (for a total amount of 79.6 million), indeed, banks gave to Zucchi Group the chance to cancel large part of past debt obligations and to demonstrate its recovered ability to generate FCFs sufficient to meet the residual debt and the new debt eventually incurred to sustain the growth and not to repay past overdue loan. As a consequence, if in the long term the company is expected to grow at a rate more or less in line with the average company in the industry, its capital structure can reasonably be expected to converge to the industry average, given also the key role played by industry-specific factors (growth, returns, asset specificity) in debt/equity trade-off.
Under this assumption, the continuing value was computed through the key value driver formula as follows:

$$Continuing\ Value_t = \frac{NOPLAT_{t+1} * \left(1 - \frac{g}{RONIC}\right)}{WACC - g} =$$

$$= \frac{NOPLAT_t * (1+g) - (IC_t * (1+g) - IC_t)}{WACC - g} = \frac{FCF_{t+1}}{WACC - g}$$

where $WACC$ is the company's weighted average cost of capital, g is the company's long run growth rate, $RONIC$ is the expected rate of return on new invested capital[35] after the explicit forecast period, IC_t the invested capital at time t, and FCF_{t+1} are the free cash flows expected in the first year after the explicit forecast period.

For what concerns the long run growth rate, its best estimate, according to Koller et al. (2015), is the expected long term rate of consumption growth for the industry's products, plus

[35] $RONIC = g/IR$ where IR (investment rate) is equal to $Net\ investment / NOPLAT$

inflation. However, since this data is not available for the household linen industry, g was estimated on the basis of the expected growth rate of nominal GDP in 2022 in countries where the group is expected to sell its products in the long run (in particular Italy, Spain, Switzerland, Greece, Germany, China, USA). This variable was chosen since the household linen industry strongly depends on the economic cycle, whose dynamic is captured by GDP. Then, the expected growth rate in nominal GDP of each country, as estimated by the International Monetary Fund in 2016, was multiplied for the target percentage of revenues that the company plans to realize in the long run. In particular, in the best case, the group is expected to generate 50% of its revenues outside Italy, reaching a 2013-2017 Strategic Plan target not achieved in that occasion, and, therefore, to grow in the long term at a rate of 2.8%, obtained by rounding to one decimal the weighted average of 2.82% resulted from *Table 4.11*. In the base case, instead, the group is expected to grow at a lower rate (1.4%), while no growth was assumed in the worst scenario.

	Country nominal GDP g in 2022	Expected sales in 2022 (%)	g (weighted average)
Italy	2,26%	50%	1,13%
Other European Countries	2,80%	40%	1,12%
Extra European Countries	5,76%	10%	0,58%
GROUP (Total)		**100%**	**2,82%**

Table 4.11 – Estimation of the long term growth rate expected in the best scenario.

The second fundamental determinant of the continuing value is the weighted average cost of capital, which is computed as follows:

$$WACC = k_e * \frac{E}{D+E} + k_d * (1-t) * \frac{D}{D+E}$$

where k_E is the cost of equity, $\frac{E}{D+E}$ and $\frac{D}{E+D}$ are the target level of equity and debt, respectively, to enterprise value, k_D is the pre-tax cost of debt and t is the corporate marginal tax rate.

First of all, the pre-tax cost of debt was calculated by adding to the risk-free rate the company's default spread, that is the premium over risk-free securities return required by creditors to compensate them for company's risk of default:

$$k_d = r_f + Default\ spread = 2.50\% + 2.25\% = 4.75\%$$

In particular, the default spread was identified according to the table in the *Appendix 6* on the basis of the average rating class in the industry (previously identified in *Table 4.9*), which is BBB. Since Zucchi Group debt to equity ratio is expected to converge, in the long run, to the industry average capital structure, indeed, it was reasonably assumed that the company will also reach the industry average rating class.

Moving forward in the WACC calculation, the target debt to equity ratio was set equal to 27.20%. This is the (adjusted) average capital structure of the selected peers (computed in *Table 4.9*) and it appears quite in line with the average debt to equity ratio computed by Damodaran over a larger sample of firms operating in the apparel industry[36] (23% at the European market level, 25% in the global market). Consequently, target equity to enterprise value ratio is equal to 78.62%, while target debt to enterprise value ratio is equal to 21.38%.

Finally, the last input of WACC calculation is the cost of equity, computed according to the CAPM formula, as follows:

$$k_e = r_f + CRP + \beta_L * ERP = 2.50\% + 2.43\% + 0.86 * 6.25\% = 10.28\%$$

In particular:

- r_f is the risk-free rate which, as already explained, was assumed equal to 2.50%;
- ERP is the equity risk premium set equal to 6.25% (source: Damodaran 2016);
- CRP is the county risk premium, computed, as already shown above, as the weighted average of CRPs of the countries in which the company operates. In this case, however, the weights were determined on the basis of the percentage of total revenues that the company is expected to generate beyond the explicit forecast period in each country. As shown in *Table 4.12*, the CRP results to be equal to 2.43%, a little bit higher than the one used to compute the unlevered cost of equity in the explicit projection period (2.36%), given that, in the long run, the company is expected to increase its turnover in European countries, whose CRPs are higher than Italy's CRP;

[36] Large part of the previously identified Zucchi Group's comparables are grouped in this industry by Damodaran.

	Country Risk Premium (CRP)	Expected sales in 2022 (%)	CRP (weighted average)
Italy	2,13%	50%	1,07%
Other European Countries	3,34%	40%	1,33%
Extra European Countries	0,34%	10%	0,03%
GROUP (Total)		**100%**	**2,43%**

Table 4.12 – Computation of country risk premium beyond the explicit projection period.

- β_L is the levered beta and it was calculated starting from the Modigliani and Miller (1958) formula and assuming that the tax shields have the same risk of operating assets and that the debt is not risk-free (β_D is different from 0):

$$\beta_L = \beta_U + \frac{D}{E}(\beta_U - \beta_D) = 0.69 + 27.20\% * (0.69 - 0.08) = 0.86$$

  In particular, while β_U and $\frac{D}{E}$ have already been computed in *Table 4.9*, the β_D was set equal to 0.08, as suggested in the *Appendix 6* for companies with a credit rating of BBB, which is the average industry credit rating and the Zucchi Group target rating.

Summing up all its component and assuming a marginal tax rate equal to 24%, the WACC results equal to 8.86%, as shown by the following calculation:

$$WACC = k_e * \frac{E}{D+E} + k_d * (1-t) * \frac{D}{D+E} =$$

$$= 10.28\% * 78.62\% + 4.75\% * (1 - 24\%) * 21.38\% = 8.86\%$$

Once identified and estimated all its determinants, it is now possible to compute the continuing value of Zucchi Group operations under each scenario, as illustrated in *Table 4.13*.

	BASE CASE			BEST CASE			WORST CASE		
	2016A	**2021E**	**Base for CV**	**2016A**	**2021E**	**Base for CV**	**2016A**	**2021E**	**Base for CV**
g			1,40%			2,80%			0,00%
WACC			8,86%			8,86%			8,86%
NOPLAT		5,73	5,81		7,07	7,26		1,77	1,77
Invested capital		35,98	36,49		36,72	37,75		34,45	34,45
Change in Invested capital			(0,50)			(1,03)			0,00
FCF			**5,31**			**6,24**			**1,77**
Continuing value		71,16			102,96			20,04	
Present value CV	**45,89**			**66,39**			**12,92**		

Table 4.13 – Continuing value calculation.

It is worth noting that the ratio between the resulting CV and the 2022 EBITDA (9.6, as reported in *Table 4.14*), in the best case, is in line with the average EV/EBITDA multiple

computed for comparable companies (9.7). Less optimistic scenarios (base case and worst case), instead, put greater emphasis on the current differences between Zucchi Group and its peers, which are not assumed to be completely eliminated in the projection period. Even if significantly reduced, such differences are expected to partially affect the company also in the continuing value, in particular in the worst scenario.

The method of multiples, therefore, assuming that the EV/EBITDA estimated by Reuters in 2016 can be fairly applied at the end of the forecasting period, provides a positive check on the hypothesis underlying the APV and DCF models, suggesting that the assumptions at the basis of the scenario analysis and cost of capital computation appear not to be overoptimistic and quite in line with the market.

Zucchi Group	CV/EBITDA
Base case	8,1
Best case	**9,6**
Worst case	6,7
Comparable Companies	**EV/EBITDA**
Caleffi	12,4
Springs Global	7,5
U10 SA	4,4
Yoong Onn Corporation Berhad	5,5
Marimekko OYJ	13,7
Linz Textile Holding AG	15,5
Fieratex	11,5
H&M	7,8
AVERAGE	**9,8**
ADJUSTED AVERAGE	**9,7**
MEDIAN	**9,7**

Table 4.14 – Zucchi Group CV/EBITDA and competitors EV/EBITDA at comparison.

4.7 Unlevered value of operations

The unlevered value of operations under each scenario was finally obtained by discounting the operating free cash flows and the continuing value at the unlevered cost of capital, and summing up the results, as shown in *Table 4.15*, *Table 4.16* and *Table 4.17*.

BASE CASE							
€ million	**2016A**	**2017E**	**2018E**	**2019E**	**2020E**	**2021E**	**Base for CV**
NOPLAT		2,53	3,01	3,65	4,92	5,73	5,81
Change in invested capital		0,62	(2,80)	(1,80)	(0,52)	(0,44)	(0,50)
Free cash flow		**3,14**	**0,21**	**1,85**	**4,40**	**5,29**	**5,31**
Ku	9,17%						
Discount Factor		0,92	0,84	0,77	0,70	0,64	
Present value of FCF		2,88	0,18	1,42	3,10	3,41	
Present value of FCF2017-2021	**10,99**						
Continuing Value						71,16	
Present value CV	**45,89**						
UNLEVERED VALUE OF OPERATIONS	**56,88**						

Table 4.15 – The unlevered value of operations under the base scenario

BEST CASE							
€ million	**2016A**	**2017E**	**2018E**	**2019E**	**2020E**	**2021E**	**Base for CV**
NOPLAT		2,66	3,31	4,47	5,65	7,07	7,26
Change in invested capital		(0,17)	(2,46)	(2,06)	(0,59)	(0,41)	(1,03)
Free cash flow		**2,49**	**0,85**	**2,41**	**5,06**	**6,65**	**6,24**
Ku	9,17%						
Discount Factor		0,92	0,84	0,77	0,70	0,64	
Present value of FCF		2,28	0,72	1,86	3,56	4,29	
Present value of FCF2017-2021	**12,71**						
Continuing Value						102,96	
Present value CV	**66,39**						
UNLEVERED VALUE OF OPERATIONS	**79,10**						

Table 4.16 – The unlevered value of operations under the best scenario.

WORST CASE							
€ million	**2016A**	**2017E**	**2018E**	**2019E**	**2020E**	**2021E**	**Base for CV**
NOPLAT		2,13	0,88	1,05	1,33	1,77	1,77
Change in invested capital		1,42	(1,01)	(2,18)	(1,12)	(0,52)	0,00
Free cash flow		**3,54**	**(0,13)**	**(1,13)**	**0,21**	**1,26**	**1,77**
Ku	9,17%						
Discount Factor		0,92	0,84	0,77	0,70	0,64	
Present value of FCF		3,24	(0,11)	(0,87)	0,15	0,81	
Present value of FCF2017-2021	**3,23**						
Continuing Value						20,04	
Present value CV	**12,92**						
UNLEVERED VALUE OF OPERATIONS	**16,15**						

Table 4.17 – The unlevered value of operations under the worst scenario.

4.8 Value of tax benefits

After having computed the unlevered value of operations, the APV method requires to estimate the value of tax benefits arising from interest expenses deducibility. This amount, however, results to be insignificant in the case of Zucchi Group, since its debt level is very low after the write-off (0.4 million in the 2016 pro-forma balance sheet) and will be progressively repaid in the explicit forecast period, while in the long run the tax benefits of debt are captured in the WACC formula.

A significant source of value, instead, is represented by the group accumulated losses, which amounted to 66.9 million on 31st December 2016. According to the art. 84 Tuir, indeed, past losses generate a tax credit since they can be carried forward without any time limitation and applied by the taxpayer against profits in the following years, within the limit of 80% of the taxable income generated in each subsequent year. By reducing the amount of taxable income in future years, therefore, net operating losses give rise to valuable tax savings.

Specifically, the value generated by the possibility to carry-forward accumulated losses was computed under each scenario as shown by *Table 4.18*, *Table 4.19* and *Table 4.20*, assuming a tax rate of 24% on EBT. This rate was computed by dividing the 16.055 million of deferred tax assets from previous years cumulated losses, which are estimated, but not recorded, in the 2016 financial statements, for the total cumulated losses of 66.9 million. This results in a tax rate of 24%, which coincides with the new IRES tax rate.

NOLs, however, cannot be forecasted to continue in perpetuity, since the positive EBT expected to be generated by the company beyond the explicit projection period, under each scenario, and, therefore, the use of cumulated losses to offset taxable income, will determine a progressively reduction of cumulated losses, until they reach 0. Thus, the explicit projection period was (roughly) extended until the expiration of NOLs, assuming, in a simplified way, that EBT will grow at the long term growth rate in each year since 2022. Even if *g* actually refers to NOPLAT growth rate, having forecasted constant non-operating items, however, it is possible to reasonably assume that also EBT will grow in the long run at g.

The present value of the tax shield flows, then, was computed by discounting the tax savings at the unlevered cost of capital, since the risk of achieving such benefits is the same of the operational income that makes the tax deduction possible. In particular, tax shield flows beyond 2021 were discounted at a slightly higher cost of capital (9.25% instead of 9.17%), because of the higher CRP expected as a consequence of Zucchi group expansion in foreign markets with higher country risk.

BASE CASE (€ million)	2016A	2017E	2018E	2019E	2020E	2021E	2022E	…	2028E
EBT		3,27	4,16	5,12	6,94	8,09	8,21	…	8,92
Compensation (80% of EBT at maximum)		2,62	3,33	4,10	5,56	6,48	6,57	…	4,02
Accumulated losses	66,90	64,28	60,95	56,85	51,30	44,82	38,26	…	0,00
Tax rate	24%								
Tax shield flow		**0,63**	**0,80**	**0,98**	**1,33**	**1,55**	**1,58**	**…**	**0,97**
Ku 2017-2021	9,17%								
Ku 2022-2028	9,25%								
Discounti factor		0,92	0,84	0,77	0,70	0,64	0,59	…	0,35
PV tax shield		0,58	0,67	0,76	0,94	1,00	0,93	…	0,35
TOT PV NOLs tax shield	**8,93**								

Table 4.18 – NOLs tax shield value in the base scenario.

BEST CASE (€ million)	2016A	2017E	2018E	2019E	2020E	2021E	2022E	…	2026E
EBT	8,111	3,46	4,59	6,30	7,98	10,00	10,28	…	11,48
Compensation (80% of EBT at maximum)		2,77	3,67	5,04	6,39	8,00	8,23	…	6,72
Accumulated losses	66,90	64,13	60,46	55,43	49,04	41,04	32,81	…	0,00
Tax rate	24%								
Tax shield flow		**0,66**	**0,88**	**1,21**	**1,53**	**1,92**	**1,97**	**…**	**1,61**
Ku 2017-2021	9,17%								
Ku 2022-2026	9,25%								
Discounti factor		0,92	0,84	0,77	0,70	0,64	0,59	…	0,41
PV tax shield		0,61	0,74	0,93	1,08	1,24	1,16	…	0,67
TOT PV NOLs tax shield	**9,51**								

Table 4.19 – NOLs tax shield value in the best scenario.

WORST CASE (€ million)	2016A	2017E	2018E	2019E	2020E	2021E	2022E	…	2052E
EBT	8,111	2,70	1,12	1,41	1,81	2,44	2,44	…	2,44
Compensation (80% of EBT at maximum)		2,16	0,89	1,13	1,45	1,96	1,96	…	0,67
Accumulated losses	66,90	64,74	63,85	62,72	61,28	59,32	57,37	…	0,00
Tax rate	24%								
Tax shield flow		**0,52**	**0,21**	**0,27**	**0,35**	**0,47**	**0,47**	**…**	**0,16**
Ku 2017-2021	9,17%								
Ku 2022-2026	9,25%								
Discounti factor		0,92	0,84	0,77	0,70	0,64	0,59	…	0,04
PV tax shield		0,47	0,18	0,21	0,24	0,30	0,28	…	0,01
TOT PV NOLs tax shield	**4,45**								

Table 4.20 – NOLs tax shield value in the worst scenario.

As regards distress costs, instead, they were not directly computed. On 31st December 2016, indeed, the group has already borne the direct costs of distress, mainly consisting in expenses for lawyers, turnaround specialists, financial advisers and other professionals assisting the group in the formulation of the new strategic plan and the negotiation of the financial manoeuvre with creditors and investors. Indirect costs of distress, instead, are not directly observable and, therefore, estimating them is a very difficult task. Thus, rather than adding further subjectivity to the valuation by supposing them as equal to a certain percentage of Zucchi Group value, they were implicitly incorporated in the assumptions at the basis of the

scenario analysis. For instance, when compared to healthy competitors, Zucchi Group's greater inability to promptly react to the entrance of a new player in the household linen industry was supposed as a consequence of its crisis situation and captured in the assumptions at the basis of the worst scenario.

4.9 Enterprise value and equity value

Lastly, Zucchi Group enterprise value as of 31st December 2016 was computed under each scenario by summing up the unlevered value of operations, the value of tax savings and non-operating assets[37] (*Table 4.21*). The equity value, then, was calculated by subtracting the net financial position and debt equivalents[38] from the enterprise value. In particular, the book value of these items reported in the 2016 pro-forma financial statements was assumed as a reasonable proxy of their market value, since the distressed debt, whose market value is significantly lower than its nominal value given the high default risk, has been subjected to write-off and, therefore, eliminated by the 2016 pro-forma financial statements. In addition, contrary to what usually happens in a distress setting when a debt forgiveness or conversion is not granted by creditors, the enterprise value is expected to be higher than the nominal value of debt in all the scenarios, further justifying the adoption of the nominal value of debt as a proxy of its market value[39].

[37] Non-operating assets value was assumed equal to their book value as of 31st December 2016.
[38] Minority interests, instead, are equal to 0 in 2016 financial statements.
[39] Assuming interest expenses computed on the basis of the market cost of debt.

(€ million)	BASE CASE	BEST CASE	WORST CASE
Unlevered value of operations	56,88	79,10	16,15
NOLs tax shield value	8,93	9,51	4,45
Non operating assets	1,32	1,32	1,32
ENTERPRISE VALUE	**67,13**	**89,93**	**21,92**
Scenario probability	50%	15%	35%
ENTERPRISE VALUE (expected)	**54,73**		
Enterprise value	67,13	89,93	21,92
NFP and debt equivalents	5,89	5,89	5,89
EQUITY VALUE	**61,25**	**84,05**	**16,03**
Scenario probability	50%	15%	35%
EQUITY VALUE (expected)	**48,84**		
Number of shares outstanding	2523,24		
VALUE PER SHARE	**0,0194**		

Table 4.21 – Zucchi Group's enterprise value and equity value.

The expected enterprise value and equity value were then computed by attributing different probabilities of realization to each scenario. In particular, Zucchi Group's history of unsuccessful restructuring attempts was taken into account in the valuation by assigning higher probability to worst case than to best case. The resulting weighted average equity value is 48.8 million (value per share 0.0194), which is in line with Zucchi Group average market capitalization over the last three months of 2016 (49.3 million, 0.0195 share price). The uncertainty about Zucchi Group's future performance, therefore, results to be reasonably managed through the scenario analysis, whose underlying assumptions appear to adequately capture the market expectations. This conclusion, in addition, is further supported by the fact that the same expected enterprise value and, therefore, equity value can be obtained by discounting Zucchi Group operating free cash flows and tax savings in the base case at a higher unlevered cost of capital, which includes a company-specific risk premium equal to 8%. In this way, the uncertainty underlying the future prospects is captured in the cost of capital through a premium over the CAPM dictated by Zucchi Group distressed conditions, rather than through the development of more optimistic and pessimistic scenarios. In particular, an empirical research conducted by Duff&Phelps in 2016 points out the existence, for listed manufacturing companies with high financial risk, of an extra-return equal to 7.53% or 5.34%, depending on whether the company stays in a "distress zone" ($Z<1,8$) or "grey zone" ($1,8<Z<2,99$), respectively, according to its Z-score computed through the Altman's formula (*Figure 4.4*).

$$Z = 1{,}2\,X_1 + 1{,}4\,X_2 + 3{,}3\,X_3 + 0{,}6\,X_4 + 0{,}999\,X_5$$

$$X_1 = \frac{Working\ capital}{Total\ assets} \qquad X_4 = \frac{Market\ value\ of\ equity}{Book\ value\ of\ total\ liabilities}$$

$$X_2 = \frac{Retained\ earnings}{Total\ assets} \qquad X_5 = \frac{Sales}{Total\ assets}$$

$$X_3 = \frac{EBIT}{Total\ assets}$$

Figure 4.4 – Altman's Z-score model for manufacturing companies. (*Duff&Phelps 2016*)

By applying the Z-score model to Zucchi Group 2016 financial statements and 2016 pro-forma financial statements data, a score lower than 1.8 was obtained, in both cases (1.0 and 1.7 respectively). Since Zucchi Group stays in a distress zone, therefore, a company-specific risk premium of 8% was selected, which rounds to one digit the premium empirically computed by Duff&Phelps (7.53%), and substituted to the country risk premium in the unlevered cost of capital[40]. By discounting the operating free cash flows and tax savings forecasted in the base case for the newly computed unlevered cost of equity (14.81%), Zucchi Group's enterprise value and equity value result to be equal, respectively, to 54.6 million and 48.8 million, which are the same values obtained through the scenario analysis. This evidence suggests that the scenario analysis indirectly captures a level of riskiness connected with the company's crisis conditions in line with the extra-premium recorded by distressed securities in the market.

Lastly, a sensitivity analysis was conducted to investigate how expected enterprise value changes with variations in key operating value drivers (sales annual growth rates and operating costs incidence on sales, *Table 4.22*), and in input variables affecting the continuing value, which accounts for 70% of the total value (long term growth rate and WACC, *Table 4.23*).

[40] As specified by Duff&Phelps (2016), indeed, the high financial risk premium was estimated as an additional return over the CAPM in its original version, which doesn't include the CRP.

Change in operating costs/sales \ Change in sales annual growth rates	-4%	-3%	-2%	-1%	0%	1%	2%	3%
4%	27,2	27,3	27,5	27,6	27,8	28,0	28,2	28,5
3,5%	30,1	30,3	30,6	30,9	31,3	31,6	32,0	32,4
3,0%	33,0	33,4	33,8	34,3	34,7	35,2	35,7	36,3
2,5%	35,9	36,4	37,0	37,6	38,2	38,8	39,5	40,2
2,0%	38,8	39,5	40,2	40,9	41,6	42,4	43,3	44,0
1,5%	41,7	42,5	43,3	44,2	45,1	46,0	46,8	47,6
1,0%	44,6	45,5	46,5	47,5	48,4	49,3	50,2	51,1
0,5%	47,5	48,6	49,7	50,6	51,5	52,5	53,5	54,6
0,0%	50,5	51,6	52,6	53,6	**54,6**	55,7	56,9	58,0
-0,5%	53,3	54,3	55,4	56,6	57,7	58,9	60,2	61,5
-1,0%	55,9	57,1	58,3	59,5	60,8	62,1	63,5	64,9
-1,5%	58,5	59,8	61,1	62,4	63,9	65,3	66,8	68,4
-2,0%	61,1	62,5	63,9	65,4	66,9	68,5	70,1	71,8
-2,5%	63,7	65,2	66,7	68,3	69,9	71,6	73,4	75,3
-3,0%	66,3	67,9	69,5	71,2	73,0	74,8	76,7	78,6

Table 4.22 – Sensitivity analysis on Enterprise Value according to variations in revenues annual growth rates and operating costs on sales.

WACC \ g long term	0,20%	0,60%	1,00%	1,40%	1,80%	2,20%	2,60%
11,36%	44,4	44,8	45,2	45,7	46,2	46,7	47,3
10,86%	45,6	46,1	46,6	47,1	47,7	48,3	49,0
10,36%	46,9	47,4	48,0	48,7	49,4	50,1	51,0
9,86%	48,4	49,0	49,7	50,4	51,2	52,2	53,2
9,36%	50,0	50,7	51,5	52,4	53,4	54,5	55,7
8,86%	51,8	52,6	53,6	**54,6**	55,8	57,1	58,6
8,36%	53,8	54,8	55,9	57,2	58,6	60,2	62,1
7,86%	56,0	57,3	58,6	60,2	61,9	63,9	66,1
7,36%	58,6	60,1	61,8	63,6	65,8	68,2	71,1

Table 4.23 – Sensitivity analysis on Enterprise Value according to variations in long term growth rate and WACC.

4.10 The market value of debt

As expressed in KPMG's audit report, the new strategic plan would have never been able to generate sufficient cash flows to repay Zucchi Group's total debt (80.04 million). As a consequence, the market value of Zucchi Group consolidated debt is expected to be significantly lower than its nominal value, justifying the huge write-off granted by creditors in the 2015 debt restructuring agreement.

In order to verify this statement, a second analysis was conducted with the purpose of estimating, first of all, the market value of Zucchi Group consolidated debt as of 31st December 2016, if a debt write-off had not been granted by banks. In particular, two different approaches were adopted in order to perform the debt valuation: the BSM model and the DCF model applied to cash flows to creditors.

Both these techniques require, firstly, to forecast the evolution of Zucchi Group operating free cash flows and, therefore, to estimate its enterprise value. The cash flows generated from operations, indeed, determine the Zucchi Group ability to repay (completely or partially) its debt obligations, and, thus, the debt market value.

The starting point for the estimation of future cash flows, was, in this case, the 2016 consolidated financial statements and not its pro-forma version. As already mentioned, indeed, the 2016 consolidated financial statements, as drawn up by Zucchi Group's accountants, don't reflect yet the effects of the new financial manoeuvre (except for the 10 million capital increase), and, therefore, record debt for its total amount of 80 million, include in the tangible assets account the real estates that should be transferred to the SPV according to the 2015 debt restructuring agreement (with a book value of 26.5 million) and don't enter within costs the rent expense to be paid to the SPV for the plant located in Rescaldina (1 million).

The APV technique was then applied to compute the unlevered value of operations. In particular, three different scenarios were developed using the same assumptions made in *paragraph 4.4*, which attempt to express the strategic guidelines of the new strategic plan in quantitative terms. The only exception to this regards the operating costs, that were computed by applying the operating costs on sales ratio, assumed in the valuation post debt write-off, and reducing the obtained amount for the rent expense of 1 million, which is not paid in this case. Since the strategic plan is not feasible without the support of creditors, it was implicitly assumed that creditors did negotiate a new financial maneuver with Zucchi Group in order to favor its continuation as a going concern, which, however, provides for a debt rescheduling (that requires debt to be totally reimbursed starting from 2017 and by the end of 2021) rather than a debt forgiveness, in combination with the 10 million capital increase subscribed by Astrance Capital. This hypothetical agreement will be indicated from now on as "restructuring with debt rescheduling", while "restructuring with debt write-off" will concern the debt agreement negotiated in December 2015.

Free cash flows were then discounted at the unlevered cost of capital computed in the previous analysis, which is equal to 9.17%, and the continuing value estimated through the

growing perpetuity formula, adopting as cost of capital an unlevered cost of equity of 9.25%, a bit higher than the cost of capital used in the explicit forecast period, because of the higher CRP (2.43% instead of 2.36%) expected in the long run as a consequence of Zucchi Group's expansion in countries with higher country risk than Italy. In this case, indeed, it was not considered reasonable to adopt the WACC in the growing perpetuity formula, since Zucchi Group appears to be still highly leveraged at the end of the explicit projection period, in all the scenarios, making the achievement of a target capital structure in line with the competitors average a quite strong assumption.

The second component of the APV model, the present value of tax shields, was then computed considering not only the tax credits generated by accumulated past losses (estimated with the same technique applied in the case of the restructuring with debt write-off and explained in *paragraph 4.8*), but also the value of tax savings arising from the fiscal deducibility of interest expenses. In particular, in order to estimate this value determinant, the interest expenses were computed, first of all, by assuming a cost of debt around 1%. In the last debt restructuring agreements, indeed, banks, in order to foster Zucchi Group's recovery, have granted interest rates particularly favorable for the company, despite its high default risk. This creditors' practice was supposed to be adopted also in the hypothetical agreement regulating a financial restructuring with debt rescheduling. In particular, past debt contracts provided a cost of medium-long term debt equal to 6 months Euribor increased of 100 basis point. According to the data and forecasts provided by EURIBOR.IT (as of 22nd December 2017), this rate was equal to -0.27% in the last months of 2017 and is expected to slightly increase in the next year reaching 0.50% in 2021. The cost of debt, therefore, was assumed equal to 0.7% in 2017, to 1.0% in 2018, 2019 and 2020 (since no precise estimation are provided on Euribor evolution in these years) and to 1.5% in 2021.

Tax shield flows were then computed, as illustrated by *Table 4.24* for the base case (but the same process was adopted also in the other scenarios), by multiplying the interest rate for the tax rate, supposed equal to 24%, and discounted at the unlevered cost of capital, assuming that these tax benefits have the same risk of the company's operating income that makes them possible[41]. The presence of an EBIT sufficiently positive to allow the deduction of interest expenses for their total amount, however, was verified for each year, under each scenario.

[41] By discounting the interest tax savings at the unlevered cost of equity, the APV converges to the CCF method. Differently from what suggested by the latter, however, it was preferred to continue to keep operating cash flows independent from leverage, rather than computing the company's business enterprise value as the sum of discounted capital cash flows.

Beyond the explicit forecast period, instead, interest expenses and, therefore, tax shield flows, were supposed to grow at the long term *g* used to compute the continuing value of Zucchi Group operations. It was assumed, indeed, that Zucchi Group will resort to a greater use of new credit lines (hypothesizing that creditors will be willing to support the group once again) to finance its growth in the long term and/or to repay interests expenses and the past debt.

BASE CASE (€ million)	2016A	2017E	2018E	2019E	2020E	2021E	Base for CV
Interest expenses		(0,57)	(0,76)	(0,75)	(0,71)	(1,03)	
Tax shield rate	24%						
Tax shield flow		0,14	0,18	0,18	0,17	0,25	0,25
Ku	9,17%						
Discount factor		0,92	0,84	0,77	0,70	0,64	
PV tax shield flow		0,13	0,15	0,14	0,12	0,16	
TOT PV tax shield flow	0,70						
CV						3,19	
PV CV	2,06						
Interest tax shield value	**2,76**						

Table 4.24 – Calculation of interest tax shield value.

Summing up all its components, the EV of Zucchi Group was computed under each scenario, as shown in *Table 4.25*.

(€ million)	BASE CASE	BEST CASE	WORST CASE
Unlevered value of assets	56,1	65,5	19,7
Interest tax shield value	2,8	3,2	2,6
NOLs tax shield value	8,4	8,9	2,5
Non operating assets	8,5	8,5	8,5
ENTERPRISE VALUE	**75,8**	**86,1**	**33,3**
Scenario probability	50%	15%	35%
ENTERPRISE VALUE (expected)	**62,4**		

Table 4.25 – Zucchi Group enterprise value in case of restructuring with debt rescheduling.

In particular, in this case, cash and cash equivalents (7.2 million, which is net of the portion equal to 1% of revenues that was considered as working cash and included in the working capital) were comprised within the non-operating assets. This allowed to study the debt evolution without mixing it with excess cash, since they can have a different dynamic, especially in a distress setting, and, therefore, to estimate the value of debt rather than the value of the NFP.

Furthermore, it is worth noting that the enterprise value in the worst scenario (33.3 million) results to be quite close to the liquidation value (31.4 million) computed through the approach proposed by Damodaran (2009), showing that the more pessimistic assumptions in the scenario analysis provide a reasonable threshold below which companies liquidation will probably be triggered by creditors. According to the Damodaran's approach (2009), the distress sales proceeds can be estimated by adding to company's current cash balance, the amount that a healthy firm operating in the same industry should be willing to pay to buy the distressed company's existing assets. As suggested by Damodaran (2009), this amount can be computed by discounting past EBIT, which represents a measure of the earning power of assets, net of taxes, at the cost of capital for healthy firm, as follows:

$$Value\ of\ existing\ assets = \frac{EBIT\ (1-t)}{Cost\ of\ Capital} = \frac{2{,}88 * (1-28\%)}{8{,}86\%} = 23.44\ million$$

In particular, 2.88 million is the EBIT in 2016, 28% the effective tax rate computed by Damodaran for the apparel industry, 8.86% the previously computed WACC.

Adding cash balance (7.91 million), the total liquidation value results equal to 31.35 million.

Actually, estimating the potential liquidation value is a very difficult task, since it strongly depends on industry-specific factors and company's features and, therefore, there are no universally recognized models to compute it. In particular, the approach based on the earning power of assets is a very simplified way to calculate potential distress sale proceeds, which provides mostly an intuition about the liquidation value rather than a precise estimate. In any case, this approach was preferred to the application of a discount on the book value of assets or on the enterprise value, since the latter would have brought to results more affected by the subjectivity of the appraiser, given also the difficulty of obtaining data about the distress sales of comparable companies on which building an estimate of the discount.

By adopting the same scenario probabilities used in the valuation of the enterprise value in the case of restructuring with debt write-off, then, Zucchi Group expected enterprise value was computed, resulting equal to 62.4 million. The latter is not particularly higher than the enterprise value expected in case of debt-write off (54.7 million). This resulting limited difference, however, can be explained by several factors. First of all, in the case of restructuring with debt rescheduling the enterprise value in the best scenario is closer to the enterprise value in the base scenario than in the case of restructuring with debt write-off, contributing, therefore, to determine a lower expected value. This can be mainly attributed to the fact that, in the valuation under restructuring with debt write-off, Zucchi Group was considered as more efficient in terms of operating costs on sales in the best scenario than in

other scenarios in 2021, largely because in the more optimistic scenario the sale of real estates transferred to the SPV was assumed to be concluded in 2020. As a consequence, in this scenario the rent expense is expected not to be paid in 2021, determining the elimination of fixed costs for 1 million and, therefore, a more pronounced improvement in the EBITDA margin than in other scenarios. In the valuation of the enterprise value under restructuring with debt rescheduling, instead, the rent expenses were eliminated in all scenarios and therefore, the efficiency level expressed in terms of operating costs on sales in the base scenario is closer to the one experienced in the best scenario in respect to the case of restructuring with debt write-off. This less pronounced difference, then, impinges on the continuing value, since the NOPLAT generated in the last year of explicit forecast (2021) is the starting point for the computation of the FCFs in the long term and, therefore, the continuing value.

Secondly, in the valuation under restructuring with debt rescheduling, the discount rate used in the growing perpetuity formula for the computation of the continuing value is higher than the one used in the valuation under debt write-off, given the greater difficulties of Zucchi Group in overcoming the financial distress and reaching a target capital structure in line with the industry average. This choice further contributed to lower the expected enterprise value obtained in case of restructuring with debt rescheduling and to move it closer to the value obtained under restructuring with debt write-off.

Finally, it is also necessary to note that in the valuation under restructuring with debt rescheduling, all the assets that should be transferred to the SPV according to the 2015 debt restructuring agreement, were considered as operating assets. This valuation choice is questionable, given that Zucchi Group decision to use such assets to service debt seems to indicate that their contribution to operations is limited. An exception, in any case, is made for Rescaldina plant for which a rent expense is regulated in the 2015 debt restructuring agreement, suggesting the operating nature of the asset. However, since the 2016 financial statements doesn’t provide separated information about the book value of Rescaldina plant, it was chosen to adopt a more conservative perspective and to consider all the assets as operating. Considering all the assets as non-operating, instead, would have resulted in an over-optimistic valuation, because cash flows would have been assumed to be generated also thanks to the contribution of Rescaldina operations, but no cost items connected with the use of such asset would have been included in the income statements, since both the rent expense and depreciation are eliminated from the profit and loss statement.

4.10.1 BSM model

The expected enterprise value resulting from the valuation under restructuring with debt rescheduling represents the first key determinant of equity and debt value when they are estimated within the option pricing theory framework. As already explained in Chapter 2, according to the model developed by Black and Scholes (1973), then further elaborated by Merton (1974) (from now on: the BSM model), equity can be likened to a call option on company's assets, or, from a different perspective, but with equivalent results, risky debt can be interpreted as a combination of risk-free debt plus a put option granted by creditors to shareholders to divest firm's underlying assets upon maturity at the debt nominal value. In particular, in a distress setting the value of such put option can reach significant levels, which are positive for shareholders and negative for debtholders, given that frequently distressed firm's enterprise value is lower than the debt nominal value at the debt maturity.

In order to estimate the value of such put option and, therefore, the market value of Zucchi Group's equity and debt, the BSM model was adopted, assuming, as already explained, that a debt rescheduling, rather than a debt write-off, was agreed with creditors in the last debt restructuring agreement.

First of all, Zucchi Group equity value was computed by applying the pricing formula for a call option developed by BSM (under the assumption of no dividends):

$$C = SN(d_1) - Ke^{-rt}N(d_2)$$

$$d_1 = \frac{ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

When applied to equity valuation, the first determinant of such formula is the current value of firm's underlying asset (S), which was assumed equal to the previously computed expected enterprise value (62.4 million). The strike price of the option (K), instead, is represented by the debt nominal value upon maturity. However, since the BSM model treats the debt as a zero-coupon bond, some elaborations were required to apply it to the typical case of debt with periodic reimbursement and remuneration.

	2016A	2017E	2018E	2019E	2020E	2021E
Time		1	2	3	4	5
Reorganized debt (nominal value)	80,04	76,43	75,76	73,48	68,64	63,17
Debt variation from plan		3,61	0,67	2,28	4,84	5,47
Debt at the end of the projected period						63,17
Interest expense from plan		0,57	0,76	0,75	0,71	1,03
Free cash flow to debt (FCD)		**4,18**	**1,43**	**3,03**	**5,55**	**69,67**
Risk-free rate		-0,17%	-0,13%	-0,06%	0,01%	0,12%
Discount factor		1,00	1,00	1,00	1,00	0,99
PV FCD		4,19	1,43	3,03	5,55	69,26
Risk free debt value	**83,46**					
FCF x time		4,19	2,86	9,10	22,18	346,28
Sum (FCD x time)	384,61					
Duration	**4,61**					

Table 4.25 – Risk-free debt value and debt duration estimation.

As shown in *Table 4.25*[42], the debt initial (risk-free) value (83.46 million) was firstly computed by discounting at the risk-free rates, which are equal, in this order, to the 1 year EURIRS, 2 years EURIRS, 3 years EURIRIS, 4 years EURIRS and 5 years EURIRS as of December 2016, the cash flows to creditors, which are constituted by the interests and coupon payments forecasted in the next years (plus, in 2021, the residual value of debt at the end of the projection period). Secondly, debt duration (4.61 years) was calculated as a weighted average of cash flows maturities and, lastly, the debt nominal value upon maturity (83.92 million) was estimated by capitalizing the risk-free debt value at the risk-free rate over a period equal to that of the duration of debt. Given that the debt duration is close to 5 years, the 5 years EURIRS was used in this case and in the BSM formula.

Finally, enterprise value volatility (σ) was assumed equal to 43%, in line with the Damodaran's estimate for the apparel industry (42.97%, updated to 2016).

[42] Calculations in *Table 4.24* were based on the free cash flow to creditors forecasted in the base scenario. The same computation in the best scenario and worst scenario led to some slight differences in debt duration and risk-free value, which, however, didn't affect significantly the BSM results.

BSM MODEL	2016
EV *(S)*	62,45
Risk free debt value	83,46
Debt duration *(t)*	4,61
Risk free rate *(r)*	0,12%
Debt nominal value at maturity *(K)*	83,92
EV volatility (σ)	43%
d1	0,15
d2	-0,78
N(d1)	0,56
N(d2)	0,22
Equity value	16,61
Debt value	**45,84**
Put value of debt	37,62
Risk neutral probability of default	**78,10%**

Table 4.26 – Risky debt value estimation through BSM model.

Combining all the option pricing determinants according to the BSM formula (*Table 4.26*), it results that the equity is not worthless, as suggested by its negative book value on 31st December 2016, but it has a market value of 16.61 million. By subtracting the latter from the expected enterprise value, then, it is possible to compute the market value of debt, which is equal to 45.84 million. As expected, the market value of debt is significantly lower than its nominal value, providing evidence in favor of the hypothesis tested by this second analysis, according to which, as stated by KMPG in its audit report, Zucchi Group expected cash flows will not be sufficiently high to repay the total debt amount, even if the implementation of the new strategic plan is expected to bring performance improvements. Despite the volatility characterizing the future evolution of enterprise value, indeed, the probability that the value of the firm's assets will be lower than debt face value is significant (78%). In particular, the difference between debt nominal value and market value (37.62 million) at the valuation date, quantifies the sacrifice that creditors are willing to accept if they estimate their recovery deriving from supporting Zucchi Group continuation as a going concern through debt rescheduling as higher than the value of their claims in the case in which other feasible solutions to exit the crisis (including liquidation) are selected.

4.10.2 DCF model applied to cash flows to debt

A second estimate of the market value of Zucchi Group consolidated debt, then, was developed by applying the DCF model to free cash flows to creditors. The most critical issue

of this approach, however, consists on deriving the market cost of debt used to discount the cash flows, which may not correspond to the cost agreed with creditors, since the latter can decide to grant favorable rates for the firm, in order to foster its recovery. As suggested by Buttignon (2014), the market value of debt was computed through an iterative calculation, which first requires to compute the interest coverage ratio by dividing EBIT for the interest expenses. The latter were calculated by multiply the market cost of debt, computed as the sum of the risk-free rate and a default spread initially assumed equal to an input number randomly chosen, for the nominal value of the reorganized debt computed as the average between its level at the beginning and at the end of the year. Then, on the basis of the interest coverage ratio, a rating class was associated to the group in each year and a credit default spread was forecasted, according to the table presented in *Appendix 6*. The market cost of debt was therefore calculated by summing up the risk-free rate with the resulting credit spread and it was then used to compute the financial expenses. This, in turn, modifies the interest coverage and therefore the rating class, giving rise to an iterative process that finally allows to calculate the market cost of debt in each year of projection.

This rate was then used to compute the present value of free cash flows to debt, which are equal to the interest and debt repayments executed by Zucchi Group according to the evolution of its performance expected in the base case, assuming the debt value at the end of the projection period as equal to its nominal value in the last year[43].

This second approach, therefore, manages the uncertainty about Zucchi Group's future prospects by discounting free cash flow to debt forecasted in the base scenario at the market cost of debt (which include the default spread), rather than through the scenario analysis (in combination with the use of risk-free discount rate), and estimates the market value of debt as equal to 41.91 million (*Table 4.27*).

This result not only provides further evidence about Zucchi Group's inability to meet its debt obligations, despite the performance recovery expected from the implementation of the strategic plan, but it is also quite close to the estimate obtained through the BSM model (45.8 million), in spite of the several assumptions underlying the two methods and their significant impact on the results (specifically, the market cost of debt and the variance of the EV for the DCF model applied to FCD and the BSM model, respectively)

[43] In any case, it had been verified that this value was not higher than the residual value of Zucchi Group assets at the end of the explicit projection period.

(€ million)	2016A	2017E	2018E	2019E	2020E	2021E
EBIT		3,35	4,09	5,10	6,97	8,16
Interest expenses (revised at market cost of debt)		15,51	15,12	14,88	14,22	10,62
EBIT/Int expenses		0,22	0,27	0,34	0,49	0,77
Rating class		D	D	D	D	C
Credit or default spread		20,00%	20,00%	20,00%	20,00%	16,00%
Risk free rate		-0,17%	-0,13%	-0,06%	0,01%	0,12%
Market cost of debt		**19,83%**	**19,87%**	**19,94%**	**20,01%**	**16,12%**
Reorganized debt (nominal value)	80,04	76,43	75,76	73,48	68,64	63,17
Interest expense from plan		0,57	0,76	0,75	0,71	1,03
Debt variation from plan		3,61	0,67	2,28	4,84	5,47
Free cash flows to debt (FCD) from plan		**4,18**	**1,43**	**3,03**	**5,55**	**6,50**
Discount factor		0,83	0,70	0,58	0,48	0,47
PV FCD		3,49	0,99	1,76	2,67	3,08
TOT PV FCD	11,99					
Debt value at the end of the projection period	29,92					63,17
Market value of debt	**41,91**					
Nominal value of debt	80,04					
Shareholder's value of the reorganization plan	38,13					
Discount on the nominal value of debt	**47,63%**					

Table 4.27 - Risky debt value estimation through DCF model applied to FCD.

4.10.3 Further intuitions on the market value of debt

Summing up, both the valuation techniques confirm that Zucchi Group is expected not to be able to reimburse its total debt in the 5 years following the valuation date, in spite of the signs of recovery that are assumed to emerge from the implementation of the strategic plan. This justifies, therefore, the choice of creditors to write-off Zucchi Group's debt, rather than opting for its rescheduling.

The debt forgiveness actually granted by banks, however, is higher than the one suggested by the implementation of the BSM model and DCF model. By writing-off 50 million debt and allocating to the SPV the residual 30 million, which are expected to be reimbursed through assets disposal, indeed, creditors seem to have attributed to the total debt of 80 million a market value of 30 million, that is lower than the one computed through the BSM model (45.8 million) and DCF model (41.9 million) in *paragraph 4.10.1* and *paragraph 4.10.2*, respectively. This difference can be explained by two main arguments. First of all, creditors valued debt at the end of 2015, before the signature of the 2015 debt restructuring agreement which had taken place on 23rd December 2015, when the main financial ratios describing Zucchi Group's operating performance were still in a negative area. At that date, therefore, the first signs of recovery experienced in 2016 were only a forecast, at best, and not a real fact. The valuation conducted as of 31st December 2016, instead, is rooted in the 2016 Zucchi

Group slightly improved conditions and forecasts the continuation of this positive trend in the future years in both base and best scenario[44]. The presence of less pronounced actual evidences in favour of Zucchi Group forthcoming recovery at the time in which valuation was performed by creditors, therefore, could have affected the development of the assumptions about the evolution of the group's key value drivers, leading to creditors' more conservative estimates. The latter results in an expected enterprise value closer to the previously computed liquidation value and, therefore, in lower cash flows to creditors than the ones forecasted in *paragraph 4.10.2*, leading, regardless the valuation technique adopted (BSM model or DCF model applied to FCD), to a lower market value of debt than the one estimated as of 31st December 2016. In particular, if the assumptions at the basis of the worst scenario had been used in order to build the reference scenario, the DCF model applied to FCD would have resulted in a market value of debt equal to 20.4 million. This suggests that creditors probably translated the strategic guidelines provided in the 2015-2020 Restructuring Plan into assumptions about the evolution of Zucchi Group's key value drivers which lie between the assumptions underlying the base case and the assumptions underlying the worst case in the scenario analysis performed in *paragraph 4.4*.

Secondly, it should be noted that the market value of debt that seems to emerge by the 2015 debt restructuring agreement (30 million) is actually the result of the negotiation between different claimholders, and, therefore, of the interaction of stakeholders' strategic behaviours and bargaining powers, which are determinants of value not considered in the BSM model adopted in *paragraph 4.10.1*. When the BSM model is used to price corporate debt and equity, indeed, it is necessary to remember that it is based on several simplified assumptions which partially compromise the reliability of results when applied to real world cases. For instance, as already explained, the model considers a zero coupon debt with no special features and assumes that default can occur only at the debt maturity date. In case of periodic debt reimbursements and remunerations, as it is typical in real cases, however, default can be strategically triggered by shareholders before the debt maturity date to extract concessions from creditors. The latter anticipate the opportunistic behaviour of equity holders, that makes the debt riskier, and reflect it on lower debt value and higher yield spreads (Mella-Barral & Perraudin 1997, Acharya et al. 2006). The lower market value of debt suggested by the 2015 debt restructuring agreement, therefore, could also be explained by these strategic components not considered in the BSM model applied in *paragraph 4.10.1*. Even if this limitation could

[44] In the worst scenario, instead, the 2016 is considered as a lucky year for the group, whose performance is expected to worsen in 2018, also because of the entrance of a new player in the household linen industry, and then to slowly recover in the next years.

theoretically be overcome by adopting one of the several approaches rooted in the Merton's model and developed in the attempt to introduce stakeholders' behavior and bargaining power in the pricing of corporate securities, their little practical applicability makes them impossible to be adopted without adding further subjectivity to the valuation.

SUMMARY AND CONCLUSIONS

If estimating the company value is a difficult task at the best of times, it becomes even more complex when the firm presents the features of distress. The corporate crisis, indeed, results in a progressive deterioration of firm's economic value at the expense of all its stakeholders, partially invalidating the use of traditional valuation techniques, which are generally designed for healthy and growing firms. A clear understanding of the crisis phenomenon, therefore, is the starting point to better figure out the effects of distress at the valuation process level. An in-depth analysis of crisis causes, signals, evolutionary path and potential solutions, indeed, provides a useful tool to interpret company's historical performance and to predict its future prospects, whose characteristics and underlying uncertainty, being a key determinant of company's current economic value, are required to be appropriately captured and managed in the valuation.

Specifically, the analysis preparatory to the valuation starts from the identification of the causes originating the company's downward turn, and, therefore, of all internal and external factors, that, by acting together, reciprocally amplify their effect on company performance. A firm, indeed, is seldom in trouble for only one reason. First of all, therefore, the signals of decline have to be promptly detected through a ratio analysis, models combining accounting measures to judge company's financial health, or, sometimes, simple intuitions, and traced back to the originating events, in order to identify the cause-effect relations underlying the distress. The earlier that the signals of crisis are identified, the less expensive and more effective are the available tools to restore company performance and, therefore, the higher is the probability that the company will continue to operate as a going concern. If the signals of distress are not promptly detected, instead, the downward trend inherent in the crisis phenomenon will proceed through its different stages, until causing the firm's going concern value to be lower than the face value of debt. At this step, the crisis is no longer only potential, but it is still reversible if radical restructuring actions are implemented. Solutions that go beyond "quick-fixes" and "band-aid" approaches, therefore, have to be designed by the current or new ownership at the managerial, operational, portfolio and financial levels and negotiated with creditors through out-of-court workouts or in-court resolutions. In particular, the contents of the restructuring plan, which are expected to cause a market reaction as soon as they are publically announced depending on whether they reveal more or less unfavorable information about the company's actual conditions and future cash flows than the market previously realized, have to be carefully judged when valuing a distressed company. In this

context, indeed, it becomes fundamental to understand whether the designed solution appropriately acts on the causes of the crisis, strongly fostering the continuation of the company as a going concern, or whether liquidation still remains a highly likely scenario.

The probability that the firm will cease its operations, in fact, is one of the elements characterizing distressed firm's future prospects that make the estimation of its economic value particularly complex. Traditional valuation techniques indeed, implicitly assume the firm as a going concern with potentially infinite life, generally forecasting that the company will grow in perpetuity in the long run. Distressed firms' declining revenues, shrinking operating margins and high leverage levels, instead, not only may prevent the firm to reach a steady state at the end of the explicit projection period, but even can determine the firm's liquidation in the very near future if restructuring actions are not implemented or reveal themselves to be ineffective. Probability of default and liquidation value, therefore, should be incorporated in distressed firm valuation, giving rise to additional estimation issues. Despite the several approaches developed in the literature to estimate these value determinants, indeed, each proposed method presents its own limitations, which are more or less crucial depending also on firm-specific conditions, making it impossible to universally identify the best approach.

Another valuation component which is generally not considered when valuing healthy companies, then, consists on the costs of distress. However, while direct costs of distress can be estimated by looking at actual bankruptcies, indirect costs of distress are not directly observable and, therefore, difficult to measure, even if empirically researches point out that they are far too substantial to be ignored in valuation. In addition to these value determinants, whose estimation complexity jeopardizes the accuracy of the valuation results, strategic factors can intervene in the valuation. This frequently happens when, as it is typical for distressed firms, the market process is substituted by an administrative process of bankruptcy, which, by limiting the amount and quality of available information, creates room for strategic behaviors. Since the output of the valuation process determines the size of the pie to be divided among company's claimholders and drives the projected recoveries, indeed, junior and senior debt holders can have opposite incentive to support, respectively, upwardly or downwardly biased estimates. On the other hand, then, shareholders can opt for strategically triggering default in order to extract more concessions from creditors. The result of the valuation performed by each claimholder, therefore, will be driven by their own strategic incentives and will already discount the lower recovery expected in case of other claimholders' subsequent strategic actions.

These peculiarities of distressed firm valuation have drawn the attention of a large part of the corporate finance literature, which, however, has frequently approached this critical issue through the elaboration of theoretical models that, in the attempt to be as comprehensive as possible, finally show little applicability to real world cases. The most practical solution to value firm in a distress setting, therefore, still consists on adjusting traditional valuation techniques to appropriately reflect distress effects on firm value. In particular, when the distress is severe enough to be terminal, the traditional asset approach provides a useful basis for the estimation of the liquidation value, to which a further discount has to be applied in case of forced liquidation, since the urgency of the sale and the lower firm's bargaining power can result in lower proceeds than in case of orderly liquidation. When there is a real chance that the firm will survive the crisis, instead, the liquidation scenario should be combined with going concern scenarios. In the latter case, however, the income approach results more suitable to capture the uncertainty underlying company's future cash flows, generally managed through an accurate scenario analysis or the adoption of more complex statistical techniques as the Monte Carlo simulation. As regards the cash flows discount rate, instead, the characteristics of distressed firms, as the unique dynamic of debt to equity ratio, invalidate, among others, the common practice of assuming a constant target capital structure during the explicit forecast period, making the adoption of the WACC and, therefore, of the DCF model, generally not suitable in a distress setting. In this context, the APV method and the CCF method, instead, reveal their technical superiority to the DCF model, by relying on the unlevered cost of equity to discount cash flows from operations and by separating them from the benefits arising from debt tax shields and other tax credits, which can represent a substantial source of value for distressed companies and require to be carefully forecasted given the peculiar dynamic that they can experience in a distress setting. The different discount rate adopted to value the tax shields, then, determines which one between the APV method and the CCF method is the more appropriate technique depending on company's debt strategy. These methods, in addition, serve better the purpose of distressed firm valuation than the market approach that is generally less suitable to distress contexts given the difficulty of identifying comparable companies with the same degree of distress of the company being valued and the typical presence of negative measures of value and, therefore, negative multiples.

Alongside the traditional valuation approaches, whose limitations in a distress setting, possible solutions and solutions' drawbacks are summarized in *Table 5.1*, another increasingly used framework for the valuation of distressed companies is the one provided by

the option pricing theory. By considering the equity as a call option on firm's assets value, the option pricing model for the valuation of corporate securities allows to value the firm's equity even when the traditional valuation approaches, by resulting in firm value estimates under a going concern or liquidation scenario lower than outstanding debt face value, erroneously suggest that the equity is worthless. Even this approach, however, presents several limitations rooted in its simplified underlying assumptions that, despite the several attempts reported in the literature, have not already be overcome in a comprehensive model, without renouncing to its practical applicability.

	Valuation method	Shortcomings in a distress setting	Possible solutions	Solutions' drawbacks
ASSET APPROACH	**Adjusted Book Value Method** **Replacement Cost Method**	Suitability only in liquidation scenario Important determinants of (forced) liquidation value are not taken into account (sale's urgency, firm's low bargaining power, liquidation costs, ..)	Apply to the resulting value a discount based on the experience of distress sale of other firms operating in the industry	Firm's peculiarities in respect to comparable companies may require a case by case analysis
INCOME APPROACH	**Traditional income approach (as a group)**	Inability to manage the high uncertainty underlying distressed firm's future cash flows Positive growth rates assumed in perpetuity to compute the terminal value fail to account for the possibility of firm's exit from the business and/or liquidation.	Scenario analysis	Underlying assumptions and scenario probabilities are strongly affected by analyst's subjectivity Distress is considered as a discrete variable and not as a continuous risk
			Monte Carlo Simulation	Computationally intensive technique Selecting the probability distributions of critical variables is a difficult task which strongly affects the outcome
			Adjust going concern DCF for default probability	Less accurate estimate than the one resulting from scenario analysis and simulations
	Discounted Cash Flow Method	Discount rate contortions	Include bankruptcy costs and probability of default directly in the WACC formula	Assumptions underlying the derivation of the formula are not reliable
		Regression beta are not reliable	Re-lever bottom-up unlevered beta	Further estimation issues arise from the computation of beta debt
			Use healthy firms average beta and add a distress premium	Distress risk puzzle
		Yield to maturity is not a good proxy of the cost of debt	Apply CAPM to risky debt	Estimation issues connected with the computation of beta debt
			Add a default spread to the risk-free rate	Default spread are based only on historical data and

				the method is not forward looking
			Subtract the yield equivalent of expected default loss from the promise yield	Dependence on Merton's model limitations.
		Constant target debt to equity ratio in line with industry average over the entire valuation period results in firm value overestimation	Adjust debt to equity ratio year by year, as the restructuring process progresses	Complex process that can lead to significant errors
	Adjusted Present Value Method	Discount interest tax shields at the cost of debt unrealistically assuming constant debt level over the entire valuation period	Use the unlevered cost of equity to discount tax shields flows	Peers selection can strongly affects the resulting discount rate
		Distress costs require to be explicitly estimated	Compute distress costs as the difference between firm going concern and distress sale value Compute distress costs as a percentage of the firm's pre distress value looking at their magnitude in actual bankruptcies	Simplified approaches that lack of precision and don't account for firm-specific features
	Capital Cash Flows Method	NOLs at the end of the explicit forecast period are incorrectly incorporated in the terminal value and assumed to grow in perpetuity since they are part of the CCF	Extend explicit forecast period until NOLs expiration	Increasing uncertainty of future cash flows
MARKET APPROACH	**Comparable Companies Method** **Comparable Transactions Method**	Peers selection when other players in the industry are healthy and growing	Select distressed comparable companies from other industries	Comparables from other industry may be in a better position in terms of generating distress sale proceeds Firms may be distressed at a different degree, justifying differences in multiplies.
		Analysts subjectivity in interpreting distressed firms lower than healthy peers' average multiples as a discount due to default risk and not as a sign of mispricing	Distress explicit incorporation: computing firm's value as a weighted average of distress sale value and going concern relative value, where weights are, respectively, the probability of default and its complementary	Estimating distress sale value and probability of default is not straightforward in practice
		Negative multiples	Adopt revenues multiple	Information about firm's operating efficiency is ignored
			Apply healthy comparables multiples to future measures of value	Firm's continuation as a going concern is taken for granted

Table 5.1 – Traditional valuation methods limitations in a distress setting.

Shifting from theory to practice, with the purpose of providing a practical approach to the valuation of distressed companies, then, the economic value of Zucchi Group was

investigated and estimated by combining different valuation techniques, appropriately adjusted to incorporate distress.

Specifically, Zucchi Group is an Italian company operating in the household linen industry that, after more than 80 years of growth, started to reveal the first signals of decline in the early 2000s. From then on, the ineffectiveness of the restructuring actions implemented in the attempt to restore the group's operating performance and financial health led to a progressive intensification of the distress conditions, which reached a "make or break" point in December 2015, when the public prosecutor notified the company a bankruptcy petition. As emerged from the crisis analysis performed by comparing Zucchi Group's key financial ratios over time and with comparable companies, a combination of several causes can be identified behind the prolonged downward trend suffered by the company (*Figure 5.1*). In particular, even if external factors, such as the outbreak of the global economic and financial crisis and the increasing competitiveness of imports in the household linen industry, negatively impacted the group performance, the main causes of the crisis showed to have an internal nature. The company's inability to promptly adapt to the changing macroeconomic and industry conditions, indeed, can be attributed to the group too rigid costs and production structure, whose origins can be traced back to the inefficient approach to merger and acquisitions adopted by the group during its expansion period. The resulting distress at the operating level, then, was exacerbated by an excessive recourse to financial leverage, that, in turn, was progressively amplified by the lack of a stable recovery in operating cash flows.

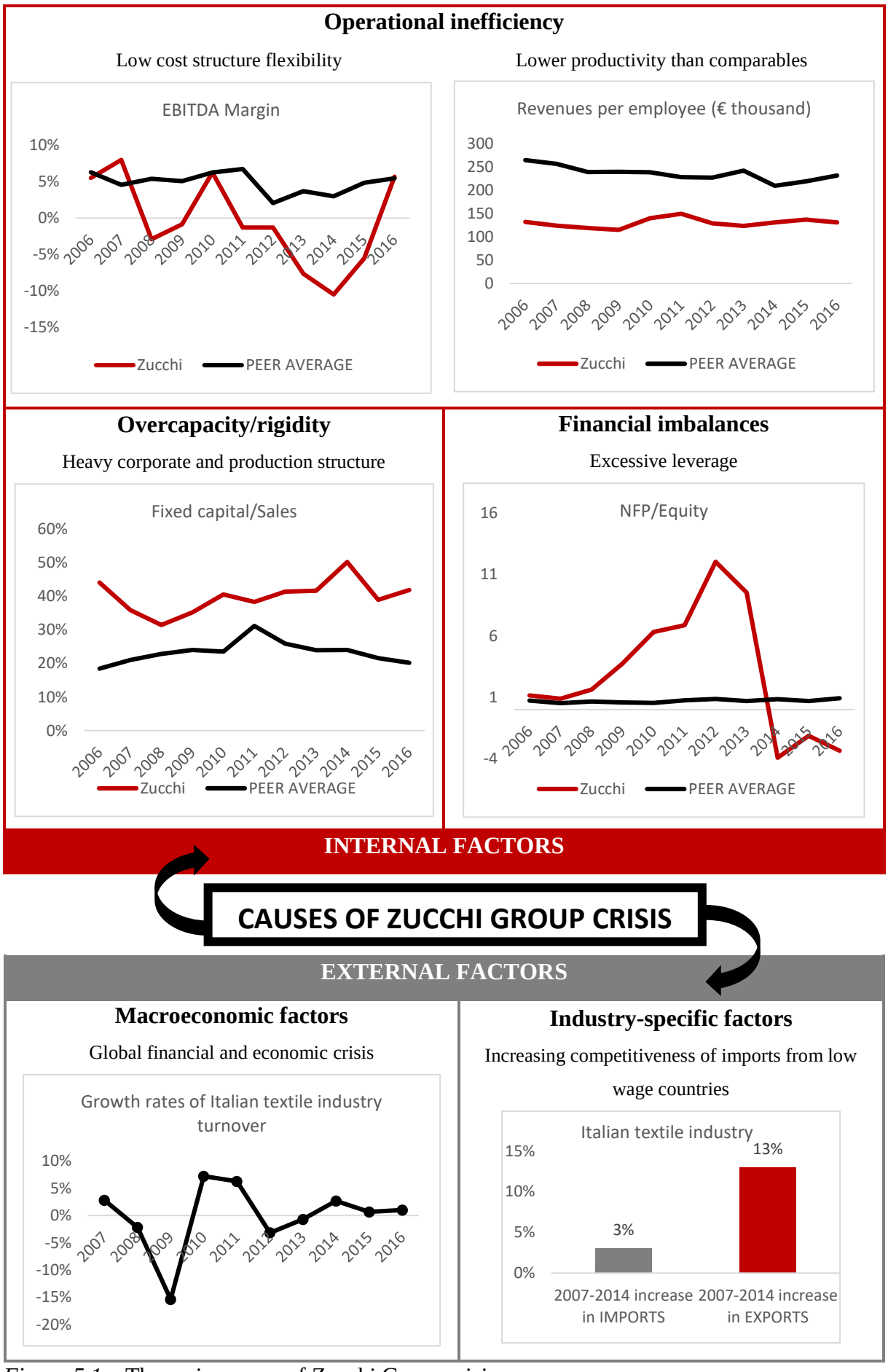

Figure 5.1 – The main causes of Zucchi Group crisis.

Solutions to overcome all these causes of distress are provided for the first time in the 2015-2020 Restructuring Plan. Differently from the previous attempts to exit the crisis, indeed, the latter not only provides for a more radical financial restructuring through the write-off of a substantial portion of Zucchi Group's consolidated debt, but also exploit the opportunities offered by the external environment, such as the expansion in foreign markets, only after having focused on group costs and production structure, through actions aimed at a stable reduction of structural costs and the disposal of redundant assets. The strategic guidelines of the restructuring plan, in addition, seems to be in line with latest market trends and competitors' KSFs by pursuing, among other objectives, the strengthening of the e-commerce network and the enhancement of customer experience in shop.

All these elements, in addition to the first signs of recovery reported by the group in 2016 annual financial statements and September 2017 quarterly financial statements, supported the adoption of a going concern hypothesis as a framework for the valuation. Nonetheless, the pronounced inversion in the operating performance expected from the implementation of the restructuring plan in the base and best scenarios, was combined with the less optimistic future prospects underlying the worst scenario. In particular, as shown in *Figure 5.2*, while the free cash flows are expected to remain positive over the entire period of explicit projection in the base scenario, despite the no trivial capital expenditure forecasted in 2018 and 2019, in the worst case scenario the free cash flows are expected to come back to negative levels and then to stabilize to a positive level below the one forecasted for 2017, assuming the signals of recovery documented in the last available 2017 quarterly financial statements as extraordinarily favorable results. This determined Zucchi Group enterprise value in the worst scenario to be extremely lower in respect to base and best scenario and close to the computed liquidation value, but in any case higher than the latter, further justifying the adoption of a going concern framework for the valuation.

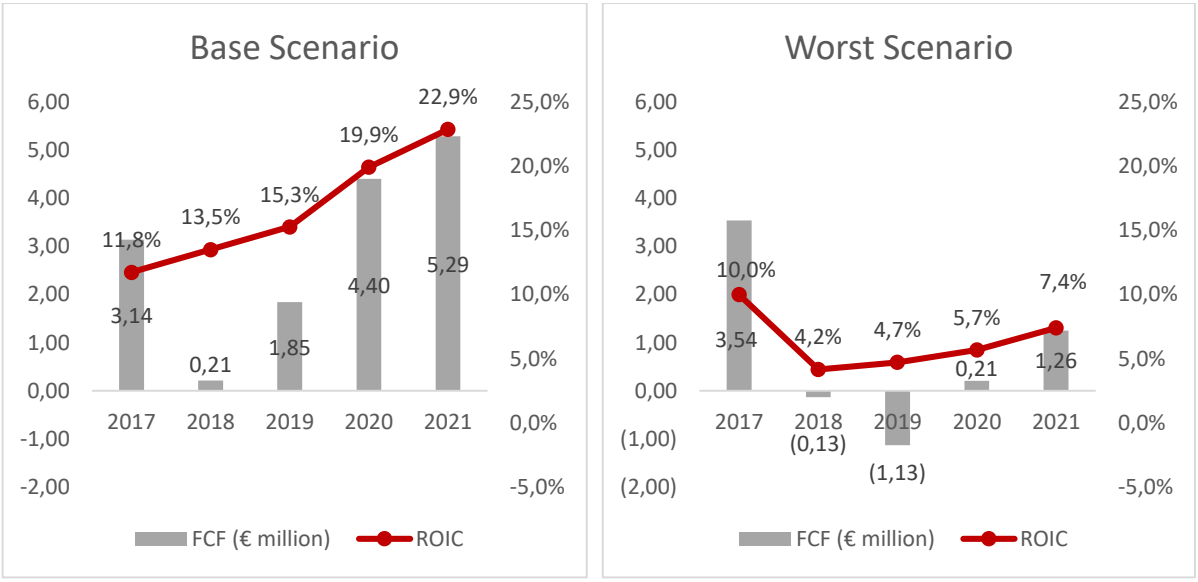

Figure 5.2 – FCFs and ROIC projections in the base and worst scenarios.

The uncertainty underlying Zucchi Group future prospects, therefore, was first of all managed through the development of a scenario analysis, starting from a 2016 financial statements appropriately adjusted in order to completely reflect the effects of the 2015 debt restructuring agreement on consolidated balance sheet and income statement. The unlevered cost of capital, computed through the CAPM, was then used to discount the operating free cash flows over the explicit projection period while the WACC was adopted in the growing perpetuity formula. A mixed version of the APV method, therefore, was implemented to value Zucchi Group, resorting to the DCF technique for the computation of Zucchi Group value beyond the explicit forecast period, under the assumption that the group will reach a steady state in 2021 and will converge to a capital structure in line with the industry average in the long run. In particular, given that the continuing value is responsible for a significant portion of total enterprise value, as it is typical for firms undertaking a restructuring plan, the reliability of its underlying assumptions was verified and confirmed through the adoption of a market approach based on comparable companies EV/EBITDA multiple. By applying the industry average multiple to the firm's measure of value expected in the first year reflecting firm's normalized operations, the main limitations of the market approach to value distressed firms are circumvented and a useful market check provided on the estimate resulting from the DCF method.

Particular attention was then dedicated to another important determinant of value in a distress setting, the tax loss carry-forward, which cannot be assumed to continue in perpetuity, requiring, therefore, that NOLs are explicitly forecasted until their expiration. Finally, by summing up all its components, Zucchi Group's enterprise value was estimated in each

scenario and its expected value computed by attributing different probability of realization to each scenario. The equity value was then derived by subtracting the value of NFP and debt equivalent and it resulted to be in line with Zucchi Group average market capitalization over the last three months of 2016. A second estimation of Zucchi Group expected equity value was then performed by capturing the uncertainty underlying Zucchi Group future prospects in the discount rate, rather than by means of the scenario analysis, and discounting, therefore, the free cash flows in the base scenario at a higher discount rate which incorporates a distress premium in line with the excess return reported in the market by stocks of companies with high financial risk. Also in this second case, the estimate resulted to be in line with Zucchi Group market capitalization and, therefore, with the output of the valuation conducted through the scenario analysis, pointing out that the uncertainty about Zucchi Group's future performance was reasonably managed through the scenario analysis, whose underlying assumptions appear to adequately capture the market expectations. By combining different methods of the income approach and limiting the subjectivity in the development of the scenario analysis through several market checks, the proposed valuation process, therefore, results to adequately reflect in company's economic value the riskiness typical of distressed firms, maintaining at the same time a high applicability to real world cases.

A second analysis was then conducted to deal with the estimation of the market value of debt, which is another critical issue in distressed firm valuation. For this purpose, it was supposed that 2015 debt restructuring agreement provided for a simple debt rescheduling, rather than regulating the creation of a SPV and the debt write-off. Under this assumption, the enterprise value was estimated in each scenario and the debt market value computed through two different approaches. Firstly, the distressed debt was interpreted as a combination of risk-free debt plus a put option granted by creditors to shareholders and its value computed through the option pricing model (BSM model). Secondly, the DCF model was applied to free cash flows to debt, by discounting the latter at a market cost of debt computed through an iterative process. Both the methods result in a market value of debt lower than its nominal value, supporting the conclusion reached by KPMG in its audit report about the inability of Zucchi Group future cash flows to meet total debt obligations, despite the performance improvements expected from the implementation of the strategic plan, and justifying, therefore, the creditors' choice to grant a debt forgiveness.

The assignation of a rating class solely on the basis of the interest coverage ratio and the derivation of the enterprise value volatility from the industry average, however, are two simplified assumptions at the basis of the models that can significantly impact the results, as

well as the presence of a single debt layer, which was supposed in the case of Zucchi Group, since no public available documents provide detailed information about the debt composition, but it is seldom the case in a distress setting. In addition, the role played by strategic factors in the valuation of corporate securities is not taken into account in the adopted option pricing model. Solving these limitations, however, as proposed by different theoretical model in the literature, will come at the expense of its practical applicability.

As regards the computation of the enterprise value, instead, a sensitivity analysis was conducted to verify how it is expected to vary by changing the assumptions underlying key inputs variables. A similar analysis, however, could result interesting to be performed also on the probabilities of realization of each scenario, which, in the Zucchi Group case, were assigned on the basis of intuitions developed from the analysis of company's history. When firm's conditions suggest that the distress could be terminal, instead, the probability of default should be computed and associated to the liquidation scenario.

In conclusion, despite its limitations, the proposed approach to the valuation of distressed companies was proven to provide a useful solution to adequately model the main features of distressed firms that, as Zucchi Group, are subjected to a restructuring at both the strategic and financial level in the attempt to overcame the crisis, without renouncing to the practical applicability of the valuation process, in a context in which, however, building a comprehensive and, at the same time, concrete model for valuing distressed firms still remain an open challenge and an alluring venture.

APPENDIX

Appendix 1 – Zucchi Group's reorganized financial statements and key ratios.

REORGANIZED BALANCE SHEET (Invested Capital)																	
(€ million)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Working cash*	3,7	3,9	4,1	3,9	3,5	3,3	3,0	2,8	2,6	2,2	1,9	1,8	1,6	1,5	1,0	0,9	0,8
Trade receivables	121,9	123,1	135,2	121,6	115,5	122,5	113,1	111,2	96,5	81,1	76,4	61,0	51,2	45,8	27,0	22,9	22,7
Inventories	110,4	132,8	130,1	151,9	151,5	125,4	104,6	98,2	91,9	84,2	71,2	71,0	48,1	45,9	37,2	21,3	20,8
Trade payables	(58,7)	(61,6)	(61,7)	(57,8)	(51,4)	(50,5)	(58,0)	(54,7)	(51,4)	(42,8)	(50,9)	(35,1)	(32,1)	(29,4)	(21,2)	(24,9)	(11,5)
Trade working capital	**177,3**	**198,1**	**207,7**	**219,6**	**219,1**	**200,7**	**162,7**	**157,5**	**139,5**	**124,7**	**98,6**	**98,7**	**68,8**	**63,7**	**44,0**	**20,3**	**32,9**
Other operating current assets	14,8	14,2	12,7	14,1	11,8	14,1	14,2	9,6	9,2	6,9	3,6	3,4	5,4	3,4	3,2	2,3	4,3
Other operating current liabilities	(18,9)	(21,0)	(24,5)	(26,7)	(22,4)	(16,1)	(18,2)	(15,5)	(15,9)	(15,7)	(9,5)	(9,7)	(8,7)	(9,4)	(5,8)	(8,1)	(5,5)
Other current assets and liabilities	**(4,0)**	**(6,9)**	**(11,8)**	**(12,6)**	**(10,5)**	**(2,0)**	**(4,0)**	**(5,9)**	**(6,7)**	**(8,8)**	**(5,8)**	**(6,3)**	**(3,3)**	**(6,0)**	**(2,6)**	**(5,9)**	**(1,3)**
Net working capital	**173,3**	**191,2**	**195,9**	**207,1**	**208,6**	**198,7**	**158,7**	**151,6**	**132,8**	**115,9**	**92,8**	**92,4**	**65,5**	**57,7**	**41,4**	**14,4**	**31,6**
Operating fixed capital	**118,1**	**119,5**	**115,6**	**117,1**	**122,0**	**150,2**	**114,9**	**85,9**	**77,0**	**79,2**	**73,5**	**68,4**	**63,3**	**62,7**	**37,9**	**34,5**	**32,9**
Operating receivables and other non-current assets	1,0	1,2	0,6	4,1	4,1	3,2	2,0	0,3	1,0	0,8	1,8	1,5	2,6	3,7	0,9	1,0	1,0
Operating deferred-tax assets/(liabilities)	9,6	6,7	5,5	8,2	7,3	(3,9)	(8,0)	(4,3)	(4,9)	(6,4)	(6,7)	(5,9)	(6,4)	(6,0)	(6,9)	(6,6)	(6,2)
Operating non-current liabilities	(1,5)	(1,1)	(0,7)	0,0	0,0	(3,2)	(2,1)	0,0	(0,1)	(0,0)	(0,1)	(0,0)	(0,1)	(0,2)	(0,0)	(0,0)	(0,7)
Operating provisions	(1,3)	(1,4)	(2,6)	(1,5)	(1,6)	(1,4)	(1,3)	(1,0)	(1,4)	(1,4)	(1,4)	(1,3)	(1,0)	(1,0)	(1,1)	(1,0)	(1,1)
Total other non-current operating assets and liabilities	**7,8**	**5,3**	**2,8**	**10,8**	**9,8**	**(5,4)**	**(9,4)**	**(5,0)**	**(5,4)**	**(7,1)**	**(6,2)**	**(5,8)**	**(4,9)**	**(3,5)**	**(7,1)**	**(6,6)**	**(7,0)**
Invested capital excluding goodwill and similar intangibles	**299,2**	**316,1**	**314,3**	**335,0**	**340,5**	**343,5**	**264,3**	**232,6**	**204,4**	**188,0**	**160,1**	**155,0**	**123,8**	**116,9**	**72,3**	**42,2**	**57,5**
Goodwill and similar intangibles	11,7	11,7	13,3	14,9	16,3	15,3	13,4	12,5	12,6	10,5	1,8	1,3	1,0	2,0	0,9	0,5	0,4
Deferred tax asset/(liabilities) on similar intangibles	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,3	1,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Goodwill and other similar intangibles	**11,7**	**11,7**	**13,3**	**14,9**	**16,3**	**15,3**	**13,4**	**12,5**	**13,9**	**11,9**	**1,8**	**1,3**	**1,0**	**2,0**	**0,9**	**0,5**	**0,4**
Invested capital including goodwill and similar intangibles	**310,9**	**327,8**	**327,6**	**349,9**	**356,8**	**358,8**	**277,7**	**245,0**	**218,3**	**199,9**	**161,9**	**156,3**	**124,8**	**118,9**	**73,3**	**42,8**	**57,9**
Non-operating current assets	0,4	0,7	0,7	0,6	0,5	0,6	0,1	0,0	1,1	1,8	0,6	1,0	1,0	1,6	0,4	0,4	0,3
Other non-operating current liabilities	(9,5)	(7,6)	(6,4)	(4,8)	(3,7)	(2,6)	(1,4)	(2,2)	(0,2)	(2,9)	(0,3)	(0,4)	(1,1)	(0,3)	(0,3)	(0,7)	(0,8)
Non-operating non-current assets	7,1	7,9	8,4	7,5	6,1	6,0	26,7	38,2	24,1	6,6	45,4	4,2	1,6	1,5	32,2	0,6	0,5
Non-operating deferred-tax assets/(liabilities)	0,0	0,0	0,0	(1,6)	(2,3)	(0,9)	2,4	1,1	0,5	(5,1)	(3,5)	(2,1)	0,9	0,2	3,3	2,0	1,3
Non-operating non-current liabilities	0,0	0,0	0,0	0,0	0,0	0,0	0,0	(14,5)	(6,0)	0,0	(41,5)	0,0	0,0	0,0	(31,6)	0,0	0,0
Non-operating assets	**(2,0)**	**1,0**	**2,7**	**1,6**	**0,4**	**3,1**	**27,8**	**22,5**	**19,5**	**0,3**	**0,7**	**2,7**	**2,5**	**3,0**	**4,1**	**2,2**	**1,3**
TOTAL FUNDS INVESTED	**308,9**	**328,7**	**330,3**	**351,4**	**357,2**	**362,0**	**305,5**	**267,6**	**237,8**	**200,2**	**162,6**	**159,0**	**127,4**	**121,9**	**77,3**	**45,0**	**59,2**

REORGANIZED BALANCE SHEET (Source of financing)																	
(€ million)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Excess cash	(30,0)	(34,6)	(30,5)	(32,9)	(37,9)	(31,2)	(26,5)	(22,6)	(17,9)	(3,6)	(2,3)	(6,1)	(8,1)	(11,2)	(6,9)	(9,4)	(7,2)
Long-term borrowings	21,1	23,1	35,7	26,2	64,2	40,1	14,5	46,9	0,5	0,2	0,1	0,1	0,0	28,7	0,0	0,0	0,0
Short-term borrowings	75,3	97,8	84,8	123,6	120,7	145,3	137,8	73,4	133,2	128,4	125,6	131,0	111,6	75,0	97,3	80,3	80,0
Net financial position	**66,5**	**86,3**	**90,0**	**116,9**	**146,9**	**154,2**	**125,8**	**97,6**	**120,6**	**125,1**	**123,5**	**125,0**	**103,5**	**92,5**	**90,4**	**70,9**	**72,9**
Provision for employee benefit	30,8	29,8	30,8	31,4	29,5	30,4	26,0	21,6	18,4	16,1	14,0	12,1	12,8	12,8	9,6	7,7	7,0
Non-operating provisions	1,5	1,1	2,2	2,9	9,8	23,5	11,6	6,1	7,9	16,9	2,9	1,6	1,3	5,0	3,7	6,1	4,6
Debt equivalents	**32,3**	**30,8**	**33,0**	**34,3**	**39,3**	**54,0**	**37,5**	**27,8**	**26,3**	**33,0**	**16,8**	**13,8**	**14,1**	**17,8**	**13,3**	**13,8**	**11,6**
Net financial position and debt equivalents	**98,8**	**117,1**	**123,0**	**151,2**	**186,2**	**208,2**	**163,4**	**125,4**	**146,9**	**158,1**	**140,3**	**138,8**	**117,6**	**110,3**	**103,8**	**84,6**	**84,5**
Minority interests	**43,4**	**25,2**	**22,5**	**22,1**	**18,1**	**20,3**	**20,0**	**20,6**	**10,1**	**8,4**	**8,8**	**8,0**	**6,7**	**5,3**	**(0,0)**	**0,0**	**0,0**
Shareholders' equity	**166,7**	**186,4**	**184,8**	**178,1**	**152,9**	**133,5**	**122,2**	**121,5**	**80,9**	**33,7**	**13,4**	**12,2**	**3,0**	**6,3**	**(26,5)**	**(39,6)**	**(25,3)**
TOTAL SOURCE OF FINANCING	**308,9**	**328,7**	**330,3**	**351,4**	**357,2**	**362,0**	**305,5**	**267,6**	**237,8**	**200,2**	**162,6**	**159,0**	**127,4**	**121,9**	**77,3**	**45,0**	**59,2**
**Working cash on revenues*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*	*1,0%*

REORGANIZED INCOME STATEMENT																	
(€ million)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Revenues	375,0	385,6	405,4	388,6	355,0	330,3	300,5	279,6	258,7	221,9	188,2	184,9	159,0	151,0	100,2	92,9	80,4
Other income	1,8	2,4	2,9	2,4	5,4	2,8	1,0	4,1	2,9	2,6	3,3	2,2	2,4	1,3	0,6	0,2	0,5
Operating costs	(329,8)	(342,6)	(361,9)	(351,9)	(321,1)	(328,3)	(284,8)	(261,4)	(269,1)	(226,4)	(179,7)	(189,5)	(163,5)	(163,9)	(111,3)	(98,3)	(76,3)
EBITDA	**47,0**	**45,3**	**46,5**	**39,1**	**39,3**	**4,8**	**16,6**	**22,3**	**(7,5)**	**(1,9)**	**11,8**	**(2,4)**	**(2,1)**	**(11,6)**	**(10,5)**	**(5,1)**	**4,6**
Depreciation	(19,7)	(21,5)	(22,7)	(23,0)	(23,6)	(19,8)	(17,5)	(14,7)	(11,7)	(11,9)	(7,7)	(6,1)	(5,5)	(4,8)	(2,8)	(2,3)	(1,5)
EBITA	**27,3**	**23,9**	**23,8**	**16,1**	**15,7**	**(15,0)**	**(0,8)**	**7,7**	**(19,2)**	**(13,7)**	**4,1**	**(8,5)**	**(7,6)**	**(16,4)**	**(13,3)**	**(7,5)**	**3,1**
Amortization of assets similar to goodwill	(4,5)	(5,5)	(3,9)	(3,6)	(4,2)	(2,9)	(2,9)	(2,5)	(2,7)	(1,9)	(0,8)	(0,6)	(0,4)	(0,5)	(0,5)	(0,2)	(0,2)
EBIT	**22,8**	**18,4**	**20,0**	**12,4**	**11,5**	**(18,0)**	**(3,7)**	**5,2**	**(21,9)**	**(15,6)**	**3,3**	**(9,1)**	**(8,0)**	**(16,9)**	**(13,8)**	**(7,7)**	**2,9**
Impairment losses																	
Non-recurring and extraordinary items	3,9	5,7	3,6	4,3	(12,5)	(29,2)	5,7	0,8	2,3	(16,2)	(0,9)	(2,9)	(0,1)	(5,2)	(1,4)	(6,4)	2,9
Interest income (expense) from investments	0,1	0,1	0,1	0,0	1,0	(0,3)	0,0	3,5	(1,1)	(0,3)	0,1	(0,1)	(0,0)	(0,1)	0,0	(0,0)	0,0
Exchange rate gains (losses)	0,1	0,4	(0,0)	(1,5)	(0,1)	0,3	(0,5)	(0,6)	(2,6)	0,1	1,0	1,1	(0,3)	(0,4)	(0,0)	(1,0)	(0,0)
Interest income (expense)	(2,9)	(3,5)	(3,5)	(3,6)	(5,3)	(4,2)	(8,4)	(7,7)	(10,6)	(6,6)	(3,0)	(5,5)	(3,2)	8,0	(1,7)	(1,5)	(0,1)
Net financial result	(2,8)	(3,1)	(3,6)	(5,2)	(5,4)	(3,9)	(8,8)	(8,3)	(13,2)	(6,5)	(2,0)	(4,4)	(3,5)	7,6	(1,7)	(2,5)	(0,1)
EBT	**24,1**	**21,1**	**20,1**	**11,6**	**(8,4)**	**(57,4)**	**(7,7)**	**1,1**	**(35,3)**	**(44,6)**	**0,2**	**(17,2)**	**(12,0)**	**(14,6)**	**(19,6)**	**(18,2)**	**5,6**
Taxes	(4,3)	(11,3)	(12,9)	(10,6)	(8,6)	6,2	(3,4)	(2,2)	(3,8)	(4,2)	0,4	0,5	1,3	(0,6)	(1,2)	(1,4)	(1,1)
Result from discontinued operation	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	(20,8)	0,0	0,0	0,0	(18,7)	0,0	0,0
Group Net Income	**19,7**	**9,8**	**7,2**	**0,9**	**(17,0)**	**(51,1)**	**(11,2)**	**(1,1)**	**(39,1)**	**(48,8)**	**(20,2)**	**(16,7)**	**(10,6)**	**(15,2)**	**(39,4)**	**(19,5)**	**4,5**
Minority result	0,0	2,9	1,5	0,3	0,0	0,0	0,5	1,3	(1,2)	(1,6)	0,3	(0,8)	(1,3)	(1,4)	(5,3)	0,0	0,0
Net Income	**19,7**	**6,9**	**5,7**	**0,6**	**(17,0)**	**(51,1)**	**(11,6)**	**(2,4)**	**(37,9)**	**(47,1)**	**(20,5)**	**(16,0)**	**(9,4)**	**(13,8)**	**(34,1)**	**(19,5)**	**4,5**

FREE CASH FLOWS CALCULATION																
(€ million)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
EBITA	**23,9**	**23,8**	**16,1**	**15,7**	**(15,0)**	**(0,8)**	**7,7**	**(19,2)**	**(13,7)**	**4,1**	**(8,5)**	**(7,6)**	**(16,4)**	**(13,3)**	**(7,5)**	**3,1**
Operating taxes	(12,0)	(13,9)	(11,8)	(15,3)	(4,9)	(5,0)	(5,0)	(7,6)	(11,6)	(0,7)	(1,8)	0,2	(0,3)	(2,2)	(4,1)	(0,3)
NOPLAT	**11,8**	**9,9**	**4,2**	**0,5**	**(20,0)**	**(5,8)**	**2,6**	**(26,7)**	**(25,4)**	**3,4**	**(10,3)**	**(7,4)**	**(16,7)**	**(15,5)**	**(11,6)**	**2,7**
Depreciation	21,5	22,7	23,0	23,6	19,8	17,5	14,7	11,7	11,9	7,7	6,1	5,5	4,8	2,8	2,3	1,5
Gross cash flow	**33,3**	**32,5**	**27,2**	**24,0**	**(0,2)**	**11,6**	**17,3**	**(15,1)**	**(13,5)**	**11,1**	**(4,2)**	**(1,9)**	**(11,8)**	**(12,7)**	**(9,3)**	**4,2**
Change in operating working capital	(17,9)	(4,7)	(11,1)	(1,5)	9,9	40,0	7,1	18,8	16,9	23,1	0,4	26,9	7,8	16,3	27,0	(17,2)
Net capital expenditures	(22,9)	(18,8)	(24,5)	(28,5)	(48,0)	17,8	14,3	(2,7)	(14,1)	(2,0)	(1,0)	(0,4)	(4,3)	21,9	1,1	0,0
Change in other operating assets and liabilities	2,5	2,5	(8,0)	1,0	15,2	4,0	(4,4)	0,4	1,7	(0,9)	(0,5)	(0,9)	(1,4)	3,6	(0,4)	0,3
Gross investment	**(38,4)**	**(20,9)**	**(43,6)**	**(29,1)**	**(22,9)**	**61,8**	**17,0**	**16,5**	**4,6**	**20,3**	**(1,0)**	**25,7**	**2,1**	**41,8**	**27,7**	**(16,8)**
Free cash flow before goodwill and similar intangibles	**(5,1)**	**11,6**	**(16,4)**	**(5,0)**	**(23,1)**	**73,4**	**34,4**	**1,4**	**(9,0)**	**31,4**	**(5,3)**	**23,8**	**(9,8)**	**29,1**	**18,4**	**(12,6)**
Investments in goodwill and other intangibles	(5,5)	(5,4)	(5,3)	(5,6)	(1,9)	(1,0)	(1,5)	(4,2)	0,1	9,2	(0,1)	(0,1)	(1,5)	0,6	0,1	0,0
Free cash flow after goodwill and similar intangibles	**(10,6)**	**6,2**	**(21,7)**	**(10,7)**	**(25,0)**	**72,4**	**32,8**	**(2,8)**	**(8,8)**	**40,6**	**(5,4)**	**23,7**	**(11,2)**	**29,7**	**18,6**	**(12,6)**
Investments in non-operating assets	(2,9)	(1,7)	1,1	1,1	(2,7)	(24,7)	5,3	3,1	19,1	(0,3)	(2,0)	0,1	(0,5)	(1,0)	1,8	0,9
Impairment losses	0,0	0,0	0,0	(3,1)	(6,1)	(0,9)	0,0	(1,4)	(6,0)	(0,2)	(0,7)	(0,3)	(0,0)	(2,8)	(1,5)	(0,0)
Non-recurring and extraordinary items	5,7	3,6	4,3	(12,5)	(29,2)	5,7	0,8	2,3	(16,2)	(0,9)	(2,9)	(0,1)	(5,2)	(1,4)	(6,4)	2,9
Interest income (expense) from investments	0,1	0,1	0,0	1,0	(0,3)	0,0	3,5	(1,1)	(0,3)	0,1	(0,1)	(0,0)	(0,1)	0,0	(0,0)	0,0
Non-operating taxes	0,8	1,1	1,2	6,7	11,1	1,6	2,8	3,8	7,5	1,1	2,3	1,1	(0,3)	1,0	2,8	(0,8)
Discontinued operations	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	(20,8)	0,0	0,0	0,0	(18,7)	0,0	0,0
Non-operating cash flow	**3,6**	**3,0**	**6,7**	**(6,7)**	**(27,1)**	**(18,3)**	**12,4**	**6,6**	**4,1**	**(21,1)**	**(3,4)**	**0,8**	**(6,1)**	**(22,8)**	**(3,3)**	**2,9**
Cash available to investors	**(6,9)**	**9,2**	**(15,0)**	**(17,4)**	**(52,0)**	**54,1**	**45,2**	**3,8**	**(4,7)**	**19,5**	**(8,8)**	**24,5**	**(17,3)**	**6,9**	**15,3**	**(9,6)**
Net financial result	(3,1)	(3,6)	(5,2)	(5,4)	(3,9)	(8,8)	(8,3)	(13,2)	(6,5)	(2,0)	(4,4)	(3,5)	7,6	(1,7)	(2,5)	(0,1)
Change in debt equivalents	(1,5)	2,2	1,2	5,1	14,7	(16,4)	(9,8)	(1,4)	6,7	(16,2)	(3,1)	0,4	3,7	(4,5)	0,4	(2,2)
Change in minority interests	(21,1)	(4,2)	(0,7)	(4,0)	2,2	(0,8)	(0,7)	(9,4)	(0,0)	0,0	0,0	(0,0)	(0,0)	(0,0)	0,0	0,0
Change in shareholders' equity	12,7	(7,3)	(7,3)	(8,3)	31,7	0,4	1,8	(2,7)	(0,0)	0,3	14,7	0,2	17,0	1,4	6,4	9,9
Decrease (increase) in net financial position	**(19,9)**	**(3,7)**	**(26,9)**	**(30,0)**	**(7,3)**	**28,4**	**28,2**	**(22,9)**	**(4,5)**	**1,6**	**(1,5)**	**21,6**	**10,9**	**2,1**	**19,6**	**(2,0)**
Beginning net financial position	**66,5**	**86,3**	**90,0**	**116,9**	**146,9**	**154,2**	**125,8**	**97,6**	**120,6**	**125,1**	**123,5**	**125,0**	**103,5**	**92,5**	**90,4**	**70,9**
Ending net financial position	**86,3**	**90,0**	**116,9**	**146,9**	**154,2**	**125,8**	**97,6**	**120,6**	**125,1**	**123,5**	**125,0**	**103,5**	**92,5**	**90,4**	**70,9**	**72,9**

KEY RATIOS																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PROFITABILITY																	
ROE	11,8%	3,9%	3,1%	0,3%	-10,3%	-35,7%	-9,1%	-2,0%	-37,5%	-82,3%	-87,1%	-124,5%	-122,8%	-295,9%	338,0%	59,1%	-13,8%
ROIC	7,1%	3,7%	3,0%	1,3%	0,1%	-5,6%	-1,8%	1,0%	-11,5%	-12,1%	1,9%	-6,5%	-5,3%	-13,7%	-16,1%	-20,1%	5,4%
Premium over book capital	1,04	1,04	1,04	1,04	1,05	1,05	1,05	1,05	1,06	1,07	1,04	1,01	1,01	1,01	1,02	1,01	1,01
ROIC without goodwill	7,4%	3,8%	3,1%	1,3%	0,1%	-5,8%	-1,9%	1,1%	-12,2%	-12,9%	2,0%	-6,5%	-5,3%	-13,9%	-16,4%	-20,3%	5,5%
Pretax ROIC	9,1%	7,8%	7,6%	5,0%	4,7%	-4,4%	-0,3%	3,1%	-8,8%	-7,0%	2,3%	-5,4%	-5,5%	-13,6%	-14,1%	-13,1%	6,1%
Operating margin (ROS)	7,3%	6,2%	5,9%	4,1%	4,4%	-4,6%	-0,3%	2,7%	-7,4%	-6,2%	2,2%	-4,6%	-4,8%	-10,9%	-13,3%	-8,1%	3,8%
Revenues/invested capital	1,25	1,25	1,29	1,20	1,05	0,97	0,99	1,13	1,18	1,13	1,08	1,17	1,14	1,25	1,06	1,62	1,61
Net working capital/revenues	46,2%	47,3%	47,7%	51,9%	58,5%	61,7%	59,5%	55,5%	55,0%	56,0%	55,5%	50,1%	49,7%	40,8%	49,5%	30,0%	28,6%
Operating fixed assets/revenues	31,5%	30,8%	29,0%	30,0%	33,7%	41,2%	44,1%	35,9%	31,5%	35,2%	40,6%	38,4%	41,4%	41,7%	50,2%	39,0%	41,9%
GROWTH RATES																	
Revenues		2,8%	5,1%	-4,2%	-8,6%	-6,9%	-9,0%	-7,0%	-7,5%	-14,2%	-15,2%	-1,7%	-14,0%	-5,0%	-33,6%	-7,3%	-13,5%
EBITDA		-3,6%	2,5%	-15,9%	0,5%	-87,8%	248,4%	34,3%	-133,6%	-74,9%	-726,5%	-120,3%	-13,4%	456,5%	-9,1%	-51,0%	-188,9%
EBITA		-12,7%	-0,1%	-32,4%	-2,2%	-195,6%	-94,6%	-1045,3%	-349,4%	-28,3%	-129,8%	-306,9%	-10,1%	115,6%	-18,8%	-43,7%	-140,8%
NOPAT		-46,4%	-16,3%	-57,1%	-89,3%	-4507,5%	-70,9%	-145,6%	-1109,0%	-5,1%	-113,4%	-402,6%	-28,2%	125,4%	-7,1%	-24,9%	-123,4%
IC		5,4%	0,0%	6,8%	2,0%	0,6%	-22,6%	-11,8%	-10,9%	-8,5%	-19,0%	-3,4%	-20,2%	-4,7%	-38,4%	-41,6%	35,3%
IC excluding goodwill		5,6%	-0,5%	6,6%	1,6%	0,9%	-23,1%	-12,0%	-12,1%	-8,0%	-14,9%	-3,1%	-20,1%	-5,6%	-38,2%	-41,6%	36,2%
Net working capital		10,4%	2,5%	5,7%	0,7%	-4,7%	-20,1%	-4,5%	-12,4%	-12,7%	-19,9%	-0,4%	-29,2%	-11,9%	-28,2%	-65,2%	119,0%
Operating fixed capital		1,2%	-3,3%	1,3%	4,2%	23,1%	-23,5%	-25,2%	-10,4%	2,9%	-7,2%	-6,9%	-7,5%	-0,9%	-39,5%	-9,1%	-4,5%
WORKING CAPITAL MANAGEMENT (Days in revenues)																	
Working Cash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Receivables	119	116	122	114	119	135	137	145	136	133	148	120	118	111	98	90	103
Inventories	107	126	117	143	156	139	127	128	130	139	138	140	110	111	136	84	95
Suppliers	57	58	56	54	53	56	70	71	73	70	99	69	74	71	77	98	52
Other current assets and liabilities	4	7	11	12	11	2	5	8	9	15	11	12	8	15	10	23	6
Net working capital	169	181	176	195	214	220	193	198	187	191	180	182	150	139	151	57	143
FINANCIAL STRUCTURE																	
NFP/Equity	0,5	0,6	0,6	0,8	1,1	1,4	1,1	0,9	1,6	3,8	6,3	6,9	12,0	9,5	-3,9	-2,1	-3,3
NFP/EBITA	3,6	4,9	5,2	9,4	11,8	-13,8	-200,9	16,3	-7,7	-11,5	34,3	-16,4	-15,5	-6,7	-7,8	-11,3	27,7
NFP/EBITDA	2,1	2,6	2,6	3,9	4,7	43,6	9,8	5,6	-19,6	-84,1	11,9	-57,9	-56,6	-9,6	-9,9	-16,5	18,5
COVERAGE																	
EBIT/interest	9,2	7,0	6,6	4,6	-0,8	-12,7	0,1	0,8	-2,0	-5,8	0,7	-2,3	-2,6	2,8	-10,8	-10,8	82,9
EBITA/interest	9,4	6,9	6,7	4,4	3,0	-3,6	-0,1	1,0	-1,8	-2,1	1,4	-1,5	-2,4	2,1	-8,0	-5,1	44,2
EBITDA/interest	16,2	13,1	13,1	10,7	7,5	1,1	2,0	2,9	-0,7	-0,3	3,9	-0,4	-0,6	1,5	-6,3	-3,5	66,3
Cash available for investors/NFP		-5,9%	7,5%	-9,9%	-9,3%	-25,0%	33,1%	36,0%	2,6%	-3,0%	13,9%	-6,3%	20,9%	-15,7%	6,6%	18,0%	-11,4%
FCF from operation/NFP		-9,0%	5,0%	-14,3%	-5,7%	-12,0%	44,3%	26,2%	-1,9%	-5,6%	28,9%	-3,9%	20,1%	-10,2%	28,6%	22,0%	-14,9%
LABOUR PRODUCTIVITY (€ thousand)																	
Revenues per employee	109,7	110,2	113,6	108,6	108,4	110,1	132,2	124,0	119,2	115,0	140,0	149,5	129,2	123,8	131,2	137,3	131,2
EBITDA per employee	13,8	12,9	13,0	10,9	12,0	1,6	7,3	9,9	-3,5	-1,0	8,8	-1,9	-1,7	-9,5	-13,7	-7,6	7,5

Appendix 2 - Comparable companies' key financial ratios.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CALEFFI											
Revenues (€ million)	57,1	58,2	60,5	57,5	58,2	55,5	50,8	56,2	52,1	55,5	59,2
Sales growth rate	17,97%	1,97%	4,00%	-5,01%	1,32%	-4,60%	-8,62%	10,72%	-7,23%	6,47%	6,65%
EBITDA margin	11,60%	10,39%	6,43%	7,04%	4,05%	3,92%	-1,77%	6,01%	2,15%	5,65%	4,50%
Net margin	4,49%	4,17%	0,65%	1,28%	-0,18%	-0,68%	-3,38%	1,00%	-2,44%	0,53%	0,85%
Operating fixed capital/Sales	4,38%	4,28%	4,74%	5,49%	4,92%	4,74%	7,36%	9,01%	10,06%	9,38%	8,77%
NWC/Sales	36,84%	37,14%	30,05%	28,32%	29,98%	31,33%	29,10%	22,84%	27,63%	30,79%	28,49%
NWC turnover	2,71	2,69	3,33	3,53	3,34	3,19	3,44	4,38	3,62	3,25	3,51
Current ratio	1,77	1,86	1,52	1,65	1,65	1,79	1,46	1,50	1,76	1,84	1,55
Quick ratio	1,32	1,26	0,95	1,06	1,00	0,93	0,90	0,81	1,02	1,19	0,94
EBITDA/Interest expenses	11,82	8,43	3,36	7,51	6,59	3,56	-1,30	4,93	1,46	5,10	6,20
NFP/EBITDA	2,61	1,59	3,28	2,82	4,59	7,54	-18,29	3,25	10,00	3,15	4,89
NFP/Equity	1,02	0,55	0,90	0,75	0,74	1,03	1,40	0,88	1,04	0,69	1,23
ROE	15,60%	13,10%	-0,94%	5,24%	0,12%	-3,95%	-17,76%	4,87%	-12,02%	2,55%	3,50%
Revenues per employee (€ thousand)	350,0	326,8	295,1	297,8	303,3	293,9	302,2	349,1	270,2	286,2	290,2
EBITDA per employee (€ thousand)	40,6	34,1	19,2	21,0	12,4	9,8	-5,3	21,1	5,9	16,3	13,1
GABEL											
Revenues (€ million)	84,6	89,3	88,7	93,4	85,7	76,7	70,7	62,4	60,8	60,1	59,9
Sales growth rate	1,20%	5,54%	-0,69%	5,37%	-8,29%	-10,47%	-7,81%	-11,80%	-2,59%	-1,17%	-0,21%
EBITDA margin	6,85%	7,64%	7,25%	5,14%	3,54%	4,71%	-4,84%	-2,50%	-2,27%	-1,43%	0,37%
Net margin	1,40%	2,50%	2,41%	1,64%	2,11%	0,47%	-9,50%	-7,89%	-6,21%	-5,62%	-2,04%
Operating fixed capital/Sales	19,93%	19,10%	18,91%	16,97%	17,59%	15,64%	12,95%	17,29%	20,01%	19,32%	18,66%
NWC/Sales	27,60%	25,99%	28,57%	31,65%	37,08%	45,07%	46,39%	44,52%	39,06%	32,92%	30,68%
NWC turnover	3,62	3,85	3,50	3,16	2,70	2,22	2,16	2,25	2,56	3,04	3,26
Current ratio	1,54	1,55	1,72	1,80	1,92	2,13	1,88	1,96	1,60	1,62	1,59
Quick ratio	0,81	0,81	0,88	0,96	1,07	1,09	0,90	1,03	0,80	0,81	0,81
NFP/EBITDA	4,28	3,42	3,98	5,76	7,24	4,51	-4,71	-8,90	-12,10	-14,13	43,60
NFP/Equity	0,50	0,63	0,67	0,71	0,54	0,42	0,51	0,46	0,62	0,44	0,42
ROE	3,30%	5,96%	5,56%	3,93%	4,43%	0,94%	-20,97%	-15,97%	-13,95%	-12,19%	-4,62%
Revenues per employee (€ thousand)	180,0	187,2	184,0	182,5	174,2	162,9	152,8	135,3	149,7	152,8	173,2
EBITDA per employee (€ thousand)	13,0	14,4	13,4	9,4	6,2	7,7	-7,5	-3,4	-3,4	-2,2	0,7
SPRINGS GLOBAL											
Revenues (€ million)	1248,6	929,3	754,1	629,8	605,7	368,3	440,3	534,5	547,3	593,1	604,7
Sales growth rate	n.a.	-25,57%	-18,85%	-16,48%	-3,83%	-39,19%	19,54%	21,40%	2,40%	8,37%	1,95%
EBITDA margin	0,40%	-4,30%	2,50%	3,10%	11,20%	11,60%	12,80%	7,60%	9,10%	10,30%	11,50%
Net margin	-6,33%	-12,08%	-11,88%	1,62%	-0,95%	-29,12%	-8,52%	-2,60%	-1,36%	0,99%	-0,32%
Operating fixed capital/Sales	31,03%	39,81%	44,89%	49,62%	48,20%	73,25%	57,36%	45,57%	42,03%	36,00%	33,19%
NWC/Sales	23,30%	28,68%	28,30%	25,25%	24,71%	46,78%	36,25%	23,24%	25,23%	27,49%	24,80%
NWC turnover	4,29	3,49	3,53	3,96	4,05	2,14	2,76	4,30	3,96	3,64	4,03
Current ratio	2,32	2,24	1,90	1,78	1,96	1,92	1,74	1,48	1,90	1,71	1,67
Quick ratio	1,09	1,16	0,91	0,96	1,14	0,98	0,93	0,83	1,08	0,93	0,98
NFP/EBITDA	63,34	-4,30	9,08	5,67	2,22	5,82	3,78	5,54	4,97	4,43	4,26
NFP/Equity	0,69	0,37	0,41	0,25	0,35	0,79	0,67	0,75	0,87	0,96	1,10
ROE	-17,25%	-17,10%	-20,40%	2,40%	1,80%	-9,90%	-0,10%	-4,50%	-2,60%	2,10%	-0,70%

Appendix 3 – Financial statements projections: Base scenario.

PROJECTED BALANCE SHEET (Invested Capital)					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Working cash*	0,8	0,8	0,8	0,8	0,8
Trade receivables	21,5	21,7	21,8	22,1	22,6
Inventories	19,7	19,7	19,5	19,6	19,6
Trade payable	(10,9)	(11,0)	(11,2)	(11,5)	(11,9)
Trade working capital	**31,0**	**31,1**	**30,9**	**31,1**	**31,2**
Other current assets and liabilities	0,0	0,7	0,7	0,7	0,7
Net working capital	**31,0**	**31,8**	**31,6**	**31,8**	**31,9**
Total operating fixed capital	**6,4**	**8,4**	**10,4**	**10,7**	**11,1**
Total other non-current operating assets and liabilities	(7,0)	(7,0)	(7,0)	(7,0)	(7,0)
Invested capital excluding goodwill and similar intangibles	**30,4**	**33,2**	**35,0**	**35,5**	**36,0**
Goodwill and other similar intangibles	0,3	0,2	0,1	0,1	0,0
Invested capital including goodwill and similar intangibles	**30,7**	**33,4**	**35,1**	**35,6**	**36,0**
Non-operating assets	1,3	1,3	1,3	1,3	1,3
Total funds invested	**32,0**	**34,7**	**36,5**	**36,9**	**37,3**

PROJECTED BALANCE SHEET (Source of Financing)					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Net financial position	(8,7)	(8,9)	(10,8)	(15,1)	(20,4)
Debt equivalents	11,6	11,6	11,6	11,6	11,6
Net financial position and debt equivalents	**2,9**	**2,7**	**0,8**	**(3,5)**	**(8,8)**
Minority interests	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Shareholders' equity	**29,1**	**32,0**	**35,6**	**40,5**	**46,1**
Total source of financing	**32,0**	**34,7**	**36,5**	**36,9**	**37,3**

PROJECTED INCOME STATEMENT					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Revenues	76,4	77,2	78,3	80,4	82,8
Other income	0,5	0,5	0,5	0,5	0,5
Operating costs	(73,0)	(73,1)	(73,2)	(73,4)	(74,7)
EBITDA	**3,9**	**4,6**	**5,6**	**7,5**	**8,7**
Depreciation	(0,3)	(0,3)	(0,4)	(0,5)	(0,5)
EBITA	**3,6**	**4,3**	**5,2**	**7,0**	**8,2**
Amortization of assets similar to goodwill	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
EBIT	**3,5**	**4,2**	**5,2**	**7,0**	**8,1**
Impairment losses	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0
Exchange rate (losses) gains	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Interest (expense) income	0,0	0,0	0,0	0,0	0,0
Net financial results	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
EBT	**3,3**	**4,2**	**5,1**	**6,9**	**8,1**
Taxes	(1,0)	(1,3)	(1,5)	(2,1)	(2,4)
Group Net Income	**2,3**	**2,9**	**3,6**	**4,9**	**5,7**
Minority result	0,0	0,0	0,0	0,0	0,0
Net Income	**2,3**	**2,9**	**3,6**	**4,9**	**5,7**

FREE CASH FLOW FORECASTS					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
EBITA	**3,6**	**4,3**	**5,2**	**7,0**	**8,2**
Operating taxes	(1,1)	(1,3)	(1,6)	(2,1)	(2,5)
NOPLAT	**2,5**	**3,0**	**3,7**	**4,9**	**5,7**
Depreciation	0,3	0,3	0,4	0,5	0,5
Gross cash flow	**2,8**	**3,3**	**4,0**	**5,4**	**6,2**
Change in operating working capital	0,6	(0,8)	0,2	(0,2)	(0,1)
Net capital expenditures	(0,2)	(2,3)	(2,3)	(0,8)	(0,8)
Change in other operating assets and liabilities	0,0	0,0	0,0	0,0	0,0
Gross investment	**0,3**	**(3,1)**	**(2,2)**	**(1,0)**	**(0,9)**
Free cash flow before goodwill and similar intangibles	**3,1**	**0,2**	**1,8**	**4,4**	**5,3**
Investments in goodwill and other intangibles	0,0	0,0	0,0	0,0	0,0
Free cash flow after goodwill and similar intangibles	**3,1**	**0,2**	**1,8**	**4,4**	**5,3**
Investments in non-operating assets	0,0	0,0	0,0	0,0	0,0
Impairment losses	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0
Non-operating taxes	0,1	0,0	0,0	0,0	0,0
Non-operating cash flow	**(0,1)**	**0,0**	**0,0**	**0,0**	**0,0**
Cash available to investors	**3,0**	**0,3**	**1,9**	**4,4**	**5,3**
Net financial result	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Change in debt equivalents	0,0	0,0	0,0	0,0	0,0
Change in minority interests	0,0	0,0	0,0	0,0	0,0
Change in shareholders' equity	(0,0)	(0,0)	0,0	0,0	(0,0)
Decrease (increase) in net financial position	**3,0**	**0,2**	**1,8**	**4,4**	**5,3**
Beginning net financial position	**(5,7)**	**(8,7)**	**(8,9)**	**(10,8)**	**(15,1)**
Ending net financial position	**(8,7)**	**(8,9)**	**(10,8)**	**(15,1)**	**(20,4)**

Appendix 4 – Financial statements projections: Best scenario.

PROJECTED BALANCE SHEET (Invested Capital)					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Working cash*	0,8	0,8	0,8	0,8	0,9
Trade receivables	22,0	22,0	22,2	22,7	23,0
Inventories	20,1	20,0	20,1	20,2	20,1
Trade payable	(11,1)	(11,3)	(11,6)	(12,1)	(12,4)
Trade working capital	**31,8**	**31,5**	**31,4**	**31,6**	**31,7**
Other current assets and liabilities	0,0	0,7	0,7	0,7	0,7
Net working capital	**31,8**	**32,2**	**32,1**	**32,3**	**32,4**
Total operating fixed capital	**6,4**	**8,5**	**10,5**	**10,9**	**11,3**
Total other non-current operating assets and liabilities	(7,0)	(7,0)	(7,0)	(7,0)	(7,0)
Invested capital excluding goodwill and similar intangibles	**31,2**	**33,7**	**35,7**	**36,3**	**36,7**
Goodwill and other similar intangibles	0,3	0,2	0,1	0,1	0,0
Invested capital including goodwill and similar intangibles	**31,5**	**33,8**	**35,8**	**36,4**	**36,7**
Non-operating assets	1,3	1,3	1,3	1,3	1,3
Total funds invested	**32,8**	**35,2**	**37,2**	**37,7**	**38,1**

PROJECTED BALANCE SHEET (Source of Financing)					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Net financial position	(8,1)	(8,9)	(11,3)	(16,4)	(23,0)
Debt equivalents	11,6	11,6	11,6	11,6	11,6
Net financial position and debt equivalents	**3,5**	**2,7**	**0,3**	**(4,7)**	**(11,4)**
Minority interests	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Shareholders' equity	**29,3**	**32,5**	**36,9**	**42,5**	**49,5**
Total source of financing	**32,8**	**35,2**	**37,2**	**37,7**	**38,1**

PROJECTED INCOME STATEMENT					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Revenues	78,0	79,2	81,4	84,6	88,0
Other income	0,5	0,5	0,5	0,5	0,5
Operating costs	(74,4)	(74,7)	(75,1)	(76,6)	(78,0)
EBITDA	**4,1**	**5,0**	**6,8**	**8,5**	**10,6**
Depreciation	(0,3)	(0,3)	(0,4)	(0,5)	(0,5)
EBITA	**3,8**	**4,7**	**6,4**	**8,1**	**10,1**
Amortization of assets similar to goodwill	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
EBIT	**3,7**	**4,6**	**6,3**	**8,0**	**10,0**
Impairment losses	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0
Exchange rate (losses) gains	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Interest (expense) income	0,0	0,0	0,0	0,0	0,0
Net financial results	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
EBT	**3,5**	**4,6**	**6,3**	**8,0**	**10,0**
Taxes	(1,0)	(1,4)	(1,9)	(2,4)	(3,0)
Group Net Income	**2,4**	**3,2**	**4,4**	**5,6**	**7,0**
Minority result	0,0	0,0	0,0	0,0	0,0
Net Income	**2,4**	**3,2**	**4,4**	**5,6**	**7,0**

FREE CASH FLOW FORECASTS					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
EBITA	**3,8**	**4,7**	**6,4**	**8,1**	**10,1**
Operating taxes	(1,1)	(1,4)	(1,9)	(2,4)	(3,0)
NOPLAT	**2,7**	**3,3**	**4,5**	**5,7**	**7,1**
Depreciation	0,3	0,3	0,4	0,5	0,5
Gross cash flow	**2,9**	**3,6**	**4,8**	**6,1**	**7,5**
Change in operating working capital	(0,2)	(0,4)	0,0	(0,2)	(0,0)
Net capital expenditures	(0,2)	(2,4)	(2,4)	(0,8)	(0,9)
Change in other operating assets and liabilities	0,0	0,0	0,0	0,0	0,0
Gross investment	**(0,5)**	**(2,7)**	**(2,4)**	**(1,1)**	**(0,9)**
Free cash flow before goodwill and similar intangibles	**2,5**	**0,9**	**2,4**	**5,1**	**6,7**
Investments in goodwill and other intangibles	0,0	0,0	0,0	0,0	0,0
Free cash flow after goodwill and similar intangibles	**2,5**	**0,9**	**2,4**	**5,1**	**6,7**
Investments in non-operating assets	0,0	0,0	0,0	0,0	0,0
Impairment losses	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0
Non-operating taxes	0,1	0,0	0,0	0,0	0,0
Non-operating cash flow	**(0,1)**	**0,0**	**0,0**	**0,0**	**0,0**
Cash available to investors	**2,4**	**0,9**	**2,4**	**5,1**	**6,7**
Net financial result	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Change in debt equivalents	0,0	0,0	0,0	0,0	0,0
Change in minority interests	0,0	0,0	0,0	0,0	0,0
Change in shareholders' equity	(0,0)	0,0	(0,0)	(0,0)	0,0
Decrease (increase) in net financial position	**2,3**	**0,8**	**2,4**	**5,0**	**6,6**
Beginning net financial position	**(5,7)**	**(8,1)**	**(8,9)**	**(11,3)**	**(16,4)**
Ending net financial position	**(8,1)**	**(8,9)**	**(11,3)**	**(16,4)**	**(23,0)**

Appendix 5 – Financial statements projections: Worst scenario.

PROJECTED BALANCE SHEET (Invested Capital)					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Working cash*	0,7	0,7	0,7	0,7	0,7
Trade receivables	20,7	19,8	20,4	20,7	21,0
Inventories	19,2	18,9	19,4	19,5	19,6
Trade payable	(10,5)	(9,9)	(10,0)	(10,4)	(10,4)
Trade working capital	**30,2**	**29,4**	**30,5**	**30,6**	**30,8**
Other current assets and liabilities	0,0	0,7	0,7	0,7	0,7
Net working capital	**30,2**	**30,1**	**31,2**	**31,3**	**31,5**
Total operating fixed capital	**6,4**	**7,5**	**8,5**	**9,6**	**9,9**
Total other non-current operating assets and liabilities	(7,0)	(7,0)	(7,0)	(7,0)	(7,0)
Invested capital excluding goodwill and similar intangible	**29,6**	**30,6**	**32,8**	**33,9**	**34,4**
Goodwill and other similar intangibles	0,3	0,2	0,1	0,1	0,0
Invested capital including goodwill and similar intangible	**29,9**	**30,8**	**32,9**	**34,0**	**34,5**
Non-operating assets	1,3	1,3	1,3	1,3	1,3
Total funds invested	**31,2**	**32,1**	**34,3**	**35,3**	**35,8**

PROJECTED BALANCE SHEET (Source of Financing)					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Net financial position	(9,1)	(9,0)	(7,8)	(8,0)	(9,3)
Debt equivalents	11,6	11,6	11,6	11,6	11,6
Net financial position and debt equivalents	**2,5**	**2,6**	**3,8**	**3,6**	**2,3**
Minority interests	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Shareholders' equity	**28,7**	**29,5**	**30,5**	**31,7**	**33,5**
Total source of financing	**31,2**	**32,1**	**34,3**	**35,3**	**35,8**

PROJECTED INCOME STATEMENT					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
Revenues	73,2	69,5	70,2	71,3	72,6
Other income	0,5	0,5	0,5	0,5	0,5
Operating costs	(70,4)	(68,5)	(68,9)	(69,6)	(70,2)
EBITDA	**3,3**	**1,5**	**1,8**	**2,3**	**3,0**
Depreciation	(0,3)	(0,3)	(0,3)	(0,4)	(0,4)
EBITA	**3,0**	**1,3**	**1,5**	**1,9**	**2,5**
Amortization of assets similar to goodwill	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
EBIT	**2,9**	**1,2**	**1,4**	**1,9**	**2,5**
Impairment losses	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0
Exchange rate (losses) gains	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Interest (expense) income	0,0	0,0	0,0	0,0	0,0
Net financial results	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
EBT	**2,7**	**1,1**	**1,4**	**1,8**	**2,4**
Taxes	(0,8)	(0,3)	(0,4)	(0,5)	(0,7)
Group Net Income	**1,9**	**0,8**	**1,0**	**1,3**	**1,7**
Minority result	0,0	0,0	0,0	0,0	0,0
Net Income	**1,9**	**0,8**	**1,0**	**1,3**	**1,7**

FREE CASH FLOW FORECASTS					
(€ million)	**2017**	**2018**	**2019**	**2020**	**2021**
EBITA	**3,0**	**1,3**	**1,5**	**1,9**	**2,5**
Operating taxes	(0,9)	(0,4)	(0,4)	(0,6)	(0,8)
NOPLAT	**2,1**	**0,9**	**1,0**	**1,3**	**1,8**
Depreciation	0,3	0,3	0,3	0,4	0,4
Gross cash flow	**2,4**	**1,2**	**1,4**	**1,7**	**2,2**
Change in operating working capital	1,4	0,1	(1,1)	(0,1)	(0,2)
Net capital expenditures	(0,2)	(1,4)	(1,4)	(1,4)	(0,7)
Change in other operating assets and liabilities	0,0	0,0	0,0	0,0	0,0
Gross investment	**1,1**	**(1,3)**	**(2,5)**	**(1,5)**	**(0,9)**
Free cash flow before goodwill and similar intangibles	**3,5**	**(0,1)**	**(1,1)**	**0,2**	**1,3**
Investments in goodwill and other intangibles	0,0	0,0	0,0	0,0	0,0
Free cash flow after goodwill and similar intangibles	**3,5**	**(0,1)**	**(1,1)**	**0,2**	**1,3**
Investments in non-operating assets	0,0	0,0	0,0	0,0	0,0
Impairment losses	0,0	0,0	0,0	0,0	0,0
Non-recurring and extraordinary items	(0,2)	0,0	0,0	0,0	0,0
Interest income (expense) from investments	0,0	0,0	0,0	0,0	0,0
Non-operating taxes	0,1	0,0	0,0	0,0	0,0
Non-operating cash flow	**(0,1)**	**0,0**	**0,0**	**0,0**	**0,0**
Cash available to investors	**3,4**	**(0,1)**	**(1,1)**	**0,2**	**1,3**
Net financial result	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Change in debt equivalents	0,0	0,0	0,0	0,0	0,0
Change in minority interests	0,0	0,0	0,0	0,0	0,0
Change in shareholders' equity	(0,0)	(0,0)	(0,0)	0,0	(0,0)
Decrease (increase) in net financial position	**3,4**	**(0,1)**	**(1,1)**	**0,2**	**1,2**
Beginning net financial position	**(5,7)**	**(9,1)**	**(9,0)**	**(7,8)**	**(8,0)**
Ending net financial position	**(9,1)**	**(9,0)**	**(7,8)**	**(8,0)**	**(9,3)**

Appendix 6 – Interest coverage ratio, credit rating, default spread and beta debt.

INTEREST COVERAGE RATIO		Rating	Spread	Beta Debt
greater than	to			
-100.000,0	0,5	D	20,00%	0,88
0,5	0,8	C	16,00%	0,88
0,8	1,2	CC	12,00%	0,88
1,3	1,5	CCC	9,00%	0,83
1,5	2,0	B-	7,50%	0,61
2,0	2,5	B	6,50%	0,61
2,5	3,0	B+	5,50%	0,61
3,0	3,5	BB	4,25%	0,31
3,5	4,0	BB+	3,25%	0,31
4,0	4,5	BBB	2,25%	0,08
4,5	**6,0**	**A-**	1,75%	-0,07
6,0	7,5	A	1,25%	-0,07
7,5	9,5	A+	1,10%	-0,07
9,5	12,5	AA	1,00%	-0,10
12,5	100.000,0	AAA	0,75%	-0,29

Source: Default Spreads for 10-year U.S. Corporate Bonds updated to January 2016 by Damodaran and Debt Beta of U.S Corporate Bonds estimated by Duff&Phelps (last available update: December 2015).

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