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Article

Analysis of the Risk of Bankruptcy of Tomato Processing Companies Operating in the Interegional Interprofessional Organization "OI Pomodoro da Industria Nord Italia"

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Abstract: The processed tomato is one of Italy's major food products and today characterizes many Italian Regions, in northern and southern Italy. This is the case even though the firms in the industry have encountered difficulties in recent years, due to an increase in the cost of raw materials. Furthermore, tomato processing firms are often characterized by significant investment in fixed assets and working capital, with an ensuing increase in equity or debt financing, and with an ensuing increase of the risk of bankruptcy, as has happened to many firms in the sector in recent years. The aim of the research is then to analyze the risk of bankruptcy of tomato processing companies by applying financial ratios to evaluate the sustainability of the management cycle. To achieve this goal, the research considers the annual data of a sample of 17 tomato processing firms operating in the Inter Regional Interprofessional Organization "OI Pomodoro da Industria Nord Italia"; firms' data are divided into still-active (not-distressed) and failed (distressed) firms, with the aim of analyzing the differences between the financial data and management practices of the two firm groups. The company data suggest that larger firms, with an adequate financial structure, have been able to withstand the tomato market crisis in recent years, whereas distressed firms are on average smaller and suffer from a higher recourse to debt capital with lower profit margins than not-distressed firms. The research could then be applied by entrepreneurs, managers, bankers and public operators to define good management practices that should be achieved and measured with financial ratios, even as a means of reducing the risk of distress for firms operating in the tomato sector.

Keywords: Interprofessional Organization "OI Pomodoro da Industria Nord Italia"; tomato processing firms; bankruptcy; distressed firms; sustainability of the management cycle

1. Introduction

Tomato farming, with its processing industry, has characterized the economy of territories in different areas of the world. On the international scene, Italy, along with the western areas of the United States of America (in particular the state of California), China and some Mediterranean countries (primarily Spain and Turkey), is a leading global center of production and transformation of tomatoes. In the country there are two main areas for the production and processing tomato industry, the first is located in the southern regions (Campania, Puglia and Basilicata), while a second area is in the northern regions (Emilia-Romagna, Lombardia and Piemonte in particular), which is characterized by a higher average size than the southern firms and a greater firm presence in the form of cooperatives. In recent years, the processing tomato firms of Emilia-Romagna, Lombardia and Piemonte were characterized by various economic crisis situations, which have also

caused bankruptcy and liquidation, as well as merger and acquisitions (M&A) operations aiming at saving firms close to bankruptcy. Many of the bankruptcies are caused by financial difficulties, and therefore take into account the fact that tomato processing firms are, in fact, characterized by a significant investment in fixed assets and working capital, and that, in general, they make investments in plants and equipment, and mostly sell their products in the food distribution chains, with an increase in inventories stock and the term of payment of commercial credits. These characteristics of the financial cycle amplify the need for investment, often financed by increasing financial debt. The cycle of working capital also causes a dilation of the investments of the firms of the sector; the sales of products to the major food retailers (Grande Distribuzione Organizzata, GDO, in Italian) leads to an expansion of the collection times of the receivables with negative effects on the financial sustainability of the business cycle, particularly in the NWC cycle. Again, processing firms frequently suffer from low brand loyalty among consumers, thus reducing their bargaining power. There are various reasons for these trends, including the rising costs of raw material supplies and the increased competition in the processed product, and, at the macroeconomic level, the situation of the international economic crisis that has led to difficulties in finding bank credit. Even Common Agricultural Policy (CAP) has a financial profitability effect on the tomato sector. In fact, with Regulation (EC) no. 1182/2007 concerning the reform of the fruit and vegetable sector, EU policy introduces, in harmony with the rest of EU policy, the decoupling of public aid. Article 5 of the National Decree no. 1540/2007 defines the applied guidelines for the implementation of the reform of the CAP in the tomato sector, granting the payment at the single farm level to support farm income.

Given the difficulties of the sector, the aim of this work is to analyze the management data of processing tomato firms in Emilia-Romagna, Lombardia and Piemonte, in particular with respect to the capital structure of firms, the sustainability of the management cycle, and access to credit. In the research, a financial ratio analysis is applied to achieve two different goals: (1) define the financial performance and capital structure of the firms operating in the tomato processing sector; (2) quantify the differences between the distressed and not-distressed firms operating in the tomato processing sector (in terms of the differences of financial ratios). To achieve this goal the research considers the annual data of a sample of 17 tomato processing firms operating in the Inter Regional Interprofessional Organization "OI Pomodoro da Industria Nord Italia"; firms' data are divided into still-active (not-distressed) and failed (distressed) firms with the aim of analyzing the differences between the financial data and management practices of the two groups of firms. The results of these two goals could be useful for entrepreneurs, managers, bankers and public operators to define good management practices to be achieved and measured with financial ratios, even as a means of avoiding (or of at last reducing) the risk of distress for firms operating in the sector (basing the analysis on historical data on financial ratios). Following this, the application of financial ratios may first have a utility for the entrepreneur as a means of correctly assessing the sustainability of the management cycle in advance; and, secondly, both for the lenders (who are thus able to evaluate more correctly the creditworthiness of the firms) and for the policy maker (who may intervene with direct or indirect (guarantee consortia) aid policies in favor of the firms for whom the use of public funds is deemed proper), thus limiting the risk of inefficient use of collective resources.

2. Methods

2.1. Annual Account Statement (AAS) Analysis

The annual account statement (AAS) is the main document for the analysis of the economic, equity and financial situation of the firms. In Italy, this document is mandatory for firms that are active in the form of joint-stock firms and cooperatives, and it is the main source of information required by law for the protection of third parties who have business relationships with firms. The AASs is the main document of external corporate information and consists of a balance sheet, income statement and explanatory notes. The AAS is governed by Articles 24 and 23 of the Civil Code; these articles of the law define, in a rigid way, the AAS's schemes and its informative content. The adoption of the AAS by firms makes it possible to have a homogeneous information base on a

European and national basis, drawn up on the basis of uniform accounting standards, and this favors the comparison between the data of firms operating in different sectors or of different firms operating in the same sector. Again, AAS is the main document, together with the Central Bank of Risks of the Bank of Italy, used by the banks to assess the creditworthiness of the firms; the valuation of the financial statements also has a relevant applied interest for the assessment of the creditworthiness by banks. The evaluation of the operating performance is an issue that affects both the choices of the entrepreneur and the decisions of all those persons who have relationships with the company. AAS is drawn up by the board of directors of a company and submitted for approval to its shareholders. Financial statements were amended into Italian legislation by the content of the Fourth Council Directive of 1978, which started the process of unification at the European level in terms of financial statements. The national legislature implemented EEC Directives IV and VII with Legislative Decree no. 127 on 9 April 1991, with which community provisions were transposed into national legislation via a radical alteration of the entire body of legislation relating to the financial statements of public firms, contained in the Civil Code. Today, the regulations of the financial statements are governed by Legislative Decree 139 of 18 August 2015, which implements the European Directive 2013/34/EU. The annual account is composed of a balance sheet statement (BSS), an income statement (IS) and a cash flow statement (CFS).

Regarding the presentation format of the balance sheet statement (BSS), the legislation imposes a pattern of contrasting sections divided into balance sheet assets, expressive of the investments, and balance sheet liabilities and equity, expressive of sources financing. The model of the balance sheet was developed through the formation of homogeneous categories for investment and source of capital, divided into further subcategories. The balance sheet assets (even expressed as a total asset, TA) assume a classification of numbers based on the destination of the investments, based on the type of use for which the investment is targeted in the management of the firm. The balance sheet liabilities are classified on the basis of the origins of the sources of financing, that is, the parties who have made funds available for the financing, divided first by the equity and debt sources of the capital (even expressed as the total source of capital, TS). The legislation then suggests a partial reclassification of the receivables and payables and the underlying maturity, distinguishing between funds maturing before and after 12 months, (a limit which is conventionally referred to as a so-called short period), thus determining the time of the realization of assets (loans) and the settlement of liabilities (debts or funding sources). We can represent the BSS equation as follows [1]:

$$\begin{aligned} &A + Bfa^{int} + Bfa^{tan} + Bfa^{fin} + Cwc^{ar<12m} + Cwc^{ar>12m} + Cwc^{o<12m} + Cwc^{o>12m} + \\ &+ Cwc^{i} + Cwc^{ql} + CL + D^{+} = AE^{sc} + AE^{r} + AA^{\Pi} + A\Pi + B + C + Df^{<12m} + \\ &+ Df^{>12m} + Dwc^{ap<12m} + Dwc^{ap>12m} + Dwc^{o<12m} + Dwc^{o>12m} + D^{-} \end{aligned} \quad (1)$$

In Equation (1), the left side expresses the balance sheet assets (TA); the right side expresses the total liabilities and the total sources of capital (TS). On the left side of Equation (1), A represents the receivables from shareholders for capital contributions, Bfa^{int} represents intangible fixed assets, Bfa^{tan} represents tangible fixed assets, Bfa^{fin} represents financial fixed assets, and $Bfa^{int} + Bfa^{tan} + Bfa^{fin} = BFA$, where BFA represents the total investment in fixed assets. $Cwc^{ar<12m}$ represents the working capital accounts receivable due within 12 months, $Cwc^{ar>12m}$ represents the working capital accounts receivable due after 12 months, $Cwc^{o<12m}$ represents the working capital other credits due within 12 months, $Cwc^{o>12m}$ represents the working capital other credits due after 12 months, Cwc^{i} represents the working capital inventories, Cwc^{ql} represents the working capital invoices of near liquid financial assets, CL represents the working capital liquidity, and D^{+} represents the positive active accrued accruals and deferrals. In Equation (1), on the right side, AE^{sc} represents the share capital, AE^{r} represents the reserves, AA^{Π} represents the retained profit from previous years, Π represents the net profit from the year, and $AE^{sc} + AE^{r} + A^{\Pi} + A\Pi = E$, where E represents the total shareholder capital, namely equity (E). B represents the provisions for risks and charges, and C represents the termination indemnities paid to workers. $Df^{<12m}$ represents the financial debts due within 12 months, $Df^{>12m}$ represents the financial debts due after 12 months, $Dwc^{ap<12m}$ represents the accounts payable

of working capital due within 12 months, $Dwc^{ap>12m}$ represents the accounts payable of working capital due after 12 months, $Dw^{co<12m}$ represents the other working capital debts expiring within 12 months, $Dw^{co<12m}$ represents the other working capital debts expiring after 12 months, and D^{-} represents the negative active accrued accruals and deferrals. In Equation (1), $B + C + Df^{<12m} + Df^{<12m} + Dwc^{ap<12m} + Dwc^{ap>12m} + Dwc^{o<12m} + Dwc^{0>12m} + D^{-} = D^{T}$, where D^{T} is the total debt, expressed as the total amount of capital given by third parties in terms of debt financing. The net amount of cash due to banks and other financial intermediaries is called the net financial position (NFP) and is expressed as follows: $NFP = Df^{<12m} + Df^{>12m} - Cl$; NFP assumes a fundamental role in quantifying: (a) the cost of debt in terms of debt financing; (b) the (net) total amount of financial debt to be repaid to financial institutions. Equation (1) is applied to quantify a fundamental margin available to pay debts due within 12 months using active voices of the balance sheet, that is the net working capital (NWC), calculated as the difference between the current assets (WCi^{T}) and liabilities (WCs^{T}), as follows: $NWC = WCi^{T} - WCs^{T}$ where $WCi^{T} = Cwc^{ar<12m} + Cwc^{o<12m} + Cwc^{i} + Cwc^{ql}$ and where $WCs^{T} = Dwc^{ap<12m} + Dwc^{o<12m}$.

In AAS, Italian Law requires that the drafting of the income statement (IS) aim to quantify the result for the year in terms of net profit. In accordance with the principle of economic competence, the income statement is articulated in operational management areas. Macro class A expresses the value of production as the value of production obtained by the firm. The total cost of production is presented in macro class B, in which costs are accounted on an accrual basis according to the nature of the cost. The difference between value and cost of production, macro classes A less B, is defined by the operating income or earnings before interest and tax (EBIT). To determine the cost of debt, Italian legislation requires the insertion of macro class C, expressive of financial income and expenses. Additionally, Italian law has designated macro class D to be expressive of value adjustments of financial assets, where macro class E is expressive of extraordinary income and charges. In this research, the income statement required by Italian Law has been used with Equation (2), as follows [1]:

$$\begin{aligned} &(S \pm \Delta Cwc^{i} + Cp + Os) - (Ms + Sc + Rc + Lc + Oc) = EBITDA \\ &EBITDA - (Dc + Ac) = EBIT;\ EBIT + (Ir - Ic) + (Rc - Dc) + (Xr - Xc) = \Pi^{bT} \\ &\Pi^{bT} - T = \Pi \end{aligned} \quad (2)$$

In Equation (2), S is the company's sales, ΔCwc^{i} is the change in inventory value, Cp is the capitalization of costs for the internal construction of fixed assets, and Os is other sales. Mc represents the costs of raw materials, Sc the costs of services, Rc the costs of renting and leasing, and Oc other costs. EBITDA is earnings before interest, tax, depreciations and amortizations, while Dc and Ac are, respectively, depreciations and amortizations; EBIT is earnings before interest and tax, and thus expresses the company's current operating income. Ir is interest revenue, Ic is interest charge, and $Ir - Ic = SF$, where SF is the balance of financial management. Rr is revaluation and Dc is devaluation, and $Rr - Dc = SR$, where SR is the balance of revaluations and impairments of financial assets. Xr is extraordinary revenue, while Xc is extraordinary charges, and $Xr - Xc = SX$, where SX is the balance of extraordinary operations. Π^{bT} is profit before taxes, while T is income taxes. Π is net profit. $A\Pi$ in the balance sheet is equal to the Π of the income statement. The income statement does not take into account the timing of monetary operations, and the income margins (EBITDA, EBIT, and Π) do not express necessary cash flow generation, as shown by several studies focusing on firms with large investments in fixed assets [2,3] and working capital [4,5]. To assess the sustainability of the firms' management, we frequently applied income values such as EBITDA and EBIT; these margins approximated the cash flow but did not consider the following: (1) the effect of the revenues to be collected from customers; (2) the purchases not paid to suppliers; (3) the change in value of inventories; following this, there must be a steady state for there to be equality, even with lag time, between income and financial margins. We can consider, in a given time t, that if $\Pi > FCFE > 0$ (where FCFE is Free Cash Flow to Equity, as the cash flow is available to equity holders), it is then possible to pay to equity holders the dividend in a share α of the profit equal to $1 > \alpha > 0$ without increasing financial debt ($\Delta^{+}FP_t$) as $\alpha\Pi = FCFE_t = d_t$; alternatively, the payment to equity holders

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could be given for a share β, where $1 \geq \beta > \alpha > 0$, with an increase in NFP_t so that $\beta\Pi = FCFE_t + \Delta^+NFP_t = d_t$, or $\beta\Pi = FCFE_t + \Delta^+NFP_{t+1} = d_t$, if the distribution of the dividend takes place at the time t + 1.

2.2. Financial Ratio Analysis

Derived from AAS data, the financial ratio (FR) analysis is based on the accrual basis, thereby taking into account the time value creation derived from the facts of management. Ratios and margins are identified and used in the analysis as they can provide information on financial performance (profitability), as well as patrimonial and financial aspects of firms' management. Several studies have been conducted to define the field of application and limitations [6,7] of FR and their usefulness in forecasting the financial distress of firms. In particular, this last field of applications of financial ratios has, for many years, perhaps been the most important application of financial ratios, since the seminal works of some authors during the sixties [8–13], works that are widely known and recognized as fundamental in scoring system constructions and risk management applications. The ratio analysis is made primarily with an analysis of IS and BSS data. The approach is developed through the identification of synthetic indicators of efficiency; calculations are made in terms of profitability, solidity of the balance sheet and liquidity. This methodology allows for its values to be rendered absolute and also allows a comparison between firms of different sizes and different sectors; the budget analysis has a greater credibility when it is not analyzed in a single year, but rather covers a number of years. In this way it is possible to identify anomalous trends of business management, though this is limited to a single year; in this case the data emerges as an anomalous value of the time series of indexes, such as the presence of components of extraordinary income that affect the overall profitability. It is also possible that the data is caused by extraordinary transactions, reflected in the management as abnormal results in determining ratios. It is also necessary to consider that the financial ratios, as based on accounting data, are formed by the aggregation and comparison of the carrying amounts, and that they are influenced by accounting standards for the preparation of AAS. Financial ratios are then applicable, when the limits inherent in the accrual basis of the preparation of the IS and BSS are considered; these two tables are in fact the database logic of ratio calculation. The IS has been prepared as a flow document that expresses and summarizes the total number of positive and negative income components that are counted over a year. The BSS is drawn up as a document of stock, analyzing the values at the end of the year, regardless of the infra-annual dynamic formation of the BSS (it is therefore the IS that performs a dynamic analysis of the events of a company). When, for running FRA, we compare the IS (with an infra-annual formation) and the BSS values (calculated at the end of the year), inevitably there is an approximation of the business dynamics, since we are comparing a dynamic result (IS) and a static result (BBS) at the end of the year.

The main measure of profitability is the ROE (return on equity), and it is the first financial ratio applied in this research. This ratio aims to quantify the return on equity contributed by the shareholders of the company. ROE is the main ratio that the shareholders of the company use to quantify the return on their own investment expressed as a nominal return on equity capital during the year due to management. ROE could be expressed as the ratio between net income (Π) and equity capital (E), as follows: ROE = Π:E. ROE > 0 is a first-order condition (necessary condition) to provide convenience in business management (if and only if ROE < 0 => Π < 0). In order to have convenience in terms of ROE, a second-order condition (necessary and sufficient condition) could also be satisfied, one that could be expressed as follows: ROE > Ke > 0, where Ke is the implicit cost E, as the use of the own resources made by the shareholders. Ke could be considered as the return on capital that the shareholders could obtain in alternative investments, from which we obtain that minimum ROE (ROE^{min}) that, as a definition, is equal to Ke (ROE^{min} = Ke), that is to say the minimum ROE acceptable by shareholders. In order to express the overall profitability of the investment made in the company, it is possible to proceed with the calculation of return on assets (ROA). ROA compares the operating income with the total capital invested in the firm, and could then be expressed as the ratio between the earnings before interest and tax (EBIT), and the total asset (TA), as follows: ROA = EBIT:TA. ROA expresses the annual percentage yield of each unit of capital invested

in an enterprise, regardless of the cost of debt, the income from extraordinary items and the taxes; additionally, the quantification of the implicit cost of using equity is not considered. ROA is therefore a ratio that is used in particular to evaluate the performance of the managers of the company, since it expresses the company's operating performance, apart from: (a) the cost of the capital used; (b) the financial choices that determine the cost of debt. In order to compare the profitability (ROA) and the cost of debt, we consider a third financial ratio as the express return on debts, i.e., the (ROD). The ratio aims to quantify, in percentage terms, the average cost of debt that is the cost of debt to which the company has applied with in order to finance the management cycle. ROD could be expressed as the ratio of the balance of financial management (SF) and the net financial position (NFP), as follows: ROD = SF:NFP.

Liquidity ratios require the expression of the balance sheet reclassification according to a financial criterion of liquidity; it could be defined as expressing both the active and the passive assets, taking into account the capacity of the assets and liabilities of becoming money in time, within and over 12 months, and reclassifying the balance sheet items according to the criteria of liquidity and receivables. The liquidity ratios aim at determining the balance sheet short-term equilibrium, defined as the capacity to cover the short term financial obligations (current liabilities) via the production of financial liquidity sufficient to meet their debts. These ratios aim at determining the ability of the company to support the management cycle in the short term, with a particular attention to the comparison between short-term investments (current assets) and the sources of short-term financing (short-term liabilities). Liquidity ratios aim to assess the company's ability to meet its current commitments, i.e., commitments which are conventionally considered to be due within 12 months. The company generally has available assets maturing within 12 months in order to meet the commitments maturing within 12 months; other sources of capital could derive from a new inflow of E or an increase in NFP. The cash conversion within 12 months of the invested assets allows the company to meet its financial obligations that are due in the same period. *Ceteris paribus*, a company will be able to meet its short-term commitments only through the conversion of a part of the assets invested in money. The assets invested with a time to cash conversion within 12 months are defined as short-time active (invested capital), while the debts to be paid within 12 months are called short-time passive (source of capital). The balance of cash then coincides with a situation in which the conversion into currency of short-time active is able to allow for the payment of the short-time passive. If this does not happen, the company must meet its financial commitments by increasing its borrowing or by raising additional capital to make the payments, if this is possible; another possibility is to request additional capital contributions from equity holders in the form of immediate liquids, to be forced to convert into cash a portion of its fixed assets (i.e., divesting part of its investments in fixed assets), or, finally, to defer part of their expected payments due within 12 months. All these solutions, with the exception of the increasing of equity capital by the shareholders (if possible) determine, in each case, a worsening of the balance sheet situation, given an increase in the risk of instability; we can consider, for example, a situation in which a business defers a part of the payments to suppliers because of its inability to access the necessary monetary resources. In this situation, the company is exposed to the risk of default as a result of the legal action by the borrower, to recover their debts. In the short term, the equilibrium of the business cycle is expressed by the current liquidity ratio, calculated as the ratio of short-term investments and current liabilities; this ratio is defined by the current ratio (CR) and is calculated as the ratio of short-term activities and liabilities, as follows: $CR = (CL + WCi^{T}):D^{M<12}$, where $D^{M<12} = Df^{<12m} + Dwc^{ap<12m} + Dwc^{o<12m}$. The ratio expresses the company's ability to meet its financial commitments due within 12 months via the conversion of the assets invested in money that are payable within 12 months; a situation where CR > 1 expresses the company's short-term financial equilibrium, as the firm is able to cover its maturing commitments in the short period (within 12 months) by converting a part of its assets in currency (active voices of the balance sheet); if CR < 1, we have a situation in which the enterprise has difficulties to cover short time obligations by converting its current assets into money. In the event that CR = 1 we have a balance between the short-time assets and liabilities. It is also possible to express CR in terms of the voice of the balance expressed not as a percentage but directly in terms of

monetary value; in this case, the margin available for paying the debts due within 12 months is analyzed using the active voices of the balance sheet; this margin takes the name of net working capital (NWC). If NWC > 0, the company is able to meet its obligations, due within 12 months, since it has financial sustainability within the business cycle in the short term; but if NWC < 0, the company is unable to meet its obligations due within 12 months and will have to use additional sources of funding; or it will have to defer a part of the payments in order to support the business cycle in the short term. For the analysis of liquidity, an additional ratio that is more restrictive is used; this ratio is the quick ratio (QR) and is the ratio between short-term investments (CL + WCi^{T}), the net of inventories (Cwc^{i}), and short-term liabilities ($D^{M<12}$) expressing means current liabilities; the ratio is expressed as follows: QR = (CL + $Cwc^{ar<12m}$ + $Cwc^{o<12m}$ + Cwc^{ql}):$D^{M<12}$. QR expresses the evaluation of the sustainability of a short-term business cycle, applying a more conservative approach than that shown in CR. This approach highlights the fact that a part of the inventory could not be immediately sold, or it can only be sold in part because it is not possible to go under a minimum stock level of inventories. Finally, amongst the capital ratios, we consider debt equity ratio (DER), calculated as the ratio of total (D^{T}) and equity (E), as follows: DER = D^{T}:E. DER immediately expresses the level of indebtedness, taking into account the degree of use of debt capital for the financing of the firm; DER is perhaps the most important financial ratio that is applied to quantify the financial strength of a firm's capital structure. The ratio variation ranges between 0 and +∞, if 0 ≤ DER < 1 => E > D^{T}, if DER = 1 => D^{T} = E, and if 1 < DER < +∞ => D^{T} > E; one should therefore note that a gradual increase in the value of DER expresses an increase in the level of debt among the company's sources of financing, detrimental to E; this situation shows a gradual reduction in the level of strength that a company's balance sheet has for increasing the use of third-party funds for the financing of investments. Additionally, the situation in which DER < 0 is theoretically possible; this situation implies that ET assumes a negative value, expressing the necessity for the equity holders to immediately give new equity capital for the financing of the company, or to declare a state of default.

To quantify the duration (in days) of a financial cycle, financial ratios that express the length of the NWC financial cycle are currently applied; there are three main financial ratios for the NWC duration: (1) AR_DAYS, calculated as follows: AR_DAYS = ($Cwc^{ar<12m}$ + $Cwc^{ar>12m}$) × 365:S; this expresses the length of the payment deferral given to clients, in days; (2) AP_DAYS, calculated as follows: AP_DAYS = ($Dwc^{ap<12m}$ + $Dwc^{ap>12m}$) × 365:S; this expresses the length of the payment given by suppliers in days; (3) INV_DAYS, calculated as follows: INV_DAYS = WCi^{i} × 365:S; this expresses the length of inventories' rotation in days. AR_DAYS + INV_DAYS − AP_DAYS = NWC_DAYS, where NWC_DAYS is the length of the NWC in days. An increase in AR_DAYS and INV_DAYS, and a decrease in AP_DAYS (thus expressing an increase of the NWC cycle duration, which is given by an increase in the NWC_DAYS value) determine an increase in the capital investment that is to be forcibly financed with debt (D^{T}) or equity (E) capital. All the applied financial ratios have been widely and frequently applied, even recently, in order to show the financial performance and capital structure of many different industries [14,15], including parts of the agricultural sector in Italy [16,17], and even in order to improve the scoring system that is specifically applicable to agricultural firms [18].

3. Results and Discussion

3.1. Overview of Firm Characteristics in the Tomato Sector

In 2016, about 38 million tons of tomatoes were processed worldwide with an increase of about 14% from 2012. Italy, with 5.2 million tons of processed tomatoes, is the second biggest processor in the world, after the USA, and represents 14% of the world production, with a total turnover of over 3.1 billion euros. About 60% of the national production is destined for the foreign market, both Europe (Germany, France, United Kingdom) and other countries (USA, Japan, Australia), with an export value of 1.6 billion euros. Tomato production areas in Italy characterize many regions, particularly Campania and Basilicata in the southern part of the country, and Emilia-Romagna and the lower part of Lombardia in the north; both territories are characterized by the tomato production

and processing industry, specializing in concentrated tomato, canned tomato, juice, and tomato pulp. These products are destined, in large part, for foreign markets; consequently, Italy is the world's leading exporter of processed tomatoes. However, even in a positive market scenario, the structure of the sector is subject to profound changes in the geography of production; this is the case even if one considers worldwide tomato processing trends. In fact, several emerging producer countries, including China, have increased their tomato production in recent years, as a result of important changes in the dynamics of international trade, on a quantitative and qualitative scale. The surface of tomato production in Italy (Table 1) had decreased by 31.71% from 2007 to 2016; this contraction is greater in tomatoes produced for food consumption (−22.27%) than in tomatoes produced for the processing industry (−16.70%).

Table 1. The tomato production surface in Italy (2007–2016) *.

Year	Tomato for Food Consumption (Ha)	Tomato for Processing Industry (Ha)	Total Tomato (Ha)
2007	**23,401**	**94,346**	**117,747**
2008	**19,806**	**88,389**	**108,195**
2009	**19,314**	**96,768**	**116,082**
2010	**19,679**	**94,514**	**114,193**
2011	**19,409**	**84,449**	**103,858**
2012	**16,325**	**75,525**	**91,850**
2013	**19,384**	**68,900**	**88,284**
2014	**18,418**	**77,539**	**95,957**
2015	**18,072**	**81,669**	**99,741**
2016	**18,190**	**78,592**	**80,411**

* National Institute of Statistics of Italy (ISTAT, Istituto Nazionale di Statistica; data available at: "http://agri.istat.it/sag_is_pdwout/jsp/dawinci.jsp?q=plCPO0000010000012000&an=2012&ig=1&ct=418&id=15A|18A|28A" accessed 10 February 2018.

In the same period (Table 2), there was an increase in the production of tomatoes for processing (3.32% for production and 3.76% for harvesting), with an increase in average yields per hectare, while the production of tomatoes for food consumption decreased by 26.22% and 28.49% in harvesting.

Table 2. The production of tomatoes in Italy (2007–2016) *.

Year	Tomato for Food Consumption Production (Ton.)	Tomato for Processing Industry Production (Ton.)	Total Tomato Production (Ton.)	Tomato for Food Consumption Harvesting (Ton.)	Tomato for Processing Industry Harvesting (Ton.)	Tomato for Food Consumption Production (Ton.)
2007	757,557	5,420,894	6,178,451	744,027	5,260,753	6,004,780
2008	619,750	4,979,199	5,598,949	604,993	4,870,202	5,475,195
2009	602,084	6,078,048	6,680,132	576,493	5,918,090	6,494,583
2010	649,360	5,125,754	5,775,114	631,429	4,997,146	5,628,575
2011	635,929	5,471,195	6,107,124	619,385	5,330,830	5,950,215
2012	489,635	4,792,568	5,282,203	460,651	4,671,325	5,131,976
2013	593,535	4,459,833	5,053,368	567,207	4,321,568	4,888,775
2014	543,842	4,714,067	5,257,909	490,206	4,609,269	5,099,475
2015	576,157	5,528,588	6,104,745	528,276	5,365,683	5,893,959
2016	558,951	5,600,839	6,159,790	532,069	5,458,447	5,990,516

* National Institute of Statistics of Italy (ISTAT, Istituto Nazionale di Statistica; data available at: "http://agri.istat.it/sag_is_pdwout/jsp/dawinci.jsp?q=plCPO0000010000012000&an=2012&ig=1&ct=418&id=15A|18A|28A" accessed 10 February 2018.

The concentration of the tomato production (Table 3) is particularly high in two main geographical areas. The most important production area is in the northern part of Italy, including the Regions of Emilia-Romagna, Lombardia, Veneto, and Piemonte, and this area produced over 2.7

million tons in 2016 (about 50% of the domestic production of tomatoes). The second area is located in the southern regions of Campania, Puglia, Calabria, and Basilicata, with a production of about 2.3 million tons in 2011 (about 43% of the domestic production).

In the northern regions, the tradition of processing tomatoes has its origins in the late 19th century with the rise of industry in the province of Parma. This type of industrial process still characterizes the territories of the provinces of Parma and Piacenza, in the Emilia-Romagna region; processing is also present in the Modena Province and in some other provinces of eastern Emilia-Romagna on the right side of the river Po, and even in the lower areas of Lombardia (Cremona and Lodi Provinces), as well as in the Veneto Region and the Alessandria Province (Piemonte Region). In fact, even today, the processing of tomatoes generally operates near the areas of production, due particularly to cost reduction. The Organizzazione Interprofessionale Inter Regionale "OI Pomodoro da Industria Nord Italia (The InterRegional Interprofessional Organization) operates in northern Italy since 2011. This is a non-profit organization that brings together in northern Italy the economic players of the tomato production chain, produced and transformed in the regions of Emilia-Romagna, Lombardia, Piemonte, Veneto and the autonomous province of Bolzano. In this area, every year, about 38 thousand hectares of tomatoes are cultivated with the involvement of about 2 thousand agricultural producers (grouped in 14 Op, producer organizations) and 29 processing plants (headed by 22 different companies) for the processing of about 2.6 million tons of tomato (website: "http://www.oipomodoronorditalia.it/?page_id=1269", accessed 11 February 2018). The first steps of the actual OI Pomodoro da Industria of northern Italy took place in 2006 and involved the Distretto del Pomodoro da Industria del Nord Italia companies and producers' organizations in the Province of Parma, Piacenza and Cremona (Emilia-Romagna and Lombardia Regions). The association was at the center of a progressive enlargement and achieved formal recognition as an Inter Regional OI in December 2011, thanks to the 24/2000 law of the Emilia-Romagna Region. OI Pomodoro da Industria of northern Italy is an InterRegional Interprofessional Organization that is non-profit and that brings together the economic players of the tomato production chain, produced and transformed in northern Italy: specifically in the regions of Emilia-Romagna, Lombardia, Piemonte, Veneto and in the autonomous province of Bolzano. Since the 2013 campaign, 29,175 hectares were cultivated in the district. The production of 1,879,993 tons, produced by the 15 Associations of Associated Producers, has been transformed by the 25 processing companies, in the 30 factories located across the territory, subdivided into 60% of private companies and 40% of cooperative enterprises. 96% of the tomato is grown as part of an integrated production, while the remaining 4% come from organic farming. The fresh tomato is transformed into 36%tomato concentrates (semi, concentrated, double or triple), 36% pulp (cubed, fine or extruded), 27% tomato pass and 1% sauces that are ready (website: "http://www.lifeprefer.it/it-it/Progetto/Prodotti/Pomodoro", accessed 11 February 2018). The concentration of tomato processing firms therefore remains located in two major districts, one in the north of the country and one in the south. In the northern district, located in the Po Valley (in particular in the territories of Emilia and southern Lombardia Regions), which we consider in this research, 21 processing firms (of which 16 are limited firms and 5 are cooperatives) and 16 Producer Organizations (OP) operate, with a reduction of 9 firms from 2011 when 30 tomato processing firms were operating in the northern district. In the southern district 70 processing firms and 30 OP operate, again with a reduction of 49 firms from 2011 when 119 tomato processing firms operated in the southern district. In fact, in recent years, tomato processing firms were affected by a large number of corporate crises, which have also led to bankruptcy and liquidation; in Italy, in the northern district, there has been a decrease in the number of firms in recent years, with the closure of 9 firms, 5 of which are certainly bankruptcies or compulsory liquidations, even if some of the firms' closures could perhaps have been avoided with extraordinary operation on equity capital, such as M&A operations.

Since the inventory change and the sales that are not yet collected affect the positive value of production on company profit, there is the possibility of mismatches between profit and cash flow in the firms of the sector, with situations in which firms, even those that are profit positive, are unable

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to support payments in the financial cycle. In the tomato sector, traditional firms have production plants with processing spaces on several floors of the plant, which are often not modernized. In the sector there are also firms that have invested in property, plants and machinery to increase their production efficiency; these firms are typically characterized as belonging to large groups, or as operating on higher production volumes, which are able to operate on a larger scale of production, with advantages in terms of reducing the unit cost of production. Following this, firms in the sector need a large amount of capital in order to finance investments in fixed assets (FA), in terms of property, plants and machinery, and in net working capital (NWC), including the finished product stocks at the end of the production phase in the summer. These funds are obtained either directly by the entrepreneur as equity capital (E), or as debt capital (D^T). Debt capital may be implicitly burdensome, as in the case of commercial debts, or they may be on an explicit charge, as in the case of bank debt. Since the size of the firms in the sector mainly equals that of small and medium enterprises (SME), it is important to apply financial ratios in order to valuate the financial performance of the firms. In fact, SMEs often have the worst access to the equity capital market (stock market, venture capital, private equity, etc.) and to the debt capital market (bank debt, structured finance, syndicated loans, etc.), as highlighted by various studies [19–23]. Generally speaking, for the financing of investments in property, plants and equipment, the firms of the sector use, in addition to equity capital (E), long-term bank loans and real estate leasing articulated generally in a technical form of mortgages with a guarantee on real estate property and, less frequently, articulated in an unsecured form; in this last case, durations are reduced and often collateral security with a pledge or guarantee of signature is requested and often given by members or credit guarantee consortia. For the financing of working capital, firms favor short-term lines of finance, such as advances on trade receivables, advances on contracts and advances on consignments of raw materials that are to be transformed. In medium-long term loans, on the basis of an amortization plan, firms have a contractual obligation to repay the contract debt increased by the interest expense (so-called debt service), while in the case of short-term forms of financing, firms, after paying the cost of the debt, proceed to the principal repayment of the loan obtained through the monetization of the sale of assets of the working capital acquired through short-term loans, once the trade receivables have been collected; the assessment of the sustainability of the debt service and the overall sustainability of the business cycle is therefore relevant, and could be calculated if the proper financial ratios were applied.

Table 3. The surface, production and yield of processing tomatoes in Italy, by region (2016) *.

Region	Surface (Ha)	Tomato for Processing Industry Production (Ton.)	Tomato for Processing Industry Harvesting (Ton.)	Yield (Ton./Ha)
Piemonte	1202	63,924	63,812	53.18
Valle d'Aosta	-	-	-	-
Lombardia	7971	538,755	538,755	67.59
Liguria	-	-	-	-
Trentino-Alto Adige	6	150	150	25.00
Veneto	2007	124,324	105,674	61.95
Friuli-Venezia Giulia	4	128	128	31.90
Emilia-Romagna	26,456	2,015,616	2,015,616	76.19
Toscana	2122	137,661	135,373	64.87
Umbria	267	14,560	14,560	54.53
Marche	25	1041	987	41.64
Lazio	2078	94,100	84,900	45.28
Abruzzo	1110	53,122	53,060	47.86
Molise	600	36,000	36,000	60.00
Campania	4083	265,456	257,389	65.01
Puglia	20,480	1,907,500	1,811,780	93.14
Calabria	2849	124,899	120,415	43.84
Basilicata	2244	127,305	125,550	56.73
Sicilia	4680	67,740	65,740	14.47
Sardegna	408	28,560	28,560	70.00
ITALY	78,592	5,600,840	5,458,448	71.26

* National Institute of Statistics of Italy (ISTAT, Istituto Nazionale di Statistica; data available at: "http://agri.istat.it/sag_is_pdwout/jsp/dwExcel.jsp" accessed 10 February 2018.

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3.2. Data Collection and Research Plan

Our research has the aim to analyze the financial data of a sample of tomato processing firms operating in the northern district. These firms operate in the transformation of tomatoes, as raw material, into finished products. Data analysis compares the data of the distressed firms (5 distressed firms) operating in the sector with the data of others firm samples (12 not-distressed firms) in order to define significance differences in management performance between the two groups (distressed and not-distressed firms) as highlighted by financial ratios' values. In the research plan, we consider "distressed" firms subjected to a formal bankruptcy procedure, during the period ranging from 2007 to 2016; the concept of bankruptcy (default) procedure here considered is as defined in the Italian Bankruptcy Law (Text of the Royal Decree of 16 March 1942, n. 267, Bankruptcy Law, containing the discipline of bankruptcy, of the arrangement with creditors, of the controlled administration and of the compulsory administrative liquidation).

The data analysis of firms in the sector of industrial tomato processing is done on the basis of the data of public filings with the Registrar of Firms for the years 2007 to 2016, on a sample of 17 firms; the data covers the 2 last years of annual account data for 5 as-defined-before distressed companies (before the firms' default), with a total of 10 years of data, and it covers 2 years of annual account data (randomly chosen in the period from 2007 and 2016), for the 12 not-distressed firms considered in the sample, with a total of 24 years of data. The data was derived from the "Computerized analysis of Italian firms" database (AIDA). The data analysis has been performed with a SPSS statistical package (issue 19). In the article, the analysis is developed as follows: (a) We reclassify the AAS of 17 firms (5 distressed firms and 12 not-distressed firms) included in the sample, applying descriptive statistics to BSS and IS, exposing balance sheets and income statements in percentage values (as a percentage of TA and S, respectively); (b) we calculate the financial ratios as exposed in the methodological part of the article; (c) we test whether there are statistically significant differences between the patrimonial values of BSS in distressed and not-distressed firms; (d) we test whether there are statistically significant differences between the economic margins of IS in distressed and not-distressed firms; (e) we test whether there are statistically significant differences between the financial ratios in distressed and not-distressed firms.

3.3. Annual Account Data Analysis

We start the data analysis by reclassifying the AAS of 17 firms applying descriptive statistics to BSS, IS, CFS and FR. The analysis of the 17 sample firms first considers the annual account data (Table 4) for 12 not-distressed firms (24 years of data) and for 5 distressed Firms (10 years of data). I particular for not-distressed firms the capital absorption is relevant in fixed assets (the mean value of BFA is 86.20% of TA), and this confirms that processing firms are characterized by relevant investments in fixed assets, particularly for Bfa^{tan} (40.31% of TA). BFA investments have an effect on the increase of capital needed to finance long-term investments, to be covered with ET or $Df^{>12m}$. To cover their financial needs in BFA, not-distressed firms in the sample use financial debt ($Df^{>12m}$ + $Df^{<12m}$) as the first source of capital, given the fact that, respectively, $Df^{>12m}$ + $Df^{<12m}$ are 14.93% and 27.66% of TA; E is 32.41%, which confirms its importance as the second source of capital. Stable sources of capital (E + $Df^{>12m}$) are 60.07% of TA, while BFA is 45.23% of TA; additionally, stable sources of finance are not able, in mean values, to completely cover the financial needs to finance BFA investments. In the cycle of working capital, $Cwc^{ar<12m}$ (26.66% of TA) and Cwc^{i} (22.29% of TA) prevail.

Concerning distressed firms, financial debt ($Df^{>12m}$ + $Df^{<12m}$) is the second source of capital, given the fact that, respectively, $Df^{>12m}$ + $Df^{<12m}$ are 12.73% and 16.46% of TA; in fact, the first source of capital is given by commercial credit, given that $Dwc^{ap<12m}$ amounts to 45.14% of TA, and this expresses the massive recourse to commercial credit in order to cover the investment cycle. Even if it is not possible to achieve a complete response to the matter, such an intensive use of commercial credit could be hiding a difficulty in accessing financial debt (given the not-positive state of the AAS, as *ictu oculi* emerges from financial data of the distressed firms) or situations that risk legal action on the part of suppliers to recover their credits, which would probably be past due (expired credits). In

the distressed firms samples, E is only 3.41% of TA, expressing a high level of indebtedness in terms of financial debt ($Df^{>12m}$ + $Df^{<12m}$) and credit, given that $Dwc^{ap<12m}$; the stable sources of capital (E + $Df^{>12m}$) are 19.87% of TA, while BFA is 22.14% of TA, given that a part of FA investments is financed with short-term debt, which expresses a typical state of financial risk. In the cycle of working capital, $Cwc^{ar<12m}$ (40.56% of TA) and Cwc^{i} (30.68% of TA) prevail. Such a high level of $wc^{ar<12m}$ and Cwc^{i} could be viewed with particular attention, because these value could overestimate the real value of credits and inventories stock, not considering the losses on credits or, definitively, the manipulation of accounting values with false accounting entries. An analysis of BSS shows that the Kolmogorov–Smirnov D statistic on normality of distribution highlights that BSS data do not follow a normal distribution. The analysis, applying descriptive statistics, shows that distressed firms have a reduced portion of TS that is financed with E, thus confirming the increase of the level of risk when equity capital reduces its weight between the sources of capital; this result is consistent with the literature [24]. It is necessary to clarify that the increase of risk is not only a potential damage for equity holders (particularly when their provision in terms of E is highly reduced) but that it is a greater risk for debt holders, whose expectations of repayment could be frustrated by the default of the firms (in fact, the damage in absolute value for equity holders will be progressively reduced with a decreasing value of E as a source of capital). As in the case, here exposed, of the tomato processing sector, the damage in the case of distressed firms for debt holders appears to be particularly relevant (even in terms of unemployment and tax damage resulting from the non-payment of taxes by distressed firms). It is interesting to note that distressed firms in the tomato sector have TS similar to that of not-distressed firms, suggesting that firms with a higher dimension are not as subjected to bankruptcy risks.

Table 4. The balance sheet data of the sample firms (not-distressed and distressed firms) with the reclassification of the balance sheets with financial forms, and an approach derived from Equation (1).

Value	Mean (€) Not-Distressed Firms	Mean (% TA) Not-Distressed Firms	Mean (€) Distressed Firms	Mean (% TA) Distressed Firms
A	-	-	-	-
Bfa^{int}	1,122,550	4.76%	656,550	5.06%
Bfa^{tan}	9,505,952	40.31%	2,132,251	16.42%
Bfa^{fin}	36,925	0.16%	85,920	0.66%
BFA	10,665,427	45.23%	2,874,721	22.14%
$Cwc^{ar<12m}$	6,285,992	26.66%	5,265,321	40.56%
$Cwc^{ar>12m}$	432,025	1.83%	69,859	0.54%
$Cwc^{o<12m}$	238,220	1.01%	663,669	5.11%
$Cwc^{o>12m}$	12,501	0.05%	26,336	0.20%
Cw^{ci}	5,256,005	22.29%	3,982,336	30.68%
Cwc^{ql}	9824	0.04%	1033	0.01%
Cl	659,223	2.80%	32,652	0.25%
D	23,321	0.10%	65,993	0.51%
TA	23,582,538	100.00%	12,981,920	100.00%
AE^{sc}	2,320,221	9.84%	510,252	3.93%
AE^{r}	1,985,622	8.42%	165,220	1.27%
AE^{Π}	2,133,221	9.05%	-20,552	−0.93%
AΠ	1,203,834	5.10%	-112,578	−0.87%
E	7,642,898	32.41%	442,342	3.41%
B	252,130	1.07%	23,025	0.18%
C	796,220	3.38%	320,221	2.47%
$Df^{<12m}$	3,521,002	14.93%	1,653,200	12.73%
$Df^{>12m}$	6,523,201	27.66%	2,136,630	16.46%
$Dwc^{ap<12m}$	3,812,412	16.17%	5,859,687	45.14%
$Dwc^{ap>12m}$	120,330	0.51%	262,022	2.02%
$Dwc^{o<12m}$	713,647	3.03%	1,663,215	12.81%
$Dwc^{o>12m}$	50,336	0.21%	62,135	0.48%
D-	150,362	0.64%	559,443	4.31%
D^{T}	15,939,640	67.59%	12,539,578	96.59%
TS	23,582,538	100.00%	12,981,920	100.00%

Further information on the typical characteristics of firms in the sector results from an analysis of economic data (Table 5). In the not-distressed firms samples, the mean value of S amounts to € 26,523,211, and the major production factors are raw materials (Mc) (14,215,333, 53.60% of S) and services (Sc) (3,862,025, 14.56% of S). EBITDA has a mean value of 4,601,746 (17.35% of S). Ac + Dc absorbs a mean value of about 8 per cent of S, and EBIT then has a mean value of 2,548,474 (9.61% of S). Financial management (SF) absorbs a mean value 1.63% of S (that is lower than EBITDA and EBIT, expressing the capacity of these income margins to pay the cost of debt); Π has a mean value of 1,203,834 (4.54% of S), and $\Pi \geq 0$ in 22 cases out of 24. It is useful to note that 2 cases of negative Π are concentrated in one firm, thus confirming firms' capacity to generate income via tomato processing in a large majority of cases. An analysis of income statements also shows that the Kolmogorov–Smirnov D statistic on normality of distribution highlights that income statements data do not follow a normal distribution. In distressed firms samples, the mean value of S amounts to 6,593,220 (largely lower than in not-distressed firms sample); raw materials (Mc) remain the most important production factors (4,102,220, 62.22% of S), as do services (Sc) (956,203, 14.50% of S). EBITDA has a mean value of 775,969 (11.77% of S, and lower than in not-distressed firms samples), and EBIT has a mean value of 115,485 (1.75% of S, again lower than in not-distressed firms samples). Financial management (SF) absorbs a mean value of 3.98% of S (which is higher than EBIT, expressing the incapacity of the EBIT margin to pay the cost of debt); Π has a mean (negative) value of 112,578 (1.49% of S), and $\Pi < 0$ in 8 cases out of 10. An analysis of IS also shows that the Kolmogorov–Smirnov D statistic on normality of

distribution highlights that IS data do not follow a normal distribution. The analysis, applying descriptive statistics, shows by event-analyzing IS that not-distressed firms in the tomato sector have a higher dimension (in this case, considering S) than the distressed firms, suggesting that firms with a higher dimension are less subject to bankruptcy risks. Following this, the matter could be usefully deepened in future research by extending the sample data to the entire tomato processing sector in Italy, as well as in other EU countries.

Table 5. The income statement data of the sample firms (not-distressed and distressed firms) with the reclassification of income statements using a value-added approach derived from Equation (2).

Value	Mean (€) Not-Distressed Firms	Mean (% S) Not-Distressed Firms	Mean (€) Distressed Firms	Mean (% S) Distressed Firms
S	26,523,211	100.00%	6,593,220	100.00%
ΔCwc^{i}	903,220	3.41%	966,320	14.66%
Cp	12,533	0.05%	32,652	0.50%
Os	423,205	1.60%	105,363	1.60%
Mc	14,215,333	53.60%	4,102,220	62.22%
Sc	3,862,025	14.56%	956,203	14.50%
Rc	1,292,330	4.87%	565,321	8.57%
Lc	3,205,630	12.09%	985,622	14.95%
Oc	685,105	2.58%	312,220	4.74%
EBITDA	4,601,746	17.35%	775,969	11.77%
Dc	1,923,020	−.25%	562,250	8.53%
Ac	130,252	−.49%	98,234	1.49%
EBIT	2,548,474	9.61%	115,485	1.75%
SF	432,033	−.63%	262,252	3.98%
SR	13,205	−.05%	10,252	0.16%
SX	132,620	0.50%	36,257	0.55%
Π^{bT}	2,235,856	8.43%	100,258	1.52%
T	1,032,022	3.89%	12,320	0.19%
Π	1,203,834	4.54%	112,578	1.71%

3.4. Financial Ratio Analysis

In Table 6, we calculate the ratios as exposed in the methodological part of the article. The analysis shows that the not-distressed firms are characterized by better performance ratios. In fact, ROE is positive for not-distressed firms (15.75%) while it is negative (25.45%) for distressed firms. The result of ROA is even greater, which is 10.81% for not-distressed firms and 0.89% for distressed firms; this ratio, which makes it possible to calculate the profitability of operating activities, shows that distressed firms are not able to generate profitability (ROA just over zero) and that the cost of debt (ROD of 6.98%) is higher than ROA; distressed firms are not able to use leverage which, as is known, is possible if and only if ROA > ROD, thus expressing that the operating return of the capital (ROA) is higher than the cost of debt (ROD); given the outcome of the analysis, we do not take into account the tax shield generated by the deduction of the cost of the debt, which at present is not relevant, given the losses recorded for distressed firms. Even the not-distressed firms, however, show a high cost of debt (ROD = 4.60% as mean value) which erodes about 42% of the operating profitability generated by the management (ROD:ROA = 0.4255). As regards the liquidity ratios (CR and QR), the analysis shows that CR is greater than 1 both for not-distressed and distressed firms, and that QR is substantially equal (0.65 and 0.62) in the two analyzed firm samples. On the other hand, it is clear that the distressed firms have a much higher level of debt (DER) than the not-distressed firms (DER are respectively at 28.35 and 2.09); the DER shows a very high level of indebtedness. It should be noted that in the case of distressed firms CR and QR do not have values considered to be of high risk [25–27].

The analysis of the data analysis (Table 6) shows the duration of the financial cycle of distressed firms, which have a considerable achievement of capital both in the customer payments cycle (AR_DAYS = 295.36) and in the warehouse cycle (INV_DAYS = 220.46). However, such a high

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duration of the company's financial cycle raises the possibility that there are overlaps in the values of the distressed firms' balance sheets, given that there is a rotation of the corporate active cycle (AR_DAYS + INV_DAYS) of 515.82 days. This duration does not seem to be compatible with the normal cycle of production and sale of tomato firms, which seems to highlight difficulties in financial management (deriving from difficulties in receipts or overvaluation of receivables or inventories) that raise the question of incorrect accounting records in the company balance sheet. As a consequence of this, the commercial liabilities of distressed firms (AP_DAYS) have a payment extension of 338.90; this extension appears to be anomalous and contrary to the normal payment practices, which generally align within 90 days of the delivery of the goods or of the provision of the services. Even this anomalous expansion of the payment cycle of trade receivables, highlighted by the anomalous duration of AP_DAYS, is a symptom of the difficulty of the financial crises of distressed firms. The periods of the financial cycle of the not-distressed firms (AR_DAYS = 92.45, AP_DAYS = 54.12, INV_DAYS = 72.33) appear, instead, to be standard and in line with the commercial practice of the sector.

Table 6. A ratio analysis of the sample firms (not-distressed and distressed firms).

Value	Mean Not-Distressed Firms	Mean Distressed Firms
ROE	15.75%	−25.45%
ROA	10.81%	0.89%
ROD	−4.60%	−6.98%
Current ratio (CR)	1.55	1.08
Quick ratio (QR)	0.65	0.62
Debt equity ratio (DER)	2.09	28.35
AR_DAYS	92.45	295.36
AP_DAYS	54.12	338.90
INV_DAYS	72.33	220.46
NWC_DAYS	110.66	176.92

3.5. Comparison between BSS, IS and FR Values in Distressed and Not-Distressed Firms Sample

In the last part of the analysis, we test whether there are statistically significant differences between the patrimonial values of BSS, between the economic margins of IS and between FR in the distressed and not-distressed firms. As shown before, the Kolmogorov–Smirnov D statistic on normality of distribution shows that all values (BSS, IS and FR values) do not follow a normal distribution; it was necessary to apply a nonparametric approach, such as the Mann-Whitney U-statistic, for independent samples. Our analysis (Table 7) considers a total of 20 comparisons, with 5 comparisons between BSS values, 5 comparisons between IS values and 10 comparisons between FR values. The BSS comparisons highlight that it is possible to reject the null hypothesis of equality between means by applying a two-sided test with a 1% significance in 3 out of 5 cases. The capital structure of not-distressed and distressed firms differs particularly for the different level of ineptness and for the equity capital level (respectively, comparisons 4 and 5). The IS comparisons highlight that it is possible to reject the null hypothesis of equality between means by applying a two-sided test with a 1% significance in 3 out of 5 cases. The IS margins of not-distressed and distressed firms differ particularly for the different level of EBIT margins and for the profit margins (Π^{bT} and Π). The FR comparisons highlight that it is possible to reject the null hypothesis of equality between means by applying a two-sided test with a 1% significance in 7 out of 10 cases. The FR of not-distressed and distressed firms differs particularly for the difference level of FR with income focus (ROE and ROA) and for the difference of FR in the NWC duration (AR_DAYS, AP_DAYS, INV_DAYS).

The statistical analysis conducted with the Mann-Whitney U-statistic confirms the outcome of the descriptive statistics analysis. It is therefore confirmed that the distressed firms in the tomato processing sector are highly indebted and characterized by low profit margins, when compared with

not-distressed firms. In particular, distressed firms have shown a statistically lower return on capital (ROA) than not-distressed firms, and lower than the cost of debt (ROD); moreover, the failed firms have highlighted non-statistically different CR and QR values relating, in particular, to receivables and to the value of the company stock, (which may be affected by the company before the failure of the firms), with an ensuing underestimation of the probability of default, and the consequent risk for any third parties. It therefore assumes an impact on the occurrence of the risk factors. A line of research can be developed that aims to test the presence of manipulations on accounting data in firms that failed, for the specific tomato sector, in order to highlight elements useful for the ex ante individuation (prior to the business disruption) of possible accounting frauds. On this subject, although not pertaining to the tomato sector, interesting work has been carried out by many researchers [28–32].

Table 7. A comparison of economic and financial data applying a nonparametric approach for independent samples (Mann-Whitney U-statistic).

Comparisons (DF Is Distressed Firms and NDF Is Not-Distressed Firms)	Type	Mann-Whitney U-Statistic	Observations (24 + 10)	Statistical Significance (2-Tailed)
Comp. 1: BFA_{DF}-BFA_{NDF}	BSS% of TS	3.121 [a]	34	0.000 **
Comp. 2: $Cwc^{ar<12m}{}_{DF}$-$Cwc^{ar<12m}{}_{NDF}$	BSS% of TS	−1.725 [b]	34	0.031 *
Comp. 3: Couple 1 $Cw^{ci}{}_{DF}$-$Cw^{ci}{}_{NDF}$	BSS% of TS	−1.492 [b]	34	0.134
Comp. 4: $D^{T}{}_{DF}$-$D^{T}{}_{NDF}$	BSS% of TS	−3.762 [b]	34	0.000 **
Comp. 5: E_{DF}-E_{NDF}	BSS% of TS	8.141 [a]	34	0.000 **
Comp. 6: $EBITDA_{DF}$-$EBITDA_{NDF}$	IS% of S	1.207 [a]	34	0.211
Comp. 7: $EBIT_{DF}$-$EBIT_{NDF}$	IS% of S	3.525 [a]	34	0.000 **
Comp. 8: SF_{DF}-SF_{NDF}	IS% of S	−0.952 [b]	34	0.340
Comp. 9: $\Pi^{bT}{}_{DF}$-$\Pi^{bT}{}_{NDF}$	IS% of S	5.140 [a]	34	0.000 **
Comp. 10: Π_{DF}-Π_{NDF}	IS% of S	6.190 [a]	34	0.000 **
Comp. 11: ROE_{DF}-ROE_{NDF}	FR values	3.428 [a]	34	0.000 **
Comp. 12: ROA_{DF}-ROA_{NDF}	FR values	2.995 [a]	34	0.000 **
Comp. 13: ROD_{DF}-ROD_{NDF}	FR values	1.898 [a]	34	0.041 *
Comp. 14: CR_{DF}-CR_{NDF}	FR values	1.019 [a]	34	0.275
Comp. 15: QR_{DF}-QR_{NDF}	FR values	0.395 [a]	34	0.420
Comp. 16: DER_{DF}-DER_{NDF}	FR values	−10.290 [b]	34	0.000 **
Comp. 17: AR_DAYS_{DF}-AR_DAYS_{NDF}	FR values	−6.341 [b]	34	0.000 **
Comp. 18: AP_DAYS_{DF}-AP_DAYS_{NDF}	FR values	−8.380 [b]	34	0.000 **
Comp. 19: INV_DAYS_{DF}-INV_DAYS_{NDF}	FR values	−7.221 [b]	34	0.000 **
Comp. 20: WC_DAYS_{DF}-NWC_DAYS_{NDF}	FR values	−3.097 [b]	34	0.000 **

** The relation is significant at the 0.01 level (2-tailed). * The relation is significant at the 0.05 level (2-tailed). [a] expresses positive rank sign; [b] expresses negative rank sign.

4. Conclusions

The research confirms that processing firms in the tomato sector in northern Italy are often characterized by a significant absorption of capital to finance investments in fixed assets and in the cycle of working capital. This character of the financial cycle could be amplified given that the tomato processing sector has a seasonal pick in summer, during the months of August and September, with a production concentration and the employment of seasonal workers during the production season. In order to reduce the financial exposure connected with the seasonality of the business cycle, only a few firms cover a wide range of production, including canned vegetables and juices. The analysis of the sector highlights firms' difficulties with regards to the sustainability of the business cycle, as evidenced by the reduction in the number of firms that are active in the sector, which is also a result of bankruptcy proceedings that have affected the sector's firms in the last decade. The research, carried out on tomato processing firms operating in northern Italy, dividing firms into still-active firms and failed firms, with the aim of analyzing the differences between the two groups of firms, give the following results:

1. The distressed firms in the sector are, on average, smaller, both for invested capital and for turnover.

2. The distressed firms in the sector have a higher recourse to debt capital on average, and generate lower profit margins than not-distressed firms.
3. The failed firms have significantly different FR compared to non-bankrupt firms, and this allows having ex ante indications on the risk level of the company, by analyzing the data of the FR.
4. The FR related to the business liquidity cycle highlight the high duration of the business cycle of the firm and this raises the question of the manipulation of accounting data (particularly in inventories and commercial credit data), which can be usefully explored via further research in the sector.

The company data suggest that larger firms, characterized by an adequate financial structure in terms of equity, have been able to withstand the tomato market crisis in recent years. The research has some limitations. Firstly, the sample analyzed is related to a small number of firms (24) on a time series of 10 years. It could be useful to extend the analysis to a larger sample, including firms operating in the southern regions of Italy; the analysis could even be repeated over the next few years, in order to monitor the process of progressive concentration that has characterized the sector in the last years through several M&A operations. These extensions could be pursued in order to enhance the impact of the achieved results.

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