COMPARATIVE APPLICATIONS OF INCOME AND FINANCIAL ANALYSIS FOR TOMATO PROCESSING FIRMS IN ITALY

Bonazzi, Giuseppe[1]
Iotti, Mattia[2]

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ABSTRACT

The processed tomato is one of the major food products of Italy. It characterizes today many Italian regions in northern and southern Italy, even though the companies in the industry have had difficulties in recent years, due to an increase in the cost of raw materials. These difficulties have reduced profitability, in part because of the length of the financial cycle. Tomato processing enterprises are, in fact, characterized by significant investment in fixed assets and working capital; and, in general, make significant investments in plants and equipment and mostly sell their products in the food distribution chain, with increase in inventories stock and term of payment of commercial credits. These characteristics of the financial cycle amplify the need for investment, often financed by increasing financial debt. Given the difficulties of the tomato industry, which has had an increase in the number of crises and failures, this research aims to identify and verify indicators that can adequately express the sustainability of the financial cycle of the enterprises in the sector. To achieve this, this article analyzes the annual budget data of a sample of 50 tomato processing companies in Italy, over a period of five years. The analysis shows that the economic margins applied to assess the sustainability of the operating cycle are significantly different from financial margins. The research also shows that Interest Coverage Ratios (ICRs), calculated by applying the financial approach suggested, differ from traditionally applied economic ICRs. A multiple regression approach is then applied to analyze the return on capital in terms of profit and cash flow, suggesting a useful approach to measure the return on equity for companies processing tomatoes. The analysis here can be applied in the future and extended to other sectors of agribusiness, particularly if characterized by high capital intensity, analyzing the return to long-term risk capital and the probability of default.

Key words: Economic and financial analysis, free cash flow to equity, flow on equity, Italian agro-food sector, interest coverage ratios, tomato processing firms

[1] Bachelor degree in Agricultural science (Università di Bologna, Italy). Professor of Economics and evaluation (Università degli Studi di Parma). Deputy Director at the Food Science Department (University of Parma). Director of the International Master in Food Technology (University of Parma and Universidad de Buenos Aires, UBA). ***Postal address:*** Via del Taglio, 10, 43125 Parma (PR), Italy. ***Phone:*** + 39-521-032707; ***e-mail:*** giuseppe.bonazzi@unipr.it

[2] Graduate in economics (Università degli Studi di Parma, Italy); M.Sc. Management of Food Distribution Channels (IAMZ, Zaragoza, Spain); Ph.D. Economics of food and agricultural systems in the Mediterranean basin (University of Parma; Italy). Professor in charge of Project Evaluation (Department of Civil Engineering, Environment, Planning and Architecture-DICATeA, Università degli Studi di Parma). ***Postal address:*** Via del Taglio, 10, 43125 Parma (PR), Italy. ***Phone:*** + 39-521-032709; ***e-mail:*** mattia.iotti@unipr.it

RESUMEN

El tomate procesado es uno de los principales cultivos alimentarios de Italia. En la actualidad caracteriza a diferentes regiones tanto en el norte como en el sur de Italia, aunque las empresas de la industria han tenido dificultades en los últimos años debidas al aumento en los costos de las materias primas. Estas dificultades han reducido la rentabilidad y esta se debe también a la extensión del ciclo financiero. Las empresas de procesamiento de los tomates –de hecho–, se caracterizan por una importante inversión en activos fijos y activos corrientes y muchas veces están llevando a cabo inversiones de capital. Las empresas de transformación del tomate, en general, realizan importantes inversiones en plantas y equipos; además, en gran parte, venden sus productos a la cadena de distribución de alimentos y ello determina un aumento de *stock* y del plazo de pago de los créditos. Estas características del ciclo financiero de las empresas amplían la necesidad de inversión, que a menudo son financiadas con el aumento de la deuda financiera. Dadas las dificultades de la industria del tomate, que ha tenido un aumento en el número de crisis y quiebras en años recientes, la investigación tiene como objetivo identificar y verificar los indicadores que puedan expresar adecuadamente la sustentabilidad del ciclo financiero de las empresas del sector. Para lograr este objetivo el artículo analiza los datos de balances anuales correspondientes a una muestra de 50 empresas de transformación de tomates en Italia, durante un período de cinco años. El análisis muestra que los márgenes económicos aplicados para valuar la sustentabilidad del ciclo de operación son significativamente diferentes de los márgenes financieros. La investigación también da cuenta que las Proporciones de Cobertura de Intereses (ICR), calculadas mediante la aplicación del enfoque financiero sugerido, difieren de los ICR económicos aplicados tradicionalmente. Para analizar el rendimiento del capital en términos de ganancias y flujo de caja se realizó luego un enfoque de regresión múltiple, cuyos resultados sugieren que es un enfoque útil para medir el retorno sobre el capital de las empresas de transformación de tomate. El análisis aquí aplicado se puede extender en el futuro a otros sectores de la agroindustria, sobre todo si se caracteriza por una alta intensidad de capital, analizando también el rendimiento a largo plazo del capital de riesgo y la probabilidad de caer en cesación de pagos (o *default*).
Palabras clave: análisis económico y financiero, empresas de transformación del tomate, flujo de caja libre para el accionista, proporción de cobertura de intereses, sector agroalimentario italiano

RÉSUMÉ

El secteur de la tomate transformée est une des principales cultures vivrières de l'Italie. Elle est aujourd'hui produite dans différentes régions italiennes, notamment le Nord et le Sud, malgré les difficultés rencontrées par les entreprises du secteur en raison de l'augmentation du coût des matières premières. Ces difficultés ont réduit la rentabilité en partie à cause de la longueur du cycle financier. Les entreprises de transformation de la tomate sont, en effet, caractérisées par des investissements importants dans les immobilisations et le fonds de roulement. Et souvent, elles se créent avec un capital important. Les entreprises de transformation de la tomate, en général, font d'importants investissements dans les installations et les équipements. Elles vendent la plupart de leurs produits dans la chaîne de distribution alimentaire, et peuvent donc subir les effets d'une augmentation des stocks et de la durée de paiement des créances. Les caractéristiques du cycle financier de ces entreprises amplifient le besoin d'investissement, souvent financé par augmentation de la dette. Compte tenu des difficultés de l'industrie de la tomate, qui a vu une augmentation du nombre de crises et des échecs, la recherche vise à identifier et à vérifier les indicateurs qui peuvent exprimer adéquatement la durabilité du cycle financier des entreprises dans le secteur. Pour atteindre cet objectif, l'article analyse les données de budget annuel d'un échantillon de 50 entreprises de transformation de tomates en Italie, sur une période de cinq ans. L'analyse montre que les marges économiques appliquées pour évaluer la durabilité du cycle de fonctionnement sont sensiblement différentes des marges financières. La recherche montre aussi que des ratios de couverture d'intérêts (ICR), calculés en appliquant l'approche financière suggérée, diffèrent de l'ICR économique, traditionnellement appliquée. Une approche de régression multiple est ensuite appliquée pour analyser le retour sur le capital en termes de bénéfice et les flux de trésorerie, ce qui suggère une approche utile pour mesurer le rendement des capitaux propres pour les entreprises de transformation de tomates. L'analyse du rendement du capital de risque à long terme et de la probabilité de défaut peut ici être appliquée à l'avenir et être étendue à d'autres secteurs de l'agro-industrie, en particulier s'ils sont caractérisés par une forte intensité capitalistique.
Mots-clé : Analyse économique et financière, des entreprises de transformation des tomates, ratios de couverture d'intérêts, secteur agroalimentaire, marge brute libre à des capitaux propres, liquidité sur capitaux propres

RESUMO

O tomate processado é um dos principais cultivos alimentares da Itália. Na atualidade se distribui por diferentes regiões, tanto ao norte quanto ao sul. Nos últimos anos são crescentes as dificuldades das empresas diante do aumento do custo das matérias primas, acarretando redução na rentabilidade e elevação do custo financeiro. As empresas processadoras de tomate caracterizam-se por realizar importantes investimentos em capital fixo (plantas e equipamentos), bem como em ativos correntes. Grande parte da produção é vendida em cadeias de distribuição de alimentos, o que acarreta um aumento dos estoques e do prazo de pagamento dos créditos. As características do ciclo financeiro ampliam a necessidade de investimentos que, amiúde, são equacionados através do aumento no nível de endividamento, em meio a um contexto recente de crise e de quebras recorrentes. Nesse contexto, a presente investigação teve como objetivo identificar e verificar os indicadores que possam expressar adequadamente o grau de sustentabilidade do ciclo financeiro das empresas do setor. Para atingir esse objetivo foram analisados dados de balanços anuais obtidos a partir de uma amostra de 50 empresas italianas processadoras de tomates durante um período de cinco anos. A análise mostra que as margens econômicas aplicadas para avaliar a sustentabilidade do ciclo de operação são significativamente diferentes das margens financeiras. A investigação também indicou que as Proporções de Cobertura de Juros (PCJ), calculadas a partir da aplicação do enfoque financeiro sugerido, diferem dos PCJ tradicionalmente aplicados. Para analisar o rendimento do capital em termos de lucros e fluxo de caixa fez-se uso de um enfoque de regressão múltipla, cujos resultados sugerem que se trata de um enfoque útil para medir o retorno sobre o capital das empresas de transformação de tomate. A análise aqui aplicada pode ser estendida, no futuro, para outros setores da agroindústria, sobretudo quando identificada com uma alta intensidade de capital, pesquisando também o rendimento a longo prazo do capital de risco e a probabilidade de interrupção de pagamentos (*default*).

Palavras-chave: análise econômica e financeira, empresas de transformação do tomate, fluxo de caixa livre para o acionista, proporção de cobertura de juros, setor agroalimentar italiano

1. INTRODUCTION

Tomato cultivation and processing are present in various areas of Italy, where tomato is one of the most important food productions. Tomato processing firms require large amounts of capital to finance investment in fixed assets (FA), such as buildings and plants for tomato processing, and even to finance the cycle of net working capital (NWC). NWC absorption is particularly relevant in the sector due the increase in inventory stock and account receivable terms of payment. High absorption of FA and NWC, frequently financed with an increase in financial debt, makes it necessary to assess the sustainability of the business cycle in tomato processing firms. This assessment is particularly relevant in the actual situation of bank credit reduction and an increased number of firms' crises and insolvency. This analysis aims to provide useful information to managers in evaluating the firms' financial cycle sustainability. In recent years, even tomato processing firms were characterized by an increase in default rate; this is particularly true in the case of small and medium enterprises (SMEs) that generally have the worst access to capital markets and debt financing, as shown in several researches (Grablowsky, 1984; Dunn & Cheatham, 1993; Peel & Wilson, 1996; Molina & Preeve, 2009). To achieve these goals, this article analyzes the management data of a sample of tomato processing firms in Italy. The analysis considers firstly the balance sheet and income statement data, particularly with respect to capital structure, sustainability of the management cycle and credit access. The analysis considers firstly the balance sheet and income statement data, particularly with respect to capital structure, sustainability of the management cycle and credit access. The analysis also applies comparison between profit margins and financial margins to quantify statistically significant differences. Again, the article tests the differences for interest coverage ratios (ICRs) if calculated applying economic and a financial approach. Multiple regression models are tested at the end to quantify determinants of profit and cash flow in the tomato processing firms, as considered in the sample. The results of the research could be applied by policy makers through public actions in supporting private

firms, even improving evaluation of financial viability of public aided firms and reducing risk of inefficient use of public aids (Boschi, Girardi & Ventura, 2014).

2. METHODS

Return on equity capital is defined as the increased value of equity capital in a given period and could be not only positive but preferably higher than the opportunity cost of capital (Lagerkvist & Andersson, 1996). Applying this point of view, return equity capital could be quantified with both economic and financial approaches. In an economic approach, revenues and costs are compared with the accrual-based methods, which quantify value creation, as expressed in accounting data. Financial approach –instead– considers cash inflow and outflow, applying a cash based approach that is suitable to quantify cash flow available to distribute dividends or to perform discretionary investments. Differences in firms' results after applying an economic or a financial approach are frequently caused by a lag between economic and financial cycles (Grenberg, Johnson & Ramesh, 1986; Kwon, 1989; Dechow, 1994; Dechow & Dichev, 2002; Russel, 2009; Iotti & Bonazzi, 2014). In fact, a traditional accounting system is based on the principles of historical cost and accrual basis value analysis; given the time lag between the economic and financial cycle, the importance of analyzing operating cash flows is expressed by several studies, particularly in regards to quantifying a firm's capacity to generate future cash flow (Finger, 1994; Wang & Eichenseher, 1998; Charitou & Panagitodes, 1999; Hussain & Al Attar, 2003). Again, several researchers have shown that economic and financial approaches have different results (Bowen & Owen, 1986; Kwon, 1989; Dechow, 1994), highlighting that firms may even have financial un-sustainability even in the case of positive income margins, both in the FA cycle (Fazzari & Petersen, 1993; Cleary, 1999; De Miguel & Pindado, 2001) and the NWC cycle (Howorth & Westhead, 2003; Padachi, 2006; Taylor, 2011; Baños-Caballero, García-Teruel & Martínez-Solano, 2014; Darun, Roudaki & Radford, 2015). Financial un-sustainability is particularly frequent in capital intensive firms as is often the case of agri-food processing firms (Glancey, 1998; Kieschnick, La Plante & Mousawwi, 2008; Sgroi, Di Trapani, Testa & Tudisca, 2014; Testa, Di Trapani, Sgroi & Tudisca, 2014).

2.1. ANNUAL ACCOUNT ANALYSIS

In the article, to quantify income and financial flows, annual account data is applied –according to the IV EU directive about company and annual accounts (EU, 1978)–, in Italy with the provision of the Italian civil code. The annual account contains a balance sheet, an income statement and integrative notes. For a given period, *t*, the balance sheet of a generic firm could be expressed as follows (Bonazzi, Iotti & Paduano, 2012):

$$(1)\quad FA_t + WCi_t^a + WCar_t^a + WCo_t^a + L_t = E_t^{sc} + E_t^r + \Pi_t^{pT} + WCap_t^p + WCo_t^p + DF_t^{M<12} + DF_t^{M>12}$$

In equation (1), the left hand side represents investment, in which FA is fixed assets, WCi^a is working capital asset inventories, $WCar^a$ is working capital asset accounts receivable, WCo^a is working capital asset-other assets, and L is liquidity. The sources of capital are represented on the right hand side of equation (1) where E^{sc} is share capital, E^r are reserves, P^{pT} is profit after tax, $WCap^p$ is working capital debt accounts payable, WCo^p is working capital debt, other values, $DF^{M<12}$ is financial debt due within 12 months and $DF^{M>12}$ is financial debt due after 12 months. The left hand side of equation (1) is total assets (TA), while the right hand side represents the total sources of capital, quantified as the total equity capital ($E^T = E^{sc} + E^r + P^{pT}$) and the total of debt capital ($D^T = WCap^p + WCo^p + DF^{M<12} + DF^{M>12}$). Net financial position (NFP_t) could be expressed as follows:

$$(2)\qquad (DF_t^{M<12} + DF_t^{M>12}) - L_t = NFP_t$$

Net Working Capital (NWC_t) expresses the absorption of capital as a result of the operating cycle, defined as acquisition, processing, and sale cycle:

$$(3)\quad (WCi_t^a + WCar_t^a + WCo_t^a) - (WCap_t^p + WCo_t^p) = WC_t^{aT} - WC_t^{pT} = NWC_t$$

In equation (3), in a given period *t*, WC^{aT} is working capital total asset and WC^{pT} is working capital total debt; NWC quantifies the net

resources generated ($NWC_t < 0$) or absorbed ($NWC_t > 0$) by the working capital management cycle (Love, Preeve, & Sarria-Allende, 2007). $NWC > 0$ expresses a so called «conservative strategy» of working capital management because is verified (Hill, Kelly & Highfield, 2010) that $NWC > 0$ is inversely related to insolvency. $NWC_t < 0$ expresses the case of «aggressive strategy» of working capital management (Grablowsky, 1984; Weinraub & Visscher, 1998) and is considered directly related to financial distress. Particularly in the tomato processing industry it is useful to express the reclassification of the balance sheet with the functional form considering NWC and NFP; in fact, tomato processing firms are often characterized by NWC absorption, to cover the cycle of raw material processing and the delay in accounts receivable payment. We could express it as follows:

$$(4) \qquad FA_t + NWC_t = E_t^T + NFP_t$$

In equation (4), FA and NWC, if positive, are covered by equity capital (E^T) and net financial position (NFP); $E^T + NFP$ is then equal to net invested capital (NIC). The income statement then quantifies the accounting profit generated for equity holders. In the income statement, the value of production (VP) for a given period, t, is:

$$(5) \quad \sum_{i=1}^{I} p_{t,i} q_{t,i} + \left(\sum_{f=1}^{F} I_{t,f} v_{t,f} - \sum_{g=1}^{G} I_{t-1,g} v_{t-1,g}\right) = S_t + (I_t - I_{t-1}) = S_t + \Delta I_{t,t-1} = VP_t$$

In equation (5), $p_{t,i}$ is the price per unit, at a given time *t*, of goods and services sold $I : I \hat{I} [1, q_t$ is the quantity sold, and $I_{t,f}$ and $I_{t»1,f}$ are inventory items $F : F \hat{I} [1$ and $G : G \hat{I} [1$, respectively, at a given time, *t* and *t-1*. Every item is valued at its respective value per unit (v). S_t is total sales at a given time *t*, then $DI_{t,t»1}$ is the variation in inventory values between *t-1* and *t*. Inventories in the income statement and balance sheet have equal values, so $I_t = WCi_t^a$ and $I_{t-1} = WCi_{t-1}^a$. The value of production (VP) is a flow value (Dechow & Dichev, 2002) that is in formation during a period, in our case *t*, without consideration of values during period $T \hat{I} [t-1, t]$. Operative costs, for a given time *t*, are as follows:

$$(6) \quad M_t = \sum_{m=1}^{M} m_{t,m} q_{t,m} \;;\; S_t = \sum_{s=1}^{S} s_{t,s} q_{t,s} \;;\; R_t = \sum_{r=1}^{R} r_{t,r} q_{t,r} \;;\; L_t = \sum_{l=1}^{L} l_{t,l} q_{t,l} \;;\; O_t = \sum_{o=1}^{O} o_{t,o} q_{t,o}$$

M_t is the cost of raw materials, S_t is the cost of services, R_t is the cost of rent and leasing, L_t is labor cost and O_t represents other operative costs. In equation (6), $m_{t,m}$, $s_{t,s}$, $r_{t,r}$, $l_{t,l}$, and $o_{t,o}$ are the single factors of costs where $M \hat{I} [1, S \hat{I} [1, R \hat{I} [1, L \hat{I} [1, O \hat{I} [1$; respective quantities are $q_{t,m}$, $q_{t,s}$, $q_{t,r}$, $q_{t,l}$, and $q_{t,o}$. The nonfinancial operative costs are as follows:

$$(7) \qquad D_t = \sum_{d=1}^{D} d_{t,d} q_{t,d} \;;\; A_t = \sum_{a=1}^{A} a_{t,a} q_{t,a}$$

In equation (7), D_t is amortizations of fixed assets (FA_t), while A_t is depreciation; $d_{t,d}$ and $a_{t,a}$ are the costs per unit, at a given time *t*, of amortizations and depreciation; these costs are, respectively, part of $D : D \hat{I} [1$ and $A : A \hat{I} [1$., with their respective quantities $q_{t,d}$ and $q_{t,a}$. Balance of the financial operation (SF_t), at *t*, is as follows:

$$(8) \qquad SF_t = I_t^a - I_t^p$$

In equation (8), I_t^a is interest receivable and I_t^p is interest payable at a given time, *t*. The balance of the extraordinary operations (SX_t), at *t*, is as follows:

$$(9) \qquad SX_t = X_t^a - X_t^p$$

In equation (9), X_t^a is extraordinary component of income, and X_t^p is extraordinary expense. The balance of the management revaluations and devaluations of financial assets is given, at *t*, as follows:

$$(10) \qquad SZ_t = Z_t^a - Z_t^p$$

In (10), Z_t^a represents revaluations while Z_t^p represents devaluations of financial activities. Income account could be then summarized as follows:

$$(11) \quad VP_t - (M_t + S_t + R_t + L_t + O_t) = EBITDA_t \;;\; EBITDA_t - (D_t + A_t) = EBIT_t \;;\; EBIT_t + SF_t + SX_t + SZ_t = \Pi_t^{aT} - T_t^Y = \Pi_t^{pT}$$

In equation (11), EBITDA approximates the creation of liquidity, with an income approach before non-monetary costs ($D_t + A_t$); EBITDA even considers non-monetary values ($DI_{t,t»1}$) of VP and thus does not directly express an

operating cash flow margin but approximates it. EBIT is an income margin that expresses operative income after non-monetary costs ($D_t + A_t$); Π_t^{aT} is profit before taxes and Π_t^{pTt} (PROFIT) expresses the firm's capacity to remunerate equity capital; T_t^Y represents income taxes.

2.2. FINANCIAL STATEMENT ANALYSIS

Income statements are not suitable to use to conduct a financial analysis and then it is necessary to apply financial statements in quantifying available cash flow. The first definition quantifies cash flow as the sum of an accounting result (profit or EBIT) plus depreciation and amortizations (Beaver, 1966); other researchers began to express cash flow while taking into account the absorption or generation of cash via the working capital cycle (Rayburn, 1986; Wilson, 1987; Gombola, Haskin, Ketz, & Williams, 1987; Finger, 1994; Lorek & Willinger, 1996; Bradbury, 2011; Bond, Bugeja & Czernkowski, 2012; Clacher, De Ricquebourg & Hodgson, 2013; Farshadfar & Monem, 2013):

$$(12)\quad \Pi_t^{pT} + (D_t + A_t) + SF_t = CF_t \;;\; CF_t - (NWC_t - NWC_{t-1}) = OCF_t \;;\; OCF_t - [(FA_t - FA_{t-1}) - (D_t + A_t) = UFCF_t] \;;\; UFCF_t - SF = FCFE_t$$

In equation (12), in the given period *t*, CF_t is cash flow, OCF_t is operating cash flow, $UFCF_t$ is unlevered free cash flow, $FCFE_t$ is free cash flow to equity, and NWC is net working capital. If $\Delta^+NWC_{t,t»1} \geq \Delta^*OCF_{t,t»1}$, an increase in net working capital implies an increase in absorption of liquidity, thus reducing OCF, and vice versa ($^*NWC_{t,t»1} \geq \Delta^+OCF_{t,t»1}$). As it has been shown by several studies, NWC management is very important, especially for SMEs that frequently have limited access to the capital market in the medium and long terms and often finance-fixed assets with short-term liabilities (due within 12 months) and have rates of default higher than companies of larger sizes. The most part of tomato processing firms are, in fact, SMEs. Given OCF_t, liquidity absorption due to FA investment has an effect on $UFCF_t$, given that $[(FA_t « FA_{t»1}) - (D_t + A_t)] > 0 \geq \Delta^*UFCF_{t,t»1}$ and vice versa. $UFCF_t$ is therefore the cash flow available to serve NFP and E^T. In a given period, *t*, $FCFE_t$ is the cash flow available for the distribution of dividends to equity holders. The aim of the research is to assess whether there are statistically significant differences in the income and financial results of firms in the sample, expressing income results in terms of EBITDA, EBIT, and P^{pT} (profit) and financial results CF, OCF, UFCF and FCFE. In fact, when assessing the financial sustainability of the business cycle applying intermediate profit margins, such as EBITDA and EBIT (margins that approximate cash flow values), is necessary to consider that income margins do not consider the effect of revenue not collected from customers, purchases not paid to suppliers, and changes in the values of inventories, as NWC variation. Again, profit calculated with an income approach differs from cash flow available FCFE in consideration of the time lag between income value creation and the time of occurrence of financial flows. In the article we would compare income and financial margins in tomato processing firms' sample to verify the significance of any differences.

2.3. RATIO ANALYSIS

Income and financial margins are even applied to quantify interest coverage ratios (ICRs) that are calculated applying both a traditional approach (income approach), and a non-traditional (Bonazzi & Iotti, 2014, Iotti & Bonazzi, 2015) financial approach. Even in literature on bankruptcy, starting with Altman (1968), researchers try to explain financial distress by applying financial ratios, and the importance of ICRs in reducing asset volatility, when covenants are costly to enforce. This was expressed by several researchers (Leland, 1994, 1998). ICRs with an income approach are expressed as follows:

$$(13)\quad ICR_1 = EBITDA_t / I_t^p \;;\; ICR_2 = EBIT_t / I_t^p$$

ICR_1 and ICR_2 express a firm's capacity to pay interest within a given period, *t*, with income margins (Healy, 1985; Sloan, 1996; Goldstein, Ju & Leland, 2001; Dothan, 2006; Moir & Sudarsanam, 2007). ICR_2 expresses a more conservative approach: $(D_t + A_t) \geq 0 \geq EBITDA_t \geq EBIT_t \geq ICR_2 \geq ICR_1$ as frequently used in bank loan agreements (Gray, Mirkovic & Ragunathan, 2006), when applying an income approach. Other authors (Bonazzi & Iotti, 2014) express ICRs for a given period, *t*, as follows (14):

$$ICR_3 = CF_t / I_t^p \;;\; ICR_4 = OCF_t / I_t^p \;;\; ICR_5 = UFCF_t / I_t^p$$

ICR_3, ICR_4, and ICR_5 express the capacity of the company to pay the cost of debt in a

given period, *t;* in this case financial flow directly expresses the liquidity generated by the firm's cycle (CF, OCF, and UFCF). In the article, we would compare ICRs with income and financial approaches to assess if there are statistically significant differences. Again, in the article –to evaluate management's efficiency– profit and financial margins are applied to quantify return on equity capital. A first ratio is traditional return on equity (Rosner, 2003; Lewellen, 2004; Love, Preeve & Sarria-Allende, 2007), that is the most known accountancy measure of profitability:

$$(15) \quad ROE_t = \Pi_t^{pT} / E_t^T$$

In (15), ROE (return on equity) expresses the income annual return of equity capital (Cheng, Liu & Schafer, 1996; Ohlson, 1980; Barnes, 1987); ROE ratio is affected by accounting conventions, particularly related to the accrual principle; in fact, it is therefore possible to observe situations where firms, even in presence of positive profit, are not able to distribute dividends to equity holders. To overcome this problem, the work also proposes the application of the following ratio:

$$(16) \quad FOE_t = FCFE_t / E_t^T$$

In (16), FOE (flow on equity) expresses the annual financial performance of equity capital (Bodenhorn, 1964; Moro Visconti, 1999). In the article, we compare ROE_t and FOE_t to quantify correlation and differences between ratios' values and even to suggest explication to ROE and FOE determinants.

3. DISCUSSION OF RESULTS

In 2013, about 40 million tons of tomatoes were processed worldwide. Italy, with 4.0 million tons of tomatoes processed, compared to about 68,000 hectares under cultivation, accounts for over 12% of the total world production and 55% of European production. The cultivation and processing of tomatoes characterizes various areas of Italy, a country in which the tomato is one of the most important components of agricultural food production. Italy is the second largest world producer of the tomato industry, second only to California. In recent years, the national tomato sector has been subject to profound changes, even considering that several emerging producer countries –including China, actually the third largest tomato producer– have increased their production with important changes in international trade dynamics, in both quantitative and qualitative terms (World Processing Tomato Council, 02/2014).

3.1. THE TOMATO SECTOR IN ITALY

In the period from 2009 to 2013, land surface for tomato production in Italy decreased by 11.68% and the contraction was greater for food consumption tomatoes, 15.12%, than for processing industry tomatoes, 10.01% (ISTAT, 2014); the production of tomatoes for food processing increased in the same period (0.98% in production and 1.24% in harvesting), with an increase in average yields per hectare, while the production of tomatoes for food consumption decreased by 16.50% in production and 16.72% in harvesting (ISTAT, 2014). Processing of tomatoes generally takes place in plants near the areas of production, particularly for cost reduction. Transportation costs reduction, in transporting raw materials from production areas to processing plants, have a great part in concentration process of tomato productions plants in Italy, which is particularly high in two main geographical areas.

The most important production area for tomatoes is located in the northern part of Italy, including the regions of Emilia-Romagna, Lombardia, Veneto, and Piemonte, which together produced 2.3 million tons in 2013 (44% of domestic tomato production). The area with the second highest production is located in the southern regions of Campania, Puglia, Calabria, and Basilicata, which together produced 2.2 million tons in 2013 (42% of national production). In southern Italy, 92 tomato processing firms were operating in 2013, of which 75 are limited companies, 11 are non-limited companies and sole proprietorships, and 6 are cooperative firms. In northern regions, the tradition of processing tomatoes has its origins in the late 19th century with the rise of the canning 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, with the presence of processing firms also 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), in the Veneto region, and in Alessandria Province (Piemonte region). In these territories, 22 processing firms are active, of which 16 are

limited companies, 5 are cooperatives, and 1 is a non-limited company. Among the three major production regions of northern Italy, Emilia-Romagna prevails, with 15 processing firms. Some firms process only tomatoes, with production concentration in summer, employing seasonal workers during the production season; these firms frequently carry on maintenance, storage, and marketing activities during the rest of the year. Other firms cover a wide range of production, including canned vegetables and juices, with the aim to reduce seasonality of tomato production. Processing firms frequently suffer by low brand loyalty among consumers, thus reducing the bargaining power of processing firms. Processed tomatoes are largely sold to the consumer market by large retail chains that often use their bargaining power to apply unfavorable conditions to increase the average time of commercial credit, with an NWC cycle that determines an expansion of investment, even considering that sales to food distribution chains give a time increase in collecting receivables with increasing NWC financial absorption. Since NWC increasing has a positive impact on production value and profit, it is necessary to verify misalignment between profit margins and cash flow margins in the tomato processing firms industry to highlight situations wherein firms are not able to sustain financial cycle even with positive profit. Tomato processing firms require high investments even in FA (for buildings, plants, and equipment) with the need of an increasing financial source, in terms of E^T or NFP investment, and this involves the need to quantify ICRs. Again, 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, there has been a decrease in the number of firms in recent years, from 166firms in 2009 to 144 firms in 2013, with the closure of 22 firms, of which 11 are bankruptcies or compulsory liquidations.

3.2. FIRMS' SAMPLE DATA

The data considered in the analysis was made available by the register of companies, covering a five-year period, from 2009 to 2013. A sample of 50 firms with a total of 250 year-data is considered in the analysis. Data analysis was performed using the statistical package SPSS, issue 19.

The analysis of the sample firms first considers asset data 2009/2013 (Table N° 1) of the annual balance sheet, which expresses capital-

Table 1
Balance sheet data of tomato processing sample firms (2009/2013)
Reclassification of the balance sheet with financial approach

Values	Mean values (€)	Mean values (%)	Median Values (€)	Standard Dev.	Skewness	Kurtosis
FA	7,190,295	34.60%	2,622,949	9,987,971	1.53	0.71
WCi^a	9,051,939	43.56%	6,132,175	10,465,119	2.68	6.86
$WCar^a$	3,602,675	17.34%	2,865,639	2,928,818	1.05	-0.15
WCo^a	643,849	3.10%	682,73	430,44	-0.13	-1.31
WC^{aT}	13,298,463	63.99%	8,942,432	13,114,386	2.29	4.87
L	293,162	1.41%	133,547	282,64	1.28	0.84
TA	**20,781,920**	**100.00%**	**13,108,774**	**22,399,365**	**1.80**	**2.08**
E^T	2,428,674	11.69%	987,304	3,185,645	1.85	2.17
$WCap^s$	3,993,015	19.21%	3,464,949	3,366,810	1.82	2.63
WCo^s	2,311,487	11.12%	1,025,205	3,251,422	2.10	3.34
WC^{sT}	6,304,501	30.34%	4,217,529	6,524,341	2.01	2.95
$DF^{M<12}$	8,922,267	42.93%	5,231,765	9,238,826	1.89	3.06
$DF^{M>12}$	3,126,478	15.04%	1,107,844	4,838,589	1.74	1.47
DF^T	12,048,745	57.98%	5,689,906	13,923,189	1.85	2.51
D^T	18,353,246	88.31%	12,075,041	19,876,450	1.99	2.98
TS	**20,781,920**	**100.00%**	**13,108,774**	**22,399,365**	**1.80**	**2.08**

Source: own calculations

intensive activities for the firms' samples, given the value of production (TA/VP 132.43%). Capital intensive attitude is particularly due to the investment (44.52% of TA); tomato processing firms, in fact, often do investments in plants to process and store tomatoes during production season. Particularly important are investment equipment and highly technological machinery, as are lines of sterilization and packaging. Accounts receivable ($WCar^a$) are also one of the major voice of investment (25.55% of TA); again, high capital absorption is determined by large retail chains, whose bargaining power increases over an average number of days for credit payments (accounts receivable). To cover TA investment, firms in the sample use financial debts as the first source of capital, given that $DF^{M<12} + DF^{M>12}$ is 42.95% of the TA, with a prevalence of loans maturing within 12 months (23.57% of TA), while loans maturing after 12 months are 19.37% of TA. Equity capital (E^T) is the third source of capital (21.51% of TA), and it is lower than WC^{sT}, which is equal to 35.53%. The analyzed capital structure shows that firms in the sector acquire a high debt level to finance investment, and a high level of financial debt increases financial dependence by the credit system, even increasing financial cost.

The analysis of the balance sheet in functional form (Table N° 2) confirms the prevalence of investments in fixed assets (70.04% of NIC) and also highlights NWC > 231 cases out of 250, where the NWC mean is 29.96% of NIC. Asset characteristics of the sample firms express even high level of capital absorption in NWC cycle; in fact, the mean length of time to collect commercial credit as an account receivable (AR_DAYS) is 123 days (median value is 147); the mean length of time to pay commercial debt as an account payable (AP_DAYS) is 177 days (median value is 190), and the mean length of time for inventory stock (INV_DAYS) is 123 days (median value is 149). The average length of the operating cycle (AR_DAYS + INV_DAYS - AP_DAYS) is 75 days (median value is 175). Functional balance sheet analysis then confirms tomato processing firms' NFP dependence and consequently debt services sustainability evaluation. The income statements (Table N° 3) quantify that the average value of VP amounts to € 12,131,548; in tomato processing firms the cost of raw materials absorbs the largest part of VP (45.80%). Cost of services is 19.97% of VP, while labor cost is 15.58% of VP as the third-largest cost; EBITDA and EBIT margin are 12.62% and 9.40% of VP respectively. The income statement shows that a relevant part of intermediate profit margins EBITDA and EBIT is absorbed financial charge, where balance of financial operation (SF) absorbs 4.56% of VP (i.e., 36.15% of EBITDA and 48.54% of EBIT). Net profit (P^{pT}) is € 340,825 on average (2.81% of VP).

The financial statement for firms' sample expresses in particular the cash flow absorption in the FA investment cycle. CF is 377.09% of PROFIT, and the average cash absorption of the NWC cycle amounts to € 170.701 (i.e., 50.08% of PROFIT), following that average OCF € 1.114.520 (327.01% of PROFIT). FA investment determines a positive UFCF for 150.60 % of PROFIT. In 195 out of 250 cases is UFCF > 0 and is UFCF > SF in 112 out of 250 cases, where it is not possible to have NFP reimbursement. The FCFE mean value is € 40.170 (median value is € 10.190) and is then FCFE > 0 in 112 out of 250 cases.

Table 2
Balance sheet data of tomato processing sample firms (2009/2013) reclassification of the balance sheet with functional approach

Values	Mean values (€)	Mean values (%)	Median Values (€)	Standard Dev.	Skewness	Kurtosis
FA	7.190.295	50,69%	2.622.949	9,987,971	1.53	0.71
NWC	6.993.961	49,31%	5.124.574	7,484,247	2.19	5.48
NIC	**14.184.256**	**100,00%**	**6.363.061**	**16,446,688**	**1.67**	**1.45**
E^T	2.428.674	17,12%	987.304	3,185,645	1.85	2.18
NFP	11.755.582	82,88%	5.613.352	13,792,314	1.87	2.56
E^T+NFP	**14.184.256**	**100,00%**	**6.363.061**	**16,446,688**	**1.67**	**1.45**

Source: own calculations

Table 3
Income statement data of tomato processing sample firms (2009/2013)
Reclassification of the income statement with value added approach

Values	Mean values (€)	Mean values (%)	Median values (€)	Standard Deviation	Skewness	Kurtosis
VP	12,131,548	100.00%	9,802,556	3,112,105	1.15	0.72
M	-5,556,003	-45.80%	-4,236,110	1,245,556	1.12	1.31
S	-2,422,189	-19.97%	-1,977,409	504,109	0.71	1.44
R	-331,248	-2.73%	-215,193	120,58	0.87	3.12
L	-1,889,709	-15.58%	-1,630,450	329,027	1.01	2.01
O	-401320	-3.31%	-332,409	658,819	0.94	3.44
EBITDA	**1531079**	**12.62%**	**1,410,985**	**190,715**	**0.32**	**2.10**
D	-334,905	-2.76%	-331,105	15,665	0.32	2.93
A	-56,025	-0.46%	-45,001	11,409	0.91	2.30
EBIT	**1140149**	**9.40%**	**1,034,879**	**125,019**	**0.93**	**2.11**
SF	-553,466	-4.56%	-516,608	61,955	0.81	2.54
R	1203	0.01%	533	788	1.02	2.10
X	-45.022	-0.37%	-12,002	32,019	1.44	2.9
P^{aT}	**542864**	**4.47%**	**506,802**	**44,015**	**0.67**	**2.07**
T	-202,039	-1.67%	-199,806	5,004	0.22	3.08
$P^{pT\ (PROFIT)}$	**340825**	**2.81%**	**306,996**	**46,228**	**0.44**	**3.04**

Source: own calculations

Table 4
Financial statement of the tomato processing sample firms (2009/2013)

Values	Mean values (€)	Mean values (%)	Median values (€)	Standard Deviation	Skewness	Kurtosis
$P^{pT\ (PROFIT)}$	340,825	100.00%	306,996	442,011	0.25	1.07
+ D	334,905	98.26%	331105	102,33	0.11	2.28
+ A	56,025	16.44%	45,001	13,609	0.51	2.31
+ SF	553,466	162.39%	516,608	45,306	0.54	3.07
CF	**1,285,221**	**377.09%**	**1,199,710**	**106,209**	**0.39**	**2.12**
- / + $DWCi^{a}$	-109,995	-32.27%	-84,550	25,06	0.65	1.93
- / + $DWCar^{a}$	-45,621	-13.39%	-13,206	30,208	2.19	6.81
- / + $DWCo^{a}$	-11,446	-3.36%	-9,008	3,609	0.67	4.11
DWC^{aT}	**-167,062**	-49.02%	**-106,764**	**67,009**	**0.75**	**3.82**
+ / - $DWCap^{s}$	-14,665	-4.30%	-10,003	5,137	0.85	3.45
+ / - $DWCo^{s}$	11,026	3.24%	1,621	13,002	3.12	3.04
DWC^{sT}	**-3,639**	**-1.07%**	**-8,382**	**5,003**	**-0.75**	**5.11**
DNWC	**-170,701**	**-50.08%**	**-115,146**	**603,112**	**1.37**	**5.30**
OCF	**1,114,520**	**327.01%**	**1,084,564**	**25,195**	**0.11**	**3.11**
- / + DFA	-601,224	-176.40%	-549,169	65,337	0.37	2.59
UFCF	**513,296**	**150.60%**	**535,395**	**21,098**	**-0.64**	**2.61**
- SF	-553,466	-162.39%	-545,585	10,336	0.09	2.17
FCFE	**-40,170**	**-11.79%**	**-10,190**	**30,114**	**2.11**	**2.03**

Source: own calculations

The analysis of financial statements (Table N° 4) highlights some typical management characteristics of firms in the tomato food processing sector. The research particularly highlights that: 1) the dynamics of FA absorb a significant amount of liquidity generated by operations (OCF) as expressed by UFCF values; 2) UFCFs are not able, on average, to cope with the balance of financial operation (SF); 3) FCFE mean and median values are negative, thus highlighting the impossibility of dividend distribution and give NFP repayment.

3.3. COMPARISON OF INCOME AND FINANCIAL MARGINS

Intermediate income margins EBITDA and EBIT results are higher than financial margins OCF and UFCF, respectively, considering both mean and median values. It is EBITDA > 0 in 241 cases, EBIT > 0 in 223 cases, CF > 0 in 249 cases, while OCF > 0 in 195 cases and UFCF > 0 in 179 cases. P^{PT} (PROFIT) also has a value higher than FCFE; PROFIT is positive in 155 cases out of 250, while FCFE is positive only in 90 cases out of 250. The application of intermediate margins EBITDA and EBIT could overestimate the cash flow available, particularly if OCF and UFCF are considered the relevant financial flows (UFCF and OCF). The analysis thus highlights a remarkable difference between income and financial margins. In particular, FA investment absorbs a substantial amount of the liquidity of the sample firms as it is expressed by the median values of CF (€ 1.199.710), OCF (€ 1.084.564), and UFCF (€ 535.395). Meanwhile EBITDA (€ 1.410.985) and EBIT (€ 1.034.879) have median values higher then financial margins, and this shows a shift in the relationship between income and financial cycle; particularly in the FA investment cycle, as expressed by the median values of PROFIT and FCEE, which are € 306.996 and € -10.190, respectively. Income margin analysis could then give a distorted assessment of financial flows availability, given that even in the case of positive accounting remuneration of equity capital, sample firms are unable to generate cash flows available for equity holders. In order to analyze the relation between analyzed values, we first have to test the normality of the distribution by applying the Kolmogorov-Smirnov D (KSD) statistic for both, income and financial flow. The KSD evidences the non-normality of distributions for all considered ratios as expressed by several researches (McLeav, 1982; Barnes,1982; Ezzamel, Brodie & Mar-Molinero, 1987). Even considering the largely reduced number of observations, we apply a nonparametric approach to correlation (Spearman's r). The analysis (Table N° 5) shows significant correlations between income margins and financial margins, with high significance (1.00%), particularly for EBITDA and EBIT margins as income values and CF and OCF as financial values. FA capital absorption for investment cycle makes UFCF statistically different from all other margins, both calculated with income and financial approaches. Again, the correlations between FCFE and other margins are not statistically significant.

To verify differences for mean values, a nonparametric approach such as the Wilcoxon statistic (Wilcoxon Matched-Pairs Signed-Ranks Test) for paired samples is applied, given the non-normality of the margin distributions. The analysis performs 7 comparisons, 3 of which are between EBITDA and financial margins (CF, OCF and UFCF), 3 between EBITDA and financial margins again (CF, OCF and UFCF), and 1 between PROFIT and FCFE. Pair wise comparisons show that in comparisons between EBITDA / OCF, EBITDA / UFCF, EBIT / UFCF, and PROFIT / FCFE we can reject the null hypothesis of equality between means with a two-sided test with significance at 1.00%. In comparisons between EBIT / CF we can reject the null hypothesis of equality between means with a two-sided test with significance at 5.00%. In comparisons between EBITDA / CF and EBIT / CF, we cannot reject the null hypothesis of equality between means with a two-sided test.

The analysis shows that income and financial margins are different even if they often correlated in the sample. EBITDA and EBIT are not statistically different from CF margins. In particular, tomato processing firms show absorption in the FA cycle; even the NWC cycle improves capital requirements, and this is particularly due to high average time in collecting commercial credits, particularly from large retail chains. In the tomato processing industry, management that considers only income margins could assume wrong decisions, particularly about firms' cycle sustainability and availability of cash in dividend distribution. In fact, research shows that firms, even if characterized by positive profit, may not be able to pay dividends, given that profit is statistically higher than FCFE.

Table 5
Correlation income and financial margins - nonparametric approach (Spearman's r)

		EBITDA	EBIT	PROFIT	CF	OCF	UFCF	FCFE
EBITDA	Corr. r Spearman	**1.000**	**.912****	**.771****	**.912****	**.962****	**.021**	**.024**
	Sig. (2-code)		.000	.000	.000	.000	.881	.887
	N		250	250	250	250	250	250
EBIT	Corr. r Spearman	**.912****	**1.000**	**.811****	**.929****	**.851****	**.231**	**.249**
	Sig. (2-code)	.000		.000	.000	.000	.193	.167
	N	250		250	250	250	250	250
P^{PT}	Corr. r Spearman	**.771****	**.811****	**1.000**	**.891****	**.877****	**.255**	**.122**
	Sig. (2-code)	.000	.000		.000	.000	.160	.476
	N	250	250		250	250	250	250
CF	Corr. r Spearman	**.912****	**.929****	**.891****	**1.000**	**.901****	**.201**	**.151**
	Sig. (2-code)	.000	.000	.000	.	.000	.301	.412
	N	250	250	250		250	250	250
OCF	Corr. r Spearman	**.962****	**.851****	**.877****	**.901****	**1.000**	**.250**	**.210**
	Sig. (2-code)	.000	.000	.000	.000		.166	.214
	N	250	250	250	250		250	250
UFCF	Corr. r Spearman	**.021**	**.231**	**.255**	**.201**	**.250**	**1.000**	**.125**
	Sig. (2-code)	.881	.193	.160	.301	.166		.470
	N	250	250	250	250	250		270
FCFE	Corr. r Spearman	**.024**	**.249**	**.122**	**.151**	**.210**	**.125**	**1.000**
	Sig. (2-code)	.887	.167	.476	.412	.214	.470	
	N	250	250	250	250	250	270	

(**) Test is significant at the 0.01 level (two-tailed)
(*) Test is significant at the 0.05 level (two-tailed)
Source: own calculations

Table 6
Comparison of income and financial margins nonparametric approach for paired samples (T-Wilcoxon)

Couple	T-Wilcoxon for paired sample stat.	T-Wilcoxon for paired sample stand. stat.	Observ.	Sig. (2-tailed)
Couple 1 EBITDA - CF	95	2.001	250	.125
Couple 2 EBITDA - OCF	47	3.375	250	.001**
Couple 3 EBITDA - UFCF	12	5.774	250	.000**
Couple 4 EBIT - CF	51	2.775	250	.044*
Couple 5 EBIT - OCF	175	-1.950	250	.143
Couple 6 EBIT - UFCF	15	3.441	250	.000**
Couple 7 PROFIT - FCFE	9	4.090	250	.000**

(**) Test is significant at the 0.01 level (two-tailed)
(*) Test is significant at the 0.05 level (two-tailed)
Source: own calculations

3.4. ICRS COMPARISON

A financial sustainability evaluation of the cost of debt needs ICRs application, particularly in preventing financial crisis. Again, banks could usefully apply ICRs to assess the creditworthiness of firms in the sector, even in the current state of reduced bank lending. Specifically, financial flow analysis shows that tomato processing firms considered in the sample may have difficulty paying interest on financial debt. Income margins, in fact, approximate liquidity creation where financial margins directly express the financial amount available to pay the cost of debt before distribution of dividends. It is then necessary to calculate ICRs applying both, an income approach (ICR_1, which is EBITDA-based, and ICR_2, which is EBIT-based) and a financial approach (ICR_3, ICR_4, and ICR_5, which are CF, OCF, and UFCF-based, respectively). ICRs with an income approach, taking EBITDA and EBIT as the numerator (ICR_1 and ICR_2), have average values of 2.77 and 2.06, respectively. ICRs calculated with a financial approach (CF, OCF, and UFCF-based) are ICR_3, ICR_4, and ICR_5 with average values 2.32, 2.01 and 0.93, respectively. The comparison of the significant differences between ICRs, calculated with both income and financial approaches, using the Wilcoxon statistic (Wilcoxon Matched-Pairs Signed-Ranks Test) for paired samples (Table N° 7), rejects the null hypothesis of equality between mean with a two-sided test with significance at 1.00% (with the exception of couples' 1 and 5 comparison). Only for the comparisons between ICR_1 and ICR_3 and between ICR_2 and ICR_4 does the analysis show equality between mean values, expressing that an EBITDA-based ICR could correctly approximate a CF-based ICR and an EBIT-based ICR could correctly approximate an OCF-based ICR.

ICRs analysis shows that sustainability assessment applying an income-based ICRs approach could give incorrect results, even if these ICRs are the most frequently applied by firms and banks. In particular, no one income-based ICR could correctly approximate a UFCF-based ICR, and in tomato processing firms this latest approach is particularly useful given the FA investment capital absorption, as highlighted by the cash flow statement analysis. The analysis then shows that it could be preferable to apply financial-based ICRs, particularly for tomato processing firms, to correctly express the firm's capacity to pay the cost of debt considering the financial resources actually available, even considering investment in FA.

3.5. REGRESSION ANALYSIS

Given the results of income and financial margins, the analysis will therefore identify determinants of income (PROFIT) and cash flow (FCFE) margins available for equity holders. We have applied a regression analysis to quantify the causal relationship between a variable to be explained (the dependent variable) and a set of explanatory variables (independent

Table 7
Comparison of ICRs with income and financial approach nonparametric approach for paired samples (T-Wilcoxon)

Couple	T-Wilcoxon for paired sample stat.	T-Wilcoxon for paired sample stand. stat.	Observation	Sig. (2-tailed)
Couple 1 $ICR_1 - ICR_3$	101	2.211	250	.133
Couple 2 $ICR_1 - ICR_4$	56	3.224	250	.005**
Couple 3 $ICR_1 - ICR_5$	12	5.955	250	.000**
Couple 4 $ICR_2 - ICR_3$	55	2.770	250	.043*
Couple 5 $ICR_2 - ICR_4$	188	-1.870	250	.151
Couple 6 $ICR_2 - ICR_5$	10	3.661	250	.000**

(**) Test is significant at the 0.01 level (two-tailed)
(*) Test is significant at the 0.05 level (two-tailed)
Source: own calculations

variables); the analysis has the aim of showing which variables are the determinants' income and financial flows. We firstly analyze relations between financial return on equity capital for a given period *t* (FOE_t), and given independent variables. To achieve this goal we consider the explanatory capacity of a linear regression model (financial model) as expressed in equation (17), where FOE_t is the financial return available for equity holders, as an independent variable for a given time (t). The idea underlying the financial model is to explain actual FOE (at a given time, *t*) with a set of explanatory variables that express capital intensity (TO, SIZE), working capital cycle duration (INV_DAYS, AR_DAYS, AP_DAYS), debt level (DER, NFP_E), operative profitability (ROS), actual income margins (EBIT, EBITDA, and PROFIT), and their respective values considered at *t-1* ($EBIT_{t-1}$, $EBITDA_{t-1}$, and $PROFIT_{t-1}$), even considering actual financial margins (CF, OCF, and UFCF) and their respective values considered at *t-1* (CF_t, OCF_t, and $UFCF_t$). In the financial model, the constant term is a, TO is turnover (VP / invested capital), INV_DAYS is the duration in days of the cycle of the inventories in stock, AR_DAYS is the duration in days of the average extension to customers, AP_DAYS is the duration in days of the average extension from suppliers, DER is debt-to-equity ratio (D/E), NFP_E is net financial position to equity ratio (NFP/E), and SIZE is the amount of capital invested in euro (total assets). The model then considers EBITDA, EBIT, and PROFIT as explanatory variables, considered in values for years *t* and *t-1* ($EBITDA_t$ and $EBITDA_{t-1}$, $EBIT_t$ and $EBIT_{t-1}$, and $PROFIT_t$ and $PROFIT_{t-1}$). Financial margins CF, OCF, and UFCF are considered explanatory variables and taking in account their values for years *t* and *t-1*; thus, there are six explanatory variables (CF_t and CF_{t-1}, OCF_t and OCF_{t-1}, and $UFCF_t$ and $UFCF_{t-1}$). The model is:

$$FOE_t = \alpha + \beta_1 TO + \beta_2 INV\_DAYS + \beta_3 AR\_DAYS + \beta_4 AP\_DAYS + \beta_5 DER + \beta_6 NFP\_E + \beta_7 SIZE + \beta_8 ROS + \beta_9 EBITDA_t + \beta_{10} EBIT_t + \beta_{11} PROFIT_t + \beta_{12} EBITDA_{t-1} + \beta_{13} EBIT_{t-1} + \beta_{14} PROFIT_{t-1} + \beta_{15} CF_t + \beta_{16} OCF_t + \beta_{17} UFCF_t + \beta_{18} CF_{t-1} + \beta_{19} OCF_{t-1} + \beta_{20} UFCF_{t-1} + \varepsilon \quad (17)$$

The financial model, as expressed in regression equation (17), is analyzed in Table N° 8 and assumes a significant statistical capacity to explain FOE_t values. The F statistic has high significance ($F = 0.000$). R^2 is 0.965, while adjusted R^2 has a value of 0.962. The model is then useful in explaining the greater part of FOE_t variability. The DW statistic is 2.052, and the majority of the variables are significant. First, TO has a positive effect on FOE values, expressing that an increase in turnover –that is a decrease in the capital-intensive structure of assets– increases the FCFE value. Explanatory variables of FOE generation are values that express working capital (WC) cycle durations. Particularly, INV_DAYS and AR_DAYS have a negative sign, where an increase in WC durations has a negative effect on the FOE result, with a decrease available cash flow. AP_DAYS has a positive sign on the FOE, expressing an opposite situation. DER has a positive sign on the FOE, given that debt increasing generates cash, while an increase in financial debt (NFP_E) has an effect on increasing interest charges, thus reducing cash flow available. Income and financial margins at a given time, t, have an effect on FOE at the same time, t (particularly $PROFIT_t$ and $UFCF_t$). Income and financial margins at *t-1* have a limited effect on FOE, with the exception of variables $PROFIT_{t-1}$ and $UFCF_{t-1}$ with a relation significant only at the 0.05 level (two-tailed).

The second considered regression model (income model) analyzes the relation between the return on equity capital for a given period, *t* (ROE_t); that is, the amount of PROFIT available for equity holders, and a set of independent variables, the same considered in the financial regression model, as expressed in the methodological part of the article. In the income regression model, the constant term is a, TO is turnover (VP / invested capital), INV_DAYS is the duration in days of the cycle of the inventories in stock, AR_DAYS is the duration in days of the average extension to customers, AP_DAYS is the duration in days of the average extension from suppliers, DER is debt-to-equity ratio (D/E), NFP_E is net financial position to equity ratio (NFP/E), and SIZE is the amount of the capital invested in euro (total assets). The model then considers EBITDA and EBIT as explanatory variables, considered in values for the years *t* and *t-1* ($EBITDA_t$ and $EBITDA_{t-1}$, $EBIT_t$). PROFIT is not considered as an explanatory variable, as it is

Table 8
Extract of the multiple regression model that shows the impact on FOEt of independent variables – Financial model, equation (17)

Model	Unstandardized coefficient		Standardized coefficient	T	Sig.
	B	Std. error	Beta		
(Constant)	-.1152	.031	-	6.77	.000***
TO	.2121	.055	.121	6.620	.000***
INV_DAYS	379.855	176.719	-0,056	-2,149	.032*
AR_DAYS	-531.100	323.366	-0,029	-2,13	,034*
AP_DAYS	751.002	406.990	0,04	2.029	.045*
DER	-.0268	.102	-.185	2.866	.006**
NFP_E	.1842	.029	.432	-7.221	.000***
SIZE	.0122	.302	.071	2.081	.040*
ROS	.1439	.071	.767	11.033	.000**
$EBITDA_t$	.1152	.069	.149	1.602	.107
$EBIT_t$	.2100	.032	.140	2.320	.028*
$PROFIT_t$	.0899	.021	.125	4.755	.000***
$EBITDA_{t-1}$	.0798	.019	.101	.832	.230
$EBIT_{t-1}$	.1215	.033	.034	.490	.551
$PROFIT_{t-1}$	.1253	.121	.059	2.109	.040*
CF_t	.1802	.067	.803	1.121	.190
OCF_t	.1309	.021	.132	2.319	.028*
$UFCF_t$	.1002	.014	.119	4.701	.000***
CF_{t-1}	.0903	.020	.112	1.362	.171
OCF_{t-1}	.0451	.029	.060	1.809	.070
$UFCF_{t-1}$	. 5023	.167	.599	2.312	.029*

Notes: Financial model, equation (17). Dependent variable: FOEt
(***) The relation is significant at the 0.001 level (2-tailed)
(**) The relation is significant at the 0.01 level (2-tailed)
(*) The relation is significant at the 0.05 level (2-tailed)

Source: own calculations

part of the ROE equation. Financial margins CF, OCF, UFCF, and FCFE are considered explanatory variables in their values for years *t* and *t-1*, giving then another eight explanatory variables (CF_t and $CF_{t»1}$, OCF_t and $OCF_{t»1}$, $UFCF_t$ and $UFCF_{t»1}$, and $FCFE_t$ and $FCEF_{t»1}$). In the income model, the set of explanatory variables is the same as in equation (17), with the exception of FCFE instead of PROFIT. We express the income model as follows:

$$(18)\quad ROE_t = \alpha + \beta_1 TO + \beta_2 INV\_DAYS + \beta_3 AR\_DAYS + \beta_4 AP\_DAYS + \beta_5 DER + \beta_6 NFP\_E + \beta_7 SIZE + \beta_8 ROS + \beta_9 EBITDA_t + \beta_{10} EBIT_t + \beta_{11} EBITDA_{t-1} + \beta_{12} EBIT_{t-1} + \beta_{13} CF_t + \beta_{14} OCF_t + \beta_{15} UFCF_t + \beta_{16} FCFE_t + \beta_{17} CF_{t-1} + \beta_{18} OCF_{t-1} + \beta_{19} UFCF_{t-1} + \beta_{19} FCFE_{t-1} + \varepsilon$$

The income regression model as expressed in equation (18) has a significant statistical capacity to explain FOE_t values, as exposed in Table N° 9. The F statistic has high significance (F = 0.000);R^2 is 0.885, while adjusted R^2 has a value of 0.882; and statistic DW is 2.121. The income model is even able to explain a large part of the variability of ROE_t although with less magnitude than the financial model. TO has a positive effect on ROE values (as in SIZE), as that increase in turnover has a positive effect on the PROFIT value. ROE generation is even affected by values expressing the duration of the working capital (WC) cycle: INV_DAYS and AR_DAYS have a positive sign, expressing that an increase in WC durations has a positive effect on the ROE result, even if this causes a decrease in cash available.

Table 9
Extract of the multiple regression model that shows the impact on ROE_t of independent variables – Second model, equation (18)

Model	Unstandardized coefficient		Standardized coefficient	T	Sig.
	B	Std. error	Beta		
(Constant)	-.0981	.032	-	6.520	.000***
TO	.1886	.052	.111	6.020	.000***
INV_DAYS	302.332	151.331	0,061	2,375	.019*
AR_DAYS	125.698	120.098	0,027	4,112	.000**
AP_DAYS	520.054	355.199	0,41	7.310	.000**
DER	.0301	.220	.203	1.445	.139
NFP_E	.2102	.039	.405	1.712	.081
SIZE	.1978	.335	.067	3.459	.002**
ROS	.1538	.098	.805	11.009	.000**
$EBITDA_t$	.1165	.081	.213	2.612	.009*
$EBIT_t$	.2159	.085	.250	3.564	.001**
$EBITDA_{t-1}$	.1035	.010	.018	.953	.324
$EBIT_{t-1}$	.0660	.016	.050	2.060	.041*
CF_t	.1559	.043	.651	1.322	.187
OCF_t	.3567	.049	.135	.988	.324
$UFCF_t$	.0909	.018	.121	4.559	.000***
$FCFE_t$	.1019	.329	.150	4.349	.000***
CF_{t-1}	.0839	.028	.009	.070	.944
OCF_{t-1}	.0449	.071	.048	.260	.795
$UFCF_{t-1}$	. 0879	.229	.052	.361	.715
$FCFE_{t-1}$	.1139	.141	.055	3.560	.001**

Notes: Income model, equation (18). Dependent variable: ROE_t
(***) The relation is significant at the 0.001 level (2-tailed)
(**) The relation is significant at the 0.01 level (2-tailed)
(*) The relation is significant at the 0.05 level (2-tailed)
Source: own calculations

AP_DAYS is not even as statistically significant DER and NFP_E are.

Obviously, ROS is particularly important in increasing the ROE value, just as EBIT and EBITDA are at a given time *t*. Income and financial margins at a given time *t* also have an effect on ROE (particularly $EBITDA_t$ and $EBIT_t$ and even $UFCF_t$ and $FCFE_t$), while in the financial model, income and financial margins at *t-1* time (with the exception of $EBIT_{t-1}$ and $FCFE_{t-1}$) have a limited effect on ROE.

4. CONCLUSIONS

Analysis shows that tomato processing firms have characteristics of production and investment that affect capital structure and need to assess business cycle sustainability. The research data highlights that tomato processing firms require large amounts of capital to finance FA investments, such as buildings, plants, and equipment for tomato processing and NWC, particularly for inventories, including finished goods, and accounts receivable. Sample data gives relevant correlations between income and financial margins, even if it is possible to note statistically significant differences, particularly between economic margins, UFCF and FCFE. The analysis then highlights that profit margins could not be applied to correctly approximate financial margins as is frequently done in bank analyses and firms' evaluation. About this topic, it is necessary to note the importance to purpose financial statements that, despite its importance, is not available in 36 of the 50 firms in the sample. Financial data analysis shows that sample firms often have difficulty in paying interest charges

and in distributing dividends as expressed by UFCF and FCFE values, respectively, and this is true even in the case of positive profit. About this topic, research data conduct a sustainability evaluation by applying traditional ICRs, calculated with an income approach (ICR_1, ICR_2); the analysis shows that income ICRs have higher values than financial ICRs (ICR_3, ICR_4, ICR_5) and then ICR_1, ICR_2 could overestimate firms' capacities to pay interest charges. Financial ICRs could then be applied with higher significance, expressing more correctly the firm's capacity to pay the cost of debt. ICRs –as tested in the research– may give better information to the firm's owner to assess the management cycle's sustainability, and could even be usefully applied by credit institutions that could assess more accurately creditworthiness of firms. At the end, the research even highlights that tomato firms' management could assume wrong decisions if they only consider economic data. In fact, research highlights that tomato firms, even if characterized by positive profit, may not be able to pay dividends. A multiple regression model approach was applied, suggesting a useful approach to measure tomato processing firms' management that could be applied to other agro-food sectors, particularly if characterized by high capital intensity, then considering long term return of equity capital. The obtained results could then be applied by policy makers, operating with aid policies in favor of the tomato sector, even in the case of subsidiary guarantees issued by credit unions to improve the sustainability of the business cycle. In fact, a better understanding of the financial sustainability of a public-aided firm could improve efficient use of collective resources even considering the probability of default.

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