

Full Length Research Paper

Financial and income approach analysis in micro (MEs) and small / medium sized enterprises (SMEs): A comparative approach in fruit and vegetables processing industry in Italy

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The aim of the research is to evaluate the differences between economic and financial results in a sample of micro enterprises (MEs) and small / medium sized enterprises (SMEs) in fruit and vegetables processing industry in Italy. The firms included in the sample operate in an industry characterized by high capital intensity; this character is caused by the length of working capital cycle and high level of fixed asset investment. These characteristics of the firms can amplify the differences in economic and financial management results. In order to offer a comparison in applying economic and financial approaches, especially useful for agro-food firms operating in a capital intensive sector, in the article are calculated 12 ratios, of which 7 are sustainability ratios (calculated 3 with economic approach and 4 with financial approach) and 5 are interest coverage ratios (calculated 2 with economic approach and 3 with financial approach). The article highlights that economic and financial approach has statistically different result in the firm's sample. Considering the significant differences in economic approach and financial approach, the firms could incur in error, and it will be necessary to identify which of the 2 approaches provides the correct indication of sustainability. The way of analysis proposed in the article can then be used to analyze firms operating in other agro-food sectors, especially if characterized by high capital intensity, high capital investment in fixed assets, long production cycle and long time debt collection.

Key words: Firm cycle sustainability, economic and financial approach, interest coverage ratio, fruit and vegetables processing industry.

INTRODUCTION

The evaluation of an investment has the aim to quantify the return on equity capital (Lagerkvist and Andersson, 1996). The return on capital has to be not only positive, in terms of profit and even in terms of intermediate income margins, but also higher than the opportunity cost of

capital invested, considering the return on alternative investments, given the risk (Damodaran, 1994; Francis et al. 2004; Lettau and Ludvigson 2005). The evaluation of these conditions could be verified considering economic or financial approaches; the first approach compares

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revenues and costs applying the accrual approach, taking into account the value creation, as expressed by accounting data, in order to quantify profit. The second approach considers the cash inflow and outflow, calculated on a cash basis, to express the cash flow available to manage the firms and available for equity holders, to be paid as dividends. The economic and the financial approach may have different results, as expressed by several researchers (Bowen and Owen, 1986; Dechow 1994; Iotti and Bonazzi, 2012). Income margins, such as EBITDA, EBIT and PROFIT, even applied in cover ratio covenants (Dothan, 2006; Gray et al., 2006), do not directly express the liquidity generated by firm management; it could be possible to have situations of unsustainable financial cycle, even when the accrual results are positive. In these cases, the firm could suffer a default situation for non-financial sustainability of the management cycle as expressed in several studies about fixed asset cycle (Fazzari and Petersen, 1993; Cleary, 1999; De Miguel and Pindado, 2001) and working capital cycle (Howorth and Westhead, 2003; Padachi, 2006; Taylor, 2011). The usefulness to compare economic and financial approach is a central topic especially in the management of micro enterprises (MEs) and small and medium sized enterprises (SMEs); in these companies, an error in the assessment of business cycle sustainability can cause default because these firms normally have an access to bank loans and equity market worst than large companies. For this purpose, the article analyzes the economic and financial results in a sample of MEs and SMEs operating in the processing industry of fruit and vegetables in Italy. Fruit and vegetables processing firms are characterized by high capital absorption in the cycle of fixed assets and in the working capital cycle; this is due to processing of raw fruit and vegetables that often requires high investments in plant and machinery and also determines the absorption of capital, particularly caused by long time collection of accounts receivable. Capital requirements primarily determines an increasing in sources of capital (equity or debt), potentially leading to increase borrowing costs, and also determines a time lag between the economic cycle and financial cycle, so the sector appears interesting in applying a survey about economic and financial approaches to firm's cycle sustainability. Moreover, the high capital requirements level is also caused by the slow accounts receivable turnovers caused by sales that firms often do to large companies. The firms of the sector, in fact, are generally characterized by market difficulties; the great distribution firms (large retailers), purchasing large volumes of production, are often able to influence the market price of the finished product. The sales to large retailer firms leads to a dilation of the times of collection of accounts receivable with negative effects on the financial sustainability of the business cycle; long delay in credit payments by retailers often causes an increasing in working capital requirements. The problem of absorption

of working capital management is a central theme for the majority of businesses in the fruit and vegetables processing industry in the Mediterranean basin, both for companies in Europe (Spain, France, Italy, Greece, Turkey) and for African firms (Morocco, Algeria, Tunisia, Libya, Egypt). Therefore, it is necessary to make an assessment of sustainability of the cycle of working capital verifying the differences between PROFIT and cash flow in firm's sample data. In the article, the aim is to assess whether there are statistically significant differences in economic and financial results of firms in the sample; these results are expressed in terms of economic margins (EBITDA, EBIT and PROFIT), and in terms of financial results as cash flow (CF), operating cash flow (OCF), unlevered free cash flow (UFCF) and free cash flow to equity (FCFE). In the article we also consider coverage ratios calculated considering a traditional approach (economic approach), even suggesting an innovative approach (financial approach), as exposed in the methodological section of the article. In fact, in case of significant differences in economic approach and financial approach, the firm using only 1 of 2 approaches to evaluate could incur in error, and it will be necessary to identify which of the 2 approaches provides the correct indication of sustainability. The article is organized as follows: First it exposed the methodology applied to analyze the principles considered for economic and financial approaches, with a review of the literature having the aim to express the role of economic and financial analysis to evaluate the firm's cycle sustainability. It is then presented the sample of firms and its characteristics in terms of economic and financial data; moreover we verify if there was a significant difference between economic and financial results in the firm data. The analysis is developed as follows:

1. Calculation of sustainability ratios according to financial and economic approach; these ratios compare income and financial margins to total assets invested, for each firm; for these ratios, the results are compared between MEs and SMEs.
2. Calculation of interest coverage ratios (ICRs) according to economic and financial approach; these ratios compare income and financial margins with the cost of debt in the sample for each firm and the results are compared between MEs and SMEs.

The conclusions of the work, the limits of the analysis and the possible development of future research are then presented at the end of the article.

LITERATURE REVIEW

The differences in firm's results, applying economic or financial approaches, could be caused by lags between

economic and financial cycle, as several studies have shown (Grenberg et al., 1986; Kwon, 1989; Dechow, 1994; Dechow and Dichev, 2002; Russell, 2009; Iotti and Bonazzi, 2013). This situation occurs particularly in firms in which we note high levels of capital absorption (Glancey, 1998; Kieschnick et al., 2008; Bonazzi et al., 2012) or, as in MEs and SMEs, that have limited access to equity and debt capital market and present default rates higher than large companies (Grablowsky, 1976; Dunn and Cheatham, 1993; Peel and Wilson, 1996; Molina and Preeve, 2009). The manager that use only one of these two approaches to evaluate firm's cycle sustainability incur in error, and it could be necessary to identify which approach provides the correct indication of sustainability. The Financial Accounting Standards Board (FASB) (1978) indicates in the "Objectives of Financial Reporting by Business Enterprises", issue, SFAC 1st, that the fundamental purpose of accounting information, considering an accrual approach, is to predict future cash flows. In fact, equity holders evaluate their advantage considering PROFIT distribution as dividends, so future cash flows are essential to assess the firm's capacity to share dividends. The information based on a cash flows approach has its practical applications considering the limits of a traditional accounting system that is based on the principles of historical cost and accrual basis value analysis. The importance to analyze operating cash flows, in comparison with accounting values, is exposed by several studies; between these it is conducted the forecast of stock exchange value analysis by Rayburn (1986), Wilson (1986, 1987), Sloan (1996), Wang and Eichenseher (1998), Charitou and Panagitodes (1999), Finger (1994), Hussain and Al Attar (2003); these studies consider the firms capacity to generate future cash flow in comparison with accrual results. Due the importance of information based on operating financial cycle to assess the firm's sustainability, many researchers were involved to verify the FASB's assertion expressing that the last earnings could provide a better base to estimate future operating cash flow than last cash flows. This assertion was criticized by Finger (1994), Krishnan and Largay (2000), Al-Attar and Hussain (2008) but was confirmed by other researchers such as Rayburn (1986), Murdoch and Krause (1989, 1990). Moreover, during time, it is possible to note a changing in the definition of cash flow applied, even varying among researchers; a first definition express cash flow as the account result (PROFIT or EBITDA) plus depreciations and amortizations, as in Beaver et al. (1966), Ball and Brown (1968); other researchers, as Gombola et al. (1987), start to express cash flow considering working capital liquidity absorption of cash as variations in accounts payable and accounts receivable, inventories and other voices of working capital; this field of research was followed by Wilson (1986, 1987), Rayburn (1986), Finger (1994), Lorek and Willinger (1996), Boisjoly (2009). Others as Livnat and Zarowin (1990), Dechow et al. (1988), consider the SFAS

n. 95 (Statements of Financial Accounting Standards) issue to quantify operating cash-flow.

MATERIALS AND METHODS

The evaluation of firm's cycle sustainability is issued applying ratios and margins. The ratios express relative quantities as relationships between values. These values can be economic or financial, depending on the type of approach applied. Economic ratios assess the sustainability considering economic values as numerator of the ratios like earnings before interest, tax, depreciation and amortization (EBITDA) or earnings before interest and tax (EBIT). These ratios are able to give an approximate evaluation of sustainability of the business cycle, correlating income margin values, as numerator, with values that express debt or debt service in the denominator. The numerator values are, in fact, intermediate income margins calculated according to accrual approach then only approximating cash flow availability. The article tries to assess the financial sustainability even considering financial values as numerator of the ratios: Cash flow (CF), operating cash flow (OCF), unlevered free cash flow (UFCF), and free cash flow to equity (FCFE). These ratios are useful to assess the sustainability of the business cycle comparing financial values (numerator) with values expressing debt or debt service (denominator).

Ratios analysis with economic approach

To evaluate the firm's performance, an accounting base of values generally accepted is the annual account of the company; this accounting document quantifies economic and financial firm's performance and consists of income statement and balance sheet. Income statement quantifies the annual profit available for equity holders, with regard to positive and negative voices of income, on an accrual basis (accounting methods). The profit analysis is a value based approach that does not consider cash inflow or outflow. Considering an economic (income) approach, in the article are applied the following ratios to express the firm's capacity to generate income:

$$S_1 = \text{EBITDA} / \text{TA} ; S_2 = \text{EBIT} / \text{TA} ; S_3 = \Pi / \text{TA} \quad (1)$$

Where EBITDA is earning before interest, tax, depreciation and amortization, EBIT is earning before interest and tax, Π is PROFIT, TA is total asset. To calculate S_1 , S_2 and S_3 , we quantify the value of production (VP), for a generic time t , as:

$$\sum_{i=1}^I p_{t,i} q_{t,i} + \left(\sum_{f=1}^F I_{t,f} v_{t,f} - \sum_{g=1}^G I_{t-1,g} v_{t-1,g} \right) = S_t + (I_t - I_{t-1}) = S_t + \Delta I_{t-1} = \text{VP}_t \quad (2)$$

In (2), $p_{t,i}$ is price per unit, at time t , of goods and services sold in number that is $I : I \geq 1$, q_t is quantity sold, $I_{t,f}$ and $I_{t-1,f}$ are inventories, in number $F : F \geq 1$ and $G : G \geq 1$, respectively at time t e $t-1$. These good are valued at their respective value per unit that is v ; S_t is total sales at time t , then ΔI_{t-1} expresses the variation in inventories value between time $t-1$ and time t . We have that inventories in income statement and in balance sheet are equal so it is that $I_t = \text{WC}_t^a$ and $I_{t-1} = \text{WC}_{t-1}^a$, where WC_t^a is working capital inventories asset, at a given time ($t-1$ and t respectively). The value of production (VP) is a flow value (Dechow and Dichev, 2002) namely a value that is in formation during a period, in this case t , without considering value assumed during time $T \in [t-1, t]$. Operative costs in a given time t are:

$$M_t = \sum_{m=1}^M m_{t,m} q_{t,m} ; S_t = \sum_{s=1}^S s_{t,s} q_{t,s} ; R_t = \sum_{r=1}^R r_{t,r} q_{t,r} ; L_t = \sum_{l=1}^L l_{t,l} q_{t,l} ; O_t = \sum_{o=1}^O o_{t,o} q_{t,o} \quad (3)$$

Where M_t are cost for raw materials, S_t cost for services, R_t cost for rent and leasing, L_t labor cost, O_t other operative cost. In (3) $m_{t,m}$, $s_{t,s}$, $r_{t,r}$, $l_{t,l}$, $o_{t,o}$, express, for a given time t , the single voices of costs, so we have $M : M \geq 1$, $S : S \geq 1$, $R : R \geq 1$, $L : L \geq 1$, $O : O \geq 1$ with their respective quantity $q_{t,m}$, $q_{t,s}$, $q_{t,r}$, $q_{t,l}$, $q_{t,o}$. The operative, cost without financial effect, are:

$$D_t = \sum_{d=1}^D d_{t,d} q_{t,d} ; A_t = \sum_{a=1}^A a_{t,a} q_{t,a} \quad (4)$$

Where D_t are amortizations of fixed assets (FA_t), A_t are depreciation. In (4) $d_{t,d}$ and $a_{t,a}$ are the cost per unit, at time t , of amortizations and depreciation; these cost are respectively in number that is $D : D \geq 1$ e $A : A \geq 1$. The respective quantity are $q_{t,d}$ and $q_{t,a}$. The net financial income is:

$$SF_t = I_t^a - I_t^p + (I_t^{ac} - I_t^{pc}) \quad (5)$$

Where I_t^a are interest income at time t , I_t^p are interest expense at time t , $(I_t^{ac} - I_t^{pc})$ is balance of revenues and costs deriving from currency exchange rate. The income deriving from extraordinary operations (SX_t), at time t , is:

$$SX_t = X_t^a - X_t^p \quad (6)$$

In (6) X_t^a are extraordinary income and X_t^p are extraordinary expense. The balance of the management revaluations and devaluation of financial assets is given, at time t , as:

$$SZ_t = Z_t^a - Z_t^p \quad (7)$$

In (7) Z_t^a are revaluations of financial activities, Z_t^p devaluation of financial activities. Hence, at time t , it is:

$$VP_t - (M_t + S_t + R_t + L_t + O_t) = EBITDA_t ; EBITDA_t - (D_t + A_t) = EBIT_t ; \quad (8)$$

$$EBIT_t + SF_t + SX_t + SZ_t = \Pi_t^{aT}$$

In Equation (8) EBITDA approximates the creation of liquidity, net of non-monetary costs ($D_t + A_t$), while it has not this capacity about the value of production, considering monetary (S_t) and non monetary values ($\Delta I_{t,t-1}$); EBIT is an income margin that express operative income; Π_t^{aT} is profit before taxes and profit after taxes is given (Π_t^{pT}) as:

$$\Pi_t^{aT} - T_t^Y = \Pi_t^{pT} \quad (9)$$

In Equation (9) Π_t^{pT} (PROFIT) expresses the firm's capacity to remunerate, at time t , the equity capital; T_t^Y are income taxes.

Ratios analysis with financial approach

In the annual account, the balance sheet expresses investment and source of capital; in a given period t , we can express balance sheet

as follows:

$$FA_t + WCI_t^a + WCar_t^a + WCo_t^a + L_t = E_t^c + E_t^s + \Pi_t^{pT} + WCap_t^s + WCo_t^s + DF_t^{M<12} + DF_t^{M>12} \quad (10)$$

In Equation (10), first member, the investments are given by FA as fixed assets, WCI^a as working capital inventories, $WCar^a$ as working capital accounts receivable, WCo^a as other voices of investment in working capital, L is financial liquidity. In equation (10), second member, the sources of capital are given by E^c that is share capital, E^s is reserves, Π^{pT} is PROFIT after taxes, $WCap^s$ is working capital accounts payable, WCo^s is other voices of capital source in working capital, $DF^{M<12}$ are financial debts expiring within 12 months and $DF^{M>12}$ are financial debts expiring over 12 months; considering that is $E_t^c + E_t^s + \Pi_t^{pT} = E_t^T$ where E_t^T is equity, we can also express (10) as follows:

$$TA_t = E_t^T + D_t^T \quad (11)$$

The first member of (11) represents capital invested in the firm at time (TA), as total asset t , the second member represents source of capital as the sum of equity (E^T) and debt (D^T), and we can express as follows: $E^T + D^T = TS$, where TS is total source of capital. The net investment in working capital (NWC), as net working capital, expresses the absorption of financial resources as a result of the cycle of buying, processing and selling products, as follows:

$$(WCI_t^a + WCar_t^a + WCo_t^a) - (WCap_t^s + WCo_t^s) = WC_t^{aT} - WC_t^{sT} = NWC_t \quad (12)$$

In Equation (12) WC^{aT} is investment in working capital (active), WC^{sT} is source of working capital (passive), NWC is net working capital, expressing the amount of net resources generated ($NWC < 0$) or absorbed ($NWC > 0$) by working capital cycle (Love et al., 2007). $NWC > 0$ expresses a "working capital conservative policy" (Weinraub and Visscher, 1998). Several studies (Kargar and Blumenthal, 1994; Hill et al., 2010) express that $|WC^{aT} - WC^{sT}| \Rightarrow NWC > 0$. A policy in which $NWC < 0$ is called "aggressive management of working capital" (Grablowsky, 1984; Weinraub and Visscher, 1998), this situation is considered risky, as it has been shown (Hill et al., 2010) that $NWC > 0$ is inversely related to risk of default. If $NWC > 0$ we can express (1) as follows:

$$FA_t + NWC_t + L_t = E_t^T + DF_t^{M<12} + DF_t^{M>12} \quad (13)$$

To analyze the cycle of cash flow creation, we have to consider the financial statement that is the table applied to quantify cash flow generated in firm's management; to prepare the financial statements are applied (Wallace et al., 1997; Francis and Schier, 1999) two approaches. The direct method (Dechow and Dichev, 2002; Chittenden et al., 1998; Almeida et al., 2004) considers the revenues and costs as determinants of cash flow (CF) only if they have a financial impact; otherwise the indirect method (depth in studies of Carroll and Griffith, 2001) quantifies the net cash amount generated by firm's management starting the analysis from an income margin (generally EBIT or PROFIT). Researchers have long discussed on which is the better method to express cash flows, as exposed in Krishnan and Largay (2000). In this article, according to the most part of the available data for the firm's sample, we apply the indirect method, that is:

$$\begin{aligned} \Pi_t^{pT} + (D_t + A_t) - (I_t^a - I_t^p) &= CF_t ; \\ CF_t - (WCI_t^a - WCI_{t-1}^a) - (WCar_t^a - WCar_{t-1}^a) - (WCo_t^a - WCo_{t-1}^a) + (WCap_t^s - WCap_{t-1}^s) + \\ + (WCo_t^s - WCo_{t-1}^s) &= OCF_t ; \\ OCF_t - (FA_t - FA_{t-1}) - (D_t + A_t) &= UFCF_t ; \\ UFCF_t + (I_t^a - I_t^p) &= FCFE_t \end{aligned} \quad (14)$$

In (14), at time t , Π^{PT} is PROFIT after taxes, D is depreciation, A is amortization, I^a is interest income, I^p is interest charge, CF is cash flow, OCF is operating cash flow, $UFCF$ is unlevered free cash flow, $FCFE$ is free cash flow to equity. Various researchers (Beaver, 1966; Deakin, 1972; Sartoris, 1983; Kim et al., 1998) consider that, for a given time t , CF expresses self-financing potential capacity. To express OCF (Klammer and Reed, 1990; Kochanek and Norgaard, 1998; Deloof 2003) we calculate as follows:

$$\begin{aligned} & CF_t - (WC_t^a - WC_{t-1}^a) - (WCar_t^a - WCar_{t-1}^a) - (WCo_t^a - WCo_{t-1}^a) + (WCap_t^a - WCap_{t-1}^a) + \\ & + (WCo_t^i - WCo_{t-1}^i) = CF_t - (WC_t^a - WC_{t-1}^a) + (WC_t^i - WC_{t-1}^i) = CF_t - (NWC_t - NWC_{t-1}) = \\ & = CF_t - \Delta NWC_{t,t-1} = OCF_t \end{aligned} \quad (15)$$

Where $\Delta NWC_{t,t-1}$ expresses the net working capital variation between time $t-1$ and time t . It is to note that $\Delta^+ NWC_{t,t-1} \Rightarrow \Delta^- OCF_t$ so that an increase in net working capital involves an increase of liquidity absorption that reduces the amount of cash available (OCF); vice versa, in case of negative variation ($\Delta^- NWC_{t,t-1} \Rightarrow \Delta^+ OCF_t$) we can note an increasing in OCF available. Even more, we have to consider that an increase in inventories is a positive voice of income but determines a reduction of financial liquidity (OCF) due to absorption of capital, and vice versa. Considering this relations, firms with positive profit, determined by an increase of inventories, record a reduction of self-financing capacity of opposite sign and equal absolute value:

$$\Delta^\pm (WC_t^a - WC_{t-1}^a) \Rightarrow \Delta^\mp OCF_{t,t-1} \quad \text{that is} \\ |\Delta^\pm (WC_t^a - WC_{t-1}^a)| = |\Delta^\mp OCF_{t,t-1}|. \quad \text{In this way,}$$

considering that OCF expresses the changes in cash resulting from the cycle of working capital; several researchers (Takahashi et al., 1984; Casey and Bartczak, 1985; Gombola et al., 1987, Charitou and Vafeas, 1997; Hill et al., 2010) consider OCF a more expressive liquidity margin because could express better free cash flow creation, considering net working capital absorption. Given OCF , and considering the absorption of liquidity due to investment, we can calculate unlevered free cash flow ($UFCF$) as follows: $[(FA_t - FA_{t-1}) - (D_t + A_t)] > 0 \Rightarrow \Delta^+ UFCF_{t,t-1}$ and vice versa, where FA is investment fixed asset. $UFCF$ is therefore the cash flow available, given the investments in fixed assets, at a time t , to remunerate financial debts and equity capital; this is done through the payment of interest expenses on financial debts (I^p) and the distribution of dividends to holders of equity capital. In a given period t , $FCFE_t$ represents the cash flow available for dividends distribution to equity holders and for the discretionary reduction of financial debt. In order to quantify the firm's capacity to create liquidity, in the article are then applied sustainability ratios with financial approach:

$$S_4 = CF/TA ; S_5 = OCF/TA ; S_6 = UFCF/TA ; S_7 = FCFE/TA \quad (16)$$

Interest coverage ratios (ICRs)

In the article are considered additional 5 ratios, numbered from S_8 to S_{12} , that express the ability of firms to pay interest on loans. These ratios are interest coverage ratios (ICRs) calculated considering economic and financial approach. According to economic approach, it is possible to express sustainability in terms of earnings before interest and taxes (EBIT) and / or in terms of earnings before interest, taxes, depreciation, and amortization (EBITDA); applying a financial approach, we can express the interest coverage ratios in terms of cash flow (CF) and / or operating cash flow (OCF) and / or unlevered free cash flow ($UFCF$); the importance of these ratio were expressed by several researchers, as in Leland (1994, 1998) where it is shown that an interest coverage ratio covenant could reduce asset volatility when

covenants are costly to enforce. The covenants considered in bank loan agreements (Gray et al., 2006) are leverage and current ratio, moreover interest coverage ratios are also frequently used, expressing EBIT and / or EBITDA to interest expense ratio. Rarely ICRs are expressed considering OCF or $UFCF$ as numerator, even if it could be a more correct way to calculate the ratio. For the purposes of calculating the sustainability of the management cycle, are often considered ratios that express the capacity of intermediate income margins to pay the cost of financial debt and repay principal; these ratios are qualified as ICR with economic approach and are expressed as follows:

$$S_8 = EBITDA/I_t^p ; S_9 = EBIT/I_t^p \quad (17)$$

S_8 (ICR_1) and S_9 (ICR_2) express firm's capacity to pay interest in a given time t with EBITDA and EBIT respectively, as income margins (Goldstein et al., 2001; Dothan, 2006). S_8 considers a more conservative approach to sustainability assessment because $(D_t + A_t) \geq 0 \Rightarrow EBITDA_t \geq EBIT_t \Rightarrow S_8 \geq S_9$. If $I_t^p = 0$ the ratio S_8 and S_9 calculus loses significance for the absence of cost of debt. In the work are even applied:

$$S_{10} = CF/I_t^p ; S_{11} = OCF/I_t^p ; S_{12} = UFCF/I_t^p \quad (18)$$

S_{10} (ICR_3), S_{11} (ICR_4), and S_{12} (ICR_5) express the possibility of the company to pay the cost of debt, in a given period t , using financial flow (CF , OCF and $UFCF$) that directly express the liquidity generated by the firm's cycle; these ratios are qualified as interest coverage ratio with financial approach. The importance of ICRs is considered in several researches (Leland, 1994, 1998) where it is highlighted that interest coverage ratio covenants could reduce asset volatility. Frequently, this type of covenants are applied in bank loan agreements (Gray et al., 2006), as leverage and current ratio; ICRs are frequently used expressing an EBIT or EBITDA to interest expense ratio, having an earnings based approach, as expressed in different studies (Dichev and Skinner, 2002; Demerjian, 2011). In fact, the banks usually include the minimum interest coverage ratio (ICR) that the firm must achieve in the term sheet for financing; the text of the covenants that defines the minimum ICR are frequently expressed in terms of earnings before interest and taxes (EBIT) and/or in terms of earnings before interest, taxes, depreciation, and amortization (EBITDA). In the course of article we compare ICR with economic approach and financial approach to assess if there are statistically significant differences.

RESULTS

The research plan

Data analysis was conducted on a sample of 216 firms operating in fruit and vegetables processing industry in Italy. The data was made available free of charge by analisaziendale IT company was randomly drawn from the annual accounts in the AIDA database considering 2006 as base year; the data extraction covers the 5-years period from 2006 to 2011 and uses the annual accounts filed by limited companies each year at the Registrar of Companies. In the analysis, a total of 1,080 year-firms have been considered. All the firms considered in the sample are micro (MEs) and small/medium sized

Table 1. Descriptive statistics.

Ratio	N	Mean median		S.Dev.	Kurtosis skewness	
	Stat	Stat	Stat	Stat	Stat	Stat
S ₁ EBITDA/TA	1,080	0.1933	0.1652	9.273	0.581	0.904
S ₂ EBIT/TA	1,080	0.1436	0.1147	-2.005	0.565	0.861
S ₃ PROFIT/TA	1,080	0.2087	0.0946	9.048	3.532	9.794
S ₄ CF/TA	1,080	0.0860	0.1140	-1.802	-1.742	2.031
S ₅ OCF/TA	1,080	0.0408	0.0402	.672	0.157	0.855
S ₆ UFCF/TA	1,080	0.0135	0.0093	-2.860	-0.172	0.182
S ₇ FCFE/TA	1,080	-0.0868	-0.0520	-2.638	-2.944	17.452
S ₈ EBITDA/I ^p	1,080	11.2874	3.6573	-2.297	4.473	74.170
S ₉ EBIT/I ^p	1,080	8.6803	2.5077	-0.450	6.068	59.077
S ₁₀ CF/I ^p	1,080	5.4973	2.2018	-2.649	7.722	74.954
S ₁₁ OCF/I ^p	1,080	2.3629	0.8118	3.959	5.767	82.980
S ₁₂ UFCF/I ^p	1,080	.4445	0.1952	1.283	6.353	40.461

(SMEs) enterprises. We define MEs as firms with turnover under 2 million Euro per year, and SMEs are firms with turnover between 2 and 50 million Euro per year. Firms with more of 50 million Euro turnover per year are not considered in the research. MEs and SMEs analysis in the sector could be interesting because these firm's size is characterized by important character: first, MEs and SMEs represent the vast majority of firms number in the sector and, moreover, MEs and SMEs are provided by a large part of the public policies aid in Italy. Data analysis was performed using the statistical package SPSS, issue 19.

Descriptive statistics

The research first considers the analysis of parametric data considered relevant in the sample of firms. We consider EBITDA, EBIT and PROFIT (income margins), and CF, OCF, UFCF, FCFE (financial margins). The analysis conducted during the research, as expressed in the introduction, include the calculation of the following ratios:

1. Sustainability ratios with economic approach (ratios from S₁ to S₃) and financial approach (ratios from S₄ to S₉); these ratios are calculated for all firms in the sample.
2. Interest coverage ratios (ICRs) calculated in accordance with the economic approach (ratios S₈ and S₉) and financial approach (ratios S₁₀ and S₁₁).

The descriptive statistics (Table 1) show that the margins are characterized by asymmetry, as expressed by kurtosis and skewness values. In particular, S₃ and S₇ are characterized by higher level of skewness, expressing the volatility of net income and net financial results for equity holders.

We verify the normality of the distribution of income and financial margins applying the Kolmogorov-Smirnov D statistic, having evidence of the not normality of distribution for all considered ratios (Table 2).

Correlation analysis

The correlation calculated with parametric approach, using the Pearson statistic (Table 3), shows significant correlations. EBITDA is highly correlated with EBIT and PROFIT, as income margins, and even with OCF, UFCF and FCFE; at the same time, EBIT is highly correlated with PROFIT, OCF, UFCF and FCFE. It is interesting to consider that PROFIT is not correlated with OCF and UFCF, while is highly correlated with FCFE, expressing that a measure of the economic result, as PROFIT, has a relation with a financial measure available for equity holders, as is FCFE. CF has a positive correlations only with OCF and UFCF, while has a negative correlation with PROFIT, expressing that this financial margin is not able to approximate the most part of income and financial margins. OFC has correlations with EBITDA, EBIT, CF, UFCF and FCFE, while it has no correlation with PROFIT; at the same time, UFCF has correlations with EBITDA, EBIT, CF, OCF, while it has no correlation with PROFIT and FCFE. FCFE has correlations with EBITDA, EBIT, PROFIT, while it has no correlation with CF and UFCF. In general, the correlations between CF / UFCF and other margins are weaker and not statistically significant, even expressing cases of negative correlations.

Considering the result of Kolmogorov-Smirnov D statistic, it could be useful to apply also a non parametric approach of correlation (Spearman ρ). The data (Table 4) confirm the results of the parametric correlation between margins: We can note an increasing in some statistical

Table 2. Kolmogorov-Smirnov D statistic on normality of distribution.

Ratio	Null hypothesis (H ₀)	Sign.	Decision
S ₁ EBITDA/TA	Distribution is normal with mean 0.1933 and S.D. 0.1652	0.000**	Reject null hypothesis
S ₂ EBIT/TA	Distribution is normal with mean 0.1436 and S.D. 0.1147	0.000**	Reject null hypothesis
S ₃ PROFIT/TA	Distribution is normal with mean 0.2087 and S.D. 0.0946	0.000**	Reject null hypothesis
S ₄ CF/TA	Distribution is normal with mean 0.0860 and S.D. 0.1140	0.001**	Reject null hypothesis
S ₅ OCF/TA	Distribution is normal with mean 0.0408 and S.D. 0.0402	0.002*	Reject null hypothesis
S ₆ UFCF/TA	Distribution is normal with mean 0.0135 and S.D. 0.0093	0.000**	Reject null hypothesis
S ₇ FCFE/TA	Distribution is normal with mean -0.0868 and S.D. -0.0520	0.003*	Reject null hypothesis
S ₈ EBITDA/I ^P	Distribution is normal with mean 11.2874 and S.D. 3.6573	0.000**	Reject null hypothesis
S ₉ EBIT/I ^P	Distribution is normal with mean 8.6803 and S.D. 2.5077	0.000**	Reject null hypothesis
S ₁₀ CF/I ^P	Distribution is normal with mean 5.4973 and S.D. 2.2018	0.000**	Reject null hypothesis
S ₁₁ OCF/I ^P	Distribution is normal with mean 2.3629 and S.D. 0.8118	0.000**	Reject null hypothesis
S ₁₂ UFCF/I ^P	Distribution is normal with mean 0.4445 and S.D. 0.1952	0.000**	Reject null hypothesis

**Test is significant at the 0.01 level (2-tailed); *Test is significant at the 0.05 level (2-tailed).

Table 3. Correlation between income and financial margins - parametric approach (Corr. Pearson).

		S ₁ EBITDA/TA	S ₂ EBIT/TA	S ₃ PROFIT/TA	S ₄ CF/TA	S ₅ OCF/TA	S ₆ UFCF/TA	S ₇ FCFE/TA
S ₁ EBITDA/TA	Corr. Pearson	1	0.986**	0.075*	0.046	0.506**	0.172**	0.104**
	Sig. (2-tailed)		0.000	0.014	0.135	0.000	0.000	0.001
	N. 1,080							
S ₂ EBIT/TA	Corr. Pearson	0.986**	1	0.075*	0.040	0.497**	0.169**	0.107**
	Sig. (2-tailed)	0.000		0.014	0.192	0.000	0.000	0.000
	N. 1,080							
S ₃ PROFIT/TA	Corr. Pearson	0.075*	0.075*	1	-0.086**	0.036	-0.027	0.075*
	Sig. (2-tailed)	0.014	0.014		0.005	0.231	0.374	0.014
	N. 1,080							
S ₄ CF/TA	Corr. Pearson	0.046	0.040	-0.086**	1	0.101**	0.338**	0.005
	Sig. (2-tailed)	0.135	0.192	0.005		0.001	0.000	0.879
	N. 1,080							
S ₅ OCF/TA	Corr. Pearson	0.506**	0.497**	0.036	0.101**	1	0.089*	0.218**
	Sig. (2-tailed)	0.000	0.000	0.231	0.001		0.000	0.000
	N. 1,080							
S ₆ UFCF/TA	Corr. Pearson	0.172**	0.169**	-0.027	0.338**	0.089*	1	-0.017
	Sig. (2-tailed)	0.000	0.000	0.374	0.000	0.000		0.583
	N. 1,080							
S ₇ FCFE/TA	Corr. Pearson	0.104**	0.107**	0.075*	0.005	0.218**	-0.017	1
	Sig. (2-tailed)	0.001	0.000	0.014	0.879	0.000	0.583	
	N. 1,080							

**The correlation is significant at the 0.01 level (2-tailed); *the correlation is significant at the 0.05 level (2-tailed).

significance of the correlations. Income margins (EBITDA and EBIT) have non parametric correlations with PROFIT and cash flow margin while relations are weaker in the cases of CF and UFCF with others margin. Analyzing the

data in absolute values, intermediate income margins (EBITDA / TA and EBIT / TA) and PROFIT / TA have more positive values (in 963, 861 and 748 observations respectively) compare to financial margins, respectively

Table 4. Correlation between income and financial margins - non parametric approach (Spearman's ρ).

		S₁ EBITDA/TA	S₂ EBIT/TA	S₃ PROFIT/TA	S₄ CF/TA	S₅ OCF/TA	S₆ UFCF/TA	S₇ FCFE/TA
S₁ EBITDA/TA	Spearman ρ Sig. (2-tailed) N. 1,080	1	0.979**	0.311*	0.348**	0.551**	0.295**	0.188**
S₂ EBIT/TA	Corr. Pearson Sig. (2- tailed) N. 1,080	0.979**	1	0.306**	0.336**	0.538**	0.282**	0.391**
S₃ PROFIT/TA	Corr. Pearson Sig. (2- tailed) N. 1,080	0.311*	0.306**	1	0.115	0.305	0.121	0.202*
S₄ CF/TA	Corr. Pearson Sig. (2- tailed) N. 1,080	0.348**	0.336**	0.115	1	0.376**	0.308**	-0.016
S₅ OCF/TA	Corr. Pearson Sig. (2- tailed) N. 1,080	0.551**	0.538**	0.305	0.376**	1	0.322**	0.181**
S₆ UFCF/TA	Corr. Pearson Sig. (2- tailed) N. 1,080	0.295**	0.282**	0.121	0.308**	0.322**	1	-0.068
S₇ FCFE/TA	Corr. Pearson Sig. (2- tailed) N. 1,080	0.188**	0.391**	0.202*	-0.016	0.181**	-0.068	1

**The correlation is significant at the 0.01 level (2-tailed); *the correlation is significant at the 0.05 level (2-tailed).

with 827 (CF / TA), 720 (OCF / TA), 581 (UFCF / TA) and 320 (FCFE / TA) positive observations.

Comparison of mean and median of values

In addition to the analysis of correlation between values, it is necessary to determine whether the values of the parameters are statistically significant different. This analysis determines whether the computational approaches (economic and financial) are significantly different, applying comparisons of values. The analysis is firstly conducted with parametric approach, using the Student's t statistic (t-Student) for paired samples to compare the results of different margins. The analysis tests the following 12 null hypotheses: H₁: the S₁ and S₄ ratios have equal means (medians) in the firm's sample; H₂: the S₁ and S₅ ratios have equal means (medians) in the firm's sample; H₃: the S₁ and S₆ ratios have equal means (medians) in the firm's sample; H₄: the S₁ and S₇ ratios have equal means (medians) in the firm's sample; H₅: the S₂ and S₄ ratios have equal means (medians) in the firm's sample; H₆: the S₂ and S₅ ratios have equal means (medians) in the firm's sample; H₇: the S₂ and S₆

ratios have equal means (medians) in the firm's sample; H₈: the S₂ and S₇ ratios have equal means (medians) in the firm's sample; H₉: the S₃ and S₄ ratios have equal means (medians) in the firm's sample; H₁₀: the S₃ and S₅ ratios have equal means (medians) in the firm's sample; H₁₁: the S₃ and S₆ ratios have equal means (medians) in the firm's sample; H₁₂: the S₃ and S₇ ratios have equal means (medians) in the firm's sample. The comparison with parametric approach highlights that in all comparisons is possible to reject the null hypothesis of equality between means (Table 5).

It was also applied a non parametric approach, given the results of Kolmogorov-Smirnov D test (as exposed in Table 2), applying the statistic of Wilcoxon for paired samples (Wilcoxon Matched-Paired Signed Ranks Test). The comparison with non parametric approach highlights, with the exception of the comparisons in the Couple S₂ - S₄ for the ratios EBIT / TA and OCF / TA (significance .607), that in all comparisons is possible to reject the null hypothesis of equality between medians. Two-sided test has significance 1.00% in 11 comparisons: the analysis shows a significant difference between economic margins (EBITDA and EBIT) and financial margins (CF, OCF and UFCF) and confirms parametric analysis results (Table 6).

Table 5. Comparison of economic / financial margins - parametric approach for paired samples (t-Student).

Couples of value		Values and statistics					
		Mean	Standard Dev.	Mean standard error	t	df	Sig. (2-tailed)
Couple 1							0.000**
Couple 2	S ₁ – S ₅	0.15249	0.16038	0.00488	31.248	1,079	0.000**
Couple 3	S ₁ – S ₆	0.17987	0.20737	0.00631	28.505	1,079	0.000**
Couple 4	S ₁ – S ₇	0.28014	0.27275	0.00829	33.754	1,079	0.000**
Couple 5	S ₂ – S ₄	0.05763	0.25913	0.00788	7.310	1,079	0.000**
Couple 6	S ₂ – S ₅	0.10277	0.16233	0.00493	20.807	1,079	0.000**
Couple 7	S ₂ – S ₆	0.13015	0.20848	0.00634	20.516	1,079	0.000**
Couple 8	S ₂ – S ₇	0.23042	0.27288	0.00830	27.750	1,079	0.000**
Couple 9	S ₃ – S ₄	0.11423	0.74608	0.02270	5.032	1,079	0.000**
Couple 10	S ₃ – S ₅	0.15937	0.71167	0.02165	7.359	1,079	0.000**
Couple 11	S ₃ – S ₆	0.18674	0.72155	0.02195	8.505	1,079	0.000**
Couple 12	S ₃ – S ₇	0.28702	0.77672	0.02363	12.144	1,079	0.000**

**Value significant at the 0.01 level (2-tailed); *value significant at the 0.05 level (2-tailed).

Table 6. Comparison of economic / financial margins - non parametric approach for paired samples (T-Wilcoxon).

Couples of value		T-Wilcoxon for paired sample stat.	T-Wilcoxon for paired sample stand. stat.	Observ.	Sig. (2-tailed)
Couple 1	S ₁ – S ₄	4.220	8.160	1,080	0.000**
Couple 2	S ₁ – S ₅	1.032	-11.630	1,080	0.000**
Couple 3	S ₁ – S ₆	1.549	-11.062	1,080	0.000**
Couple 4	S ₁ – S ₇	971.000	11.688	1,080	0.000**
Couple 5	S ₂ – S ₄	11.245	-.515	1,080	0.607
Couple 6	S ₂ – S ₅	7.196	4.918	1,080	0.000**
Couple 7	S ₂ – S ₆	7.072	4.802	1,080	0.000**
Couple 8	S ₂ – S ₇	5.165	-6.919	1,080	0.000**
Couple 9	S ₃ – S ₄	4.342	3.443	1,080	0.000**
Couple 10	S ₃ – S ₅	6.521	5.872	1,080	0.000**
Couple 11	S ₃ – S ₆	7.454	6.294	1,080	0.000**
Couple 12	S ₃ – S ₇	8.441	6.988	1,080	0.000**

**Value significant at the 0.01 level (2-tailed); *value significant at the 0.05 level (2-tailed).

The analysis about sustainability of the cost of debt is performed calculating ICRs; this evaluation has importance for firms to prevent financial crisis as in case of firm's inability to pay the cost of debt and, at the same time, these ratios could be useful for banks to assess the creditworthiness of companies in the sector. In this analysis it is also useful to consider the current state of reduced bank lending (credit crunch) having that assessment of ICRs could offer a significant applied interest. In Italy, in the agro-food sector, credit crunch has hit in particular MEs and SMEs, that are firms involved in the sample here considered. The ICRs calculated using income approach, taking EBITDA and EBIT as numerator, then expressing ICR₁ and ICR₂, have average values 3.1225 and 2.7751, respectively; the ICRs

calculated with financial approach, with CF, OCF and UFCF as numerator (ICR₃, ICR₄ and ICR₅) have average values 2.2901, 1.6974 and 0.9182 respectively. The comparison of significance of differences between ICRs calculated with economic and financial approach was firstly calculated (Table 7) applying a parametric approach (Student's t statistic for paired samples). The analysis is articulated considering 6 comparisons, and shows that all comparisons highlight, with the exception of the comparison ICR₂ and ICR₃ (Couple S₉ - S₁₀), that it is possible to reject the null hypothesis of equality between the means applying a two-sided test, with significance 1.00%.

Given the results of Kolmogorov-Smirnov test, we also apply a non parametric approach (Table 8), considering

Table 7. Comparison of economic / financial ICRs - parametric approach for paired samples (t-Student).

Couples of value		Values and statistics					
		Mean	Standard Dev.	Mean standard error	t	df	Sig. (2-tailed)
Couple 1	S ₈ – S ₁₀	5,7901	45,1548	1,3740	4.214	1,079	0.000**
Couple 2	S ₈ – S ₁₁	8,9245	56,1130	1,7074	5.227	1,079	0.000**
Couple 3	S ₈ – S ₁₂	10,8429	79,3804	2,4154	4.489	1,079	0.000**
Couple 4	S ₉ – S ₁₀	3,1830	45,0203	1,3699	2.324	1,079	0.020*
Couple 5	S ₉ – S ₁₁	6,3174	49,6436	1,5106	4.182	1,079	0.000**
Couple 6	S ₉ – S ₁₂	8,2358	73,8156	2,2461	3.667	1,079	0.000**

**Value significant at the 0.01 level (2-tailed); *value significant at the 0.05 level (2-tailed).

Table 8. Comparison of economic / financial ICRs - non parametric approach for paired samples (T-Wilcoxon).

Couples of value		T-Wilcoxon for paired sample stat.	T-Wilcoxon for paired sample stand. stat.	Observ.	Sig. (2-tailed)
Couple 1	S ₈ – S ₁₀	6.336	5.853	1,080	.000**
Couple 2	S ₈ – S ₁₁	3.753	-8.604	1,080	.000**
Couple 3	S ₈ – S ₁₂	2.829	9.666	1,080	.000**
Couple 4	S ₉ – S ₁₀	8.389	-3.433	1,080	.001**
Couple 5	S ₉ – S ₁₁	4.535	-7.618	1,080	.000**
Couple 6	S ₉ – S ₁₂	3.833	8.485	1,080	.000**

**Value significant at the 0.01 level (2-tailed); *value significant at the 0.05 level (2-tailed).

the statistic of Wilcoxon (Wilcoxon Matched-Paired Signed Ranks Test for paired samples). The comparison in pairs with non parametric approach highlights, without exception, that in all comparisons is possible to reject the null hypothesis of equality between the means for two-sided test, with significance 1.00%.

The analysis of the ICRs shows that sustainability assessment has different results applying economic and financial ratios suggested in the article, and financial ICRs are able to express more correctly the firm's capacity to pay the cost of debt in the sector.

The regression analysis

The regression analysis aims to quantify the causal relationship between a variable to be explained (the dependent variable) and one or more explanatory variables (independent variables). Objective of the analysis is to identify the independent variables explaining the variation of the dependent variable, and their impact on dependent variable. In the article we would explain the relation between financial and economic flow; particularly, we are interested in analyze if there was a relation between a financial measure as FCFE, that express the amount of cash available for equity holders, and some independent variables. We

have developed an additive linear regression model, as follows, with two regression equations:

$$FCFE_t = \alpha + \beta_1 EBITDA_t + \beta_2 EBIT_t + \beta_3 PROFIT_t + \beta_4 EBITDA_{t-1} + \beta_5 EBIT_{t-1} + \beta_6 PROFIT_{t-1} + \varepsilon \quad (19a)$$

$$FCFE_t = \alpha + \beta_1 CF_t + \beta_2 OCF_t + \beta_3 UFCF_t + \beta_4 CF_{t-1} + \beta_5 OCF_{t-1} + \beta_6 UFCF_{t-1} + \varepsilon \quad (19b)$$

The first model, expressed in (19a), considers $FCFE_t$ as independent variable in a given time (t), which expresses the amount of cash available for equity holders. The constant term is α , EBITDA is explanatory variable considered in values for the years t and t-1 (EBITDA_t and EBITDA_{t-1} respectively), at the same time are considered explanatory variables EBIT and PROFIT, considered in their values at years t and t-1, having then other four explanatory variables (EBIT_t and EBIT_{t-1}, PROFIT_t and PROFIT_{t-1}). The idea underlying the model is that could be possible to explain actual FCFE (at a given time t) considering, as explanatory variables, the actual income margins (EBITDA, EBIT and PROFIT) and their respective values considered at time t-1 (EBITDA_t, EBIT_t and PROFIT_t). The model seeks to explain whether the intermediate income margins can be considered adequately explanatory variables of the amount of cash available for equity holders in fruit and vegetables industry. This information is important because the generation of cash flows for equity holders enables small

Table 9. Extract of the multiple regression model that shows the impact on $FCFE_t$ of economic independent variables – model 19a.

Model	Unstandardized coefficient		Standardized coefficient	T	Sig.
	B	Std. error	Beta		
(Constant)	-0.1121	0.023	-		
$EBITDA_t$	0.1299	0.014	0.122	7.011	0.000***
$EBIT_t$	0.0922	0.011	0.136	4.552	0.000***
$PROFIT_t$	0.0877	0.019	0.098	2.859	0.006**
$EBITDA_{t-1}$	0.1192	0.025	0.035	2.531	0.011*
$EBIT_{t-1}$	0.1064	0.033	0.045	2.090	0.040*
$PROFIT_{t-1}$	0.0089	0.051	0.065	1.928	0.061

19a. Dependent variable: $FCFE_t$; ***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).

Table 10. Extract of the multiple regression model that shows the impact on $FCFE_t$ of financial independent variables – model 19b.

Model	Unstandardized coefficient		Standardized coefficient	T	Sig.
	B	Std. error	Beta		
(Constant)	0.2152	0.012	-	60.225	0.000***
CF_t	0.0118	0.080	0.020	0.154	0.875
OCF_t	0.2864	0.005	0.522	30.951	0.001***
$UFCF_t$	-0.0872	0.021	-0.021	-0.859	0.402
CF_{t-1}	0.1025	0.035	0.009	0.965	0.340
OCF_{t-1}	0.4499	0.036	0.461	20.655	0.003**
$UFCF_{t-1}$	0.0122	0.090	0.022	-0.901	0.361

19b. Dependent variable: $FCFE_t$; ***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).

and medium-sized enterprises to attract capital in terms of equity, having impact in increasing the firm's average size. In addition, since these firms are often small and medium-sized, and are based on family labor, the availability of financial resources for distribution to shareholders is essential to ensure the continuity of the business, which is based precisely on the remuneration of shareholders with monetary distribution of dividends and / or their discretionary reinvestment in the firm, even ensuring to improve technical efficiency. The model (19a), analyzed in Table 9, assumes a significant statistical capacity to explain $FCFE_t$ values; F statistic for the considered model has high significance ($F = 0.000$); R^2 has value 0.833 while adjusted R^2 has the value 0.831 expressing the capacity of the model to explain the great part of the variability of $FCFE_t$; statistic DW is 2.411. In the model 19a, the coefficients of $EBITDA_t$, $EBIT_t$, $PROFIT_t$ are highly significant (0.001 level and 0.01 level); $EBITDA_{t-1}$ and $EBIT_{t-1}$ are relatively significant (significant at the 0.05 level) while $PROFIT_{t-1}$ is not statistically significant (significant at the 0.061 level). It is interesting to note that $FCFE$ is mainly influenced by

intermediate income margins of the year while intermediate income margins of previous years are less important as explanatory variables.

The second model, expressed in (19b), considers $FCFE_t$ as independent variable at a given time (t) considering, as explanatory variables, the actual financial margins (CF, OCF, and UFCF) and their respective values considered at time t-1 (CF_t , OCF_t and $UFCF_t$). This second model would explain whether the intermediate financial margins can be considered adequately explanatory variables of the amount of cash available for equity holders in fruit and vegetables industry, for the same reasons expressed before, about the first model. At the same time we would compare the results of these two models in order to quantify which model is more useful to quantify the variability of the independent variable. The model (19b), analyzed in Table 10, assumes an adequate statistical capacity to explain the performance of $FCFE_t$; F statistic has moderate significance ($F = 0.021$) while R^2 has quite moderate value that is 0.488 and adjusted R^2 has the value 0.484, expressing the capacity of the model to

explain only a part of the variability of $FCFE_t$; statistic DW is 2.004. In the 19b model, the coefficients of OCF_t and OCF_{t-1} are mostly significant (significant at the 0.001 level) while other variables (CF_t , CF_{t-1} , $UFCF_t$ and $UFCF_{t-1}$) are not significant. The model expresses that the variations of FCFE in a given time (t) are only partly influenced by intermediate financial margins and only OCF is quite accurate to express FCFE variations.

DISCUSSION

The cultivation and processing of fruit and vegetables in Italy characterizes the economy of the territories in many parts of Italy. This country is considered one of the major processing country of fruit and vegetables in the basin of the Mediterranean Sea, as some others Mediterranean countries (Spain, Morocco, Tunisia and Turkey). Italy has two main areas of production and processing of fruit and vegetables industry: the first is located in the southern regions, particularly in Sicilia, Puglia and Campania regions, while a second area includes the regions of Emilia-Romagna, Lombardia and Piemonte. The firms in the sector of fruit and vegetables processing are characterized, as is shown in the analysis, by high level of capital investment, in particular to finance investment in plant and machinery. These firms often require investments to achieve a high level of technical efficiency, and to reduce costs of production, and also to ensure food safety standards. Investment in capital equipment, however, needs to be covered with sources of capital that are retrieved with direct contribution of the entrepreneur, as equity capital, or acquiring new capital as debt. This capital requirement could cause financial difficulties, especially for small and medium-sized enterprises, which are disadvantaged in the access to capital market. In fact, small firms have difficulty in acquiring capital by banks because of opacity risk in financing relations due the limited information generally available in applying credit scoring models to SMEs; the need to deep credit analyses could cause excessive cost for banks, especially considering the return on capital loaned to SMEs, and the related risk of firm's default. At the same time, small firms do not have, in general, access to the equity capital market because of their too small size. For firms in the sector of fruit and vegetables processing industry, as considered in the article, the time lag that exists between economic cycle and financial cycle can direct to wrong strategic decisions, with the risk of default for many firms in the sector. In fact, in recent years, the processing companies of the sector have been characterized by a large number of corporate crises, which have also caused bankruptcy and liquidation. Many extraordinary restructuring plans were also performed to avoid firm's bankruptcy. In fact, in the processing of fruit and vegetables sector, many firms have suffered for an increasing in raw material costs and for the recently

increased level of competition in the market of the processed product. About this topic, it is to consider that the distribution of finished products is carried out by large retail chains; these firms use their bargaining power to impose trading prices of finished product that are unfavorable for producers, even increasing the average time of suppliers payment, as for processing firms. Many firms, often, have a low level of production differentiation and modest brand loyalty at consumer level; these strategic weaknesses is disadvantageous for bargaining power of processing firms against large retailers, having negative effects in terms of market price and delay in credit payment. All these facts could cause an increasing of the working capital absorption. It is even necessary to consider that some of the firms process only a few number of productions (for example tomato), with a concentration of production in the summer period, with use of seasonal workers in the peak of production, having maintenance, storage and marketing activities in the rest of the year. In other cases, firms conduct a multi-production strategy that includes various vegetable preserves, even considering fruit processing for juice production, also in order to reduce the seasonal nature of the agro-food activity. Given this general context, the analysis conducted in the article, expressing a comparison between Income margins and financial margins, has the aim to identify whether there are statistically significant differences between economic and financial margins in the firms of the sample, given their characterization of high liquidity absorption in the financial cycle of fixed asset and working capital. This case is particularly relevant for the sector, where the majority of firms are classified as small and medium-sized enterprises, as firms where an increase in the value of net working capital (NWC) could generated difficulties in applying to additional source of cash, because of their reduced firm's capacity to obtain bank loans. For the assessment of the sustainability of the business cycle, are frequently applied margins that consider income values as EBITDA and EBIT to approximate cash flow measure. Moreover, it is necessary to express that these margins do not consider: (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. Only in a steady state situation (no change in the extension granted and received by customers and suppliers, no variation in the average number of days of inventory, no change in turnover etc.) we have the equality, even with lag time, between income and financial margins (Bonazzi et al., 2012). About this topic, the analysis shows that margins calculated with economic approach, that are EBITDA, EBIT and PROFIT, often differ significantly from the margins calculated with financial approach (CF , OCF , $UFCF$ and $FCFE$). This shows that income margins do not adequately approximate the creation of financial liquidity generated by the management of the companies in the sector. This is especially true for $UFCF$ and $FCFE$.

In particular, the values of FCFE are very low due to the high level of debt that companies in the sector reach for financial investments in fixed assets. In addition, sector's firms have often a high level of PROFIT, but this values cannot be distributed to equity holders due to lack of financial liquidity; in fact, firms in the sample have often positive PROFIT (748 cases), while only a limited number of cases of positive FCFE (320), which means that in 428 cases firms are not able to distribute PROFITS to shareholders due to lack of cash available. The ICRs suggested and applied in work showed, again, significant differences compare to traditionally applied ICRs, that have an income approach; the suggested ratios could then be usefully applied by managers and financial institutions, as banks, for the assessment of affordability and sustainability of the business cycle. In fact, the research shows that, in the firm's sample, ICRs with financial approach are lower than ICRs with economic approach and then it is necessary to consider this fact in case of companies ability evaluation to repay debts. In fact, the sustainability assessments carried out with economic approach have an overestimation of the ability of companies to serve debt, thus providing distorted information to the manager of the company. The analysis shows the usefulness of considering cash flow statement's data to evaluate the sustainability cycle, especially if this is related to financing operations; with the cash flow statement approach, it could be possible to take management decision considering data that correctly express financial sustainability of the business cycle. The article shows that EBITDA and others PROFIT margin, traditionally applied to approximate the cash generated from operations, are not adequate for this purpose. In particular, the analysis shows absorption of capital by NWC having that EBITDA is significantly higher than OCF and, likewise, we have a significant absorption of liquidity in investment in fixed asset (FA). The analysis confirms that companies in the fruit and vegetables processing sector are characterized by difficulties in debt service payment: the median value of $UFCF / TA$ (+ 0.0093) is lower than I / TA (+ 0.0426), expressing the inability of firms to cover debt service. At the same time, the analysis in the sample shows a shift between income cycle and financial cycle: median value of $PROFIT / TA$ is + 0.0946 while median value of $FCFE / TA$ is - 0.0520. The analysis of PROFIT then generates distorted information for equity holders, because firms in the sample, although characterized by accounting remuneration, are unable to generate cash flows available to distribute dividends. The analysis of the proposed regression models shows a better interpretations capacity applying the first model (19a) to explain FCFE results; the model expresses that could be possible to quantify actual FCFE, for a given time (t), having as explanatory variables actual income margins ($EBITDA_t$, $EBIT_t$ and $PROFIT_t$) and their respective values considered at time t-1 ($EBITDA_{t-1}$, $EBIT_{t-1}$ and

$PROFIT_t$). The model is able to confirm that intermediate income margins are explanatory variables of the cash amount available for equity holders, in fruit and vegetables industry. In the first model, the coefficients of $EBITDA_t$, $EBIT_t$, $PROFIT_t$ are mostly significant and $EBITDA_{t-1}$, $EBIT_{t-1}$ are relatively significant while $PROFIT_{t-1}$ is not statistically significant. The second model (19b) considers $FCFE_t$ as independent variable at a given time (t) proposing, as explanatory variables, the actual financial margins (CF, OCF, and UFCF) and their respective values, considered at time t-1 (CF_t , OCF_t and $UFCF_t$). The second model has a worst statistical capacity to explain the performance of $FCFE_t$ even if the coefficients OCF_t and OCF_{t-1} are mostly significant (significant at the 0.001 level) while other variables (CF_t , CF_{t-1} , $UFCF_t$ and $UFCF_{t-1}$) are not significant, considering a 0.05 level. It is then possible to express that variations of FCFE in a given time (t) are partly influenced by intermediate financial margins in which only OCF is useful to express FCFE variations. This result allows defining a guideline for managers having the aim to estimate cash flows for shareholders (FCFE) in the sector of fruit and vegetables processing industry.

Conclusion

The analysis in the article, applied to a sample of firms operating in the fruit and vegetables processing industry in Italy, shows that firms in the sample are characterized by high capital absorption in working capital and fixed assets cycle. In the article are calculated intermediate income margins (EBITDA, EBIT and PROFIT, in relations with TA) of the firm's sample; these margins are compare to financial margins (CF, OCF, UFCF, FCFE, in relations with TA). The article shows that there are significant differences between economic and financial margins, and these differences have effect on firm's cycle sustainability. The analysis shows even significant correlation between economic and financial margins; moreover, there are differences in the margins value, thus expressing that the application of economic margins to management decisions could give distorted information. This situation is also present in the calculation of the ICRs. The results are particularly relevant in the sample of firms in the processing of fruit and vegetables that has been analyzed: in fact the firms in the sample require large amounts of capital, in terms of equity capital and / or debt, to finance investment in fixed asset (buildings, plant and equipment for processing) and working capital (inventories, including finished goods, and accounts receivable). In view of the high absorption of capital due to investment and working capital cycle, and due to the high level of debt, it is necessary to assess the sustainability of the business cycle, particularly considering debt payment capacity. The article shows that the suggested ICRs, calculated with financial

approach, are statistically different compared to traditional ICRs used in banking covenants and, often, for the calculation of the firm's rating, that are calculated applying income approach. These ratios can be applied also by policy makers, in public intervention actions, to support firms, including credit union actions, to assess financial strength of companies that could receive public aid, thus limiting the risk of inefficient use of public funds. The data analysis of regression models have shown that not only the economic margins, at time t , but also economic margins, at time $t-1$, are illustrative of the cash flows available for equity holders (FCFE) at time t . This information is also useful for banks, as the financial flow FCFE assumes that is already paid debt service, therefore providing correct information to firm's manager. The research can moreover constitute a base for other empirical research, and in this way it could be possible to test the validity of our conclusions, applying the applied methodology to different sector of the agro-food system, especially in industry characterized by financial constraints, long period of working capital cycle, and high level of capital absorption.

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REFERENCES

- Bonazzi G, Iotti M, Paduano F (2012). Valutazioni di convenienza e di sostenibilità per le imprese del comparto del Prosciutto di Parma Dop: un'analisi attraverso l'applicazione di incidi economici e finanziari, *Rivista di Economia Agraria*, 67:2.
- Bowen RM, Owen O (1986). Evidence on the Relationships Between Various Earnings Measures of Cash Flow, *Accounting Review*, 61(4):713-725.
- Casey C, Bartczak N (1985). Using Operating Cash Flow Data to Predict Financial Distress: Some Extensions. *J. Account.* pp.146-160.
- Carroll C, Griffith JM (2001). Free Cash Flow, Leverage, and Investment Opportunities. *Q. J. Bus. Econ.* 3:27-51.
- Charitou A, Vafeas N (1997). The association between operating cash flows and dividend changes: an empirical investigation. *Akron Bus. Econ. Rev.* pp. 25-49.
- Charitou A, Panagitodes G (1999). Financial analysis, future earnings and cash flows and the prediction of stocks returns: evidence for the UK. *Account. Bus. Res.* pp. 29-41.
- Chittenden F, Poutziouris P, Michaelas N (1998). Financial Management and Working Capital Practices in UK SMEs, Manchester. *Manch. Bus. School.*
- Cleary S (1999). The Relationship between Firm Investment and Financial Status. *J. Financ. LIV*, Pp.673-692.
- Damodaran A (1994). *Damodaran on Valuation Security Analysis for Investment and Corporate Finance*, John Wiley Sons, New York.
- Deakin E (1972). A Discriminant Analysis of Predictors of Business Failure. *J. Account. Res.* pp. 167-179.
- Demerjian P (2011). Accounting Standards and Debt Covenants: Has the "Balance Sheet Approach" Led to a Decline in the Use of Balance Sheet Covenants?, *J. Account. Econ. LII*, pp. 101-158.
- De Miguel A, Pindado J (2001). Determinants of Capital Structure: New Evidence from Spanish Panel Data. *J. Corp. Financ.* 7:77-99.
- Dechow PM (1994). Accounting Earnings and Cash Flow as Measures of Firm Performance: the Role of Accounting Accruals. *J. Account. Econ.* 18:3-42.
- Dechow PM, Dichev L (2002). The Quality of Accruals and Earnings, the Role of Accruals Estimation Errors. *Account. Rev.* 77: 35-59.
- Deloof D (2003). Does Working Capital Management Affect Profitability of Belgian Firms?, *J. Bus. Financ. Account.* 30: 573-587.
- Dichev I, Skinner D (2002). Large-Sample Evidence on the Debt Covenant Hypothesis. *J. Account. Res.* 40:1091-1123.
- Dothan M (2006). Costs of Financial Distress and Interest Coverage Ratios. *J. Financ. Res.* 29(2):147-162.
- Dunn P, Cheatham L (1993). Fundamentals of Small Business Financial Management for Start-up, Survival, Growth, and Changing Economic Circumstances. *Manage. Financ.* 19:1-13.
- Fazzari S, Petersen B (1993). Working Capital and Fixed Investment: New Evidence on Financing Constraints, *Rand J. Econ.* 24:328-342.
- FINANCIAL ACCOUNTING STANDARD BOARD (1978). Objectives of Financial Reporting by Business Enterprises Statement of Financial Accounting Concepts, N°1.
- Finger CA (1994). The ability of earnings to predict future earnings and cash flows. *J. Account. Res.* pp. 210-223.
- Francis J, Schier K (1999). Have Financial Statements Lost Their Relevance?, *J. Account. Res.* 37:319-352.
- Francis J, LaFond R, Olsson PM, Schier K (2004). Cost of Equity and Earnings Attribute, *Account. Rev.* 84:967-1010.
- Glancey K (1998). Determinants of Growth and Profitability in Small Entrepreneurial Firms. *Intl. J. Entrepreneurial Behav. Res.* 4:18-27.
- Goldstein R, Ju N, Leland H (2001). An EBIT-Based Model of Dynamic Capital Structure. *J. Bus.* 74:483-512.
- Gombola MJ, Haskin JE, Ketz, JE, Williams DD (1987). Cash flow in bankruptcy prediction. *Financ. Manage.* Pp.55-65.
- Grablowsky BJ (1976). Mismanagement of Accounts Receivable by Small Business. *J. Small Bus.* 41:23-28.
- Grablowsky BJ (1984). Financial Management of Inventory. *J. Small Bus. Manage.* 22:59-65.
- Gray S, Mirkovic A, Raganathan V (2006). The Determinants of Credit Ratings: Australian Evidence, *Australian J. Manage.* 31(2):333-354.
- Grenberg RR, Johnson GL, Ramesh K (1986). Earnings versus Cash Flow as a Predictor of Future Cash Flow Measures. *J. Account.* 4:266-277.
- Hill MD, Kelly WG, Highfield MJ (2010). Net Operating Working Capital Behavior: a First Look. *Financ. Manage.* 2:783-805.
- Howorth C, Westhead P (2003). The Focus of Working Capital Management in UK small firms. *Manage. Account. Res.* 14:94-111.
- Hussain S, Al-Attar A (2003). Corporate data and future cash flows *Journal of Business. Financ. and Account.* pp.101-119.
- Iotti M, Bonazzi G (2012). EBITDA / EBIT and Cash Flow Based ICRs: a Comparative Approach in the Agro-Food System in Italy. *Financ. Asset Invest.* 2(2):19-31.
- Iotti M, Bonazzi G (2013). Assessment of return on investment and sustainability of the business cycle in the meat processing sector in Italy. *Afr. J. Agric. Res.* 8(40):5051-5063.
- Kargar J, Blumenthal RA (1994). Leverage Impact of Working Capital in Small Businesses. *TMA J.* 14:46-53.
- Klammer TP, Reed S (1990). Operating Cash Flow Formats: Does Format Influence Decisions. *J. Account. Public Policy.* 9:217-235.
- Kieschnick R, LaPlante M, Mousawwi R (2008). *Working Capital Management, Corporate Governance and Firm Value*, University of North Texas University Press, Austin.
- Kim C, Mauer D, Sherman A (1998). The Determinants of Corporate Liquidity: Theory and Evidence. *J. Financ. Q. Anal.* 33: 305-334.
- Kochanek RF, Norgaard T (1998). Analyzing the Components of Operating Cash Flow: the Charter Company. *Account. Horiz.* 2:58-64.
- Krishnan GV, Largay L (2000). The predictive ability for direct method cash flow information, *Journal of Business. Financ. Account.* pp. 215-245.
- Kwon YK (1989). Accrual versus Cash-Basis Accounting Method: an Agency-Theoretic Comparison. *J. Account. Public Policy.* 8:267-281.
- Lagerkvist CJ, Andersson H (1996). Taxes, Inflation and Financing – the Rate of Return to Capital for the Agricultural Firm. *Euro. Rev. Agric. Econ.* 23:437-454.
- Leland H (1994). Corporate debt value, bond covenants and optimal

- capital structure, *J. Financ. IL*, pp.1213–1252.
- Leland H (1998). Agency costs, risk management, and capital structure. *J. Financ.* 53:1213-43.
- Lettau M, Ludvigson SC (2005). Expected Returns and Expected Dividend Growth, *Journal of Financial Economics*, 76: 582-626.
- Livnat J, Zarowin P (1990). The incremental information content of cash flow components. *J. Account. Econ.* pp. 25-46.
- Lorek KS, Willinger G (1996). A multivariate times series prediction model for cash flow data. *Account. Rev.* pp. 81-101.
- Love I, Preve L, Sarria-Allende V (2007). Trade Credit and Bank Credit: Evidence from Recent Financial Crisis. *J. Financ. Econ.* 83:453-469.
- Molina C, Preeve L (2009). Trade Receivable Policy of Distressed Firms and its Effects on the Cost of Financial Distress. *Financ. Manage.* 38:663-686.
- Murdoch B, Krause P (1989). An empirical investigation of the predictive power of accrual and cash flow data in forecasting operating cash flow. *Akron Bus. Econ. Rev.* pp. 100-113.
- Murdoch B, Krause P (1990). Further evidence on the comparative ability of accounting data to predict operating cash flows. *Mid-Atl. J. Bus.* pp.1-14.
- Padachi K (2006). Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms. *Int. Rev. Bus. Res. Pap.* 2:45-58.
- Peel MJ, Wilson N (1996). Working Capital and Financial Management Practices in the Small Firm Sector. *Int. Small Bus. J.* 14:52-68.
- Rayburn J (1986). The Association of Operating Cash Flow and Accruals with Security Returns. *J. Account. Res.* pp.112-133.
- Russel PB (2009). The Cash Flow Implication of Managing Working Capital and Capital Investment. *J. Bus. Econ. Stud.* 15:98-108.
- Sartoris W, Hill N (1983). A Generalized Cash Flow Approach to Short-Term Financial Decisions. *J. Financ.* 38:349-360.
- Sloan R (1996). Do stock prices fully reflect information in accrual and cash flows about future earnings? *Account. Rev.* pp. 71-93.
- Takahashi K, Yurokawa Y, Watase K (1984). Corporate Bankruptcy Prediction in Japan. *J. Bank. Financ.* pp. 229-247.
- Taylor D (2011). Optimizing Working Capital Business Credit. 6:12-15.
- Wallace RSO, Choudhury MSI, Pendlebury M (1997). Cash Flow Statement: an International Comparison of Regulatory Position. *Int. J. Account.* 32:1-22.
- Wang Z, Eichenseher J (1998). Informativness and predictability of cash flows. *J. Appl. Bus. Res.* pp. 21-32.
- Weinraub HJ, Visscher S (1998). Industry Practice Relating to Aggressive and Conservative Working Capital Policies. *J. Financ. Strateg. Decis.* 10:21-37.
- Wilson GP (1986). The relative information content of accruals and cash flows: combined evidence at the earnings announcement and annual report release date. *J. Account. Res.* pp. 165-200.
- Wilson GP (1987). The incremental information content of accrual and funds components of earnings after controlling for earnings. *Account. Rev.* pp. 293-322.