Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA)
Available online at www.inia.es/sjar

Spanish Journal of Agricultural Research 2010 8(3), 547-558
ISSN: 1695-971-X
eISSN: 2171-9292

Estimation of valuation multiples of Spanish unlisted food companies

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Abstract

In the valuation of Spanish unlisted companies, the most commonly used methods are the discounted cash flow, adjusted net book value and multiple valuation methodologies. The Spanish food industry mainly comprises unlisted SMEs (Small and Medium Enterprises) whereas the number of listed food companies is very low. In view of these two facts, there is practically no information on valuation multiples in this sector. In this context, a massive discounted cash flow model is created allowing for the obtainment of valuation multiples for small and medium-sized companies. Once the value of each company is obtained, the most common valuation multiples are calculated. The multiples which vary the least, and specifically the EV/EBITDA (Enterprise Value/Earnings Before Interest, Taxes, Depreciations and Amortisation) multiple, which presents the lowest interquartile range [10.32-14.78 in small companies] and coefficient of variation [0.43 in small companies], are most appropriate for use as a contrast and to aid in the valuation of companies. EV/EBITDA harmonic mean equals 11.51 for small companies and 11.88 for medium companies. Upon comparing the distribution of the multiples of small and medium-sized companies, no statistically significant differences were found.

Additional key words: discounted cash flows, food sector, small and medium enterprises, unquoted firms.

Resumen

Estimación de múltiplos de valoración de empresas alimentarias españolas no cotizadas

En la valoración de empresas en España las metodologías más extendidas son el descuento de flujos de caja, el valor neto contable corregido y la valoración por múltiplos. El sector alimentario español está constituido mayoritariamente por PYMEs (Pequeñas y Medianas Empresas) no cotizadas mientras que el número de empresas alimentarias cotizadas es muy bajo. Estos dos hechos hacen que no exista prácticamente información sobre los múltiplos de valoración en el sector. En este contexto se formaliza un modelo de valoración masiva por descuento de flujos de caja que permite la obtención de múltiplos de valoración para pequeñas y medianas empresas. Una vez obtenido el valor de cada empresa se calculan los múltiplos de valoración más habituales. Los múltiplos con menor variabilidad son más aptos para utilizar como contraste y ayuda en las valoraciones de empresas, concretamente el múltiplo EV/EBITDA (valor de la empresa/beneficio antes de intereses, impuestos y amortizaciones) presenta el menor rango intercuartílico [10,32-14,78 en pequeñas empresas] así como el menor coeficiente de variación [0,43 en pequeñas empresas]. La media armónica del EV/EBITDA es igual a 11,51 en pequeñas empresas y a 11,88 en medianas empresas. Se han comparado las distribuciones de múltiplos entre pequeñas y medianas empresas no hallando diferencias estadísticamente significativas.

Palabras clave adicionales: descuento de flujos de caja, empresas no cotizadas, pequeñas y medianas empresas, sector alimentario.

* Corresponding author: frarisan@esp.upv.es
Received: 07-12-09; Accepted: 23-04-10.

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Abbreviations used: CAPEX (capital expenditures), CF (free cash-flow), CPI (consumer price index), D (debt), DA (depreciation), DCF (discounted cash flows), E (equity), EBIT (earnings before interest and taxes), EBITDA (earnings before interest, taxes, depreciations and amortisation), EV (company value), GDP (gross domestic product), GVA (gross value added), IGBM (general index of the Madrid stock exchange), K_e (cost of equity), K_d (cost of debt), MEMo (multiples estimation model), NCEA (National Code of Economic Activities), PCF (price cash flow ratio), PER (price earnings ratio), q (Tobin's q), ROC (return of capital), RR (reinvestment rate), SABI (Iberian Balance Sheet Analysis System), SME (small and medium enterprises), t (tax rate), WACC (weighted average cost of capital), WC (working capital).

Introduction

Valuation of privately held firms has become increasingly important in recent years (Petersen *et al.*, 2006). While multiple-comparison methods are used in the valuation of listed companies (Demirakos *et al.*, 2004; Dukes *et al.*, 2006), in the valuation of unlisted firms there are differences between countries (Caselli and Gatti, 2004). In Continental Europe, the number of quoted companies is not high and in this context, finding a good sample of comparables is not an easy exercise. In the United States and the United Kingdom, valuation by comparison has been used for a long time by merchant and investment banks.

In France, Chastenet and Jeannin (2007) conclude that the discounted cash flow method is systematically used in the valuation of unlisted companies. French professionals also use stock market multiple comparison methods. However, the study shows that there are large disparities in their use. In Spain, Rojo and García (2006) show that Spanish assessors rely mostly on discounted cash flow and adjusted net book valuation methods.

The main drawback relating to the use of valuation multiples in Spain is the limited number of companies from which to extract a comparison group considering that only companies listed on the stock market can be taken into consideration, and they are hardly comparable with the company under study, bearing in mind that according to the Central Directory of Companies (*Directorio Central de Empresas*) (DIRCE), over 99% of the companies are SMEs[1]. The Spanish food sector is not unaffected by this problem since listed companies in the food group are very rare[2] and very different from one another, meaning that the information stemming from valuation multiples is quite unreliable. However, in 2007, the Spanish food and drinks industry accounted for around 14% of industrial production measured as a percentage of Gross Value Added (GVA).

The aim of this study is to create a methodology that allows for the obtainment of different valuation multiples. This methodology expands on the information available on valuation multiples in the Spanish food sector and for this purpose resorts to the valuation of a large number of small and medium-sized companies in this sector by means of a discounted cash flow model. Once the main valuation multiples are determined, the results are analysed and the possible differences between small and medium-sized companies are tested.

Literature specifically relating to the valuation of agri-food companies is very scarce, and the most recent literature includes *inter alia,* the following:

Caballer and Moya (1998) propose the application of analogical-stock market valuation methodology to estimate a value similar to stock market value for those companies whose share capital is not listed on a stock market. Based on economic and financial information, they obtain equations on the stock market value of agri-food companies using techniques such as factor analysis of principal components and multiple regressions.

Adelaja *et al.* (1999) examine whether diverse areas, such as liquidity, financial leverage, profitability, sales growth, stock, performance capacity, percentage of ordinary shares sold on the stock market and book ratio are statistically significant in explaining the mergers and acquisitions between agri-food companies which took place in the American market from 1985-1994.

Sales (2002) also uses the analogical-stock market methodology to value grower association companies in Spain. This type of companies can not be listed on the stock market, and consequently its market value has not been calculated. For this reason, based on different explanatory economic and financial variables, the author estimates different valuation models. The most explanatory model is created on the basis of total assets, an agri-food company stock market index, and the ratio of equity to total assets.

Vidal *et al.* (2004) use the analogical-stock market methodology to obtain a global value for the wine co-operatives within the Appellation of Origin Alicante in Spain. The model enables the complementary merger value of the wine co-operatives to be estimated in order to judge the convenience of a hypothetic association among them.

Vardavaki and Mylonakis (2007) study the UK food retail sector rather than the agri-food sector, applying various valuation models in order to determine which

[1] In its Recommendation 2003/361/CE, the European Commission defines an SME as a company employing less than 250 persons and with an annual turnover of not more than 50 million Euros or an annual balance sheet of not more than 43 million Euros.

[2] Current data from the Madrid Stock Exchange indicate that there are ten companies from the food and drinks sectors (Barón de Ley, S.A.; Bodegas Riojanas, S.A.; Compañía Vinícola del Norte de España, S.A.; Campofrío, S.A.; Ebro Puleva, S.A.; Natra, S.A.; Paternina, S.A.; Pescanova, S.A.; Sos Cuétara, S.A., and Viscofan, S.A), four of which are wine producers and one, Viscofan, manufactures artificial casings for the meat industry.

model explains the largest proportion of the cross-sectional variation in equity values.

Methodology

Multiples estimation model (MEMo)

The first precedent of this model is found in the study carried out by Ribal *et al.* (2009) in which they use a mass model for valuation of food companies in Spain and develop an algorithm for eliminating outliers.

The above referred to mass model is developed in this study. The general premises for the development of a MEMo (multiples estimation model) are as follows:

— Premise 1. MEMo is a model to be applied to historical accounting data that attempts to mimic the valuation models used by analysts and valuation professionals on specific companies.

— Premise 2. MEMo is composed by a discounted valuation model applied to a group of unlisted companies plus an estimation of distributions of valuation multiples.

— Premise 3. Discounted valuation model assign value to the firm that equals the present value of expected future accounting measures, based on all currently available information.

Discounted cash flows model

The most widely used DCF (discounted cash flows) model is usually broken down into two stages, a first stage of explicit cash flows and a second stage which calculates a residual value using the Gordon formula (Jennergren, 2008):

$$EV = \frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \ldots + \frac{CF_n}{(1+k)^n} + \frac{CF_n \cdot (1+h)/(k-h)}{(1+k)^n} \quad [1]$$

where CF: expected free cash flow for the first year of projection (year 1); k: discount rate; n: duration of the first stage; h: expected constant growth during the second stage.

In the case of unlisted companies, it is not possible to fix explicit cash flows for each company by year, given that their growth and investment policies are not known. Therefore, a different two stage model is used, replacing the explicit cash flows stage with a constant growth stage based on company history:

$$EV = CF \cdot \left(\frac{1+g}{k-g}\right) \cdot \left[1 - \frac{(1+g)^n}{(1+k)^n}\right] + CF \cdot \left[\frac{(1+g)^n \cdot (1+h)}{(k-h) \cdot (1+k)^n}\right] \quad [2]$$

where g: expected constant growth during the first stage.

Equation [1] is equivalent to equation [2] if the free cash-flows grow at a constant annual rate g. The definition of free cash flow used [3] is the one most widely used in the business environment (Damodaran, 2006b).

EBIT (1 – Tax Rate) – (Capital Expenditures – – Depreciation) – Change in Noncash Working Capital = Free Cash Flow

$$CF = EBIT \cdot (1-t) + DA - CAPEX - \Delta WC \quad [3]$$

This approach may appear to be far from the practical reality in the valuation of a company. However, future growth and investment policies are not usually very clear in small companies, principally due to the absence of a strategic plan. For this reason, the analyst tends to rely more on historical and sectorial data. Petersen *et al.* (2006) uphold that publicly held companies are easier to research than private firms.

Applying DCF valuation models, pre-supposes setting out a series of hypotheses. If this model is to be applied to a large number of companies, then the same premises must be used for all the companies in order to give coherence to the mass model. That is to say, calculation methods for parameters such as growth, discount rate, etc. will be the same for all the companies, but not the values for these parameters which will be specific to each company.

Determining Free Cash-Flow (CF)

Free Cash-Flow will be determined by the variables included in [3].

Fixed asset investments are not included in the financial statements of the SMEs, and accordingly, the fixed asset investment is calculated as shown in [4].

CAPEX = Capital Expenditures year n = = (Net Fixed Assets year n) – (Net Fixed Assets year n – 1) + Depreciation year n [4]

Besides, it can vary significantly over time, and therefore it might not be reliable to consider only the last year. Accordingly, the reinvestment rate is calculated as the average estimate of the gross investment between EBIT$(1 - t)$ + DA in the last five available years:

$$RR = \frac{\sum_{i=1}^{5}\left(CAPEX_i + \Delta WC_i\right)}{\sum_{i=1}^{5}\left(EBIT_i \cdot \left(1 - t\right) + DA_i\right)} \qquad [5]$$

This approach, where the free cash-flow [6] is calculated by applying [5], is consistent with the approach of Damodaran (2006b).

$$CF = \left(EBIT \cdot \left(1 - t\right) + DA\right) \cdot \left(1 - RR\right) \qquad [6]$$

The reinvestment rate may be higher than 1 which would mean that the company resorts to external financing to make its investments. However, this possibility would generate a negative value in [6] and consequently in [2]. Additionally, it would change the company's capital structure, and consequently it would be necessary to determine which part of the cash-flow generated by the company is reinvested without varying the capital structure. This would entail changing the expression [6] by means of the percentage of equity to capital structure E/(E+D). More will be said about capital structure later.

$$CF = \left(EBIT \cdot \left(1 - t\right) + DA\right) \cdot \left(1 - RR \cdot \frac{E}{E + D}\right) \qquad [7]$$

Discount rate

Since the financial cash flow model was chosen, the discount rate should give rise to the returns demanded by the suppliers of capital. These suppliers of capital are considered to include both owners and creditors, and accordingly, the discount rate will be the weighted average cost of capital (WACC), which is called k [8]. According to Damodaran (2006a) *«the cost of capital is the weighted average of the costs of the different components of financing used by a firm to fund its investments»*.

$$k = WACC = \frac{E \cdot k_e + D \cdot k_d \cdot \left(1 - t\right)}{E + D} \qquad [8]$$

where E: equity, k_e: cost of equity, D: debt, and k_d: cost of debt.

The inclusion of the corporate tax rate (in this case the marginal rate) is necessary to take into account the positive effect on the calculation of corporation tax of the interest on the company's debt. This is called the «tax shield».

The cost of equity or earnings demanded by the shareholders will be fixed on the basis of the CAPM (capital assets pricing model). To estimate the Beta of each company an industry-derived unlevered beta levered to the company's capital structure will be used following Koller *et al.* (2005): *«Companies in the same industry face similar operating risks, so they should have similar operating betas»*.

Following Copeland, Koller and Murrin(2004) the calculation was performed as follows [9]:

$$\beta_L = \left[1 + \left(1 - t\right) \cdot D/E\right] \cdot \beta_U \qquad [9]$$

where β_L: Levered Beta and β_U: Unlevered Beta.

Time horizon (n)

Following Morris (1994), the explicit timeframe of the valuation depends on the reliability of the estimate of future operations, the usual periods being three to ten years, longer periods being possible for highly stable companies. In a study on the application of net present value methods in Denmark by Petersen *et al.* (2006), it was found that 64.3% of the analysts consulted use an average forecasting horizon between 1 and 5 years.

Capital structure (E, D)

According to Krishnamurti and Vishwanath (2008) the cost of capital used in valuation is a function of market value leverage ratio. Since the securities are not traded, it is difficult to get estimates of leverage. In fact, capital structure presents the problem of circularity. To determine the weighted average cost of capital, we must know the weightings based on market value, but to determine market value, free cash flows must be discounted from the weighted average cost of capital. One way of solving this problem is to set a capital structure target for the company; another way is to carry out an iterative calculation (Copeland *et al.*, 2004). In this latter solution, in addition to fixing the costs of equity and of external financing, the value of equity is determined in such a way that the total of these

$$EV = E + D = CF \cdot \left(\frac{1+g}{k-g}\right) \cdot \left[1 - \frac{(1+g)^n}{(1+k)^n}\right] + CF \cdot \left[\frac{(1+g)^n \cdot (1+h)}{(k-h) \cdot (1+k)^n}\right]$$

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

Figure 1. Circularity plot.

and of company debt is equal to the value obtained by DCFs. Given that the financial capital target is not known, and that the book capital structure is not very reliable, we chose to solve the problem of capital structure circularity using iterative calculations. Figure 1 shows the problem of circularity.

Calculating WACC requires that the capital structure not change, the company must rebalance its capital structure to maintain the same value debt ratio for the future. This is called the rebalancing assumption.

Growth rates (g, h)

Using the two stage constant growth DCF model means that two specific growth rates for each stage must be calculated.

In the first stage growth (g) will be calculated following Damodaran (2006b), and increases will be calculated according to return of capital (ROC) and the reinvestment rate (RR), [10], [11], [12] and [13].

$$ROC = \frac{EBIT \cdot \left(1 - Tax\ \ Rate\right)}{E + D} \qquad [10]$$

$$\text{Reinvestment Rate} = RR = \qquad [11]$$
$$= \frac{Capital\ Expenditures - Depreciation + \Delta Working\ Capital}{EBIT \cdot (1 - Tax\ Rate)}$$

Accordingly, growth in the first stage will be as follows:

$$g = ROC \cdot RR \qquad [12]$$

$$g = ROC \cdot RR = \qquad [13]$$
$$= \frac{Capital\ Expenditures - Depreciation + \Delta Working\ Capital}{E + D}$$

In the second stage, in the longer term, growth will be close to some measure of growth of the economy (gross domestic product, GDP) or of prices (consumer price index, CPI), it being understood that in mature sectors with a large number of companies, annual growth in the long term will not be very high. Morris (1994) warns of the common error of forever using unsustainable growth rates.

Continuing value

Gordon's formula was used and entailed fixing an indefinite time horizon for the second stage. This assumption is a consequence of mass valuation, although it is possible that within the context of an individual valuation the second phase was limited.

Value of equity (E)

Once the value of the company (EV) has been obtained, the value of equity or value of shares (E) can be calculated as [14]:

$$\begin{aligned} &Value\ of\ equity = E = EV - Net\ Debt = \\ &= EV - Debt + Accounts\ receivable + \\ &+ Liquidity\ position \end{aligned} \qquad [14]$$

Multiples chosen

In regard to the election of the multiples chosen to perform this study, Martínez and García (2005) propose that they be grouped according to the classification made by Fernández (2001), who concentrates the indicators based on capitalisation, multiples based on the value of the company and multiples based on growth. Damodaran (2006b) takes equity multiples and value multiples into consideration.

In this study the multiples chosen are the most extended in empirical studies and in professional practice.

— PER (price earnings ratio), is the indicator which is most commonly used for the valuation of the market by multiples. This ratio is calculated as the quotient between the market value and earnings per share, and can be defined as recovery time since it represents the average time it would take the investor to fully recover its investment if all the earnings were to be paid out as dividends (Martínez and García, 2005).

— The drawbacks of the PER include, *inter alia,* that it can be distorted due to the varying accounting policies followed in different countries. It is a very sensitive ratio in cyclical companies and it is possible to obtain distorted results due to the level of leveraging of the companies being analysed (Fernández, 2001).

— PCF (price cash flow ratio), calculated as price over cash flow, is similar to the PER, both in the manner in which it is calculated and in its use. The fundamental reason for using cash flows in place of earnings is due to its increased objectivity and comparability, since the cash flow measures the flow of funds generated by the company, eliminating the effects of valuation adjustments, such as amortisation and depreciation and provisions from earnings, thus giving them a predictive nature. Both the PCF and the PER multiples shall be calculated based on the value of equity, *E*.

— EV/SALES is the quotient between the value of the company and its earnings. The analysts frequently use this indicator to analyse a company since this multiple is more reliable than multiples based on earnings given that they are easier to manipulate than sales and can be slanted by differences between companies and by extraordinary or non-recurring profit.

— EV/EBITDA is an indicator commonly used in the valuations of companies. It is a well accepted ratio since it eliminates the distortions created by different accounting legislation, tax systems and valuation adjustments. EBITDA calculates earnings without taking into account expenses relating to interest, taxes, impairment and depreciation and amortisation, meaning that it prevents the distortions caused by different financial structures and tax policies.

— EV/EBIT calculates earnings without taking into account expenses relating to interest, taxes, impairment and depreciation and amortisation, meaning that it prevents the distortions caused by different capital structures and tax policies. However, it should be taken into account that this multiple will be affected by the different accounting policies applied by the companies in relation to amortisation and depreciation.

Additionally, the Tobin's *q* was calculated. The *q* ratio is theoretically calculated as the quotient between the value of the company and its asset replacement value. In practice, the denominator is difficult to calculate and it is common to resort to approximate measures. Accordingly, Whited (2001) measures this ratio as the quotient between the value of the company and its book value. It is not a typical valuation multiple. However, it does provide interesting information on the company and its supply of intangible assets. A *q* ratio higher than the unit would entail a surplus of value over book value, which for accounting purposes, would be attributed to good-will.

Data gathering

The information was obtained from the SABI database[3], specifically on small and medium-sized companies, and micro-companies were excluded in this study. Additionally, for classification purposes, only business volume was taken into account and no regard was paid to the number of employees (since no reliable data on this variable was available) and the annual general balance sheet. The sector was defined by means of the 2009 National Code of Economic Activities-NCEA (Código Nacional de Actividades Económicas de 2009-CNAE), code 10 «Food Industry».

In this manner information on food companies was obtained, and at the same time the companies were classified into two groups, the first comprising companies with a turnover from 2 to 10 million euros in 2007 (small companies) and the second comprising companies with turnover ranking from 10 to 50 million euros (medium-sized companies). Companies with a negative cash flow in 2007 were excluded from the analysis.

Thus a database was built with a total of 2,178 companies and 72 accounting variables. These companies comply with the previous requirements and the available information comprises at least the interval from 2003 to 2007.

For each of the NCEA food sector sub-codes and based on size, Table 1 shows the number of companies and their percentage over the total number. Additionally, graphically, the proportion of small and medium-sized companies with the same NCEA sub-code is shown.

The most recent information that could be obtained on the aforementioned companies is from 2007, so the reference is taken as the valuation of companies in June 2008[4], and the parameters for calculating value are those available at that date.

Taking into account the companies with negative cash flows in 2007, companies for which certain accounting data was not available, or companies in relation to which resolving the problem of the circularity of the capital structure led to a negative value of equity or for which it was not possible to obtain the *EV*, the number of companies was reduced from 2,178 to 1,630.

Application of the multiples estimation model

The parameters both for each company in particular and on a general level were calculated as previously detailed, taking into account the following considerations:

[3] SABI: Iberian Balance Sheet Analysis System, a database which contains the annual accounts of over 800,000 Spanish companies.

[4] The definitive data from 2007 are considered in 2008 with the legalisation of books in the Companies Register.

Table 1. Number of companies used

NCEA[1]	Description	Small		Medium	
		No.	%	No.	%
101	Meat preservation products and preparation of meat products	539	33.1	163	30.5
102	Processing and preservation of fish, crustaceans and molluscs	121	7.4	39	7.1
103	Processing and preservation of fruits and vegetables	137	8.4	64	11.7
104	Manufacture of oils and vegetable and animal fats	104	6.4	34	6.2
105	Manufacture of dairy products	63	3.9	31	5.7
106	Manufacturing of milling, starch and amylaceous products	56	3.4	29	5.3
107	Manufacture of bakery and pastry products	231	14.2	36	6.6
108	Manufacture of other food products	252	15.5	89	16.2
109	Manufacture of animal feed	127	7.8	59	10.8
10	**Total**	**1,630**	**100.0**	**548**	**100.0**

[1] NCEA: National Code of Economic Activities.

— Companies with accounting data for the previous five years were used.

— All the companies for which information is available were valued by means of the DCF model in two phases following the expression [2]. The time horizon for the first phase is five years.

— An explicit timeframe of five years has been chosen for the application, subsequently considering a residual value using the Gordon model. This explicit duration is probably shorter than the one which would be used if there were more specific information about each company.

— To fix the free cash flow, the operating profit and loss and the depreciation and amortisation charge according to the last available income statement (in this case 2007) were taken into account.

— The tax rate to be applied was fixed at 30%[5]. The positive effect on the calculation of tax on finance costs will be included in the discount rate set.

— The first stage growth, g, as well as the reinvestment rate, RR, are calculated with data from the previous 5 years (2003-2007).

— Second stage growth, h, stems from average GDP growth in the Euro zone from 1996 to 2007.

— The discount rate is fixed as the weighted average cost of capital, and the existence of preferred stock is not taken into consideration.

— The investor is considered to diversify in accordance with the portfolio theory, and accordingly, the cost of equity, k_e, is determined by systematic risk. Therefore, k_e is calculated by means of the CAPM based on the average unlevered Beta of the European food sector[6], specifically $\beta = 0.48$. The risk premium (9.40%) is estimated by measuring and extrapolating historical excess returns of the General Index of the Madrid Stock Exchange (IGBM) from 1983 to 2007. The risk-free rate (4.29%) relates to ten-year Treasury Bonds.

— Non-systematic risk is not taken into account for the estimation of cost of equity.

— The cost of debt (k_d) is calculated using each company's accounting information like the quotient between financial expenditure and the mean balance of debts. In the case that k_d is less than 5.275% the latter is taken into consideration. This figure is chosen since it is the average of preferential interest rates of banks and savings banks for 2007, according to data published by the Bank of Spain.

— The problem of circularity between the value and weighted cost of capital is resolved by means of repeated calculations.

— The capital structure is considered to be constant along the DCF model, and consequently the rebalancing assumption is applied.

— No discount is applied to the value obtained for ownership control and lack of marketability.

— During the projection period, it was considered that no dividends would be paid to the shareholders.

[5] The tax rate for small-sized companies is currently 25% for the first 120,202.41 Euros of profit and 30% for the surplus. For these purposes small sized companies are considered to be those with sales of less than 8 million euros.

[6] From Bloomberg information at the end of 2007, the unlevered Betas for listed food sector companies from various European countries (Germany, Austria, Belgium, Denmark, Spain, Norway, Finland, France, Greece, Italy, Ireland, the UK, Switzerland, Sweden, etc.).

Results

All the companies from the two groups were valued according to the above referred to model and the valuation multiples for each company were calculated based on company value (EV) and equity value (E). In Table 2 the descriptive statistics for each of the multiples selected for the study are shown, according to the size of the company. Table 2 shows the high variability of the different multiples. The large dispersions are the cause of the histograms shown in Figure 2. Additionally, a generality in all the histograms of the multiples analysed is the existence of positive asymmetry, *i.e.* all the histograms tail off to the right since companies with negative values were excluded.

The measures of central tendency are very similar between small and medium companies and consequently, a priori there will be no statistically significant differences. Given the non-normality of the distributions of multiples a permutation test, has been used. As expected, the null hypothesis, that distributions are not different, is not refuted in any multiple.

In addition to classical statistics, the harmonic mean was calculated and provides a way to mitigate the effect of the very low denominators giving rise to very high multiples. Effectively, the harmonic mean is lower than the arithmetic mean in all cases, decreasing the effect of the anomalous multiples.

The multiples are consistent with each other. For example, sales are higher than EBITDA which in turn is higher than EBIT, meaning that the multiple EV/Sales will be lower than the EV/EBITDA multiple which in turn will be lower than the EV/EBIT multiple. Similarly, the PCF will be lower than the PER multiple.

Both the PER and the EV/EBIT show very high maximum values, causing high typical deviation and variation coefficient values. These results match usual management practices in small companies, excessively people-centric and asset preserving, where the impact of companies tax leads to the attempt to minimize net profit.

The PCF ratio shows much higher variability in small-sized companies that in medium-sized ones. In medium-sized companies its dispersion is similar to that of more uniform ratios.

Taking into account the 25th and 75th percentiles, there are practically no differences between small-sized companies and medium-sized companies for each of the multiples. To better appreciate the interquartile range it was rescaled based on the 25th percentile for each of the multiples (Table 3). Among the valuation multiples, the lowest dispersion was shown by the PCF, EV/EBITDA and Tobin's q, for both groups of companies. These results are consistent with the variation rates obtained, where the lower dispersion of these three multiples was also highlighted.

As for usefulness, multiples with lower dispersion will be preferable to obtain the most likely value or to perform valuation contrasts. In multiples of value, the EV/EBITDA multiple has the lowest variability rate as well as the lowest interquartile range relationship (75th percentile/25th percentile) whereas in multiples of prices, the PCF multiple will be preferable to the PER multiple.

The model provides an increase in the sector information that can be used by means of profile graphs of value, using the 25th percentile as the minimum value

Table 2. Descriptive statistics of the multiples selected for the study, differentiating between small and medium-sized companies

Stat.	Small companies						Medium companies					
	q	EV/ Sales	EV/ EBITDA	EV/ EBIT	PCF	PER	q	EV/ Sales	EV/ EBITDA	EV/ EBIT	PCF	PER
n	882	882	881	820	877	828	320	320	320	292	319	277
Min	0.08	0.06	2.68	3.24	1.29	1.64	0.20	0.12	1.31	1.35	2.64	2.70
Max	5.69	6.42	128.35	292.05	282.28	292.26	4.01	4.30	30.48	279.38	43.89	251.18
Mean	1.30	1.08	12.77	29.94	14.09	44.94	1.30	1.00	13.02	29.91	14.61	47.46
Median	1.18	0.90	12.41	21.06	12.74	29.31	1.15	0.85	12.93	20.52	13.93	27.27
H. Mean	1.05	0.69	11.51	18.97	11.57	24.74	1.07	0.67	11.88	18.25	12.56	24.40
St. Dv.	0.61	0.75	5.45	30.21	11.00	42.42	0.60	0.65	3.47	30.79	5.71	48.65
cv	0.47	0.70	0.43	1.01	0.78	0.94	0.46	0.65	0.27	1.03	0.39	1.03

Missing data indicates elimination of the company in the calculation of certain multiples.

and the 75th percentile as the maximum value. Figure 3 shows a value profile for a specific company. This profile can show ranges of value based on the multiple which are more or less similar, or on the contrary, might be an unbalanced profile, which can serve as a sign of warning with respect to certain of the business success accounting variables.

Discussion

The weight of the food sector in the industrial production of Spain, the high number of unlisted SMEs and the scarce number of listed companies make it necessary to broaden the information relating to the value of the companies in the sector.

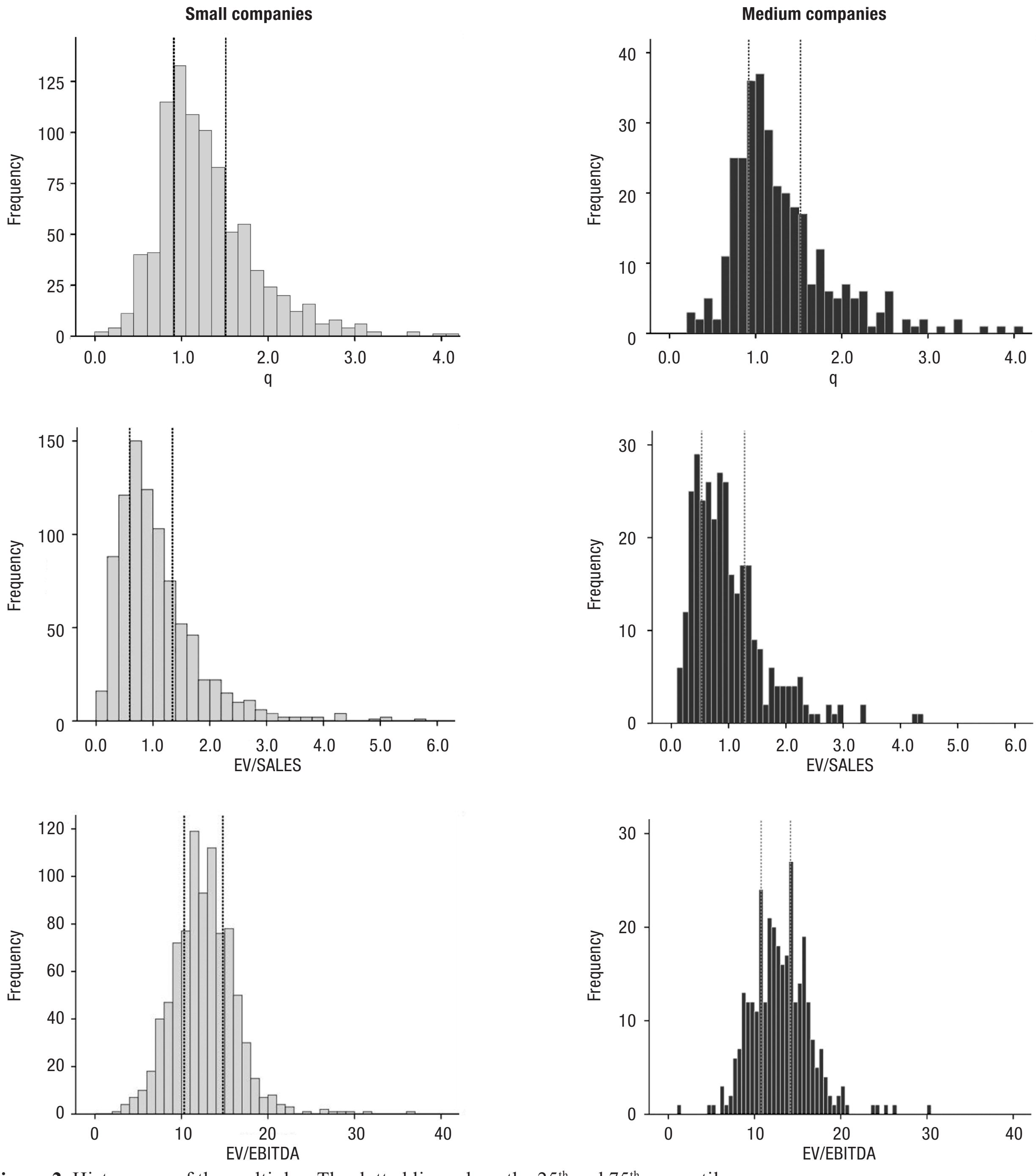

Figure 2. Histograms of the multiples. The dotted lines show the 25th and 75th percentiles.

The proposed model provides quantitative information on the typical multiples of the food sector to contrast valuations made by means of other methodologies (commonly cash flow discount). Caselli and Gatti (2007) state that in Continental Europe the multiples method has never been considered as a basis for the valuation but only as a «control value» for analytical estimates obtained with earning based methods.

The high variability in the values of the multiples obtained, which in certain cases have very high peaks, combined with the elimination of the negative values, leads to mean values which may be a bit high. In this regard, measures such as the interquartile range, the median

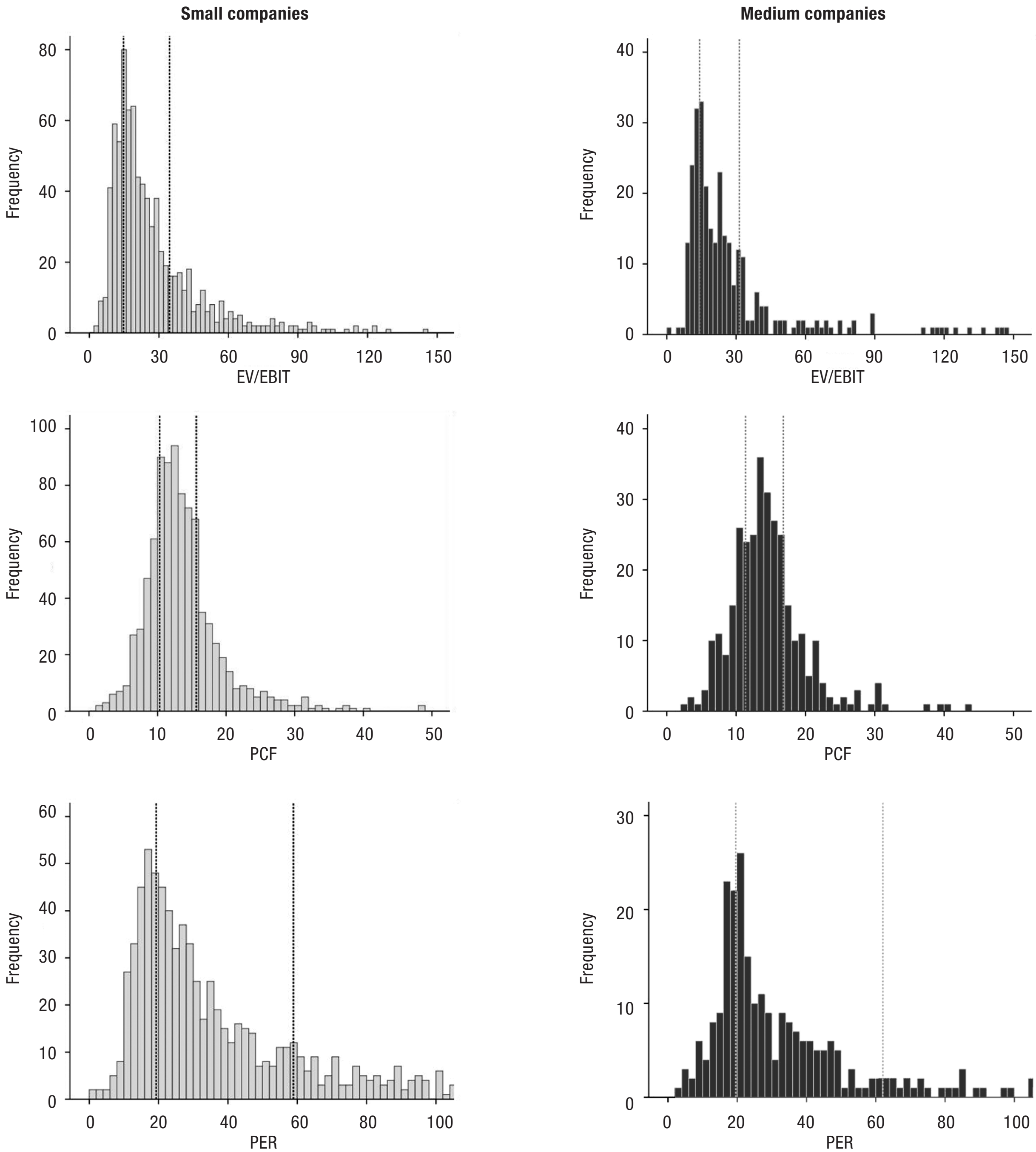

Figure 2 (cont.). Histograms of the multiples. The dotted lines show the 25th and 75th percentiles.

Table 3. Interquartile range of the multiples selected for the study

	Small companies				Medium companies			
	Values		Rescaled		Values		Rescaled	
	P25	P75	P25	P75	P25	P75	P25	P75
q	0.91	1.55	1.00	1.70	0.92	1.52	1.00	1.65
EV/SALES	0.59	1.35	1.00	2.29	0.53	1.28	1.00	2.42
EV/EBITDA	10.32	14.78	1.00	1.43	10.76	15.13	1.00	1.41
EV/EBIT	14.70	33.73	1.00	2.29	14.06	30.73	1.00	2.19
PCF	10.32	15.66	1.00	1.52	11.36	16.80	1.00	1.48
PER	19.00	55.52	1.00	2.92	18.86	49.17	1.00	2.61

P25: percentile 25. P75: percentile 75.

or the harmonic mean, which are less sensitive to extreme values, can provide an appropriate reference of valuation multiples for small and medium-sized companies.

Declerck (2003) studied the valuation multiples, EV/Sales (Enterprise Value/Sales) and EV/EBITDA, in a sample of 100 French agrifood companies that were sold within the merger and acquisition processes in the period from 1996-2001. He obtained multiples calculated on real transactions where the average values of the multiples were EV/Sales = 1.05 and EV/EBITDA = 11.83, very close to the average values obtained from the model.

In the comparison of the multiples for small and medium-sized companies, significant differences were not found either between the statistics of position or between the interquartile ranges. It should be taken into account that the classification between small and medium-sized companies follows a legal and pre-established criterion. Therefore, a grouping under statistical criteria could lead to the establishment of differences between the different clusters.

The companies' values were obtained assuming that the investor diversifies, *i.e.* taking into account systematic or market risk since non-systematic risk should be eliminated by means of diversification. In the case that total risk is considered, the investor does not diversify and the cost of equity calculated by means of the CAPM would be higher and consequently the value of each company and its corresponding multiples would also be lower.

In addition to the use of multiples for purposes of contrast, the model could be used to determine the value of a brand name by comparing its multiples with those relating to a generic company (Damodaran, 2006b). Another possibility would arise from the modification of the hypothesis regarding the investor's diversification behaviour since in the event that the model were to be applied taking total risk (systematic and non-systematic risk) into consideration, the differences between one model and another would enable the rates of reduction in the value of companies due to the lack of liquidity to be measured.

Acknowledgements

The authors would like to thank the R&D&I Linguistic Assistance Office, Universidad Politécnica de Valencia (Spain), for translating this article.

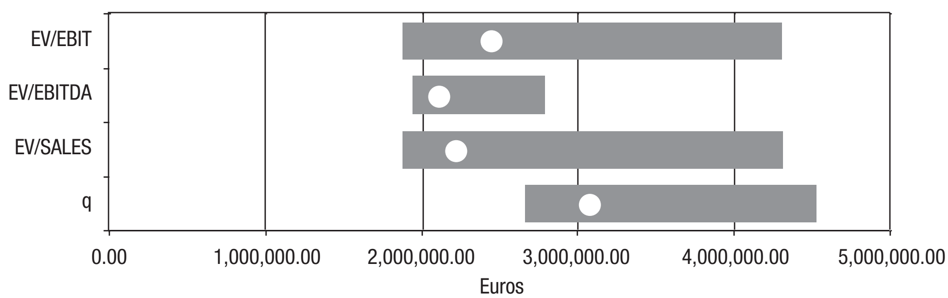

Figure 3. Example of profile of values using the interquartile range and EV multiples. The white circle indicates the position of the harmonic mean.

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