DIFFERENCES IN THE COST OF CAPITAL: THE CASE OF FOOD COMPANIES FROM EMERGING AND DEVELOPED EUROPEAN ECONOMIES

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ABSTRACT

The research aims to assess the cost of capital according to the WACC methodology across the food industry companies. The study also investigates the primary financial indicators for company position on the market as total assets, total revenues, and total equity. The study was conducted among 35 European countries from a sample of 1,274 records. The research period covers the years 2015–2018. The results of the survey underline the current asymmetric information problems in WACC food companies’ assessment between European emerging and developed economies. The emerging markets were characterized by a higher level of the cost of equity and debt. The cost of debt among companies from emerging economies was related to total assets value and revenues, which proves the importance of the size of enterprises in relation to their market assessment.

Key words: cost of capital, WACC, cost of debt, cost of equity, European food companies, emerging and developed economies

JEL codes: L22, L11, E32

INTRODUCTION

The cost of capital is an important parameter of any capital decisions – everyone who invests their funds in a company or provides capital calculates on this basis the predicted benefits. From a company’s point of view, the cost of capital represents the income that a particular investment brings to the owners. For the aim of the analyses, the most often used methodology is a weighted average cost of capital (WACC). It is a popular measure for both firms and investors and plays a central role in finance theory. The issue of measuring the cost of capital has been analysed since Modigliani’s and Miller’s pioneering research in the 1950s [Modigliani and Miller 1958]. Modigliani and Miller first proposed the definition of the average cost of capital before the tax-deductibility. According to theory assumptions, the capital structure achieves its optimum at the minimum level of the WACC. The theory approach assumed that minimalizing the WACC will maximize the value of firms. Further development of the capital structure theory concerns the impact of taxes. Companies that maximize the share of debt can decrease the WACC level [Budhathoki and Rai 2020], due to the tax shield effect. The practical cost of capital references was developed by Damodaran [1994] and Madden [1998] and it was related mostly to the firm’s valuation studies.

The cost of capital is defined as a minimum rate of return that a company should offer its investors to...
induce them to buy stocks. The WACC, in comparison with the rate of return on capital, allows evaluating the investment effectiveness by revision of how the company is creating its value. It also allows establishing the competitive position of the enterprise. Furthermore, the WACC method appoints the market value of a firm [Mari and Marra 2019].

Capital structure theory suggests that more relevant information on the market is associated with a lower cost of capital; thus, it reduces transaction cost and estimation of risk. Under information asymmetry, some companies may influence the availability of external financing by changing the information policy [Suto and Takehara 2017]. However, the imperfect markets with high information asymmetry will impact on the higher costs of capital and scarcer financing [Coman 2011]. According to Armstrong et al. [2011], the markets with perfect competition do not notice the effect of information asymmetry on the cost of capital. These studies were the basis for the division of the sample into emerging and developed economies markets. This criterion of grouping underlined the cost of capital determinants that Szczepankowski [2007] relates to production capacity, time preferences for consumption, risk, inflation, and the degree of limited capital resources.

The aim of the paper is the assessment of the cost of capital among food companies from emerging and developed European countries. The conducted analyses also revised the impact of the size and scale of operation on the WACC level of companies from the food industry (firms specifics control variables). The paper contributes to the discussion of the agency and information asymmetry theory among capital structure theories and signs into international business research across intra-industry characteristics.

THE WACC ROLE IN FINANCIAL AND INVESTMENT DECISIONS

The weighted average cost of capital is widely used in investment and financial decisions, both by managers and potential investors. This methodology is widely used in:
- discounting cash flows from investments,
- discounting the company’s average income for establishing the value of the company,
- assessment of the impact of the capital structure on the enterprise value,
- determining the lowest acceptable rate of return for new investments,
- economic added value calculation [Habib 2006].

The cost of capital also represents an operational and financial risk of the company [Rady et al. 2019] and the assessment of the results of long-term investment and financial decisions made by the company that could be compared to the profits expected by shareholders. The WACC is also a measure that assesses the use of assets rather than the sources of their financing. Thus, companies exert WACC for project accept/reject decisions while investors use it for their over-valued/under-valued judgment. The WACC also identifies the value that the company is expected to pay to its security holders to provide funding for its assets.

THE WACC DIFFERENCES ACROSS ECONOMIES AND INDUSTRIES

Financial markets in emerging economies are not assessed as being so efficient in terms of liquidity, the number of players, and the role of public authorities. Due to financial market imperfections, emerging economies are characterized by a higher cost of equity. The country risk, especially in emerging markets, affects asset valuation [Soeriowardojo 2010].

The WACC method is more comparable when it concerns the same segment or industry. Then the results identify how the market is efficient among a particular industry that has similar risk determinants [Copeland et al. 2005]. In the case of cross-country comparisons, the difference could be a consequence of the portfolio structure held by investors, which will impact the expected equilibrium returns and the financial policies of companies [Rezende et al. 2019].

The WACC of younger firms is higher than that of mature firms [Garcia et al. 2016]. Also, small firms have limited capital market access and severe asymmetric information problems [Frank and Shen 2016]. Thus, large and small firms often make different choices about creating corporate policy as related to different capital structure theories.
The barrier of estimating the cost of capital concerns the methodology issues of calculating the cost of equity [Franc-Dąbrowska and Kobus 2012, Franc-Dąbrowska et al. 2018, Pawlonka 2018, Pawlonka and Franc-Dąbrowska 2018]. The cost of equity has proven to be the more troublesome component of the WACC. Among practitioners and researchers, the standard valuation of the cost of equity capital in using the capital asset pricing model (CAPM) method to calculate the WACC is challenging, mostly across emerging markets [Barthelemy et al. 2012]. Calculation of the beta for a company or an entire industry in an emerging market is subjected to very high uncertainty and instability [Barthelemy et al. 2012, Rady et al. 2019]. Emerging markets provide high investment opportunities, but also bring higher risk, which will be included in the cost of equity capital [von Jenner 2008].

The younger markets with shorter history are characterized by a higher cost of capital. Furthermore, the cost of equity calculated on the CAPM method basis does not fully integrate the risk in emerging markets associated with potential economic and financial shocks. Additional risks and uncertainties are related to currency issues, inflation pressure and tax reforms [Fernandez 2010]. What’s more, in many emerging markets, long-term government bonds are not appropriately quoted and do not reveal the real operating risk [Okere et al. 2010, Rady et al. 2019].

RESEARCH MATERIAL AND METHODOLOGY

The study concerns food companies listed on European stock exchanges. The research sample includes 1,274 observations in a four-year study period (2015–2018) for 35 countries in which food companies were listed during the investigated period. The companies included in the sample need to be listed during two years of observation. The total number of companies were varied in the research period from 303 in 2015 to 329 in 2017. This researched period relates to the available time-series data in Eikon database – Thomson Reuters (TR). The sample was divided into two groups: emerging and developed economies, according to the IMF economies division in 2018. The following countries are classified as developed economies: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The following countries were included in the emerging economies group: Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Macedonia, Poland, Montenegro, Serbia, Romania, Russia, and Ukraine. The study uses the ex-post data for the cost of capital.

The WACC methodology includes a two-step calculation of the cost of equity-based on the capital asset pricing model and the cost of debt. According to the WACC TR methodology, each category of capital was proportionately weighted. All sources of capital, including equity stock, preferred stock and debt, were included in the calculation of TR. The cost of equity represents the return a firm theoretically pays its equity investors. It was calculated by multiplying the equity risk premium of the market with the beta of the stock plus an inflation-adjusted risk-free rate. The cost of debt represents the marginal cost to the company of issuing new debt. It is calculated by adding the weighted cost of short-term debt and weighted cost of long-term debt based on the one-year and ten-year appropriate credit curve. Beta used in CAPM calculation represents how much stock moves for a given move in the market (based on the covariance of the security price movement to the market’s price movement).

The WACC for a company represents the minimum return that a company must earn on an existing assets base to satisfy its creditors, owners, and other providers of capital. It is calculated using the following formula:

$$ R_{WACC} = \frac{E}{V}K_E + \frac{D}{V}K_D(1-t_c) + \frac{P}{V}K_P $$

where:

- $E$ – the value of equity,
- $D$ – the company’s debt,
- $P$ – the company’s preferred stock,
- $V$ – total capital ($E + D + P$),
- $K_E$ – the cost of equity,
- $K_D$ – the cost of debt,
- $K_P$ – the cost of preferred stock,
- $t_c$ – corporate tax.
Three financial values were included in the study: total assets, total revenues, and total equity. They are the most often used indicators that present the company position on the market and firm-level characteristics [Bozec et al. 2014].

Based on the capital structure theory the following hypotheses were tested:
- **H1**: The cost of capital varies between companies in emerging and developed markets.
- **H2**: The equity cost of capital varies between companies in emerging and developed markets.
- **H3**: The debt cost of capital varies between companies in emerging and developed markets.
- **H4**: The WACC of food companies depends strongly on the size of a company, equity, and total revenues, which represent the financial indicator of the company on the market.

For the H1, H2 and H3 hypotheses verification, the U Mann–Whitney test was applied. This test was used for investigating differences between the highlighted groups of economies. The U Mann–Whitney is equivalent to the classic Student’s t-test for independent groups. It relies on ranking results of a dependent variable (from smallest to more significant) in the studied groups and then comparing two groups. To analyse the H4 hypothesis, a nonparametric correction was made. The Spearman rank correlation test does not carry any assumptions about the distribution of the data compared to the Pearson correlation ($r$).

**RESEARCH RESULTS**

Food companies vary from other industries by the business cycle, investors’ behaviour, and institutional environment [Zabolotnyy and Wasilewski 2019]. The food industry is characterized by slower adjustment to the production cycle and operation conditions of an agro-natural basis related to natural properties of plant and animal growth. The figure represents the sector of the food industry group according to the NACIS classification. The biggest number of companies listed on European stock exchanges relay to manufacturing companies (79.2%), the second-highest are companies that were classified with their major activity as agriculture, forestry, fishing and hunting (16.8%).

Table 1 presents the descriptive statistics of WACC results. In the investigated sample, the bigger groups constituted for developed economies – 892 observations and 382 – were representing emerging economies in capital markets. The WACC for the food companies sample amounts to 4.55%, while the median was lower only by 0.23%. The equity cost capital was higher than the debt cost and amounted to 5.55%, while the debt was equal to 2.06%. The cost of debt was characterized by a higher variation than equity capital, which amounts to 96.46%. It shows the different share of debt in the investigated sample. In the case of developed economies, the WACC level was lower (4.16%) than in emerging economies (5.50%). The main component that influences that difference was the cost of equity, which was higher in emerging economies and amounted to 96.46% (6.37% for median). In the case of the developing economies, the cost of the equity was lower and amounted to 4.98% on average and 4.64% median value. Due to the stage of financial market development, the cost of debt was more moderate in the developed economies group of companies. It amounted to 1.72%, while in the emerging, it was equal to 2.86%. However, the variation in the cost of debt was higher in the group of companies

![Fig. The NACIS sector structure of companies](source: Author’s own elaboration based on Eikon database.)

Table 1. Descriptive statistics of WACC across developed and emerging economies in 2015–2018 (%)

<table>
<thead>
<tr>
<th>Detailed</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>25 quartile</th>
<th>75 quartile</th>
<th>Standard deviation</th>
<th>Coefficient of variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1 274</td>
<td>4.55</td>
<td>4.32</td>
<td>3.02</td>
<td>5.82</td>
<td>3.10</td>
<td>68.11</td>
</tr>
<tr>
<td>WACC Cost of Capital</td>
<td>1 244</td>
<td>5.55</td>
<td>5.24</td>
<td>3.52</td>
<td>7.13</td>
<td>3.59</td>
<td>64.72</td>
</tr>
<tr>
<td>WACC Cost of Debt</td>
<td>1 274</td>
<td>2.06</td>
<td>1.66</td>
<td>0.48</td>
<td>3.19</td>
<td>1.98</td>
<td>96.46</td>
</tr>
<tr>
<td>Developed economies</td>
<td>892</td>
<td>4.16</td>
<td>3.87</td>
<td>2.52</td>
<td>5.50</td>
<td>3.21</td>
<td>77.34</td>
</tr>
<tr>
<td>WACC Cost of Capital</td>
<td>862</td>
<td>4.98</td>
<td>4.64</td>
<td>3.08</td>
<td>6.56</td>
<td>3.51</td>
<td>70.48</td>
</tr>
<tr>
<td>WACC Cost of Debt</td>
<td>892</td>
<td>1.72</td>
<td>1.21</td>
<td>0.38</td>
<td>2.60</td>
<td>1.81</td>
<td>105.32</td>
</tr>
<tr>
<td>Emerging economies</td>
<td>382</td>
<td>5.50</td>
<td>4.95</td>
<td>4.12</td>
<td>6.40</td>
<td>2.61</td>
<td>47.40</td>
</tr>
<tr>
<td>WACC Cost of Capital</td>
<td>382</td>
<td>6.85</td>
<td>6.37</td>
<td>4.79</td>
<td>8.01</td>
<td>3.45</td>
<td>50.38</td>
</tr>
<tr>
<td>WACC Cost of Debt</td>
<td>382</td>
<td>2.86</td>
<td>2.85</td>
<td>1.58</td>
<td>3.85</td>
<td>2.15</td>
<td>75.19</td>
</tr>
</tbody>
</table>

Source: Author’s own elaboration based on Eikon database.

Table 2 presents the descriptive statistics for WACC’s main components. According to TR data, the equity risk premium notices a similar level in the case of developed and emerging economies companies that operate in the food industry. However, the beta from developed economies (105.32%) compared to emerging economies (75.19%). It indicates different possibilities of shaping debt involvement in the capital structure and the effect of the tax shield on the WACC level.

Table 2. Descriptive statistics of equity risk, beta and market capitalization in 2015–2018

<table>
<thead>
<tr>
<th>Detailed</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>25 quartile</th>
<th>75 quartile</th>
<th>Standard deviation</th>
<th>Coefficient of variation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1 244</td>
<td>5.50</td>
<td>6.00</td>
<td>5.00</td>
<td>6.00</td>
<td>1.67</td>
<td>30.43</td>
</tr>
<tr>
<td>WACC Equity Risk Premium (%)</td>
<td>1 274</td>
<td>0.58</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.64</td>
<td>111.14</td>
</tr>
<tr>
<td>Beta</td>
<td>895</td>
<td>3 850.87</td>
<td>140.86</td>
<td>32.82</td>
<td>703.79</td>
<td>18 948.00</td>
<td>492.05</td>
</tr>
<tr>
<td>Historic Mkt Cap, 5 Yr Avg (million EUR)</td>
<td>609</td>
<td>4 626.50</td>
<td>128.64</td>
<td>34.21</td>
<td>685.69</td>
<td>21 094.23</td>
<td>455.94</td>
</tr>
<tr>
<td>WACC Equity Risk Premium (%)</td>
<td>862</td>
<td>5.54</td>
<td>6.00</td>
<td>5.00</td>
<td>6.00</td>
<td>1.51</td>
<td>27.27</td>
</tr>
<tr>
<td>Beta</td>
<td>382</td>
<td>0.49</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.63</td>
<td>128.61</td>
</tr>
<tr>
<td>Historic Mkt Cap, 5 Yr Avg (million EUR)</td>
<td>286</td>
<td>2 199.26</td>
<td>160.17</td>
<td>29.93</td>
<td>703.79</td>
<td>13 150.08</td>
<td>597.93</td>
</tr>
</tbody>
</table>

Source: Author’s own elaboration based on Eikon database.
indicates a higher level among companies listed in emerging economies on capital markets. The average beta was 0.77. The food companies on developed economies stock have higher average capitalization that amounted to 3,850 million EUR; however, the median value was much lower. Capitalization was significantly varied mainly in a group of companies from emerging economies (597.93%).

The U Mann–Whitney test results (Table 3) confirmed the significant differences between emerging and developed economies according to total WACC, WACC cost of equity, and WACC cost of debt.

Table 4 shows the correlations between WACC, cost of equity, and debt to total assets, total equity, and total revenue. All correlation ratios were significant in the case of developed economies; however, the strength of WACC relation to assets, equity, and revenues was relatively weak. The highest level of correlation was noticed in the cost of equity capital and total assets and total revenues (0.3289 and 0.3309). In the case of the developed economies group, the correlation was significant, however weak. The correlation between the cost of debt to total assets and total revenues amounted respectively to 0.2178 and 0.2068.

**CONCLUSION AND DISCUSSION**

The conducted research confirms the existing information asymmetry barrier between companies listed on European capital markets. In addition, food sector companies in emerging markets are characterized by higher volatility of quotations compared to developed economies.

### Table 3. U Mann–Whitney test results – differences between developed and emerging economies

<table>
<thead>
<tr>
<th>Detailed</th>
<th>U</th>
<th>z</th>
<th>p</th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Average Cost of Capital</td>
<td>112</td>
<td>230.0</td>
<td>–9.6629</td>
<td>0.000000</td>
<td>892</td>
</tr>
<tr>
<td>WACC Cost of Equity</td>
<td>104</td>
<td>374.5</td>
<td>–10.3110</td>
<td>0.000000</td>
<td>862</td>
</tr>
<tr>
<td>WACC Cost of Debt</td>
<td>113</td>
<td>857.0</td>
<td>–9.3925</td>
<td>0.000000</td>
<td>892</td>
</tr>
</tbody>
</table>

Source: Author’s own elaboration based on Eikon database.

### Table 4. Spearman’s rank-order correlation

<table>
<thead>
<tr>
<th>Detailed</th>
<th>Total assets</th>
<th>Total equity</th>
<th>Total revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Average Cost of Capital</td>
<td>0.2141*</td>
<td>0.1960*</td>
<td>0.1938*</td>
</tr>
<tr>
<td>WACC Cost of Equity</td>
<td>0.2224*</td>
<td>0.1701*</td>
<td>0.1920*</td>
</tr>
<tr>
<td>WACC Cost of Debt</td>
<td>0.25638</td>
<td>0.1398*</td>
<td>0.2225*</td>
</tr>
</tbody>
</table>

**Developed economies**

| Weighted Average Cost of Capital | 0.2915*      | 0.2827*      | 0.2891*       |
| WACC Cost of Equity              | 0.3289*      | 0.3099*      | 0.3309*       |
| WACC Cost of Debt                | 0.2943*      | 0.2077*      | 0.2592*       |

**Emerging economies**

| Weighted Average Cost of Capital | 0.0706       | 0.0598       | 0.0448        |
| WACC Cost of Equity              | 0.0605       | –0.0531      | –0.0041       |
| WACC Cost of Debt                | 0.2178*      | 0.0461       | 0.2068*       |

*p < 0.05.

Source: Author’s own elaboration based on Eikon database.
economies. One of the reasons for this result is the age of investigated companies. Therefore, companies’ lifecycle theory predicts that the WACC will tend to fall over the lifecycle and will prolong [Mueller 2003]. Thus, the WACC of younger firms is higher than that of mature firms [Garcia et al. 2016]. The study results support stated hypothesis H1, H2, H3, according to which the total WACC, equity, and debt distinguish the food companies on emerging and developed markets. The study was based on one main criterion of division: the state of economic development. Thus, it does not include the broad variety of factors that influence the cost of debt on different markets.

The WACC level was significantly diversified between emerging and developed economies. It carries a riskier approach to estimate the return on investment by investors. The WACC of companies from developed economies was influenced by the relationship between the cost of equity and the level of assets and revenues. Among the investigated industry from an emerging market, the WACC was determined by the cost of debt also related to the level of total assets and revenues. The H4 hypothesis was thus only partly confirmed. The study results also affirmed the results of Salehi et al. that information asymmetry is positively associated with debt and equity financing and thus influences the WACC level [Salehi et al. 2014]. An efficient market which reflects all available information in the current equity price, will enable companies to decrease the WACC level. This was also confirmed in Suto and Takehara studies [2017]. Thus, it is especially important in the case of smaller and younger firms with a limited scale of operation. Frank and Shen [2016] also underlined this issue.

Further research should include the diversification of the WACC level among the food industry according to cross-country analysis and macro-level determinants (like labour market, level of unemployment, and economic growth).

The limitation of the study is short time-series data and a limited – at this point – number of variables considered in the analysis. The research was conducted on a large group of entities, so it was not possible to make individual adjustments related to all factors influencing the cost of debt, for example, the level of the interest rate.

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ZRÓŻNICOWANIE KOSZTU KAPITAŁU PRZEDSIĘBIORSTW SPOŻYWCZYCH WŚRÓD WCHODząCYCH I ROZWINIĘTYCH GOSPODAREK EUROPEJSKICH

STRESZCZENIE


Słowa kluczowe: koszt kapitału, WACC, koszt długu, koszt kapitału własnego, europejskie firmy spożywcze, gospodarki wchodzące i rozwinięte