
Empirical Evidence on the Relationship between Capital Structure and Organizational Life Cycle

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Abstract

The paper investigates the capital structure of companies listed on the Bucharest Stock Exchange (BSE) from an organizational life cycle perspective, seen as a determinant of the decisions to finance operations and growth. For this purpose, the life cycle is measured according to the cash flows patterns. Motivated by the pecking-order theory (POT) and carried out on a sample of 59 companies in the period 2010-2020, the study uses a Least Squares Dummy Variable (LSDV) panel data model and shows that listed Romanian companies resort more to bank financing in the initial stages of their life cycle. As they reach the maturity and shake-out stages, companies reorient towards internal financial resources and equity issuance, which is in line with the POT. Furthermore, the age of companies has a rather weak effect on the financial leverage, and its effect diminishes as firms age. The results also confirm the importance of having a high level of tangible fixed assets as collateral for bank loans, but also the significant role of the industry and geographical positioning on the degree of external financing.

Key words: capital structure; life cycle; financial leverage; cash flows; external financing;

JEL Classification: M41, M10, G30

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Introduction

The theory of the organizational life cycle states that companies, by analogy with living organisms, go through predictable stages of development and that each stage of the life cycle is characterized by certain resources, competitive advantages, informational asymmetries, financial structures, strategies, etc. (Akbar and others, 2019). Dickinson (2011) concludes that companies evolve under the influence of internal factors (strategic choices, financial resources, managerial capabilities, etc.) and external factors (the competitive environment and macroeconomic conditions), and the modification of these factors determines distinct phases that define the life cycle of an entity.

The literature documents that the stages of the company's life cycle do not follow a linear, sequential model. Sometimes entities may enter an advanced stage of the life cycle, skipping two or more stages, in other circumstances firms may return to an earlier stage of their life cycle or the stages may imperceptibly overlap, making the delineation of the organizational life cycle stages a difficult undertaking. This explains, in the opinion of Walid (2019), the lack of consensus among researchers regarding the temporal delimitation, the extent and the number of stages to be considered (for example, there are life cycle models in three phases – Anthony and Ramesh, 1992; four-phase models – Miller and Friesen, 1980 and five-phase models – Dickinson, 2011). Differences of opinion also appear with reference to the criteria used to identify each phase of the life cycle. For some authors, the evolution of a company is done as it ages (Walid, 2019). Other authors consider dividends, sales growth, capital expenditures and the company's age as descriptors that must be analyzed to explain the entity's transition from one stage of the organizational life cycle to another (Ambalavanar, 2019). Dickinson (2011) is of another opinion: she develops, for the delimitation of the life cycle stages, a proxy based on the expected behavior of the cash flows (the cash flow model), her idea being later accepted by other researchers (Tian, Han and Zhang, 2015; Faff and others, 2016).

Over time, studies related to the organizational life cycle have been conducted in the financial, accounting and corporate governance literature, which highlights the interest on this topic. Their results document that organizational life cycle stages significantly influence financing, investment, asset pricing, financial

performance, dividend policy, corporate social responsibility, human resource's learning and development, reporting of economic entities (Atif, Liu and Nadarajah, 2022; Bakarich, Hossain and Weintrop, 2019; Hasan and Habib, 2017; Krishnan, Myllymäki, and Nagar, 2021; Tam, Gray and Can, 2016; Tsalidis and others, 2021; Zhao and Xiao, 2018).

A separate category of researchers has been interested in investigating the relationship between the organizational life cycle stages and the capital structure, in order to understand how corporate financing changes over time, that is, how capital restructuring takes place (Hillier and others, 2014). In general, firms try to discover the optimal capital structure that maximizes their market value. This structure, also called the target capital structure (Hillier and others, 2014), represents the optimal debt-equity ratio if it results in the lowest cost of capital (Mironiuc, 2018).

The response of the financial policy to the passage through the phases of the organizational life cycle was analyzed by Frielinghaus, Mostert and Firer (2005) in South Africa, La Rocca, La Rocca și Cariola (2011) in Italy, Tian, Han and Zhang (2015) in China, Ahsan, Wang and Qureshi (2016) in Pakistan, Pinková and Kamínková (2012) in the Czech Republic, Ambalavanar (2019) in Germany, Castro, Tascón and Amor-Tapia (2015) in France and Spain. We join the existing discussions in the literature on this topic to examine the direct impact of the corporate life cycle stages on the capital structure, which is why we pose the following research question: "*What is the extent of the capital restructuring determined by the corporate life cycle stages of Romanian listed companies?*" To answer it, the paper analyzes whether the level of indebtedness, measured by the financial leverage, and implicitly, the degree of financing through equity, of Romanian companies listed on the main segment of the BSE, changes from a stage to another and whether indebtedness is more important in the initial phases of the life cycle.

The paper is, to the best of our knowledge, **the first** to address the connection between the phases of the corporate life cycle and the level of external financing of Romanian listed companies. It joins and complements the existing literature in the field of the organizational life cycle, contributing to it by bringing new and more recent evidence regarding the existence of a relevant relationship between the financing behavior of listed firms and their life cycle, in the case of an emerging country (Romania), which is less

studied. An emerging country, where the capital market is a relatively new and less developed institution, and the opacity of business ties generates information asymmetry, with direct negative effects on the level of corporate lending (Jõeveer, 2013; Nenu, Vintilă and Gherghina, 2018) represents a relevant background for studying this topic. The macroeconomic context, dominated by the lack of available public information and the poor quality of state institutions, significantly influences the volume of corporate bank lending, which is low, and the level of interest rates, which is high (Jõeveer, 2013; Nenu, Vintilă and Gherghina, 2018). On the other hand, the poorly developed and inefficient capital market makes banking intermediation play an essential role in the development of new businesses and in their subsequent growth (La Rocca, La Rocca and Cariola, 2011), which justifies, once again, studying the association between life cycle and indebtedness in this context.

To achieve the proposed research goal, two models are used to test the two developed research hypotheses. The first one is based on the classification of firms by life cycle phase according to their cash flows patterns (Dickinson, 2011) and the second model uses the age of firms and its non-linear relationship with the capital structure (La Rocca, La Rocca and Cariola, 2011). The results reveal the impact of the business life cycle on financing resources, supporting life cycle theories according to which firms in a certain stage have different financing characteristics and behaviors compared to those in another phase. Also, the empirical study shows that the company's ability to provide material guarantees for bank loans, the specifics of the activity carried out and the geographical location in certain macro-regions of economic development explain, to a significant extent, the recourse to external financing in certain stages of the business life cycle.

The rest of the paper is organized as follows: Section 1 reviews the theoretical framework and representative studies in the field, which help developing the main research hypotheses. Section 2 describes the research methodology in the form of the variables used, sample selection and data sources, but also the used methods and developed models. Section 3 consists of the presentation and discussion of the results and the last section concludes the paper.

1. Delimitations and interactions between organizational life cycle theory and financial structure theories

The organizational literature indicates the presence of elements related to the life cycle theory in studies as early as the 50s and summarizes the entire chronology of the development of this theory in four periods (Tam, Gray and Can, 2016).

Studies related to the "primitive period" (1950-1960) look at the progress of firms biologically, with an emphasis on the management challenges and survival thresholds at certain stages (Lippitt and Schmidt, 1967). During the 70s, numerous models were developed to conceptually describe, through a different number of phases, the evolution of organizations in terms of size (from small to large) and age (from young to mature), in correlation with changes in the managerial strategies and the business environment (Scott, 1971; Greiner, 1972; Lyden, 1975). One can note the ten-stage model developed by Adizes (1979) and his key observation that the stages of organizational life "are defined by the interrelationship between flexibility and control" and not by the chronological age, sales, assets or number of employees of the organization (Frielinghaus, Mostert and Firer, 2005).

The extension of the organizational life cycle context to the SME environment is specific to the 80s, a period in which a stage of decline in the organizational life cycle is proposed for the first time, because an organization cannot remain profitable, stable and efficient for its entire life (Cameron, Myung and Whetten, 1987). Miller and Friesen (1984) review research in organizational life stage theory to identify common phases in most of the literature and to propose five generic stages of organizational growth (introduction, growth, maturity, revival, and decline), while arguing that not all organizations will go through the same stages in a linear sequence. In the same decade, Mintzberg (1984) tries to understand the power of the manager and managerial coalitions in different stages of the organizational life cycle, and Kazanjian (1988) finds that human resources are crucial in all these stages.

Tam, Gray and Can (2016) call the period of the 90s and after the "validation period", in which researchers strive to validate, by empirical means, the models of the

organizational life cycle previously proposed in a conceptual form and to debate more deeply the consistency and linearity of the stages of growth. Thus, Hanks (1990) argues that organizations do not necessarily pass through the defined growth stages, but operate actively by managing change from one stage to another without a unidirectional sequence. Drazin and Kazanjian (1990) review Miller and Friesen's (1984) five-stage model with additional tests and conclude that the stages of birth, growth, and maturity are empirically supported, thus providing further evidence for a usable three-stage model. Phelps, Adams and Bessant (2007) accept the concept of organizational problems within the life cycle and opine that overcoming them and continuing to grow depend on the speed with which organizations acquire the necessary knowledge to address them.

To conclude, we emphasize that the organizational life cycle theory, which enjoyed the greatest popularity in the 1970s and 1980s and is seen as an extension of the product life cycle theory, is the result of research in the field of strategic management (Frielinghaus, Mostert and Firer, 2005). Understanding the individual stages of the organizational life provides management with a compass to guide the firm's strategic direction and understand how to commit and balance tangible and intangible resources as the firm moves from one life stage to another. According to Frielinghaus, Mostert and Firer (2005) and Solomon, Fernald and Dennis (2003), these are critical aspects of a firm's success.

Around the time when the theory of organizational life cycle began to develop, researchers with experience in corporate finance developed the controversial theories related to the capital structure.

The debate related to the mechanisms that guide firms' financing choices began in 1958, when Modigliani and Miller published the theory of capital structure irrelevance or value invariance, according to which "the market value of any firm is independent of its capital structure" (Frielinghaus, Mostert and Firer, 2005; Myers, 1984). Their theory was developed under perfect capital market conditions ("frictionless market") or under a "deliberately artificial set of conditions" (Barclay, Smith and Watts, 1995; Frielinghaus, Mostert and Firer, 2005), i.e. a market without taxation, a market where all operators have perfect and symmetrical access to information, a market without transaction costs and with a stable investment policy. By challenging the simplifying assumptions of Modigliani and Miller, other key theories in the study of capital structure were derived.

The trade-off theory, substantiated by Kraus and Litzenberger, in 1973, disputes the hypothesis of the lack of taxes by Modigliani and Miller and introduces the effects of taxation into the analysis. According to this theory, indebted companies benefit from fiscal savings as the interest on the borrowed capital is tax deductible, which theoretically encourages the increase of indebtedness. Stiglitz (1974) brings as an argument for limiting debt to an optimal level the costs of bankruptcy, which are associated with high levels of debt (Frielinghaus, Mostert and Firer, 2005). Consequently, the static trade-off theory, an evolved variant of the initial theory, concludes that companies can establish an optimal level of indebtedness, respectively a capital structure that maximizes their market value by balancing the fiscal savings, derived from indebtedness, with the current value of bankruptcy costs (Ambalavanar, 2019; Myers, 1984).

The *pecking order theory* (POT) is authored by Myers and Majluf (1984) and comes as a reaction to the perfect information hypothesis of Modigliani and Miller. According to this theory, there is an informational asymmetry between managers, who are better informed about the company's risks and prospects, and contractual partners (creditors and investors/shareholders), who lack the same key information. Also, based on the agency relationship, there may be conflicts of interest between managers and shareholders or between shareholders and creditors, which could affect the company's financing decisions. Both situations lead to the manifestation of phenomena such as adverse selection and moral hazard, increase the company's risk, increase the cost of capital, due to the higher rewards expected by creditors, and negatively affect the participants in the contractual relationship (Mirrlees, 1971). In order to minimize the costs of adverse selection (costs of information asymmetry) and moral hazard (agency costs), managers prefer to access the necessary financing resources in a hierarchical order, that is: i) reinvested profits; ii) debt; iii) equity. Retained earnings are cheaper compared to debt and equity financing due to the avoidance of information asymmetry, in the absence of the involvement of external financiers. As for external financing, managers prefer to use debt, especially low-risk debt that usually corresponds to short-term debt, to the detriment of equity, the cost of debt being lower than the cost of equity (Serrasqueiro and Caetano, 2014). According to agency cost theory, firms use more debt in their capital structure when investors try to pressure management to use funds efficiently (Frielinghaus, Mostert and Firer, 2005).

Capital structure and organizational life cycle have largely been examined separately. Only at the beginning of the 90s did researches appear to seek to explain the interdependencies between these theories, the empirical testing of the mentioned links having appeared even later. It was observed, at that time, that understanding the characteristics of the company's life stages could facilitate the understanding of corporate financing mechanisms and the identification of the factors that determine the need to adjust the capital structure over time. The results of these interdisciplinary researches, on topics related to strategic management and corporate finance, have contributed to the formation of a body of knowledge considered by some researchers to represent the capital structure life stage theory (Frielinghaus, Mostert and Firer, 2005).

Frielinghaus, Mostert and Firer (2005) opine that early research on the connections between capital structure and organizational life cycle stages have focused their arguments on the trade-off between financial risk and business risk. For example, Bender and Ward (1993) postulate that business risk is reduced during the life stages of a firm, allowing financial risk to increase. Thus, the authors warn the firms in the early stages of life that they should have less debt to compensate for the higher business risk, and in the mature stages they should resort to debt as much as possible, encouraged by the fiscal savings. When entering the declining life stages, companies would again experience an increase in business risk and should reduce their exposure to debt. Damodaran (2001) concluded that expanding firms would primarily finance themselves with equity, while mature firms would replace equity with debt. Hovakimian, Opler and Titman (2001) believe that firms should progressively use more debt in their financing mix as they mature and also use more debt to finance existing assets and more equity to finance their growth opportunities. The results of the previously mentioned studies seem to confirm the static trade-off theory, namely that debt ratios follow a "low-high-low" model ("inverted U") throughout the life of the firm.

Against the background of insufficient empirical studies that test the link between the capital structure and the organizational life cycle, Frielinghaus, Mostert and Firer (2005) are among the first authors to carry out a pilot study, on South African industrial firms, finding a statistically significant relationship between the stage of life and capital structure. However, their results do not support the trade-off theory, but confirm the pecking order theory, according to which firms in the early and late

stages of life, which usually have less internal financing than they need, use more debt than mature firms (high-low-tall/U-shaped pattern). Similar conclusions are presented by La Rocca, La Rocca and Cariola (2011) after examining the strategic financing options of Italian small and medium-sized companies through the lens of the business life cycle. Thus, in accordance with the pecking order theory, the authors argue that in the first stages of the life cycle, debt is the first financing option for young and middle-aged companies, due to informational asymmetry and insufficient retained earnings to support the business with internal financing. On the contrary, companies can have substantially higher retained earnings in their maturity stages, being able to replace debt with internal capital and thus rebalance their financial structure in the later stages of their life cycle. Pinková and Kamínková (2012) empirically prove that Czech firms in the birth, growth and decline life cycle stages have the highest levels of debt. Furthermore, they find that this financial behavior appears to be consistent over time and across industries.

It can be seen that the empirical deductions confirm, in relation to the analyzed theories, that firms make different financing decisions from one stage to another of their life cycle, which makes the benefits and costs of debt financing vary throughout the life cycle and determine the adjustment of financing strategies. In this context, the first research hypothesis is developed:

H₁: Life cycle stages, delimited based on the cash flows patterns, are significantly associated with the level of indebtedness through bank loans in the case of Romanian companies listed on the Bucharest Stock Exchange.

In order to test whether the age of the companies also influences their financing decisions, the second research hypothesis is developed:

H₂: The financial structure of the capital of companies listed on the Bucharest Stock Exchange is significantly correlated with their age.

2. Research methodology

2.1 Variables

Table no. 1 shows how the main dependent and independent variables used in the models were calculated. It also refers to other relevant papers in the field that used the same or similar variables, in different contexts.

Table no. 1. Dependent variable, main variables of interest and control variables		
Variable	Calculation method	Source
Dependent variable		
Financial leverage (LEV)	Interest-bearing financial liabilities / (Interest-bearing financial liabilities + Stockholders equity)	(Dickinson, 2011; La Rocca, La Rocca and Cariola, 2011; Hasan and Habib, 2017)
Main variables of interest		
Life cycle stages (LCS) <ul style="list-style-type: none"> • Introduction (Intr) • Growth (Grw) • Maturity (Mat) • Shake-out (SO) • Decline (Dcl) 	Based on cash flows from operations (CFO), investments (CFI) and financing (CFF) as follows: Introduction: CFO <0, CFI <0, CFF >0 Growth: CFO >0, CFI <0, CFF >0 Maturity: CFO >0, CFI <0, CFF <0 Shake-out: CFO >0, CFI >0, CFF >0 sau CFO >0, CFI >0, CFF <0 sau CFO <0, CFI <0, CFF <0 Decline: CFO <0, CFI >0, CFF >0 sau CFO <0, CFI >0, CFF <0	(Dickinson, 2011; Tian, Han and Zhang, 2015; Hasan and Habib, 2017; Wasilewski and Żurakowska, 2020; Durana and others, 2021)
Age (Age)	ln(number of years since incorporation)	(Dickinson, 2011; La Rocca, La Rocca and Cariola, 2011; Tian, Han and Zhang, 2015; Hasan and Habib, 2017; Cucculelli and Peruzzi, 2020; Durana and others, 2021)
Control variables		
Profitability (Prof)	BDITDA/ Capital	(La Rocca, La Rocca and Cariola, 2011)
Tangibility (Tang)	Fixed tangible assets/Total assets	(La Rocca, La Rocca and Cariola, 2011; Tian, Han and Zhang, 2015; Durana and others, 2021)
Size (Size)	ln(total assets)	(Tian, Han and Zhang, 2015; Hasan and Habib, 2017; Huang, Tseng and Lin, 2020)
Industry (Industry)	Manufacturing (Man) Pharmaceutical (Pharma) Gas and electricity (G&E) Financial (Fin) Other industries (Other)	(La Rocca, La Rocca and Cariola, 2011; Hasan and Habib, 2017)
Geographical location (Geography)	The four macroregions of development of Romania (MR1-MR4)	(La Rocca, La Rocca and Cariola, 2011; Walid, 2019; Cucculelli and Peruzzi, 2020)

Source: Authors' projection

Financial leverage (LEV), as an expression of the degree of indebtedness of the company, is an essential indicator of capital structure because its level influences the financial balance of the company (Mironiuc, 2018). High leverage increases the degree of risk associated with the firm, with negative effects on its market value. Finding an optimal level of indebtedness and its appropriate structure is a constant concern for managers when implementing the financial policy. From another perspective, leverage indicates the financial constraints faced by the firms

which, by resorting to external financing, are carefully analyzed and monitored by creditors. This limits the decision-making freedom of managers (Hasan and Habib, 2017). In Romania, the external financing of listed companies mainly takes the form of accounts payable and bank loans (Huian, 2015b), the use of debt securities, such as bonds, or derivative instruments, being very limited, due to a poorly developed and ineffective capital market (Istrate, 2014; Huian, 2015a). Therefore, the use of short and long-term loans payable is the main form of

external financing for the growth of companies of all sizes, being a specific instrument for countries where the main financial intermediary is the banking sector (La Rocca, La Rocca and Cariola, 2011).

Firm *age* (Age) is often used, as a separate indicator or in combination with other indicators (eg, size), as a proxy for the life cycle of firms (Tian, Han, and Zhang, 2015; Hasan and Habib, 2017). Its use is often criticized because firms do not move sequentially from one life stage to another, so they do not necessarily go progressively from start-up to decline. Dickinson (2011) believes that the life cycle is non-sequential, as a firm can go into decline from any phase, even from the introduction stage. She proposes the classification of firms into various stages according to the *characteristics of their cash flows*. In this paper, both classification of firms into life cycle stages (the cash flows model and companies' age) are used.

Based on the reviewed literature, five *control variables* are selected, as deemed relevant to the study of the relationship between the capital structure and the corporate life cycle. *Profitability* (Prof) is considered, according to the pecking-order theory, to have an essential role in optimizing the financial structure, because profitable companies have at their disposal levers other than bank loans to finance their short- and long-term needs (Hasan and Habib, 2017; La Rocca, La Rocca and Cariola, 2011; Nenu, Vintilă and Gherghina, 2018). Therefore, a negative relationship between financial leverage and profitability is expected. The *tangibility* (Tang), expressed as the share of tangible fixed assets in total assets, is expected to be relevant for obtaining borrowed capital due to its role in guaranteeing loans (Nenu, Vintilă and Gherghina, 2018). *Firm size* (Size), inversely correlated with the probability of bankruptcy, allows firms to borrow more. Large firms have easier access to external financing and can more easily generate

economies of scale (Cucculelli and Peruzzi, 2020). This fact translates into an expected positive relationship with the dependent variable. The *field of activity* (Industry) shows the differences among sectors with different growth rates that leave their mark on the corporate financial structure (La Rocca, La Rocca and Cariola, 2011). *Geographical location* (Geography), expressed through regional dummy variables, is considered relevant because more economically developed areas, with more efficient local institutions, are potentially more accessible for obtaining bank loans (La Rocca, La Rocca and Cariola, 2011; Huang, Tseng and Lin, 2020).

2.2 Sample and data source

The data was taken from Bureau Van Dijk's Orbis database and refers to companies listed on the main segment of the Bucharest Stock Exchange, covering a timeframe between 2010 and 2020. All financial data comes from individual or consolidated financial statements, drawn up according to the IFRS. The age of the companies was calculated based on the data taken from their websites about their year of incorporation. The geographical classification was carried out according to the declared main headquarters, based on Romania's development macro-regions, at the NUTS1 level (Eurostat, 2022a). Due to availability of cash flow data, an unbalanced sample of 68 firms and 512 annual observations was obtained. Subsequently, observations with zero financial leverage were removed, leaving 59 firms and 365 observations in the final sample.

2.3 Research methods and models

In order to test the research hypotheses, a panel data analysis was performed, by developing two models, according to equations (1) and (2).

$$Y_{it} = \beta_0 + \beta_1 \times LCS_{it} + \beta_2 \times Prof_{it} + \beta_3 \times Tang_{it} + \beta_4 \times Size_{it} + \beta_5 \times Industry_{it} + \beta_6 \times Geography_{it} + \varepsilon \quad (1)$$

$$Y_{it} = \beta_0 + \beta_1 \times Age_{it} + \beta_2 \times Age^2 + \beta_3 \times Prof_{it} + \beta_4 \times Tang_{it} + \beta_5 \times Size_{it} + \beta_6 \times Industry_{it} + \beta_7 \times Geography_{it} + \varepsilon \quad (2)$$

where, t = time period (year); i = company at time t; Y = dependent variable (financial leverage – LEV); LCS = life cycle stages (dummy variables described in **Table no. 1**); Age = Age of the company, calculated from the date of its incorporation; Prof = profitability; Tang = tangibility or share of tangible fixed assets in total assets;

Size = company size; Industry = field of activity; Geography = location in the 4 economic macroregions of Romania; ε = the error term.

In both equations, we started from a *baseline model* that contained, in addition to the variables of interest LCS and Age, the control variables Prof, Tang and Size. Subsequently, dummy variables regarding the field of activity

(Industry) and geographic location (Geography) were added, which resulted in the *extended models* from equations (1) and (2). To account for the non-linear relationship between capital structure and firm age, the term age squared (Age^2) was introduced, following the model of La Rocca, La Rocca and Cariola, 2011.

In Model 1, *Ordinary Least Square* (OLS) regression was applied to the baseline model, with heteroscedasticity-consistent standard errors. For the extended Model 1, *Least-Squares Dummy Variable* (LSDV) was applied (Greene, 2003; La Rocca, La Rocca, & Cariola, 2011) with cross-sectional effects, that diminish or cancel the bias generated by the omitted variables, and with robust standard errors. The results of this model are identical to those we would obtain when applying the cross-sectional fixed-effects model, proven to be the most appropriate, according to the Hausman test. *Generalized Least Square* (GLS) regression with random effects and robust standard errors was applied to the baseline Model 2. Extended Model 2, based on the LSDV approach with cross-sectional and time effects, was validated by testing the time parameters (La Rocca, La Rocca, and Cariola, 2011).

In order to avoid the dummy variable trap (Gujarati, 2011), which creates multicollinearity issues that affect the accuracy of the calculated regression coefficients, three (two) dummy variables used in Model 1 (Model 2) were chosen as reference variables: for the life cycle – Introduction stage (Intr); for the field of activity and the economic macro-regions, the categories with the highest

frequency, namely, the manufacturing industry sector [Man] and the MR1 macro-region, formed by the NUTS2 regions North-West and Centre. To ensure normality of the distribution, the dependent variable (LEV) and the control variable (Tang) were logarithmized.

3. Results and discussion

Table no. 2 shows the descriptive statistics of the modeled variables. It is observed that the financial leverage had an average level of approximately 0.25, which denotes a low degree of use of external financing by Romanian listed companies. These low levels are not surprising for an emerging country like Romania, where information asymmetry generates problems which constitute a major impediment in companies' recourse to bank financing (Jõeveer, 2013). The negative values of the indicator are due to the negative equity of the firms in question (12 observations). The average age of the sampled firms was approximately 50 years. Around half of them (48.21%) were in the mature phase of their life cycle and 22.73% were in the growth stage. Between 10 and 11% of the companies were in the introduction or shake-out phases. Only 7.39% were in decline.

Table no. 2. Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
LEV	0.2490	0.6112	-2.8381	8.1813
Age	49.9726	36.0739	1.0000	246.0000
Intr	0.1013	0.3022	0.0000	1.0000
Grw	0.2273	0.4197	0.0000	1.0000
Mat	0.4821	0.5003	0.0000	1.0000
SO	0.1150	0.3195	0.0000	1.0000
Dcl	0.0739	0.2620	0.0000	1.0000
Prof	0.8077	2.0159	-1.5315	26.4466
Tang	0.4591	0.2404	0.0004	0.9500
Size	11.3422	1.7532	7.3187	16.1103
Man	0.4904	0.5005	0.0000	1.0000
Pharma	0.0821	0.2750	0.0000	1.0000
G&E	0.1643	0.3711	0.0000	1.0000
Fin	0.0712	0.2575	0.0000	1.0000
Other	0.1917	0.3942	0.0000	1.0000
MR1	0.3561	0.4795	0.0000	1.0000
MR2	0.2246	0.4179	0.0000	1.0000
MR3	0.3041	0.4606	0.0000	1.0000
MR4	0.1150	0.3195	0.0000	1.0000

Source: Authors' processing, 2022

Profitability was, on average, 0.80, only mature firms exceeding 1 (**Table no. 2**) and tangible fixed assets represented approximately 46% of total assets. The average size of the assets of the sampled companies was approximately 530,000 thousand euros, with fairly high standard deviations, varying between a minimum of 1,508 thousand euros and a maximum of 9,922,577 thousand euros. Almost half of the sample was represented by manufacturing companies (Man – 49.04%), 16.43% were active in the gas and electricity (G&E) sector, 8.21% in the pharmaceutical sector, approximately 7% in the financial sector (exclusively banking) and the rest (19.17%) in other sectors than those mentioned. 35.61% of the companies came from the MR1 macro-region, 30.41% from Bucharest – Ilfov and South-Muntenia (MR3 macro-region) and only 11.5% from the South-West and West

(MR4 macro-region). According to the value of GDP per capita, the most developed macro-region in the analyzed period was MR3, followed at a great distance by MR1 and MR4 (almost equal) and MR2 (Eurostat, 2022b).

Table no. 3 presents the mean of the main variables of interest by life cycle stage, industry and geography. It is observed that the most indebted firms are those in the introduction phase, with the leverage decreasing as they advance in the life cycle. Profitability, tangibility and the size of total assets showed the highest values in the maturity stage. The most indebted are the companies in the manufacturing sector, and the most profitable are those in the financial sector and gas and electricity (which are also the largest). In the macro-regions, the companies in MR3 have the biggest leverage, (they are also the largest), and the companies in MR1 are the most profitable.

Table no. 3. Descriptive statistics by life cycle stage, field of activity and geographic region

Variable	No. of obs.	LEV (Mean)	Prof (Mean)	Tang (Mean)	Size (Mean)
Life cycle stages					
Intr	37	0.3009	0.7661	0.4216	10.5483
Grw	83	0.2856	0.6803	0.4613	11.2753
Mat	176	0.2451	1.1005	0.5125	11.7749
SO	42	0.2256	0.3446	0.3290	10.9001
Dcl	27	0.1272	0.0685	0.3582	10.5040
Field of activity					
Man	179	0.3026	0.5374	0.5238	10.7913
Pharma	30	0.2344	0.7141	0.3388	11.3979
G&E	60	0.1784	1.3352	0.4925	13.8296
Fin	26	0.1720	2.7082	0.1422	10.9832
Other	70	0.2074	0.3812	0.4345	10.7288
Geographical location					
MR1	130	0.2568	1.5446	0.4777	10.6972
MR2	82	0.2063	0.2722	0.5390	11.1743
MR3	111	0.2799	0.5064	0.4262	12.1784
MR4	42	0.2267	0.3689	0.3330	11.4573

Source: Authors' processing, 2022

The correlation analysis in **Table no. 4** reveals relationships between variables of very weak, weak and moderate

intensity, both positive and negative, which minimizes the risk of multicollinearity in the developed models.

Table no. 4. Correlation analysis

Variable	1	2	3	4	5	6	7	8	9	10	11
1. LEV	1										
2. Intr	0.12	1									
3. Grw	0.15	-0.17	1								

Variable	1	2	3	4	5	6	7	8	9	10	11
4. Mat	-0.07	-0.30	-0.54	1							
5. SO	-0.14	-0.11	-0.19	-0.35	1						
6. Dcl	-0.07	-0.08	-0.15	-0.27	-0.10	1					
7. Prof	0.00	0.00	-0.03	0.13	-0.08	-0.09	1				
8. Tang	0.21	-0.10	0.04	0.24	-0.21	-0.17	-0.13	1			
9. Size	-0.07	-0.16	-0.02	0.23	-0.08	-0.13	-0.04	0.05	1		
10. Industry	-0.18	0.04	-0.01	-0.05	0.06	-0.00	0.07	-0.36	0.09	1	
11. Geogr.	-0.06	-0.04	0.06	-0.05	0.05	-0.01	-0.22	-0.22	0.28	-0.04	1

Source: Authors' processing, 2022

The results of the regression analysis are presented in Table no. 5.

Table no. 5. Regression analysis				
Variable	Model 1 Life cycle stages		Model 2 Age	
	Baseline model	Extended model	Baseline model	Extended model
Grw	-0.2755	-0.0952		
Mat	-0.8772***	-0.4326***		
SO	-1.1566***	-0.6568***		
Dcl	-0.9419**	-0.2860		
Age			0.6852	2.1689*
Age ²			-0.2021	-0.6312*
Prof	0.0252	-0.0010	-0.0142	0.0015
Tang	0.3005***	0.5466***	0.5169**	0.5064***
Size	-0.0584	0.0892	0.0082	0.0940
Pharma		-0.1601		2.2377
G&E		-1.8107***		-3.3692**
Fin		1.7529***		0.5978
Other		-3.0809***		-2.4989***
MR2		-0.2233		-0.4669
MR3		0.5293		1.4342*
MR4		-3.1409***		-2.3122
R ²	0.1071	0.8286	0.0770	0.8293
F test /Wald chi	4.39***	4.53***	12.17**	-
Year dummies	-	No	-	Yes
Company dummies	-	Yes	-	Yes

Source: Authors' processing, 2022

Table no. 5 shows that in Model 1, which uses the cash flows patterns to classify firms into the life cycle stages, both in its baseline and extended form, relatively the same independent variables have statistically significant connections with financial leverage. Thus, mature firms and those in the shake-out stage have lower debt ratios than those in the reference category (introduction stage). This confirms the idea from the literature that more mature firms generally have positive operating cash flows and

high liquidity (Dickinson, 2011; Durana and others, 2021), so a greater ability to generate internal financial resources (profits), resorting to external financing to a lesser extent. By contrast, early-stage firms have a greater need to raise capital from bank loans to grow (La Rocca, La Rocca and Cariola, 2011; Tian, Han and Zhang, 2015; Wasilewski and Żurakowska, 2020). In other words, this result is consistent with the pecking-order theory, according to which firms initially access bank loans and in the later

stages of their life cycle turn more and more to equity issues and self-financing, because they have high and stable profitability (Myers, 1984).

As for the control variables, it can be observed that there are no scale effects, as the size of the company did not influence the degree of use of external financial resources. This finding is consistent with other results from the literature, including those regarding Romanian companies (Nenu, Vintilă and Gherghina, 2018; Walid, 2019). Profitability does not turn out to be associated with leverage, which can be explained by the low level of corporate profitability. This lack of significance is also confirmed by other works that focus on the Romanian listed companies (Nenu, Vintilă and Gherghina, 2018). The only relevant financial variable was tangibility (Tang). This confirms the important role of tangible fixed assets in attracting capital from banks, for which they often serve as collateral (La Rocca, La Rocca and Cariola, 2011; Mironiuc, 2018; Nenu, Vintilă and Gherghina, 2018), meaning that a higher level of these assets is associated with higher leverage. The extended model validates the existence of a relationship between the field of activity and the level of financial leverage (La Rocca, La Rocca and Cariola, 2011), highlighting the differences between the various sectors, based on the specificity of each sector, which influences its short- and long-term financing needs (Mironiuc, 2018). Thus, companies in the gas and electricity (G&E) sector and in other sectors (Other) have a lower level of debt than those in the reference group (manufacturing) and for those in the financial sector (Fin) there is a significant and positive relationship with financial leverage. In addition, compared to the firms in the reference microregion MR1 (consisting of the NUTS2 Northwest and Center regions), the most numerous in the sample, firms located in the MR4 microregion (consisting of the NUTS2 Southwest and West regions) borrow less capital from banks. MR4 consists predominantly of companies from the manufacturing sector (Man), which represents almost 75% of the total number of companies in the region (the rest operating in the pharmaceutical and financial sectors) and companies distributed in a perfectly balanced manner between the initial stages (introduction and growth) and the most advanced stages of the life cycle (maturity, shake-out and decline). Hypothesis H₁ is validated.

Model 2 shows the low significance (only in the extended model, with a p-value < 0.1) of the variable age (Age) for the capital structure, confirming some similar results from the literature (Tian, Han and Zhang, 2015) and invalidating

others (La Rocca, La Rocca and Cariola, 2011). It is observed that both variables (Age and its square – Age²) are significant, validating the existence of a non-linear relationship, but they have an opposite sign, which shows that as firms age, the effect of age on leverage becomes weaker. This fact can be interpreted in the sense that the ageing of companies comes with the repayment of bank loans, thus reducing indebtedness, and with the use of other means of financing (Walid, 2019). Regarding the control variables, results similar to those in model 1 are found, namely the positive influence of a high level of tangible fixed assets, which can be used as a collateral for the borrowed capital (Mironiuc, 2018) and the negative association with some fields of activity such as gas and electricity (G&E) and other sectors (Other). Unlike model 1, in the second one, location in the most economically developed microregion (MR3) comes with a higher level of indebtedness than that of the firms from the reference category, a fact also confirmed by the descriptive statistics in Table no. 3. Hypothesis H₂ is partially validated.

Conclusions

The paper, based on the organizational life cycle approach, investigates the degree of dependence between certain stages of the life cycle and the capital structure of listed companies. The results validate the pecking-order theory, according to which the more mature and therefore more profitable firms substitute the financial debts, to which they resorted to during the introduction and growth stage, with profits and resources generated through equity issuance, restructuring their sources of financing. Therefore, firms at various stages of their life cycle, determined on the basis of the cash flows patterns, have different financing characteristics.

Changes in the capital structure can be a non-linear function of firm age. However, in this paper, the nonlinear relationship is of low intensity and shows that reaching maturity increases the firm's ability to generate internal resources, which allows it to gradually change its capital structure. Manufacturing companies and those located in the MR3 macro-region (which includes Romania's most developed area – Bucharest-Ifov) are the ones that borrow the most.

The results are intended to be useful to investors, creditors, managers, auditors and financial analysts in their correct assessment of companies, of the financing decisions made in various phases of their life cycle and of the determinants of the choices regarding the capital structure. The paper is also

addressed to regulators who must be aware of the need to develop and implement policies to support the growth of companies based on the most diverse financing alternatives, which ensure access to both the financial market and the markets of goods and services.

The limitations of the paper are related to the small sample size, specific to emerging capital markets. It also

focuses on a sample of well-established companies, which resort to bank loans to a rather limited extent because they have a greater variety of financial instruments at their disposal than small and medium-sized companies. Replicating the models on the case of the latter companies, for a comparative analysis, is one of the future research directions that the authors intend to pursue.

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