CAPITAL STRUCTURE OF COMPANIES APPLYING PRINCIPLES OF CIRCULAR ECONOMY

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Abstract: This paper concerns the capital structure of companies that apply the principles of circular economy. Such companies inquire information about this more sustainable approach. The objective of the paper is to find out what is the capital structure in companies that operate in the field of agriculture and are also actively involved in the circular economy system. The paper examines statistical characteristics and basic items of financial statements related to companies that apply and those that do not apply the principles of circular economy. The difference between these types of companies is thus sought. There is an analysis that includes data taken from the Cribis database of the CRIF - Czech Credit Bureau a.s. An abbreviated financial analysis focusing on absolute indicators of financial statements is used as well.

Keywords: Capital, capital structure, financing, agriculture, circularity

Introduction

The main topic of the paper is the capital structure in companies that deal with circular economy. In general, the basic economic element is a company, whose goal is usually to satisfy the needs of its customers. It does so in order to achieve and maximize its profit. Thus, each company must carefully analyse its asset and capital structure.

The current economic situation is very challenging for companies. It is therefore important to draw sufficient attention to this topic and be successful in terms of one's competition in the market. The principle of circular economy is increasingly emphasized due to current conditions as it can be a suitable tool for sustainable resources.

Companies must begin to respect nature and the environment so that there is no need to address resource scarcity in the future. The sooner they move to this environmentally friendly system, the sooner they will overcome certain barriers and problems associated with this approach. This system will then significantly benefit companies over their competitors. Environmental friendliness appeals to more and more people and hence to customers.

Better corporate culture leads to a positive effect on profitability (Fay, Feng, Patel, 2022). Thus, the paper will primarily deal with the capital structure of companies that follow the principles and methods of circular economy. In order for a company to have such a positive effect on the environment, it must have the capital to spend on this activity.

Ecosystem restoration translates into an increase in natural capital and thus human well-being. This activity must also be integrated into circular economy (Alba-Patino et al., 2021).

1 Paper Objective

The objective of this paper is to find out what is the capital structure in companies that carry out their business activities in the field of agriculture and are also actively involved in the circular economy system. In order to meet the objective, two research questions were formed:

1. What was the structure of own resources of agricultural companies applying the principles of circular economy in the Czech Republic between 2016 and 2020?
2. What is the composition of external resources of financing in relation to these companies?

2 Literature Review

The ability to create circular economy means adopting its principles at all stages of the value chain. Borrelli (2018) stated that it is necessary to consider how the circular economy principles are integrated into agricultural companies. It is definitely necessary to draw attention to the principle of renewability in the quality and size of capital stock, as it is related to welfare sustainability. Cappelletti, Rossi and Germani (2022) outlined the main obstacles to making circular economy a reality. The most critical issues include operating costs and human potential. In general, however, it follows that the production process based on circulation aims to create a closed loop system and to use resources as efficiently as possible while reducing waste and negative impact on the environment. De Pascale et al. (2021) stated that it is necessary to correctly define a specific context and to effectively apply the principles to it.

Ghafourian et al. (2022) emphasized the fact that the transition from the linear model to the circular economy model has intensified in recent years. Considerable effort has been put into evaluating circular systems, but less attention has been paid to the economic aspect. In order to propose the best option for economic profitability, cost analysis and project life cycle analysis must be performed. After their completion, it turns out that the investment in the project is economically viable. Companies confirmed medium to high success of the implementation into circular economy. According to Piyathanavong et al. (2021), it is implemented at the departmental level rather than within a company as a whole. The main driving forces are internal motivation and long-term sustainable development. Shortcomings include little knowledge and low support from top management.

In an investment project analysis, Donia, Mineo and Sgroi (2019) assessed economic feasibility with regard to investments of total capital self-financing. In circular economy, every waste product actually becomes a resource again. Restoration of these substances creates sustainable agriculture, e.g. it preserves soil fertility. Fabbri et al. (2021) highlighted the fact that soil is a natural non-renewable resource. The current rate of its use leads to degradation and loss of land for agriculture. The sustainability of agriculture considerably fell from 1950 to 2015. This was observed by Smit (2020) who also pointed out that the scenario of sustainable agriculture in 2040 strongly recommends a very significant reduction in energy and raw material consumption in combination with replacing a large amount of labour capital. Agricultural policy should be based on systematic changes. A sustainable agricultural system brings about higher labour costs and large savings in input purchases. Costs can be eliminated by purchasing local materials and involving local stakeholders. In their analysis, Kuipers et al. (2022) stated that if reusable materials are available in sufficient quantities, it can actually contribute to circular economy in agriculture. Co-operation between farmers is another way to circular economy. The areas of bio-economy and agriculture are also interconnected, where the former contributes to the development of the latter. The current and future goal of the European Union is to move from green to circular economy. Mary and Mariana (2022) analysed production costs, number of employees or turnover, and underlined the necessity of concrete and unified measures by Member States. Barros et al. (2020) aimed to compile a currently available literature review intended to contribute to the introduction and expansion of circular economy practices in agriculture.

With the growing demand of the human population for products, bio-waste from various agricultural sectors is rapidly increasing. It is usually disposed of unprofessionally. Ravindran et al. (2021) documented that this creates serious environmental problems, loss of nutrients and resources. They analysed several effective methods of using industrial biological waste. In agriculture, waste can be converted into clean energy. Fernando et al. (2022) looked into chain values as a prerequisite for circular economy capabilities. They suggest that strategic opportunities are explored in agriculture to benefit from clean energy while protecting the environment. Zadgaokar, Darwai

and Mandavgane (2022) support a concept where crop cultivation and animal farming complement each other and lead to a sustainable agricultural system. Here, the impact of one system is used as a resource for the other. Two basic human needs are related to agriculture. Therefore, sustainable agriculture is in the interest of humanity.

Regarding the available scientific sources, it is clear that circular economy is currently a highly addressed topic. Appropriate methods are being sought to put its principles into practice. At the same time, the economic efficiency of the entire system is widely consulted, along with interconnectedness with other sectors, environmental impacts, costs of circular principles or the need for human capital. However, the issue of capital, its intensity and composition, which are necessary to enter circular economy, are addressed almost to a minimum. That is the reason why the author of this paper selected the capital structure of companies applying the principles of circular economy as the main topic. Following from her work, the author wishes to contribute and help companies make the transition from linear to circular economy. Data in this paper will be evaluated with the use of an analysis.

3 Data a Methodology

The basic data source shall comprise the Cribis database of the CRIF - Czech Credit Bureau a.s. Information on agricultural companies is also available to general public in the Collection of Documents, where companies publish their financial statements every year. The data used shall be processed in Microsoft Excel. There will be two files, with the first one including 10 companies that apply the principles of circular economy (the companies are approximately the same size and they were searched for on their websites), and the second one including 10 companies that do not participate in circular economy. The files shall contain columns with ID number, company name, year, total liabilities, own resources, share capital, capital funds, profit funds, economic result (profit or loss), external resources, reserves, bank loans, short-term liabilities and long-term liabilities, with all analysed data being in thousands of CZK and relating to the period of 2016-2020. Results show that companies in circular economy have a higher capital intensity than companies in linear economy.

First, certain formulas in Excel shall be used to calculate the basic statistical characteristics, i.e. arithmetic mean, median, maximum and minimum. The formulas are as follows:

1. arithmetic mean: $\bar{x} = \frac{1}{n}(x_1 + x_2 + \cdots x_n)$

2. median: $Me(X) = \frac{n+1}{2}$

The calculations shall be performed for both files of selected companies in relation to their total liabilities, own resources, share capital, economic result (profit or loss), external resources, short-term liabilities and long-term liabilities. The resulting figures are in thousands of CZK and are mathematically rounded. The data obtained shall be classified and presented in Excel tables 1 and 2. Based on the data, a comparative method shall be used to examine whether there are significant differences in the capital structure of the companies being compared, whether external resources or own resources prevail, and how does the capital structure of the companies change in the period under review? What is the structure of own resources of agricultural companies that apply the principles of circular economy? What is the composition of external resources of these companies?

4 Results

Results are presented in tables. As regards companies involved in circular economy, total liabilities average from CZK 248 201 to CZK 392 144, reaching their maximum in 2017 and their minimum in 2016 and 2018. Own resources are similar in 2016-2018 (around CZK 115 000) and increase slightly in the next two years (up to CZK 130 000). External resources prevail over own resources, but only slightly. Share capital is almost identical in the first three monitored years (approximately CZK 77 000), increasing slightly in the next two years up to around CZK 79 000. The capital structure of such companies has a growing trend in the period under review. Their economic result is positive and at the same time it is growing in the monitored years. In 2016, it reaches its minimum of CZK 25 612 and its maximum of CZK 41 707 in 2020. External resources are, on average, higher than the companies' own resources. In 2016 and 2018, external resources are of a similar value (approximately CZK 130 000), reaching their maximum of CZK 277 079 in 2017. Short-term liabilities are lower than long-term liabilities. It is interesting that short-term liabilities are always below CZK 100 000, whilst long-term liabilities are above CZK 100 000 (except in 2016), being the highest (CZK 155 786) in 2019.

Total liabilities have their minimum value in 2018 and their maximum value in 2017. Own resources also reach their minimum in 2018 and yet their maximum in 2019. In 2017, external resources are at their minimum value in the period under review and yet reach their maximum value in 2019.

Additionally, median values for each year are given in Table 1 as well. The maximum median value of total liabilities may be seen in 2017, whereas their minimum median value in 2016 and 2018. As for own resources, their median value is the same in 2016-2018 (CZK 105 242) and in 2019-2020 (CZK 110 125). The median value of share capital is 75 847 CZK in 2016-2018 and CZK 77 280 in 2019-2020. The economic result´s median value ranges from CZK 20 513 to CZK 29 007. The lowest median value of external sources may be observed in 2016 and 2018 and the highest in 2017. When regarding short-term liabilities, their median value is at its minimum in 2017 and at its maximum in 2016, whilst long-term liabilities are the lowest in 2016 and 2018 and the highest in 2017, 2019 and 2020.

Table 1: Basic statistical characteristics of companies applying principles of circular economy

Arithmetic means of companies applying principles of circular economy							
Year	Total liabilities	Own resources	Share capital	Economic result	External resources	Short-term liabilities	Long-term liabilities
2016	248274	117307	77679	25612	130648	74575	95585
2017	392144	115308	77915	27787	277079	13888	147424
2018	248201	116452	77950	28985	131621	24253	105787
2019	297120	125421	79402	32047	172264	19450	155786
2020	296784	130852	79405	41707	166140	24586	144160
Maximums and minimums of companies applying principles of circular economy							
Year	Total liabilities minimums	Total liabilities maximums	Own resources minimums	Own resources maximums	External resources minimums	External resources maximums	
2016	210520	279300	95120	135306	95400	156420	
2017	280490	452100	96260	142500	180510	297540	
2018	198520	298410	93250	148510	95420	156941	
2019	205120	356400	105200	168500	104120	196360	
2020	205630	364580	107600	143500	105640	188450	
Median values of companies applying principles of circular economy							
Year	Total liabilities	Own resources	Share capital	Economic result	External resources	Short-term liabilities	Long-term liabilities
2016	214812	105242	75847	20513	105048	66875	90522
2017	356251	105242	75847	22152	198520	10152	120103
2018	214812	105242	75847	22152	105048	20542	90522
2019	285621	110125	77280	28042	125412	17052	120103
2020	285621	110125	77280	29007	125412	20542	120103

Source: Own processing based on own data selection

As regards companies that do not participate in circular economy, total liabilities average from CZK 228 374 to CZK 362 254. These and the following figures are shown in Table 2. Own resources

range from CZK 105 018 to CZK 122 317 in the period under review. Share capital is stagnant in the first three monitored years and yet increases slightly in 2019 and 2020. The economic result of such agricultural companies is always positive, reaching its minimum in 2016 and its maximum in the last year. External resources are at their lowest in 2016 and so are short-term liabilities and long-term liabilities. The highest mean of external resources is in 2017, the highest mean of short-term liabilities is in 2018 and the highest mean of long-term liabilities is in 2017.

Total liabilities are the lowest in 2018 and the highest in 2017. The minimums of own resources range from CZK 94 320 to CZK 105 200, whereas their maximums range from CZK 126 306 to CZK 152 510. External resources have their lowest minimum in 2016 and the highest minimum in 2017, whereas their lowest minimum is in 2016 and their highest maximum in 2017.

The median values are in the range from CZK 213 802 (in 2016) to CZK 326 351 (in 2017). Own resources have their median values almost comparable in the monitored years (they range from CZK 101 925 to CZK 105 425). Share capital had the lowest median value in 2019 and the highest one in 2018. Also, these agricultural companies reported a profit as their economic result (being the lowest in 2016, similar in 2018 and the highest in the last monitored year, i.e. 2020). External resources grew in 2017 and 2018 and yet decreased in the next two years. Short-term liabilities are the lowest in 2016 and the highest in 2018. Long-term liabilities are significantly higher than short-term liabilities, reaching their minimum in 2016 and their maximum in 2017.

Table 2: Basic statistical characteristics of companies not applying principles of circular economy

Arithmetic means of companies not applying principles of circular economy							
Year	Total liabilities	Own resources	Share capital	Economic result	External resources	Short-term liabilities	Long-term liabilities
2016	228374	122317	67129	15302	106308	15075	82085
2017	362254	105018	68156	17157	257129	14088	126024
2018	236211	114152	68156	22085	122621	23653	92507
2019	282320	115321	72158	28447	167214	20140	123086
2020	249845	121652	73140	35607	126130	20286	94160

Maximums and minimums of companies not applying principles of circular economy						
Year	Total liabilities minimums	Total liabilities maximums	Own resources minimums	Own resources maximums	External resources minimums	External resources maximums
2016	200120	278301	94320	126306	94300	161420
2017	310490	422130	96810	131500	171510	217540
2018	196510	289410	96350	152510	95300	152911
2019	203210	326300	102310	152500	103220	183310
2020	204660	345180	105200	151500	103140	182400

Median values of companies not applying principles of circular economy							
Year	Total liabilities	Own resources	Share capital	Economi cresult	External resources	Short-term liabilities	Long-term liabilities
2016	213802	105242	70817	19013	100028	10170	80156
2017	326351	102041	70817	21022	208120	11840	119420
2018	215802	103262	73407	19252	215148	22670	102450
2019	275521	105425	69150	23152	145012	19450	101523
2020	215601	101925	70180	30427	113402	21521	95143

Source: Own processing based on own data selection

5 Discussion of Results

Total liabilities of agricultural companies that apply the principles of circular economy are higher than those companies that do not support the principles. The analysed data indicate answers to the previously established research questions.

1. What was the structure of own resources of agricultural companies applying the principles of circular economy in the Czech Republic between 2016 and 2020?

As can be seen from Table 3, own resources of companies with circular economy are higher than those of other companies. Own resources and share capital thus allow them to better focus on the sustainable use of resources and deepening circularity in a number of activities. The use of own resources in the transition to circularity is one of the important sources of financing.

2. What is the composition of external resources of financing in relation to these companies?

Agricultural companies in circular economy also have their external resources in higher figures than other companies. In particular, short-term liabilities and long-term liabilities are significantly higher. The transition to circular economy is costly and external resources must be taken into account. Banks play a big role here. In general, it may be stated that the bigger the company, the higher the costs. The transition to circular economy requires significant changes in a number of processes that must be set in order to be profitable in the long run. SMEs are more flexible and at an advantage in the transition to circularity. The system will not do either without the financial support of the state and the European Union. As stated by Borrelli (2018), the size of capital stock is crucial. Nowadays, many companies underestimate circular economy. However, it is certain that the sooner they abandon linear economy, the better. Ghafourian et al. (2022) emphasized the fact that in recent years, the number of companies in circular economy has been growing. Agricultural companies often perceive the principles of circular economy as an order from the EU, whereas for other companies ecology is already the norm, and for some other companies these principles are a competitive advantage. According to Piyathanavong et al. (2021), the principles are implemented at the departmental level rather than within a company as a whole.

By 2015, the sustainability of agriculture had fallen considerably. Smit (2020) pointed out the need to reduce energy and raw materials. He mentioned the involvement of local materials and co-operation between farmers as the necessities. At the same time, linking bio-economy and agriculture is a suitable way. According to Mary and Marian (2022), the European Union's current and future goal is to move to circular economy.

Circular economy has already been addressed in the European Green Deal, which was issued by the European Commission in December 2019. Subsequently, The Circular Economy Action Plan: Cleaner and More Competitive Europe was introduced in March 2020. The plan focuses on the sustainable use of resources, follows on plans from previous years and is the basis for the transformation of all sectors. One of its aims is to ensure that all packaging on the EU market be recyclable by 2030 (Ministry of Industry and Trade, 2021).

The author’s findings coincide with previous analyses and will serve as a source of information for companies that are considering and preparing themselves for the transition to circular economy.

Table 3: Comparison of arithmetic means in relation to agricultural companies for the year 2020

Arithmetic means of companies applying principles of circular economy							
Year	Total liabilities	Own resources	Share capital	Economic result	External resources	Short-term liabilities	Long-term liabilities
2020	296784	130852	79405	41707	166140	24586	144160
Arithmetic means of companies not applying principles of circular economy							
Year	Total liabilities	Own resources	Share capital	Economi cresult	External resources	Short-term liabilities	Long-term liabilities
2020	249845	121652	73140	35607	126130	20286	94160

Source: Own processing based on own data selection

The paper contributes to emphasizing the necessity for long-term sustainable agriculture and its financing. The objective was to analyse own resources and external resources of agricultural companies that apply the principles of circular economy, with 2016-2020 being selected as the period under review. Using specific formulas in Excel, arithmetic means, median values as well as minimums and maximums were calculated for total liabilities, own resources, share capital, economic result (profit or loss), external resources, short-term liabilities and long-term liabilities in relation to companies involved in circular economy and companies involved in linear economy.

Above all, companies need support in the transition phase to circulatory system. The whole transformation must be well processed and secured. Companies therefore face financial challenges where banks play a key role. The government should raise awareness of the need for circular economy, motivate agricultural companies, provide them with more subsidies and guarantees and also amend laws and regulations that will protect the circular business. Circular economy is a great opportunity as well as challenge for agriculture and the whole society.

6 Conclusion

The objective of the paper was fulfilled, the structure of own resources and external resources of agricultural companies in circular economy between 2016 and 2020 was analysed in the Results section with the use of individual calculations of arithmetic means, median values, maximums and minimums. Certain limits of the research were found while collecting data and searching for agricultural companies that apply the principles of circular economy. It was difficult to distinguish between companies that apply and those that do not apply circular economy. The limit of the research was also in the subjectivity of selecting the calculation sample. Only specific companies, which may not have the same characteristics (and may show some differences on their own), were selected. Moreover, included in the paper are contributions with regard to the environment, society and economy. In terms of the environment, it is the idea of supporting the conservation of national natural resources and recycling of raw materials. The social contribution can be seen in the realization that the goal of entrepreneurial activities is not only profit, but also a sustainable solution to a given problem. As for economy, the emphasis is put on the competitiveness of companies and opening up space for innovations.

Circularity is increasingly discussed as a topic. The practical benefit for this scientific field as well as for the professional community is seen in analysing the capital structure of companies in circular economy. Own resources and external resources of such companies are higher than of companies without circular economy. The reason is observed in the cost of establishing and maintaining the circulatory system. Particular numbers are the subject of this paper. Firms that are actively involved in sustainability must be inevitably supported by the state and the European Union in terms of financing.

As a theoretical enrichment of knowledge in this area is the fact that circular economy must be associated with corporate social responsibility. Sustainability must become the standard not only for agricultural companies. Apart from circular economy, there are not many other alternatives of how to make better use of resources. However, this also requires clear, direct policy and simple legislation.

The topic for the author's next paper could consist, for instance, in monitoring of subsidy titles in relation to circular economy, the EU's approach to circular economy and how this affects companies and their economy.

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