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Article

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BUSINESS MODELS FOR CIRCULAR ECONOMY AND SUSTAINABLE DEVELOPMENT: THE CASE OF LEASE TRANSACTIONS

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Abstract
The purpose of this paper is to discuss the features of leasing as a business model in the circular economy, which is presumed to support sustainable development by product recirculation and driving economic performance. In particular, this study highlights microeconomic benefits for listed Romanian companies, showing that adopting a "greener" business model, as in the case of leasing, does not penalize firms economically but it is a catalyst for increasing their performance, both in terms of accountancy-based measures (return on assets and return on sales), but also in terms of the subjective perceptions of investors and financial analysts operating on the capital market (proxied by Tobin's Q and market to book value of equity). Based on 266 observations from companies listed on the Bucharest Stock Exchange (BSE) during 2013-2016, the study uses regression analysis to show that financial performance is higher for quoted Romanian companies that use leasing and renting and that performance is also directly associated with leasing intensity, *i.e.* the share of the value of the rights to use leased goods in the total value of property, plant and equipment.

Keywords: circular economy, product-service systems (PSS), leasing and renting, sustainable development in Romania.

Clasificare JEL: D29, L25, M19, M41.

Introduction

Sustainable development of companies, countries, and at a global level integrates economic performance indicators with environmental and social ones. In this context, in the recent years, circular economy is a topic highly discussed at the political level, but also within academic and non-governmental fora, being seen as an innovative economic model,

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superior to the classical, linear, one, which emphasized, in particular, the economic dimension, to the detriment of the environmental one through the inefficient use of resources with a negative impact on the natural environment. By contrast, circular economy is presumed to increase resource efficiency by recirculation, products being either reintroduced into a new economic cycle or reintegrated into the natural circuit, thus reducing waste and pollution and allowing for a better balance between the components of sustainable development.

Implementing the circular economy at a microeconomic level is based on *circular business models* such as *product-service systems*, in which goods are produced primarily for the sale of services arising from their functionality and not for an actual sale (*e.g.* rental and leasing transaction or the simultaneous use of a product by multiple users). However, the success of such business models and, implicitly, the gradual transition from the classical economic model to a circular type entails on the one hand, a broad and conjoint involvement of the various economic, political and social actors, but also the necessity that these models are financially sustainable, *i.e.* the need for "an economic return on investment, in order to provide suitable motivation to companies and investors" (Ghisellini et al., 2016).

Although the concept of *circular economy* is rather widespread and discussed in the literature, its implementation at a global scale, as well at the microeconomic level is still in its infancy, being mainly focused on recycling rather than on re-use (Ghisellini et. al., 2016; Sousa-Zomer et al., 2017). In addition, there are very few empirical studies that provide actual data on the impact of the business models specific to the circular economy, in what concerns either the environment or their financial sustainability, which offers new research opportunities.

In this context, this study aims to discuss and provide empirical evidence of leasing and hiring as circular business models based on re-use of products in business to business transactions. The paper is structured as follows: the first paragraph discusses the concept of circular economy as a premise for new business models, while the second paragraph presents the characteristics of leasing as a business model in the circular economy and its environmental and financial impact. The third paragraph describes the research methodology and the forth one presents and comments on the results of the research. The last paragraph summarizes and concludes the work.

1. Circular economy as a premise for new business models

Circular economy is a new "emerging institution" (Stål and Corvellec, 2018), still in its early stages of development (Sauvé et al., 2016, p.53), promoted by the EU (European Commission, 2015; 2017),), or by the governments of many countries - such as China, Japan, Great Britain, France, Canada, the Netherlands, Sweden, Finland etc., but also by companies around the world (Korhonen, 2018, p.39) and non-governmental organizations (e.g. Ellen MacArthur Foundation, 2010). As an emerging concept, there is not yet full consensus on the definition of the concept (Kirchherr et al, 2017), although, in general, circular economy is construed as a model that ensures economic development in connection with the protection of the natural environment for a sustainable development. In the circular economy, resources extracted from nature are used in the production of goods which, after use, are reintegrated either into the natural circuit as biodegradable materials or are introduced into a new economic cycle through repair, rebuilding, refurbishing, reuse,

recycling etc., the entire economic circuit being a circular one, a closed loop. In essence, the concept of circular economy is defined as an "industrial system that is restorative or regenerative by intent and design" (Ellen MacArthur Foundation, 2013, p.7).

The model of circular economy has been increasingly promoted over the past decades as a model for replacing the classical, linear, economic approach in which products are manufactured, used and then eliminated with a significant loss of value, due to the exhaustion of classical material resources, the need for protecting the natural environment and promoting sustainable business development. At a macroeconomic level, both in Europe and in China or other countries, circular economy is seen as an intermediate goal towards the ultimate objective of decoupling economic growth from resource consumption (Ghisellini et al., 2016, p.24). According to Korhonen (2018, p.39-40), the successful application of the concept of circular economy involves all three dimensions of sustainable development: the economic dimension, the protection of the natural environment and the social dimension. Circular economy involves behavioural mutations at both the producer and the user level. As a result, a product has to be thought of as reusable, recyclable, biodegradable and/or entailing zero waste/emissions. On the other hand, the circular economy is related to a new culture of consumption of products that involves new consumer systems defined as ”user groups and communities sharing the use of the function, service and value of physical products (…) as opposed to individuals that only own and consume (“run down”) the physical products” (Korhonen, 2018,p.41).

The transposition of the concept of circular economy at the microeconomic level led to the design and adoption of circular business models. In a circular business model, an economic organization creates value in a circular economic system that "involves creating value by exploiting value retained in used products to generate new offerings” (Linder and Williander, 2015). Circular business models cover a wide range of activities, from waste recycling as raw materials and/or natural decomposition to minimal costs and non-pollution, designing modular and adaptable products to the uncertain and dynamic world of contemporary business, or providing services - by leasing, renting and simultaneous use of the goods by several users, remanufacture and re-use of the products (Lewandowski, 2016; Nußholz, 2017; Sousa-Zomer et al., 2017; Korhonen, 2018). As it is observed, in the circular economy, companies rather produce tangible goods not in order to sell them as such, but to sell their use or functionality, also called the "servitization of products". This approach gives rise to the business concept of “product-service systems” (PSS).

A product-service system (PSS) can be defined as a system of products, services, as well as partner networks and support infrastructure that are competitive, able to meet the specific needs of customers, and have a lower impact on the environment compared with the traditional business models (Mont, 2002).

Tukker (2004) identified three main groups of such serviced-based business models:

- "product-oriented services": the business model is still mainly based on the sale of products, but it includes post-sale services required during the period of product use, such as maintenance, financing, consultancy and technical and managerial assistance to optimize the use of the good, supply of consumables, and end-of-life take-back contracts;

- "use-oriented services": the traditional product still has a central role, but the business model is not aimed at selling the products, as the ownership of the goods remains with the

supplier, which transfers only use rights. It is the case of leasing, renting or product use by multiple users (product pooling);

- "result-oriented services": In this business model, the customer and the supplier agree on an expected result or performance level without involving a predetermined product. This is the case for the most of the outsourcing contracts of the company activities that include performance indicators controlling the quality of the outsourced service, although most often the way in which the activity is carried out does not essentially change (for example, the outsourcing of cleaning services, catering, unit payment for photocopying, etc.).

In the context of the product-service systems specific to the circular economy, the concept of "leasing society" is used in the sustainable development literature (Fischer et al., 2012; 2015), which is a concept developed from the classical meaning of lease transactions consisting in providing a right to use a good for a period of time in exchange for a payment and returning the good to the supplier-owner for re-cycling. Accordingly, "leasing society" is construed as a social construct obtained circumscribing the leasing model to the sustainable development model. According to Fischer et al. (2015), the notion of "leasing society" is based on two main pillars: "1. More innovative and service-oriented business models to fulfil customer needs, focusing on the provision of product use and result of product use, and 2. A product ownership staying in the realm of the producer, while the customer either uses the actual product or consumes the actual result of the product use". In a "leasing society", leasing transactions run between businesses (business-to-business: B2B) as well as between business and end-consumers (business-to-consumer: B2C) and are circular business models as the supplier-owner recovers the asset at the end of a lease or at the end of its lifetime and (re)integrates into a new economic cycle with a minimal impact on the natural environment.

2. Leasing as a business model in the circular economy: economic and environmental impact

Leases are not a new variety of transactions within the business environment, but the novelty consists in its analysis as a business model specific to the circular economy, being theorized as one of the "product-service" (PSS) systems, i.e. a "use-oriented services system".

In the classical definition, a lease is a contract that gives the right to use an asset (the underlying) for a certain period of time in exchange for a consideration (IFRS 16, paragraph 9, according to IFRS (2001)). In a lease transaction, the lessee controls the use of the underlying during the term of the lease and has the obligation to return the leased asset to the lessor at the end of the lease term (IFRS 16, BC 28, according to IFRS (2016)). In the leasing model, it is the right to use an asset that is acquired (rights to use property, industrial equipment and plant, cars, aircrafts, office equipment, etc. - goods called generic fixed assets or tangible assets) in return for lease payments, with the option of buying the asset that was the subject of the lease at a residual value which takes into account previous lease payments. From this point of view, leasing is considered as an alternative to other sources of finance - equity and debt and can take several forms: operating lease, the finance lease and lease-back (IAS 17 and IFRS 16, according to IFRS (2001;2016)).

Treating leasing as a circular business model for sustainable development, involving the sale of a service and the recirculation of the good (Ghisellini et al., 2016; Guldmann, 2016; Korhonen, 2018), brings novelty to the fact that the producer or the supplier, who remains the owner of the asset throughout its useful life, attempts to control the leased assets at the end of the (first) use period for the renewal, refurbishment, remanufacturing of the product and recycling of the materials. So, within product-service systems, such as leasing and renting, a company offers the customer access to the product, but retains the property, and at the end of the life of the asset, the lessor recovers it for remanufacturing or recycling as raw materials, thus diminishing the impact on the natural environment. Therefore, in a leasing transaction, the ownership of the asset is split into two components: the legal property that remains with the producer/supplier, which is the "legal owner of the underlying asset" (IFRS 16, BC 22) and the economic ownership, which is transferred to the lessee (the user) in exchange for a series of payments. Thus, leasing becomes an alternative to the traditional "buy and own" model (Lewandowski, 2016).

The comparison between the linear business model, based on the sale of products and the circular business model, based on leasing and renting, is summarized in Table no. 1:

Table no. 1: The comparison between the linear business model (sale of goods) and the circular business model based on rental and leasing

Characteristics of the business model	Sale of goods	Leasing and rental of goods
Property of the goods	Belongs to the buyer through the purchase of the products	Remains with to the producer or other supplier (leasing company)
Access to asset (right of use)	Unlimited, according to property rights	Limited for the duration of the lease, the user having the economic property
Operating costs	User-supported	Operational costs: user-supported; Some costs (e.g. property taxes, etc.): incurred by the owner
Returning the goods to the supplier as a prerequisite for recirculation	Not assumed	Assumed to occur at the end of the rental or leasing period
The cost of managing the asset at the end of its life and recirculation	Not (clearly) defined	Supported by the producer
The economic and environmental impact (a “green” transaction) expected	Economic performance expected; Environmental performance not defined	Economic performance expected; Environmental performance expected, leases being considered "green" transactions

The literature provides with case studies that show an extension of leasing as a business model specific to the circular economy involving other goods than buildings, equipment and industrial machinery, motor vehicles, ships and aircraft. For example, Stahel (2016, p.436) cites the case of Michelin, who has sold the use of tires ("by the mile") since 2007 for car carriers. In order to increase the useful life of the tires, mobile workshops for "repair and regrooving" were used. To close the loop, the used tires are recovered and sent to Michelin regional factories for retreading and reuse. Stahel (2016, p.436) documents the same approach for the Swiss company Elite for hotel mattresses and for textile leasing

companies that "offer uniforms, hotel and hospital textiles and industrial wipes as service", selling only their use.

As we have shown, in sustainable development studies, leasing and renting are considered as business models that have a high potential for achieving economic performance, but at the same time they are "green" transactions that can make a significant contribution to the protection of the natural environmental. Agrawal et al. (2012) claim that, as leasing is perceived as being superior to selling/purchasing, some companies adopt lease business models to make their image more "green." However, there are authors who consider that a multiple use of services by leasing and renting does not automatically lead to a lower impact on the natural environment. In this sense, Mont (2002) shows that the impact of leasing on the environment depends, to a large extent, on the circumstances, schemes, and the conditions surrounding the use of the leased products.

However, the sustainable development of companies cannot be conceived beyond economic performance. However, there are very few empirical studies linking economic performance to leasing as a business model. A research by Bourjade et al. (2017) on a sample of 73 international airlines for the period 1996-2011 shows that, amid the loss of profitability in the industry, many airlines use operating leases to improve their financial performance; and the authors claim that the desired increase in performance occurs only if there is an optimal level (a certain share of the leased assets in the total fixed assets of the companies).

Another research that links lease transactions to financial performance belongs to Richardson et al. (2014), who analysed the financial impact of different types of leases employed in the air transport sector based on 2011-2012 financial data for 23 out of the 29 large US airports. Their results show that the type of the lease agreement significantly affects the financial performance of airports defined by five key financial performance areas (cost efficiency, revenue generation, commercial performance, financial profitability and capital investment).

Other studies analyse the factors that drive the companies to enter into lease agreements. As we have shown above, leasing is also an alternative form of financing that provides access to the use of tangible non-current assets. Some research results show that the use of leasing is also determined by the financial position of companies. For example, Koh and Jang (2009) show that in the hotel industry, companies have used operating leasing not only for having access to operating equipment, but also as a financing instrument, by means of *sale and lease back* agreements. This study also showed that hotel companies with reduced internal funding or more leveraged are more likely to use operating leases.

Rogers and Rodrigues (2015) show that long-term leasing of cars could be a financially beneficial solution for both the supplier and the customer in a sustainable development. Rogers and Rodrigues (2015) also took into account the environmental consequences of keeping a vehicle in service for longer periods, showing that because most of the emissions come from primary production and vehicle manufacturing, extending the life of the asset reduces the annualized value of these emissions in the natural environment.

However, there are very few research results providing empirical data on the economic performance of lease transactions, as well as the measurement of their environmental impact, this field of research being in its initial stages of development. In this context, this paper aims to provide empirical evidence of leasing and renting as circular business models

in Romania, highlighting the extent to which they permit sustainable development in terms of financial performance.

3. Research methodology

This study focuses on companies listed on the Bucharest Stock Exchange (BSE) in the last four years (2013-2016) on both the Premium and Standard tiers (Table no. 2). The chosen interval represents the most recent period after Romanian listed companies mandatorily adopted international standards for financial reporting in 2012 to ensure the comparability of accounting variables. Out of the 316 firm-year observations, companies in insolvency or judicial reorganization and missing financial data reduced our population to 266 firm-year observations. The remaining sample contains 31.6% companies listed on the Premium tier and 79.7% profit-firms, with manufacturing and financial industries being the most represented (53.4% and 16.2%, respectively), which is representative for the structure of companies listed on the BSE. The source of data for financial information was Thomson Financials database, any missing data being supplanted with data collected from the companies' reported financial statements, and the BSE website. Any remaining missing financial data was subjected to listwise deletion. The authors performed cross-checks to ensure data accuracy.

Table no. 2: Sample composition (panel data)

Firm-year observations included in the sample	
Observations for companies listed on the BSE (2013-2016)	316
Less companies in insolvency or judicial reorganization	(40)
Less missing financial data	(10)
Total	266
Tier	
Premium	31.6%
Standard	68.4%
Performance	
Profit firms	79.7%
Loss firms	20.3%
Industry [a)]	
Accommodation and food service activities	6.0%
Construction	3.8%
Electricity, gas, steam and air conditioning supply	3.0%
Financial and insurance activities	16.2%
Human health and social work activities	0.4%
Manufacturing	53.4%
Mining and quarrying	4.1%
Professional, scientific and technical activities	1.1%
Transportation and storage	6.0%
Wholesale and retail trade	6.0%

Note: a) Romanian industry classification codes (CAEN – Classification of National Economic Activities) in compliance with United Nations' ISIC Rev. 4 (International Standard of Industrial Classification of All Economic Activities) and Eurostat' NACE Rev. 2 (Statistical classification of economic activities in the European Community).

To increase the validity of our variables operationalisation, we have opted for four measures of firm performance: two accountancy-based: return on assets (ROA) and return

on sales (ROS), and two stock-based measures: Tobin's Q measured as the ratio between the sum of the market value of the companies' equities and liabilities and the sum of their book value and Market to Book Value, *i.e.*, the ratio between the market value of equities and their book value (MarketToBook).. As discussed elsewhere (Haslam *et al.* 2009), the accounting-based measures relate to the companies' recent past performance and are construed as 'objective' financial evidence of the firms' operations. Contrariwise, the market-based measures refer to current financial performance, but also to the future potential for success and are substantially driven by 'subjective' perception of investors and financial analysts.

The same approach was adopted for the use of lease transactions, for which two measures were employed: a dummy variable (LeaseDummy) that captures the extent to which companies enter into lease agreements and LeaseIntensity, measured as the ratio between the value of the use rights acquired under (finance or operating) lease or rental transactions and the total value of tangible assets. For financing leasing contracts, the value of usage rights is measured through the carrying amount of the leased assets. For operating leases, companies do not provide sufficient information about their commitments for future lease payments and contract durations, so that the value of the use rights was estimated based on the annual payments, discounted at an average interest rate of 10% per year for a period of 5 years, this being the average duration of the commitments reported by companies with quality financial statements. This approach is similar to the one employed in the literature (e.g. Devos and Rahman, 2014)

Following previous literature (Campbell and Minguez-Vera, 2008; Wang and Clift, 2009; Vafaei et al., 2015) and within the constraints of data availability for the BSE, we employ several control variables that can explain financial performance, that is, we control for the effect of companies size, leverage and quality of corporate governance proxied by the size of the board of directors. We also control for companies' age measured in terms of the years of listing on the stock market and also their investing opportunity proxied by assets in place. The investment in assets (inventories and property, plant and equipment) is employed as an inverse growth indicator.

Based on the theoretical arguments advanced in the literature about the impact of leasing transactions on the economic dimension of sustainability, we posit that:

- H_1: Financial performance is higher for quoted Romanian companies that use leasing and renting;
- H_2: Financial performance is directly proportional to the lease intensity.

The hypotheses were tested based on the following regression models:

$$Performance_{ij} = \alpha_0 + \alpha_1 x LeaseDummy_{ij} + \alpha_2 x FirmSize_{ij} + \alpha_3 x BoardSize_{ij} + \alpha_4 x FirmAge_{ij} + \alpha_5 x Leverage_{ij} + \alpha_6 x AssetsInPlace_{ij} + \alpha_7 x IndustryDummy_{ij} + \alpha_8 x YearDummy_{ij} + \varepsilon_{ij} \quad (1)$$

$$Performance_{ij} = \alpha_0 + \alpha_1 x LeaseIntensity_{ij} + \alpha_2 x LeaseIntensity^2{}_{ij} + \alpha_3 x FirmSize_{ij} + \alpha_4 x BoardSize_{ij} + \alpha_5 x FirmAge_{ij} + \alpha_6 x Leverage_{ij} + \alpha_7 x AssetsInPlace_{ij} + \alpha_8 x IndustryDummy_{ij} + \alpha_9 x YearDummy_{ij} + \varepsilon_{ij} \quad (2)$$

Where:

$Performance_{ij}$ – stands for ROA_{ij}, ROS_{ij}, Tobin's Q_{ij}, and $MarketToBook_{ij}$;

ROA_{ij} – Return on assets for company i in the year j, computed as $Net\ Income_{ij}$/$Total\ assets_{ij}$;

ROS_{ij} – Return on sales for company i in the year j, computed as $Net\ Income_{ij}$/$Total\ sales_{ij}$;

Tobin's Q_{ij} – The ratio of the company i 's market value in the year j and its book value, calculated as ($Market\ capitalization_{ij}$ + $Liabilities_{ij}$)/($Owners'\ equity_{ij}$ + $Liabilities_{ij}$);

$MarketToBook_{ij}$ – Market to book value for company i in the year j, computed as $Market\ capitalization_{ij}$/ $Total\ common\ equity_{ij}$;

$LeaseDummy_{ij}$– A dummy variable equal to 1, if the company i uses leased assets in year j and 0 otherwise;

$LeaseIntensity_{ij}$ – Lease intensity of company i in year j computed as (Carrying amount of usage rights under finance $leases_{ij}$ + Discounted value of future lease payments for operating $leases_{ij}$)/(Total tangible $assests_{ij}$ + Discounted value of future lease payments for operating $leases_{ij}$);

Bourjade et al. (2017) documented a nonlinear (non-monotonic and concave) relation between leasing intensity and the accountancy-based measures of performance, therefore, the regression model (2) also includes the variable $LeaseIntensity_{ij}^2$;

$FirmSize_{ij}$ – Natural logarithm of total assets of company i in the year j;

$BoardSize_{ij}$ – Natural logarithm of the number of board members for company i in the year j;

$FirmAge_{ij}$ – Natural logarithm of the age of company i in the year j, measured as the period over which it was listed on the BSE;

$Leverage_{ij}$ – Ratio of debt to total assets of company i in the year j;

$AssetsInPlace_{ij}$ – Ratio of total inventory, property, plant and equipment to total assets of company i in the year j;

IndustryDummy and YearsDummy are dummy variables used to control for time and industry fixed effects

4. Research results

Research results show that the majority of listed Romanian companies use leasing and rentals (72.2%, Figure no. 1). However, quoted companies prefer operating rather than finance leasing (66.2% vs. 27.4%), which can be explained by the different accounting policies in place that require the recognition of lease liabilities in the case of finance lease transaction and the consequent increase in leverage. In the case of operating leases, companies only recognize the costs occasioned annually by those transactions without recognizing the rights of use and the related debts.

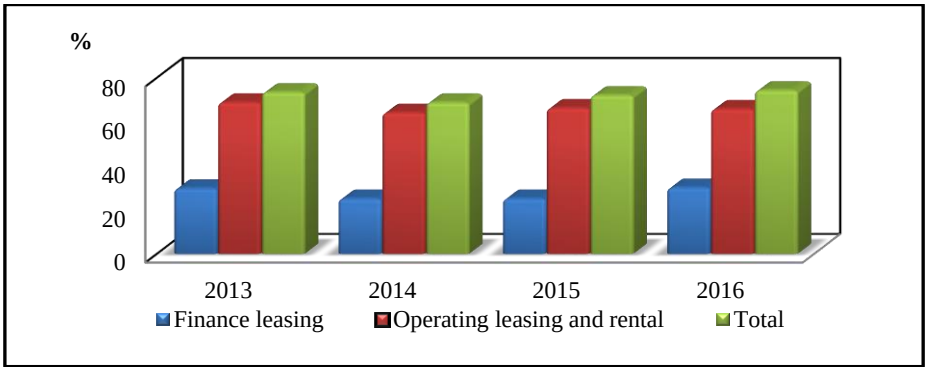

Figure no. 1: Percentage of listed companies using leases and rentals

When analysing the value of the use rights acquired under the leasing and rental contracts (Figure no. 2), it becomes evident the preference of the Romanian listed companies for operating leasing and rentals, for which even the annual expenses as a percentage of the total tangible assets (1.8%) exceeds the value of finance lease contracts (0.8%). When determining the present value of future commitments related to operating leases and rentals, it also becomes evident that there is a clear understatement in the financial reports of the use rights acquired under these contracts, the percentage increasing to an average of 9.4% of the total fixed assets. Overall, the average share of the value of the use rights acquired under leasing and rental transactions for the Romanian companies listed during 2013-2106 is 10.2%.

If the percentage of companies using leased assets is relatively constant over the analysed period, there is an increase in their value measured as percentage of total tangible assets (from 8.9% in 2013 to 11.3% in 2016).

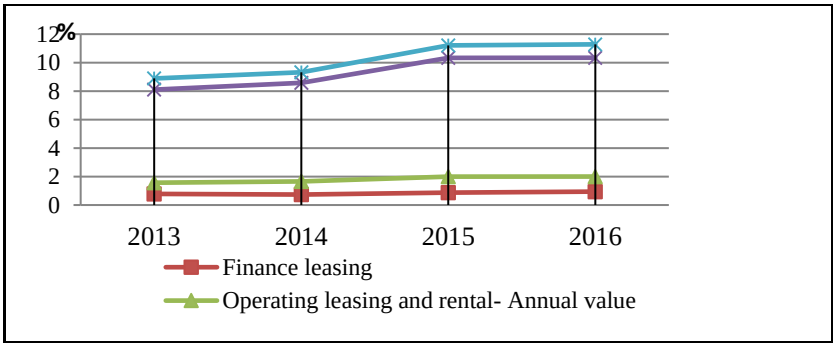

Figure no. 2: The value of the rights to use the assets acquired under lease and rental agreements as percentage of total tangible assets

Table no. 3 presents descriptive statistics for all the variables describing the companies included in our sample. Lease intensity ranges from a low of zero to a maximum of 20%, and an average of 4.8%. The oldest companies included in our samples are those listed immediately after the BSE was reopened (i.e. former communist companies subject to the

mass privatisation program - 22 years old), the newest ones being just recently listed (1 year old). The average listing age of our sample firms is 11.3 years.

Table no. 3: Descriptive statistics

	Minimum	Maximum	Mean	Median	Std. Deviation
ROA	-1.468	.191	.024	.027	.110
ROS	-149.287	22.605	-.837	.056	10.511
Tobin's Q	.211	2.493	.870	.786	.416
Market To Book	-8.433	6.480	.692	.586	1.052
Lease Dummy	***0***	***1***	***.722***	***1.00***	***.449***
Lease Intensity	***0***	***.200***	***.048***	***.011***	***.069***
Board Size	2	11	5.110	5	1.718
Firm Listing Age	1	22	11.316	11	6.194
Leverage	0	1.034	.146	.048	.210
Total Assets (RON, millions)	11.485	51,816.432	2,968.432	214.904	9,224.548
Market Capitalization (RON, millions)	1.635	26,611.306	1,016.993	70.282	3,111.279
Assets in Place	0	1.020	.515	.590	.515

Following previous literature (Campbell and Minguez-Vera, 2008; Wang and Clift, 2009; Vafaei et al., 2015) we use natural logarithm for board and company size and listing age to avoid nonlinearities. Outliers were identified based on Tukey's model with a 2.2 multiplier (Iglewicz and Banerjee, 2001) and data was winsorized by the nearest unsuspected value.

Table no. 4 shows the comparison of the means for listed companies that undertake lease transactions or not. Based on the results of the *t* test, there appears to be significant differences between the two groups. Leasing companies are on average smaller both in terms of total assets and stock market capitalization (total assets: RON 600.811 million compared to RON 834.193 million; market capitalization: RON 257.835 million compared to RON 416.318 million). They are also more indebted (leveraged: 15.6% versus 8.6%), are older (12.21 years versus 9 years) and are performing less in terms of accounting variables (ROA: 2.4% versus 4.7 % ROS: 5.3% versus 9.9%).

Table no. 4: Comparison of the means

	Mean	Mean	T test
	Companies not using leasing/renting	Companies using leasing/renting	
ROA	.047	.024	2.981***
ROS	.099	.053	2.389**
Tobin's Q	.804	.871	-1.348
Market to Book Value	.721	.671	.687
Board Size	5.280	5.040	.921
Firm Age	9	12.208	-3.610****

	Mean	Mean	T test
	Companies not using leasing/renting	**Companies using leasing/renting**	
Leverage	.086	.156	-3.338***
Total Assets (RON, millions)	834.193	600.811	1.928*
Market Capitalization (RON, millions)	416.318	257.835	2.667***
Assets in Place	.484	.528	-1.135

Table no. 5 presents the results of the regression analysis for the first independent variable that captures the extent to which the listed Romanian companies resort to leasing transactions (LeaseDummy). Contrary to expectations, only performance variables based on market values (Tobin's Q and MarketToBook) are significantly correlated with the LeaseDummy variable. Adoption of a leasing business model does not appear to have a significant impact on companies' accounting performance, but appears to have an important effect on the subjective perceptions of market players, who appreciate leasing as a business model that increases the value of shareholders, having a positive impact on market expectations regarding the future performance of listed companies.

Table no. 5: Regression results:
The use of leasing and companies' performance

Variables	ROA	ROS	Tobin's Q	MarketToBook
Intercept	.022	.011	1.295	1.392
	(.905)	*(.186)*	*(8.387)***	*(6.227)****
Lease Dummy	**-.008**	**-.026**	**.124**	**.145**
	(-1.076)	***(-1.489)***	***(2.643)*** **	***(2.043)*** **
Board Size	.014	.060	-.051	.152
	(1.205)	*(2.148)***	*(-.690)*	*(1.338)*
Firm Age	.000	.007	-.123	-.181
	(.109)	*(.705)*	*(-4.512)****	*(-4.400)****
Leverage	-.107	-.157	.361	-1.013
	*(-5.926)****	*(-3.520)****	*(2.409)***	*(-4.462)****
Firm Size	.012	.022	.076	.050
	*(5.222)****	*(3.957)****	*(4.849)****	*(2.142)***
Assets in Place	-.100	-.160	-.513	-.653
	*(-5.476)****	*(-3.550)****	*(-4.107)****	*(-3.416)****
N	266	266	266	266
F statistic	8.758****	7.824****	9.015****	7.497****
R^2	.392	.366	.455	.410
Adjusted R^2	.348	.319	.405	.356

Notes: ROA represents return on assets, ROS return on sales, Tobin's Q is the ratio of the company's market value to its book value and MarketToBook is the ratio between the market value of equity and its book value. LeaseDummy is 1, if the company uses leased or rented assets, and 0 otherwise,

FirmSize is the natural logarithm of the stock market capitalization, BoardSize is the natural logarithm of the size of board of directors, FirmAge is the natural logarithm of the company's listing age, Leverage is the ratio between the total amount of the company's debt and the total value of its assets, AssetsInPlace is the ratio between the sum of the company's inventories and tangible assets and the total value of its assets. The model also includes dummy variables for years and industry to control for fixed effects.
Significance levels: **** 0.001, *** 0.01, ** 0.05, * 0.1.

Among control variables, Firm Size is significantly correlated with performance across all models, bigger firms performing better in terms of both accounting-based and market-based measures of performance. These results are in-line with others reported for the Romanian market (Ionașcu et al., 2017) and with the general consensus, although contrary results have been documented for different economic environments (e.g. Vafaei et al., 2015, Hart and Oulton 1996). Firm listing age is negatively correlated with market performance, which indicates that market better appreciates the potential of younger companies compared to the older ones, *i.e.* companies surviving the communist regime that were early listed on the stock exchange. The positive direction of association between age and accountancy-based measures of performance would indicate that older companies are, in fact, the best performers, although the correlation is not significant. Leverage is negatively correlated with market-based performance, which is to be expected, as leverage is a measure of company risk. Yet, the same direction of association with ROA seems to indicate that leverage is not a catalyst for firm performance either, which could be explained by the low economic performance of Romanian listed companies and their high cost of debt.

Assets in place are used as a proxy for inverse growth opportunities and are, expectedly, negatively correlated with market-based performance. The same direction of association is also present for accounting-based measures of performance which could indicate that Romanian listed companies do not profit enough from their investments and could also show the limitations of the classic business model based on the purchase of inventories and tangible assets.

Untabulated results show that some of the years and industry sector dummies are significantly correlated with company performance.

The lack of a positive correlation between the use of leased assets and performance indicators based on accounting values may be due to the fact that the analysis does not include the value of the leasing transactions. Consequently, we proceed by extending the analysis to leasing intensity, *i.e.* the share of the value of the rights of use acquired under leasing/renting contracts in the total of tangible assets. Table no. 6 shows the results of the regression model (2), which includes the variable $LeaseIntensity^2$ for the dependent variables ROA and ROS, based on previous studies (Bourjade et al., 2017), which documented a non-linear relation between the intensity of the lease and accounting-based measures of performance. According to Bourjade et al. (2017), $LeaseIntensity^2$ variable can capture the decreasing marginal return of the lease.

As it can be observed in Table no. 6, all performance indicators are positively correlated with the intensity of the lease, which confirms the second hypothesis of the study, business model based on leases having a positive impact at a micro-economic level. In models that include accounting performance variables (ROA ROS), the coefficient of $LeaseIntensity^2$ variable is negative and significantly different from zero, which shows the expected

decreasing marginal return of the lease. Control variables generally have the same direction of association and significance as in the previously tested and commented model (1).

Table no. 6: Regression results:
Leasing intensity and companies' performance

Variables	ROA	ROS	Tobin's Q	MarketToBook
Intercept	.024	.017	1.239	.835
	(.950)	*(.276)*	*(7.912)*****	*(3.623)*****
Lease Intensity	**.346**	**1.067**	**.763**	**1.016**
	(1.810)*	***(2.267)*****	***(2.181)*****	***(2.290)*****
Lease Intensity^2	***-2.015***	***-6.240***		
	(-2.097)**	***(-2.636)******		
Board Size	.011	.052	-.041	.238
	(.979)	*(1.869)**	*(-.545)*	*(2.348)***
Firm Age	-.003	-.001	-.097	-.142
	(-.763)	*(-.121)*	*(-3.771)*****	*(-4.114)*****
Leverage	-.114	-.180	.457	-1.093
	*(-6.335)*****	*(-4.061)****	*(3.140)***	*(-6.753)*****
Firm Size	.012	.024	.075	.065
	*(5.540)*****	*(4.390)*****	*(4.779)*****	*(3.302)****
Assets in Place	-.105	-.177	-.473	-.801
	*(-5.787)*****	*(-3.956)*****	*(-3.735)*****	*(-4.927)*****
F statistic	8.603 ****	7.869 ****	8.796 ****	11.117 ****
R^2	.402	.381	.449	.451
Adjusted R^2	.355	.333	.398	.410

Notes: ROA represents return on assets, ROS return on sales, Tobin's Q is the ratio of the company's market value to its book value and MarketToBook is the ratio between the market value of equity and its book value. LeaseIntensity is the share of the value of usage rights acquired under lease/rental contracts in total value of property, plant and equipment, FirmSize is the natural logarithm of the stock market capitalization, BoardSize is the natural logarithm of the size of board of directors, FirmAge is the natural logarithm of the company's listing age, Leverage is the ratio between the total amount of the company's debt and the total value of its assets, AssetsInPlace is the ratio between the sum of the company's inventories and tangible assets and the total value of its assets.
The model also includes dummy variables for years and industry to control for fixed effects.Significance levels: **** 0.001, *** 0.01, ** 0.05, * 0.1.

Conclusions

The study aimed at analysing leasing transactions as a business model in the circular economy. The concept of circular economy is currently crystallizing in the literature, generally, being defined as a model that ensures economic development in connection with the protection of the natural environment for a sustainable development. In the circular economy, resources are reintegrated after their (first) use, either in the natural or economic

circuit, unlike the classical linear system that produces pollution and economic loss. Leasing transactions are an illustrative business model for the circular economy that allows product recirculation both through multiple uses and through rebuilding, refurbishing, or recycling.

In the context of leasing being presumed to be a more environmentally friendly business model than the classic/linear product-sale model, this study aims to highlight that leasing does not penalize the economic performance of firms, but allows for their sustainable development.

Based on a population of Romanian companies listed on BSE during the period 2013-2016, research results show that most of Romanian companies use leasing and rental arrangements (72.2%), most of them preferring operating leasing transactions (66.2% of companies) although the percentage of the value of the use rights in the total value of fixed assets is reduced (10.2%). The results of the regression analysis confirm our initial hypotheses, showing that financial performance is generally higher for listed Romanian companies that use leasing and renting and that performance is also directly associated with leasing intensity, *i.e.* the share of the value of the rights to use leased goods in the total value of property, plant and equipment. Specifically, the results indicate that adopting a business model based on leasing increases corporate performance measured in terms of market values, investors appreciating leasing as a business model that has the potential to enhance company's value, but it is not sufficient to increase performance in accounting terms. To this end, a certain lease intensity is required, which, however, must not exceed a specific threshold, results suggesting a decreasing marginal return of the lease, which is related to the risk of debt, as confirmed by Bourjade et al. (2017) for a sample of international airline companies.

The study is relevant both for the business environment, as managers can design more "green" business models by using leasing and renting, that would enable them to achieve a sustainable development, as well as for regulatory factors that can stimulate business leasing, offering tax incentives or other forms of encouragement. The study is also relevant for the field of research investigating circular economy, being among the few research that provides empirical evidence about the impact of circular business models.

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