

Analysis of the Effective Tax Rate during the Coronavirus Pandemic on an Emerging Capital Market – Romania

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Abstract. *In the context of the permanent global evolution and the flexible economic framework that investors encounter in the decision-making process, this paper aims to analyze the evolution of the effective tax rate in the context of the Coronavirus pandemic in Romania, as well as the factors of influence associated with it, results in the mentioned period. In order to answer these objectives, a quantitative research was carried out for the 85 companies listed on the regulated trading market on the website of the Bucharest Stock Exchange, where a retrospective methodology was applied based on the financial statements published by them for the years 2020 and 2021. Regarding the determination of the influencing factors associated with the evolution of the effective tax rate, it was performed a regular regression for both mentioned years, noticed that in 2020 the size of the companies (SIZE), their solvency (SOLV), as well as the return on assets (ROA), influenced the variation of the effective tax rate, aspect that could not be noticed in 2021. Regarding the evolution of the effective tax rate, it was found that the companies listed on the Bucharest Stock Exchange were undertaxed in the period 2020-2021.*

Key words: effective tax rate, corporate income tax, covid-19, quantitative analysis, retrospective methodology, fiscal burden;

Introduction

The tax system, as a complex entity, has its roots since the beginning of mankind, taking various forms throughout human evolution. So, since the time of the Roman Empire, a unitary taxation system has been defined, aimed either at the direct taxation of individual properties, or the indirect taxation of sales, imports and other economic activities. A special aspect is the direct contribution of the population to the military effort of the Empire, in the form of a "tributum", a practice that reflects the way in which society contributed to the proper functioning of the empire (Tan J., 2022).

During the historical evolution, the taxation system knew various significant transformations, one of the most significant felt in the digitalization era. According to the study realized by Liesegang C. and Runkel M. (2016), the monetary "mobility" allowed entities to perform economic activities and to invest without being "tied" to a physical location. This reality has intensified competition between countries in terms of tax rates and incentives granted to individuals or businesses. Thus, analyzing the multiple aspects taken into account by those who develop their business in a certain country, the fiscal "burden" becomes a determining factor in the decision-making process.

Keeping in mind that these tax "facilities" are granted by the government system in a state, Nicodeme G. (2007) mentions that the tax system represents a very powerful political economic instrument, and its construction is often at the barriers between efficiency and equality, with certain differential treatments between taxpayers.

In the context of Romania, the fiscal system is divided into two major categories of taxes: direct and indirect. However, in this paper, the focus is on the profit tax. According to the Law 227/2015 regarding the Tax Code, this tax represents the difference between the revenues and expenses of a company, adjusted with non-taxable revenues and tax deductions, as well as non-

deductible expenses. Even though the standard rate is fixed, the taxpayers can benefit from a lower or higher effective tax rate depending on the non-taxable revenues/tax deductions or non-deductible expenses they register. This flexibility in the computation of the corporate income tax provides a favorable framework for the fiscal adaptability of companies to their financial specifics.

Based on these aspects related to the complexity of the tax system around the world, the paper proposed to consider the following research questions:

Research question 1: *How did the effective tax rate for the companies listed on the Bucharest Stock Exchange evolve during the Coronavirus pandemic?*

Research question 2: *What are the influencing factors associated with the effective tax rate for companies listed on the Bucharest Stock Exchange during the Coronavirus pandemic?*

In this respect, within the following chapters it was performed a literature review, from which relevant aspects were presented regarding the authors' perception related to the global taxation system and the effective tax rate, but also their results following the studies carried out. Later, as part of the research methodology, it was presented how the sample of companies on which the study was carried out was obtained, the presentation of the variables used in the simple regression model, the generated equation as well as the description of the program in which the correlation of the variables was analyzed. The paper contains a section dedicated to the results obtained from the analysis of the effective tax rate, in comparison with the statutory one established in the period 2020-2021 in Romania and also the interpretation of the statistical results generated by the SPSS program. The present study ends with the conclusions generated from the synthesis of the specialized literature and the results obtained from the actual analysis.

Literature review

The effective tax rate represents, the actual percentage that an individual or a business pays in tax, taking into account all incentives, exemptions and other elements that affect the tax result. There is thus a chance that, depending on the fiscal facilities granted by a state, it may have different values compared to the statutory one established by law, which in the case of Romania, according to Law 227/2015 regarding the Tax Code, represents 16%.

According to Lazăr S. (2010), with the emergence of the phenomenon of globalization, the authors of specialized literature focused their attention on determining the effective tax rate of worldwide companies, thus proving that in most cases they differ from the statutory rates established by local legislations. In addition, he states that these differences between the statutory and the effective rate arise mainly because companies want to benefit as much as possible from the tax aids offered by governments and want to reduce their tax obligations as much as possible, through legal methods, defining these actions in the form of "tax shelter".

Regarding the calculation method of the effective tax rate, the author presents two methods, among which, the one based on the financial reports of the companies, called in the specialized literature the "micro backward-looking methodology", which provides for its calculation in the form of a ratio between tax liabilities and revenues (current profits). The second method described by the author following the review of specialized literature is the neoclassical investment method, which mentions the fact that the effective average tax rate depends on the effective marginal tax rate and the cost of capital, a method called "micro forward-looking methodology".

According to the study of Egger P. et al (2009), it shows the importance of effective corporate tax rates for investment and financing opportunities in various fields. This study uses the "anticipative effective tax rate" method originally developed by Fullerton&King (1984) and later

taken over and adapted by other authors such as Devereux&Griffith (1998), a method also described by Lazar S. (2010), which provides for the use of the present incentives, offered of countries to estimate future behaviors of effective tax rates. The author applied the method to about 650,000 companies in Europe and abroad, where he found that the cost of capital has a positive influence on net investment. It also states as a general conclusion that the use of country-level effective tax rates in microeconomic studies of companies can be problematic and lead to misleading conclusions. The same method was also used by Suzuki M. (2014) for 12 Asian countries, showing that in the period 1985-2012 less developed countries had an effective average tax rate lower than the statutory rate, while developed countries had presented a higher effective share. Also, making an analogy to what it was presented above regarding fiscal competitiveness between countries, this author demonstrated that the exact opposite happened in the Asian area, more precisely while some countries increased their effective tax rates, others and they have decreased them, thus there is no competition between them in terms of the charging system.

Although it was saw above that authors such as Suzuki M. (2014) present a correlation between the size of Asian countries and the effective tax rate, in his work, Nicodeme G. (2007) investigates whether the size of companies in any way influences the taxation of companies. Thus, he presents the idea that in a theory based on political power, large companies will have lower effective tax rates, due to the power they have in negotiating taxes, but also to the opportunities generated by the large number of transactions that they have, thus opening the opportunity for "creative" techniques of accounting records, a practice that is defined as "extending to the limits the faithful image of an accounting provision, while pretending that the basic rules are respected" (Myddelton D., 2009). Also, in the same paper, it is stated that in an opposite manner, based on a cost-based political theory, due to increased market visibility and greater market control, there is a chance that large trading companies will pay a burden higher tax rate compared to other companies. So, Nicodeme G. (2007) chose to test this hypothesis using two different variables for size, more precisely the total assets that he logarithm and the number of employees. After testing the regression model, the author determined that in the period 1992-2004, for 21 European countries, a correlation is validated between the effective tax rate and the size of the company tested based on total assets, the model not being valid in the case of the number of employees. Also, in his work, Nicodeme G. (2002) draws attention to the importance of the size of companies for the analysis of the effective tax rate, because these companies benefit from more resources than a normal one and thus the possibility to do profit shifting increases, even if there are various collaboration mechanisms between states in place and also convention such are the tax avoidance ones.

It was also seen that authors such as Dyreng S. et al. (2017) used in their work a fairly comprehensive period of time for the analysis, more precisely 25 years, from 1988 to 2012, thus including 54,024 firm-year observations from the American market. The authors analyzed the effective tax rate in correspondence with the size of assets, R&D expenses, the ratio between tangible fixed assets and total assets, intangible assets, the leverage effect, capital expenses, marketing expenses, some special items, an indicator that determines whether or not the company records a loss carried forward, as well as a variable that determined whether the company was multinational or local. Thus, starting from the assumption that multinational companies had a lower effective tax rate over time than local ones, the authors demonstrated that the hypothesis was confirmed for the US market, while the statutory tax rate remained stable.

Regarding the influencing factors on the effective tax rate, Richardson et al (2007) test in his work if there is a correlation between the effective rate and the size of the companies, the capital

structure (leverage effect) and an asset mix (capital intensity, stocks and of R&D), research based on the tax reference "Ralph Review". Regarding the size of the companies, just like Nicodeme G. (2007), Richardson et al (2007) state that the principles underlying the possible correlation between the two previously mentioned variables are based on the theory of political cost and that of political power. To analyze the correlation between the variables, the authors develop an OLS regression model, where they use the effective tax rate (ETR) as the dependent variable, described in two ways, more precisely through the ratio between the income tax expense and the accounting income, and the -the second way being represented by the ratio between the expense with the profit tax and the operating cash flow, and as independent variables it uses the size of the company expressed as the total value of the assets which it logarithm, the financial leverage measured as the ratio between the long-term liabilities and the total assets, and use capital, inventory and R&D intensity as proxy variables. Following the hypothesis testing, the authors found a significant negative association between the effective tax rate and company size and between the effective rate and capital structure for financial leverage. They also find a negative (positive) association with asset mix for capital and R&D intensity.

In the situation of Romania, Lazar S. et al (2011) presents the tax rate of 16% as quite low compared to that of other states, instead he mentions that taxes with social security contributions have a rather high rate and represents as a whole a fiscal burden for entities. So, the authors chose to collect information about the companies listed on the Bucharest Stock Exchange, for the period 2000-2009, using the micro retroactive method, more precisely building their database using the financial statements of the listed companies because in the most well-known databases of data (Amadeus, Bach, etc.) not all the necessary information was found to calculate the effective tax rate according to the formula established by them. In the opinion of these authors, calculating the effective rate only on the basis of the income tax expense is only part of the problem regarding the tax burden, because it does not show the whole essence of the problem. So, taking into account the fact that the paper mentions that payroll, real estate or other taxes are important factors in determining the effective tax rate, in their study they determine this rate using the ratio of the expense to the profit tax, to which taxes are added related to employee work and other significant taxes, and turnover. Following this analysis, they obtained that the effective rate of taxation decreased during the years 2000 - 2008, having a significant increase in the year 2009, when the economic crisis came, and the turnover of the companies decreased, thus decreasing their taxation. Also, through their analysis, they specify that they have demonstrated that the profit tax has a rather low weight in the tax burden of commercial companies, so taking only this expense as a reference point can sometimes represent a confusing point in the analysis. In addition, doing an analysis by activity sector, they concluded that hotels and restaurants, together with transportation are the most taxed sectors, while energy and commerce are the least taxed.

Also, other authors such as Teodorescu M. and Istudor I. (2017) studied the effective tax rate in the context of Romania, using the micro backward-looking methodology, so as the companies listed on the Bucharest Stock Exchange, but the period analyzed in their work refers to one of macroeconomic stability, more precisely 2011-2016. The authors underline the fact that in Romania the difference between the effective tax rate and the statutory one is mainly due to the different accounting treatment than the fiscal one. It is also specified that the predominant industry in the analysis carried out is the processing one, so that it becomes the most significant for the analyzed model, concluding, using as the calculation formula for the effective tax rate the expense with the tax and the profit before taxation, that this sector is very little undertaxed only in 2011 and

2014, instead it is essentially overtaxed, but very little over the statutory quota highlighted in the work. Thus, from the total sample of 31 companies included in the model, most, with the exception of 6 isolated results, the effective tax rate of companies listed on the Bucharest Stock Exchange was above the standard rate of 16% in the period 2011-2016.

According to Tatu et al. (2011), in the decision-making process of a company to invest in a certain country, there is not only the value of the statutory tax rate established by that country, because it can be influenced by various factors established by the tax legislation, and in addition, it supports certain "regulations" and on the basis of conventions for avoiding double taxation established between countries. So that, based on the previous mentions, two more arguments are brought regarding the importance of the effective tax rate.

Methodology

Research hypotheses

Taking into account the unfavorable global context developed during the Coronavirus pandemic for the business environment, where both the contact with the public and the operating hours of the companies were restricted, this paper aims to research the trend of companies in Romania regarding the influence of the degree their taxation.

RH₁: *During the Coronavirus pandemic, the tendency of companies was to reduce their tax rate.*

Following the analysis of the work of Richardson G. and Lanis R. (2007), as well as of Nicodeme G. (2007), the paper aims to determine if the effective tax rate is also influenced by other additional factors, than the psychological ones, caused by the macroeconomic context from the period 2020-2021 on companies. Thus, the size of the companies, the intensity of the capitals, the stocks, the solvency and the profitability of the assets were selected for the analysis in order to determine if they influence the effective tax rate

RH_{2.a}: *During the Coronavirus pandemic, the size of companies played an important role in influencing the effective tax rate of companies.*

RH_{2.b}: *During the Coronavirus pandemic, capital intensity played an important role in influencing the effective tax rate of companies.*

RH_{2.c}: *During the Coronavirus pandemic, the intensity of stocks played an important role in influencing the effective tax rate of companies.*

RH_{2.d}: *During the Coronavirus pandemic, the companies' solvability played an important role in influencing the effective tax rate of companies.*

RH_{2.e}: *During the Coronavirus pandemic, the return on assets played an important role in influencing the effective tax rate of companies.*

Data collection

In order to demonstrate the above hypotheses, it was conducted a quantitative research, based on a retrospective methodology described by Egger P. et al (2009) and Lazar S. (2010) in their works, using the financial statements published by the companies included in the regulated market of the Bucharest Stock Exchange, for the years 2020 and 2021. Analyzing this market, an initial sample of 85 companies resulted, which it was refined based on the availability of financial information, but also on the domain in which they applied, more precisely, it was eliminated companies that did financial intermediation or were essentially financial institutions, an aspect determined and taken over based on the conclusions reached by various authors in their works such as Richardson G. and Lanis R. (2007). Thus, the rejected companies were as follows:

Table 1. The number of companies rejected for each year analyzed

	2020	2021
Financial intermediation	9	9
Financial institution	4	4
No data available	6	2
Total rejected companies	19	15

Source: Author's own contribution in excel based on the collected data.

According to table 1, from the total sample of 85 companies included on the regulated market on the website of the Bucharest Stock Exchange, 19 of them were rejected for the year 2020, respectively 15 for the year 2021, resulting in a final sample of 66 companies for the year 2020, respectively 70 for the year 2021 that were analyzed within the current research paper.

Although according to the CAEN code (6420 – Activities specific to holdings), one of the companies included in the final sample from 2021 is specific to financial intermediation, after an in-depth analysis of its object of activity, it was found that it actually carries out consulting and management activities in the field of constructions, so it was not eliminated based on the above criteria.

Regarding the analysis of the correlation between the effective tax rate and the associated influencing factors, it was chosen that the effective tax rate (ETR) to be determined as the ratio between the income tax expense (account 691 from the financial statements) and the gross profit (the profit before taxation), analyzing it in correlation with the size of the company (SIZE) calculated as the logarithm of total assets, the capital intensity (CAPIT) as the ratio between fixed assets and total assets, the intensity of stocks (INVINT) as the ratio between stocks and total assets, the degree of solvency (SOLV) as a ratio between total assets and liabilities, and return on assets (ROA) as a ratio between net profit and total assets. Based on these aspects, it was developed a simple regression equation, using as dependent variable the effective tax rate (ETR) and as independent variables company size (SIZE), capital intensity (CAPIT), shock intensity (INVINT), general solvency rate (SOLV) and return on assets (ROA), an equation which was tested individually in the SPSS statistical program for the years 2020 and 2021:

$$ETR_i = \alpha + \beta_1 SIZE_i + \beta_2 CAPIT_i + \beta_3 INVINT_i + \beta_4 SOLV_i + \beta_5 ROA_i + \varepsilon,$$

Results and discussions

Analysis of the effective tax rate

From the sample of 71, respectively 67 companies that were analyzed, the results obtained were classified, regarding the effective tax rate, into 3 categories, more precisely companies that registered a negative, zero or positive effective rate, obtaining the following statistics:

Table 2. Distribution of the companies by category of effective tax rates

	2020	2021
Negative rate (<0)	0	3
Zero rate (=0)	23	25
Positive rate (>0)	43	42
Total companies	66	70

Source: Author's own contribution in excel based on the collected data.

As can be seen from table 2, approximately 34% of companies in 2020 and 35% in 2021 had zero tax rates, which translates into the fact that they did not record income tax expenses in the financial statements presented for the two reference years. This may be due to the fact that although the companies recorded an accounting profit, due to the fiscal incentives offered by the Romanian legislation or the fiscal loss recorded in previous years, they reached a position of a negative fiscal result, or recorded an accounting loss, and the non-deductible expenses did not have a significant impact on it so as to bring them to a positive fiscal result. From those that did not register expenses with the profit tax, their distribution is as follows:

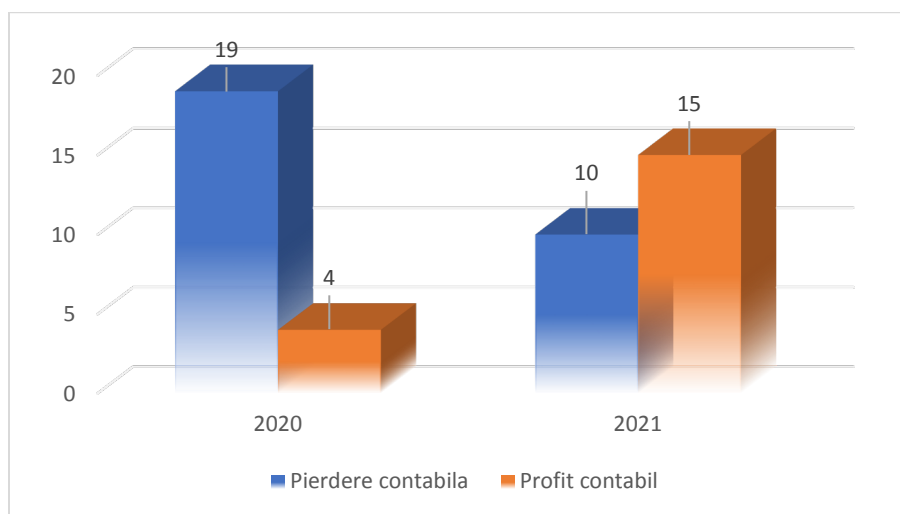


Figure 1. Distribution of the companies with zero effective rate by profit category

Source: Author's own contribution in excel based on the collected data.

Regarding the 3 results obtained in the year 2021 in which the companies registered a negative effective tax rate, even though they are atypical for the sample obtained, they are due to the fact that these companies, although they had an accounting loss, they registered a fiscal profit. Judging the situation according to the general profit income tax formula, which, according to Law 227/2015 regarding the Tax Code, is determined based to the accounting result, to which non-deductible expenses are added and from which non-taxable income and tax deductions are subtracted, it was concluded that these entities have recorded non-deductible expenses that covered the accounting loss, turning it into fiscal profit.

In respect to the evolution of the effective tax rate during the Coronavirus pandemic, it is as follows:

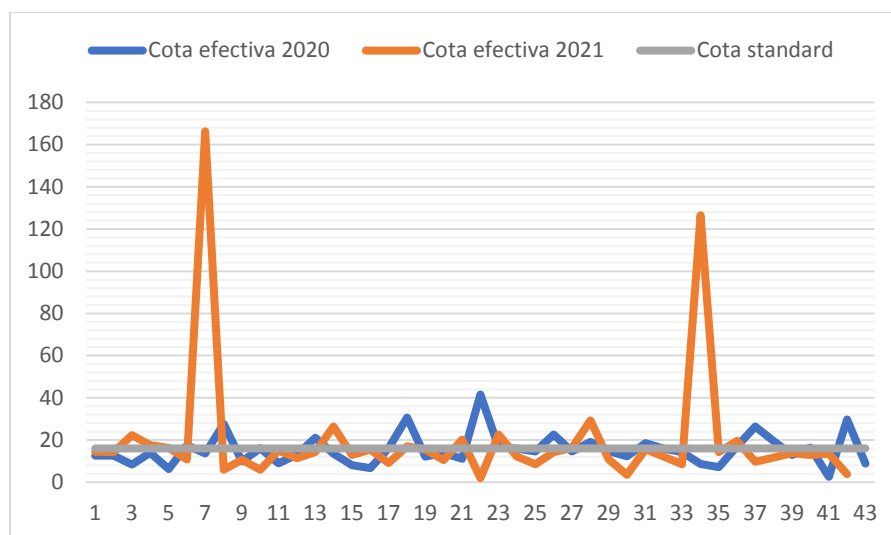


Figure 2. Evolution of the effective tax rate in comparison with the statutory one during the Coronavirus pandemic

Source: Author's own contribution in excel based on the collected data.

It is to be remembered that art. 17 of Law 227/2015 regarding the Tax Code establish the standard tax rate at 16% for all companies in Romania that are excluded from the special regime for micro-enterprises, stated on art. 47 of the aforementioned law. Thus, as shown in figure 2, the effective tax rate of the companies listed on the Bucharest Stock Exchange do not significantly exceed the statutory one, with small exceptions in 2021, where two extreme values of 166.28% and 126.50% of two companies were recorded, and in the opposite part, the negative value of -127.67% was recorded.

Using a descriptive statistical distribution in the SPSS program, for the two years in which the Covid-19 pandemic was manifested, it was obtained the following results listed in table 3 below:

Table 3. Descriptive statistics of the effective tax rate during the Coronavirus pandemic

	Observations	Minimum	Average	Maximum	Std. Deviation
Effective tax rate 2020	66	0	10.02	41.56	9.46
Effective tax rate 2021	70	-127.69	9.75	166.28	30.03

Source: Author's own contribution in SPSS based on the collected data.

According to the information included in table 3, in 2020, also the first year in which the effects of the Covid-19 pandemic were felt, the level of taxation of companies was quite close to the statutory rate of 16%, more precisely with a minimum threshold of 0% , that is, some of the analyzed entities ended the fiscal year with both accounting and fiscal losses, a maximum threshold of 41.56% and an average of 10.02%, which makes us conclude that the entities included in the sample had tax incentives, so that they reduced their tax rate below the standard threshold of 16%, aspect which according to Lazar S. (2010) can be named "tax shelter".

Although in 2021 the measures imposed by the authorities against the SARS-CoV-2 virus were more relaxed compared to the previous year, it can be seen certain "anomalies" in the values obtained, more precisely in this period the lowest recorded tax value was -127.69 % , the highest of 166.28%, and the average being at the threshold of 9.75%. However, based on the extremes

recorded, the tendency would have been for the average to increase considerably compared to the year 2021, but we see that in fact it has decreased, an aspect that makes us conclude that these 2 previously mentioned values represent only isolated cases, the tendency of companies being to decrease their tax paid. Corroborating both the data obtained for the year 2020 and those for the year 2021, it can be noticed that the average taxation is below the threshold set by law of 16%, the tendency of companies being to reduce this percentage.

Keeping in mind that during this period of global crisis, certain sectors that involved direct contact with the public or staff suffered more than others due to the measures adopted by the Romanian Government regarding social distancing and protection, it was chosen to be seen in which way the companies were taxed, depending on the industry in which they operate. The analysis is based on the CAEN code of the entities, declared in the financial statements published on the BVB, having as a benchmark the 16% threshold, represented by the statutory tax rate.

Table 5. Distribution of NACE codes by tax categories for 2021

	Number of undertaxed companies	Share of undertaxed companies (% of total companies)	Number of overtaxed companies	Share of overtaxed companies (% of total companies)
Manufacturing industry	33	82.5%	7	17.5%
Information and communications	3	100%	0	0%
Transport and storage	3	60%	2	40%
Wholesale and retail trade	2	50%	2	50%
Construction	4	100%	0	0%
Health and social assistance	1	100%	0	0%
Extractive industry	3	75%	1	25%
Production and supply of electricity and thermal energy, gas, hot water and air conditioning	1	50%	1	50%
Professional, scientific and technical activities	2	100%	0	0%
Hotels and restaurants	4	100%	0	0%
Financial intermediation and insurance	0	0%	1	100%
Total	56		14	

Source: Author's own contribution in excel based on the collected data.

According to table 5 it can be observed that a significant part of companies, more exactly a number of 40 (57.14%) of the total of 70 are included in the manufacturing industry, we can conclude that this category is the most representative to draw a preliminary conclusion regarding sample rate of taxation. So that, as can be seen from the previously mentioned table, this industry is predominantly undertaxed, as are also "Information and telecommunications", "Transport and storage", "Construction", "Health and social assistance", "Extractive industry", "Professional, scientific and technical activities", and "Hotels and restaurants". According to this aspect, from the total of the 11 analyzed industries, 8 of them (72.73%) present a lower level of taxation in 2021 than the standard one of 16%, and of the remaining 3, 2 of them have an equal percentage of the

number of overtaxed and undertaxed companies. Therefore, only the "Financial intermediation and insurance" industry is overtaxed in 2021.

Table 6. Distribution of NACE codes by tax categories for 2020

	Number of undertaxed companies	Share of undertaxed companies (% of total companies)	Number of overtaxed companies	Share of overtaxed companies (% of total companies)
Manufacturing industry	32	80%	8	20%
Information and communications	2	100%	0	0%
Transport and storage	1	25%	3	75%
Wholesale and retail trade	3	100%	0	0%
Construction	3	75%	1	25%
Health and social assistance	0	0%	1	100%
Extractive industry	3	75%	1	25%
Production and supply of electricity and thermal energy, gas, hot water and air conditioning	1	50%	1	50%
Professional, scientific and technical activities	2	100%	0	0%
Hotels and restaurants	3	75%	1	25%
Total	50		16	

Source: Author's own contribution in excel based on the collected data.

The Coronavirus Pandemic started at the end of 2019, so its effects were fully felt during 2020. Although, the response of the Romanian authorities was delayed in appearing this year, it being visible after the middle of the year, the psychological effect generated on the population of caused a decrease in the flow of people in crowded areas or in environments where the virus was easily transmissible. Therefore, the external macroeconomic shock that the commercial companies in Romania encountered, made them to be conservative in terms of the increase in taxation, thus 7 out of the 10 industries (70%) registered in 2020 an effective tax rate lower than the statutory one. As it was also presented for the year 2021, the most representative sector is the processing one, where 40 of the 70 companies (57.14%) are included, and in this case also a share of 80% of the companies are undertaxed.

Based on the fact that the gradual resumption of the companies' activity in 2021 and the relaxation of the measures adopted by the authorities increased in that period, the "Transport and storage" industry, a significant one for the development of all businesses, registered 3 of the 4 total companies (75%) overtaxed entities an aspect that also may be due to both the fiscal and general legislative uncertainty of that period. A novelty in this (overtaxed) area is represented by the "Health and social assistance" industry.

Table 7. Descriptive analysis of the associated factors with the effective tax rate for the year 2020

	Observations	Minimum	Average	Maximum	Std. Deviation
SIZE	66	23.38	27.84	35.45	2.52
CAPIT (%)	66	6.70	59.78	97.71	21.21
INVINT (%)	66	0	14.34	61.96	15.24
SOLV (%)	66	26.29	756.88	8929.07	1364.90
ROA (%)	66	-17.84	1.87	35.59	9.39

Source: Author's own contribution in SPSS based on the collected data.

In respect to the associated factors for the influence of the effective tax rate, as shown in table 7, from the 66 companies analyzed, it was found that the size of the companies (SIZE) does not vary much, standing at an average of 23.38, while the capital intensity (CAPIT) shows a minimum of 6.70%, a maximum of 97.71% and an average of 59.78%, which is also normal because this indicator measures the weight of fixed assets in total assets, thus, taking into account that the analyzed sample contains companies from several industries, it is normal that in certain domains fixed assets do not play such a role important in the development of economic activity. Regarding the intensity of stocks (INVINT), it shows values between 0% and 61.96%, with an average value of 14.34%. It is expected here that the hospitality industry or construction, for example, will have a higher number of stocks compared to those based on the provision of services.

For the solvency of the companies (SOLV), the values are between 26.29% and 8929.07%, with an average of 756.99%, being rather large discrepancies between the values, which is due both to the tested period that was analyzed (uncertain period), and to the various industries included in the sample. Taking into account that the values recorded for this indicator are positive, and the average is more than 100%, it can be concluded that the companies included in the sample are solvent, more precisely their total assets can easily cover the total value of the recorded debts, an aspect that was expected because it was chosen as samples the companies listed on the Bucharest Stock Exchange on the regulated market, companies that are subject to additional checks compared to ordinary companies and that are otherwise publicly listed on the trading market, so their financial statements are public and can be analyzed by anyone, and any alarm signal can be raised at any time by their investors.

Regarding the return on assets (ROA), although values between -17.84% and 35.59% are recorded, there is a large difference in the threshold where the average is located, more precisely at 1.87%, which shows that the profitability of these companies, compared to registered assets is not exactly favorable.

Table 8. Descriptive analysis of the associated factors with the effective tax rate for the year 2021

	N	Minim	Media	Maxim	Deviata Std.
SIZE	70	23.16	27.96	35.52	2.57
CAPIT (%)	70	1.92	54.76	96.30	20.99
INVINT (%)	70	0	15.16	55.77	14.92
SOLV (%)	70	18.44	702.22	8956.61	1228.17
ROA (%)	70	-23.47	5.77	125.55	17.86

Source: Author's own contribution in SPSS based on the collected data.

Analyzing the information from table 8 for the year 2021 in correlation with the results for the year 2020, it can be observed that there are no significant differences, with the exception of the return on assets.

Related to this (ROA), we see an average increase of 208.56% compared to 2020 and a maximum increase of 252.77%, quite anormal growth, but beneficial for the business environment because it shows that the companies included in the sample had a higher profitability than to their total assets. This can be due to adaptability, both in terms of the economic and the social plan.

Results analysis

To create the econometric model, it was used the effective tax rate as the dependent variable, and the company size (SIZE), capital intensity (CAPIT), inventory intensity (INVINT), solvency degree (SOLV) and return on assets (ROA) as independent variables.

Table 9. The results of statistical models

	2020	2021
Sum of squares	1996.263	3859.805
Mean of squares	399.253	771.961
F test	6.262	0.847
Signification of the model	0.000	0.522
R square	0.343	0.062

Source: Author's own contribution in SPSS based on the collected data.

As can be seen in table 9 for the year 2020, taking into account that the significance threshold considered is below 0.05, the null hypothesis could be rejected, so the model proved valid, but for the year 2021, the same conclusion could not be adopted, the model proving to be invalid from a statistical point of view. So that, based on the independent variables chosen, it resulted that in a percentage of 34.3% they explain the fluctuation of the effective tax rate in the year 2020, while this percentage significantly decreased to the threshold of 6.2% in the year 2021. These differences between the year 2020 and 2021, both in terms of the significance of the model, as well as the percentage of explanation of the dependent variable by the independent ones, is mainly due to the uncertain macroeconomic context that caused there to be no linearity or predictability in the financial statements of the companies included in the sample.

Table 10. Linear regression analysis

	2020	2021
Constant	0.443 (-9.870)	0.490 (-32.261)
SIZE	0.047** (0.856)	0.157 (2.170)
CAPIT	0.778 (-1.880)	0.271 (-26.427)
INVINT	0.109 (-15.225)	0.549 (-19.779)
ROA	0.001*** (38.781)	0.917 (-2.520)
SOLV	0.019** (-0.180)	0.631 (-0.150)

Source: Author's own contribution in SPSS based on the collected data.

Keeping in mind that the null hypothesis could only be rejected in the case of 2020, it can be seen that 3 of the 5 variables included in the model proved significant. It should be mentioned that three asterisks (***) were used when the variable had a strong correlation (significance $<1\%$), two asterisks (**) when the variable had an average correlation (significance $\leq 5\%$) and an asterisk (*) when there is a weaker correlation (significance $\leq 10\%$). So, it turned out that in 2020 the return on assets is the most representative variable for the established model, explaining the fact that if it increases by one percentage point, the effective tax rate will increase by 38.78. Also, as can be seen from table 10, it emerged that both the size of the companies and their solvency explain, in a lower percentage compared to the return on assets, the effective tax rate.

Based on the above, it was demonstrated, as Dyreng et. Al (2017) and Nicodeme G. (2007) did in their working papers, that the size of companies influences the effective tax rate. Also, regarding the return on assets and solvency, it was proven, as Richardson et. Al (2007) demonstrated in the case of Australia that they also influence the effective tax rate, a hypothesis that could not be supported for the intensity of assets or stocks.

Regarding the year 2021, it can be observed that both in the case of the regression analysis described in table 10, as well as in the descriptive one presented in table 3, there are certain anomalies defined by extreme values or non-correlations between the variables presented. These aspects may be due to the fact that the analyzed period is one of decision-making uncertainty caused by the evolution of the Coronavirus pandemic, but also by external factors such as the psychological effect caused by the existence of this new type of virus. In addition, these things were fueled by the package of legislative measures adopted, that physical limited the contact between people, restricted the circulation on public roads or imposed certain social distancing measures. Thus, in this second year (i.e. 2021) it was seen a tightening of these decisions in the first quarter that led to a "freezing" of the countries' economy and a subsequent relaxation that eased commercial relations both domestically and internationally. It is thus observed that those work environments that succeeded in the transition to the online activity part, were able to continue their activity to the same extent as in the past, and other sectors such as HoReCa (i.e. restaurants, hotels, catering, etc.) that required permanent contact with the public, were suspended or even closed a period of time, causing in some situations insolvency or bankruptcy. In addition, with the "closure" of the economies, countries were forced to adopt various legislative recovery measures, so among many other measures to increase investments or grace periods granted to companies, the Romanian legislature adopted Emergency Ordinance 153/2020 which introduced at that time exemptions related to the submission deadlines of certain declarations, as well as reductions for increases in adjusted capital or for situations in which the accounting equity registers a positive value. We conclude from here that in addition to 2020, in 2021 both the external factors described previously, as well as the fiscal legislative or regarding social distancing package, contributed to some extent to inconclusive results for this year included in the analysis.

Also, taking into account that the analyzed sample contained companies from several sectors of activity (see table 5 and 6), the analysis was based on both companies with uninterrupted activity, as well as companies with partially or fully suspended activity in certain periods of the years 2020 and 2021. Therefore, not being able to clearly delimit these time segments, the present analysis was limited to the inclusion of both full years (i.e. 2020 and 2021), hence a possible reason for the lack of correlation between the variables presented in the model.

Therefore, regarding the validity of the research hypotheses listed in the sub-chapter "Research hypotheses", they were concluded to be as follows:

Table 11. The validity of research hypotheses

	2020	2021
Hypothesis 1	VALID	VALID
Hypothesis 2.a	VALID	INVALID
Hypothesis 2.b	INVALID	INVALID
Hypothesis 2.c	INVALID	INVALID
Hypothesis 2.d	VALID	INVALID
Hypothesis 2.e	VALID	INVALID

Source: Author's own contribution.

Conclusion

Following the review of the specialized literature, it was found that the tendency of the authors is to analyze the effective tax rate at the level of European countries, without paying much attention to individual economies or periods of macroeconomic shocks. Thus, this paper aims to analyze the evolution of the effective tax rate at the level of Romania, as well as the associated factors with it during the Coronavirus pandemic. Based on these aspects, to carry out the analysis, the years 2020 and 2021 were selected, period in which the Sars-Cov-2 virus made its full presence felt both in Romania and globally. Regarding the influencing factors associated with the effective tax rate, based on the results obtained by various authors in the field such as Richardson G. et al (2007) and Nicodeme G. (2007), the size of companies (SIZE), capital intensity (CAPIT), inventory ownership (INVINT), return on assets (ROA) and solvency (SOLV) were chosen as variables to be tested in correlation with the effective tax rate (ETR). Regarding the sample of companies, taking into account that the specific databases (Amadeus, TP Catalyst, Orbis, etc.) did not contain all the data that was needed for analysis, it was used the Bucharest Stock Exchange's website in order to collect the necessary information from the financial statements published by the companies. Therefore, to refine the initial sample, it were eliminated those companies that were banks or companies that carried out financial intermediation, resulting in a final sample of 66 companies for the year 2020, respectively 70 for the year 2021.

The results of this study show that the effective tax rate for these companies was below the standard threshold of 16% established by the legislation in force, so it was concluded that Romanian entities were undertaxed throughout the analyzed period. Regarding the study for each sector separately, it was found that the sample of companies mainly contained entities from the manufacturing industry, thus it was considered that it is the most representative for the analysis, proving, based on the data obtained, that it was also undertaxed throughout the two years. Going further with the analysis towards the influencing factors associated with the effective tax rate, it was found that in 2020 the size of the companies, together with the return on assets and solvency influenced the taxation of the analyzed entities, an aspect that could no longer be demonstrated for the year 2021. Based on these aspects, hypotheses 1, 2.a, 2.d, 2.e, as well as hypothesis 1 for 2021, could be confirmed for 2020.

It is to be mentioned that this work had some limitations. For example, the companies included in the sample were mainly companies from the manufacturing industry, an aspect that can influence the general conclusions. Also, taking into account that the analyzed period was one of macroeconomic crisis, social and financial instability can influence the tendency of companies in terms of the effective tax rate, so it is proposed that for future research the sample should be extended to companies from other fields, such as and towards a longer period of time so as to determine if the under taxation of companies in Romania is a general trend, and if the influencing

factors that were determined in this paper have an impact in other periods of time as well. Also, another aspect that should be taken into account for future research is to perform the study using another methodology, for example the micro anticipative methodology, so as to see if companies' behavior during the Covid-19 pandemic period could have been "predicted" using similar situations like the 2009 financial crisis was and their financial information for last years.

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