

The Impact of Tax Rates on the Economic Performance of IT Companies: the Case of Moldova and Romania

Sergey Yakubovskiy* • Giorgio Dominese** • Anastasiia Shapoval*** • Julia Pichugina****

Abstract This article analyzes the IT sectors of Romania and Moldova when examining the impact of the tax policy of states on the economic performance of companies in the sector. The IT sector is a rather promising component for countries to develop; with the proper involvement of international companies and support for companies with local capital, the overall economic indicators in the country will improve. Theoretically, the systematic effect of tax changes for the sector on the economic performance indicators of IT companies was determined. Based on autoregression-built models, when performing the Granger and Wald tests, it was noted the impact of tax rates on the economic performance of companies in the IT sector. The central tax rates discussed in the article are the tax on company income, payroll tax, and social and medical insurance contributions. Changes in time for each tax were worked out to build the most reliable model of the interdependence between indicators. In addition, the general trends of improvement in the IT sectors of the countries are reflected, and a shared understanding of the impact of new changes in tax policy is noted. After introducing new preferential conditions or the reduction of standard taxes, there was an increase in the number of companies in the sector, investment in the sector, foreign investment, and turnover in the sector.

Keywords: IT sector, IT park, tax policy, ITC sector, foreign investment.

Jel Classification: D22, E62, E65, F21, F23

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1. Literature review

The study of the evolution of state policy to stimulate the development of national business in the countries of Central and Eastern Europe attracts the attention of many scientists. In particular, Chumachenko et al. (2021), Dominese et al. (2020, 2021), Lomachynska et al. (2020), Malyarenko (2021), Maslii et al. (2018, 2019) studied the development of emerging market economies in general, the impact of national financial policies and the influx of foreign investment on them. However, the analysis of the impact of state-level tax policy on the economic performance of companies in the IT sector needs to be understood through familiarized with studies on reducing and increasing tax rates both for individual sectors and for the state's economic growth as a whole. The analyzed literature allows concluding that the reduction in costs resulting from a change in tax policy to reduce tax rates on the state's economic growth has a positive effect.

It should be noted that under Gale et al. (2014, 2017), it was proved that with a decrease in the tax rate, the state budget deficit increases. To compensate for these losses, it is necessary to find additional items (items of funding) to replace state budget losses. Nevertheless, the reduction in taxation is considered a positive effect generally. Simultaneously, an assumption was made about the negative impact of taxation policy on economic growth when rates are reduced. However, it has not been proven in the material studied.

Durante (2021) examined several studies confirming tax policy's impact on economic growth. This exploration analyzed the work of various researchers who have studied this topic for a long time (Mertens & Montiel Olea, 2018; Zidar, 2019; Ljungqvist & Smolyansky, 2018; Cloyne et al., 2018). The economist confirmed the positive impact of the reduction of tax rates on the country's economic growth. The study notes that it is essential to understand that economists do not consider all the taxes the country levies. Instead, their analysis examined certain rates: corporate, personal income, value-added, and over and under various federal levels of taxes.

According to a study by Katz and Jung (2021), tax policy affects the investment choices made by the telecommunications sector. The effects of a few taxes that needed to be paid were calculated. It is proven that companies depend on special tax rates. The tax on corporate income and regulatory fees is one tax that has a detrimental impact on where capital is located. However, there is little evidence that payroll tax negatively influences how the corporation allocates its capital.

The analysis of the effect of tax policy on companies' value and profitability served as the foundation for the study conducted by Almajid and Muhamed (2021). The study provides particular measures, such as turnover, indebtedness rate, and others, to analyze the profitability of businesses. Furthermore, companies' sensitivity to taxation policies was proven using panel data in the study. Furthermore, it has been found that there is a dialectical relationship between taxation and company position on the market, with mutual causality between them.

Following researchers Devereux and Maffini (2006), one can say that international companies need to find the most attractive and cost-effective place to locate their capital, invest, and so forth. The study argues that effective average rates affect the choice of companies regarding the location of branches or, in other words, affect the diversification of the capital of an international company. At the same time, it is worth noting that the paper states that not all rates of the tax system impact the decision-making of international companies regarding the location of equity capital, that is, entering a new market. It has been noted that the tax rates in the country of location affect the financial policy of the company and the establishment of transfer prices if talking about multinational companies.

A study by Adefunke and Usiomon (2022), based on data from 12 companies in Nigeria, found that corporate income tax significantly impacts companies' after-tax profits. In addition, it has been proven that the tax also affects shareholder returns. With an increase in corporate tax, the possibility of diversifying the company's funds when distributing them to other needs decreases. The basis of the study was regression analysis.

One of the recent studies regarding the impact of tax rates on entrepreneurship is the study presented by Block (2021). Corporate income taxation was studied using data from 17 countries (Western Europe). The corporate income tax rate has been found to impact entrepreneurship.

Based on the heterogeneous NK-DSGE model, China's tax base in the high-tech industry was explored in the research material published by Miao et al. (2022). The impact of state policy, such as a decrease in tax rates, on the development of the subject area is examined. As in the previous analyses cited, a positive impact for companies was proved, and so is the result of the study that the reduction in income tax in the high-tech sector leads to the development of this area in the short term.

An analysis of the above literature allows speaking about the existence of the influence of the tax policy of the state, namely the regulation of tax rates, on economic indicators both at the state level and at the level of economic sectors and companies. Therefore, it should be mentioned that lowering tax rates for businesses promotes economic expansion on a national scale. Additionally, cutting taxes promotes entrepreneurship to perform better financially and economically. It also allows international companies to invest in new branches and allocate capital with fewer losses. However, in general, according to the analyzed literature, there is a noticeable tendency to study mainly the level of state influence as an indicator of economic growth, and individual industries are less examined; at the same time, literature on the impact of tax policy specifically on economic and financial indicators, such as profit, income, turnover (and similar in meaning) segment of IT companies is not enough.

2 Methodology, hypothesis, and data

For testing the theoretical foundations of the impact of tax policy when specific tax rates change on the economic performance of companies in the IT sector, the vector autoregression (VAR) model was chosen as the basis.

Analyzing to confirm the theoretical assumption on this basis will provide a systematic display of time series while reflecting the current values of these series, depending on the past values of indicators. The use of the VAR model makes it possible to study the empirical consequences of the response of companies in the sector to an external factor of influence in the form of tax changes and the creation of an adequate theoretical model based on the selected indicators. The primary presented test based on the constructed VAR model is the test of non-causality according to the Granger Causality Test, with economic indicators of companies in the IT sector and variable introductory tax rates of this sector, the model takes the following form:

$$\begin{aligned} Profit_t &= \alpha_1 + \sum_{i=1}^p \beta_{1i} Tax_{t-i} + \sum_{i=1}^p \gamma_{1i} Profit_{t-i} + \delta_{1t} \\ Tax_t &= \alpha_2 + \sum_{i=1}^p \beta_{2i} Profit_{t-i} + \sum_{i=1}^p \gamma_{2i} Tax_{t-i} + \delta_{2t} \end{aligned} \quad (1)$$

An explanation of the coefficients and variables is given: *Profit* – reflects the economic performance of companies in the IT sector (can be net income); *Tax* – reflects the tax rates required for sector companies to pay as their tax burden; δ – error term; α is a constant component, β and γ are coefficients to be estimated. The lag order that is selected is reflected – p .

The basis of the test is to put forward a null hypothesis regarding Granger non-causality from tax to profit, and vice versa from profit to tax, that is, $\beta_{1i} = 0$ and $\gamma_{2i} = 0$ at the 5% level. If the model deviates, tax rate data can help determine the value of a company's economic performance and vice versa.

Studies of the theoretical part through the model are carried out in the following order. First of all, estimate the unlimited VAR. Next, the optimal number of lag_s is based on the test and confirmation by the AIC, BIC, and HQC coefficients. In case of discrepancy between the coefficients, the BIC criterion is chosen as optimal, which from the proposed models allows determining the most truthful model when confirming the Log Likelihood value. Next, check the causal relationship according to the Granger test. Another option for validating the applied model is the Wald test. The test makes it possible to note the importance and acceptability of variables in the constructed model in the presence of time delays, as lag values are limited in pairs.

The data used for the analysis is collected from official government statistics websites, Eurostat, and official company data. Based on these tests, an analysis is made of the theoretical basis for studying the impact of changes in tax policy based on changes in tax rates and the introduction of preferential terms for companies in the IT sector.

3. Preliminary analysis

Nowadays, some countries choose the IT sector as the basis of their growth. To encourage the development of national and international companies, specific incentives and conditions are created at the state level to encourage companies. At the same time, international companies are trying to choose the most favorable conditions for investing their capital at a minimal cost. As a result, international companies in the IT sector are increasingly starting to locate their branches or hire workers from countries located in Central and Eastern Europe.

In recent years, Moldova has become an attractive investment market. An excellent example of the country's importance is the growth of outsourcing in the territory used by technology companies. In addition, it should be noted that at the state level of the country, a somewhat promising system of stimulating events for international companies in the IT sector, as well as for the development of their own companies, starting from small sizes, has been introduced.

To analyze the impact of tax policy on the economic and financial performance of companies in the IT sector, one should consider the overall situation in the IT sector in the country. It should be noted that in addition to considering the indicators of the IT sector, it is also worth noting the costs in the country's economy for the technological and information component. From 2010 to 2020, there was an increase in this indicator. In 2010, the costs of all sectors of the economy by types of economic activity on ITC amounted to 980.5 mln lei, in 2015 – 1,438.9 mln lei, and in 2020 – 1,963.1 mln lei (Statistika Moldovei, 2022). The growth in the value of spending on information and communication components in 2020 compared to 2010 amounted to 100.22 percentage points; compared to 2015, the growth was 36.43 percentage points or an increase of 2 times and 1.36 times, respectively.

In 2020, while spending sectors of the economy on ITC, most of the expenses were directed to the item of other expenses, as in 2015. In 2010, the maximum value of expenses was recorded under the item «procurement of electronic and communication equipment including computers.» In 2020, a significant 569.6 mln lei and 359 mln lei were directed to the articles «procurement of electronic and communication equipment including computers» and «procurement of software products,» respectively (Statistika Moldovei, 2022).

The analyzed statistical data allow noting a trend towards an increase in demand for services and products of the ITC sector by companies from all sectors of the economy.

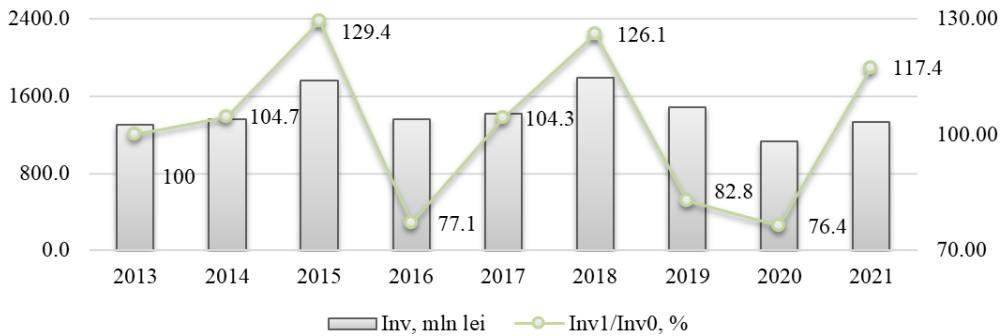


Figure 1. Dynamics of investments in noncurrent assets by the ITC sector in Moldova in 2013-2021

Source: calculated and compiled by the authors based on (Statistika Moldovei, 2022).

One of the most significant values of the investment in noncurrent assets indicator is the value in 2015 and 2018. In 2021, the recovery of the indicator concerning 2020 was noticeable; however, the value compared to the indicator in 2019 is still 10.35 percentage points lower. Significant growth in 2018 can be associated with several specially adopted norms and laws introduced to attract IT sector companies to the creation and development. As a result, it allowed companies to reduce the risks and future costs of investing in the long term. As a result, growth in 2018 compared to 2017 increased by 20.85 percentage points.

The number of companies in the IT sector in the territory of Moldova was 2531 units in 2020. The growth in 2019 amounted to 2.89 percentage points and 27.44 percentage points compared to 2015 (Statistika Moldovei, 2022). In actual terms, in 2015, the number of companies in the sector was 1986. It should be noted that, according to the given statistics of the National Bureau of Statistics of the Republic of Moldova, almost all the companies belonging to this category belong to small and medium enterprises. For 2020, the number was 2508 companies representing SMEs.

It should be noted that 47 units are classified as medium, 262 units are classified as small, and 2,199 units are classified as micro. The number of large companies in 2020 is significantly less than the presented values and amounts to 23 companies in the segment (Statistika Moldovei, 2022). Of these, more than 50% belong to the IT sector. Among all companies in the IT sector belonging to large ones, companies in the IT sector accounted for 60.87% in 2020, and in 2021 this figure was 65.38%. The main changes occurred in 2018 when the indicator of IT companies exceeded for the first time the indicator of companies in the ITC sector unrelated to the IT segment. In 2015, the indicator of the total amount of large companies for IT reached 52.38%, with a significant increase in 2017, when the indicator was 42.11%. By 2020 for all

subgroups of SMEs in the IT sector, companies in the IT sector had an amount of around 80%. It should be noted that according to statistics for 2021, this indicator of belonging to the IT sector for all groups is more than 80%.

The 2,531 companies in the ITC sector ended with a surplus, but several companies ended the financial year with a deficit despite this (Statistika Moldovei, 2022). It led to the fact that the number of companies in the segment that closed the financial year 2020 with a positive value was 56.89%. This value is an improvement of 10.27 percentage points compared to 2015. It is due to a significant increase in the number of companies in the IT segment with a surplus, which is an increase of almost two times more, and a reduction in deficit companies in the telecommunications sector also two times.

The sector's importance for the state is confirmed by generating 7.14% of the country's GDP in 2020. Since 2015, there has been a general trend for the growth of this indicator from 6.68%. In general, the growth amounted to 0.46 percentage points. Considering the IT sector separately, it is worth noting that in 2015 the value generated in GDP was 1.76%, and in 2020 – 3.57% (Statistika Moldovei, 2022; State tax service, 2022). It shows an increase of 1.81 percentage points. Furthermore, a sharp increase in the indicator occurred in 2017, which correlates with the previously considered indicators.

The sales volume indicator confirms the gradual assumption by IT companies of a management role in the ITC segment. Sales of IT sector representatives in 2020 accounted for 50% of the total sales of ITC. In 2015, this value was only 26.38%. The weight growth in the ITC sector composition amounted to 23.66 percentage points. Significant growth was observed in 2017 compared to 2016, when there was an increase of 1.72 times (ICT sector overview Moldova, 2022).

A general overview of the sector allows for noting significant shifts in indicators from 2017 to 2018. It happened due to introducing new regulations and laws to support the IT sector. These shifts occurred at the state level due to a long-term government policy to expand preferential terms for the sector to increase the generated share of IT in GDP. On this basis, the creation of an IT park was introduced. On a legislative basis, the park is subject to laws and regulations to regulate the IT park's activities. In addition, The Fiscal Code of the Republic of Moldova is also an essential regulatory document for the activities of companies based on the IT park, which outlines the main changes regarding the taxation of companies acquiring resident status. Moreover, the final document is the provision on the regime of foreigners on the territory of the country.

One of the main conditions for an IT park that allows attracting foreign investment and developing micro-enterprises in the field is creating a single tax on turnover. The size of the single tax for companies that are representatives of the IT sector and residents of the park is 7%. With the introduction of a single rate for

taxing company income, the following taxes were abolished:

1. Corporate income tax (at the time of adoption – 12%);
2. payroll tax (at the time of adoption – 18%);
3. payment of social insurance by the employer and employee (at the time of adoption – 24%);
4. payment of health insurance by the employer and employee (at the time of adoption – 9%);
5. local taxes;
6. real estate tax;
7. payment for the use of roads in the country (State tax service, 2022; Tax Guides, 2022).

The company will pay a tax of 7%, provided that the percentage of the company's income is more than 30% of the average monthly salary in the country for each employee. When deductions of 7% of income are less than the payment of wages, the company contributes to the state budget exactly the amount calculated based on wages (IT Park, 2022).

According to the data presented by the IT park, one can note its effective functioning to attract foreign investments for the creation of branches or the full entry of foreign companies and the development of national micro-segment companies. It can be seen in the growth in the number of companies becoming park residents. By the end of the fourth quarter of 2021, the park had 960 residents. For the fourth quarter of 2018, there were 228 companies (Report annual by IT park, 2022). Over the years of the park's existence, there has been an increase of 184.02 percentage points. Significant growth in the number of residents should be considered in 2019 compared to 2018 when there was an increase of 5.33 percentage points, and in 2021 compared to 2020. As noted earlier, the growth in 2021 compared to 2020 is associated with a gradual recovery in the activities of the companies in the segment and a more ability to take risks after the effects of the first years of the pandemic. It was reflected in the fact that the growth of new residents in 2020 relative to 2019 was not as significant as expected.

According to the statistics of the park, it is noted that the growth of local companies exceeds the number of companies of foreign origin. The difference in growth reaches a mark of almost two times. However, foreign companies in the IT segment began to enter the Moldovan market more confidently and create their branches in the territory after the initial quarters of the park's operation.

In 2020, there were 174 residents of the park belonging to companies with foreign capital. Concerning 2018, in 2020, there was an increase of 20 percentage points, while in 2020, this value experienced an increase of only 9.02 percentage points. The most significant increase in the entry of companies in the sector with foreign capital into the country's market was noted in 2019, with an increase of 38.54 percentage points. The growth is due to a change in the state's tax policy, or rather its impact on the first year

of the park's existence in 2018, which made it possible to demonstrate the effectiveness of the implementation of this approach. Most companies with foreign capital originate from the United States; in the fourth quarter of 2021, the number was 27. It is followed by companies with Romanian capital, comprising 22 companies. This rather significant value is explained by certain cross-investment of countries. Germany, Italy, and the UK are following in less than 20 companies every (Report annual by IT park, 2022).

Total sales revenue from resident companies increased by 259.19 percentage points in 2021 compared to 2018. However, despite the significant number from the statistics, it should be noted that the categories of companies by national and foreign capital generate almost the same revenue for 2021. Thus, foreign companies accounted for about 47% of the total revenue, which is more than 3.200 mln lei in absolute terms (Report annual by IT park, 2022).

A review of park statistics also indicates an increase in investments from 2018. The total investment in the activities of residents amounted to 403.9 mln lei. Growth in 2021 compared to 2018 was 13.24 times. The distribution of investment items shows that foreign companies invest mainly in tangible assets, while companies with national capital mainly invest in intangible assets.

In confirmation of the previously reviewed data on SMEs in the ITC sector, it should be noted that the IT sector companies that are residents of the park are in the vast majority: micro and mini companies account for about 93% (904 companies), medium-sized companies – 5% (47 companies), significant – 2% (9 companies). From this, it can be noted that with a weightless number of large companies in the sector, 9 are park residents and generate sales revenue at 27% (Report annual by IT park, 2022).

It is important to note that the example of the park perfectly demonstrates the influence of older residents on the revenue side than newcomers. That is, significant revenue values should be expected in the long term.

After examining the general state of the ITC and the IT sector of Moldova, proceed to an overview of the sector under study in a country similar in certain aspects to the previous representative – Romania. The IT sector of the Romanian example is also essential for the country. The country also has special incentives for companies in the IT sector. Furthermore, state-level politics in Romania are not as directed as those in Moldova.

The sector's investment component (see Figure 2) experienced quite fluctuating characteristics from 2008 to 2020. The significant increase in investment in ITC in 2008 can be explained as a consequence of the country's accession to the European Union, which officially took place in 2007. Therefore, the significant importance of investments during this period can be characterized as a general trend in the sectors of the country's economy.

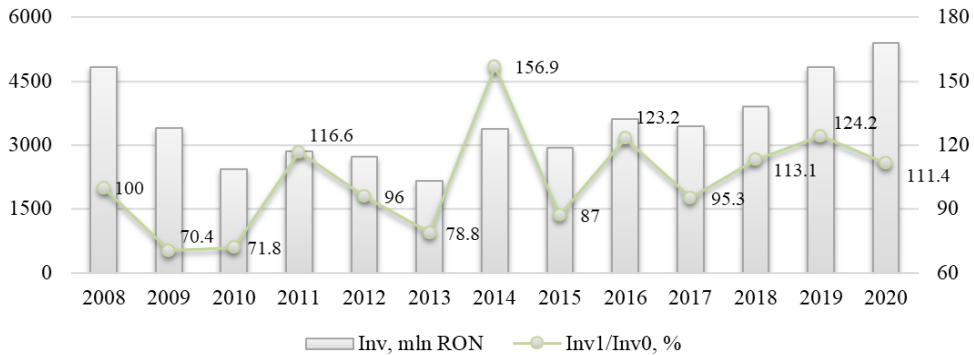


Figure 2. Dynamics of net investments by the ITC sector in Romania in 2008-2020

Source: calculated and compiled by the authors based on (Eurostat, 2021)

Between 2008 and 2016, there has been a constant fluctuating trend in investment in the ITC sector. The growth trend is reflected in the period from 2017 to 2020. It should be noted that despite the growth of the actual indicator of receipts concerning previous years, the trend is somewhat slower. Growth in 2020 occurred by 11.43 percentage points compared to 2019, while growth in 2019 compared to 2018 was characterized by an increase of 24.21 percentage points. Although the value increased in 2020, it is still worth noting the effects of the pandemic, as growth had somewhat decreased in speed, so the value of 2020 is lower compared to the value of 2018, when the growth was 13.09 percentage points. In total, during the study period, there was an increase in investments in the sector by 11.7 percentage points from the value of 4,824.7 mln RON in 2008 to 5,389.5 mln RON in 2020 (Eurostat, 2021).

At the same time, it should be noted that the volume of FDI stock in Romania in the ITC sector amounted to 3.918 mln euros in 2020, which is 4.31% of the total foreign investment in the country. This value has increased since 2017 when the mark was 3.150 mln euros. In 2011, this figure amounted to 2.967 mln euros, which accounted for 5.38% of total FDI. For the decade, the maximum value was reached in 2014 with a value of 4.390 mln euros. In 2020, the export of companies in the ITC sector amounted to 4.522 mln euros, while the imports of this sector amounted to 1.283 mln euros. Most exported companies engaged in computer activities, and more specifically, companies related to the article «computer service» (INSSE, 2022).

It should be noted that the number of companies in the ITC sector has gradually decreased from 2008 to 2011. The decrease was from 20,049 units to 16,317 units, representing 18.61 percentage points. However, since 2012, a growth trend has begun in the number of companies in the sector, which in 2020 amounted to 29,226 companies. Considering the entire period from 2008 to 2020, the growth was 1.45 times or 45.77 percentage points. Concerning 2012, growth in 2020 amounted to 66.92 percentage points (INSSE, 2022).

The share of the IT sector in the number of units in ITC during the study period was over 60% and had been growing steadily from 2008 to 2020. In 2008, the IT sector accounted for 60.08% of all companies; in 2015 – 68%, and in 2020 – 75.04%. It is directly related to a significant increase in IT sector companies by 82.05 percentage points from 12,046 units to 21,930 units and a decrease in the number of companies in the telecommunications sector. On the other hand, the decline in the telecommunications sector amounted to 8.83 percentage points. Comparing these figures, the growth of IT companies in the sector is much more significant than the decline in the telecommunications sector.

ITC sector revenue reported in the gross result of exercise still declined sector performance from 2008 to 2011. The maximum value was obtained in 2020, with an increase of 79.54 percentage points compared to 2019. This situation was caused by two unprofitable items in 2019, which significantly impacted the overall result of 2019. The IT sector in the overall sector indicator in 2020 is 79.54%. It is a significant increase over the non-IT group of companies. The IT sector generated 2020 an amount of 6 bln RON. The main income item is «Computer programming, consultancy, and related activities.» At the same time, the «Software Publishing article» experienced substantial gains against a deficit in 2019 and low performance in previous periods (INSEE, 2022; ANIS, 2022).

The ITC sector generated more than 6% of the GDP in 2020. Since 2000, this value has not decreased below the mark of 4%, which is a significant indicator for the sector. It should also be noted that, in actual terms, the indicator tends to increase over 21 years. However, there were specific periods of decline. One of the years was the period after 2008, which was a particular moment of crisis. It is also worth noting the gradual increase in the structural share of the sector in GDP since 2000. This period is characterized by the first stages of the sector's innovation of the taxation policy in the country. The reduction of the tax led to its gradual impact on companies in the sector (INSEE, 2022).

In general, the tax incentive system for the IT sector in Romania is somewhat different from Moldova. Using the example of Romania should talk about companies' dependence on all taxes necessary to pay; that is, even changes in general tax rates matter for companies in making decisions in the local market and investing in the country to create branches. The central examined tax rates are the rates that were also presented in the example of Moldova:

1. Tax on corporate income;
2. payroll tax;
3. payment of social insurance by the employer;
4. payment of health insurance by the employer.

Better taxation conditions for enterprises have become partially due to the evolution of each tax and contribution. From 25% to 16%, the corporate income tax was decreased. Since 2005, this change has been fixed. Concerning social and health insurance

payments, it should be said that both the employee and the employer were liable at the beginning. The amounts have been declining, as social security contributions have dropped from 24.5% to 15.8% over time, and health insurance has dropped from 7% to 5.2%. Closer to 2020, the last two payments were transferred from employers to company employees (Law: 1997, 1999, 2002).

Directly related to the IT sector is payroll tax. Since 2001, companies in the sector have not been liable to pay this tax. The abolition of the tax was necessary at that time, as high payroll taxes prevented the established companies from surviving. The highest tax rate, which was 40%, was reduced to 0%. It should be noted that under the law, not all companies in the IT sector were required to pay 40% tax since there was a system for paying smaller amounts depending on the company's turnover. According to the company's average turnover, a tax was chosen for further work at 28%. In order to be able to pay tax at 0%, companies must meet certain conditions; in addition to the fact that the activity must be related to articles under CAEN 58.2 and 62, employees must meet specific conditional criteria for both education and earnings for the year (Law: 1997, 1999, 2002).

Although there is a special rate for businesses in the IT sector, it should be emphasized that not everyone qualifies for it due to the convoluted eligibility method. At the same time, this tax has also undergone a successful transformation for companies, and in 2021 is 10%, which is more attractive for companies in the international segment. Generally, this tax has a significant advantage for companies with foreign capital when taking an event on the market. Furthermore, since this tax significantly reduces personnel costs, companies can consider this market attractive.

4. Results and discussion

Confirmation of the theoretical framework proposed earlier can be started by summarizing states' policies regarding the IT sector's taxation and the further impact of the changed rates on companies.

One of the main activities at the state level in Moldova is implementing a plan for developing, creating, and maintaining an IT park in the country. This measure was introduced in 2018 based on several legislative norms. The latest change in the norm is mediated by introducing a single percentage of taxation of companies in the IT sector. The tax rate is 7%. The following list of taxes and their rates used for the model is identical to the single tax from 2005 to 2017 inclusive:

- Corporate income tax – 12%;
- payroll tax – 18%;
- social payments – 24%;
- medical insurance – 9%.

Hence, to conduct a practical analysis, the company's leading economic indicator is the IT sector's profit before tax; in addition, the tax rate the company must pay is taken. The study period is 16 years: from 2005 to 2021.

By 2016 there was a somewhat fluctuating trend in the profit margin of the IT sector. It is because of significant periods of growth from 2013 to 2015 and from 2017 to 2019; the last significant period of growth is the period from 2000. It is because significant periods of growth should be considered from 2013 to 2015 and from 2017 to 2019; the last significant period of growth is the period from 2000. Nevertheless, it is essential to point out that if we draw a linear trend over the data, can see an increasing trend starting in 2017. However, even if the tax rate for the industry under consideration remained constant from 2013 to 2018, there has been a noticeable decline since then (Statistica Moldovei, 2022; Tax guides, 2022).

An autoregressive analysis is carried out based on previously collected data. Building on the Var model, the tests carried out determined (the final result of which is given below) the required number of lag_s – 3.

Table 1. Results for order selection criteria for Moldova data

Lag	LR	FPE	AIC	BIC	HQC
0	NA	3681.739	13.88641	13.97770	13.87796
1	30.29944	420.3469	11.70334	11.97722	11.67799
2	5.023806	448.8426	11.71657	12.17304	11.67431
3	15.85196*	94.15124*	10.02343*	10.66249*	9.964276*

Endogenous variable: Profit and Tax
Sample: 2005 – 2021

Source: prepared by authors.

The test results show that the best option for the number of lag_s is 3 for all reflection coefficients. From here, build a Var model that looks like this.

Table 2. Var model for Moldova data

	Profit (-1)	Profit (-2)	Profit (-3)	Tax (-1)	Tax (-2)	Tax (-3)	C
Profit	1.078355	0.091498	0.300896	482.6306	-163.0204	-919.8392	330.051
Tax	-0.000298	0.000571	-0.001669	0.131944	-0.330273	-0.627671	1.25821
R-squared	0.978316						
Adj. R-squared	0.959729						
F-statistic	52.63546						
Akaike criterion	10.02343						
Schwarz criterion	10.66249						

Source: prepared by authors.

With the constructed model using three lags, the significance of the constructed model can be noted with the value of the R^2 indicator of 0.97. The indicator has a high value for this model, bringing it closer to 1. The Aikake and Schwarz criteria also satisfy the model.

To understand the interdependence of indicators and confirm the theory of the impact of tax policy on a company's economic performance, a Wald causality test is carried out based on an autoregressive model, taking into account three lags.

Table 3. Results of block exogeneity Wald test for Moldova data

Dependet variable: Profit				Dependet variable: Tax			
Excluded	Chi-sq	df	Prob	Excluded	Chi-sq	df	Prob
Tax	15.86988	3	0.0012	Profit	31.29552	3	0.0000
All	15.86988	3	0.0012	All	31.29552	3	0.0000

Sample: 2005 – 2021

Included observation: 14

Source: prepared by authors.

From the test results obtained, it can be noted that do not accept any of the hypotheses since the value corresponds to a value of less than 5%. Therefore, a group Granger test was carried out to present null hypotheses with optimally defined three lags for a more accurate analysis.

Table 4. Results of pairwise Granger causality tests for Moldova data

Null Hypothesis	F-Statistic	Prob.
Tax doesn't Granger Cause Profit	5.28996	0.0322
Profit doesn't Granger Cause Tax	10.4318	0.0056

Sample: 2005 – 2021

Source: prepared by authors.

The null hypothesis is that the decrease in the sector's tax rate does not impact the profits of IT companies, which is not confirmed but rejected since the value is less than 5%. So, it is confirmed by the analysis carried out.

In the example of Moldova, a dependence of indicators among themselves was carried out. The main thing is that the model proved the impact of a change in tax policy, specifically the introduction of a single tax of 7% on corporate profits before tax. As for the number of lags, they can be defined and argued as a delay due to the impact of changes in rates over time.

In order to more accurately interpret the study's results on the impact of a change in tax policy on a company's economic performance, an analysis of Romania is presented below. Like the previous representative, there are special tax incentives for the IT sector in the country under study. However, they have a specific difference in the choice of implementation method and the primary criterion for change.

The following list of taxes and their rates used for the model are identical for payment following the years:

- corporate income tax – 16%;
- payroll tax – 0%;
- social payments – 19.5%, 18%, 20.8%, 15.8;
- medical insurance – 5.5%, 5.2%.

Hence, to conduct a practical analysis, the company's leading economic indicator is the IT sector's profit; in addition, the tax rates presented above are taken per the years. The study period is 14 years: from 2008 to 2021.

The economic performance indicator of companies reflects the growth trend over the period presented. Thus, according to the given data of four taxes, IT companies only bear the burden of corporate tax on income, which for years was at a rate of 16%, while by 2004, the rate was 25%. At the same time, a significant increase in the efficiency indicator of the sector has been reflected since 2019, when there was a shift in the tax burden from employers to employees: the transfer of social contributions and the health fund (INSSE, 2022; Chamber of Deputies: Law).

According to the test, the number of optimal lag_s for the model is 2.

Table 5. Results for order selection criteria for Romania data

Lag	LR	FPE	AIC	BIC	HQC
0	NA	1.15e+16	42.65321	42.71373	42.58683
1	32.21459	2.66e+14	38.85113	39.03268	38.65197
2	10.52752*	8.44e+13*	37.54563*	37.84821*	37.21369*
3	1.369575	1.91e+14	37.88910	38.31272	37.42439

Endogenous variable: Profit and Tax

Sample: 2008 – 2020

Source: prepared by authors.

In the above analysis, it is advisable to rely on two lag_s as the most valid model among the proposed ones. Furthermore, it is confirmed by the Log-likelihood indicator built by the VAR model, which, given its value, is the most optimal of the possible ones when building other models.

Table 6. Var model for Romania data

	Profit (-1)	Profit (-2)	Tax (-1)	Tax (-2)	C
Profit	0.395425	0.834654	-7.68e+09	4.48e+08	2.96e+09
Tax	-1.87e-10	1.40e-10	0.718295	-2.226714	1.090503
R-squared	0.987166				
Adj. R-squared	0.978610				
F-statistic	115.3758				
Akaike criterion	37.37346				
Schwarz criterion	37.73519				

Source: prepared by authors.

The constructed model can be considered acceptable due to the significant value of R^2 , which is 0.98. In addition, the Wald test based on the constructed VAR model has proven the relationship between the performance indicator of companies in the IT sector and the tax burden.

Table 7. Results of block exogeneity Wald test for Romania data

Dependet variable: Profit				Dependet variable: Tax			
Exluded	Chi-sq	df	Prob	Exluded	Chi-sq	df	Prob
Tax	8.047278	2	0.0179	Profit	37.88052	2	0.0000
All	8.047278	2	0.0179	All	37.88052	2	0.0000

Sample: 2008 – 2020

Included observation: 11

Source: prepared by authors.

Based on the data presented, it can be argued that the profit of the companies in the sector under consideration depends on the taxes that are the obligations of these companies.

Granger testing allows putting forward null hypotheses between the studied indicators. The test values do not allow one of the hypotheses to be accepted because the indicator values are less than 5%. It should be noted that taxes are dependent on companies' profits. Thus, the profit of companies in the sector depends on the taxes that affect it.

Table 8. Results of pairwise Granger causality tests for Romania data

Null Hypothesis	F-Statistic	Prob.
Tax doesn't Granger Cause Profit	41.6369	0.0001
Profit doesn't Granger Cause Tax	12.0360	0.0071

Sample: 2008 – 2020

Source: prepared by authors.

The two autoregressive analysis tests allow asserting the impact of the state tax policy on IT sector companies and indicate the causality of the relationship between the indicators. It should be noted that lag_s as time delay events. Their influence can be explained by knowing the events that influenced the economic life of countries during this period: Romania's accession to the EU, the pandemic, the individual inclination to adopt changes on a legislative basis, and the speed of adaptation.

In the example of Romania, it is advisable to trace the theoretical foundations discussed in the literature section through practical analysis. The previously studied material was based on general economic indicators, full-fledged sectors, or groups of companies; it is advisable to try to analyze the dependence on tax policy on one of the international companies in the IT sector. Romania's IT sector is somewhat diluted by foreign capital; according to an analysis by Cushman & Wakefield Echinox, sales of Romania's top 50 IT companies have quadrupled in the ten years since 2009. By the end of 2019, a mark in the total sales income of 3 bln euros was indicated (Cushman&Wakefield, 2020). A significant part belongs to international IT companies: Amazon, IBM, HP, Microsoft, and others.

For further analysis, an international company represented in the technological market of Romania – IBM, was chosen. The branch's 2021 profit was 16.4 mln euros, with the company's global profit across all branches at 5,743 mln euros. The profit growth of the Romanian branch in 2020 amounted to 3.96 percentage points, while the profit of the international company increased by 2.73 percentage points (IBM 2022; IBM Romania, 2022).

Since a branch located in Romania generally affects the underlying company's performance, it can theoretically be said that all changes in tax rates for the Romanian branch directly impact the underlying company's results. Therefore, an analysis is carried out based on the Wald test with the presentation of null hypotheses.

The main variables used to carry out the analysis are the net income of the underlying company and the introduction of tax rates that the subsidiaries in Romania have to pay. The company's required payment size is based on an analysis of the historical change (average standard values) of the tax rate from 1999-2020. The central rates taken into account in the analysis are the company's income tax rate, payroll tax,

and social and medical payments from the employer (IBM 2022; IBM Romania, 2022; Portal Legislative).

Based on the ARDL model, with a limit of 6 lag_s for two variables, the following results were obtained from the Wald test.

Table 9. Result of Wald test for model 3

Test statistic	Value	df	Probability
F-statistic	7.704267	(4, 4)	0.0366
Chi-square	30.81707	4	0.0001
Null Hypothesis: $c(1)=c(2)=c(3)=c(4)=0$			
Normalized Restriction (=0)	Value	Std. Err.	
C (1)	0.682213	0.194532	
C (2)	1.364803	0.820302	
C (3)	1.064202	0.377599	
C (4)	-1.770906	0.453852	

Source: prepared by authors.

The obtained test results allow noticing the importance and acceptability of the variables in the constructed model in the presence of delays in the time as lag values, limited in pairs to 6. It allows acquiring the following form of the model:

$$D_{(Income)} = 0.34031(Income_{(-1)} - (330.036178Tax_{(-1)} - 103.88232)) \quad (2)$$

Thus, this suggests that the taxation indicator is influential in building a model dependent on the company's profit indicator. In addition, the dependence of the company's net income on changes in tax rates in Romania in the IT sector has been proven. Based on Var Granger Causality, the Probability value was 0.0037. When examining the null hypothesis, the absence of income dependence on taxes at the obtained value is not confirmed. Therefore, it is not accepted, which allows rejecting this statement.

In general, this analysis demonstrated the impact of tax policy on an international company: a tax for a company located in the taxation territory impacts the base company, which was proved by the test above.

5. Conclusion

It is possible to note the significance of these sectors for the economies of the depicted nations thanks to the study conducted using Moldova and Romania's IT sectors. Sector GDP during the turn of 2020–2021 generation is more than 6%. This figure reaches more than 7% in Moldova, and it is still at 6% in Romania. However, programs for

future years note the need to increase this indicator despite this. The government is implementing a particular policy to attract companies using tax incentives to implement this scenario.

A general analysis of the IT sectors shows that their dynamics have improved over the past decades in the territories of the countries represented. The growth of investments in the sector is an important indicator confirming investors' attraction and confidence in countries entering the market. In addition, foreign investors also choose these markets to host their branches.

Similar aspects of taxation in Romania and Moldova are the availability of preferential conditions for companies in the IT sector; however, their implementation is different. In Moldova, an IT park was created and implemented to introduce preferential tax incentives, at which a single taxable rate was introduced. IT sector companies that are residents of the Moldovan park pay only this tax, excluding the payment of taxes on corporate income, payroll tax, and social and medical depreciation. The tax rate is 7%.

In Romania, the only tax that directly targets the IT sector is the payroll tax. In Romania, this tax is 0% for companies in the IT sector. It should be noted that other taxes also impact the activities of companies, as a result of which taxes on the company's income, insurance, and medical contributions from the employer are indicated. Their change also affects the economic effectiveness of companies. The change in the company's income tax rate from 25% to 16% is a fairly significant shift, as is the gradual reduction in rates payable for insurance and medical depreciation.

A general analysis tested the impact of the tax rates on the economic performance of IT sector companies. The analysis was carried out on the example of two countries separately. Therefore, the effect of the implemented single tax, due in the amount of 7%, on the earnings of businesses before tax was demonstrated using the example of Moldova. Furthermore, the effect of current tax reforms on company profits before tax has been demonstrated through testing in the Romanian IT sector.

Furthermore, it has been demonstrated that lowering one payroll tax to 0% and other taxes will have a more significant impact. Changes in taxable rates (reduction over time), such as those for payroll and income taxes, insurance premiums, and medical contributions, impact the financial viability of businesses in the information technology sector.

It made it feasible to examine the international dependence of IT companies on tax rates. The effect of tax rates on the net income of an international corporation is illustrated using a specific scenario. Additionally, it was revealed that, between 1999 and 2020, the company's net income depended on changes in tax rates.

Looking at the overall results of the analysis can talk about the importance of a competent taxation policy for the IT sector for its further development since this directly impacts the economic performance of companies, which will further influence their decisions regarding their activities.

References

- Adefunke, A. B., Usiomon, A. O. (2022). Impact of company income tax on corporate profitability in Nigeria. *Indian Journal of Finance and Banking*. DOI: <https://doi.org/10.46281/ijfb.v9i1.1567>
- Almajid, F. A., & Muhamed, T. M. (2021). The impact of taxation on the value of companies. *African Journal of Business Management*. DOI: <https://10.5897/AJBM2020.9177>
- Block, J. (2021). Corporate income taxes and entrepreneurship. DOI: <https://wol.iza.org/articles/corporate-income-taxes-and-entrepreneurship/long>
- Chumachenko, D., Derkach, T., Babenko, V. (2021). Development Prospects of Banking Sector in Central and Eastern European Countries in Terms of Financial Integration. *Studies of Applied Economics*, 39(7). <https://doi.org/10.25115/eea.v39i7.4949>
- Devereux, M. P., Maffini, G. (2006). The Impact of Taxation on the Location of Capital, Firms, and Profit: A Survey of Empirical Evidence. <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.471.1773&rep=rep1&type=pdf>
- Dominese, G., Yakubovskiy, S., Tsevukh, J. (2020). Impact of International Migration Flows on the European Union and Ukraine. *Journal Transition Studies Review*, 27(2), 83-98. <https://doi.org/10.14665/1614-4007-27-2-007>.
- Dominese, G., Rodionova, T., Tsviakh, A. (2020). Comparative Analysis of the Return on Foreign Investments of the United States, Germany and Japan. *Journal Global Policy and Governance*, 9(2), 17-27. <https://doi.org/10.14666/2194-7759-9-2-002>
- Dominese, G., Yakubovskiy, S., Rodionova, T. (2021). Determinants of the government bond yields of Italy, Spain, Portugal and Greece. *Journal Global Policy and Governance*, 10(1), 23–34. <https://doi.org/10.14666/2194-7759-10-1-002>
- Durante, A. (2021). Reviewing Recent Evidence of the Effect of Taxes on Economic Growth. Tax Foundation. <https://taxfoundation.org/reviewing-recent-evidence-effect-taxes-economic-growth/>
- Gale, W. G., Samwick, A. A. (2014). Effects of Income Tax Changes on Economic Growth. *Economic Studies at Brookings*. <https://10.1093/acprof:oso/9780190619725.003.0002>
- IBM net income. (2021). Statista. <https://www.statista.com/statistics/265004/ibms-net-income-since-1999/>. Accessed September 2022
- IBM Romania SRL. (n.d.). Romanian Companies. <https://www.romanian-companies.eu/ibm-romania-srl-378660/>. Accessed September 2022
- ICT sector overview Republic of Moldova. (2022). https://moldovaitpark.md/wp-content/uploads/2021/12/ICT-contents-2021-big-file_final.pdf
- Katz, R. L., Jung, J. (2021). The impact of taxation in the telecommunications industry. DOI: <https://dx.doi.org/10.2139/ssrn.3992806>
- The Large Technology companies in Romania. (2020). Cushman&Wakefield. <https://37.cwechinox.com/the-large-technology-companies-have-quadrupled-their-businesses-and-teams-in-romania-between-2009-and-2019-to-over-3-billion-euros-and-50000-employees/>. Accessed August 2022
- Law of 1997. Portal Legislative. <https://legislatie.just.ro/Public/DetaliiDocumentAfis/11532>
- Law of 1999. Official website of the Chamber of Deputies. http://www.cddep.ro/pls/legis/legis_pck.http_act_text?id=20611

- Law of 2002. Official website of the Chamber of Deputies. http://www.cdep.ro/pls/legis/legis_pck.htm_act_text?id=36443
- Lomachynska, I., Babenko, V., Yemets, O. (2020). Impact of the Foreign Direct Investment Inflow on the Export Growth of the Visegrad Group Countries. *Studies of Applied Economics*, 38(4). <http://dx.doi.org/10.25115/eea.v38i4.4007>
- Malyarenko, T. (2021). China's Belt and Road Initiative in the Contested Eastern Neighborhood: A Case Study of Ukraine. *Lex Portus*, 7(2), 39-63. <https://doi.org/10.26886/2524-101X.7.2.2021.3>
- Malyarenko, T., Wolff, S. (2021). Introduction "Belt and Road Initiative in the South Caucasus and Eastern Europe: Trade, Policy, Regulations". *Lex Portus*, 7(2), 7-10. <https://doi.org/10.26886/2524-101X.7.2.2021.1>
- Maslii, N., Zakharchenko, N., Butenko, V., Savastieieva, O., Butenko, T., Shyriaieva, L. (2018). Modern technologies of detection and prevention of corruption in emerging information society. *Problems and Perspectives in Management*, 16(1), 58-67. [https://doi.org/10.21511/ppm.16\(1\).2018.06](https://doi.org/10.21511/ppm.16(1).2018.06)
- Maslii, N., Demianchuk, M., Skribans, V. (2019). Bifurcation Points Analysis Application in Economic Studies. *ICIBE 2019*, 359-364. <https://doi.org/10.1145/3364335.3364405>
- Miao, Y., Li, Z., Bai, Z. (2022). Incentive effect of structural tax reduction policy on consumption upgrading and high-tech industry. *Economic Research-Ekonomiska Istraživanja*. DOI: <https://doi.org/10.1080/1331677X.2022.2094442>
- Page, B. (2017). The Macroeconomic Effects of Taxes. Tax policy center | urban institute & brookings institution. <https://www.urban.org/sites/default/files/publication/88811/2001178-the-macroeconomic-effects-of-taxes.pdf>
- Rapoartele parcului. (2022). IT-Park. <https://moldovaitpark.md/about-us-ro/>
- Raport anual privind activitatea MITP 2021. (2022). https://moldovaitpark.md/wp-content/uploads/2022/07/MITP_Raport-anual-2021_final.pdf
- State tax service of the Republic of Moldova. <https://sfs.md/en>. Accessed September 2022
- Statistical databank. (2022). Statistica Moldovei. <https://statbank.statistica.md/PxWeb/pxweb/en/40%20Statistica%20economica/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>. Accessed September 2022
- Statistici, INSSE. (2022). <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>. Accessed September 2022
- Statistics by industry, trade and services. (2021). Eurostat. https://ec.europa.eu/eurostat/databrowser/explore/all/icts?lang=en&display=list&sort=category&extractionId=FATS_G1A_08_custom_3139394. Accessed September 2022
- Studiu privind impactul industriei de software și servicii IT în economia României. (2021). ANIS. https://anis.ro/wp-content/uploads/ANIS_RB_Studiu-privind-impactul-industriei-SWIT_FINAL.pdf
- Tax Guides Library Archive. (2022). https://www.ey.com/en_gl/tax-guides/tax-guide-library-archive. Accessed September 2022