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TAX COMPETITIVENESS AND BUSINESS R&D EXPENDITURES: DO TAXES MATTER FOR INNOVATION?

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Abstract. *Purpose* – tax policies can be seen as one of the factors potentially affecting firms' investment decisions and innovation. The paper examines the relationship between tax competitiveness and business Research and Development (R&D) expenditures across EU countries. Specifically, it analyses the tax rules governing corporate taxation in EU countries.

Research methodology – based on a combination of data from several databases (International Tax Competitiveness Index, OECD, and Eurostat) – we comprehensively examined the relationship. Using cluster analysis and PCA on cross-sectional data, we identified countries with similar tax competitiveness in relation to business R&D expenditures. Subsequently, we identified the effects of tax policy instruments and tax competitiveness on business R&D by using panel regression models (fixed effects and general method of moments).

Findings – our results suggest that countries that are very similar in terms of tax competitiveness and the structure of individual tax elements (especially the Baltic countries) also achieve relatively low levels of R&D spending. While we get mixed results on R&D tax credits as a standalone R&D factor, tax competitiveness in general is significantly associated with business R&D expenditures in EU countries. The results also indicate the importance of tax instruments, which are hitherto less examined within the context of business innovation, such as tax depreciation rules.

Research limitations – the size and geographical focus of the sample used in the analysis may limit general applicability and comparability with some previous studies based on datasets from different countries.

Practical implications – the results are discussed within the current context of policies supporting innovation, and several policy recommendations have been highlighted. They help to guide more effective tax policies to boost business R&D and innovation.

Originality/Value – there are only a few up-to-date empirical studies examining the effects of tax competitiveness on business R&D. Unlike prior studies, this paper analyses the relationship using a combination of quantitative techniques and classifies countries into clusters based on their tax competitiveness. The findings highlight the impact of overlooked aspects, such as tax depreciation rules.

Keywords: tax competitiveness, innovation, business R&D, corporate taxes, R&D tax credit.

JEL Classification: H25, O31, O38.

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1. Introduction

Support for business innovation is an integral part of innovation policies. National and supranational governments are increasingly focusing on shaping innovation policy and leveraging public support for business innovation. To achieve stated policy goals, governments use various instruments tailored to the possibilities and characteristics of the given country or region. These instruments do not directly impact the final goals (e.g., economic growth,

environmental sustainability, or health system improvement). Still, their effect can occur indirectly through their influence on the innovation process (Borrás & Edquist, 2013). Research and Development (R&D) activities are considered a key factor affecting the intensity of business innovation (Baumann & Kritikos, 2016; Guo et al., 2016). Investment in R&D plays a prominent role in firms' adoption of new technology and the development of innovative products (Sandu & Ciocanel, 2014). Business R&D expenditure also improves firms' competitiveness and growth (Pieri et al., 2018) as well as profitability (Freihat & Kanakriyah, 2017) and labour productivity (Hunady et al., 2020). Thus, public financial support for business innovation is often focused on R&D activities. This support can be divided into direct (financial) and indirect (fiscal).

Our research focuses on the latter, which primarily consists of tax incentives. Indirect public support instruments generally receive less attention in literature. However, Hauptman et al. (2009) argue that the importance of tax instruments is increasing, and countries are gradually reorienting towards the use of fiscal financial support. Public subsidies for R&D investments are also often risky because they can finance R&D projects that would have been implemented without the subsidy, potentially leading to a crowding-out effect. The positive impact of R&D tax incentives on innovation has also been found by Dechezleprêtre et al. (2023). Our results enhance their results in several ways. Our approach builds on macro panel data from different countries, which considers not only tax incentives per se but also tax competitiveness.

Tax policy is not set in isolation; instead, governments set their strategic aims relative to the tax jurisdiction of their neighbours. This fact represents the essence of tax competition and, consequently, a country's competitiveness (Saunoris & Nurmanova, 2025). Moreover, tax competitiveness in a broader sense is also linked to the country's good governance, level of corruption, and shadow economy (Mazurenko et al., 2023). Despite its crucial role policymakers must often balance tax competitiveness with revenue generation to ensure economic stability (Judijanto et al., 2025).

Differences in tax competitiveness should be reflected in investment levels and, potentially, in innovation. A competitive tax system could foster innovation. Tax incentives for R&D are among the key tools for supporting innovation in the business sector. However, the effectiveness of tax incentives could be debatable. Moreover, differences in economic circumstances across EU countries, business environments, and innovation capacities could affect the use of financial or non-financial subsidies.

This paper examines the relationship between tax competitiveness and business Research and Development (R&D) expenditures across EU countries. It analyses the tax rules governing corporate taxation across EU countries and assesses their importance for innovation. The paper also examines differences in innovative performance across EU countries and justifies the importance of considering the tax aspects of innovation. Our focus primarily concerns tax incentives for Research and Development (R&D) as well as the country's overall tax competitiveness. Using a combination of secondary data from available sources (International Tax Competitiveness Index, OECD, and Eurostat), we comprehensively examined the relationship, which has not been the focus of previous studies. Hence, our research offers a unique perspective on the examined problems and provides new empirical insights into tax

competitiveness within the context of innovation. The following section systematically reviews previous studies' findings while introducing the problem of tax competitiveness and its potential relationship to innovation. The methodology section describes the data and methods used in the paper. The other sections present and discuss the key results achieved in the empirical analysis, providing conclusions and policy implications.

2. Literature review

Tax competitiveness refers to a country's ability to attract and retain foreign investment and business activity by implementing an efficient, favourable tax system. A competitive tax system promotes a dynamic business environment that benefits the entire economy (Mengden, 2024). Improving the competitiveness of the tax system means not only offering low tax rates for businesses but also implementing a mix of tax policies, including tax incentives for research and development, efficient tax administration, and transparent tax laws. Kindsfaterienė and Lukaševičius (2008) emphasise that tax incentives can further support economic growth by stimulating the inflow of funds into the country, thereby strengthening its competitiveness.

On the other hand, higher corporate taxes could negatively impact productivity and investment, particularly in industries with high innovation intensity (Gemmell et al., 2010). Furthermore, higher tax rates also affect the economic activity of digital enterprises (Kraus & Kraus, 2025), which are considered particularly innovative (Yu et al., 2024). A favourable tax environment, characterised by tax breaks and incentives for research and development, can positively influence the innovation performance of EU countries (Kiselakova et al., 2017). This fact is further supported by the empirical results of Mukherjee et al. (2017), who found that an increase in the corporate tax rate is associated with decreases in patenting activity, investment in Research and Development (R&D), and product innovation.

Hence, tax competitiveness is one of the factors affecting business activities, such as R&D and innovation. Despite this, to the best of our knowledge, there are very few empirical studies that examine the relationship between tax competitiveness and innovation. However, the results of several studies investigating the impact of public support and incentives on corporate innovation are well known. Although most of them focus on direct support for innovation and R&D, several empirical studies have also examined the effects of tax support. Higher taxes generally harm innovation activities, while corporate taxes tend to have a particularly significant effect on corporate innovation (Akcigit et al., 2022). However, more competitive corporate taxation alone cannot correct the market failure and raise private R&D investment to the desired level (Howell, 2016).

Meng et al. (2025) found a "U-shaped" relationship between local government tax competition and improvements in local technological innovation in China. Tax structure, income distribution, and industrial agglomeration appear to be three main factors shaping technological innovation at the local level.

ITU, with tax structure, income distribution, and industrial agglomeration playing a non-linear mediating role. Improvements in technological innovation will reinforce the inverted "U-shaped" relationship between local government tax competition and ITU.

Dechezleprêtre et al. (2023) found a positive causal effect of R&D tax incentives on a firm's innovation and on its technological neighbours. Lee (2012) also demonstrated the positive impact of various types of tax incentives on corporate investment in research and development. While the tax incentives take different forms, the results may differ slightly based on their type. Tax incentives, such as additional or accelerated depreciation, significantly affect corporate investment volume. This effect was found to be the most significant in cases involving large companies and investments in long-term assets (Eichfelder & Schneider, 2014). Lacová and Huňady (2018) examined the potential effect of tax base calculation rules and tax rates on firm investment in R&D across EU countries. While the impact of the corporate tax burden on corporate innovation was insignificant, the impact of tax incentives was assessed as positive. The effect was similar for incentives that affect the tax base and for those that aim to reduce the tax rate. However, some studies indicate that tax deductions can lead to disproportionately high R&D spending, which may be attributed to firms' upward manipulation of R&D and tax avoidance practices (He et al., 2025; Toumi & Jouini, 2025). According to Thayyib (2025), R&D intensity has become a key component of corporate tax planning, especially for U.S. companies.

One of the main tax policy tools to support innovation activities is patent boxes. Patent boxes are often referred to as an intellectual property regime. Business income derived from intellectual property in this regime is taxed at a lower rate than the statutory corporate income tax rate to support local research and development (Mengden, 2024). Bornemann et al. (2022) confirm that the use of patent boxes increases patent applications, which, in turn, increases employment in innovative sectors. However, they also point to the adverse effects of reducing patent quality. Similarly, Bradley et al. (2015) found that a 1% reduction in the tax rate on patent income leads to 3-% increase in new patent applications. Although patent boxes can increase the profits of existing patents (Stimmelmayr et al., 2016), their ability to support innovations is limited. Several studies (Gaessler et al., 2021; Haufler & Schindler, 2023) show that companies' primary motivation for utilising patent boxes is often tax optimisation rather than supporting genuine innovation. Based on this, several countries have introduced the so-called "nexus clause," which conditions tax benefits on research and development performed in each country. Stimmelmayr et al. (2016) found that after the introduction of this condition, the impact of patent boxes on firm profitability disappears, suggesting that their effect depends on the specific setting of tax policy. Patent boxes that condition tax benefits on the existence of domestic R&D activities have proven to be the most effective in supporting domestic innovation (Alstadsæter et al., 2018).

The second key instrument of tax policy is tax breaks and tax credits (R&D tax credits). Tax credits play a crucial role in supporting innovation, enabling companies to reduce their tax liability and, in turn, lower research and development costs. Their nature varies by country, and they can take the form of a direct reduction in income tax, a deduction of eligible costs, or a tax credit that can be carried forward. A tax credit is usually applied to the company that implemented a project. Hence, tax support instruments help fund ex post projects that have proven successful and profitable (Sterlacchini & Venturini, 2019). Tax credits are a more direct and effective way of stimulating innovation activity compared to patent boxes, as patent boxes are often used for tax optimisation (Hall, 2021). Tax credits can increase international

competitiveness by enhancing companies' innovative capacity (Negassi & Sattin, 2019). In economically developed countries, tax credits aimed at supporting innovation are often implemented through specialised funds and grants, facilitating cooperation between research and industry and supporting startups.

3. Research methodology

The research problem is analysed in two steps. In the first step, we examine tax competitiveness using a set of indicators and classify EU countries into groups based on similar circumstances. This part of the analysis utilises cross-sectional data from the Tax Foundation database for the most recent year (2023). Twenty-two EU countries have been included in the sample. Other five EU countries have not been examined due to the limited data availability. These eight variables have been used in the first part of the analysis: R&D tax credit, statutory corporate tax rate, carry forward tax loss (years), cost recovery of expenditures to machines, cost recovery of expenditures to buildings, cost recovery of expenditures to intangibles, dividends withholding tax rate, and royalties withholding tax rate. These variables capture the tax rules and the tax burden associated with the taxation of corporate R&D investments. We included three variables showing cost recovery or capital allowances, which are the amounts of capital investment costs a business can deduct from its revenue through the tax code via depreciation. Hierarchical cluster analysis was employed to classify countries based on their tax competitiveness, followed by Principal Component Analysis (PCA). Based on the results, we can reduce the problem to two main variables (principal components). This procedure enables us to analyse the characteristics of individual clusters along the two primary dimensions, which can be interpreted as tax rates and tax base rules. This approach will enable us to examine the following research question: RQ1: "Which countries share similar tax competitiveness in the context of business R&D and innovation?" RQ2: "How do business R&D expenditures vary among groups of countries with similar tax competitiveness?".

The second part of the analysis examines the relationship between tax competitiveness and R&D expenditure, using panel data from 2016 to 2023. The study focuses only on 22 EU countries for which complete data were available. Five EU member states were excluded due to missing data in International Tax Competitiveness Index. Hence, we examined a panel with a large n and a small t ($n = 22$, $t = 8$). Overall, a relatively small sample can be seen as a limitation of our study, but it still contains essential information for most EU countries. However, mentioned exclusion may introduce certain degree of selection bias, as the excluded nations may represents different tax and innovation profiles. Hence, the results should be interpreted more as exploratory rather than definitive evidence of causality. The potential causal relationships should be further investigated on larger data samples.

Fixed effects and GMM panel regressions have been used to examine the potential relationship between three different tax competitiveness variables and business R&D expenditures. The GMM estimation was mainly used to capture the causal effect and mitigate potential endogeneity problems. Similar to our approach, GMM has been previously used by Didinmez et al. (2025) examine tax competition based on the panel data for European countries in the period 2010–2021. Despite its many advantages, this approach's potential benefits

are still somewhat limited by data availability and a relatively small sample size. Hence, the GMM results should also be treated as indicative.

The dependent variable and all three independent variables mentioned are described in Table 1. The first independent variable captures each country's overall international tax competitiveness, as reported by the Mengden (2024). The second independent variable specifically addresses corporate tax competitiveness, and the third captures the estimated volume of an R&D tax credit. Moreover, GDP per capita has been used as a control variable in all models.

Table 1. Description of variables used in the regression models (source: authors' own conception based on data from Eurostat and Tax Foundation databases)

Variables	Description
R&D expenditure (dependent variable)	Share of research and development expenditure, by sectors of performance: Business enterprise sector (data from Eurostat: [tsc00001]) (%)
Overall tax competitiveness	International Tax Competitiveness Index 2024 according to the Tax Foundation database (0–100)
Corporate tax competitiveness	Corporate Tax Competitiveness Score (Competitiveness index focused only on corporate tax) according to the Tax Foundation database (0–100)
R&D tax credit	B-Index: Volume of the tax credits for R&D expenses based on OECD and Tax Foundation data

Note: Bulgaria, Croatia, Cyprus, Malta and Romania have been excluded from the same due to missing ITCI or B-Index data.

Applied methodology allows us to examine the third research question as follows: RQ3: "Is tax competitiveness positively associated with business R&D expenditures?" The results are discussed, along with specific explanations and policy implications.

4. Research results

The initial part of the analysis examines tax competitiveness based on eight indicators. These indicators are related to business R&D expenditures and their future taxable profits (R&D tax credit, corporate tax rate, carry-forward tax loss, recovery of expenditures to machines, buildings, and intangibles, dividends withholding tax rate, and royalties withholding tax rate). Ward's method hierarchical cluster analysis with Euclidean distance has been applied to create homogenous clusters of countries based on their tax competitiveness similarities. The results are graphically illustrated by the dendrogram in Figure 1. In line with the results, three main clusters have been created. The number of clusters was selected using the Calinski-Harabasz index, with consideration of the lowest and highest acceptable numbers for proper interpretability. The first cluster comprises 15 countries, the second comprises four countries, and the third comprises only 3 Baltic countries. It is also important to note that the missing 5 EU countries (Bulgaria, Croatia, Cyprus, Malta and Romania) were not included in the analysis due to data unavailability.

Cluster analysis was followed by Principal Component Analysis (PCA), which allows us to reduce the dimensionality and improve the interpretability of the results. According to the eigenvalues, two principal components have been identified. These two principal components capture almost 60% of the variability of the mentioned original eight variables.

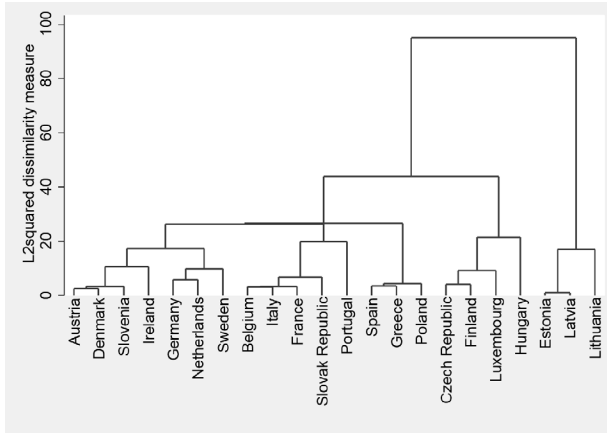

Figure 1. Dendrogram showing the results of hierarchical cluster analysis (source: author's own conception using Stata 14 software)

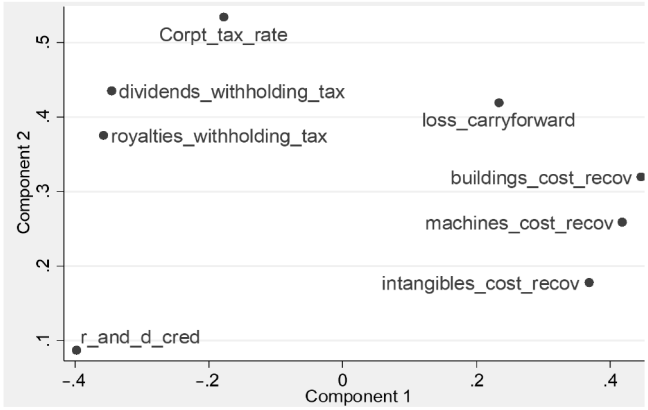

Figure 2. Component loadings of variables for two principal components (source: author's own conception using Stata 14 software)

The component loadings plot in Figure 2 shows the representation of individual variables on the variability of each of the two main components. While the first component appears to represent depreciation rules, the second component captures the tax rates.

Both principal components have been used to describe the characteristics of each cluster, as shown in Figure 3.

It shows the boxplots of components and R&D tax credit for each cluster. The R&D tax credit was treated as a separate variable because it appears uncorrelated with both identified components. The results suggest that Baltic countries have very supportive depreciation rules, combined with relatively high tax rates and an average level of R&D tax credits. Especially Latvia and Estonia have the highest recovery rates of expenditures. Countries in the second cluster have relatively low tax rates, while those in the first cluster have average tax rates with high variability. Moreover, the highest average R&D tax credit was found in the first cluster. Finally, we compare the level of business R&D expenditure across clusters, as shown in Figure 4.

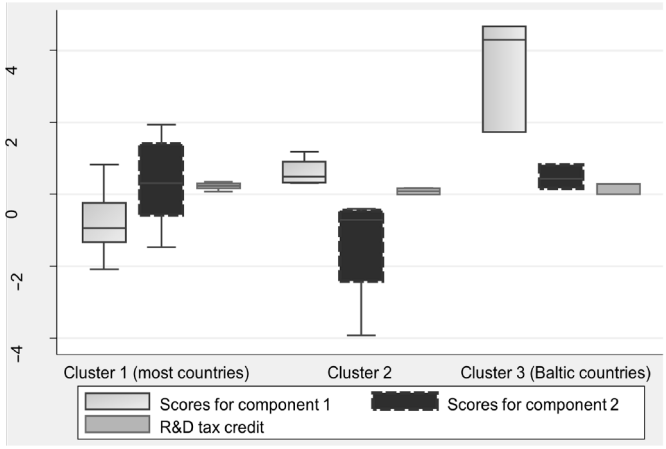

Figure 3. Boxplots of two components and R&D tax credit for each of the three mains (source: author's own conception using Stata 14 software)

Figure 4. Boxplots of two components and R&D tax credit for each of the three mains (source: author's own conception using Stata 14 software)

Descriptions of each cluster's characteristics are summarised in Table 2. Interestingly, countries with the most favourable depreciation rules, concentrated in the third cluster, get the lowest level of business R&D expenditure. On the contrary, countries in the first cluster generally achieved the highest business R&D investments. However, the variability is also significantly higher in that area. The reason behind this is that this cluster encompasses most countries. Countries classified in the second cluster (Czechia, Hungary, Finland, and Luxembourg) have average business R&D expenditures.

The potential relationship between tax competitiveness and business research and development investment has been further examined by panel regression analysis. Overall tax competitiveness was expressed with the tax competitiveness index. In addition to this index, corporate tax competitiveness and R&D tax credits were also used as independent variables. GDP per capita was applied basically as the control variable. The results are summarised in Table 3.

Table 2. Characteristics of each cluster based on the results (source: author's own conception using Stata 14 software)

	Countries	Characteristics
Cluster 1	Austria, Denmark, Slovenia, Ireland, Germany, Netherlands, Sweden, Belgium, Italy, France, Slovakia, Portugal, Spain, Greece, Poland	Most countries included in this cluster. In general, less favourable tax depreciation rules and shorter time for loss to be carry forward. High variability in tax rates in general. Slightly higher R&D tax credit. Higher variability in business R&D expenditures with the highest average R&D expenditures.
Cluster 2	Czechia, Finland, Luxembourg, Hungary	Lower tax rates and average tax depreciation rules. Average business R&D expenditures.
Cluster 3	Estonia, Latvia, Lithuania	All three Baltic countries included in the same cluster. The most favourable tax depreciation rules but rather high tax rates. The lowest business R&D expenditures with less variability.

Table 3. The results of panel regression analysis (source: author's own conception using Stata 14 software)

	Dependent variable: R&D expenditure			
	Fixed effects	Fixed effects	GMM	GMM
Overall tax competitiveness	–0.0023 (0.003)		0.005*** (0.001)	
Corporate tax competitiveness		0.005** (0.002)		0.002*** (0.0006)
R&D tax credit	0.225* (0.102)	0.41** (0.172)	0.003 (0.07)	0.0005 (0.0006)
Log (GDP per capita)	0.537*** (0.156)	0.477** (0.476)	0.379*** (0.01)	0.309*** (0.022)
R&D expenditure (–1)			0.658*** (0.019)	0.663*** (0.028)
Constant	–4.14** (1.64)	–4.063** (1.469)		
Number of observations	220	220	176	176
AR (1) z-stat			–2.81***	–2.75***
AR (2) z-stat			–0.893	–1.01
Sargan J-test [p-value]			20.16	20.13
R2	0.967	0.967		
F stat./	234.2	239.7		

Note: Fixed effects and GMM models have been used (random-effects models have been tested as well). Symbols */**/*** means statistical significance at 10%/5%/1% level of significance. Heteroskedasticity-consistent standard errors were used.

We applied both fixed effects and GMM models to test the robustness of the results. GMM models have also been used to address potential endogeneity. The Sargan J-test was used to test overidentifying restrictions and verify the validity of the instruments used in GMM models.

The results suggest that the problems of tax competitiveness and R&D are connected. Our results indicate a positive relationship between tax competitiveness and business R&D expenditure. These findings hold across all three variables and capture certain aspects of tax competitiveness. The effect of corporate tax competitiveness is the most robust. Regarding the R&D tax credit, we found only mixed evidence. The GMM results do not indicate a significant effect of this tax tool. Hence, we are unable to make any claims about specific causal effects of R&D tax credits. However, in general, tax competitiveness plays a role in business R&D investments and thus is likely to affect business innovation performance.

The results achieved provide valuable insights into the problem of tax competitiveness in relation to business investment in R&D and business innovation. It shows the differences and similarities in the tax competitiveness of EU countries through cluster analysis. This procedure allows us to answer the first research question ("Which countries share similar tax competitiveness in the context of business R&D and innovation?"). We found that the Baltic countries are very similar in their tax competitiveness. This finding aligns with Bernardelli et al. (2023), who also note that the tax competitiveness of the Baltic countries appears to be comparable. This fact could stem from their similar geographical location and shared cultural and historical background. The tax competitiveness of Czechia, Hungary, Finland, and Luxembourg appears to be similar to some extent. These countries are in different parts of Europe, but they share certain aspects of tax competitiveness. The level of tax depreciation is very comparable in all four countries.

Classifying countries into similar groups also allows for a comparison of R&D expenditures to answer the second research question ("How do business R&D expenditures vary among groups of countries with similar tax competitiveness?"). The results are interesting but mixed. The cluster with the most countries is characterised by high variability in tax rates and in business R&D expenditures. Interestingly, the Baltic countries perform, on average, the worst in terms of R&D expenditures, despite their favourable depreciation rules. However, this approach is somewhat limited, yielding only indicative results and providing a static view of the problem. Hence, we also use panel regression analysis as a more suitable methodology to examine the potential relationship between tax competitiveness and business research and development. The GMM technique provides more detailed and accurate results while alleviating potential endogeneity. GMM has also been used by Liu (2016) to examine tax competition between OECD countries.

An original contribution of our research lies also in providing initial empirical evidence of a positive link between corporate tax competitiveness and business R&D expenditures. Our findings align with those of Dechezleprêtre et al. (2023), who, based on microdata, found that R&D tax incentives support innovation at the firm level. Similarly, several studies highlighted the positive relationship between different forms of tax incentives and business R&D (Lee, 2012; Eichfelder & Schneider, 2014), as well as between tax base calculation and R&D firm investments (Lacová & Huňady, 2015). Our findings also complement those of Mukherjee et al. (2017), who found an adverse effect of the corporate tax rate on patenting, business R&D expenditures, and the introduction of innovative products.

Despite our best efforts, our approach also has some limitations. Especially, the size and geographical focus of the sample used in the analysis may limit the analysis's general

applicability and comparability with some previous studies based on datasets from different countries. Potential selection bias and the relatively small sample size do not allow us to make definite causal claims. The results are not applicable for countries which has been excluded from sample (Croatia, Malta, Cyprus, Bulgaria and Romania). Even though the results may not fully represent all EU countries, the study provides several new empirical evidence and explores a novel topic. Future research could build on stated findings by employing alternative approaches, using broader datasets, and incorporating additional control variables to even further test the robustness of our results.

5. Conclusions

The findings of this paper contribute to a significant body of research on business innovation in the EU. Given that the literature on the relationship between tax policy tools and innovation remains significantly underdeveloped, this study offers novel and more comprehensive insights into this research problem. The study employs a unique approach, considering not only selected tax incentives but also tax competitiveness, and combining diverse approaches and data types (cross-sectional and panel data). It concludes that overall tax competitiveness, and specifically corporate tax competitiveness, are both closely associated with business R&D expenditures. The results allow us to clarify the research question on which countries share similar tax competitiveness in the context of business R&D and innovation.

The results of the cluster analysis suggest three main groups of EU countries with similar approaches. The three Baltic countries (Lithuania, Latvia, and Estonia) share many similarities in their tax policy tools. All three of them apply highly favourable tax depreciation rules for R&D. However, the level of business R&D spending is still low here, suggesting that tax incentives in the form of tax depreciation rules cannot fully compensate for other structural and economic factors. This finding addresses our second research question regarding how business R&D expenditures vary across country clusters with similar tax competitiveness. Countries included in the largest cluster show higher average R&D expenditures despite having mixed tax rates and less aggressive depreciation schedules. Most major European economies are included in this cluster, including Germany and France. The results show relatively high resilience of established innovation ecosystems in these countries.

The third research question, which focused on the association between tax competitiveness and business R&D expenditures, has been clarified using panel-data fixed effects and GMM regression analyses. The results highlight the crucial role of tax competitiveness in promoting innovation. Corporate taxes are often seen as crucial to international capital flows and the business environment. Hence, maintaining a corporate tax rate that is internationally competitive is linked to a higher intensity of business innovation. This finding applies not only to the statutory tax rates but also to other tax rules and incentives, such as tax exemption, taxation of income from intangible capital, and the use of patent boxes. However, our empirical evidence regarding the positive effects of R&D tax credits is relatively weak. The results are mixed, and GMM models fail to detect a statistically significant relationship between tax credits and business innovation. Despite the small sample size, the research still provides valuable findings to support future research in this area.

Our findings suggest that policymakers should consider tax rules among the factors when creating an innovative ecosystem. However, there is some mixed evidence regarding the potential effect of the R&D tax credit. These results imply that tax credits are most effective when integrated into a broader tax strategy that improves overall tax competitiveness and the business environment. Moreover, relatively low R&D expenditures found in countries with favourable depreciation rules suggest that tax stimulation alone may not be the silver bullet for boosting business innovation. Simple tax breaks may not be as effective as fundamental changes to tax bases to attract long-term capital investment in business research and development. Such a favourable tax policy can be characterised by a balanced mix of tools that support business innovation through various paths. This fact also underscores the need to enhance the country's overall international tax competitiveness, while accounting for other key factors, such as human capital development and infrastructure.

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