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CÁC NHÂN TỐ ẢNH HƯỞNG ĐẾN ĐỔI MỚI SÁNG TẠO: VAI TRÒ CỦA THUẾ THU NHẬP DOANH NGHIỆP

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Tóm tắt

Trong khi các tài liệu gần đây chủ yếu tập trung vào các nền kinh tế phát triển và nghiên cứu tác động của thuế doanh nghiệp lên đổi mới sáng tạo bằng số lượng bằng sáng chế hoặc chi tiêu cho nghiên cứu và phát triển, chúng tôi cố gắng sử dụng một chỉ số toàn diện để đo lường mức độ đổi mới tổng thể ở cấp quốc gia. Bài báo này tiến hành một nghiên cứu thực nghiệm về tác động của thuế doanh nghiệp trong việc thúc đẩy đổi mới tại 11 quốc gia có thu nhập trung bình cao từ năm 2011 đến năm 2021, bằng cách áp dụng mô hình hồi quy phương pháp bình phương nhỏ nhất (POLS), mô hình hiệu ứng cố định (FEM), và mô hình bình phương tối thiểu tổng quát khả thi (FGLS). Kết quả cho thấy thuế thu nhập doanh nghiệp sẽ cản trở sự đổi mới, trong khi các biến kiểm soát, bao gồm chỉ số phát triển con người và chi tiêu cho nghiên cứu và phát triển, cho thấy tác động tích cực đến sự đổi mới. Chúng tôi đưa ra một số gợi ý thực tiễn cho các nhà hoạch định chính sách nhằm quản lý hệ thống đổi mới sáng tạo tốt hơn.

Từ khoá: Đổi mới sáng tạo, thuế doanh nghiệp, chi tiêu cho nghiên cứu và phát triển, chỉ số phát triển con người, các nước có thu nhập trung bình cao

FACTORS AFFECTING INNOVATION PERFORMANCE: THE ROLE OF CORPORATE INCOME TAX

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Abstract

While recent literature mainly focuses on developed economies and examining the effects of corporate taxes on the number of patents or R&D expenditures, we attempt to use a comprehensive index measuring the overall innovation at the country level. This paper conducts an empirical study on the impact of corporate tax in promoting innovation in 11 upper-middle-income countries from 2011 to 2021, by applying Pooled Ordinary Least Squares regression model (POLS), Fixed Effects Model (FEM), and Feasible Generalized Least Squares (FGLS). The result suggests that the corporate income tax rate will hinder innovation while control variables, including the human development index and research and development expenditure, revealed a positive effect on innovation. Following the investigation, we expose several practical implications for policymakers for better management of the innovation system.

Keywords: Innovation, Corporate taxes, R&D expenditure, Human Development Index, Upper middle-income countries

1. Introduction

In recent years, the significance of innovation has surged significantly across various sectors, particularly in driving economic growth in emerging economies (Fagerberg et al., 2010). By definition, innovation is the process of generating, promoting, and implementing new ideas (Scott & Bruce, 1994; Tahir, 2020), which bring benefits to the organization (Janssen, 2000). Innovation includes both input (e.g., human capital and research, institution) and output (e.g., knowledge and technology, creative outputs) (WIPO, 2023). Solow (1957) and Romer and Romer (1990) underscore innovation as the primary driver of long-term economic growth. To promote innovation, tax policy is regarded as one of the most important tools of the government (WIPO, 2023). However, there has been controversy among policymakers regarding the impact of taxation on investment, growth, and innovation. While several researchers concluded that tax reduction may increase inequality and burden on governmental budgets (Keuschnigg and Ribi, 2010), the literature in institutional economics consistently emphasizes the positive influence of tax reduction on enterprise technology development and innovation.

Specifically, scholars have explored the impact of corporate income taxes on firm investment and business activity (Cummins, Hassett, and Hubbard, 1996; Giroud and Rauh, 2019). However, there is a lack of understanding regarding how tax policy may shape long-term output and performance through the innovation index at the national level. Thus, our study aims to fill this gap by examining the impact of corporate income tax on innovation across a sample of upper-middle-income countries, including Azerbaijan, Argentina, Armenia, Bosnia and Herzegovina, Brazil, Bulgaria, China, Colombia, Costa Rica, Mexico, Russian Federation, South Africa, Thailand, Turkey, Moldova, Paraguay, Peru, El Salvador, Georgia, Guatemala, Indonesia, Kazakhstan, and Malaysia. As mentioned by Mukherjee, Singh and Zaldokas (2015), underlying local economic conditions can affect tax policy and innovation, resulting in incorrect estimation of the causal effect of the tax effect on innovation. So, we address this issue by concentrating on countries that are considered upper-middle income levels, which are exposed to similar economic conditions.

Moreover, our research seeks to clarify the extent to which corporate income taxes influence innovation within these countries. Unlike previous studies that mainly focused on developed economies and examining the effects of corporate taxes on the number of patents (Mukherjee, Singh, and Zaldokas, 2015; Ufuk et al., 2018) or R&D expenditures (Shao and Xiao, 2019), we attempt to use the Global Innovation Index as a primary variable to measure the overall innovation levels of a country. Additionally, our results suggest that corporate income taxes has a negative effect on the innovation index, by comprising control variables such as R&D expenditures and the Human Development Index.

The remaining part of the research is organized as follows: Section 2 examines empirical evidence, identifies research gaps, and develops research hypotheses. Section 3 outlines the research model and data. Section 4 presents the analysis and discussion of the research findings. Lastly, section 5 concludes the paper.

2. Literature Review

Innovation has been defined as introducing new products or services, new processes, opening new markets, and using new resources to create value in the market (Obunike & Udu, 2019; Wang & Ahmed, 2017). According to Pisano (2015), innovation is classified into four main types: disruptive, architectural, routine, and radical. While businesses and startups are recommended to focus more on radical innovation (Damanpour and Wischnevsky, 2006) large firms should put more emphasis on routine or incremental innovation in order to gain competitive advantage.

In accordance with WIPO (2023), ensuring the sustainability of innovation, probably through a transparent innovation policy, is embedded as a key priority in a country's pathway to national development and progress. Innovation is an important motive that helps improve and strengthen a business operation so that it can create competitive advantages equal to or greater than those of foreign competitors and correspondingly proceed economic development (Distanont and Khongmalai, 2018). Innovation is normally assessed through the number of patent applications (Porter and Stern, 2000; Bilbao-Osorio and Rodríguez-Pose, 2004; Bottazi and Peri, 2007; Barra and Zotti, 2016). Although regarded as an indicator for measuring technological knowledge and innovation, it has the disadvantage that only a part of technological knowledge is preserved within a patent (Voutsinas et al., 2018). Other indicators for measuring innovation, such as the proportion of innovation enterprises, and complex innovation indicators considering selected inputs and outputs of the innovation system (Carayannis and Grigoroudis, 2014), are proposed in previous literature. However, the number of patent applications is chosen to be the most common proxy of innovation due to data availability limitations.

The publication of the Oslo Manuals marks a significant milestone in innovation measurement. The first edition was released in 1993, aiming to establish a comprehensive framework for measuring innovation to facilitate international comparisons. Concurrently, a standardized questionnaire survey, known as the Community Innovation Survey (CIS), was conducted in the Member States of the European Union (Sabadie-Kwiatkowski, 2016). Over decades, the Global Innovation Index (GII) has been the leading reference for innovation, which serves as an effective tool for policymakers (Johnson Cornell University, INSEAD and WIPO, 2015). With continuous efforts to ensure data availability and improve innovation performance, the GII has the prospect to assist nations, especially developing countries in further development of their innovation systems, which is also the main reason the research employs this index as the primary variable.

According to Akcigit and Stantcheva (2020), tax policies can be divided into two broad groups: general tax policy (such as the personal or corporate income tax) and targeted tax policies (such as R&D tax credits, local tax incentives for innovating firms, or subsidies for specific types of research). Corporate taxes are direct taxes levied by the government on the profits accruing to businesses (Tax Foundation, 2023). The level of corporation taxation is underscored within a firm because it determines the amount of after-tax profits available for paying out dividends to shareholders or reinvesting in the business (Pass et al., 1991). On a legal basis, corporations are treated as individual entities in the eye of law, which implies that corporate taxes are direct taxes levied on those legal entities. However, on economic aspects, corporations are owned by their shareholders, so any taxes levied on the corporation would be an indirect tax on the shareholders as well. (Lipsey, 1993).

Several empirical studies have proven the negative impacts of corporate tax on innovation. According to an investigation by Ufuk et al. (2018), a one percentage point higher top corporate tax rate leads to a decrease of around 6-6.3% in patents, 5.5-6% in citations, 4.6-5% in number of inventors, and 8.5-9.3% in the number of superstar inventors, at the macro level. They found a sensitive relationship between the share of patents assigned to corporations and corporate tax rate, with one percentage increase in the top corporate tax rate resulting in close to 1.2 percent fewer patents assigned. Meanwhile, at the firm level, by assigning investors to their tax brackets corresponding to productivity, Ufuk et al. (2018) came to the conclusion that the decision of a firm for its R&D laboratory's location in a given state has been negatively affected by the top corporate tax rate.

In Chinese high-tech companies, corporate tax cuts may result in enforcing R&D investment and firm productivity (Chen et al., 2018). In terms of the tax collection reform applied to manufacturing firms in China established after 2002, a research by Cai, Chen and Wang (2018), with a comprehensive investigation of all medium and large enterprises in China, concluded that a decrease of effective tax rate by one standard deviation (0.01) can raise 5.7% of the average number of patent applications, which appears to be a strong and robust causal relationship.

Mukherjee, Singh and Žaldokas (2017) exploited the unstable changes in state-level corporate tax rates within all US public firms over 1990 to 2006. By employing a difference-in-differences approach, the research came to a conclusion that higher corporate taxes reduce innovator incentives and indeed discourage risk-taking. Another research on the effects of fiscal policy on patenting by Atanassov and Liu (2014) revealed that corporate taxes, primarily tax cuts may hinder innovative activities, while Mukherjee, Singh and Žaldokas (2017) blamed this for tax increases. In detail, around 1.1% rise in corporate taxes is equivalent to approximately 37% of treated firms with one fewer innovation project patented. Conversely, few research shows the opposite relationship between innovation and corporate tax. By conducting natural experiments through industry-level innovation shocks applying a difference-in-differences analysis, Cheng et al. (2020) identified a positive causal effect between the number of patents and corporate tax planning, the systematic approach that companies employ to legally minimize their tax (Fincart, 2023). Shao and Xiao (2019), using the same analysis strategy within the scope of China, also documented that corporate tax deduction positively affected firm patenting, significantly with large-sized firms or ones located in the eastern provinces of China.

Therefore, we have the first hypothesis:

H1 (+): The corporate tax rate has a negative influence on innovation.

Investment in research and development (R&D) reflects a region's effort to generate new knowledge and develop technology within that area (Bilbao-Osorio and Rodriguez-Pose, 2004). R&D activities are fundamentally the primary input in the innovation process (WIPO, 2024). Therefore, it is essential to analyze how varying levels of R&D investment influence regional innovation activities. Specifically, R&D investment was mostly measured by the expenditure in R&D as a percentage of GDP (Kučera and Fiľa, 2022; Bilbao-Osorio and Rodriguez-Pose, 2004).

Traditionally, Trajtenberg (1990) regarded investment in R&D as one of the main strategies to secure technological potential and, therefore, innovation and economic growth. Several empirical researches have pointed out the significant effect of R&D expenditure on innovation across different regions and time periods (Porter and Stern, 2000; Kučera and Fiľa, 2022; Fritsch and Franke, 2004). Porter and Stern (2000) found that R&D investment positively influenced patenting rates, which inferred innovation, in OECD countries from 1973 to 1993. Similarly, Kučera and Fiľa (2022) used secondary data from EU countries in 2020 to show a statistically significant relationship between R&D expenditure and innovation performance (measured by the Summary Innovation Index - SII). The correlation coefficient of 0.74 and an R-squared value of 0.55 indicate that 55% of the variation in innovation performance can be explained by changes in R&D spending. At the micro-level, Fritsch and Franke (2004) surveyed manufacturing firms to prove a significant positive impact of R&D expenditure on innovation activities in Germany from 1992 to 1995. This research also highlights the beneficial effects of R&D cooperation between service firms and public research institutions on patenting. However, by analyzing the European Union (EU) between 2017 and 2018 with holistic meta-analysis, MacGregor Pelikánová (2019) found that the number of patents submitted to the European Patent Office (EPO) has continued to rise, while R&D spending has not increased. Thus, it can not be concluded that there is a conclusive or strong relationship between R&D expenditure and innovation outcomes. In conclusion, the innovation performance is assumed to depend positively on the amount of expenditure on R&D.

Thus, the second hypothesis is

H2(+): The R&D expenditure has a positive influence on innovation.

The Human Development Index (HDI) is a measure of assessing the level of economic development, health, and education dimensions. The health dimension of the HDI is evaluated based on life expectancy at birth. The education dimension is calculated by the average number of years of schooling received by adults aged 25 and older, as well as the expected years of schooling for children at the age of school entry. The standard of living dimension is measured using gross national income (GNI) per capita (UNDP, 2022). In general, HDI reflects differences not only in economic development but also in the strength of human capital (Van Hiel et al., 2018).

The theoretical foundation linking human capital and innovation has been established by endogenous growth theory (Romer, 1990; Aghion and Howitt 1992). This theory argues that innovation is predetermined and influenced by internal factors, in contrast to the neoclassical perspective (Solow, 1957), which views innovation as an external factor beyond explanation. With investment in human capital and institutions, innovation will be developed as an endogenous growth.

Previous studies have revealed the positive influence of the human development index on innovation performance (Vukoszavlyev, 2019; Van Hiel et al., 2018). Education increases human capital by enhancing knowledge, skills, and abilities of individuals (Lange and Topel, 2006; Anderson and Keys, 2007), thereby fostering innovation as they are better equipped to generate new ideas, develop advanced technologies, and improve processes. In developed countries, where education systems are often well-established, this effect is particularly pronounced (Hanushek and Kimko, 2000). Through secondary data from 126 countries, Vukoszavlyev (2019) used the multivariate regression analysis to prove HDI positively affected the innovative index, which was the most significant factor among other economic well-being indexes. The correlation coefficient of HDI is 0.706 and an R-squared value of 0.708 indicates that 70.8% of the variation in global innovation index can be explained by changes in HDI. To examine this influence, Van Hiel et al. (2018) conducted a multilevel mode based on a random coefficient model with data from 2005 to 2014. The research supported the direct positive effect of HDI while the analysis also proved the indirect effect of the cross-level interaction between HDI on innovation via liberalization values remained significant. Overall, HDI is expected to positively affect innovation performance.

Thus, the third hypothesis is

H3(+): Human Development has a positive influence on innovation.

3. Research method

3.1. Research model and data

Based on the research gap and research hypothesis identified in Section 2, the research model is put forward:

$LogIn_{i,t} = \beta_0 + \beta_1 RDE_{i,t} + \beta_2 CT_{i,t} + \beta_3 HDI_{i,t} + \varepsilon_{i,t}$

where:

i (=1 … …, N) represents the studied countries (24 upper- middle income countries)

t (=1 … …, T) represents the year from 2011 to 2021

β is the coefficient of logarithm of innovation

β_1, β_2, β_3 is respectively the coefficient of research and development expenditures, corporate tax rate, and human development.

it indicate the random error term in the model.

The dependent variable: LogIni,t is the log Global Innovation Index, denoting the development and application of ideas and technologies that improve goods and services or make their production more efficient (European Central Bank, 2017). The independent variables: RDEi,t indicates the research and development expenditure, which is represented by government spending as percent of GDP; CTi,t represents the highest statutory corporate tax rate and HDIi,t is the human development index. All variables are demonstrated in a natural logarithmic scale.

By taking the log of the Global Innovation Index, the research is viable to investigate the non-linear relationship between the independent variables and the dependent variable.

Table 1. Research variables and measurement method

Symbol	Variable name	Measurement	Source
In	Global Innovation Index	Points	WIPO (2023)
CT	Corporate Tax Rate	% of commercial profits	UNESCO (2023)
RDE	R&D Expenditures	%	Trading Economics (2023)
HDI	Human Development Index	Points	UNDP (2023)

Source: Authors' compilation

Secondary data is employed in this research, with the sample including 242 observations across 24 countries: Azerbaijan, Argentina, Armenia, Bosnia and Herzegovina, Brazil, Bulgaria, China, Colombia, Costa Rica, Mexico, Russian Federation, South Africa, Thailand, Turkey, Moldova, Paraguay, Peru, El Salvador, Georgia, Guatemala, Indonesia, Kazakhstan, and Malaysia. Investigated over the period from 2011 to 2021. After thoroughly reviewing existing literature on the topic, we find that the upper-middle income group are appropriate research subjects with the feasibility and availability of research data being continuously recorded to ensure detailed analysis.

3.2. Estimation method

The possibility of Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM), Random Effects Model (REM) and Feasible Generalized Least Squares (FGLS) is equal to cointegration (Bussiere et al, 2005). Therefore, a wide variety of econometric models is employed in this research. POLS is initially employed in order to evaluate the effects of RDE, CT, and HDI on logIn. The Hausman test is then performed to determine the most appropriate estimator between FEM and REM. The research then follows the FGLS and FEM estimation methods to control the problems of simple and robust-OLS for the panel data.

4. Results and Discussions

4.1. Stationarity and Descriptive statistics

We conducted Levin, Lin and Chu tests to assess the stationarity of the data. The results, as presented in Table 2, indicated that all variables logIn, RDE, CT, and HDI exhibit stationarity, with p-values less than 5%. Furthermore, a comprehensive descriptive statistical analysis was performed, presenting key summary statistics including the mean, maximum, minimum, standard deviation, and the number of observations for each variable, as shown in Table 3.

Table 2. Stationarity of data

Variable	Levin, Lin and Chu test		
	Statistic	**Prob**	**Conclusion**
logIn	-6.3968	0.00	Stationary
RDE	-1.97	0.02	Stationary
CT	13.6842	0.00	Stationary
HDI	-9.6447	0.00	Stationary

Source: Authors' calculation.

Table 3. Descriptive data

	LogIn	**RDE**	**CT**	**HDI**
Mean	3.543	0.533	22.494	0.762
Maximum	4.004	2.43	35	0.853
Minimum	3.109	0.02	0	0.617
Standard deviation	0.155	0.506	7.680	0.050
Observations	264	242	264	264

Source: Authors' calculation.

4.2 Correlation coefficient matrix and variance inflation factor

At a significance level of 1%, the variable logIn demonstrated a negative correlation with the variable CT, while displaying positive correlations with the variables RDE and HDI. Table 4 showed the positive correlation coefficient among the independent variables RDE, CT and HDI range from 0.1434 to 0.7347, and the negative values ranged from -0.1643 to -0.0512. No cases are 0 recorded. Hence, the absolute values of these coefficients fell below 0.8, indicating the absence of a strong correlation among these variables within the model (Kim, 2019). Additionally, VIF values remain below 10 across all cases, suggesting there was no significant multicollinearity in the model (Gujarati, 2008).

Table 4. Correlation of variables and Variance Inflation Factors

	logIn	**RDE**	**CT**	**HDI**
logIn	1.000			
RDE	0.7347***	1.000		
CT	-0.0512***	0.1434**	1.000	
HDI	0.4463***	0.3180***	-0.1643***	1.000
VIFs		1.16	1.07	1.17

*Note: *, **, *** representatively denotes statistical significance at 10%, 5% and 1%.*

Source: Authors' calculation.

4.3. Estimation results

Table 5. Westerlund test for cointegration

H0: No cointegration	**Number of panels = 24**	
H1: All panels are cointegrated	**Avg. number of period = 10.083**	
Cointegrating vector**: Panel specific**		
Panel means: **Included**		
Time trend: **Not included**		
AR parameter: **Same**		
	Statistic	P-value
Variance ratio	**-0.7677**	**0.2213**

Source: Authors' calculation.

At a P-value of 0.2213, the Westerlund test showed there was no cointegration among the variables logIn, RDE, CT and HDI. Accordingly, pooled OLS (POLS), dynamic OLS (DOLS), the FE and the random effects estimators are appropriate to estimate the cointegrating variables (Bussiere et al, 2005). Therefore, we first conducted the Pooled OLS model to estimate the impacts of RDE, CT and HDI on LogIn. The value of R-squared was 0.592 which means 59.2% of the dependent variable LogIn could be explained by the independent variables including RDE, CT and HDI.

Then we examined the reliability and suitability of the POLS model using various tests. The Wooldridge test for autocorrelation in panel data was applied and the results showed that P-value = 0.1899, more than 0.05. This means H0: no first-order autocorrelation could not be rejected. The POLS model had no issue of autocorrelation. According to table 6, however, the POLS model indicated a heteroskedasticity problem as the significance level for White's test fell below 0.05 (sig = 0.0301).

Table 6. White's test for heteroskedasticity

Source	chi2	df	p-value
Heteroskedasticity	18.47	9	0.0301
Skewness	5.11	3	0.1636
Kurtosis	4.14	1	0.0419
Total	27.73	13	0.0099

Source: Authors' calculation.

Therefore, to find a best-fit model for this study, we used the Hausman test to compare RE and FE. The Hausman test suggested that FEM was a more appropriate estimator for this study.

According to FEM estimation outcomes, we utilized the Wooldridge test to evaluate the problem of autocorrelation. As P-value exceeded 0.05 (P-value =0.1899), it is concluded that the model had no autocorrelation problems. Conversely, the Modified Wald test for heteroskedasticity revealed a p-value of 0.000, suggesting the existence of heteroskedasticity problems in the model.

With the estimation results according to FEM, the model merely had a problem of heteroscedasticity. Therefore, we used the FGLS model and the FEM with the robust result to correct this error. Our final results were tabulated in Table 7.

Table 7. Summary of regression results

Independent variable	Dependent variable: logIn				
	Pooled OLS	**FE**	**RE**	**FE robust**	**FGLS**
RDE	0.213***	0.102**	0.170***	0.102*	0.223***
	(0.014)	(0.046)	(0.028)	(0.056)	(0.009)

Independent variable	Dependent variable: logIn				
	Pooled OLS	FE	RE	FE robust	FGLS
CT	-0.002***	0.003	-0.001	0.003	-0.002**
	(0.001)	(0.003)	(0.002)	(0.004)	(0.001)
HDI	0.559***	-0.694*	-0.040	-0.694	0.384***
	(0.138)	(0.366)	(0.261)	(0.660)	(0.134)
Constant	3.055***	3.955***	3.496***	3.955***	3.175***
	(0.109)	(0.278)	(0.205)	(0.510)	(0.110)
Observations	242	242	242	242	242
R-squared	0.592	0.130		0.130	

*Notes: The figures in parentheses are the standard error. *, **, *** representatively denotes statistical significance at 10%, 5% and 1%.*

Source: Authors' calculation

4.4. Discussions

The value of R-squared equaled 0.13, which means the dependent variable could be explained by 13% of independent variables in the model. Table 7 shows that the variables RDE, CT, and HDI were statistically significant at 1% in the model FGLS while only RDE remained statistically significant at 10% in the FE robust model. In this case, the FGLS model proved to be more efficient.

Based on FGLS results, the Corporate Tax Rate exerted a negative impact on Innovation. A 1% rise in the corporate tax rate led to a decrease of 0.002% in Innovation. The hypothesis H1 is accepted, and this outcome supports the empirical evidence found by Ufuk et al., (2018). Higher tax rates may deter firms from allocating resources towards innovation efforts and technological upgrades, as it reduces their net profit (Jacob, 2021). However, there is a heterogeneity in the level of responsiveness of firms to tax changes based on their sizes and geographic locations (Shao & Xiao, 2019;). Therefore, the impacts sometimes can be insignificant in the short run. In addition, according to OECD (2022) , tax credit is more commonly used in upper middle-income while low-income countries prefer reducing corporate income tax.

Furthermore, the FGLS analysis reveals a positive regression coefficient for the variable RDE in Table 7, indicating a positive effect of R&D expenditure on Innovation. Specifically, a 1% increase in R&D expenditure contributed to a 0.223% increase in innovation, thereby supporting the acceptance of hypothesis H2. This finding aligns with conclusions drawn in

Koski and Fornaro (2022). This means the more the governments invest in R&D activities, the more innovative the countries become. R&D activities are believed to create new knowledge and technologies, improving the productivity of the production process and living standards for the citizens (Audretsch & Belitski, 2020). However, the impact of R&D spending on innovation was not strong. Liu & Xia (2018) analyzed the case of China and found that R&D investment resources were not effectively planned or utilized. Moreover, these investments are geared towards quick, low-tech gains rather than long-term, high-tech innovations. This strategy yields immediate profits but does not contribute significantly to innovation performance.

In addition, we found that HDI has a positive influence on Innovation, with a 1-point increase in HDI resulting in a 0.384% rise in Innovation. Hence, the hypothesis H3 is accepted, consistent with the findings of Vukoszavlyev in the year 2019. It highlights the importance of socio-economic factors, including education, healthcare, and income levels, in driving innovation. This can be explained by the fact that in countries with higher HDI scores, individuals tend to enjoy a better quality of life and have a more liberalized mindset, emphasizing autonomy and personal freedom. This mindset, in turn, contributes to better innovation outcomes (Van Hiel et al., 2018).

5. Conclusion

Innovation evaluation has been a crucial benchmarking tool for policymakers, business leaders, and other stakeholders to establish informed business decisions. By conducting a regression analysis on the impacts of corporate tax on innovation performance in the specific case of 11 upper-middle-income countries in the world, we figured out that the index of global innovation is negatively affected by national corporate tax rates. Meanwhile, the research results also imply the positive relationship between innovation and human development index as well as the expenditure for research and development within national enterprises. To be able to optimize innovation performance and maintain fiscal stability at the same time, policymakers should take action to ensure the balance between promoting innovation and efficiently managing budgets.

Throughout the research, reliable empirical tests and evidence have been provided in order to bridge the research gaps from previous studies and reinforce the findings on the causal relationship between corporate tax and innovation. However, further studies could expand the approach towards testing and evaluating the moderating or intervening effect of other tax incentives on the performance of innovation. Regarding the geographical scope of the research, future studies can explore the relationship between innovation and corporate tax within other income groups with more sufficient data availability, or make comparative analysis among them. When the fluctuations are assessed in more detail, practical implications could be proposed to policymakers for better management of innovation systems.

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