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An Assessment of the Effectiveness and Scale of Tax Expenditures to Support Investments and Priority Sectors in G20 Countries

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Abstract: Tax expenditure management is one of the tools for conducting responsible fiscal policy. Unlike direct expenditures, tax expenditures do not consume resources, but allow the achievement of certain social and economic goals. The purpose of this study is to test the hypothesis of the expediency of using the mechanism of tax expenditures to influence investment activities and the development of priority sectors of the economy. The object of this study was a sample of nine countries of the G-20 group, whose reports provided data on the share of tax expenditures related to investment support and stimulating the development of priority sectors of the economy. The practice of generating reports on tax expenditures is quite common in developed countries, but there are several limitations for cross-country comparison: national characteristics of fiscal elements, and the level of openness and transparency of data on tax expenditures. The scale of using tax expenditures is determined by the multidimensional average method; countries are rated according to the value of the integral indicator. The scale of tax breaks determines the position in the ranking. The effectiveness of using tax breaks is assessed through the coefficient of increase in investment and the coefficient of increase in industrial production. The assessment results show whether economic indicators are outpacing the growth rate of tax benefits and preferences. A study of panel data revealed the average degree of influence of the total amount of tax expenditures on the dynamics of capital investments. The allocation of a target group of tax expenditures related to investment support showed a weak degree of influence on the dynamics of capital investment volumes. The results obtained can be explained by the fact that the allocation of a target group of tax expenditures may not reflect the full range of tax benefits provided to support investments, which is due to the peculiarities of the system of accounting and assessment of tax expenditures in a particular country. In addition, the contribution of tax expenditures may be insignificant if direct forms of support prevail.

Keywords: tax expenditures; tax benefits; investments; priority sectors; scale of tax expenditures; efficiency of tax expenditures; targeted tax incentives and preferences

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1. Introduction

The concept of "tax expenditures" originated in the 1960s, initially in the United States and Germany, and then spread to other states. Tax expenses are understood as lost revenues of the relevant budget due to the provision of tax benefits, exemptions, deferrals, and other tax preferences. Considering the variety of forms of tax breaks and incentives

in this study, the generalized term "tax benefits" will be used. Tax expenses are those tax benefits that, based on their purpose, can be replaced by direct payments from the budget (for example, in the form of subsidies). In practice, tax expenses are defined as such if the relevant tax legislation of the country directly classifies them into this category. The tax expense must meet certain requirements: firstly, it must be taken to achieve programmatic, socio-economic goals; secondly, it must deviate from the basic tax structure (which includes structural benefits as elements of the tax); thirdly, do not reduce the fairness of the tax system (Sokolovska and Zatonatska 2022).

Given the availability of an alternative political solution, such as providing a tax benefit or grant/subsidy, tax expenditures can be seen as one of the most significant tools for shaping fiscal policy and contributing to decisions on budget expenditure optimization and future revenue generation. The concept of "fiscal space" (Heller 2005), although relatively new, has not yet been defined by a single methodology (Nerlich and Reuter 2016; Guido et al. 2022; Barroy et al. 2016). This term refers to a potential or reserve in the state budget that can be used for specific purposes without compromising the financial stability of the country's financial system. Although initially, debt instruments were seen as key sources of funding for achieving goals, and an emphasis was placed on external borrowing, over time, the financial landscape has changed. Due to the challenges of external borrowing and the need to maintain debt sustainability, economic leaders agreed on the importance of mobilizing domestic sources of funding and rationalizing spending. In this context, tax expenditures represent a state's ability to adjust fiscal policies based on current circumstances (Barradale 2022; Lieuw-Kie-Song et al. 2011). Under this approach, the focus is not on government debt levels, but rather on budget revenue and expenditures. A significant reason for choosing such a trajectory is the progressive increase in public debt (Figure 1).

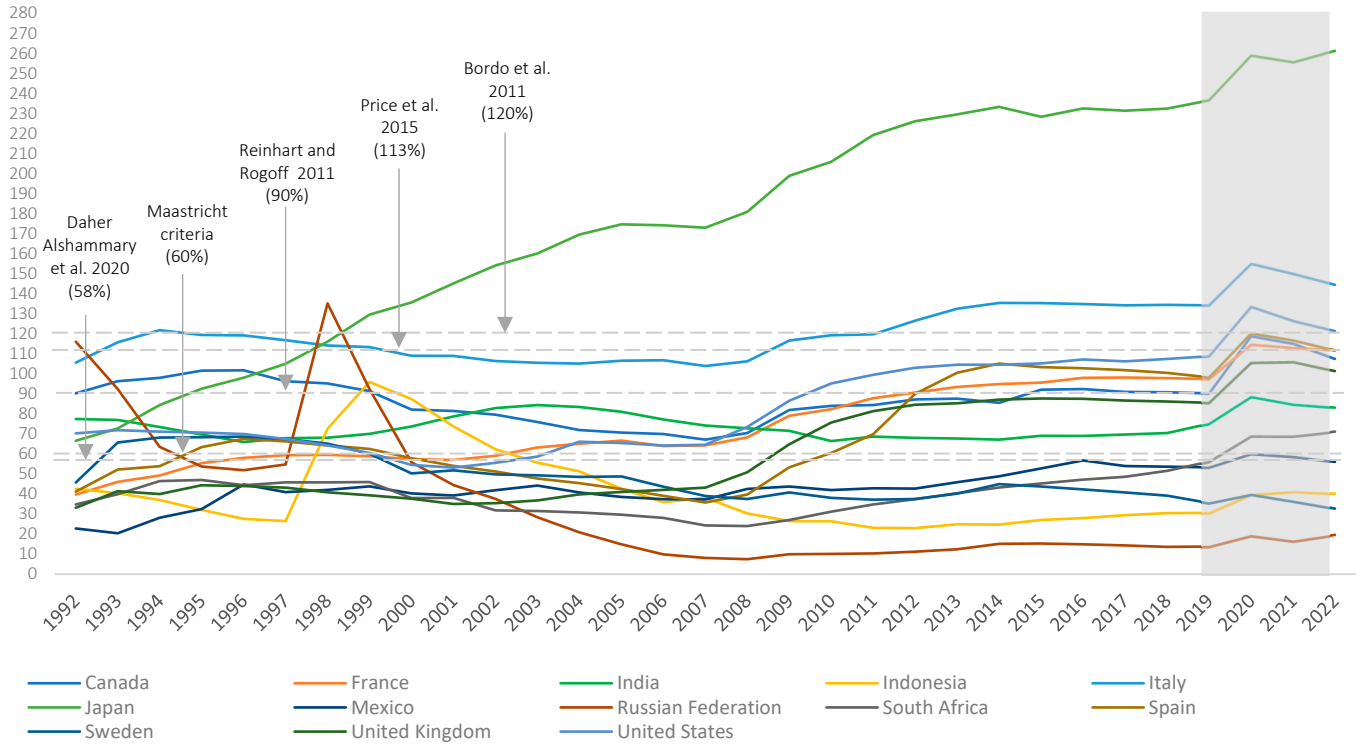

Figure 1. Gross public debt and the threshold recommended in accordance with the Maastricht Treaty, results Daher Alshammary et al., Bordo et al., Price et al., Reinhart and Rogoff, as a percentage of GDP. Source: based on data from (Treaty 1992), (Daher Alshammary et al. 2020), (Price et al. 2015), (Bordo et al. 2011), (Reinhart and Rogoff 2011), https://www.imf.org/external/datamapper/d@FPP/USA/FRA/JPN/GBR/SWE/ESP/ITA/ZAF/IND/CAN/RUS/IDN/ME (accessed on 21 January 2024).

One of the major risks in the global economy is debt risk. This is caused by difficulty in servicing the accumulation of debt by corporations, households, or the government, which can lead to massive bankruptcies, liquidity crises, or defaults. It can also cause sovereign debt crises if a country has an exorbitant amount of public debt. In such cases, it becomes difficult to decide whether to borrow money to stimulate the economy in the future or not. In 2022, the total amount of global debt, including public and private sector debt, reached 238% of global GDP, an increase of 9% from the pre-pandemic level in 2019. The volume of public debt in 2022 was a very high 92% of GDP. According to projections by the World Bank, the cost of servicing government and government-guaranteed debt was projected to increase by 10% for developing countries and almost 40% for low-income countries in the period from 2023 to 2024. According to forecasts from the US Congressional Budget Office, the primary deficit in 2032 will be twice as high as the 50-year average. Interest payments are expected to increase from 1.6% of GDP currently to 3.3% by 2030. By 2050, public debt is projected to reach 200% of GDP (Congressional Budget Office 2004). At the same time, over the past three years, there have been more cases of sovereign default than in the previous 20 years (18 cases in 10 developing countries) (The Global Risks Report 2024). The increase in budget deficits in most countries is illustrated in Figure 2.

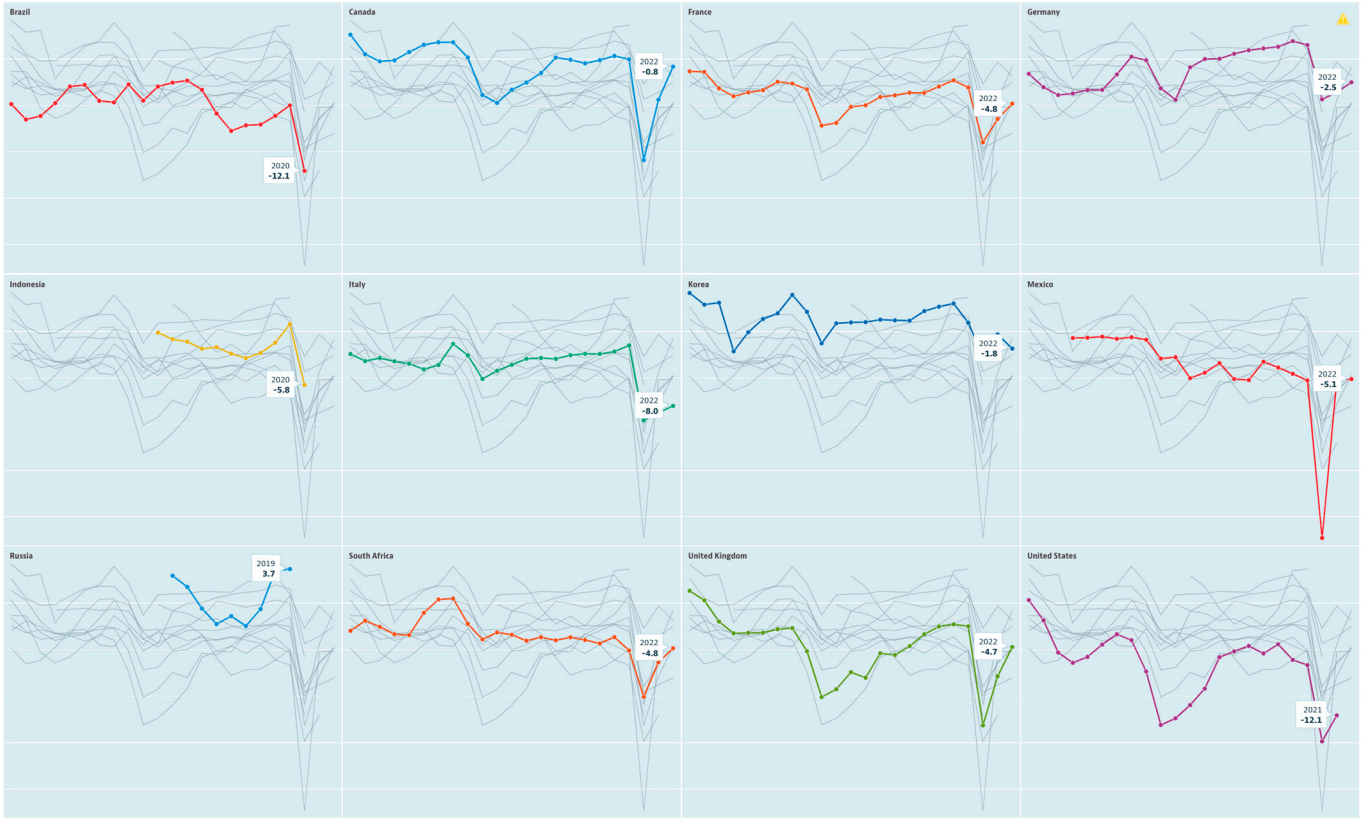

Figure 2. General government deficit, total, 2000–2022 percent of GDP. Source: https://data.oecd.org/pinboard-editor/ (accessed on 21 April 2024).

Governments of developed countries faced large budget deficits following the subprime crisis and the Eurozone debt crisis, which reduced the fiscal space and financial capabilities of countries (Kose et al. 2022). This caused a decrease in confidence in tax multipliers and undermined the reliability of government guarantees.

The US federal budget deficit amounted to 14.6% of GDP in 2020, the highest level of deficit since 1943–1945 (Federal Surplus or Deficit); in the 75-year perspective, the government sees a way out in reducing non-interest expenses and increasing revenues (Executive Summary 2023). Another example is the countries of the Euro area, where the

concept of "excessive budget deficits" is used, and the growth of debt and deficits has led to a transformation of fiscal management (Economic Governance Review 2023, 2024).

The increased budget deficit also affected the effectiveness of government policies and the functioning of the banking sector (Silva 2021; Dantas et al. 2023). Given these fiscal pressures, any alternative policy instrument could be considered an important tool for stimulating and stabilizing the economy.

Another important factor that requires special attention is the increasing inflation, which inevitably leads to an increase in interest rates. The cost of paying interest, including payments to foreign lenders, is also rising. This makes a country's financial situation more vulnerable to higher interest rates, as the cost of debt service increases more with each percentage point increase in interest rates if the debt level is higher. For example, in the Eurozone, budget support in response to high energy prices and inflation is expected to decrease significantly in 2024 and 2025. Of the planned incentives, approximately 50% in 2024 will relate to subsidies, while the remainder will consist of extending reductions in energy prices, other indirect taxes, and measures to compensate for inflation through reduced direct taxation. In 2025, the estimated budgetary cost of these support measures is projected to decrease to 0.2% of GDP, compared to about 2% in 2022 and 23 (Bankowski et al. 2023). The size of these measures during this projected period will largely depend on future decisions by governments in fiscal policy and on future energy price and inflation trends. According to estimates by Bankowski et al. (2023), an "inflationary surprise" could put pressure on spending, increasing and negating the benefits of higher budget revenues. As a result, the budget balance could decrease by 0.5% of GDP in 2024, assuming direct impacts, excluding discretionary measures and other mitigating factors.

Given the recent trend of slowing economic growth that is expected to continue in the medium term (World Economic Outlook 2023), as well as the persistence of budget deficits and increasing inflation, solutions may be limited to implementing a policy of fiscal discipline.

Fiscal consolidation is a manifestation of fiscal discipline through the optimization of government spending and changes in tax rates. Decisions to reduce government spending have a more positive impact on the economy than decisions to increase taxes. Spending cuts cause a smaller recession and entail fewer production losses (Alesina et al. 2015, 2017).

At the same time, tax breaks and other preferences in terms of mandatory payments are designed not only to stimulate the development of certain areas of activity in the country but also to ensure an increase in the tax base in the medium and long term as the basis for increasing the financial independence of budgets. Effective tax breaks, unlike transfers, do not lead to an increase in dependency sentiment on the part of beneficiaries. However, there is another point of view: since the reduction in tax revenues is based on increasing the taxpayer's income without any effort, then the beneficiaries may not strive to develop economic activities and improve the quality of products (Panskov 2020), and therefore in the future will not become sources of increasing budget revenues. Adherents of the Keynesian schools believe that high taxes lead to increased labor and the development of production processes to compensate for lost income. A variety of tax incentives have a stimulating effect on savings (Pigou 1920). At the same time, negative trends may be caused by the exaggeration of corporate tax benefits to the detriment of other methods of state regulation of socio-economic processes (Bosworth 1984). Significant tax breaks are largely aimed at increasing dividends in large corporations; they do not have an effect on the investment activity of the state, stimulating aggregate demand to a greater extent than aggregate supply (Galbraith 1981). The inefficient use of tax benefits should be understood as the use of "released" funds by business entities for purposes and directions other than the purposes of their provision. Increased global financial stability risks and higher interest rates will inevitably force governments to make decisions on assistance to vulnerable categories of citizens and economic sectors. The growth of investment and production activity is one of the indicators of economic sustainability; however, recent studies in cross-country comparisons of tax expenditures are increasingly paying attention

to two key topics: the system of managing tax expenditures and stimulating the energy transition, supporting energy efficiency. These issues are important, but the diversity of tax expenditures requires research into all target areas of tax incentives and assessment of their effectiveness. The study of the effectiveness of tax expenditures is associated with assessing their impact on budget revenues and capital growth. Developing countries typically use the lost income method, which quantifies the direct loss of income. The method assumes that the behavior of beneficiaries remains unchanged after deducting tax expenditures (Heady and Mansour 2019). Assessing dynamic effects requires understanding the behavior of taxpayers, the elasticity of supply and demand for goods and services, and income, as well as the impact on income received in other markets. Some countries use computer modeling, e.g., in Excel. Micro-simulation models include the interaction between tax instruments and entitlements to benefits (Barrios et al. 2016). In the context of determining the macro-economic consequences of taxes, differences between models are studied: macro-econometric, applied, input–output, and general equilibrium (Freire-Gonzalez 2018). More complex models can take into account the interaction between different types of tax benefits, even the possibility of a taxpayer choosing alternative types of tax benefits depending on specific circumstances. The impact of tax expenditures on the growth of investment capital was assessed using econometric models (Kakaulina and Gorlov 2022). The scale of application of tax expenditures was assessed using the multivariate average method (Tyurina et al. 2023). The assessment of reporting on tax expenditures noted the use of advanced approaches to managing tax expenditures in individual developing countries and the lack of a methodology for estimating the cost of tax expenditures (Redonda and Neubig 2018). Some works are devoted to studying the impact of tax expenditures on the development of certain sectors of the economy, for example, the energy sector (Tyurina et al. 2023), fossil fuel sector (Laan and Steenblik 2023), and energy transition sector (European Commission 2021). In relation to the assessment of tax expenses, ex ante and ex post forecast estimates were used (Sachinta 2019). Despite the fact that ex post estimates are carried out post factum, interference can take place: the influence of other taxes or other factors. The environmental effectiveness of carbon taxes was studied ex ante using simulations and ex post using econometric estimates (Schratzenstaller and Köppl 2021). Measuring indirect socio-economic effects is a complex research task; structural models can be applied to individual tax expenditures, but often, these models will not include the spillover effects of incentives on outcomes such as employment, wages, and economic growth (Beer et al. 2022). However, qualitative estimation approaches can already provide some important insights into indirect effects.

The aim of this work was to investigate the scale of tax expenditures and the effectiveness of tax expenditures aimed at supporting investments and priority sectors of the economy through coefficient analysis in individual countries of the G20 Group. The analysis of the impact of tax expenditures on capital investments was carried out on the basis of panel data on available country indicators.

2. Methodology

2.1. Data

This study was based on the analysis of tax expenditures reported in the Global Tax Expenditure Database https://GTED.net/ 21 January 2024 for the period from 2016 to 2021. Data on the dynamics of investment and sector production were obtained from the OECD statistical database https://data.oecd.org/ (accessed on 21 January 2024) and Statista https://www.statista.com/statistics (accessed on 21 January 2024).

Two target areas of tax expenditures were studied: investment support and stimulation of the development of priority sectors of the economy.

The initial sample included countries with advanced tax expenditure management systems that disclose data on G20 Group tax expenditures. After the analysis of the relevance of the indicators, 9 countries remained in the final sample, for which a case study was conducted.

The countries under study are Canada, France, Germany, India, Indonesia, Italy, Mexico, Russia, and South Korea. The selected 9 countries indicated tax expenditures related to supporting investments and stimulating the development of priority sectors of the economy. The financial services sector was excluded from the priority sectors.

The World Bank database was used to sample panel data.

2.2. Methods

At the first stage, elements of tax expenditures were typologized for the selected 9 countries and the share of tax expenditures aimed at stimulating investment and supporting priority sectors of the economy in total tax expenditures and gross domestic product was estimated.

At the second stage, based on the data obtained at the first stage, a matrix grouping of countries into six groups was carried out based on the criterion of the share of tax expenditures related to the activation of investments and support for priority sectors of the economy in the volume of tax revenues. The data were sampled for 2016–2021. The Sturgess Formula (1) was used to calculate the number of intervals.

$$\mathrm{K} = 1 + 3.322 * log_{10}(n) \quad (1)$$

n—number of iterations in data sample.

At the third stage, an assessment was made of the scale of the use of tax expenditures related to the promotion of investments and support for priority sectors of the economy.

The assessment was carried out using the method of calculating an integrated indicator based on a multidimensional average, which was proposed to assess the effectiveness of tax incentives (Steshenko and Tikhonova 2018) according to the following formula:

$$\overline{P}_i = \frac{1}{n}\sum_{j=1}^{n}\frac{a_{ij}}{\overline{a}_j} \quad (2)$$

a is the value of the j-th indicator of tax expenditures for the i-th country;

$\overline{a}_j$ is the average value of the j-th indicator of tax expenditures for all countries in total;

a_1 is tax expenditures associated with the promotion of investments, measured as a percentage of GDP;

n is the number of iterations for analysis.

The attributes of a are the following: tax expenditures associated with promoting investment and supporting priority sectors of the economy (% of GDP and % of budget tax revenues).

The use of a multidimensional average makes it possible to solve the problems of qualitative homogeneity (aggregate approach) and maximum coverage of the feature space (variational approach). All indicators of tax expenditures were calculated as a share (%) of the volume of tax revenues of the country's budget and as a share of GDP.

At the fourth stage, an assessment of the effectiveness of tax expenditures was carried out. The effectiveness of tax expenditures was assessed based on the criterion of achieving certain economic indicators. The goals of tax expenditures (investments and support for priority sectors) predetermined the choice of indicators: investments in fixed capital and sector output.

The investment coefficient (IC) and the sector production coefficient (PC) were calculated as the ratio of the growth rate of one of the above indicators and the growth rate of the corresponding tax expenditures. The coefficient values reflect how many times the growth rate of the analyzed indicator exceeds the growth rate of tax benefits and preferences. The result can be considered positive if the coefficient value is greater than or equal to one, that is, equal to or greater than the growth rate of tax expenses.

At the fifth stage, panel data analysis was carried out to identify the impact of tax incentives and preferences related to tax expenditures on capital investments, considering the allocation of tax expenditures as a policy goal related to supporting individual sectors

of the economy and promoting investments. To expand the number of observations, it was decided to consider all countries for which data were available.

The selection of countries for the analysis of panel data was carried out according to the following criteria: availability of data on tax expenditures for the entire study period in the GTED database https://gted.taxexpenditures.org (accessed on 21 January 2024); availability of investment data for the entire study period in the World Bank National Accounts database and the OECD National Accounts data files https://data.worldbank.org/indicator/NE.GDI.TOTL.CD (accessed on 21 January 2024).

Thus, the initial sample included 36 countries that report tax expenditures to GTED and have gross capital formation (gfcf) estimates in the World Bank database.

The country indicators were combined in the form of panel data, where the dependent variable was the gfcf growth rate. The following indicators were considered as independent variables:

Total tax expenditure (USD per capita), te;

Tax expenditure policy objective: attract or promote investment (USD per capita), tei;

Tax expenditure policy objective: develop a priority economic sector or activity (USD per capita), tes.

The period for the panel data analysis was selected based on the availability of data on total tax expenditures and on the desired policy objectives. The most complete data were reflected from 2016, so the period was 2016–2021. As a result, the number of countries was first clarified due to the lack of data for 2021 on tax expenditures from Japan, South Africa, Turkey, and the United Kingdom; and secondly, due to the lack of investment data for 2021 from Brazil, India, and Russia. Thus, the final analysis uses data from 28 countries.

Models were built to study panel data: a general regression model, a fixed-effects model, and a random-effects model.

In a fixed-effects model, the unobserved variables must correlate with those included in the regression. The specification of the model is suitable for objects with unique characteristics; in this case, these are countries whose budget policy in the field of tax expenditures has specifics due to the peculiarities of the tax system and the mechanism for managing tax expenditures. Given the availability of data for all countries, the model can be considered balanced. The random-effects model considers the effect of uncorrelated unobservable variables on the dependent variable.

The models were tested using the Breusch–Pagan and Hausman tests, which revealed which model was optimal for this study.

3. Results

3.1. Support for Priority Sectors of the Economy

The allocation of priority sectors of the economy is an effective tool for the country's development strategy. It helps create an environment for economic growth. Government support measures can include a system of tax incentives and exemptions to encourage companies in certain sectors. These measures are presented in Table 1, which shows tax expenditures related to priority sectors in selected G20 countries.

Table 1. Tax expenditures related to supporting priority sectors in selected G20 countries in 2016–2021.

Year	Canada	France	Germany	India	Indonesia	Italy	Mexico	Russia	S.Korea
Policy Objective: Develop a priority economic sector or activity, % of total tax expenditure									
2016	–	31.43	21.56	8.79	21.96	0.75	3.60	19.19	29.90
2017	–	32.69	21.74	8.80	22.60	1.59	4.49	17.68	31.17
2018	–	30.75	21.33	8.44	23.70	2.22	4.06	26.93	27.62
2019	–	31.55	21.31	6.71	23.87	2.50	3.29	29.70	26.27
2020	–	34.86	19.75	4.66	24.43	2.38	1.96	31.44	25.51
2021	–	35.04	21.42	4.13	23.08	6.24	1.88	32.73	24.47
Rank (2021)	–	1	5	7	4	6	8	2	3

Table 1. *Cont.*

Year	Canada	France	Germany	India	Indonesia	Italy	Mexico	Russia	S.Korea
Policy Objective: Develop a priority economic sector or activity, % of GDP									
2016	–	1.17	0.13	0.30	0.34	0.08	0.12	2.34	0.62
2017	–	1.30	0.13	0.29	0.38	0.05	0.17	2.99	0.65
2018	–	1.26	0.13	0.26	0.42	0.07	0.15	3.69	0.62
2019	–	1.26	0.13	0.26	0.42	0.09	0.13	4.01	0.70
2020	–	1.36	0.11	0.25	0.38	0.09	0.08	3.83	0.66
2021	–	1.23	0.14	0.19	0.41	0.17	0.08	4.56	0.64
Rank (2021)	–	2	7	5	4	6	8	1	3

Source: authors' calculations based on data from https://gted.net/ (accessed on 25 January 2024).

The data from Table 2 allow us to draw several important conclusions about the role of tax expenditures in supporting priority sectors of the economy in the group of countries under consideration.

Table 2. Tax expenditures related to supporting priority sectors in selected G20 countries in 2016–2021.

Sector	Canada	France	Germany	India	Indonesia	Italy	Mexico	Russia	S.Korea	Argentina	S.Africa
agricultural		√	√	√ (until 2019)		√	√	√	√		
energy		√ (except 2016, 2018)		√ (until 2019)			√ (2017)	√	√		
defense		√							√		
extractive	√	√ (2020, 2021)						√		√	
housing/real estate		√	√	√		√ (2021)	√	√			
transportation		√	√	√ (until 2019)			√	√	√		√ (without 2021)
export				√ (until 2019)				√			
knowledge-intensive			√ (2021)	√ (until 2019)		√ (2016)	√	√	√	√	
manufacturing			√					√	√	√	√ (without 2021)
tourism		√	√	√ (until 2019)		√ (except 2017)		√	√		
ICT		√		√				√	√		
SMEs		√	√		√	√ (2016)	√ (2016–2018)	√ (2019–2021)	√	√ (except 2016)	
financial			√	√ (until 2019)				√	√		
multiple		√						√			
other		√						√		√ (except 2016)	

√—tax expenditures related to the support of priority sectors took place. Source: authors' calculations based on data from https://gted.net/ (accessed on 21 January 2024), Report on Federal Tax Expenditures (Report 2022).

In terms of support for priority economic sectors, the absolute leader in terms of tax expenditures in GDP and tax revenues is France (35.04%), with Russia in second place (32.73%). Relative to the share in GDP, Russia has the highest indicator—4.56%, France—1.23%.

Structurally, the Russian priority sectors that received tax breaks in 2021 (as a percentage of GDP) reflect the characteristics of the country's economic activity: 51% of the volume of tax expenditures in priority sectors of the economy falls on the extractive sector (in 2020—38%), 16% on the financial services sector (in 2020—21%), and 10% on the agricultural sector (in 2020—9%).

At the same time, in the period 2016–2021, the share of the financial sector in tax expenditures decreased from 68% to 16%; the share of the agricultural sector increased from 6% to 10%; the share of the mining sector, on the contrary, increased from 13% to 51%; the share of the transport sector—from 5% to 9%; the share of export promotion—from 1% to 5%; tourism—from 0% to 1% (Figure 3).

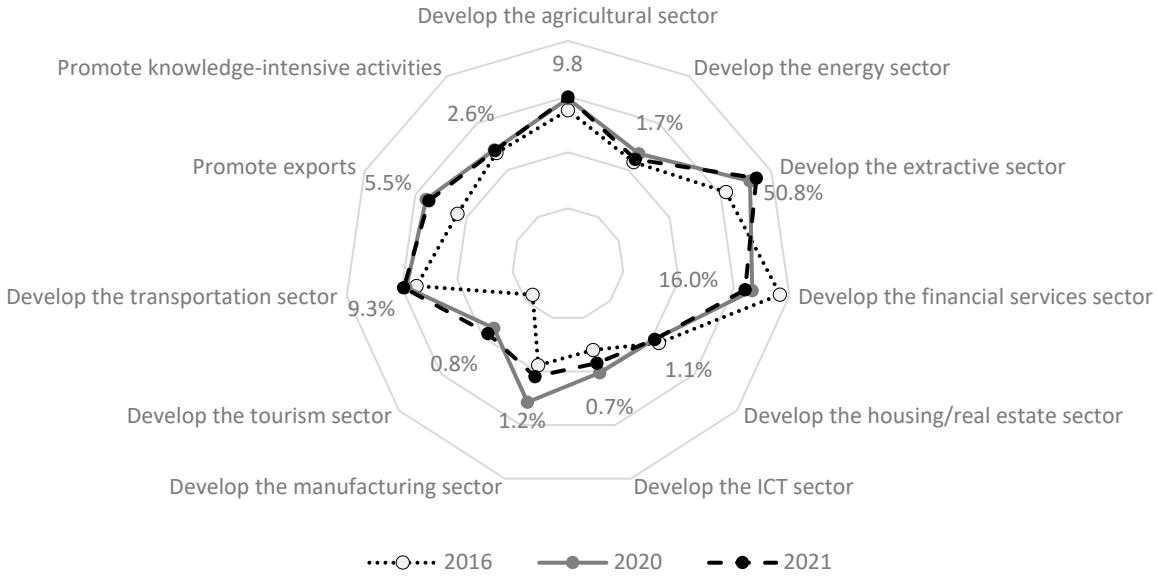

Figure 3. Structure of tax expenditures by priority sectors in Russia in 2021, % of GDP (logarithmic scale with data callout for 2021). Source: based on data from https://gted.net/ (accessed on 21 January 2024).

In France, the largest volume of tax expenditures for the target group under consideration fell on the housing/real estate sector (34% in 2021, 43% in 2016), on transport development (7% in 2021, 8% in 2016), and on supporting SMEs (4% in 2021, 8% in 2016). Throughout the period under review, France reflected tax expenditures in the interests of the ICT sector; their share remained stable—4% in 2016–2017 and 3% in 2018–2021; in the interests of the tourism sector, it was 3% in 2016–2019 and 2% in 2021. Other sectors accounted for about 43% in 2021. Tax expenditures to support the defense sector as a priority industry were reflected by France (0.01% in the structure of priority industries in 2021) and South Korea (0.2% in 2021 and 15% in 2022). It can be assumed that in the context of the geopolitical crisis, data supporting the defense sector are not disclosed and cannot be quantified.

Canada provided targeted tax incentives for priority sectors in the period 2000–2005; in other years, this target was not allocated. Nevertheless, the Report on Federal Tax Expenditures considers the fossil fuel sector among the priorities, which is confirmed by the support measures provided through the tax expenditure mechanism. All countries except South Africa reported tax expenditures by SMEs, except for Argentina and South Africa—in the agricultural sector (traditionally one of the highly subsidized sectors). Indonesia only counts incentives and preferences for SMEs as tax expenditures for priority sectors.

3.2. Support for Investment Activities

Nine countries identified a policy objective related to investment support through targeted tax incentives (Table 3). Higher tax expenditures (by share of GDP in 2021) were found in Canada (0.60%) and Indonesia (0.19%). This was followed by Italy (0.09%), Korea (0.04%), and France (0.02%). According to the share of total tax revenues, the ranking is as follows: Indonesia (10.65%), Canada (7.53%), India (1.91%), Italy (1.26%), Russia (1.19%). Over the period 2016–2021, India showed a significant decrease in tax expenditures on investment promotion in total tax expenditures; the volume decreased by 5.2 times.

Table 3. Tax expenditures related to attracting/promoting investments in selected G20 countries in 2016–2021.

Year	Canada	France	Germany	India	Indonesia	Italy	Mexico	Russia	S.Korea
Policy Objective: Attract/Promote investment, % of total tax expenditure									
2016	6.32	0.42	0.04	10.02	23.28	0.89	0.15	0.01	3.11
2017	6.71	0.42	0.42	12.00	9.23	1.37	0.12	0.01	2.71
2018	7.75	0.44	0.61	10.50	10.33	1.92	0.30	0.02	4.03
2019	10.16	0.47	0.12	7.11	9.37	2.71	0.04	0.52	2.12
2020	8.89	0.47	0.20	3.52	12.14	1.69	0.04	1.28	1.37
2021	7.53	0.53	0.31	1.91	10.65	1.26	0.05	1.19	0.18
Rank (2021)	2	7	8	3	1	4	9	5	6
Policy Objective: Attract/Promote investment, % of GDP									
2016	0.39	0.016	0.0004	0.34	0.36	0.08	0.005	0.001	0.06
2017	0.43	0.017	0.004	0.40	0.16	0.03	0.005	0.002	0.06
2018	0.50	0.018	0.005	0.32	0.18	0.04	0.011	0.002	0.09
2019	0.57	0.019	0.001	0.28	0.16	0.07	0.002	0.003	0.06
2020	0.52	0.019	0.002	–	0.19	0.04	0.002	0.005	0.04
2021	0.60	0.02	0.003	0.09	0.19	0.01	0.002	0.005	0.0001
Rank (2021)	1	5	8	–	2	4	7	6	3

Source: authors' calculations based on data from https://gted.net/ (accessed on 25 January 2024).

The main types of taxes used by Canada to stimulate investment are deductions, benefits, rebates, refunds, and deferrals of corporate (CITs) and personal (PITs) income taxes. In Canada, there are eight main types of tax expenditures; micro-simulation models are used to estimate most tax expenditures for income taxes, and micro-modeling is used for corporate income taxes. Indonesia and India only apply tax deductions for corporate income tax. Italy used incentives, discounts, and refunds under CIT and a reduced tariff on capital gains tax, as well as other forms. The most common types of support in Korea were exemptions, tax breaks, discounts, refunds, CIT deductions, exemptions on customs duties, VAT, and excise taxes. France stimulated investment through PIT exemption, deductions, exemptions, reduced CIT tariff, reduced rate, and Multiple Income Tax (MIT) deductions. Only Russia used a zero rate for CIT; in addition, reduced rates, exemptions and deductions for CIT, and exemptions and deductions for VAT were used.

The group of countries depending on the target role of tax expenditures associated with the activation of investments and support of priority sectors of the economy, according to the share in tax revenues of the country's budget, is presented in Table 4. According to the criterion of the share in tax revenues of the country's budget, it reflects the country's place according to the data of 2021, as well as the trend of changes in the share of tax revenues compared to 2020. The grouping was carried out based on an expert assessment of data on tax expenditures in a selected group of countries.

Table 4. Grouping of countries depending on the target role of tax expenditures associated with the activation of investments and support of priority sectors, in terms of share of tax revenues in 2021.

The level of tax expenditures associated with the activation of investments (b)							
	VH						
	H	Canada (no/−)					
	AA						
	A				Indonesia (−/−)		
	L						
	VL	India (−/−) Italy (+/−) Mexico (−/+)			Germany (+/+)	S.Korea (−/−)	France (+/+) Russia (+/−)
		VL/n	L	A	AA	H	VH
		The level of tax expenditures related to the support of priority sectors of the economy (a)					

Symbols: (–)—downward trend; (+)—upward trend; (a/b); VL—very low level; L—low level; A—average level; AA—above average level; H—high level; VH—very high level.

A relatively stable tax policy regarding incentives, promotion of investments, and support of priority sectors of the economy through the mechanism of tax expenditures is implemented in Indonesia and France. A very high level of using tax benefits and preferences is typical for Russia and France. Reduced use of the tax expenditure mechanism to support investment and priority sectors was observed in Mexico and Korea. A very low level of using tax expenditures to stimulate investment was seen in Germany, with a high level of using this mechanism to support priority sectors of the economy.

Indonesia's budget policy is characterized by a larger scale of application of targeted tax incentives and preferences to regulate investment activities and priority sectors. To assess the scale of tax expenditures, an integral indicator was calculated based on four indicators (Table 5). The result was influenced by the highest share of tax expenditures for the purpose of investment in the total volume of tax revenues, and the fact that tax expenditures to support priority sectors were also at a high level.

Table 5. Integral assessment of the scale of application of tax expenditures to stimulate investment and support priority sectors of the economy in the G20 countries (based on data for 2021).

Country	Tax Expenditures Associated with Increased Investment		Tax Expenditures Associated with Supporting Priority Sectors		Number of Indicators	Integrated Indicator	
	% of GDP	% Tax Revenue	% of GDP	% Tax Revenue		$\overline{P}_i$	Position in Ranking
Canada	0.599	7.53	-	-	2	4.371	1
France	0.019	0.53	1.23	35.04	4	0.899	4
Germany	0.003	0.31	0.14	21.42	4	0.362	7
Indonesia	0.19	10.65	0.41	23.08	4	1.901	2
Italy	0.01	1.26	0.17	6.24	4	0.274	8
Mexico	0.002	0.05	0.08	1.88	4	0.056	9
India	0.086	1.91	0.19	4.13	4	0.500	6
Russia	0.005	1.19	4.56	32.73	4	1.794	3
Korea	0.0001	0.18	0.64	24.47	4	0.518	5
Average	0.102011	2.6233	0.9275	18.6238	–	–	

Source: authors' calculations.

The large scale of the use of targeted tax incentives and preferences to stimulate investment activity is characterized by Canada's fiscal policy; however, it should be noted that only two indicators were considered in the assessment.

Indonesia and Russia are distinguished by the significant scale of the application of targeted tax incentives and preferences to stimulate both investment activities and priority sectors of the economy. Indonesia's result was influenced by the value of the share of tax expenditures for the purpose of investment in the total amount of tax revenues, with a fairly high level of tax expenditures to support priority industries.

In Russia, for the purpose of fiscal regulation of investment activity, tax incentives have been applied since 2016 to support investment activity with a priority of domestic investment. The share of "sectoral" tax expenditures is the most significant in the pool of countries under consideration, both in terms of GDP and in terms of tax revenues.

France ranks fourth, whose fiscal policy is more like the Russian approach than other countries studied, and a wide range of measures to support priority sectors of the economy are also highlighted.

South Korea ranks fifth in terms of the scale of tax expenditures, and India ranks sixth. Korea has higher values for "industry-specific" tax expenditures. The ranking result relative to Germany is interesting: it turned out to be lower than India—seventh place. Although tax expenditures on supporting priority sectors of the economy have higher values in terms of the share of tax revenues in the German budget, they are inferior to Indian ones in other indicators.

Italy and Mexico, respectively, took the last positions with the lowest shares of tax expenditures for the analyzed purposes in both GDP and tax revenue.

Note that the selected indicators are relevant for each of the countries. At the same time, it is important to analyze the share of tax expenditures in both budget indicators and GDP, since the level of government intervention in the economy through the fiscal mechanism may vary. The country's rating reflects the active use of targeted tax benefits and preferences (tax expenditures) in government regulation policy. However, it should be borne in mind that approaches to granting the status of "priority" to economic sectors may differ from country to country.

To assess efficiency, the coefficient of increase in sector production (Cp) and the coefficient of increase in investment (Ci) were calculated; the results are shown in Tables 6 and 7.

Table 6. Assessment of the effectiveness of tax expenditures to support priority sectors of the economy in the group of countries (coefficient Cp).

Country	Coefficient	2017	2018	2019	2020	2021
France	Cp	0.90	1.04	1.00	0.96	1.09
Germany	Cp	1.00	1.04	1.00	1.10	0.14
Indonesia	Cp	0.90	0.94	1.11	1.27	2.41
Italy	Cp	1.61	1.07	0.99	1.38	0.91
Mexico	Cp	0.69	1.11	1.22	1.82	1.08
Russia	Cp	0.77	0.78	0.92	1.21	0.98
S.Korea	Cp	0.95	1.08	0.93	1.09	1.08
India	Cp	1.22	1.44	1.26	1.38	1.56

Source: authors' calculations on data (OECD 2023).

Table 7. Assessment of the effectiveness of tax expenditures to stimulate investment in a group of countries (coefficient Ci).

Country	Coefficient	2017	2018	2019	2020	2021
Canada	Ci	0.90	0.85	0.85	1.12	1.13
France	Ci	0.96	0.92	0.98	0.96	1.10
Germany	Ci	0.09	0.69	5.21	0.60	0.60
Indonesia	Ci	2.27	0.83	1.09	0.84	1.05
Italy	Ci	2.56	0.76	0.58	1.02	0.54
Mexico	Ci	0.97	0.39	6.15	0.82	1.03
Russia	Ci	0.59	0.75	0.54	0.62	1.07
S.Korea	Ci	1.18	0.59	1.56	1.56	7.94
India	Ci	0.92	1.40	1.15	1.35	2.18

Source: authors' calculations on data (OECD 2023).

When analyzing the data presented above, it should be noted that the investment increase rates change most dynamically. In 2016, the coefficient of increase in investment in Germany exceeded 2.17 due to a halving of tax expenditures. In 2017, the coefficient in the country was close to 0 (tax incentives were introduced to attract various types of investments). In 2019, the coefficient exceeded 5.2; this year, the government refused to support the attraction of national investment (tax expenditures for this item are zero).

In Mexico, in 2019, the investment increase coefficient also showed an extremely high value (6.15); compared to the previous year, tax expenditures decreased six times and amounted to 15.5% of the 2018 volume. In 2020, the coefficient of increase in investment was 0.82, and the coefficient of increase in sector production showed progressive growth from 2016 and amounted to 1.82 in 2020. It should be noted that since 2020, the country has had increased control over tax revenues by the Tax Administration Service (ECLAC 2022). In 2021, despite the economic recovery, nominal tax revenues grew at a slower pace. As a result of strengthening international controls, a decrease in revenues as a percentage of GDP in 2021 was observed for all main types of taxes (Revenue 2023).

In Italy in 2017, the coefficient of increase in investment was 2.56, the government abandoned tax incentives for foreign direct investment, and the volume of tax expenditures in annual terms decreased by 2.5 times. In Indonesia, the coefficient of 2.27 was reflected in 2017, when the volume of tax expenditures decreased by more than two times.

The coefficient of increase in sector production did not show any extreme values: the main values were in the range from 0.58 (Mexico) to 1.82 (Mexico). Tax costs associated with supporting SMEs in Mexico were available in 2016, 2017, and 2018. In 2017, the energy sector also received tax support.

The resulting coefficients show changes in fiscal policy and indicate decisions made in favor of introducing new tax benefits or modernizing existing ones.

The low proportion of tax expenditures that can be considered effective determined the further course of the study to assess the impact of tax incentives and preferences on investment activity using panel data.

Analysis of panel data to determine the degree of impact of tax expenditures on investment accumulation.

Descriptive statistics show the maximum amount of tax expenditures (te) per capita at USD 8689, with a minimum value of USD 51.81. The median value of tax expenditures is lower than the average and is equal to USD 935.7 per capita, which means that half of the countries considered have tax expenditures above this amount.

The median tax expenditures for investment purposes (tei) and for industry support (tes) take a zero value, which means that half of the countries considered do not single out the corresponding tax expenditure goals as separate (Table 8).

Table 8. Descriptive statistics.

	Average	Median	Min	Max	Std Deviation
gfcf	8359	8399	1022	23,451	5599
te	1739	935.7	51.81	8689	1894
tei	15.48	0.0000	0.0000	313.4	48.85
tes	66.04	0.0000	0.0000	876.1	177.9

There are no missed observations.

The asymmetry is 0.67851. This value is greater than zero; therefore, the distribution has a long right tail. A negative kurtosis value (−0.17602) means that there are fewer outliers in the data than in the normal distribution.

Correlation analysis shows an average (closer to weak) correlation of gross investment accumulation with the volume of tax expenditures and a very weak correlation with tax expenditures allocated in the reporting to support investments and economic sectors (Table 9).

Table 9. Correlation analysis.

gfcf	te	tei	tes	
1.0000	0.5492	0.1429	0.1435	gfcf
	1.0000	0.2829	0.4864	te
		1.0000	0.1582	tei
			1.0000	tes

Two-way critical values for n = 168: 5% 0.15, 1% 0.1982. Multicollinearity was not detected. The next step is to build models. To build models, we will use the logarithm of the dependent variable (l_{gfcf}). Observations used—168 for 28 spatial objects; the length of the time series was 6. The basic regression model was built using the pooled method LSM (Table 10).

Table 10. Specification of the basic regression model.

	Coefficient	St. Error	t-Statistics	*p*-Value	
const	8.33215	0.0557630	149.4	<0.0001	***
te	0.000250023	2.35529×10^{-5}	10.62	<0.0001	***
tei	0.000808895	0.000325002	2.489	0.0193	**
tes	−0.000339308	0.000406762	−0.8342	0.4115	
Average of the dependent variable		8.756954	St. deviation		0.801426
RSS		71.94954	St. model error		0.662357
R2		0.329213	Fixed R2		0.316943
F(3, 27)		59.61001	*p*-value (F)		4.92×10^{-12}
Log. of likelihood		−167.1498	Crit. Akaike		342.2995
Crit. Schwartz		354.7954	Crit. Hannan–Quinn		347.3709
Parameter rho		−0.210712	Stat. Durbin–Watson		2.060618

Note: The standard errors grouped at *, ** and *** indicate significance at 10, 5 and 1 percent, respectively.

The coefficients for the variables te and tei are statistically significant. However, the R-squared shows that the change in the dependent variable can only be explained by regressors by 32%. The next step is to build a fixed variable regression model for time series to include individual country effects (Table 11).

Table 11. Specification of the fixed variable model.

	Coefficient	St. Error	t-Statistics	*p*-Value	
const	8.33752	0.0343991	242.4	<0.0001	***
te	0.000241298	2.37686×10^{-5}	10.15	<0.0001	***
tei	0.00166860	0.000370412	4.505	0.0001	***
tes	−0.000392481	0.000426215	−0.9209	0.3653	
Average of the dependent variable		8.756954	St. deviation		0.801426
RSS		66.72194	St. model error		0.697869
LSDV R2		0.377950	В пределах R2		0.327437
Log. of likelihood		−160.8135	Crit. Akaike		383.6271
Crit. Schwartz		480.4700	Crit. Hannan–Quinn		422.9307
Parameter rho		−0.318450	Stat. Durbin–Watson		2.197827

Note: The standard errors grouped at *, ** and *** indicate significance at 10, 5 and 1 percent, respectively.

Joint test on selected regressors: test statistics: F(3, 27) = 51.626; *p*-value = P(F(3, 27) > 51.626) = 2.59102×10^{-11}.

Robust test for the difference of constants in groups: null hypothesis—groups have a common intersection; test statistics: Welch F(27, 50.1) = 0.368945; *p*-value = P(F(27, 50.1) > 0.368945) = 0.996708. The coefficients for the variables te and tei are statistically significant. The R2 shows that the change in the dependent variable can be explained by regressors by only 37.8%.

When building a model with random effects, the model was tested.

Hausman test: null hypothesis—OMNA estimates are consistent. Asymptotic test statistics: Chi-squared (3) = 37.5258; *p*-value = 3.56139×10^{-8}.

Breusch–Pagan test: null hypothesis—variance of observation-specific errors = 0. Asymptotic test statistics: Chi-squared (1) = 5.75607; *p*-value = 0.0164318.

Thus, the most acceptable of the presented models is the model with fixed variables.

Since the tei and tes indicators poorly explain l_{gfcf}, they were excluded from the fixed variable model. The adjusted model specification is presented in Table 12.

Table 12. Adjusted specification of the fixed variable model.

	Coefficient	St. Error	t-Statistics	*p*-Value	
const	8.34466	0.0413684	201.7	<0.0001	***
te	0.000237139	2.37941×10^{-5}	9.966	<0.0001	***
Average of the dependent variable		8.756954	St. deviation		0.801426
RSS		68.14367	St. model error		0.700173
LSDV R2		0.364695	Within the range of R2		0.313106
Log. of likelihood		−162.5846	Crit. Akaike		383.1693
Crit. Schwartz		473.7642	Crit. Hannan–Quinn		419.9371
Parameter rho		−0.327367	Stat. Durbin–Watson		2.234643

Note: The standard errors grouped at *, ** and *** indicate significance at 10, 5 and 1 percent, respectively.

The equation of the model:

$$l_{gfcf} = 8.24 + 0.000237 * te \quad (3)$$

Standard error for the free term: 0.0414; for the regressor coefficient: 2.38×10^{-5}.

Joint test on selected regressors: test statistics F(1.27) = 99.327; *p*-value = P(F(1, 27) > 99.327) = 1.52644×10^{-10}. A fixed variable model is preferable to a pooled one.

Robust test for the difference of constants in groups: null hypothesis—groups have a common intersection; Welch test statistics F(27, 50.1) = 0.336481; p-value = P(F(27, 50.1) > 0.336481) = 0.998412.

Wald's test for heteroscedasticity without distribution: null hypothesis—observations have a common error variance. Asymptotic test statistics: Chi-squared (28) = 99.7406; p-value = 5.57907×10^{-10}.

The adjusted data do not satisfy the homoscedasticity condition, even with robust standard errors and logarithm introduced. It follows that a fixed-effects model cannot be used to predict the value of gross investments and an adjustment for heteroscedasticity is needed. The next step will be the procedure for eliminating data heteroscedasticity (Table 13).

Table 13. Adjusted specification of the fixed variable model.

	Coefficient	**St. Error**	**t-Statistics**	***p*-Value**	
const	8.48325	0.0751348	112.9	<0.0001	***
te	0.000229033	2.53244×10^{-5}	9.044	<0.0001	***
Average of the dependent variable		483.7831	St. deviation		1.707149
RSS		0.330087	St. model error		0.326051
LSDV R2		81.79336	Within the range of R2		3.86×10^{-16}
Crit. Schwartz		−327.2262	Crit. Akaike		658.4524
Parameter rho		664.7003	Crit. Hannan–Quinn		660.9881

Note: The standard errors grouped at *, ** and *** indicate significance at 10, 5 and 1 percent, respectively.

Standard errors for the free term: 0.0751; for the regressor coefficient: 2.53×10^{-5}.

The equation of the model:

$$l_{gfcf} = 8.48 + 0.000229 * te \quad (4)$$

The coefficient of te is statistically significant.

The model specifications did not improve the R-squared index, whose value is 0.33. Shifting the values of the l_{gfcf} indicator with a 1-year lag also did not improve the model.

The simulation results demonstrate the presence of heteroscedasticity when choosing the most appropriate model with fixed effects. As a result, the model was replaced with a linear model adjusted for heteroscedasticity.

Regression statistics by countries with the standard errors of the models and coefficient values by countries are presented in Tables 14 and 15.

According to the data presented in Table 12, the gfcf explains 17% to 90% of the variation in the te for 20 countries. The adjusted R-sq. is negative for three countries and close to zero for Norway; this indicates that the model has no predictive value.

p-value (te) is not significant for Chile (0.4733), France (0.1637), Iceland (0.1039), Spain (0.2271), Italy (0.3842), Latvia (0.22225), Lithuania (0.4148), Mexico (0.5907), New Zealand (0.1709), Norway (0.3168), Korea (0.1061), Slovakia (0.4138), Estonia (0.4721), and Sweden (0.9002). Coefficients are statistically significant for 12 countries.

The overall indicator of tax expenditures has a statistically significant positive impact on the accumulation of investments. Thus, the improvement of the tax expenditure management system as a factor of influence on the investment sphere is necessary. In combination with other factors, this study can provide additional benefits of improving the effectiveness of management decisions in the budgetary and tax sphere.

Table 14. Regression statistics by countries (model OLS, observations 2016–2021).

Indicator	Argentina	Australia	Austria	Bulgaria	Canada	Chile	Colombia
R-squared	0.885278	0.608558	0.637064	0.567065	0.696165	0.135214	0.516238
Adjusted R-sq.	0.856598	0.510698	0.546330	0.458831	0.620206	−0.080982	0.395297
Standard error	0.111449	0.049349	0.070065	0.148787	0.058479	0.134802	0.109992
Number of obs.	6	6	6	6	6	6	6
Indicator	Estonia	Finland	France	Germany	Hungary	Iceland	Italy
R-squared	0.135864	0.939014	0.420436	0.785434	0.511913	0.523958	0.192468
Adjusted R-sq.	−0.080170	0.923768	0.275546	0.731792	0.389891	0.404948	−0.009415
Standard error	0.226028	0.023792	0.077034	0.061036	0.198347	0.082051	0.108353
Number of obs.	6	6	6	6	6	6	6
Indicator	Latvia	Lithuania	Luxembourg	Mexico	The Netherlands	New Zealand	Norway
R-squared	0.342324	0.171153	0.721062	0.078506	0.814588	0.409853	0.246217
Adjusted R-sq.	0.177905	−0.036058	0.651327	−0.151867	0.768235	0.262316	0.057771
Standard error	0.178487	0.177205	0.040985	0.126064	0.048234	0.082520	0.062309
Number of obs.	6	6	6	6	6	6	6
Indicator	Portugal	Romania	South Korea	Slovakia	Spain	Sweden	United States
R-squared	0.757858	0.977943	0.519492	0.171859	0.336953	0.004441	0.583334
Adjusted R-sq.	0.697322	0.972428	0.399365	−0.035176	0.171192	−0.244449	0.479168
Standard error	0.087328	0.030977	0.061190	0.097887	0.085705	0.083899	0.055934
Number of obs.	6	6	6	6	6	6	6

Table 15. Coefficient values by countries (model OLS, observations 2016–2021).

Country		Coefficient	Standard Error	t-Statistics	*p*-Value	Significance
Australia	const	8.75821	0.285356	30.69	6.71×10^{-6}	***
	te	0.000149736	6.00452×10^{-5}	2.494	0.0672	*
Argentina	const	6.34173	0.215248	29.46	7.90×10^{-6}	***
	te	0.00350493	0.000630859	5.556	0.0051	***
Austria	const	8.69573	0.283821	30.64	6.76×10^{-6}	***
	te	0.000519011	0.000195871	2.650	0.0570	*
Bulgaria	const	7.21542	0.165856	43.50	1.67×10^{-6}	***
	te	0.00528621	0.00230945	2.289	0.0840	*
Canada	const	8.79333	0.159292	55.20	6.45×10^{-7}	***
	te	0.000152120	5.02481×10^{-5}	3.027	0.0389	**
Chile	const	7.88381	0.333976	23.61	1.91×10^{-5}	***
	te	0.000615669	0.000778504	0.7908	0.4733	
Estonia	const	9.07690	0.426378	21.29	2.88×10^{-5}	***
	te	−0.00131827	0.00166232	−0.7930	0.4721	
Finland	const	8.28186	0.139024	59.57	4.76×10^{-7}	***
	te	0.000186376	2.37486×10^{-5}	7.848	0.0014	***
France	const	8.18173	0.577354	14.17	0.0001	***
	te	0.000626945	0.000368044	1.703	0.1637	

Table 15. *Cont.*

Country		Coefficient	Standard Error	t-Statistics	*p*-Value	Significance
Germany	const	7.56599	0.432793	17.48	6.29×10^{-5}	***
	te	0.00406680	0.00106279	3.827	0.0187	**
Hungary	const	6.23939	1.02347	6.096	0.0037	***
	te	0.00569872	0.00278226	2.048	0.1099	
Island	const	9.38218	0.100218	93.62	7.81×10^{-8}	***
	te	0.000104729	4.99125×10^{-5}	2.098	0.1039	
Italy	const	8.80428	0.0943402	93.32	7.90×10^{-8}	***
	te	-5.35904×10^{-5}	5.48854×10^{-5}	−0.9764	0.3842	
Latvia	const	7.21186	0.745516	9.674	0.0006	***
	te	0.000714845	0.000495415	1.443	0.2225	
Lithuania	const	7.34227	0.256453	28.63	8.86×10^{-6}	***
	te	0.000612376	0.000673802	0.9088	0.4148	
Luxemburg	const	9.35798	0.180104	51.96	8.21×10^{-7}	***
	te	0.000316459	9.84134×10^{-5}	3.216	0.0324	**
Mexico	const	7.31017	0.519686	14.07	0.0001	***
	te	0.000864349	0.00148065	0.5838	0.5907	
The Netherlands	const	8.40225	0.215094	39.06	2.57×10^{-6}	***
	te	0.000118818	2.83435×10^{-5}	4.192	0.0138	**
New Zealand	const	8.56021	0.407335	21.02	3.03×10^{-5}	***
	te	0.00119751	0.000718480	1.667	0.1709	
Norway	const	9.69271	0.259810	37.31	3.08×10^{-6}	***
	te	8.69389×10^{-5}	7.60586×10^{-5}	1.143	0.3168	
Portugal	const	7.39456	0.261475	28.28	9.30×10^{-6}	***
	te	0.000740410	0.000209259	3.538	0.0241	**
Romania	const	6.97160	0.0771550	90.36	8.99×10^{-8}	***
	te	0.00182146	0.000136776	13.32	0.0002	***
Korea	const	8.84327	0.184598	47.91	1.14×10^{-6}	***
	te	0.000489842	0.000235552	2.080	0.1061	
Slovakia	const	8.14813	0.237416	34.32	4.30×10^{-6}	***
	te	0.000682200	0.000748768	0.9111	0.4138	
Spain	const	7.89664	0.534530	14.77	0.0001	***
	te	0.000868254	0.000608981	1.426	0.2271	
Sweden	const	9.62318	0.685151	14.05	0.0001	***
	te	-3.84401×10^{-5}	0.000287769	−0.1336	0.9002	
United States	const	10.3516	0.363701	28.46	9.07×10^{-6}	***
	te	−0.000189533	8.00921×10^{-5}	−2.366	0.0771	*

Note: The standard errors grouped at *, ** and *** indicate significance at 10, 5 and 1 percent, respectively.

To improve the model, additional data collection will be required for each country, as well as data validation and further research.

Summary results by countries are presented in Tables 16 and 17.

Table 16. Summary results by countries (coefficients).

Country	Integral Assessment of the Scale of Application of Tax Expenditures to Stimulate Investment and Support Priority Sectors of the Economy		Assessment of the Effectiveness of Tax Expenditures to Support Priority Sectors of the Economy	Assessment of the Effectiveness of Tax Expenditures to Stimulate Investment
	Rank	Meaning	Cp (2021)	Ci (2021)
Canada	1	4.371 (investments only)	–	1.13
Indonesia	2	1.901	2.41	1.05
Russia	3	1.794	0.98	1.07
France	4	0.899	1.09	1.10
S.Korea	5	0.518	1.08	7.94
India	6	0.500	1.56	2.18
Germany	7	0.362	0.14	0.60
Italy	8	0.274	0.91	0.54
Mexico	9	0.056	1.08	1.03

Table 17. Summary results by countries (regression statistics).

Country	The Impact of Tax Expenditures on Investment Accumulation		Country	The Impact of Tax Expenditures on Investment Accumulation		Country	The Impact of Tax Expenditures on Investment Accumulation	
	R (te)	*p*-Value		R (te)	*p*-Value		R (te)	*p*-Value
Australia	0.510698	0.0389 **	Germany	0.731792	0.0187 **	New Zealand	0.262316	0.1709
Argentina	0.856598	0.0051 ***	Hungary	0.389891	0.1099	Norway	0.057771	0.3168
Austria	0.546330	0.0570 *	Island	0.404948	0.1039	Portugal	0.697322	0.0241 **
Bulgaria	0.458831	0.0840 *	Italy	−0.009415	0.3842	Romania	0.972428	0.0002 ***
Canada	0.620206	0.0389 **	Latvia	0.177905	0.2225	Korea	0.399365	0.1061
Chile	−0.080982	0.4733	Lithuania	−0.036058	0.4148	Slovakia	−0.035176	0.4138
Estonia	−0.080170	0.4721	Luxemburg	0.651327	0.0324 **	Spain	0.171192	0.2271
Finland	0.923768	0.0014 ***	Mexico	−0.151867	0.5907	Sweden	−0.244449	0.9002
France	0.275546	0.1637	The Netherlands	0.768235	0.0138 **	United States	0.479168	0.0771 *

Note: The standard errors grouped at *, ** and *** indicate significance at 10, 5 and 1 percent, respectively.

Based on the reported data on tax expenditures, for countries that did not specify policy goals aimed at supporting investments, it can be assumed that tax incentives, exemptions, and preferences may be included in multiple policy objectives or not linked to any goal at all, but at the same time reflect such a priority. In addition, the criterion of demand may be at an extremely low or even zero level when taxpayers are not interested in the format of tax benefits. These problems require a more in-depth analysis with consideration of the specifics of the tax expenditure management system in each individual country. Along with the improvement of methodological approaches to the formation of tax expenditure management systems and their digitalization, the criteria of systematicity and quality of these processes need to be clarified.

The subject of our research was related specifically to tax expenditures, the substantive criteria of which are lost income and the purpose of providing tax benefits. Institutional criteria include approaches to the identification of tax expenditures, assessment methods, and the formation and openness of reporting on tax expenditures in a particular country.

4. Discussion

The relevance of the issue of tax expenditures is due to the development of the methodology, the introduction of procedures for accounting and assessing tax expenditures in the fiscal processes of many countries, and the digitalization of tax procedures that make

it possible to collect information on the use of tax benefits and preferences. The peculiarities of the budget and tax system and the tax expenditure management system in each country introduce restrictions for cross-country comparison of tax expenditures, due to the lack of unity of the conceptual apparatus, methods of estimating tax expenditures, compilation, and publication of reports.

Thus, the first difficulty in analyzing tax expenditures in cross-country comparison is related to the lack of a standard international definition of tax expenditures, structure, categories, and objectives of tax expenditures, which may vary even in regions within a country. In some cases, the structural differences are purely linguistic in nature, and in others, they are more significant.

The second problem is related to the variety of methodologies used in the assessment of tax expenditures and in the preparation of financial statements. The completeness and representativeness of tax expenditure data will inevitably vary depending on how the data were collected.

The reasons for the lack of conditionality of the tax benefits and preferences provided for the purpose of promoting and supporting investments may be a large-scale approach that does not reflect the impact of tax incentives in achieving investment targets. In further research, it is advisable to identify individual areas, groups of enterprises, or industries to obtain relevant data. Additionally, there are factors constraining investment activity such as manifestations of corrupt behavior, shadow transactions, the temporary nature of tax incentives, which may deter active investment decisions, and the complexity of procedures to meet the requirements for obtaining a tax benefit; in addition, the reasons may be managerial omissions.

Tax expenditures in most countries have been incorporated into the tools of state support to achieve cumulative effects from the implementation of incentive measures that aim to promote investment and priority industries. These measures are designed to achieve economic sovereignty. However, in some cases, these expenditures may be technical in nature, such as when it comes to tax exemptions for budgetary institutions. The impact of COVID-19 restrictions has further increased the volume of fiscal stimulus, but after this period, many countries have moved towards fiscal consolidation to deal with increased debt, budget deficits, inflation, and interest rates.

Austerity measures are often used by governments to address high levels of debt and budget deficits, but they can also have negative consequences for economic growth, employment, and income. Therefore, the implementation of austerity measures requires careful consideration and balance of short-term and long-term economic and social goals and many other factors. An inflationary shock has become a challenging factor for most developed countries, which can partially affect nominal government spending, including investments that can be established under long-term contracts.

The achievement of certain socio-economic results largely depends on how fiscal and monetary policy, in cooperation, will respond to challenges.

For further research, it is important to consider integrating tax expenditures into the concept of fiscal space, as this tool balances approaches related to cost optimization and revenue inflows. We adhere to the view that the priority in seeking resources to expand fiscal space during times of turbulence should not be on debt instruments (due primarily to the exponential increase in debt servicing costs), but on improving spending efficiency, increasing revenue, and changing tax policies. The fiscal space itself is volatile due to the unpredictability of financial processes and the cyclical nature of economic development, characterized by both expansion and contraction processes. The tax expenditure instrument is flexible, as it is linked to policy goals and has performance criteria, allowing for easy cancellation if desired results are not achieved.

The authors intend to continue the study of the effectiveness of tax expenditures in terms of using more economic indicators, with further calculation of the integral indicator, as well as modeling the impact of tax expenditures on socio-economic indicators.

5. Conclusions

The expansion of government support measures in different countries is associated with both indirect methods, which include tax incentives, and direct methods, such as budget subsidies, which are even more effective (Buzdalina and Bondarenko 2020). Almost all OECD countries use the tools of tax expenditures; in Germany, there are 86 types of such expenditures, the volume of which is estimated at 0.74% of GDP; in the Netherlands—101 (2% of GDP); in Spain—139 (4.6% of GDP); in the USA—164 (6% of GDP); in Canada—175 (6.6% of GDP); in the UK—362 (12.8% of GDP); and in France—486 (2.2% of GDP) (Bogacheva and Fokina 2017). In Russia, the sectoral diversity and the volume of tax benefits, exemptions, and preferences characterize political and economic priorities, so in 2016–2018, it was support for the financial sector, and in 2019–2020, it was support for the extractive sector.

Among the sectoral priorities of support in most countries, the agricultural sector stands out (due to seasonality and vulnerability to the effects of endogenous factors), and the transport sector, which has high socio-economic importance, as well as small businesses; the peculiarity of the activities of these groups is associated with the lack of reserves to continue operations in conditions of economic destabilization (Smoke et al. 2022; Solomon 2019). In terms of the study of priority industries, this study does not consider the direction related to energy transfer; the authors investigate this issue separately (Tyurina et al. 2023). In this direction, it is important to divide companies in the extractive sector into energy and others.

According to the available database, tax expenditures, as targeted tax benefits and preferences, are included in the mechanism of fiscal regulation of socio-economic development and more than 100 countries submit open data on tax expenditures to the global digital resource GTED. The peculiarity of targeted tax benefits and preferences is the possible substitution for alternative (direct) budget expenditures. The introduction of a unified methodology for assessing the effectiveness of tax expenditures contributes to making informed decisions about the amount of targeted tax benefits and preferences and the use of alternative forms.

Ranking of countries by assessing the share of tax expenditures in GDP revealed the leading countries, depending on the target role of tax expenditures related to investment activation: Canada, Indonesia, and Korea; by share in total tax revenues—Indonesia, Canada, and Italy. Depending on the target role of tax expenditures related to the support of priority sectors of the economy, according to the assessment of the share of tax expenditures in GDP and the share of total tax revenues, the leading countries are Russia, France, and Korea. The results obtained can be explained by the priority of the sectoral approach to supporting and stimulating economic entities, which meets the principles of complexity, and secondly, the share of the state in the economy. At the same time, Canada does not single out such a goal of tax expenditures as support for priority sectors of the economy.

The conducted assessment of the effectiveness of tax benefits and preferences through the coefficient method reflects the ratio between the rate of changes in the analyzed indicators and the rate of changes in tax expenditures within a particular country. The revealed interrelationships of tax expenditures with individual socio-economic indicators in the sample of countries indicate a trend, rather than statistical patterns.

In the period of 2000–2021, there was a steady decline in the share of tax expenditures for property taxation and an increase in targeted tax benefits for the taxation of goods and services. The main trends in the structure of beneficiaries are associated with a decrease in tax expenditures in the interests of households and an increase in the share of businesses. The authors believe that this situation is also explained by the improvement of methodological approaches to the content of the basic tax system and structural tax benefits. Business support and sector approach meet the goals of economic development as a contribution to the formation of aggregate demand and aggregate supply. In four G20 countries, the share of targeted tax incentives to support business in total tax expenditures

at the end of 2020 exceeded 50%. Nine countries identified a policy objective related to investment support through targeted tax incentives.

In identifying priority economic sectors and their tax incentives, Russia takes first place, both in terms of the share of GDP and the share of tax revenues, with France in second place. Structurally, the priority sectors of the economy that received tax breaks in Russia are as follows, in descending order in terms of share in GDP: mining sector, financial services sector, agricultural sector, transport sector, exports, industrial production, knowledge-intensive areas, energy sector, real estate sector, ICT, tourism.

In the period of 2016–2020, the share of the financial and agricultural sectors decreased, while the share of the mining and transport sectors and exports increased, in terms of tax expenditures.

Indonesia is characterized by a larger scale of using the considered targeted tax incentives and preferences; the country has a high share of tax expenditures in both directions, Russia is in second place, and France is in third place.

Investment growth rates change most dynamically, reflecting the target priorities of governments in the use of government support instruments. Ultra-high values of the coefficient are observed in cases where decisions are made in favor of introducing or canceling targeted new tax benefits or a significant reduction in volumes.

The coefficients of increase in industrial production are more stable, which determines the priority of the sector approach in stimulating economic activity.

The scale of using tax expenditures and coefficients assessing the effectiveness of targeted tax incentives through the achievement of economic indicators can be used for cross-country comparison. However, to improve the accuracy of assessments in this area at the level of national governments, it is necessary to develop unified methodological approaches to tax expenditures, adhere to unified reporting deadlines (calendar year, since the budget code differs in different countries), and develop national digital resources for managing tax expenditures.

In terms of the allocation of priority economic sectors and their tax incentives, France ranks first in terms of share of GDP, Russia in terms of share of tax revenues, and the second places are also among the countries represented.

Canada's fiscal policy is characterized by the significant scale of the use of targeted taxes to stimulate investment activity. Indonesia is in second place, as unlike Canada, tax expenditures in the country are provided in both directions, and Russia is in third place. Mexico closes the ranking. The progressive increase in the role of inter-budgetary transfers in Mexico may reduce the incentives for subnational authorities to collect their own revenues (Smoke et al. 2023), and therefore to manage tax expenditures.

Ultra-high values of the investment increase coefficient are noted in cases when decisions are made in favor of introducing or canceling new tax benefits or significantly reducing their share. The coefficients of increase in industrial production have more stable dynamics, which reflects the greater predictability of the sectoral approach in stimulating economic activity.

The scale of tax incentives correlates with the expert grouping of countries, depending on the target role of tax expenditures related to the activation of investments and support for priority sectors of the economy, according to the criterion of the share in tax revenues. This is due to the high share of tax expenditures on investment activation in both total tax expenditures and GDP (while only two average indicators are involved in calculating the multidimensional average).

The scale of application of tax expenditures can be used in the future for cross-country comparison. However, to improve the accuracy of estimates in this area at the level of national governments, it is necessary to come to similar methodological approaches to understanding tax expenditures, adhere to uniform reporting deadlines (calendar year, since the budget code differs in different countries), and develop national information systems for managing tax expenditures. We agree with the authors who consider it necessary to

develop a unified standard for reporting tax expenditures under the coordination of an international organization; for example, the OECD could take on such a role.

The overall indicator of tax expenditures has a statistically significant positive impact on the accumulation of investments. However, the study of a panel of data revealed heteroscedasticity, which can lead to biased estimates of modeling. It is necessary to expand observations, investigate the specifics of providing data for each country, consider additional explanatory variables, and possibly identify a group of stimulating tax expenditures.

The object of further research remains the systematic analysis of state incentive instruments and their combination to achieve the goals of socio-economic development. One of the main principles that we believe to be guided by is the "principle of realism", formulated by the IMF as accounting for the entire range of fiscal transactions, including tax expenditures, in forecasts. This is especially relevant for federal states with large-scale and voluminous tax expenditures at all levels of government.

Recommendations for individual countries are related to the creation of a unified information system for managing tax expenditures. With the introduction of artificial intelligence technologies, the behavioral factor can also be considered when assessing tax expenditures, including at the planning stage. The tactical tasks that the information system will contribute to solving are related to the formation of a "single window" of access to information on tax expenditures, improving the operational efficiency of the tax expense management system, and ensuring the possibility in the short term to exclude those for which benefits and preferences have expired this year from the list of tax expenditures.

However, digitalization is impossible without unified developed methodological and methodological approaches to the tax expenditure management system, their codification, and ensuring transparency both domestically and internationally.

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References

Alesina, Alberto, Carlo Favero, and Francesco Giavazzi. 2015. The Output Effect of Fiscal Consolidation Plans. *Journal of International Economics* 96: S19–S42. [CrossRef]

Alesina, Alberto, Omar Barbiero, Carlo Favero, Francesco Giavazzi, and Matteo Paradisi. 2017. *The Effects of Fiscal Consolidations: Theory and Evidence*. Cambridge: Harvard University Working Paper.

Bankowski, Krzysztof, Othman Bouabdallah, Cristina Checherita-Westphal, Maximilian Freier, Pascal Jacquinot, and Philip Muggenthaler. 2023. Fiscal policy and High Inflaation. ECB Economic Bulletin, Issue 2. Available online: https://www.ecb.europa.eu/press/economic-bulletin/articles/2023/html/ecb.ebart202302_01~2bd46eff8f.en.html (accessed on 21 February 2024).

Barradale, Greg. 2022. Is the Fiscal «Black Hole» Real? We Asked Economists. The Big Issue Limited. November 18. Available online: https://www.bigissue.com/news/politics/is-the-fiscal-black-hole-real-we-asked-economists/ (accessed on 21 February 2024).

Barrios, Salvador, Francesco Figari, Luca Gandullia, and Sara Riscado. 2016. *The Fiscal and Equity Impact of Tax Expenditures in the EU. JRC Working Papers on Taxation and Structural Reforms*. № 1/2016. Seville: European Commission, Joint Research Centre.

Barroy, Helene, Susan Sparkes, and Elina Dale. 2016. Assessing Fiscal Space for Health Expansion in low- and Middle-Income Countries: A Review of the Evidence. In *Health Financing Working Paper № 3*. World Health Organization: 33p, Available online: https://iris.who.int/bitstream/handle/10665/251904/WHO-HIS-HGF-HFWorkingPaper-16.3-eng.pdf?sequence=1 (accessed on 21 February 2024).

Beer, Sebastian, Dora Benedek, Brian Erard, and Jan Loepric. 2022. How to Estimate Tax Expenses. p. 20. Available online: https://www.imf.org/en/Publications/Fiscal-Affairs-Department-How-To-Notes/Issues/2022/11/How-to-Evaluate-Tax-Expenditures-525166 (accessed on 30 November 2023).

Bogacheva, Olga, and Tatyana Fokina. 2017. Management of tax expenditures in OECD countries. *Mirovayaekonomika i Mezhdunarodnye Otnosheniya* 61: 26–36. (In Russian) [CrossRef]
Bordo, Michael D., Agnieszka Markiewicz, and Lars Jonung. 2011. A Fiscal Union for the Euro: Some Lessons from History. NBER Working Paper No. 17380. Cambridge. September. Available online: https://www.nber.org/system/files/working_papers/w17380/w17380.pdf (accessed on 21 February 2024).
Bosworth, B. P. 1984. *Tax Incentives and Economic Growth*. Wash: Brookings Institutions.
Buzdalina, Olga B., and Nikita O. Bondarenko. 2020. Analysis of the concept of tax expenditures of the budget and its implementation in the Russian Federation. *Finansovaya zhizn* 2020: 113–16. (In Russian).
Congressional Budget Office: Официальный сайт. 2004. Available online: https://www.cbo.gov/ (accessed on 21 February 2024).
Daher Alshammary, Mohammed, Zulkefly Abdul Karim, Norlin Khalid, and Riayati Ahmad. 2020. Debt-Growth Nexus in the MENA Region: Evidence from a Panel Threshold Analysis. *Economies* 8: 102. [CrossRef]
Dantas, Manuela, Kenneth J. Merkley, and Felipe B. G. Silva. 2023. Government Guarantees and Banks' Income Smoothing. *Journal of Financial Services Research* 63: 123–73. [CrossRef]
ECLAC. 2022. Fiscal Panorama of Latin America and the Caribbean, Economic Commission for Latin America and the Caribbean, Santiago. Available online: https://www.cepal.org/en/publications/48015-fiscal-panorama-latin-america-and-caribbean2022-fiscal-policy-challenges (accessed on 21 February 2024).
Economic Governance Review: Council Adopts Reform of Fiscal Rules. 2024. Council Agrees on Reform of Fiscal Rules. European Council. Available online: https://www.consilium.europa.eu/en/press/press-releases/2024/04/29/economic-governance-review-council-adopts-reform-of-fiscal-rules/ (accessed on 29 April 2024).
Economic Governance Review: Council Agrees on Reform of Fiscal Rules. European Council. 2023. Available online: https://www.consilium.europa.eu/en/press/press-releases/2023/12/21/economic-governance-review-council-agrees-on-reform-of-fiscal-rules/ (accessed on 21 December 2023).
European Commission, Directorate-General for Taxation, and Customs Union. 2021. Taxation in Support of Green Transition: An Overview and Assessment of Existing Tax Practices to Reduce Greenhouse Gas Emissions: Good Practice Fiches. Publications Office. Available online: https://data.europa.eu/doi/10.2778/063153 (accessed on 21 February 2024).
Executive Summary to the 2023 Financial Report of the U.S. Government. 2023. Available online: https://fiscal.treasury.gov/files/reports-statements/financial-report/2023/executive-summary-2023.pdf (accessed on 21 February 2024).
Freire-Gonzalez, Jaume. 2018. Environmental taxation and the double dividend hypothesis in the CGE Modeling literature: A critical review. *Journal of Policy Modeling* 40: 194–223. [CrossRef]
Galbraith, J. 1981. *Economics, Peace and Laughter*. New York: New American Library. 382p.
Guido, Maia, Marco G. P. Garcia, and Pedro Maia. 2022. *Fiscal Space in an Era of central Bank Activism, Texto Para discussão*. Rio de Janeiro: Departamento de Economia, Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio).
Heady, Christopher, and Mario Mansour. 2019. *Tax Expenditure Reporting and Its Use in Fiscal Management: A Guide for Developing Economies*. №. 2019/002. Washington, DC: International Monetary Fund, p. 19.
Heller, P. 2005. *Understanding Fiscal Space. IMF Policy Discussion Paper № PDP/05/4*. Washington, DC: International Monetary Fund, pp. 1–19.
Kakaulina, Maria O., and Dmitry R. Gorlov. 2022. Assessment of the Impact of Tax Incentives on Investment Activity in Special Economic Zones of the Russian Federation. *Journal of Applied Economic Research* 21: 282–324. [CrossRef]
Kose, Ayhan, Sergio Kurlat, Franziska Ohnsorge, and Naotaka Sugawara. 2022. A Cross-Country Database of Fiscal Space. *Journal of International Money and Finance* 128: 102682. [CrossRef]
Laan, Tara, and Ronald Steenblik. 2023. Challenges and Opportunities for the Reform of Fossil Fuel Tax Expenditures in Developing and Emerging Economies. *CEP Discussion Note*. Available online: https://www.cepweb.org/wp-content/uploads/2023/07/Laan-and-Steenblik-2023-Fossil-Fuel-TEs-Reform_pdf_DN.pdf (accessed on 21 February 2024).
Lieuw-Kie-Song, Maikel, Kate Philip, Mito Tsukamoto, and Marc van Imschoot. 2011. *Towards the Right to Work: Innovations in Public Employment Programmes (IPEP)*. Employment Working Paper № 69. Geneva: ILO. International Labour Organization, p. 65.
Nerlich, Carolin, and Wolf H. Reuter. 2016. Fiscal Rules, Fiscal Space, and the Procyclicality of Fiscal Policy. Finanz Archiv. *Public Finance Analysis* 72: 421–52. Available online: http://www.jstor.org/stable/44861227 (accessed on 21 February 2024). [CrossRef]
OECD. 2023. Investment (GFCF) (Indicator). Available online: https://data.oecd.org/gdp/investment-gfcf.htm (accessed on 21 February 2024).
Panskov, V. G. 2020. A New Approach to Tax Regulation of the Russian Economy. *Stage: Economic Theory, Analysis, Practice* 1: 24–46.
Pigou, Arthur C. 1920. *The Economics of Welfare*. London: Macmillan & Co., p. 976.
Price, Robert, Thai-Thanh Dang, and Jarmila Botev. 2015. *Adjusting Fiscal Balances for the Business Cycle: New Tax and Expenditure Elasticity Estimates for OECD Countries, OECD Economics Department Working Papers, 1275*. Paris: OECD Publishing. [CrossRef]
Redonda, Agustin, and Tom Neubig. 2018. Assessing Tax Expenditure Reporting in G20 and OECD Economies. CEP Discussion Note 2018/3. Available online: https://www.cepweb.org/wp-content/uploads/2018/11/Redonda-and-Neubig-2018.-Assessing-Tax-Expenditure-Reporting.pdf (accessed on 21 February 2024).
Reinhart, Carmen, and Kenneth Rogoff. 2011. Growth in a time Debt. *American Economic Review: Papers & Proceedings* 100: 573–78. Available online: https://www.nber.org/papers/w15639 (accessed on 21 February 2024).

Report on Federal Tax Expenditures—Concepts, Estimates and Evaluations. 2022. Government of Canada. Available online: https://www.canada.ca/en/department-finance/services/publications/federal-tax-expenditures/2022.html (accessed on 21 February 2024).

Revenue Statistics in Latin America and the Caribbean. 2023. Paris: OECD Publishing. [CrossRef]

Sachinta, Fernando. 2019. Environmental Efficiency of Carbon Taxes: A Comparative Study of the Nordic Countries. In *The First International Conference on Carbon Pricing*. World Bank Working Paper Series; Washington, DC: World Bank, pp. 313–32.

Schratzenstaller, Margit, and Angela Köppl. 2021. Taxation in Support of Green Transition. An Overview and Assessment of Existing Tax Practices to Reduce Greenhouse Gas Emissions. WIFO Studies. № 66820. Available online: https://ideas.repec.org/b/wfo/wstudy/66820.html (accessed on 21 February 2024).

Silva, Felipe Bastos Gurgel. 2021. Fiscal Deficits, Bank Credit Risk, and Loan-Loss Provisions. *Journal of Financial and Quantitative Analysis* 56: 1537–89. [CrossRef]

Smoke, Paul, David Gomez-Alvarez, Andres Felipe Munoz, and Axel Radics. 2022. *The Role of Subnational Governments in the COVID-19 Pandemic Response: Are There Opportunities for Intergovernmental Fiscal Reform in the PostPandemicWorld?* Washington, DC: Inter-American Development Bank. [CrossRef]

Smoke, Paul, Mehmet S. Tosun, and Serdar Yilmaz. 2023. Subnational Government Responses to the COVID-19 Pandemic: Expectations, Realities and Lessons for the Future. *Public Administration and Development* 43: 97–105. [CrossRef]

Sokolovska, Alla, and Tetiana Zatonatska. 2022. Debatable Aspects of the Concept of Tax Expenditures. *Ekonomika* 101: 109–24. [CrossRef]

Solomon, David M. 2019. Voice of Small Business in America: 2019 Insights Report. [Электронный ресурс]. Available online: https://www.goldmansachs.com/citizenship/10000-smallbusinesses/US/2019-insights-report/report.pdf/ (accessed on 21 February 2024).

Steshenko, Julia A., and Anna V. Tikhonova. 2018. Tikhonova. An Integral Approach to Evaluating the Effectiveness of Tax Incentives. *Journal of Tax Reform* 4: 157–73. [CrossRef]

The Global Risks Report. 2024. 19th Edition. World Economic Forum. Available online: https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf (accessed on 21 February 2024).

Treaty on European Union (Maastricht, 7 February 1992). Available online: https://www.cvce.eu/content/publication/2002/4/9/2c2f2b85-14bb-4488-9ded-13f3cd04de05/publishable_en.pdf (accessed on 21 February 2024).

Tyurina, Yulia, Svetlana Frumina, Svetlana Demidova, Aidan Kairbekuly, and Maria Kakaulina. 2023. Estimation of Tax Expenditures Stimulating the Energy Sector Development and the Use of Alternative Energy Sources in OECD Countries. *Energies* 16: 2652. [CrossRef]

World Economic Outlook. 2023. IMF. Available online: https://www.imf.org/en/Publications/WEO/Issues/2023/04/11/world-economic-outlook-april-2023 (accessed on 24 December 2023).