

CHAPTER 8

ASSESSMENT OF THE G20 PARTICIPATING COUNTRIES IN TERMS OF TAX RATES USING THE CRITIC BASED CoCoSo APPROACH

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INTRODUCTION

Taxation is one of the foremost of the sovereign rights of a state. In addition, taxation is a tool that has important consequences when used economically, socially and politically. As a fiscal policy tool, taxation allows states to make effective practices in achieving their goals in the macro economy. The government can realize the desired contraction and expansion in the supply and demand aspects of the economy through taxation. In addition, growth policies can be implemented through public sector savings shaped after taxation. The role of tax policies in achieving similar macroeconomic targets reveals that taxation is the most effective and effective economic policy tool in the hands of the state (Dietsch, 2015; Tcherneva, 2006).

There are also several ways to evaluate a tax system. For example, determining a social welfare function that includes value judgments, an economic model and the initial balance of the economy, whether it is possible to increase social welfare with tax reform are important points. There are many successful and unsuccessful reform studies carried out by developing countries (Di John, 2006). The most successful among these reforms is the 1974 Colombian tax reform. This reform met most of the needed changes in the country's tax system. The 1974 reform sets an example for developing countries. On the other hand, another reform that affected all tax reforms after 1980 was the US 1986 tax reform. This reform, which emerged from the USA and England after 1980 and spread all over the world and was structured in accordance with all the requirements of the supply-side economical approach, has been accepted as a model by many developed/developing countries, even if it is not very valid for their own countries (Bird, 1989, 2004;

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Collins, Kemsley, & Shackelford, 1995).

Unfortunately, Tax expenditures (TEs) are not transparent and are not given the same amount of scrutiny in the budget process as direct expenditures, while having a considerable influence on government budgets. Though they have a major influence on public finances, TEs are seldom as closely scrutinized as direct expenditure throughout the budgeting process (Polackova Brixi, Valenduc, & Swift, 2004). Cost-benefit analysis is rarely performed on TEs. Perhaps more concerning is the fact that some nations simply do not attempt to estimate the income lost as a result of these exemptions. The Greek TE report recognizes that “there is also a substantial distinction between direct and tax expenditures: while the former are subject to annual discussion and approval by the House via the budget process, the latter is discussed and authorized after it is implemented...” (Angelopoulos, Economides, & Kammass, 2007; Fleming Jr & Peroni, 2010; Redonda & Neubig, 2018).

It is thought that more than fifty per cent of the world’s main tax havens are situated in Europe. This study is presented in a scholarly analysis titled “The Missing Profits of Nations” by three economists, in which they give a list of tax havens. According to the authors of the report, 92% of unlawfully transferred wealth is concentrated in just 11 tax havens, six of which are in Europe (Alstadsæter, Johannesen, & Zucman, 2018; Tørsløv, Wier, & Zucman, 2018).

Despite the global outrage that both the Panama Papers and the Paradise Papers provoked, the practice of businesses hiding their money in tax havens seems to be as prevalent as ever. This was followed by an EU initiative to combat corporate tax avoidance via a “blacklist.” Companies continue to employ legal loopholes to move profits away from native tax systems, as shown by the fact that just eleven nations absorb about €532 billion in profits, as stated in the research (Bricongne, Delpeuch, & Forero, 2021; Koutsouva, 2020; Przygoda, 2018).

As stated in the United Nations Report on Financing for Development, taxes play an essential role in financing state expenditures on fundamental social services such as education, health care, and social security. Effective governmental expenditure that meets the needs of the people necessitates the collection of enough tax money (Sachs, Kroll, Lafortune, Fuller, & Woelm, 2021). Figure 1 shows the major tax havens of the world.

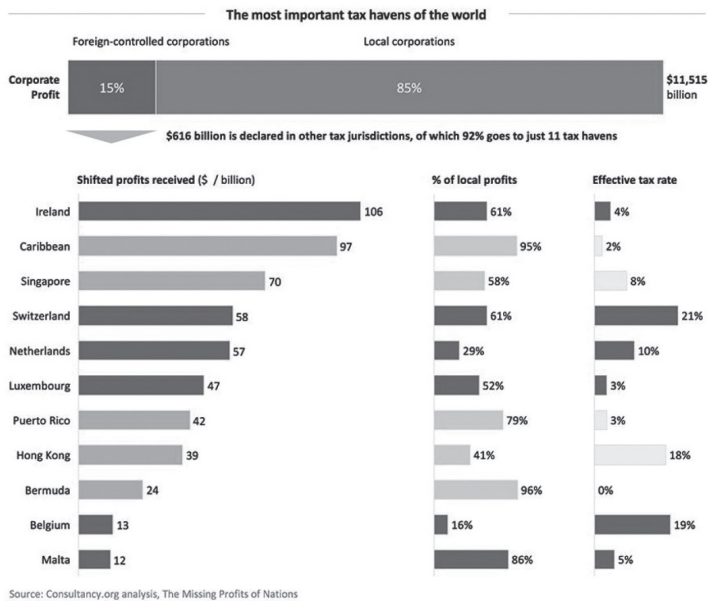


Figure 1. The most important tax havens of the world (Zacharia, 2020).

Experience has shown that tax arrangements, regardless of how clever they seem on paper, have limited efficacy if they are implemented inefficiently or corruptly. Therefore, a simple tax system and a transparent, responsible, and corrupt-free tax administration that may reduce tax evasion and avoidance should be established (Forstater, 2018). Figure 2 represents the tax cycle expected by citizens in general. Ideally, a citizen would want it to go as follows:

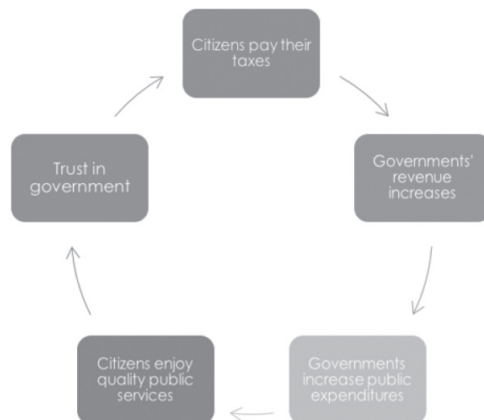


Figure 2. The ideal tax cycle (Horst, 2020)

Unfortunately (and predictably), this paradigm does not match the reality in the majority of emerging nations (Horst, 2020). If the distribution of taxes in a country is to be balanced and fair, it is necessary to pay attention to the share of indirect-direct taxes in tax revenue. Direct taxes can be said to be more equitable since they take into account the taxpayer's ability to pay relatively more, thanks to the progressive tax schedule, minimum living allowance and various tax expenditures. On the contrary, indirect taxes create a distorting effect on tax justice, as they create a heavier tax burden on lower-income individuals and are insufficient to take into account their ability to pay taxes (Aksoy, 2019; Susam & Oktayer, 2007)

The establishment of the G20, which is accepted as the main platform within the scope of international economic cooperation, was decided at the G-7 Finance Ministers and Center Heads Meeting held in Washington on September 25, 1999 (Jokela, 2011; Norton, 2010). After the Mexican Peso crisis in 1994, the Asian crisis in 1997 and the Russian crisis in 1998, the "emerging market economies", whose importance and weight have increased in the international system, are more represented in global economic governance and the global economic Providing an informal environment for discussion and exchange of views in order to ensure and promote financial stability and financial stability emerges as the founding purpose of the G20 (Bibow, 2010).

The G20 platform, which brings together the "emerging market economies" and developed countries, consists of the USA, Germany, Argentina, European Union, Australia, Brazil, China, Indonesia, France, South Africa, South Korea, India, England, It consists of Italy, Japan, Canada, Mexico, Russian Federation, Saudi Arabia and Turkey (Nelson, 2009). G20 countries, which are of great importance in terms of the global economic and financial system, account for approximately 80% of the global gross product; It represents more than 75% of global trade and 60% of the world's population (Christians, 2010; Utamawati, Trihartanto, & Naully, 2022). In addition, other countries affiliated to the European Union (EU) are represented by a single participant in the G20. Each year, one of the member countries holds the term presidency (Gstöhl, 2009).

The G20 consensus follows an agreement signed by 136 nations on October 8, 2021, to establish the minimum worldwide tax rate for major firms at 15%. This agreement was negotiated by the Organization for Economic Cooperation and Development (OECD), a Paris-based international organization with 38 member states. There was an earlier phase of negotiations conducted in July 2021. Ireland, Hungary, and Estonia were added as signatory nations to the OECD accord. Ireland

and Hungary have the lowest European Union corporate income tax rates. Ireland is a particularly significant signatory due to the fact that multinational firms often exploit aspects of Irish corporate taxation legislation to decrease their corporate taxes. One approach used by multinational firms is known as the “Double-Irish with a Dutch Sandwich,” in which many company subsidiaries are established in Ireland. Irish tax legislation and tax treaties allow these subsidiaries to transfer earnings to a “tax haven” jurisdiction with no income tax. Such cross-border tax reduction tactics are routinely used by huge technological firms that may readily do international business regardless of the location of their customers. According to the OECD, the agreement would encompass 90 percent of the global economy (Jain, 2021; Jones, 2021; Mehboob, White, & Reeves, 2021; Nowicki, 2021).

Listed below are just a few of the many similar MCDM studies along these lines that have been conducted:

Choudhary and Mishra (2021) aimed to discover and study the Critical Success Enablers (CSEs) that facilitate Industry 4.0 deployment. These Enablers have been found after a literature review and consultation with experts. After that, a hybrid technique based on fuzzy AHP and combined compromised solution (CoCoSo) was used. Lai, Liao, Long, and Zavadskas (2022) used the fuzzy CoCoSo approach for collective decision-making and applied it to assessment of blockchain platforms. Dwivedi and Sharma (2022) used Shannon Entropy and COCOSO methodologies to assess the achievement of sustainable development objectives. Yazdani, Wen, Liao, Banaitis, and Turskis (2019) examined an enhanced version of the combined compromise solution approach with grey numbers, abbreviated as CoCoSo-G, to evaluate the performance of suppliers in a Madrid construction firm. The CoCoSo-G approach is used to disclose and rank each supplier's score. the Shannon entropy and CoCoSo methodologies to find the most suitable technical components for sustainability. Peng, Zhang, and Luo (2020) used the Pythagorean fuzzy MCDM methods that rely on CoCoSo and CRITIC with a scoring function to analyze the 5G industry. They investigated the environmental impacts of construction projects in time-cost trade-off project scheduling problems with CoCoSo multi-criteria decision-making method. Banihashemi, Khalilzadeh, Zavadskas, and Antucheviciene (2021) used the CoCoSo Multi-Criteria Decision-Making Method to explore the environmental implications of building projects in time-cost trade-off project scheduling difficulties.

Multi-Criteria Decision Making procedures are widely used to assess many alternatives based on a variety of criteria. In this study, 22 nations and EU, including G20 members and participants, are assessed using the CRITIC-based

CoCoSo approach in terms of the tax title, which the G20 has recently focused on and attempted to standardize. The CoCoSo technique is a novel approach in the literature. The approach has been evaluated in the research provided in the literature review section, as well as in several additional investigations, and it has been shown to yield findings that are compatible with other MCDM methods.

When the literature was reviewed, it was observed that MCDM approaches were not being used adequately in this respect, and no comparison was done in this dimension. As a result, the aim is to improve the existing literature in terms of techniques and the extent of the topic covered by the study, as well as to draw awareness to the tax issue, which is essential for corporations, governments, and individuals. In brief, the study's objective is to draw attention to the tax problem while also contributing to existing research on the issue. Furthermore, the research aims to inform academics and policymakers in related nations about taxes.

The rest of the research is organized as follows: The second section focuses on each step of the suggested MCDM approach. Section 3 displays the obtained results. Section 4 provides the discussion and conclusion.

2. METHODS AND DATA

This section provides the research framework of the study, the tax indicators and the definitions of them, and the methods used. Research framework of the study is shown in Figure 3.

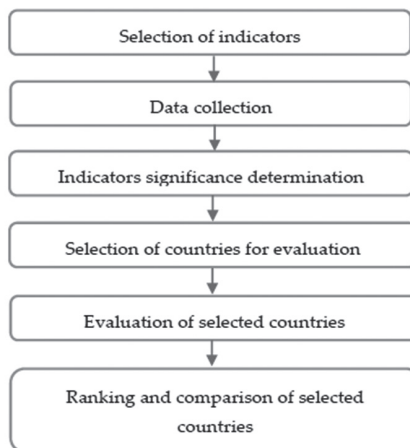


Figure 3. Generalized framework for MCDM process (Stanujkic, Popovic, Zavadskas, Karabasevic, & Binkyte-Veliene, 2020).

Indicator definitions are presented in Table 1.

Table 1. Indicator Definitions

Criteria	Definitions
Sales Tax Rate (%)	A sales tax is a consumption tax imposed by the government on the sale of goods and services.
Corporate Tax Rate (%)	A corporate tax is a tax on the profits of a corporation. The taxes are paid on a company's taxable income, which includes revenue minus cost of goods sold (COGS), general and administrative (G&A) expenses, selling and marketing, research and development, depreciation, and other operating costs.
Personal Income Tax Rate (%)	Personal income tax is a type of income tax that is levied on an individual's wages, salaries, and other types of income.
Social Security Rate For Employees (%)	The Social Security tax is applied to income earned by employees and self-employed taxpayers. The Social Security tax pays for the retirement, disability, and survivorship benefits.
Social Security Rate For Companies (%)	It refers to the rate of the current social security tax rate paid by the employer in each salary payment period.
Social Security Rate (%)	The social security rate definition is a tax taken out of employees and employers salaries and wages. This tax goes towards the social security program in the relevant countries. This program provides benefits to eligible retired persons.

Table 2 shows the raw data on indicators and assessed nations.

Table 2. Raw Data on Indicators and Assessed Nations

	MIN	MIN	MIN	MIN	MIN	MIN
Countries	C1	C2	C3	C4	C5	C6
Argentina	25	35	21	37,4	20,4	17
Australia	30	45	10	11,5	9,5	2
Brazil	34	27,5	17	39,8	28,8	11
Canada	26,5	33	5	14,38	7,66	6,72
China	25	45	13	39,02	28,52	10,5
France	26,5	45	20	68	45	23
Germany	30	45	19	40,21	19,98	20,23
India	25,17	42,74	18	24	12	12
Indonesia	22	30	10	7,74	5,74	2
Italy	24	43	22	39,49	30	9,49
Japan	30,62	55,97	10	31,52	16,24	15,28
Mexico	30	35	16	9,23	7,58	1,65

Netherlands	25	49,5	21	51,24	23,59	27,65
Russia	20	13	20	30	30	0
Saudi Arabia	20	0	15	22	12	10
Singapore	17	22	7	37	17	20
South Africa	28	45	15	2	1	1
South Korea	25	45	10	19,24	10,11	9,13
Spain	25	47	21	36,25	29,9	6,35
Switzerland	14,93	40	7,7	12,8	6,4	6,4
Turkey	23	40	18	34,5	20,5	14
United Kingdom Kingdom	19	45	20	27,8	13,8	14
United States	21	37	6,35	15,3	7,65	7,65

2.1. CRITIC (CRiteria Importance Through Intercriteria Correlation) Method

The CRITIC approach is one of the weighing techniques that produces the objective weights of the criteria presented in the literature by Diakoulaki, Mavrotas, and Papayannakis (1995). In this approach, the standard deviation of the criterion and the correlation between the criteria are included into the weighing procedure. This method’s application procedure consists of five stages, which are detailed below in Figure 4 (Diakoulaki et al., 1995).

Step 1: The X matrix is created, which shows the performance of alternatives consisting of different criteria and different

options. An example matrix X is shown in equation.
$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix}; i = 1, \dots, m \text{ ve } j = 1, \dots, n$$



Step 2: The decision matrix is normalized based on whether it is focused on benefits or costs. Equation 2 is used to normalize the decision matrix based on benefits. Equation 3 is used to normalize the decision matrix based on costs.

$$r_{ij} = \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}} \quad r_{ij} = \frac{\max x_{ij} - x_{ij}}{\max x_{ij} - \min x_{ij}}$$



Step 3: At this step, equation 4 is used to figure out the correlation coefficients based on the data from the normalized decision matrix.

$$\frac{\sum_{i=1}^m (r_{ij} - r_j) * (r_{ik} - r_k)}{\sqrt{\sum_{i=1}^m (x_{ij} - \bar{x}_j)^2 * \sum_{i=1}^m (x_{ik} - \bar{x}_k)^2}}; j, k = 1, \dots, n$$



Step 4: "1 - Pjk" values are obtained by subtracting the correlation coefficients from 1. The cumulative sum of this obtained value is multiplied by the standard deviation values "σj" to obtain the "Cj" value. Equation 5 is used to figure out Cj, and equation 6 is used to figure out σj.

$$c_j = \sigma_j \sum_{k=1}^n (1 - p_{jk}); \quad j = 1, \dots, n \qquad \sigma_j = \sqrt{\frac{1}{n-1} \sum_{j=1}^n (x_{ij} - \bar{x}_j)^2}; \quad i = 1, \dots, m$$



Step 5: The "Cj" values obtained are divided by the total "Cj" values, and the Wj values for which the weights of the criteria are determined are obtained. Wj values are calculated by equation 7.

$$w_j = \frac{c_j}{\sum_{i=1}^n c_j}; \quad j = 1, \dots, n$$

Figure 4. The CRITIC method calculation steps (Diakoulaki et al., 1995)

2.2. CoCoSo (Combined Compromise Solution) Method

CoCoSo (Combined Compromise Solution) method is one of the multi-criteria decision making methods introduced to the literature by Yazdani. This approach is an integrated method, which is a summary of the compromise solutions of the exponentially weighted product and the simple additive weighted product model (Peng et al., 2020). This method consists of 5 steps and these steps are shown below (Yazdani et al., 2019).

1st Step: In this stage, a decision matrix including the raw criteria values of the alternatives is constructed.

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix}; i = 1, \dots, m \text{ and } j = 1, \dots, n \qquad (1)$$

2nd Step: The values of the criterion are normalized in accordance with benefit-oriented and cost-oriented criteria. The benefit-oriented criteria are normalized using Equation 2, whereas the cost-oriented criteria are normalized using Equation 3.

$$R_{ij} = \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}} \quad (2)$$

$$R_{ij} = \frac{\max x_{ij} - x_{ij}}{\max x_{ij} - \min x_{ij}} \quad (3)$$

3rd Step: In this step, the total weighted comparability sequence (Si) and total power weighted comparability sequence (Pi) matrices for each decision alternative were calculated as shown in equations 4 and 5, respectively.

$$S_i = \sum_{j=1}^n w_j \times r_{ij} \quad (4)$$

$$P_i = \sum_{j=1}^n (r_{ij})^{w_j} \quad (5)$$

4th Step: This stage includes calculating the relative weights of the alternatives using equations 6, 7, and 8.

$$k_{ia} = \frac{p_i + s_i}{\sum_i^m (p_i + s_i)} \quad (6)$$

$$k_{ib} = \frac{s_i}{\min s_i} + \frac{p_i}{\min p_i} \quad (7)$$

$$k_{ic} = \frac{\lambda(s_i) + (1-\lambda)(p_i)}{(\lambda \max s_i + (1-\lambda) \max p_i)}; 0 \leq \lambda \leq 1 \quad (8)$$

The value of λ expressed, $\lambda \in [0,1]$, in Equation 8 is determined by the decision makers and is generally evaluated as 0.5.

5th Step: In the last step, the relative performance values (k_i) indicating the performance ranking of the alternatives are calculated based on three aggregated appraisal scores k_{ia} , k_{ib} , and k_{ic} , as follows:

$$k_i = (k_{ia} \times k_{ib} \times k_{ic})^{1/3} + (k_{ia} + k_{ib} + k_{ic}) \frac{1}{3} \quad (9)$$

While is the value that determines the final ranking of the alternatives, the alternative with the highest value is considered the most successful.

3. RESULTS

The decision matrix consisting of raw data used in the CRITIC and CoCoSo (A Combined Compromise Solution) methods is presented in Table 3. The CRITIC method is an objective approach in which indicator weights are determined using raw data without subjective evaluations. The data used are 2021 data from the “Trading Economics” database. In the first part of this section, calculation steps are given to show the stages of the CRITIC method.

	MIN	MIN	MIN	MIN	MIN	MIN
Countries	C1	C2	C3	C4	C5	C6
Argentina	25	35	21	37,4	20,4	17
Australia	30	45	10	11,5	9,5	2
Brazil	34	27,5	17	39,8	28,8	11
Canada	26,5	33	5	14,38	7,66	6,72
China	25	45	13	39,02	28,52	10,5
France	26,5	45	20	68	45	23
Germany	30	45	19	40,21	19,98	20,23
India	25,17	42,74	18	24	12	12
Indonesia	22	30	10	7,74	5,74	2
Italy	24	43	22	39,49	30	9,49
Japan	30,62	55,97	10	31,52	16,24	15,28
Mexico	30	35	16	9,23	7,58	1,65
Netherlands	25	49,5	21	51,24	23,59	27,65
Russia	20	13	20	30	30	0
Saudi Arabia	20	0	15	22	12	10
Singapore	17	22	7	37	17	20
South Africa	28	45	15	2	1	1
South Korea	25	45	10	19,24	10,11	9,13
Spain	25	47	21	36,25	29,9	6,35
Switzerland	14,93	40	7,7	12,8	6,4	6,4
Turkey	23	40	18	34,5	20,5	14
United Kingdom	19	45	20	27,8	13,8	14
United States	21	37	6,35	15,3	7,65	7,65
MAX	34,0	56,0	22,0	68,0	45,0	27,7
MIN	14,9	0,0	5,0	2,0	1,0	0,0

Since all indicators in the application are cost-oriented, cost normalization process has been applied to all of them. The normalized decision matrix obtained is shown in Table 4.

Table 4. CRITIC Method Normalized Decision Matrix

Countries	C1	C2	C3	C4	C5	C6
Argentina	0,5	0,4	0,1	0,5	0,6	0,4
Australia	0,2	0,2	0,7	0,9	0,8	0,9
Brazil	0,0	0,5	0,3	0,4	0,4	0,6
Canada	0,4	0,4	1,0	0,8	0,8	0,8
China	0,5	0,2	0,5	0,4	0,4	0,6
France	0,4	0,2	0,1	0,0	0,0	0,2
Germany	0,2	0,2	0,2	0,4	0,6	0,3
India	0,5	0,2	0,2	0,7	0,8	0,6
Indonesia	0,6	0,5	0,7	0,9	0,9	0,9
Italy	0,5	0,2	0,0	0,4	0,3	0,7
Japan	0,2	0,0	0,7	0,6	0,7	0,4
Mexico	0,2	0,4	0,4	0,9	0,9	0,9
Netherlands	0,5	0,1	0,1	0,3	0,5	0,0
Russia	0,7	0,8	0,1	0,6	0,3	1,0
Saudi Arabia	0,7	1,0	0,4	0,7	0,8	0,6
Singapore	0,9	0,6	0,9	0,5	0,6	0,3
South Africa	0,3	0,2	0,4	1,0	1,0	1,0
South Korea	0,5	0,2	0,7	0,7	0,8	0,7
Spain	0,5	0,2	0,1	0,5	0,3	0,8
Switzerland	1,0	0,3	0,8	0,8	0,9	0,8
Turkey	0,6	0,3	0,2	0,5	0,6	0,5
United Kingdom	0,8	0,2	0,1	0,6	0,7	0,5
United States	0,7	0,3	0,9	0,8	0,8	0,7

After this stage, correlation coefficients are calculated by using the normalized decision matrix data. The correlation coefficient findings of tax indicators are presented in Table 5.

Table 5. CRITIC Method Correlation Coefficient Results

Criteria	C1	C2	C3	C4	C5	C6
C1	1	0,374300191	0,178549	0,101499	0,138230423	0,013519
C2	0,3743	1	0,096154	0,15976	0,059576967	0,250874
C3	0,178549	0,096153507	1	0,564097	0,614106688	0,299111
C4	0,101499	0,159759592	0,564097	1	0,90786063	0,792967
C5	0,13823	0,059576967	0,614107	0,907861	1	0,464455
C6	0,013519	0,250873784	0,299111	0,792967	0,464455475	1

After the correlation coefficients are calculated, they are subtracted from 1 and “1 -Pjk” values are obtained. The cumulative sums of this obtained value are multiplied by the standard deviation values “ σ_j ” to obtain the “Cj” value. 1-The obtained Pjk, σ_j and Cj results are presented in Table 6.

Table 6. 1-Pjk , σ_j and Cj Values

Criteria	C1	C2	C3	C4	C5	C6
C1	0	0,625699809	0,821451	0,898501	0,861769577	0,986481
C2	0,6257	0	0,903846	0,84024	0,940423033	0,749126
C3	0,821451	0,903846493	0	0,435903	0,385893312	0,700889
C4	0,898501	0,840240408	0,435903	0	0,09213937	0,207033
C5	0,86177	0,940423033	0,385893	0,092139	0	0,535545
C6	0,986481	0,749126216	0,700889	0,207033	0,535544525	0
σ_j	0,244821	0,224545595	0,323829	0,237242	0,244823751	0,268102
C _j	1,026757	0,911506007	1,051792	0,586894	0,689367328	0,852318

In the last step, the wj values are obtained by dividing the Cj values by the total Cj values. The wj values for the indicators that constitute the subject of the research are presented in Table 7.

Criteria	Criteria Codes	Weights
Corporate Tax Rate (%)	C1	0,200592
Personal Income Tax Rate (%)	C2	0,178076
Sales Tax Rate (%)	C3	0,205483
Social Security Rate (%)	C4	0,114658
Social Security Rate For Companies (%)	C5	0,134678
Social Security Rate For Employees (%)	C6	0,166513
	Total	1

When the w_j values representing the importance weights of the criteria shown in Table 9 are examined, the criterion with the highest importance is C3 Sales Tax Rate (%); the criterion with the least importance is C4 Social Security Rate (%).

The first step of the CoCoSo method is the creation of the decision matrix, as in the CRITIC method. In the next step, the criteria are normalized according to the benefit and cost situations. Normalized decision matrix data is presented in Table 8.

	MIN	MIN	MIN	MIN	MIN	MIN
Countries	C1	C2	C3	C4	C5	C6
Argentina	0,5	0,4	0,1	0,5	0,6	0,4
Australia	0,2	0,2	0,7	0,9	0,8	0,9
Brazil	0,0	0,5	0,3	0,4	0,4	0,6
Canada	0,4	0,4	1,0	0,8	0,8	0,8
China	0,5	0,2	0,5	0,4	0,4	0,6
France	0,4	0,2	0,1	0,0	0,0	0,2
Germany	0,2	0,2	0,2	0,4	0,6	0,3
India	0,5	0,2	0,2	0,7	0,8	0,6
Indonesia	0,6	0,5	0,7	0,9	0,9	0,9
Italy	0,5	0,2	0,0	0,4	0,3	0,7
Japan	0,2	0,0	0,7	0,6	0,7	0,4
Mexico	0,2	0,4	0,4	0,9	0,9	0,9
Netherlands	0,5	0,1	0,1	0,3	0,5	0,0
Russia	0,7	0,8	0,1	0,6	0,3	1,0
Saudi Arabia	0,7	1,0	0,4	0,7	0,8	0,6

Singapore	0,9	0,6	0,9	0,5	0,6	0,3
South Africa	0,3	0,2	0,4	1,0	1,0	1,0
South Korea	0,5	0,2	0,7	0,7	0,8	0,7
Spain	0,5	0,2	0,1	0,5	0,3	0,8
Switzerland	1,0	0,3	0,8	0,8	0,9	0,8
Turkey	0,6	0,3	0,2	0,5	0,6	0,5
United Kingdom	0,8	0,2	0,1	0,6	0,7	0,5
United States	0,7	0,3	0,9	0,8	0,8	0,7

After the normalization processes, total weighted comparability (S_i) and total power weighted comparability (P_i) matrices are calculated for each decision alternative. Table 9 shows the results of the total weighted comparability (S_i) matrix.

Table 9. Total Weighted Comparability (S_i) Matrix

Countries	C1	C2	C3	C4	C5	C6	S_i
Argentina	0,0947	0,0667	0,0121	0,0532	0,0753	0,0641	0,3661
Australia	0,0421	0,0349	0,1450	0,0982	0,1087	0,1545	0,5833
Brazil	0,0000	0,0906	0,0604	0,0490	0,0496	0,1003	0,3499
Canada	0,0789	0,0731	0,2055	0,0932	0,1143	0,1260	0,6909
China	0,0947	0,0349	0,1088	0,0503	0,0504	0,1033	0,4424
France	0,0789	0,0349	0,0242	0,0000	0,0000	0,0280	0,1660
Germany	0,0421	0,0349	0,0363	0,0483	0,0766	0,0447	0,2828
India	0,0929	0,0421	0,0483	0,0764	0,1010	0,0942	0,4550
Indonesia	0,1262	0,0826	0,1450	0,1047	0,1202	0,1545	0,7332
Italy	0,1052	0,0413	0,0000	0,0495	0,0459	0,1094	0,3513
Japan	0,0356	0,0000	0,1450	0,0634	0,0880	0,0745	0,4065
Mexico	0,0421	0,0667	0,0725	0,1021	0,1145	0,1566	0,5545
Netherlands	0,0947	0,0206	0,0121	0,0291	0,0655	0,0000	0,2220
Russia	0,1473	0,1367	0,0242	0,0660	0,0459	0,1665	0,5866
Saudi Arabia	0,1473	0,1781	0,0846	0,0799	0,1010	0,1063	0,6972
Singapore	0,1788	0,1081	0,1813	0,0539	0,0857	0,0461	0,6538
South Africa	0,0631	0,0349	0,0846	0,1147	0,1347	0,1605	0,5925
South Korea	0,0947	0,0349	0,1450	0,0847	0,1068	0,1115	0,5776
Spain	0,0947	0,0285	0,0121	0,0552	0,0462	0,1283	0,3649
Switzerland	0,2006	0,0508	0,1728	0,0959	0,1181	0,1280	0,7663
Turkey	0,1157	0,0508	0,0483	0,0582	0,0750	0,0822	0,4303

United Kingdom	0,1578	0,0349	0,0242	0,0698	0,0955	0,0822	0,4644
United States	0,1367	0,0604	0,1892	0,0916	0,1143	0,1204	0,7126

In Table 10, the results of the total power weighted comparability (Pi) matrix are given.

Table 10. Total Power Weighted Comparability (Pi) Matrix

Countries	C1	C2	C3	C4	C5	C6	Pi
Argentina	0,8602	0,8396	0,5587	0,9156	0,9247	0,8531	4,9519
Australia	0,7310	0,7481	0,9309	0,9823	0,9715	0,9876	5,3515
Brazil	0,0000	0,8866	0,7777	0,9071	0,8741	0,9190	4,3645
Canada	0,8293	0,8533	1,0000	0,9765	0,9781	0,9547	5,5919
China	0,8602	0,7481	0,8775	0,9099	0,8761	0,9235	5,1954
France	0,8293	0,7481	0,6442	0,0000	0,0000	0,7432	2,9647
Germany	0,7310	0,7481	0,7002	0,9056	0,9268	0,8033	4,8150
India	0,8569	0,7735	0,7428	0,9546	0,9620	0,9096	5,1993
Indonesia	0,9113	0,8722	0,9309	0,9896	0,9848	0,9876	5,6764
Italy	0,8785	0,7708	0,0000	0,9082	0,8651	0,9324	4,3550
Japan	0,7068	0,0000	0,9309	0,9343	0,9443	0,8746	4,3910
Mexico	0,7310	0,8396	0,8073	0,9868	0,9784	0,9898	5,3330
Netherlands	0,8602	0,6810	0,5587	0,8546	0,9075	0,0000	3,8619
Russia	0,9399	0,9540	0,6442	0,9387	0,8651	1,0000	5,3419
Saudi Arabia	0,9399	1,0000	0,8333	0,9595	0,9620	0,9280	5,6226
Singapore	0,9772	0,9149	0,9746	0,9170	0,9409	0,8074	5,5321
South Africa	0,7930	0,7481	0,8333	1,0000	1,0000	0,9939	5,3683
South Korea	0,8602	0,7481	0,9309	0,9659	0,9692	0,9354	5,4098
Spain	0,8602	0,7218	0,5587	0,9195	0,8659	0,9575	4,8835
Switzerland	1,0000	0,7999	0,9651	0,9797	0,9825	0,9571	5,6843
Turkey	0,8955	0,7999	0,7428	0,9252	0,9242	0,8891	5,1766
United Kingdom	0,9530	0,7481	0,6442	0,9447	0,9548	0,8891	5,1339
United States	0,9260	0,8248	0,9831	0,9745	0,9782	0,9475	5,6341

In the third step, the relative weights of the alternatives were calculated using the data shown in Tables 9 and 10. In the fourth and final step, performance scores

(ki) were calculated for each decision alternative. The obtained results are presented in Table 11.

Table 11. CoCoSo Method Ranking and Performance Scores (ki)					
Countries	k_a	k_b	k_c	k	Final Ranks
Argentina	0,0108	5.317	0,8244	1,773	16
Australia	0,0123	5.934	0,9200	1,979	9
Brazil	0,0098	4.714	0,7308	1,572	20
Canada	0,0129	6.282	0,9740	2,095	5
China	0,0117	5.637	0,8740	1,880	13
France	0,0069	3.113	0,4853	1,044	23
Germany	0,0103	5.097	0,7903	1,700	18
India	0,0116	5.654	0,8766	1,886	12
Indonesia	0,0132	6.409	0,9936	2,137	2
Italy	0,0097	4.706	0,7296	1,569	21
Japan	0,0101	4.797	0,7437	1,600	19
Mexico	0,0122	5.887	0,9127	1,963	11
Netherlands	0,0073	4.084	0,6331	1,362	22
Russia	0,0122	5.928	0,9191	1,977	10
Saudi Arabia	0,0128	6.319	0,9797	2,108	4
Singapore	0,0124	6.186	0,9590	2,063	6
South Africa	0,0124	5.961	0,9241	1,988	8
South Korea	0,0123	5.987	0,9282	1,997	7
Spain	0,0109	5.248	0,8136	1,750	17
Switzerland	0,0132	6.641	1	2,151	1
Turkey	0,0115	5.607	0,8692	1,870	14
United Kingdom	0,0114	5.598	0,8679	1,867	15
United States	0,0130	6.346	0,9839	2,117	3

4. DISCUSSION AND CONCLUSION

Taxation emerges as a transmission mechanism so that states can fulfill their responsibilities towards their citizens socially. Theoretically, it is accepted that states should act with equal responsibility towards every citizen. The ability of each of the citizens of a country, especially the lower income group, to benefit from basic public services requires the financing of these public services. Providing the op-

opportunities of the upper income group mainly to the citizens of the lower income group can only be possible if the state transfers some resources, which it collects as taxes from the upper income group, to the citizens of the lower income group as a public service. Thus, it is ensured that opportunities such as basic health and education are available to all citizens and that the social structure is maintained in a healthy and social way. In other words, taxation constitutes the most important dimension of this transmission mechanism.

Political powers shape their partition policies in the country according to their worldviews. The most effective way of ensuring the standards that the political powers want to apply regarding the distribution is again through taxation. While left-wing governments would prefer to apply progressive taxes by emphasizing justice in the division, right-wing governments would prefer to shape their tax policies to ensure efficiency or to use taxation as a policy tool at least. The trade-off balance between efficiency and fairness in distribution will be adjusted by the political powers in a way that best suits their worldview and approach to the economy. Taxation policy plays the most important role in the adjustment of this balance in the direction of the desired result.

The importance of taxation raises the question of the importance of the strength and effectiveness of the structure of the tax system. As long as the tax system in a country is healthy, the aims that are tried to be achieved through taxation in that country can be reached directly. However, modern world economies, especially after the globalization and neo-liberalism movements that became widespread after 1980, have turned into living structures that interact with the environment and try to adapt to the ever-changing environments. It is possible to give appropriate reactions to the changes that occur in the environments in which these structures are located, with a carefully and meticulously prepared, determined and accepted fiscal policy and the tax system that is a part of it. Tax systems should be reviewed and restructured over time in order to adapt the economies to the changing conditions of the dynamic global economy and to protect the balance of social structures. In this respect, tax revisions and tax reforms are a subject that states have been paying attention to recently. Tax reforms maintain their importance in order to reach future goals as well as lessons learned from past experiences. In this context, it is seen that the G20 countries also focus on joint work on this issue.

When the results are evaluated, the countries with the best score according to the 6 tax rates included in the study with the data of 2021 are as follows: Switzerland, Indonesia, United States, Saudi Arabia and Canada. The final results show that Switzerland is the country that offers the best individual and corporate taxation environment among the countries evaluated in terms of tax rates.

When the indicator values are reviewed, Switzerland does not have the best ratios in all indicators. Despite this, as a result of a holistic evaluation made with multi-criteria decision-making methods, Switzerland provides a better business and living environment for individuals and corporations in terms of the tax environment it provides. In addition, Indonesia and the USA also have a final performance score close to Switzerland. Since Switzerland and even Singapore, which is ranked 6th, are among the countries that are described as tax havens, their place in the ranking is not surprising. In this way, these countries become the tax avoidance point of a significant amount of individuals and corporations. Companies continue to employ legal loopholes to move profits away from native tax systems, as shown by the fact that just eleven nations absorb about €532 billion in profits, as stated in many researches. According to the reports, 92% of unlawfully transferred wealth is concentrated in just 11 tax havens, six of which are in Europe.

Italy, Netherlands and France, which are among the oldest members of the EU, are the 3 countries at the bottom of the ranking according to the results of the study. It is understood from this situation that these countries keep their tax policies stricter than other countries and tax remains a very important expense for citizens and corporations. Heavy taxation policies, which are an important obstacle to the increase of the welfare of the people, make the lives of those with low income and fixed income difficult.

It is very important for the G20 countries to implement the rates and issues they have agreed on in order to set an example for other countries. G20 countries, which are of great importance in terms of the global economic and financial system, account for approximately 80% of the global gross product; it represents more than 75% of global trade and 60% of the world's population.

When the literature is reviewed, it is seen that there is a lack of studies comparing and evaluating the countries with MCDM in terms of existing tax rates, as in this study. It is expected that the increase in such studies will contribute to the continuation of the interest in this subject and to follow the development of the policies of the countries. While the G20 countries agreed on corporate taxes and their rates on October 8, 2021 and promised to implement them and similar reforms are expected, this study is also important as a resource in terms of determining and evaluating the current situation.

According to the results, when Turkey is counted as a European country, seven of the last ten countries such as Turkey, United Kingdom, Spain, Germany, Italy, Netherlands and France are European countries. South Korea, South Africa, Australia, Russia, Mexico, India and China have scores closer to the top countries

than the countries at the bottom of the list in terms of the scores they obtained from the evaluation made with MCDM methods in terms of relevant tax indicators. India, China, Turkey and United Kingdom have very close values to each other in terms of final evaluation scores.

The CoCoSo (Combined Compromise Solution) method used in the study is a fairly new multi-criteria decision making method. At the same time, the application of the CRITIC (CRiteria Importance Through Inter-criteria Correlation) method, which is one of the objective weighting methods, has become very popular. Both the recognition of the method and the fact that MCDM methods are not sufficiently utilized in an important social issue such as tax has led to this method being preferred. As emphasized in the literature review section in the introduction part of the study and in many other studies, the CoCoSo (Combined Compromise Solution) method and the CRITIC-based CoCoSo method are quite consistent with the results of other methods and have an accepted calculation basis. This approach is an integrated method, which is a summary of the compromise solutions of the exponentially weighted product and the simple additive weighted product model.

The limitation of the study is that the indicator weights can be different when the indicator data in the study are analyzed with similar objective weighting methods such as Entropy or subjective MCDM weighting methods such as ANP and AHP. Even if the same weight values are used, the rankings may change slightly when other MCDM methods such as TOPSIS, VIKOR, MOORA are used instead of CoCoSo. However, as stated earlier in the study, it is understood that the rankings are very consistent in comparative applications with CoCoSo and other MCDM methods. Therefore, researchers are expected to compare this study with the analysis results of other MCDM or different methods in the future.

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