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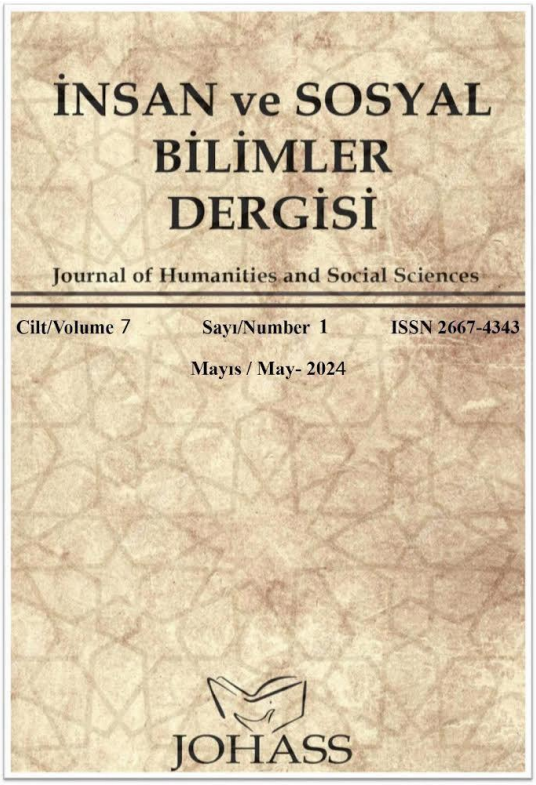

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Comparative Analysis of Higher Education Financing Policies Used by OECD Member Countries and Financing Policy Proposal for Türkiye

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Abstract

The Turkish higher education system has developed remarkably in parallel with the developments and changes in the world today. With the ease of access to higher education for students and the increase in the number of students, higher education costs are increasing. This situation puts the higher education system under financial pressure in countries that provide higher education financing from public sources. In this study, higher education financing methods used worldwide are compared and the most appropriate financing method for Türkiye is discussed. For this purpose, the Entropy method was used in weighting the criteria determined for the evaluation of financing policies, and the performance analysis of the alternatives was carried out with the TOPSIS method, which is one of the multi-criteria decision-making methods. Alternative decision options for financing higher education are based on "No Fee", "Pre-charging" and "Income-Contingent Loan-ICL" methods and the main criteria are enrollment, education expenditures and labor force. In this context, sub-criteria were created and the financing methods used by OECD countries were analyzed. Within the scope of the study, it has been determined that the financing methods used by Norway, the Netherlands and the United Kingdom in higher education systems are in the top three. In this context, it has been determined that the "Income-Contingent Loan" method used by the first and third ranked countries is the most preferred method in terms of performance.

Keywords: Higher education, financing, TOPSIS, ICL

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Introduction

Education is seen as consumption in the sense that it provides immediate benefits on the one hand and investment in the sense that it determines the future production and earning capacity of the individual on the other (Gölpek, 2013, 43). The expansionary and diversification policies used by countries differentiate higher education, which is the highest level of education (Martin, 2016, 351).

Countries are faced with the issue of financing higher education in line with the increasing demand and costs of higher education and are looking for solutions to these problems. In general, the increase in demand leads to a rapid increase in the number of institutions and students, but developing countries do not have the means to meet these costs because they do not have enough resources. Therefore, there is a need for changes in education financing policies or models, especially in these countries.

As in economic activities, the costs incurred in providing education services reflect the relationship between the factors of production and the product. However, the concept of costs in educational services is quite different from the costs incurred in the production of general economic goods and services.

The value of resources consumed in the production of education is the cost of education. The cost of education consists of social and private (personal) costs (Xia et al. 2022, 1). The social cost of higher education is that countries invest more in higher education. Another social cost is the cost to society resulting from the fact that university graduates do not participate in the labor market during their studies (Özekicioğlu, 2013, 15). Apart from the tuition fees charged to higher education students, other financial and administrative costs increase in parallel with the increase in the number of higher education students (Jongbloed, 2004; Özekicioğlu, 2013). Private costs include the expenditures made by the individual in the process, starting before becoming a higher education student, and the costs after becoming a higher education student (Özekicioğlu, 2013, 15). The cost of education to society consists of public and private education expenditures and alternative/opportunity/avoidance costs.

Considering the costs of higher education, there have been major changes and developments in the provision of higher education before and after 1980. Higher education service, which is offered "free of charge" by many countries in consideration of social returns (YÖK, 2007, 57- 60), has been implemented in Türkiye under the name of tuition/tuition fee/student contribution in small amounts of 5-10% of the current costs in order for students to share the cost.

External shocks, such as policy decisions and demographic shifts, can affect government spending, as was the case during the 2008 financial crisis and the COVID-19 pandemic. Despite the potential benefits of budget cuts during these periods for productivity and economic vitality, they can affect the quality of publicly provided education, especially at times when the gains from investment in education, which are important for supporting economic development, come to the fore (OECD, 2023, 319). An increase in inflation significantly affects the costs and quality of higher education provision.

The increasing costs of higher education and who should bear these costs are among the most debated issues today. The reason for these debates stems from the social and personal returns generated by higher education. Countries have developed and implemented unique strategies to reduce the costs of higher education and the burden on public resources (Vossensteyn, 2000,56).

The issue of financing the provision of higher education services is complex and broad (Johnstone, 2009, 347). The policy of the state towards higher education varies in terms of the supply or financing of the service (Özekicioğlu, 2013,15). The methods used by states in financing higher education can be grouped under two main headings: "Public resources" and "Private Resources".

Two main situations are encountered in financing with public resources. The first one is the "Tax Financing Method", in which the costs are financed by the public sector through tax revenues, taking into account the social benefits generated by higher education services. The second method is the "Voucher Method" or the "Education Voucher" method. The voucher financing method is based on the principle that instead of transferring the taxes collected by society directly to higher education institutions for students and their families, funds are given directly to the people who benefit from the service (Aydın, 2014,31). It ensures that the resources allocated to each student are used at the initiative of students and parents through "school vouchers" or "education vouchers" (Özekicioğlu, 2013, 28). It is made within the framework of a protocol that includes the desired features of education and is based on the principle of leaving decision-making to the student.

In the case of financing with private resources, it is categorized under three main headings. The first one is "Tuition Fee Financing", which is applied as a mixed method. In this method, the state and higher education students share the costs incurred, but students pay a very small amount of the cost (Jongbloed, 2004; Özekicioğlu, 2013). The second method is the "Scholarship Financing Method". Scholarships are provided free of charge to students by both the public and private sectors and are widely used around the world (Akça, 2012, 100-

101). The third method is the "Financing by Borrowing Method". It aims to cover the costs incurred by the student receiving higher education services and is a method that has become more and more widespread especially in recent years. In general, higher education institutions either collect the costs from the recipient of the service as "Pre-charging" (Ergen, 2006, 137) or, with the "Income-Based Borrowing" method, collect higher education costs as a tax deduction in the form of a certain percentage of earnings if the individual reaches a certain income threshold in his/her earnings after graduation.

Between 2019 and 2020, most OECD countries experienced an increase in government spending, particularly on education. The increase in total government spending during the COVID-19 pandemic can be attributed to measures such as fiscal stimulus and health interventions. Investments in education, such as the development of distance learning infrastructure, contributed to the overall increase. Some countries, such as Brazil, Chile, Costa Rica, Hungary and Türkiye, experienced a 5% decrease in public spending on education between 2019 and 2020. Türkiye was the only country where total public spending decreased during this period (OECD, 2023, 320).

In this study, the higher education financing policies used by OECD member countries were investigated, and the TOPSIS methodology was used to analyze the higher education financing plans used in member countries and evaluate their performance. As a result of the data obtained in this study, recommendations were made to be used in the financing of Turkish higher education.

Student Loan Programs

The need for student borrowing programs stems from the rising costs of higher education. This cost often exceeds what students and their families can afford. Therefore, students need to borrow to cover tuition, living expenses and housing costs (Jiménez and Glater, 2020, 131).

In order to ensure access to higher education for low-income students, there is a need for a publicly supported student borrowing program. Borrowing can theoretically provide an important resource to support higher education.

It is assumed that countries have several options on how to finance higher education. The first is the use of public subsidies for higher education costs. The second option is to use some kind of charging policy to collect a certain portion of the cost of higher education from the student, such as contributions/fees etc., and to provide the remaining portion through public subsidies. However, it should be noted that not all higher education costs are covered

by public resources. When these assumptions are taken into account in the financing of higher education in countries, the main question addressed should be "What kind of state aid should be provided to prospective students who cannot pay" (Chapman and Ryan, 2002, 1). It becomes an important problem how the higher education pricing policy should be for high income and low income students in countries.

There are two types of borrowing in higher education. First, "Traditional mortgage type borrowing" is a borrowing program that allows individuals who receive higher education services to repay their loans after graduation within a predetermined fixed plan (Woodhall and Richards, 2008, 189). This type of borrowing is the first form of the higher education borrowing system and is offered to students by commercial banks or state banks and backed by the state. Repayments are predetermined on a fixed schedule (Chapman, 2014, 29). Repayments can start with a small amount and gradually increase, and the interest rate can be fixed or variable (Johnstone, 2005, 10). In addition, this type of borrowing covers both tuition fees and living expenses. The second one is "Income-Contingent Loan - ICL". In this method, the amount borrowed by individuals receiving higher education services for the cost of this service is based on their earnings after graduation. It is a borrowing program where repayments are made through the income tax system.

The importance of effective governance in ensuring the viability and successful implementation of ICLs has been emphasized by various scholars (Britton et al., 2019; Chapman, 2014; Woodhall, 2007; Shen and Ziderman, 2009; Chapman and Ryan, 2002; Johnstone 2009; Benjamin et al., 2019; Gölpek, 2013). Scholars argue that borrowing programs are not only a technical issue but also require efficient political strategies in addition to administrative procedures in restructuring the financing of higher education.

Two leading economists today, Bruce Chapman in Australia and Nicholas Barr in the UK, have been pivotal in convincing governments of the viability of income-based repayment plans for student loans. They are advocates of Income-Contingent Loans (ICL). Chapman's positive assessment of the Higher Education Contribution Scheme (HECS) in Australia was complemented by Barr's effective and efficient work in the UK. They have been influential in many countries, providing advisory services to the World Bank, various organizations and governments interested in adopting ICLs (Woodhall, 2007, 33-34).

Higher Education Loan Programs Used by Countries

United States of America

The higher education system used by the United States of America (USA) is among the best in the world (Tulip, 2007, 1). The amounts of higher education fees vary depending on the dynamics of supply and demand for higher education institutions (Dezhina & Nafikova, 2019, 24).

About 70% of college students in the United States take out loans to pay for their college education (Despard et al., 2016; Mbah et al., 2020; Mbah, 2021). While 43% of the income of public higher education institutions is covered by funds allocated from the national budget, 93% of the income of private for-profit higher education institutions is covered by fees charged to students. In order to cover the costs of higher education, students are offered two different borrowing programs: Federal and Private borrowing programs.

For the 2023-2024 academic year (annually), undergraduate students can borrow between $5,500 and $12,500 and graduate students can borrow $20,500 (URL-1). As of 2023, 43 million higher education students in the United States owe over 1.6 trillion dollars. The government offers both a fixed-payment and an income-driven repayment plan, known as Income Driven Repayment (IDR), for borrowers to repay their debts. Repayments can be made at rates ranging from 10% to 15% of annual earnings with the income-driven repayment plan option or 10, 25, and 30 years with the fixed repayment plan option (Murto, 2024, 1-2).

Australia

The Higher Education Support Act was enacted in 2003 and formed the basis of the current system of higher education implementation policies used until today. Since 2005, it has been called HECS-HELP (Higher Education Contribution Scheme- Higher Education Loan Program) (Australian Government, 2024, 1).

The amount of borrowing offered to students by the Australian government varies according to the academic program they are enrolled in. As of 2023-2024, student borrowing ranges from A$4,124 to A$15,142 per year. If a graduate's income for 2023-2024 is below A$51,550, there is no deduction from earnings unless they exceed the income threshold. If the graduate's annual earnings are above A$51,550, a 1% deduction will be made to collect the repayment. If annual earnings are $151,201 or more, a 10% tax deduction is applied (Australian Government, 2024, 1). The annual income threshold and upper payment threshold amounts are determined each year by the Australian Taxation Office (ATO) (ATO, 2024).

Germany

Student loans are regulated by the "Bundesausbildungsförderungsgesetz" (Federal Education Assistance Act) and are referred to as 'BAföG' loans. BAföG loans are means-tested, especially for borrowing for living expenses, and eligibility depends on parental income (Grave and Sinning, 2014, 112-113).

Financial support for living and care expenses is provided to students according to the Federal Education Assistance Act (BAföG). For the fall semester 2022 and onwards, if the student lives with his/her family, a total of 633 € is provided, including 511 € for basic needs, 94 € for health insurance and 28 € for care insurance. If he/she is far away from his/her family, a total of €934 is provided, including €812 for basic needs, €94 for health insurance and €28 for care insurance.

The repayment starts after the end of the maximum funding period of five years (BAföG, 2024, art. 17). For example, if students receive BAföG funding of €30,000 during their studies, approximately €20,000 is not repaid (URL-2). Here, half of the loan is in the form of a grant and the other half in the form of an interest-free state loan, and the loan part is the debt that must be repaid. In other words, the €15,000 part has to be paid by the borrower. However, since there is an upper limit of €10,010 on the repayment amount, €4,990 more is received. The amounts that the student can receive during the education period vary depending on the student and the family's asset income. As a result, only €10,010 must be repaid in a minimum of €130 and a maximum of 77 installments (BAföG, 2024, art. 17).

According to Article 18(a) of the Federal Education Assistance Act (BAföG), repayments can be made "income-dependent". Under this repayment option, the student is exempt from repayment if his/her monthly income is not more than €1,000. If the monthly income is €1,605, the payment starts at €42 and increases as the income increases.

United Kingdom

In 1989, the Student Loan Company (SLC) was established in the UK. Classified as a non-profit and state-run organization, it operates independently of the Ministry of Education and offers financial assistance to students in higher education in the form of scholarships and loans. Loans cover both living expenses and tuition costs (SLC, 2024a).

As of the 2023-2024 academic year, students can borrow between £4,221 and £13,348 for undergraduates and between £12,167 and £28,673 for postgraduates (SLC, 2024b).

Repayments are based on income and are implemented as "plans" with specified repayment thresholds and repayment amounts. The annual income thresholds for these plans

are as follows: "Plan1- £22,015, Plan2- £27,295, Plan4- £27,660, Plan5- £25,000, and the repayment threshold for graduate borrowing is £21,00 (SLC, 2024c). In this context, a certain percentage of the income generated is paid over the income threshold according to the type of borrowing. The income threshold for plans is different for each plan type.

Japan

The Japan Student Services Organization (JASSO) was established in 2004 as a core institution to comprehensively implement various student support services for higher education in Japan (JASSO, 2022, 2).

JASSO provides financial support to its citizens for students studying in all academic programs. Students in need of financial support are provided with interest-free loans, referred to as Category 1, and interest-bearing loans, referred to as Category 2.

Borrowing amounts offered to students in the 2022-2023 academic year (JASSO, 2022, 8-10);

-Category 1 has 48-month fixed payments ranging from ¥20,000 to ¥64,000, with repayments ranging from 120 to 216 months depending on the amount borrowed and the university.

-Category 2 pays a fixed amount of ¥20,000 to ¥120,000 for 48 months, with repayments ranging from 120 to 240 months. Repayment can be made on demand, either as a fixed plan or income-dependent.

Türkiye

The Higher Education Credit and Dormitory Institution (KYK) in Türkiye offers students access to financial assistance for living expenses. These funds, known as "tuition loans", are specifically designed for living expenses and do not cover tuition fees. The aim of this lending initiative is to provide financial support to students to help cover some of their living costs. Borrowing amounts are disbursed monthly to students throughout their academic program, and enrolling in a higher education institution is a prerequisite for accessing these loans.

The General Directorate of Credit and Dormitories has been providing student loans since 1962 in accordance with the Law No. 351 on Higher Education Credit and Dormitories Institution, contribution loans between 1985 and 2012 in accordance with the Higher Education Law No. 2547, and scholarships since 2004 in accordance with the Law No. 5102 on Granting Scholarships and Loans to Higher Education Students (KYK, 2024a).

In Article 46 of Law No. 2547, the heading "current service cost" covers all amounts charged to students, and the amounts charged to students for second (night) education and distance education are called "tuition fee" and the amounts charged to regular (first) education students are defined as "contribution fee". In line with the Decree of the Council of Ministers No. 2012/3584, the contribution loan offered by the Credit and Dormitories Institution exclusively to regular education students has been abolished as of the 2012-2013 academic year.

The borrowing amounts (monthly) offered to students in the 2023-2024 academic year are 2,000 TL for Bachelor's, 4,000 TL for Master's and 4,000 TL for PhD (KYK, 2024b). Repayments begin two years after graduation, with a fixed payment.

Method

In this study, Entropy method was used to calculate the criteria weights and TOPSIS method, one of the multi-criteria decision making methods, was used for the performance ranking of countries' financing policies. Brief information about the stages and processes for the application of these methods is given.

Entropy

The entropy method was developed by Rudolph in 1865 in the field of thermodynamics, followed by the concept of information entropy by Claude E. Shannon in 1948 (Zhang et al., 2011, 445). The entropy method, which is used to determine the importance of criteria, is a method in which the weights of the criteria in a multi-criteria decision problem (MCDM) are calculated by considering the data without creating a hierarchical structure in the decision problem. It is an objective evaluation method (Karaatlı, 2016, 66). It consists of five stages. These process steps are given below;

Phase 1: A decision Matrix $\boldsymbol{A}_{ij} = [a_{ij}]$is created, with rows representing alternatives and columns representing evaluation criteria.

Phase 2: In order to eliminate the effects of each index, which are different from each other in the created decision matrix, on the inequalities, the indexes are normalized using different techniques. The index created according to the benefit criteria is normalized using equation (1); $\boldsymbol{r_{ij}=a_{ij}/max_{ij}}$ *(i=1…..m; j=1….n)*.The index created according to the cost

criteria is normalized using equation (2); $\boldsymbol{r_{ij}=min_{ij}/a_{ij}}$ *(i=1…m; j=1….n)*. The values after normalization are represented in the matrix R= $[\boldsymbol{r_{ij}}]_{\boldsymbol{mxn}}$

Phase 3: The entropy value for each criterion is calculated by equation (3);

$e_j = -k\sum_{j=1}^{n} r_{ij}.\ln(r_j)$, *(i=1…..m; j=1….n).*

In this step, ln is the natural logarithm; k=1/ln(m) is a fixed number calculated from $0 \leq e_{ij} \leq 1$.

Phase 4: The degree of differentiation of knowledge is calculated by equation (4); d_j=1-e_j , *(i=1…..m; j=1….n).*

Phase 5: Entropy criterion weights are calculated using equation (5);

$W_j = \frac{d_j}{\sum_{i=1}^{n} d_j}$, $\sum_{j=1}^{n} W_j$=1 (J=1,…n) (5)

The obtained W_j shows the degree of utility of the criteria and it is concluded that the criterion with the maximum entropy value is the best decision option.

TOPSIS Method

TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) method (Agrawal et al., 1991; Cheng et al., 2003; Chen, 2000; Monjezi et al., 2012), which is the most widely used by researchers in multi-criteria decision making methods, was developed by Hwang and Yon (1981). This method allows the selection of the best alternative among alternative decision options by determining the decision option that is closest to the positive ideal solution and farthest from the negative ideal solution (Jee and Kang, 2000; Kim et al., 1997; Wang and Elhag 2005; Monjezi et al., 2012).

The stages used in the TOPSIS method are as follows;

Phase 1: A decision Matrix $\boldsymbol{A_{ij}} = [a_{ij}]$is created, with rows representing alternatives and columns representing evaluation criteria.

Phase 2: The decision matrix is normalized using equation (6);

$r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^{m} a_{kj}^2}}$, *(i=1…..m; j=1….n)* $\boldsymbol{R_{ij}}=[r_{ij}]$.

Phase 3: At this phase, the values of the decision matrix are weighted according to the importance given to the criteria and a weighted decision matrix (V) is formed. The weight value is determined according to the importance given to the criterion ($\sum_{i=1}^{n} W_i$=1). The column values of the normalized decision matrix are multiplied by W_i to obtain the V matrix. Equation (7);

$V_{ij}=w_j.r_{ij}$, *(i=1.....m; j=1....n)* $V_{ij}=\begin{bmatrix} w_1r_{11} & w_2r_{12} & \dots & w_nr_{1n} \\ w_1r_{21} & w_2r_{22} & \dots & w_3r_{2n} \\ . & . & \dots & . \\ . & . & \dots & . \\ w_1r_{m1} & w_2r_{m2} & \dots & w_nr_{mn} \end{bmatrix}$

Phase 4: At this phase, positive ideal (A^*) and negative ideal (A^-) solutions are created. The best performing values of the weighted normalized decision matrix represent the ideal solutions, while the worst performing values represent the negative ideal solutions.

The construction of an ideal solution set is shown in the following equation.

$A^*=\{ max_i v_{ij} \mid j\in J).(min_i v_{ij} \mid j\in J'\}$ data set to be obtained from the equations;

It is $A^*=\{v_1^*, v_2^*, \dots\dots\dots, v_n^*\}$ *(8)*

The negative ideal solution is;

$A^-=\{ min_i v_{ij} \mid j\in J).(max_i v_{ij} \mid j\in J'\}$ data set to be obtained from the equations;

It is $A^-=\{v_1^-, v_2^-, \dots\dots\dots, v_n^-\}$. *(9)*

Phase 5: Discrimination criteria are calculated using the Euclidean Distance Approach.

The distance of each decision option from the ideal solution;

$$S^* = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_i^*)^2} \qquad i=1....m. \qquad (10)$$

The distance of each decision option from the negative ideal solution;

$$S^- = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_i^-)^2} \qquad i=1....m. \qquad (11)$$

Phase 6: Calculating the closeness of decision alternatives to the ideal solution is shown in the equation below.

$$C_i^* = \frac{s_i^-}{s_i^- + s_i^*} \qquad i=1....m. \qquad (12)$$

This approach is the ratio of the negative discrimination measure included in the total discrimination measure calculated. According to the approach, the C_i^* value is in the range $0 \leq C_i^* \leq 1$, and $C_i^*= 1$ means that the decision alternative is at the positive ideal point, while $C_i^*=0$ means that the decision alternative is at the negative ideal solution point.

In this study, the performance of the financing methods currently used by the member countries of the Organization for Economic Co-operation and Development (OECD) in their higher education systems was analyzed using Entropy and TOPSIS multi-criteria decision-making methods. As a result of the data obtained, suggestions were made for the use of the higher education financing method used by the countries with the highest performance in Türkiye.

Data and Data Limitations of the Research

The data set of this study consists of information on OECD countries and the criteria used. The higher education financing methods used by these countries between the years 2016-2020 and the criteria that are determined as important in the higher education system and indicating the success of the system were collected from the data published by the OECD and The World Bank Organization. The arithmetic average of the countries whose data could not be obtained in the relevant years was calculated according to the years for which data were available, and the average data for five years were tried to be obtained.

A total of 42 countries, including 38 OECD official members, 1 candidate country, 2 important partner countries and the Russian Federation, were included in this study. Argentina, a candidate country, is included in the study, while Bulgaria, Brazil, Croatia, Peru and Romania are excluded due to lack of data. China and South Africa are important partners of the OECD and both are included in the study.

Information on the financing practices currently used by OECD countries in the higher education system is presented in Table 1.

Table 1

Higher Education Financing Practices Used in OECD countries

Higher Education Financing Implementation	**Countries**
No Tuition Fee	Argentina, Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Iceland, Ireland, Italy, Netherlands, Slovakia, Slovenia, Spain, Switzerland, Türkiye, Lithuania, Luxembourg, Latvia, Costa Rica, Colombia, Poland, Romania, Romania, Estonia, Switzerland, Türkiye
Income-Contingent Borrowing	Australia, Chile, Israel, New Zealand, Norway, South Africa, Sweden, United Kingdom
Pre-charge	Canada, China, Japan, South Korea, Mexico, Portugal, Portugal, United States of America

Criteria Used in the Study

In order to select the method with the highest performance among the financing methods used by the countries, a total of 9 criteria, 3 main criteria, each consisting of 3 sub-criteria, published in the OECD and World Bank statistical databases, were determined.

In the study, the main criteria and sub-criteria for comparing the financing methods used by the countries were selected from the issues that are directly related to the higher

education financing policies used by the countries. In the analysis, the definitions of the sub-criteria are coded as "K". The main criteria and sub-criteria are coded as "Enrollment (K1,K2,K3)", "Education Expenditures (K4,K5,K6)" and "Employment (K7,K8,K9)". In the research, the cost criteria were selected as "K7" and "K8" and the other criteria were selected as benefit criteria. The main criteria and sub-criteria of the main criteria to be used in this research are presented in detail in Table 2.

Table 2

Main and Sub-criteria

Main Criteria	**Sub-criteria**	**KODU**
Enrollment	Percentage of adults with tertiary education	K1
	Percentage of university-age population enrolled in higher education	K2
	University enrollments per capita	K3
Education Expenditures	Public expenditure per higher education student as a share of Gross Domestic Product (GDP) per capita	K4
	Total Expenditure on education as a percentage of GDP	K5
	Ratio of total education expenditures to public expenditures	K6
Employment	Total Unemployment rate	K7
	Ratio of unemployed university graduates to total population	K8
	Ratio of university graduates with a job to total population	K9

Findings

For the purpose of the study, Entropy method was used to find the weights of the criteria and TOPSIS method was used for performance analysis and the following findings were obtained.

Entropy Findings

Entropy Decision Matrix

Table 3

Country Data for The Criteria (Entropy Initial Decision Matrix (A Matrix))

	Countries	Years *	K1	K2	K3	K4	K5	K6	K7	K8	K9
No Tuition Fee	Argentina	Avg	28.54	83.13	91.05	16.50	5.18	12.92	9.72	3.61	85.18
	Austria	Avg	32.89	87.19	85.41	36.23	5.35	13.54	5.24	3.07	86.28
	Belgium	Avg	40.30	98.13	78.65	32.26	6.42	12.25	6.36	3.36	85.82
	Czech Republic	Avg	24.04	94.95	64.29	20.34	4.54	11.42	2.73	1.34	86.23

Income-Contingent Borrowing	Denmark	Avg	39.12	91.03	81.17	43.12	7.75	15.34	5.52	4.27	86.76
	Finland	Avg	45.38	95.98	89.59	33.93	6.49	11.98	7.85	4.52	85.61
	France	Avg	36.86	92.78	66.60	31.62	5.43	9.69	8.98	4.77	85.12
	Germany	Avg	29.42	92.30	70.92	33.58	4.90	11.06	3.64	2.08	88.77
	Greece	Avg	31.53	93.53	139.88	11.19	3.53	7.30	19.59	13.94	73.55
	Hungary	Avg	25.21	87.66	49.82	25.40	4.62	9.96	4.13	1.51	85.52
	Iceland	Avg	39.80	89.25	74.03	27.31	7.53	16.75	3.48	2.62	90.62
	Ireland	Avg	46.99	98.81	76.95	15.54	3.52	13.20	6.28	6.27	84.51
	Italy	Avg	19.10	92.60	63.30	24.32	4.03	8.29	10.52	5.85	80.70
	Netherlands	Avg	38.91	96.99	84.14	35.77	5.26	12.71	4.38	2.57	89.21
	Slovakia	Avg	24.44	88.43	46.55	27.60	3.94	9.40	7.36	3.42	82.51
	Slovenia	Avg	33.33	96.67	77.85	24.32	4.83	10.86	5.82	4.20	88.27
	Spain	Avg	37.52	89.94	89.59	21.81	4.20	10.07	16.35	9.27	80.85
	Switzerland	Avg	43.45	91.21	60.57	37.40	4.91	15.45	4.73	3.49	88.74
	Türkiye	Avg	20.53	80.01	114.13	35.28	4.29	12.41	11.87	9.88	74.54
	Lithuania	Avg	41.79	98.86	72.31	17.99	3.90	11.84	7.17	2.99	90.77
	Luxembourg	Avg	46.01	82.72	18.93	42.75	3.61	8.58	5.95	4.01	85.65
	Latvia	Avg	34.94	96.39	89.13	23.37	4.42	12.00	8.04	4.00	87.96
	Costa Rica	Avg	23.75	63.00	55.78	37.61	6.85	25.15	11.05	6.68	80.26
	Colombia	Avg	23.31	54.86	55.55	20.91	4.49	14.34	10.33	10.15	80.62
	Poland	Avg	30.89	95.70	68.16	25.41	4.60	11.16	4.27	2.11	88.50
	Estonia	Avg	40.63	93.67	71.26	36.92	5.10	13.08	5.83	3.57	85.49
	Australia	Avg	46.26	94.14	114.46	17.82	5.16	13.63	5.64	3.47	83.52
	Chile	Avg	25.17	92.16	89.91	20.12	5.39	21.28	7.88	5.62	82.25
	Israel	Avg	50.28	91.78	62.51	18.18	6.04	15.55	4.23	3.00	87.29
	New Zealand	Avg	38.50	88.87	81.77	25.25	6.23	16.52	4.58	2.38	88.03
	Norway	Avg	43.84	93.28	82.19	39.82	7.86	15.80	4.15	2.43	89.06
	South Africa	Avg	15.27	80.35	22.73	47.40	6.31	18.96	27.64	11.40	77.43
	Sweden	Avg	42.98	99.20	70.08	43.24	7.60	15.66	7.04	3.85	89.69
	United Kingdom	Avg	46.77	93.15	61.39	37.99	5.36	13.52	4.22	2.38	85.93
Pre-charge	Russia	Avg	55.50	91.94	83.38	19.82	4.37	12.93	5.14	3.10	82.44
	Canada	Avg	58.04	82.99	70.29	31.44	5.26	12.21	6.86	4.87	81.90
	China	Avg	9.68	58.00	51.97	20.12	3.66	11.96	4.28	3.92	91.67
	Japan	Avg	51.64	94.50	63.83	20.60	3.12	9.95	2.70	2.10	84.95
	South Korea	Avg	48.83	96.93	95.67	15.02	4.37	14.86	3.76	3.33	77.39
	Mexico	Avg	17.98	64.04	40.75	29.65	4.55	17.36	3.70	4.10	79.10
	Portugal	Avg	25.46	98.51	65.19	26.90	5.34	10.93	8.04	5.54	87.30
	USA	Avg	4.57	89.97	88.29	19.42	4.99	13.38	4.97	2.55	82.03

* In the years column, the average of the data obtained between 2016-2020 is calculated.

Source: Created with data obtained from OECD/Data and The World Bank databases

Entropy Normalized Matrix

Equations (1) and (2) were applied to matrix (A) and normalization was performed. The (R) matrix was created with the calculated values.

Table 4

Normalized Matrix

	K1	K2	K3	K4	K5	K6	K7	K8	K9
Argentina	0.491643694	0.837949312	0.65091507	0.347995781	0.659351145	0.513511612	0.27784924	0.371930796	0.929209091
Austria	0.566712612	0.878909302	0.610612668	0.764345992	0.681085666	0.538362154	0.51507058	0.437142113	0.94128
Belgium	0.694383184	0.989188781	0.562231913	0.680590717	0.816369805	0.486931472	0.42479547	0.400119119	0.93624
Czech Republic	0.414266023	0.957158338	0.459590363	0.429113924	0.577184054	0.453896156	0.98973607	1	0.940647273
Denmark	0.673931771	0.917643205	0.5802831	0.909704641	0.986005089	0.609785811	0.48895328	0.314770997	0.946450909
Finland	0.78184011	0.967490739	0.640495425	0.715822785	0.825699746	0.476173508	0.34377387	0.297388225	0.933970909
France	0.635113715	0.935233487	0.476140263	0.667088608	0.690839695	0.385228325	0.30066815	0.281712584	0.928581818
Germany	0.506891799	0.930445301	0.506988133	0.708438819	0.623409669	0.439866662	0.74175824	0.647330892	0.968356364
Greece	0.543177119	0.942818981	1	0.236075949	0.449109415	0.290441807	0.13785357	0.096376209	0.802407273
Hungary	0.434321158	0.883621885	0.356144552	0.535864979	0.588100085	0.395930365	0.65375303	0.887216059	0.932901818
Iceland	0.685768436	0.899700108	0.529239348	0.576160338	0.957591179	0.66581588	0.77541643	0.513765678	0.98856
Ireland	0.809614059	0.996068647	0.550096511	0.327848101	0.448261238	0.525041995	0.43007327	0.214447601	0.921905455
Italy	0.329014473	0.933393816	0.452530741	0.513080169	0.513146735	0.329562202	0.25655644	0.22976162	0.880363636
Netherlands	0.670365265	0.977646733	0.601539415	0.75464135	0.669211196	0.505515294	0.61700183	0.523330996	0.973156364
Slovakia	0.421157822	0.891383786	0.332803117	0.582278481	0.501272265	0.373766997	0.36704731	0.392360706	0.900065455
Slovenia	0.574293591	0.974446209	0.556566343	0.513080169	0.614927905	0.431657368	0.464077	0.320179201	0.962967273
Spain	0.646381806	0.906605176	0.640495425	0.460126582	0.533927057	0.400323802	0.16517803	0.145000108	0.881978182
Switzerland	0.748656099	0.919432474	0.43299614	0.789029536	0.624681934	0.614301702	0.57106599	0.385096016	0.968116364
Turkey	0.353635424	0.806481691	0.815877895	0.744303797	0.545801527	0.493299955	0.22754087	0.136040095	0.813163636
Lit Türkiye huania	0.719986216	0.996522265	0.516960967	0.379535865	0.496183206	0.470949065	0.37677924	0.449184274	0.99024
Luxembourg	0.792660234	0.833799551	0.135348156	0.901898734	0.459287532	0.341067725	0.45362903	0.334845238	0.934385455
Latvia	0.60206754	0.971598498	0.637206892	0.493037975	0.562340967	0.477242139	0.33598805	0.335748913	0.959607273
Costa Rica	0.409269469	0.635064641	0.398788247	0.793459916	0.871755725	1	0.24425547	0.201197963	0.875607273
Colombia	0.401585114	0.553035458	0.397126108	0.441068917	0.570610687	0.570267273	0.26127347	0.132439625	0.879469091
Poland	0.5321847	0.96469343	0.487239062	0.536075949	0.584817642	0.443554883	0.63261481	0.635993562	0.965432727
Estonia	0.699965541	0.944230236	0.509400915	0.778902954	0.648430874	0.520224043	0.46328071	0.376147816	0.932618182
Australia	0.797036527	0.948917618	0.818290678	0.375949367	0.656912638	0.541910542	0.47838412	0.387070754	0.911083636
Chile	0.433666437	0.929008846	0.642747355	0.424367089	0.686174724	0.846198211	0.34263959	0.239159843	0.897272727
Israel	0.866264645	0.925203498	0.446883043	0.383544304	0.768447837	0.61839946	0.63829787	0.448464619	0.952254545
New Zealand	0.663301172	0.89586956	0.584572491	0.532700422	0.793044953	0.656813739	0.58900524	0.565393031	0.960349091
Norway	0.755375603	0.940273683	0.587592937	0.840084388	1	0.628279904	0.65060241	0.552330839	0.971585455
South Africa	0.2630255	0.809959426	0.162514298	1	0.802290076	0.753811435	0.09769865	0.117888604	0.844647273
Sweden	0.740558236	1	0.500965113	0.912236287	0.967345208	0.622549559	0.38363171	0.34884204	0.978414545
United Kingdom	0.805892488	0.938988433	0.43887618	0.801476793	0.681933842	0.537487414	0.63981043	0.56553582	0.937374545
Russia	0.956179646	0.92681636	0.596064484	0.41814346	0.555979644	0.51412711	0.52508751	0.433699161	0.899309091
Canada	1	0.836521257	0.502502145	0.663291139	0.669211196	0.4854802	0.39370079	0.27605194	0.893454545
China	0.16678153	0.584662685	0.37154704	0.424367089	0.466072943	0.475481008	0.63035019	0.343105209	1
Japan	0.889688146	0.952630562	0.456295873	0.434599156	0.39639525	0.395620638	1	0.638820872	0.926770909
South Korea	0.841247416	0.977092311	0.683925508	0.316877637	0.555555556	0.5908465	0.71808511	0.404041619	0.844298182
Mexico	0.309820813	0.645548247	0.291321132	0.625527426	0.579304495	0.690440565	0.73012439	0.327963288	0.862930909
Portugal	0.43869745	0.992994128	0.466060194	0.567510549	0.679389313	0.434735208	0.33598805	0.242387069	0.952363636
USA	0.819641626	0.906882387	0.631183872	0.409704641	0.634435963	0.532132952	0.54325956	0.527564002	0.894894545

Entropy Values

After the normalized decision matrix (R) was created, entropy weight values "e_j" were calculated according to equation (3) and degrees of differentiation "d_j" were obtained

according to equation (4). Entropy criteria weights were calculated according to equation (5) and "W_j" values were found. The data obtained are presented in Table 5.

Table 5

Entropy Matrix

	K1	K2	K3	K4	K5	K6	K7	K8	K9
Argentina	-0.07528	-0.08468	-0.10409	-0.06003	-0.08971	-0.08748	-0.05893	-0.08557	-0.08935
Austria	-0.08366	-0.08770	-0.09942	-0.10752	-0.09186	-0.09056	-0.09351	-0.09629	-0.09020
Belgium	-0.09706	-0.09560	-0.09365	-0.09894	-0.10470	-0.08413	-0.08117	-0.09028	-0.08984
Czech Republic	-0.06617	-0.09334	-0.08076	-0.07039	-0.08133	-0.07986	-0.14771	-0.17005	-0.09015
Denmark	-0.09498	-0.09052	-0.09583	-0.12156	-0.11966	-0.09914	-0.09003	-0.07561	-0.09056
Finland	-0.10571	-0.09408	-0.10290	-0.10259	-0.10556	-0.08275	-0.06929	-0.07246	-0.08968
France	-0.09097	-0.09178	-0.08291	-0.09751	-0.09281	-0.07064	-0.06260	-0.06956	-0.08930
Germany	-0.07702	-0.09144	-0.08683	-0.10183	-0.08609	-0.07802	-0.12129	-0.12716	-0.09208
Greece	-0.08108	-0.09232	-0.14042	-0.04443	-0.06740	-0.05698	-0.03402	-0.03007	-0.08019
Hungary	-0.06858	-0.08805	-0.06671	-0.08308	-0.08247	-0.07211	-0.11098	-0.15731	-0.08961
Iceland	-0.09619	-0.08922	-0.08961	-0.08764	-0.11724	-0.10559	-0.12509	-0.10813	-0.09348
Ireland	-0.10837	-0.09608	-0.09218	-0.05735	-0.06730	-0.08892	-0.08192	-0.05650	-0.08883
Italy	-0.05548	-0.09165	-0.07984	-0.08045	-0.07451	-0.06276	-0.05543	-0.05958	-0.08588
Netherlands	-0.09462	-0.09479	-0.09835	-0.10655	-0.09069	-0.08648	-0.10651	-0.10956	-0.09242
Slovakia	-0.06701	-0.08861	-0.06336	-0.08832	-0.07322	-0.06905	-0.07279	-0.08900	-0.08728
Slovenia	-0.08449	-0.09457	-0.09296	-0.08045	-0.08523	-0.07693	-0.08665	-0.07658	-0.09171
Spain	-0.09214	-0.08972	-0.10290	-0.07418	-0.07676	-0.07271	-0.03928	-0.04165	-0.08599
Switzerland	-0.10247	-0.09065	-0.07726	-0.10998	-0.08622	-0.09967	-0.10077	-0.08779	-0.09207
Türkiye	-0.05865	-0.08232	-0.12211	-0.10550	-0.07802	-0.08494	-0.05051	-0.03960	-0.08098
Lithuania	-0.09963	-0.09612	-0.08808	-0.06414	-0.07266	-0.08208	-0.07424	-0.09820	-0.09359
Luxembourg	-0.10675	-0.08437	-0.03130	-0.12083	-0.06855	-0.06443	-0.08521	-0.07917	-0.08971
Latvia	-0.08748	-0.09437	-0.10252	-0.07810	-0.07978	-0.08289	-0.06810	-0.07933	-0.09148
Costa Rica	-0.06557	-0.06885	-0.07265	-0.11042	-0.10972	-0.14017	-0.05336	-0.05379	-0.08553
Colombia	-0.06463	-0.06199	-0.07242	-0.07186	-0.08064	-0.09444	-0.05621	-0.03877	-0.08581
Poland	-0.07986	-0.09388	-0.08433	-0.08311	-0.08213	-0.07851	-0.10842	-0.12562	-0.09188
Estonia	-0.09763	-0.09242	-0.08713	-0.10897	-0.08862	-0.08832	-0.08654	-0.08628	-0.08959
Australia	-0.10717	-0.09276	-0.12236	-0.06368	-0.08946	-0.09100	-0.08860	-0.08812	-0.08807
Chile	-0.06851	-0.09134	-0.10316	-0.06980	-0.09236	-0.12501	-0.06912	-0.06143	-0.08709
Israel	-0.11369	-0.09106	-0.07910	-0.06466	-0.10025	-0.10014	-0.10911	-0.09809	-0.09096
New Zealand	-0.09389	-0.08894	-0.09634	-0.08272	-0.10255	-0.10457	-0.10303	-0.11571	-0.09153
Norway	-0.10313	-0.09214	-0.09670	-0.11496	-0.12085	-0.10129	-0.11060	-0.11382	-0.09231
South Africa	-0.04663	-0.08258	-0.03623	-0.12979	-0.10341	-0.11531	-0.02577	-0.03534	-0.08329
Sweden	-0.10168	-0.09636	-0.08607	-0.12179	-0.11807	-0.10063	-0.07524	-0.08162	-0.09278
United Kingdom	-0.10801	-0.09205	-0.07804	-0.11120	-0.09194	-0.09045	-0.10930	-0.11573	-0.08992
Russia	-0.12184	-0.09118	-0.09771	-0.06903	-0.07910	-0.08756	-0.09483	-0.09574	-0.08723
Canada	-0.12569	-0.08457	-0.08627	-0.09711	-0.09069	-0.08394	-0.07671	-0.06851	-0.08681

China	-0.03250	-0.06467	-0.06888	-0.06980	-0.06931	-0.08266	-0.10815	-0.08062	-0.09426
Japan	-0.11585	-0.09302	-0.08033	-0.07107	-0.06129	-0.07207	-0.14873	-0.12600	-0.08918
South Korea	-0.11136	-0.09475	-0.10784	-0.05587	-0.07906	-0.09690	-0.11857	-0.09093	-0.08327
Mexico	-0.05297	-0.06971	-0.05722	-0.09307	-0.08155	-0.10836	-0.11996	-0.07796	-0.08462
Portugal	-0.06910	-0.09587	-0.08160	-0.08667	-0.09169	-0.07734	-0.06810	-0.06206	-0.09097
USA	-0.10932	-0.08974	-0.10182	-0.06797	-0.08721	-0.08980	-0.09720	-0.11019	-0.08692
Criteria weights									
e_j	0.9853248	0.9979101	0.9872961	0.9858883	0.9930427	0.9916845	0.974834	0.9700579	0.9996582
d_j	0.01468	0.00209	0.0127	0.01411	0.00696	0.00832	0.02517	0.02994	0.00034
W_j	0.12839	0.01828	0.11114	0.12346	0.06087	0.07275	0.22017	0.26195	0.00299

The findings obtained as a result of calculating the weights of the sub-criteria are as follows; "Unemployment rate of university graduates" ranks first with an entropy value of 0.262. criterion (K8) with an entropy value of 0.220, "Percentage of the total unemployed labor force" criterion (K7) with an entropy value of 0.220, and "Percentage of adults with a higher education degree" criterion (K1) with an entropy value of 0.128 in third place.

Topsis Findings

The TOPSIS method was used to compare the financing methods by considering the criteria weights.

Normalized Decision Matrix

All elements of the initial matrix (A) are normalized to the values obtained by applying equation (6) and the matrix (R) is obtained.

Table 6

Topsis Normalized Decision Matrix

	K1	**K2**	**K3**	**K4**	**K5**	**K6**	**K7**	**K8**	**K9**
Argentina	0.11724	0.14320	0.18351	0.08683	0.15197	0.14600	0.17492	0.10661	0.15495
Austria	0.13515	0.15019	0.17215	0.19072	0.15698	0.15307	0.09436	0.09071	0.15696
Belgium	0.16559	0.16904	0.15851	0.16982	0.18816	0.13844	0.11441	0.09910	0.15612
Czech Republic	0.09879	0.16357	0.12957	0.10707	0.13303	0.12905	0.04911	0.03965	0.15686
Denmark	0.16071	0.15681	0.16360	0.22699	0.22726	0.17337	0.09940	0.12597	0.15783
Finland	0.18645	0.16533	0.18057	0.17861	0.19031	0.13539	0.14138	0.13334	0.15575
France	0.15146	0.15982	0.13424	0.16645	0.15923	0.10953	0.16165	0.14076	0.15485
Germany	0.12088	0.15900	0.14293	0.17677	0.14368	0.12506	0.06552	0.06126	0.16148
Greece	0.12953	0.16112	0.28192	0.05891	0.10351	0.08258	0.35257	0.41144	0.13381
Hungary	0.10357	0.15100	0.10041	0.13371	0.13555	0.11257	0.07434	0.04469	0.15557

Iceland	0.16354	0.15375	0.14921	0.14376	0.22071	0.18931	0.06268	0.07718	0.16485
Ireland	0.19307	0.17022	0.15509	0.08180	0.10332	0.14928	0.11301	0.18491	0.15373
Italy	0.07846	0.15951	0.12758	0.12802	0.11827	0.09370	0.18944	0.17258	0.14681
Netherlands	0.15986	0.16707	0.16959	0.18830	0.15424	0.14373	0.07877	0.07577	0.16228
Slovakia	0.10043	0.15233	0.09383	0.14529	0.11553	0.10627	0.13241	0.10106	0.15009
Slovenia	0.13695	0.16652	0.15691	0.12802	0.14173	0.12273	0.10473	0.12384	0.16058
Spain	0.15414	0.15493	0.18057	0.11481	0.12306	0.11382	0.29424	0.27347	0.14708
Switzerland	0.17853	0.15712	0.12207	0.19688	0.14398	0.17466	0.08511	0.10297	0.16144
Türkiye	0.08433	0.13782	0.23002	0.18572	0.12580	0.14026	0.21360	0.29148	0.13560
Lithuania	0.17170	0.17029	0.14574	0.09470	0.11436	0.13390	0.12899	0.08828	0.16513
Luxembourg	0.18903	0.14249	0.03816	0.22504	0.10586	0.09697	0.10714	0.11842	0.15581
Latvia	0.14358	0.16603	0.17964	0.12302	0.12961	0.13569	0.14465	0.11810	0.16002
Costa Rica	0.09760	0.10852	0.11243	0.19798	0.20092	0.28432	0.19898	0.19708	0.14601
Colombia	0.09577	0.09451	0.11196	0.11005	0.13152	0.16214	0.18602	0.29940	0.14666
Poland	0.12691	0.16485	0.13736	0.13376	0.13479	0.12611	0.07683	0.06235	0.16099
Estonia	0.16692	0.16136	0.14361	0.19435	0.14945	0.14791	0.10491	0.10542	0.15552
Australia	0.19007	0.16216	0.23070	0.09381	0.15141	0.15408	0.10160	0.10244	0.15193
Chile	0.10342	0.15876	0.18121	0.10589	0.15815	0.24059	0.14185	0.16580	0.14963
Israel	0.20658	0.15811	0.12599	0.09570	0.17711	0.17582	0.07614	0.08842	0.15879
New Zealand	0.15818	0.15309	0.16481	0.13292	0.18278	0.18675	0.08252	0.07013	0.16014
Norway	0.18014	0.16068	0.16566	0.20962	0.23048	0.17863	0.07470	0.07179	0.16202
South Africa	0.06272	0.13841	0.04582	0.24952	0.18491	0.21432	0.49747	0.33636	0.14085
Sweden	0.17660	0.17089	0.14123	0.22762	0.22296	0.17700	0.12669	0.11367	0.16316
United Kingdom	0.19218	0.16046	0.12373	0.19998	0.15717	0.15282	0.07596	0.07012	0.15631
Russia	0.22802	0.15838	0.16805	0.10433	0.12814	0.14618	0.09256	0.09143	0.14997
Canada	0.23847	0.14295	0.14167	0.16550	0.15424	0.13803	0.12345	0.14364	0.14899
China	0.03977	0.09991	0.10475	0.10589	0.10742	0.13519	0.07710	0.11557	0.16676
Japan	0.21217	0.16279	0.12864	0.10844	0.09136	0.11248	0.04860	0.06207	0.15454
South Korea	0.20061	0.16697	0.19282	0.07907	0.12805	0.16799	0.06768	0.09814	0.14079
Mexico	0.07388	0.11032	0.08213	0.15608	0.13352	0.19631	0.06657	0.12091	0.14390
Portugal	0.10462	0.16969	0.13139	0.14160	0.15659	0.12360	0.14465	0.16359	0.15881
USA	0.19546	0.15498	0.17795	0.10223	0.14623	0.15130	0.08946	0.07516	0.14923

Weighted Normalized Decision Matrix

The weights of the criteria and the values of the alternatives obtained by the entropy method were calculated according to equation (7) and the normalized decision matrix was obtained.

Table 7

Topsis Weighted Decision Matrix

	K1	K2	K3	K4	K5	K6	K7	K8	K9

Argentina	0.01505	0.00262	0.02040	0.01072	0.00925	0.01062	0.03851	0.02793	0.00046
Austria	0.01735	0.00275	0.01913	0.02355	0.00955	0.01114	0.02078	0.02376	0.00047
Belgium	0.02126	0.00309	0.01762	0.02097	0.01145	0.01007	0.02519	0.02596	0.00047
Czech Republic	0.01268	0.00299	0.01440	0.01322	0.00810	0.00939	0.01081	0.01039	0.00047
Denmark	0.02063	0.00287	0.01818	0.02802	0.01383	0.01261	0.02189	0.03300	0.00047
Finland	0.02394	0.00302	0.02007	0.02205	0.01158	0.00985	0.03113	0.03493	0.00047
France	0.01945	0.00292	0.01492	0.02055	0.00969	0.00797	0.03559	0.03687	0.00046
Germany	0.01552	0.00291	0.01589	0.02182	0.00875	0.00910	0.01443	0.01605	0.00048
Greece	0.01663	0.00295	0.03133	0.00727	0.00630	0.00601	0.07762	0.10778	0.00040
Hungary	0.01330	0.00276	0.01116	0.01651	0.00825	0.00819	0.01637	0.01171	0.00047
Iceland	0.02100	0.00281	0.01658	0.01775	0.01343	0.01377	0.01380	0.02022	0.00049
Ireland	0.02479	0.00311	0.01724	0.01010	0.00629	0.01086	0.02488	0.04844	0.00046
Italy	0.01007	0.00292	0.01418	0.01581	0.00720	0.00682	0.04171	0.04521	0.00044
Netherlands	0.02052	0.00305	0.01885	0.02325	0.00939	0.01046	0.01734	0.01985	0.00049
Slovakia	0.01289	0.00279	0.01043	0.01794	0.00703	0.00773	0.02915	0.02647	0.00045
Slovenia	0.01758	0.00304	0.01744	0.01581	0.00863	0.00893	0.02306	0.03244	0.00048
Spain	0.01979	0.00283	0.02007	0.01417	0.00749	0.00828	0.06478	0.07163	0.00044
Switzerland	0.02292	0.00287	0.01357	0.02431	0.00876	0.01271	0.01874	0.02697	0.00048
Türkiye	0.01083	0.00252	0.02556	0.02293	0.00766	0.01020	0.04703	0.07635	0.00041
Lithuania	0.02204	0.00311	0.01620	0.01169	0.00696	0.00974	0.02840	0.02312	0.00049
Luxembourg	0.02427	0.00261	0.00424	0.02778	0.00644	0.00705	0.02359	0.03102	0.00047
Latvia	0.01843	0.00304	0.01997	0.01519	0.00789	0.00987	0.03185	0.03094	0.00048
Costa Rica	0.01253	0.00198	0.01250	0.02444	0.01223	0.02068	0.04381	0.05163	0.00044
Colombia	0.01230	0.00173	0.01244	0.01359	0.00800	0.01180	0.04096	0.07843	0.00044
Poland	0.01629	0.00301	0.01527	0.01651	0.00820	0.00917	0.01692	0.01633	0.00048
Estonia	0.02143	0.00295	0.01596	0.02399	0.00910	0.01076	0.02310	0.02761	0.00047
Australia	0.02440	0.00296	0.02564	0.01158	0.00922	0.01121	0.02237	0.02684	0.00045
Chile	0.01328	0.00290	0.02014	0.01307	0.00963	0.01750	0.03123	0.04343	0.00045
Israel	0.02652	0.00289	0.01400	0.01182	0.01078	0.01279	0.01676	0.02316	0.00047
New Zealand	0.02031	0.00280	0.01832	0.01641	0.01113	0.01359	0.01817	0.01837	0.00048
Norway	0.02313	0.00294	0.01841	0.02588	0.01403	0.01300	0.01645	0.01881	0.00048
South Africa	0.00805	0.00253	0.00509	0.03081	0.01125	0.01559	0.10953	0.08811	0.00042
Sweden	0.02267	0.00312	0.01570	0.02810	0.01357	0.01288	0.02789	0.02978	0.00049
United Kingdom	0.02467	0.00293	0.01375	0.02469	0.00957	0.01112	0.01672	0.01837	0.00047
Russia	0.02928	0.00290	0.01868	0.01288	0.00780	0.01063	0.02038	0.02395	0.00045
Canada	0.03062	0.00261	0.01575	0.02043	0.00939	0.01004	0.02718	0.03763	0.00045
China	0.00511	0.00183	0.01164	0.01307	0.00654	0.00983	0.01698	0.03027	0.00050
Japan	0.02724	0.00298	0.01430	0.01339	0.00556	0.00818	0.01070	0.01626	0.00046
South Korea	0.02576	0.00305	0.02143	0.00976	0.00779	0.01222	0.01490	0.02571	0.00042
Mexico	0.00949	0.00202	0.00913	0.01927	0.00813	0.01428	0.01466	0.03167	0.00043
Portugal	0.01343	0.00310	0.01460	0.01748	0.00953	0.00899	0.03185	0.04285	0.00047
USA	0.02510	0.00283	0.01978	0.01262	0.00890	0.01101	0.01970	0.01969	0.00045

Solution Sets

Equation (8) was applied to the normalized decision matrix to find the positive ideal A^* and Equation (9) was applied to calculate the negative ideal A^- solution set.

Table 8

Positive and Negative Ideal Solution Sets

	K1	K2	K3	K4	K5	K6	K7	K8	K9
Argentina	0.01505	0.00262	0.02040	0.01072	0.00925	0.01062	0.03851	0.02793	0.00046
Austria	0.01735	0.00275	0.01913	0.02355	0.00955	0.01114	0.02078	0.02376	0.00047
Belgium	0.02126	0.00309	0.01762	0.02097	0.01145	0.01007	0.02519	0.02596	0.00047
Czech Republic	0.01268	0.00299	0.01440	0.01322	0.00810	0.00939	0.01081	0.01039	0.00047
Denmark	0.02063	0.00287	0.01818	0.02802	0.01383	0.01261	0.02189	0.03300	0.00047
Finland	0.02394	0.00302	0.02007	0.02205	0.01158	0.00985	0.03113	0.03493	0.00047
France	0.01945	0.00292	0.01492	0.02055	0.00969	0.00797	0.03559	0.03687	0.00046
Germany	0.01552	0.00291	0.01589	0.02182	0.00875	0.00910	0.01443	0.01605	0.00048
Greece	0.01663	0.00295	0.03133	0.00727	0.00630	0.00601	0.07762	0.10778	0.00040
Hungary	0.01330	0.00276	0.01116	0.01651	0.00825	0.00819	0.01637	0.01171	0.00047
Iceland	0.02100	0.00281	0.01658	0.01775	0.01343	0.01377	0.01380	0.02022	0.00049
Ireland	0.02479	0.00311	0.01724	0.01010	0.00629	0.01086	0.02488	0.04844	0.00046
Italy	0.01007	0.00292	0.01418	0.01581	0.00720	0.00682	0.04171	0.04521	0.00044
Netherlands	0.02052	0.00305	0.01885	0.02325	0.00939	0.01046	0.01734	0.01985	0.00049
Slovakia	0.01289	0.00279	0.01043	0.01794	0.00703	0.00773	0.02915	0.02647	0.00045
Slovenia	0.01758	0.00304	0.01744	0.01581	0.00863	0.00893	0.02306	0.03244	0.00048
Spain	0.01979	0.00283	0.02007	0.01417	0.00749	0.00828	0.06478	0.07163	0.00044
Switzerland	0.02292	0.00287	0.01357	0.02431	0.00876	0.01271	0.01874	0.02697	0.00048
Türkiye	0.01083	0.00252	0.02556	0.02293	0.00766	0.01020	0.04703	0.07635	0.00041
Lithuania	0.02204	0.00311	0.01620	0.01169	0.00696	0.00974	0.02840	0.02312	0.00049
Luxembourg	0.02427	0.00261	0.00424	0.02778	0.00644	0.00705	0.02359	0.03102	0.00047
Latvia	0.01843	0.00304	0.01997	0.01519	0.00789	0.00987	0.03185	0.03094	0.00048
Costa Rica	0.01253	0.00198	0.01250	0.02444	0.01223	0.02068	0.04381	0.05163	0.00044
Colombia	0.01230	0.00173	0.01244	0.01359	0.00800	0.01180	0.04096	0.07843	0.00044
Poland	0.01629	0.00301	0.01527	0.01651	0.00820	0.00917	0.01692	0.01633	0.00048
Estonia	0.02143	0.00295	0.01596	0.02399	0.00910	0.01076	0.02310	0.02761	0.00047
Australia	0.02440	0.00296	0.02564	0.01158	0.00922	0.01121	0.02237	0.02684	0.00045
Chile	0.01328	0.00290	0.02014	0.01307	0.00963	0.01750	0.03123	0.04343	0.00045
Israel	0.02652	0.00289	0.01400	0.01182	0.01078	0.01279	0.01676	0.02316	0.00047
New Zealand	0.02031	0.00280	0.01832	0.01641	0.01113	0.01359	0.01817	0.01837	0.00048
Norway	0.02313	0.00294	0.01841	0.02588	0.01403	0.01300	0.01645	0.01881	0.00048
South Africa	0.00805	0.00253	0.00509	0.03081	0.01125	0.01559	0.10953	0.08811	0.00042
Sweden	0.02267	0.00312	0.01570	0.02810	0.01357	0.01288	0.02789	0.02978	0.00049
United Kingdom	0.02467	0.00293	0.01375	0.02469	0.00957	0.01112	0.01672	0.01837	0.00047
Russia	0.02928	0.00290	0.01868	0.01288	0.00780	0.01063	0.02038	0.02395	0.00045
Canada	0.03062	0.00261	0.01575	0.02043	0.00939	0.01004	0.02718	0.03763	0.00045

China	0.00511	0.00183	0.01164	0.01307	0.00654	0.00983	0.01698	0.03027	0.00050
Japan	0.02724	0.00298	0.01430	0.01339	0.00556	0.00818	0.01070	0.01626	0.00046
South Korea	0.02576	0.00305	0.02143	0.00976	0.00779	0.01222	0.01490	0.02571	0.00042
Mexico	0.00949	0.00202	0.00913	0.01927	0.00813	0.01428	0.01466	0.03167	0.00043
Portugal	0.01343	0.00310	0.01460	0.01748	0.00953	0.00899	0.03185	0.04285	0.00047
USA	0.02510	0.00283	0.01978	0.01262	0.00890	0.01101	0.01970	0.01969	0.00045
$MaxA^{*}$	0.03062	0.00312	0.03133	0.03081	0.01403	0.02068	0.01070	0.01039	0.00050
$MaxA^{-}$	0.00511	0.00173	0.00424	0.00727	0.00556	0.00601	0.10953	0.10778	0.00040

Calculation of Discrimination Criteria

The separation criteria were calculated by applying Equation (10) and Equation (11) to the obtained Positive and Negative ideal solution sets. The distances of alternative decision options from ideal solutions; Positive ideal S_i^* and Negative ideal S_i^- distances are calculated and presented in the table.

Table 9

Closeness to The Ideal Solution

	(S_i^*)	(S_i^-)
Argentina	0.0443940522	0.1087499260
Austria	0.0277353592	0.1249618450
Belgium	0.0307286124	0.1203631580
Czech Republic	0.0328696678	0.1394458267
Denmark	0.0313366919	0.1193837642
Finland	0.0372962802	0.1110402545
France	0.0447308180	0.1049414366
Germany	0.0274833144	0.1339245086
Greece	0.1224255488	0.0434364715
Hungary	0.0336881724	0.1346156873
Iceland	0.0252009319	0.1321684934
Ireland	0.0496658352	0.1061914616
Italy	0.0579165157	0.0933555314
Netherlands	0.0239718103	0.1302767255
Slovakia	0.0416274396	0.1152789478
Slovenia	0.0373417922	0.1165110369
Spain	0.0859861474	0.0619049662
Switzerland	0.0291240701	0.1245916309
Türkiye	0.0794289306	0.0751591735
Lithuania	0.0362371219	0.1192263224
Luxembourg	0.0402351508	0.1186067415
Latvia	0.0393155091	0.1115708455
Costa Rica	0.0593623289	0.0902763175

Colombia	0.0815554600	0.0759062262
Poland	0.0301313178	0.1314919073
Estonia	0.0306656680	0.1208978245
Australia	0.0309877225	0.1226341496
Chile	0.0477845001	0.1037982852
Israel	0.0308320171	0.1281172865
New Zealand	0.0257168500	0.1301627554
Norway	0.0202582997	0.1325654295
South Africa	0.1305350503	0.0327859804
Sweden	0.0323663736	0.1171980630
United Kingdom	0.0243573584	0.1320110145
Russia	0.0300123836	0.1258025482
Canada	0.0387199424	0.1126509330
China	0.0443096757	0.1211473847
Japan	0.0294531693	0.1370289335
South Korea	0.0304537098	0.1283077530
Mexico	0.0402295055	0.1226982315
Portugal	0.0491015431	0.1027456196
USA	0.0279678869	0.1285922575

Closeness to the Ideal

The relative closeness of the decision options to the ideal solution is calculated by applying equation (12) to calculate the closest value to (C_i^*).

Table 10

Relative Closeness to The Ideal Solution

	C^*
Argentina	0.71012
Austria	0.81836
Belgium	0.79662
Czech Republic	0.80925
Denmark	0.79209
Finland	0.74857
France	0.70114
Germany	0.82973
Greece	0.26188
Hungary	0.79984
Iceland	0.83986
Ireland	0.68134
Italy	0.61714
Netherlands	0.84459
Slovakia	0.73470

Slovenia	0.75729
Spain	0.41858
Switzerland	0.81053
Türkiye	0.48619
Lithuania	0.76691
Luxembourg	0.74670
Latvia	0.73944
Costa Rica	0.60330
Colombia	0.48206
Poland	0.81357
Estonia	0.79767
Australia	0.79829
Chile	0.68476
Israel	0.80603
New Zealand	0.83502
Norway	0.86744
South Africa	0.20075
Sweden	0.78360
United Kingdom	0.84423
Russia	0.80738
Canada	0.74420
China	0.73220
Japan	0.82309
South Korea	0.80818
Mexico	0.75308
Portugal	0.67664
USA	0.82136

Ranking Decision Options

In the last stage, the relative closeness (C_i^*) of the Alternative Decision Options obtained by TOPSIS method to the ideal solution was calculated with the help of equation (12), and the highest ranking of the obtained values was selected**.**

Table 11

Ranking of Alternative Decision Options

1	Norway	0.8674
2	Netherlands	0.8446
3	United Kingdom	0.8442
4	Iceland	0.8399
5	New Zealand	0.835
6	Germany	0.8297
7	Japan	0.8231

8	USA	0.8214
9	Austria	0.8184
10	Poland	0.8136
11	Switzerland	0.8105
12	Czech Republic	0.8092
13	South Korea	0.8082
14	Russia	0.8074
15	Israel	0.806
16	Hungary	0.7998
17	Australia	0.7983
18	Estonia	0.7977
19	Belgium	0.7966
20	Denmark	0.7921
21	Sweden	0.7836
22	Lithuania	0.7669
23	Slovenia	0.7573
24	Mexico	0.7531
25	Finland	0.7486
26	Luxembourg	0.7467
27	Canada	0.7442
28	Latvia	0.7394
29	Slovakia	0.7347
30	China	0.7322
31	Argentina	0.7101
32	France	0.7011
33	Chile	0.6848
34	Ireland	0.6813
35	Portugal	0.6766
36	Italy	0.6171
37	Costa Rica	0.6033
38	Türkiye	0.4862
39	Colombia	0.4821
40	Spain	0.4186
41	Greece	0.2619
42	South Africa	0.2007

Results and Discussion

In this study, the financing methods used by OECD countries in the provision of higher education services were analyzed. As a result of the analysis, the performance ranking of the financing policies examined was made and it was found that the top three countries with the highest performance in terms of financing policies used in these countries were Norway, the Netherlands, and the United Kingdom, respectively. The financing schemes used by these countries are Norway "Income Contingent Loan", the Netherlands "Tuition Fee Free" and the United Kingdom "Income Contingent Loan". In this context, it has been determined that two of the three countries with the best performance use the Income Contingent Loan

method. When the table is analyzed as a whole, it is seen that the "Tuition-Free" countries are relatively behind, while the countries that apply "Income-Contingent Loan" are ahead.

Among the higher education financing schemes used, the " Income- Contingent Loan" method has been found to be the one with the highest performance. In this context, since higher education is an expensive service that cannot be offered to everyone who wants it without imposing almost no cost on higher education students, it has become quite common for countries to offer this service for a fee on a cost-sharing basis (Vossensteyn, 2000; Jonglobed, 2004; Johnstone & Marcucci, 2007; Xia et al., 2022; Gölpek, 2011; Özekicioğlu, 2013). Within the scope of the study, it is suggested that the " Income- Contingent Loan" financing policy (Chapman, 2014; Johnstone, 2009; Özekicioğlu, 2013; Britton et al., 2019), which has been highly preferred in the financing of higher education in recent years worldwide, should be adapted to the Turkish higher education system and implemented as a new financing strategy.

Nowadays, tuition fees are demanded from those who receive education services, which causes students to take on more debt and graduate with longer-term debt. Long-term indebtedness as a result of education and training is more serious for individuals with lower socio-economic status. Benefiting a student by participating in a system that only serves the interests of the privileged and does not take into account the obstacles faced by those who cannot afford the rising costs of higher education is a long-standing social injustice in the education and training system. Therefore, evaluating the pricing schemes not only in Turkey but also globally and determining which one will create a more appropriate structure will provide higher education services on a more economical basis for students. This study, which can constitute an important road map in terms of eliminating these deficiencies, is important in research on higher education financing practices.

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References

Agrawal, V. P., Kohli, V., & Gupta, S. (1991). Computer aided robot selection: the 'multiple attribute decision making'approach. *The International Journal of Production Research, 29*(8), 1629-1644. https://doi.org/10.1080/00207549108948036

Akça, H. (2012). "Yükseköğretimin Finansmanı ve Türkiye İçin Yükseköğretim Finansman Modeli Önerisi". *Yönetim ve Ekonomi Dergisi, 19* (1), 91-104

ATO, Australian Taxation Office (2024). (Study and training loan indexation rates | Australian Taxation Office (ato.gov.au) online,22.03.2024)

Australian Goverment (2024). 2024 Commonwealth Supported Places and HECS-HELP İnformation,. (https://www.studyassist.gov.au/system/files/documents/2023-12/Final%202024%20CSP%20and%20HECS-HELP%20booklet.pdf , online,22.03.2024)

Aydın, M. S. (2014). *Türkiye'de Yükseköğretimin Finansmanı*. Marmara Üniversitesi Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi, İstanbul.

BAföG.(2024). Bundesgesetz über individuelle Förderung der Ausbildung (Bundesausbildungsförderungsgesetz - BAföG) , "Bundesausbildungsförderungsgesetz in der Fassung der Bekanntmachung vom 7. Dezember 2010 (BGBl. I S. 1952; 2012 I S. 197), das zuletzt durch Artikel 3 des Gesetzes vom 21. Dezember 2022 (BGBl. I S. 2847) geändert worden ist" [Online: https://www.gesetze-im-internet.de/baf_g/BJNR014090971.html#BJNR014090971BJNG000201310], Date of Access:03.03.2024.

Benjamin, K., Wen, X., Nketia, E. B., & Kweitsu, G. (2019). A Comparative Analysis on Efficiency of the Student Loan Repayment Policy in Ghana, Kenya, Tanzania, Rwanda and Nigeria. https://doi.org/10.18535/ijsrm/v7i2.em03

Britton, J., van der Erve, L., & Higgins, T. (2019). Income contingent student loan design: Lessons from around the world. Economics of Education Review, 71, 65-82. https://doi.org/10.1016/j.econedurev.2018.06.001

Chapman, B. (2014). "Income Contingent Loans: Background". B. Chapman, T. Higgins, & J. E. Stiglitz(Ed.), Income Contingent Loans:*Background, Income Contingent Loans; Theory,Practice and Prospects* (s. 26-39). London: Palvarage, ISBN: 9781137413208. https://doi.org/10.1057/9781137413208

Chen, C. T. (2000). Extensions of the TOPSIS for group decision-making under fuzzy environment. *Fuzzy sets and systems*, *114*(1), 1-9. https://doi.org/10.1016/S0165-0114(97)00377-1

Cheng, S., Chan, C. W., & Huang, G. H. (2003). An integrated multi-criteria decision analysis and inexact mixed integer linear programming approach for solid waste management. *Engineering Applications of Artificial Intelligence*, *16*(5-6), 543-554. https://doi.org/10.1016/S0952-1976(03)00069-1

Despard, M. ., Perantie, D., Taylor, S., Grinstein-Weiss, M., Friedline, T., & Raghavan, R. (2016). Student debt and hardship: Evidence from a large sample of low- and moderate-income households. *Children and Youth Services Review,* 70, 8–18. https://doi.org/10.1016/j.childyouth.2016.09.001

Dezhina, I. G., & Nafikova, T. N. (2019). Tuition fees as a source of funding and a policy instrument: international experience. Университетское управление: практика и анализ, 23(5), 22-30. https://doi.org/10.15826/umpa.2019.05.038

Ergen, Z. (2006). Yükseköğretim Finansmanında Öğrenci Borçlanma Yöntemi. *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi,15(1),*133-150

Gölpek, F. (2011). Yükseköğretim Finansman Politikasında Yeni Bir Yaklaşım:Maliyet Paylaşımı . *Yükseköğretim Dergisi, I* (1), 25-33.

Gölpek, F. (2013). *Yükseköğretimin Finansmanında Güncel Yaklaşımlar:Borçlanma ile Finansman.* Derin Yayınları, İstanbul.

Grave, B. S., & Sinning, M. (2014). Why don't we just give them the money? Financing living expenses of students in Germany. *In Income Contingent Loans: Theory, Practice and Prospects* (pp. 109-124). London: Palgrave Macmillan UK. https://doi.org/10.1057/9781137413208_10

JASSO (*Japan Student Services Organization*) (2022). *JASSO Outline 2022'2023.* [Online: https://www.jasso.go.jp/en/gakusei/index.html], Date of access: 10.03.2023.

Jee, D. H., & Kang, K. J. (2000). A method for optimal material selection aided with decision making theory. *Materials & Design*, *21*(3), 199-206. https://doi.org/10.1016/S0261-3069(99)00066-7

Jiménez, D., & Glater, J. D. (2020). Student debt is a civil rights issue: The case for debt relief and higher education reform. *Harv. CR-CLL* Rev., 55, 131. https://doi.org/10.2139/ssrn.3475224

Johnstone, B. (2009). Financing higher education: Who pays and other issues. The American university in the 21st century: Social, political, and economic challenges, 347-369.

Johnstone, D. B., & Marcucci, P. (2007). Student loans in international context: A primer.

Jongbloed, B. (2004). Tuition fees in Europe and Australasia: theory, trends and policies. *In Higher education: Handbook of theory and research* (pp. 241-310). Springer, Dordrecht. https://doi.org/10.1007/1-4020-2456-8_7

Karaatlı, M. (2016). ENTROPİ-GRİ ilişkisel analiz yöntemleri ile bütünleşik bir yaklaşım: Turizm sektöründe uygulama. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 21(1)*, 63-77.

KYK (Kredi ve Yurtlar Genel Müdürlüğü), (2024a). "*Tarihçe*" [Online: https://kygm.gsb.gov.tr/Sayfalar/2397/3193/Tarihce]. Date of access: 20.04.2024.

KYK (Kredi ve Yurtlar Genel Müdürlüğü), (2024b). "*Burs ve Kredi*" [Online: https://kygm.gsb.gov.tr/HaberDetaylari/1/267069/burs-kredi-odemeleri-basladi.aspx]. Date of access: 20.05.2024.

Martin, C. (2016). Should Students Have to Borrow?Autonomy,Wellbeing and Student Debt. *Journal of Philosophy of Education*, 50 (3), 351-370. https://doi.org/10.1111/1467-9752.12133

Mbah, R. E. (2021). Expanding the theoretical framework in student debt research by connecting public policy theories to the student debt literature. *Advances in Social Sciences Research Journal, 8(11)*, 211-219. https://doi.org/10.14738/assrj.811.11196

Mbah, R. E., Forcha, D. F., & Mende, C. M. (2020). Assessing the relationship between Pell Grant and Federal Student Loan at Louisiana four-year public institutions [Abstract]. *Journal of Education and Practice, 11(9*), 40- 44. https://doi.org/10.7176/JEP/11-9-04

Monjezi, M., Dehghani, H., Singh, T. N., Sayadi, A. R., & Gholinejad, A. (2012). Application of TOPSIS method for selecting the most appropriate blast design. *Arabian journal of geosciences*, *5*(1), 95. https://doi.org/10.1007/s12517-010-0133-2

Murto, M. J. (2024). Student Loans and College Majors: The Role of Repayment Plan Structure. *Consumer Financial Protection Bureau Office of Research Working Paper*, (24-01). https://doi.org/10.2139/ssrn.4744213

OECD (2023), Education at a Glance 2023: OECD Indicators, OECD Publishing, Paris, https://doi.org/10.1787/e13bef63-en.

OECD (2024). *"Data"* [Online: https://data.oecd.org/]. Date of access: 10.01.2024.

Özekicioğlu, S. (2013). *Yükseköğretimin Finansmanında Güncel Yaklaşımlar: Borçlanma İle Finansman.* İstanbul: Derin Yayınları.

Shen, H., & Ziderman, A. (2009). Student loans repayment and recovery: international comparisons. *Higher education*, 57, 315-333. https://doi.org/10.1007/s10734-008-9146-0

SLC.(2024a). *Student Loans Company* [Online: https://www.gov.uk/government/organisations/student-loans-company/about#about-us], Date of access: 10.03.2024.

SLC.(2024b). *Student Loans Company,* [Online: https://www.gov.uk/student-finance/new-fulltime-students], Date of access: 10.03.2024.

SLC.(2024c). *Student Loans Company,* [Online: https://www.gov.uk/repaying-your-student-loan/what-you-pay], Date of access: 10.03.2024.

The World Bank (2024). *"Data"* [Online: https://www.worldbank.org/en/search?q=data]. Date of access: 05.01.2024.

Tulip, P. (2007). Financing higher education in the United States.

URL-1. "*Studentaid",* [Online: https://studentaid.gov/understand-aid/types/loans/subsidized-unsubsidized], Date of acces: 20.05.2024.

URL-2. "*Studentwerke/Göttingen",* [Online https://www.studentenwerk-goettingen.de/studienfinanzierung/bafoeg-fuer-studierende], Date of acces: 10.03.2023.

Vossensteyn, H. (2000). Sharing The Cost Of Higher Education İn Europe And Australia-Who Pays?. Journal Of İnstitutional Research, 9(2), 54-66.

Wang, Y. M., & Elhag, T. M. (2006). Fuzzy TOPSIS method based on alpha level sets with an application to bridge risk assessment. *Expert systems with applications, 31*(2), 309-319. https://doi.org/10.1016/j.eswa.2005.09.040

Woodhall, M. (2007). Funding higher education: The contribution of economic thinking to debate and policy development.

Woodhall, M., & Richards, K. (2008). "Student and Unıversıty Fundıng ın Devolved Governments ın The UK". P. N. Teixeira, B. D. Johnstone, M. J. Rosa, & H. Vossensteyn (Eds.), *Higher Education Dynamics; Cost-Sharing andAccessibility in Higher Education: A Fairer Deal?*[E-Book] (Cilt 14, s. 189-212). The Netherlands: Springer. ISBN: 978-1-4020-4660-5.

Xia, Z., Yue, X., Niu, F., & Hu, Z. (2022). Prediction of higher education cost and analysis of sharing ability based on artificial neural network. Security and Communication Networks, 2022. https://doi.org/10.1155/2022/7649918

YÖK. (2007). *Türkiyenin Yükseköğretim Stratejisi.* Ankara: Meteksan A.Ş.

Zhang, H., Gu, C. L., Gu, L. W., & Zhang, Y. (2011). The evaluation of tourism destination competitiveness by TOPSIS & information entropy–A case in the Yangtze River Delta of China. *Tourism Management, 32(2),* 443-451. https://doi.org/10.1016/j.tourman.2010.02.007

Chapman, B., & Ryan, C. (May 2002). *Income-Contingent Financing of Student Charges for Higher Education: Assessing the Australian Innovation.* Centre for Economic Policy Research, Australian National University, Discussion Papers No:449.

2547 Sayılı YÖK Kanunu. (1981). T.C. Resmi Gazete. *17506* . 06 Kasım 1981