Research Article/Araştırma Makalesi

Capital Budgeting Methods Used in Investment Project Evaluation: The Example of Top 500 Industrial Enterprises of Turkey[1]

Yatırım Projesi Değerlendirilmesinde Kullanılan Sermaye Bütçelemesi Yöntemleri: Türkiye'nin 500 Büyük Sanayi Kuruluşu Örneği

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Abstract

The main aim of this study is to determine the capital budgeting methods preferred by Turkey's Top 500 Industrial Enterprises when evaluating their investment projects and the usage rates of the capital budgeting techniques. Also, it is aimed to determine the relationship between the capital budgeting methods preferred by both Turkey's Top 500 Industrial Enterprises and companies whose stocks are traded in Borsa Istanbul and firm size, exports, year of establishment, financial risk, education level of managers, sector, and firm performance. The study made use of a questionnaire survey. The survey was used as the data collection method in the study and the survey questions were applied to 500 Largest Industrial Enterprises of Turkey announced by the Istanbul Chamber of Industry in 2018, in 2020. The association between the obtained data was shown using logistic regression analysis. The findings indicated that a statistically significant relationship was determined between the education level, sector and firm age in both Turkey's Top 500 Industrial Enterprises and the companies whose stocks are traded in Borsa Istanbul (Istanbul Stock Exchange), and the preferred methods. However, there is no significant relationship was found between the methods preferred by the companies in Turkey's Top 500 Industrial Enterprises and the firm size, there is a significant relationship was found between the methods preferred by the companies whose stocks are traded in Borsa Istanbul and the firm size. A significant relationship was determined between the export and the methods preferred by the companies in Turkey's Top 500 Industrial Enterprises, but a significant relationship was not found between the companies whose stocks are traded in Borsa Istanbul and their export and firm performance.

Jel Codes: G31, L60, O22
Keywords: *Capital Budgeting Techniques, Top 500 Industrial Enterprises of Turkey, Real Option Method*

Öz

Yapılan bu çalışmanın amacı Türkiye'nin 500 Büyük Sanayi Kuruluşunun yatırım projelerini değerlendirirken tercih ettikleri sermaye bütçelemesi yöntemlerinin kullanım oranının tespit edilmesidir. Ayrıca çalışmada, hem Türkiye'nin 500 Büyük Sanayi Kuruluşunun hem de pay senedi Borsa İstanbul'da işlem gören işletmelerin tercih ettikleri sermaye bütçelemesi yöntemleriyle firma büyüklüğü, ihracat, firma yaşı, finansal risk, yöneticilerin eğitim durumu, sektör ve firma performansı gibi belirleyiciler ile arasındaki ilişkinin ortaya konulması amaçlanmıştır. Çalışmada veri toplama yöntemi olarak anket kullanılmış ve anket soruları İstanbul Sanayi Odası tarafından 2018 yılında ilan edilen Türkiye'nin 500 Büyük Sanayi Kuruluşuna 2020 yılında uygulanmıştır. Çalışmada lojistik regresyon analizi kullanılmıştır. Elde edilen bulgular değerlendirildiğinde; hem Türkiye'nin 500 Büyük Sanayi Kuruluşundaki hem de pay senedi Borsa İstanbul'da işlem gören işletmelerdeki yüksek lisans eğitimine sahip olan yöneticilerin eğitim durumu, sektör ve firma yaşı ile tercih edilen yöntemler arasında istatistiksel olarak anlamlı bir ilişki tespit edilmiştir. Türkiye'nin 500 Büyük Sanayi Kuruluşundaki işletmelerin tercih ettikleri yöntemler ile firma büyüklüğü arasında anlamlı bir ilişki tespit edilemezken, pay senedi Borsa İstanbul'da işlem gören işletmelerin tercih ettikleri yöntemler ile firma büyüklüğü arasında anlamlı bir ilişki tespit edilmiştir. İhracat değişken ile, Türkiye'nin 500 Büyük Sanayi Kuruluşundaki işletmelerin tercih ettikleri yöntemler ile arasında anlamlı bir ilişki tespit edilmiş ancak pay senedi Borsa İstanbul'da işlem gören işletmeler ile ihracat ve firma performansı ile anlamlı bir ilişki tespit edilememiştir.

Jel Kodları: *G31, L60, O22*
Anahtar Kelimeler: *Sermaye Bütçelemesi Yöntemleri, Türkiye'nin 500 Büyük Sanayi Kuruluşu, Reel Opsiyon Yöntemi*

1. Introduction

The need for strategic investments and well-prepared projects to ensure national development continues today. Increasing international competition because of globalization makes it mandatory for businesses to produce not only for national markets, but also for international markets. This situation requires businesses to prepare projects that can cope with global competition and make strategic investments (Gedik, et al., 2005: 51). Therefore, capital budgeting decisions, which are also used as financing expenses of investments made in fixed assets for more than one year play an important role in the survival of enterprises in this global competitive environment. Projects prepared for investments primarily require a large amount of cash outflows and cash inflows occur in the long run. The expectation of the enterprises is to convert their expenditures for the investment project into profit and to complete the project successfully. Managers who want to make predictions about this process and avoid making wrong decisions for their businesses to survive, prefer to use capital budgeting methods when evaluating investment projects. Investment decisions are important for businesses and play a decisive role in increasing the income and market values of businesses in the coming years (Aktaş, et al., 2017: 286). In this direction, businesses should pay attention to the right timing when investing and make investment decisions that are in line with their interests. Otherwise, problems such as financial difficulties or bankruptcy will be inevitable for businesses. To avoid such problems, businesses use capital budgeting methods when evaluating investment projects (Souza & Lunkes, 2016: 515; Ishtiaq et al., 2017: 163; Ma'aji & Barnett, 2019: 174).

Investments are an important issue that determines the welfare of the country in the macro sense and the future of the companies in the micro sense and should be given importance by the managers. It can be clearly said that the investments made by Turkey's Top 500 Industrial Enterprises, which are composed of enterprises operating in the manufacturing industry which has the highest share in the Gross Domestic Product (GDP), not only maximizes the value of the firm, but also it helps to increase the welfare of the country. Therefore, the aim of this study is to determine the rate of use of capital budgeting methods preferred by enterprises in Turkey's Top 500 Industrial Enterprises. When examining the literature on the subject, the survey studies conducted by Öker (1995) and Ergün (2008) on Turkey's Top 500 Industrial Enterprises drew attention. In the study of Öker (1995), the method most used by Turkey's Top 500 Industrial Enterprises is the payback period method; In the study of Ergün (2008), it was determined that the most used method is the net present value method. As a result of the studies conducted using the same sample, it can be clearly said that the methods used by Turkey's Top 500 Industrial Enterprises when evaluating their investment projects have changed.

In the context of this study;

1. Whether the capital budgeting methods preferred by Turkey's Top 500 Industrial Enterprises have changed in the last 13 years,

2. Relationship with preferred capital budgeting methods by using determinants such as firm size, export, establishment year (firm age), financial risk, education level of managers, sector belonging to Turkey's Top 500 Industrial Enterprises,

3. Firm size, exports, year of establishment (company age), financial risk, education level of managers, price/earnings ratio used as a sector and firm performance indicator of both Turkey's Top 500 Industrial Enterprises and companies whose stocks are traded on Borsa Istanbul To investigate the relationship between preferred capital budgeting methods.

The capital budgeting methods most preferred by businesses are described below.

Accounting Rate of Return (ARR): This method, also known by different names such as approximate/average return on investment, average return on capital, profitability ratio method, is defined as the ratio of the average profit from the project to the average carrying amount of the investment. The accounting rate of return indicates the profitability that the project will achieve over its economic life (Seitz & Ellison, 2005: 179; Pike, Neale & Linsley 1993: 129).

Pay Payback Period (PP): The payback period is the length of time or the number of years that must pass before the net inflow of money that an investment will provide can meet the amount of the investment. In other words, it is how soon the invested money will be recovered (Van Horne & Wachowicz, 2005: 320-321). In this method, the acceptance of investment projects is related to the shortness and length of the payback period.

Net Present Value (NPV): The net present value of an investment is calculated by subtracting the initial cash outflow (investment amount) from the sum of the current discounted values of expected cash flows at a certain discount rate (Van Horne & Wachowicz, 2005: 323).

Internal Rate of Return (IRR): This is the ratio that equates the discounted value of net cash inflows expected from an investment to the initial cash outflow (investment amount). It is also defined as the discount rate that equates the NBD to zero (Higgins, 2016: 251).

Real Option Method (RO): It is used for making strategic decisions and evaluating these decisions in terms of financial sustainability and sorting investment projects. This method, like traditional capital budgeting methods, evaluates not only the risks of projects, but also the opportunities they have. In addition, the calculation of this method is based on the net present value method. The new value obtained by adding the option value to the value calculated by the net present value method helps managers in the decision-making process (Fabozzi & Peterson, 2003: 472). In the calculation of the option value in the real option method; the Black-Scholes option pricing model and the Binomial option pricing model are used.

2. Literature Review

Studies on capital budgeting methods started in the 1950s and continue to be researched today. The investments made by the enterprises, which are the subject of capital budgeting, in tangible assets have become more important for the national economies with the

globalization process. For this reason, there are many studies in the literature and some studies are shown in Table 1.

Tablo 1: Literature Review

Author(s)	Year	Country	Method	Conclusion
Istvan	1961	USA	Survey	(1) ARR, (2) PP
Stanley & Block	1984	USA	Survey	IRR
Jog & Srivastava	1995	Canada	Survey	IRR
Oker	1995	Turkey	Survey	PP
Block	1997	USA	Survey	PP
Payne & Heath	1999	Canada & USA	Survey	USA: IRR; Canada: NPV
Graham & Harvey	2001	Canada & USA	Survey	Large scale business: NPV; Small scale business: PP
Ryan & Ryan	2002	Fortune 1000	Survey	NPV
Brounen, Jong & Koedijk	2004	UK, Netherlands, Germany, France	Survey	Large scale business: NPV; Small scale business: PP
Lazaridis	2004	Cyprus	Survey	PP
Hermes, Smid & Yao	2007	Netherlands and China	Survey	The Netherlands prefers NPV more than China.
Leon, Isa & Kester	2008	Indonesia	Survey	Scenario Analysis and Sensitivity Analysis
Ergün	2008	Turkey	Survey	NPV
Holmen & Pramborg	2009	Switzerland	Survey	NPV
Bennouna, Meredith & Marlt	2010	Canada	Survey	NPV, IRR and 3.8% RO
Shinoda	2010	Japan	Survey	PP and NPV
Ahmed	2013	United Arab Emirates	Survey	PP, NPV, PI and IRR, respectively
Dağlı, Eyüboğlu & Sevim	2013	Turkey	Survey	IRR
Daunfeldt & Hartwig	2014	Sweden	Survey	PP
Rossi	2014	Italy, France, and Spain	Survey	PB and NPV
Schlegel, Frank & Britzelmaier	2016	Germany	Survey	NPV
Ishtiaq, Latif, Saleem, Tahir & Tahir	2017	Pakistan	Survey	Large scale business: NPV
Su, Lee, Chou, Yeh & Thi	2018	Vietnam	Survey	There is a positive relationship between preferred capital budgeting techniques and education level, investment size and type of investment
Ma'aji & Barnett	2019	Cambodia	Survey	PP
Alles et al.	2021	Sri Lanka	Survey	(1) PP, (2) NPV
ARR: Accounting Rate of Return, PP: Payback Period, NPV: Net Present Value, IRR: Internal Rate of Return, RO: Real Option Method, PI: Profitability Index				

Kaynak: (Author)

3. Method

In this study, logistic regression analysis was used. Contrary to linear regression analysis, in which both dependent and independent variables are specified numerically, this type of analysis is used to reveal the relationship between dependent variable and independent variable(s) using logistic regression analysis when the dependent variable is specified as a quality (categorical) (Sümbüloğlu & Akdağ, 2007: 139).

In binary logistic regression analysis, the dependent variable has two categories. While coding, the zero number "O" is used as the code for the situation where there is no risk, and the number 1 is used as the code for the situation where there is a risk. In binary logistic regression analysis, although there is no limitation regarding the type of independent variables, the independent variables can be continuous numerical, discrete numerical, unordered, or sortable qualitative variables. Since the result obtained is a probability value, it can only take a value between 0 and 1. The mathematical expression of binary logistic regression analysis is shown in Equation 1 (Alpar, 2021: 635).

X Let's assume the data matrix for the: argument. In the linear regression model $X = x$ when (X when the value of is known) Y The expected value of:

$$E(Y|X = x) = \beta_0 + \beta_1 X \tag{1}$$

The result of this linear function X it can take a value between -∞ and +∞ depending on the value. Since the values estimated by the linear model are not limited between 0 and 1, they are not used for probability modelling. Also, the response variable Y is a binomial random variable. In other words, Y The variance of π (X It is a function of the probability that the dependent variable takes the value 1 when known, as π. The logistic regression model given in Equation 2 can be used to model the probability.

$$\pi(x) = p(Y = 1|X = x) = \frac{e^{(\beta_0 + \beta_1 x)}}{1 + e^{(\beta_0 + \beta_1 x)}} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x)}} \tag{2}$$

According to Equation 2; $X = x$ when $Y = 1$ the possibility or X when the independent variable is known Y the probability that ' is 1 is called π (Alpar, 2021: 635).

3.1. Lojit Model

The nonlinear logistic regression function given in Equation 2 can be linearized when the logit transform is applied. Logit transformation is done by taking the natural logarithm of the odds value (difference value) of an event. Odds of an event $p/(1-p)$ or $\pi/(1-\pi)$ is given, but this ratio can take a value between 0 and ∞. When the natural logarithm of odds is taken, a logit conversion is performed, and logits can take a value between -∞ and +∞. The mathematical expression of the logit transformation is shown in Equation 3 (Alpar, 2021: 636):

$$lojit\ \pi(x) = g(x) = \ln\left(\frac{\pi(x)}{1-\pi(x)}\right) \tag{3}$$

The logistic regression model can be specified from the odds type of the response variable as follows.

$$\frac{\pi(x)}{1-\pi(x)} = e^{(\beta_0 + \beta_1 x)} \tag{4}$$

When the natural logarithm of the odds is taken, the model turns into a linear model.

$$g(x) = \ln\left(\frac{\pi(x)}{1-\pi(x)}\right) = \ln e^{(\beta_0 + \beta_1 x)} = \beta_0 + \beta_{1x} \quad (5)$$

It can be seen in Equation 5; the logit transform creates a linear function of the β parameters. In other words, the only assumption in logistic regression analysis is the relationship between logit and independent variables is linear. The logit model includes many desirable features of the linear regression model. In linear model β_1 while the independent variable shows how much a change in *x* causes a change in the dependent variable, it shows how much a change in logit is caused by a 1-unit change in *x* in the logistic model.

3.2. Sample and Data Set

In this part of the study, information is given about the survey questions and the data collection process, which were created to determine the methods preferred by Turkey's Top 500 Industrial Enterprises and the companies whose stocks are traded in Borsa Istanbul (Istanbul Stock Exchange) when evaluating their investment projects. Ergun (2008), Baker et al. (2010) and Horn et al. (2015) studies were revised and a new survey form consisting of 31 questions was created. After the survey questions were created, the opinions of 6 experts were taken and the survey questions were applied as a pre-test by making face-to-face interviews with the enterprises in Turkey's Top 500 Industrial Enterprises. Officials in the positions of Finance, Accounting, Financial Affairs, Budget Control Specialist and Manager participated in the survey. As a result of the interviews, a survey was conducted with a total of 128 businesses/managers, 66 of which are traded in Borsa Istanbul. The response rate of the survey study carried out; 27.11%, and similar rates were found in the literature review. For example, Öker (1995) obtained a return rate of 17.6% in their study, 20.5% in Ryan & Ryan (2002), and 19.55% in Ergün (2008).

3.3. Research Model

In this part of the study, the models based on the literature review and the variables of the models are mentioned. Model 1 was created to determine the direction and significance of the relationship between the education level of managers, firm size, the sector in which they operate, financial risk, export, and firm age with the capital budgeting methods most preferred by Turkey's Top 500 Industrial Enterprises. Model 2 was created to determine the direction and significance of the relationship between the education level of managers, firm size, the sector in which they operate, financial risk, export, and firm age and price/earnings ratio with the capital budgeting methods most preferred by stocks are traded in Borsa Istanbul.

Model 1*:*

$$CB_i = \alpha_0 + \alpha_1 edu_i + \alpha_2 fsize_i + +\alpha_3 sec_i + \alpha_4 fr_i + \alpha_5 exp_i + \alpha_6 fage_i + \varepsilon_i \quad (6)$$

Model 2:

$$CB_i = \alpha_0 + \alpha_1 edu_i + \alpha_2 fsize_i + +\alpha_3 sec_i + \alpha_4 fr_i + \alpha_5 exp_i + \alpha_6 fage_i + \alpha_7 pe_i + \varepsilon_i (7)$$

The explanations of the variables in Model 1 and Model 2 are shown in Table 2.

Table 2: Variables for Model 1 and Model 2

Dependent Variables		
Sembol	*Variables*	*Data*
CB	Capital Budgeting Techniques RO: Real Option Method PP: Payback Period NPV: Net Present Value IRR: Internal Rate of Return ARR: Accounting Rate of Return	Survey
Independent Variables		
Sembol	*Variables*	*Data*
edu	Primary and secondary school, high school, undergraduate, graduate, master and Ph.D	Survey
fsize	Firm size = Total assets (TL)	İSO
sec	Food, textile, metal industry etc.	Survey
Fr	Total debt/ Total assets	Survey
exp	Foreign sales (TL)	Finnet
fage	Year the company started operating	Survey
pe	Price Earnings Ratio (Borsa Istanbul)	Finnet

The hypotheses created in the context of Model 1 and Model 2 are as follows:

H_1: There is a relationship between the preferred capital budgeting methods and the educational status of managers. (For 500 Major Industrial Enterprises of Turkey and companies whose stocks are traded in Borsa Istanbul)

H_2: There is a relationship between preferred capital budgeting methods and firm size. (For 500 Major Industrial Enterprises of Turkey and companies whose stocks are traded in Borsa Istanbul)

H_3: There is a relationship between the preferred capital budgeting methods and the sectors. (For 500 Major Industrial Enterprises of Turkey and enterprises whose share certificates are traded on Borsa Istanbul)

H_4: There is a relationship between the preferred capital budgeting methods and the size of the financial risk. (For 500 Major Industrial Enterprises of Turkey and companies whose stocks are traded in Borsa Istanbul)

H_5: There is a relationship between the preferred capital budgeting methods and export. (For 500 Major Industrial Enterprises of Turkey and companies whose stocks are traded in Borsa Istanbul)

H_6: There is a relationship between the preferred capital budgeting methods and the year of establishment of the firms. (For 500 Major Industrial Enterprises of Turkey and companies whose stocks are traded in Borsa Istanbul)

H_7: There is a relationship between the preferred capital budgeting methods and financial performance. (For companies whose stocks are traded in Borsa Istanbul)

4. Findings

Descriptive statistics of Turkey's Top 500 Industrial Enterprises are shown in Table 3 and Table 4.

Table 3: Demographic Information

		Frequency	Percentage (%)
Gender	Man	89	69.5
	Woman	39	30.5
	Total	**128**	**100**
		Frequency	Percentage (%)
Age	<40	20	15.6
	40-49	71	55.5
	50-59	37	28.9
	Total	**128**	**100**
		Frequency	Percentage (%)
Education Level	Bachelor's degree	70	54.7
	Master's degree	58	45.3
	Total	**128**	**100**
		Frequency	Percentage (%)
Tenure	<4 years	20	15.6
	4-9 years	89	69.5
	> 9 years	19	14.8
	Total	**128**	**100**

As it can be seen in Table 3, 69.5% of the officials participating in the survey who take charge in finance, accounting, financial affairs, budget control specialist or managerial positions are "male" and 30.5% are "female". In addition, when the age distribution of the participants is examined; 15.6% are "under 40 years old", 55.5% are "40-49 years old", 28.9% are "50-59 years old". When the educational status of the participants is examined, only undergraduate and graduate students were preferred among the six groups in the education category (primary education-secondary education-high school-bachelor's degree- master's degree-doctorate). 45.3% have a "master's degree" education and 54.7% have a "bachelor's degree" education. 15.6% of the participants continue their duties in enterprises "less than 4 years", 69.5% "between 4-9 years" and 14.8% "more than 9 years".

Table 4: Descriptive Statistics

Variables	Number of Observation	Mean	Standard Deviation	Minimum	Maximum
fsize	84	35.577	59.39	2.4144	350.668
Fr	99	2.3398	4.534821	0.2	32
exp	98	289.604	737.223	1.2604	5682.76
age	128	51.453	21.529	7	128
Fk	37	15.989	7.8456	5.2	40

When Table 4 is examined. it is observed that the number of observations belonging to the enterprises is different. The age variable represents the year of establishment of the

enterprises, and this data could be easily collected by means of a survey. However, not every business shares the data on firm size, financial risk, price/earnings ratio, and export variables. For this reason, the number of observations varies. When the averages of the data belonging to the enterprises are examined, the average of the firm size variable is 35,577 TL, the average of the financial risk and price/earnings ratio variable is 2.3398% and 15.989%, respectively. The average of the export variable is 289,604 TL. The mean of the age variable is 51,453 years.

Table 5: Correlation Matrix (Turkey's Top 500 Industrial Enterprises)

Variables	fr	fsize	edu	exp	sec	fage
Fr	1.000					
fsize	0.015	1.000				
edu	0.037	0.230	1.000			
exp	-0.008	0.573	0.205	1.000		
sec	0.098	0.184	0.194	0.321	1.000	
fage	0.056	0.161	-0.016	0.147	0.078	1.000

When Table 5 is examined, according to the Pearson correlation coefficient interpretation; It is determined that there is a positive moderate correlation between the "export and firm size" and "sector and export" variables, while there is a positive but weak correlation between the other variables. However, it is determined that there is a weak negative correlation between the "export and financial risk" variables.

Table 6: Correlation Matrix (Shares Traded on Borsa Istanbul)

Variables	fsize	fage	exp	edu	sec	fr	pe
fsize	1.000						
fage	0.465	1.000					
exp	0.529	0.312	1.000				
edu	0.501	0.221	0.316	1.000			
sec	0.111	0.100	0.283	0.126	1.000		
fr	-0.057	0.127	-0.038	0.146	0.363	1.000	
pe	-0.161	-0.020	-0.142	-0.206	0.084	0.046	1.000

When Table 6 is examined, according to the Pearson correlation coefficient interpretation; It has been determined that there is a moderate positive correlation between the variables of "firm age, export and education level of managers" and "firm size" variable. Similarly, it has been determined that there is a moderate positive correlation between the "educational level and sector of the managers" variables and the "export" variable and between the "financial risk and sector" variables. In addition, there is a weak negative correlation between the "financial risk" variable and the "firm size and export" variables; It has been determined that there is a weak negative correlation between the "price/earnings ratio" variable and the "firm size, export, age and educational status" variables.

The most preferred capital budgeting method in the study is shown in Table 7.

Table 7: Preferred Capital Budgeting Methods

	Primary		Secondary		Tertiary	
	Frequency	(%)	Frequency	(%)	Frequency	(%)
Real option method	26	20.31	63	49.22	31	24.22
Accounting rate of return	64	50	46	35.94	10	7.81
Net present value	77	60.16	30	23.44	14	10.94
Payback period	31	24.22	25	19.53	64	50
Profitability index	13	10.16	32	25	58	45.31
Internal Rate of Return	22	17.19	49	38.28	46	35.94
Annual equivalent expense	13	10.16	6	4.69	18	14.06
Personal value and opinion	3	2.34	0	0	5	3.91
Capital structure of similar companies	2	1.56	1	0.78	0	0
Regression and simulation analysis	4	3.13	4	3.13	8	6.25

In Table 7, the methods preferred by the companies participating in the survey are; As in the study of Ma'aji & Barnett (2019), they were grouped as primary, secondary and tertiary preferred methods. According to this grouping, 60.16% of the enterprises prefer the "net present value" method as the primary method, 49.22% choose the "real option" as the secondary method, and 50% prefer the "payback period" method as the tertiary method.

The most preferred capital cost method in the study is shown in Table 8.

Tablo 8: Cost of Capital Methods

	Frequency	Percentage (%)
Cost of Debt	61	47.7
Cost of Equity	34	26.6
Weighted average cost of capital	15	11.7
Benchmarks based on your experience	10	7.8
Growth expectation and dividend distribution expectation	2	1.6
Interest rate	1	0.8
I do not want to answer	5	3.9
Total	128	100.0

When Table 8 is examined, the enterprises participating in the survey while determining the cost of capital 47.7%, "cost of debt", 26% "cost of equity", 11.7% "weighted average cost of capital", 7.8% "metrics based on past experience" use is detected. In addition, 1.6% of the enterprises stated that they use the "growth expectation and dividend distribution expectation", and 0.8% use the "interest rate". 3.9% of the enterprises did not answer this question in the survey.

4.1. Logistic Regression Analysis Results

In this part of the study, Model 1 and Model 2 created for Turkey's Top 500 Industrial Enterprises and companies whose stocks are traded in Borsa Istanbul are analyzed by logistic regression method and the results are given.

4.1.2. Logistics Regression Analysis Results for Turkey's Top 500 Industrial Enterprises

While determining the capital budgeting methods used as the dependent variable in the study, the question *"Which is the capital budgeting method used to evaluate investment projects in your company? (Please* rank *1 in order of importance)."* According to the answers of the participants, the most preferred methods were grouped as in the study of Hermes et al., (2007). While doing this grouping; if real options (RO), net present value (NBV), accounting rate of return (ARR), internal rate of return (IRR), payback period (PP), profitability index (CI), annual equivalent expense (AEE), personal value and opinion (PVO), capital structure of similar companies (CSSC) and regression and simulation analysis (RSA) methods if 1st and 2nd; As 1, if it is not in the top 2 in the ranking; It is set to 0. While determining the educational status variable, EDU=1 if the education level of the administrators is a master's degree, and 0 if it is a bachelor's degree. The sector variable is divided into 8 groups and its coding is shown in Table 9.

Table 9: Coding of Sector Groups

Sector	Codes
Food, Beverage, and Tobacco	sec1
Textiles, Apparel and Leather	sec2
Paper and Paper Products, Printing and Publishing	sec3
Chemistry Pharmaceutical Petroleum Rubber and Plastic Products	sec4
Based on Stone and Soil	sec5
Base Metal Industry	sec6
Metal Goods Machinery Electrical Devices and Transportation Vehicles	sec7
Other	sec8

In addition, the export data in the study is divided by 1,000 TL and the firm size data by 100 million TL, making it easier to interpret the data. Financial risk is used as a ratio.

Table 10: Logistic Regression Analysis Results

Variables	RO	NPV	ARR	PP	IRR
fsize	0.00924	-0.0147	-0.00843	-0.00921	0.0140
	(0.0147)	(0.0106)	(0.00882)	(0.0128)	(0.0118)
fage	-0.0598**	0.00540	0.0200	0.0152	-0.00874
	(0.0279)	(0.0171)	(0.0156)	(0.0158)	(0.0190)
exp	-0.00127	0.0115**	0.00195	-0.00216	-0.00539
	(0.00429)	(0.00495)	(0.00282)	(0.00328)	(0.00437)
edu	0.200	1.545	-0.220	-0.356	-0.745
	(0.861)	(0.984)	(0.654)	(0.737)	(1.003)
sec2	1.195	2.099*	-0.103	0.267	
	(1.014)	(1.253)	(0.871)	(0.987)	
sec4		1.472	0.190	-0.957	1.905
		(1.382)	(1.003)	(1.320)	(1.163)
sec5		0.393	0.365	2.164	
		(1.459)	(1.402)	(1.510)	
sec6	0.0920	-2.452*	0.407	1.394	0.722
	(1.497)	(1.388)	(1.117)	(1.208)	(1.459)
sec7	2.713**	-3.952**	-0.341	0.431	3.195***
	(1.360)	(1.598)	(1.092)	(1.182)	(1.193)
sec8	0.611	-1.542	1.230	0.939	
	(1.379)	(1.435)	(1.295)	(1.239)	
fr	-0.0553	0.0313	0.0316	-0.0448	0.0229
	(0.0398)	(0.0370)	(0.0268)	(0.0328)	(0.0353)
Constant	1.661	-1.341	-1.394	-0.547	-2.225*
	(1.586)	(1.282)	(1.106)	(1.236)	(1.347)
Number of observations	56	56	56	55	56

Note: The data in parentheses show the standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Due to the small number of companies using PI (Profitability Index) and other methods, they could not be separated and included in the model.

Table 10 shows the results of binary logistic regression analysis estimated with explanatory variables, affecting the probability of using capital budgeting methods preferred by Turkey's Top 500 Industrial Enterprises. The coefficients of the estimated logistic regression model cannot be interpreted directly, and marginal effects (dy/dx) are used to interpret the coefficients (Çağlayan Akay & Korkmaz, 2021: 199). The marginal effects of the results of the logistic regression analysis conducted to examine Turkey's Top 500 Industrial Enterprises are given in Table 11.

Table 11: The Marginal Effects of the Results of the Logistic Regression Analysis

Variables	RO	NPV	ARR	IRR	PP
fsize	0.00112	-0.00202	-0.00181	0.00160	-0.00174
	(0.00177)	(0.00137)	(0.00184)	(0.00131)	(0.00231)
fage	-0.00726**	0.000742	0.00429	-0.000997	0.00256
	(0.00302)	(0.00235)	(0.00318)	(0.00215)	(0.00270)
exp	-0.000155	0.00158***	0.000419	-0.000615	-0.000396
	(0.000520)	(0.000561)	(0.000596)	(0.000484)	(0.000581)
edu	0.0243	0.212*	-0.0473	-0.0850	-0.0770
	(0.104)	(0.125)	(0.140)	(0.114)	(0.130)
sec2	0.145	0.289*	-0.0221		-0.00493
	(0.119)	(0.155)	(0.187)		(0.170)
sec4		0.202	0.0409	0.217*	-0.222
		(0.182)	(0.215)	(0.126)	(0.228)
sec5		0.0540	0.0784		0.336
		(0.200)	(0.300)		(0.252)
sec6	0.0112	-0.337**	0.0874	0.0823	0.206
	(0.182)	(0.169)	(0.239)	(0.166)	(0.205)
sec7	0.329**	-0.543***	-0.0732	0.364***	0.0301
	(0.144)	(0.171)	(0.234)	(0.108)	(0.207)
sec8	0.0742	-0.212	0.264		0.116
	(0.167)	(0.190)	(0.270)		(0.214)
Fr	-0.00671	0.00430	0.00680	0.00262	-0.00779
	(0.00461)	(0.00499)	(0.00549)	(0.00399)	(0.00550)
Number of Observation	56	56	56	56	56
McFadden R^2	0.22	0.37	0.07	0.20	0.12

Note: The data in parentheses show the standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

When Table 11 is analyzed, with the capital budgeting methods preferred by Turkey's Top 500 Industrial Enterprises; The statistical relationship between the education level of the managers, the size of the firm, the sector in which they operate, financial risk, exports and the age of the firm is as follows:

> ➢ A one-unit increase in a firm's age (as the firm gets older) reduces the probability of RO choice by approximately 0.72%.

> ➢ If a company operates in the metal goods industry, the probability of choosing RO increases by approximately 32.9%.

> ➢ A one-unit increase in a firm's exports increases the probability of NPV to be preferred by about 0.15%.

> ➢ One unit increase in the education level of a company manager (from undergraduate to graduate) increases the probability of choosing NPV by approximately 21.2%.

> ➢ If a firm operates in the textile industry, the probability of choosing NPV decreases by approximately 28.9%.

➢ If a company operates in the basic metal industry, the probability of choosing NPV decreases by approximately 33.7%.

➢ If a company operates in the metal goods industry, the probability of choosing NPV decreases by approximately 54.3%.

➢ If a company operates in the chemical, pharmaceutical and petroleum industries, the probability of choosing IRR increases by approximately 21.7%.

➢ If a company operates in the metal goods industry, the probability of choosing IRR increases by approximately 36.4%.

4.2.2.2. Logistics Regression Analysis Results for Stocks Traded in Borsa Istanbul

In this section, *"Do you operate in Borsa Istanbul?"* coding according to the answer given to the question; 1 if the entity's answer is yes; If no, it is set to 0. In addition, the price-earnings ratio added to the model is included in the analysis (see Model II). Logistic regression analysis results are shown in Table 12.

Table 12: Logistic Regression Analysis Results

Variables	RO	NPV	ARR	PP	IRR
fsize	0.0257	-0.0119	0.0226	-0.0834*	-0.0399
	(0.0382)	(0.0141)	(0.0180)	(0.0479)	(0.104)
fage	0.240	0.0353	-0.118*	0.233*	-0.144*
	(0.204)	(0.0483)	(0.0662)	(0.124)	(0.0821)
exp	0.0457	0.00385	0.00384	-0.00117	-0.00477
	(0.0396)	(0.00350)	(0.00349)	(0.00404)	(0.0106)
pe	0.00211	0.000283	-0.00501	0.00551	-0.00330
	(0.00805)	(0.00325)	(0.00589)	(0.00743)	(0.00619)
fr	0.156	0.00951	0.0688	-0.108	0.0266
	(0.301)	(0.0482)	(0.0586)	(0.0850)	(0.0711)
edu	-7.542	0.994	-2.856*	4.461	0.237
	(6.746)	(1.345)	(1.707)	(3.307)	(1.636)
sec2	24.72	0.804			
	(22.47)	(1.480)			
sec7	16.87	-2.146	3.186	-7.079*	4.876*
	(16.27)	(1.727)	(1.966)	(4.104)	(2.532)
sec8	27.92		0.629		
	(25.06)		(2.529)		
sec4		1.163	0.978	-7.337**	4.246
		(1.443)	(1.484)	(3.363)	(2.599)
sec5			0.471	-1.327	
			(2.821)	(6.910)	
Constant	-41.68	-2.274	2.902	-5.293	4.349
	(36.54)	(2.320)	(2.833)	(4.971)	(3.780)
Number of Observation	26	26	26	26	26

Note: The data in parentheses show the standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Since the results obtained in the logistic regression analysis cannot be interpreted directly, the marginal effects were calculated, and the results are shown in Table 13.

Table 13: The Marginal Effects of The Results of The Logistic Regression Analysis

Variables	RO	NPV	ARR	PP	IRR
fsize	-0.000762	-0.00260	0.00353	-0.00780**	-0.00426
	(0.00235)	(0.00268)	(0.00252)	(0.00350)	(0.0110)
fage	0.0142*	0.00620	-0.0185**	0.0217**	-0.0154**
	(0.00811)	(0.00912)	(0.00783)	(0.00855)	(0.00653)
exp	0.00101	0.000460	0.000602	-0.000110	-0.000509
	(0.00143)	(0.000916)	(0.000502)	(0.000374)	(0.00112)
pe	0.000506	0.000132	-0.000785	0.000515	-0.000352
	(0.000494)	(0.000645)	(0.000874)	(0.000673)	(0.000648)
fr	-0.0105	0.000876	0.0108	-0.0101	0.00284
	(0.0183)	(0.00932)	(0.00831)	(0.00684)	(0.00752)
edu	-0.337	0.228	-0.447**	0.417	0.0253
	(0.287)	(0.258)	(0.217)	(0.274)	(0.174)
sec2	1.701	0.182			
	(225.5)	(0.283)			
sec6	1.347	0.197			
	(225.5)	(0.471)			
sec7	1.409	-0.363	0.499**	-0.662**	0.521***
	(225.5)	(0.325)	(0.249)	(0.303)	(0.188)
sec8	1.852		0.0985		
	(225.5)		(0.394)		
sec4		0.277	0.153	-0.686***	0.453**
		(0.287)	(0.225)	(0.183)	(0.225)
sec5			0.0738	-0.124	
			(0.441)	(0.645)	
Number of Observation	26	26	26	26	26
McFadden R^2	0.50	0.17	0.28	0.55	0.38

Note: The data in parentheses show the standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

When Table 13 is examined, with the capital budgeting methods preferred by the companies whose stocks are traded in Borsa Istanbul; The statistical relationship between the education level of the managers, the size of the firm, the sector in which they operate, the financial risk, the price-earnings ratio, the export, and the age of the firm is as follows:

➤ A 1-unit increase in the age of a firm (as the firm gets older) increases the probability of choosing RO by approximately 1.4%.

➤ A 1-unit increase in the age of a firm (as the firm gets older) reduces the probability of choosing ARR by approximately 1.8%.

➤ One unit increase in the education level of a company manager (from undergraduate to graduate) reduces the probability of choosing ARR by approximately 44.7%.

➢ If a company operates in the metal goods industry, the probability of choosing ARR increases by approximately 49.9%.

➢ A one-unit increase in the firm size of a firm reduces the probability of choosing the PP by approximately 0.7%.

➢ A 1-unit increase in the age of a firm (as the firm gets older) increases the probability of choosing PP by approximately 2.1%.

➢ If a company operates in the chemical, pharmaceutical and petroleum industries, the probability of choosing PP decreases by approximately 68.6%.

➢ If a company operates in the metal goods industry, the probability of choosing PP decreases by approximately 66.2%.

➢ An increase of 1 unit in the age of a firm (as the firm gets older) reduces the probability of choosing IRR by approximately 1.5%.

➢ If a company operates in the chemical, pharmaceutical and petroleum industries, the probability of choosing IRR increases by approximately 45.3%.

➢ If a company operates in the metal goods industry, the probability of choosing IRR increases by approximately 52.1%.

➢ In addition, in the study, the relationship between firm performance (price/earnings ratio) and preferred methods was tried to be determined, but a statistically significant relationship could not be determined.

Table 14: Summary of Model 1 and Model 2 Results

Variables	Turkey's 500 Largest Industrial Enterprises	Companies whose Shares are Traded on Borsa Istanbul
Education (Master's Degree)	NBD (Increases)	MGO (decreases)
Company Size	-	SEE (decreases)
Textile Industry	NBD (Increases)	-
Chemical Industry	IVO (Increases)	IVO (Increases); GOS(Decreases)
Base Metal Industry	NBD (Decreases)	-
Metal Goods Industry	NBD (Increases); RO (Increases)	MGO (Increases); IVO(Increases); GOS (Decreases)
Financial Risk	No relationship	No relationship
Export	NBD (Increases)	No relationship
Firm age (As it increases)	RO (Decreases)	RO (Increases); GOS (Increases); MGO (Decreases); IVO (Decreases)
Firm Performance (F/K)	-	No relationship

5. Discussion

In this part of the study, the relationship between the capital budgeting methods preferred by Turkey's Top 500 Industrial Enterprises and the companies whose stocks are traded in Borsa Istanbul, and the education level of the managers, firm size, sector, export, financial risk, firm age and price/earnings ratio is discussed.

5.1. The Relationship Between Preferred Capital Budgeting Methods and Educational Level of Managers

As a result of the profit expectation of the enterprises or their partners, it is expected that the business managers consider the dynamic methods including the risks, uncertainties and the time value of money, while making investment decisions, or the static methods (Leon, 2008: 180; Batra & Verma, 2017: 38). However, for managers to make sound decisions, individuals in managerial positions are expected to receive education in their fields (such as master's degree, doctorate degree), to have knowledge and skills about financial programs, and to be at a high level in computer use (Hermes et al., 2007: 634). It is also expected that managers with such characteristics or decision makers for investment projects will prefer dynamic or real options rather than static methods (Ma'aji & Barnett, 2019: 180; Daunfeldt & Harwing, 2014: 106). In this context, in this study, it is expected that managers with undergraduate or graduate education who answer the survey questions will prefer dynamic methods such as real option, net present value, internal rate of return, and profitability index.

Hermes et al. (2007). Leon et al. (2008), Maquieira et al. (2012), Ahmed (2013), Daunfeldt & Harwing (2014), Batra & Verma (2017), Su et al. (2018) and Ma'aji & Barnett (2019) found that managers with undergraduate or graduate education use real options or dynamic methods. In addition, Ma'aji & Barnett (2019) concluded that administrators with high school, secondary or primary education generally prefer the payback period method. Brounen et al. (2004) found that managers of companies operating in the Netherlands, Germany and France prefer dynamic methods. However, a significant relationship could not be found between the education levels of the managers of the enterprises operating in the United Kingdom and the preferred capital budgeting method. Baker et al. (2010); Andres et al. (2015) revealed that there is no significant relationship between the real option method and the educational status of the managers.

In this study, it has been determined that the managers who have master's education in Turkey's Top 500 Industrial Enterprises prefer the net present value method more. This finding supports the opinion that dynamic methods are preferred more in a change observed in the education level of managers, as seen in the literature. It has been determined that the managers who have a master's degree in the companies whose stocks are traded in Borsa Istanbul prefer the accounting rate of return method less. This situation shows that business managers whose stocks are traded in Borsa Istanbul may give up preferring static methods in a change observed in education level.

5.2. Relationship Between Preferred Capital Budgeting Methods and Firm Size

Large-scale businesses may experience financial distress or even face bankruptcy if they do not consider the cost of capital while making high-risk investments with increasing global competition. While this situation reveals the importance of capital cost calculation, it also reveals that managers tend to prefer dynamic methods in which the capital cost is included in the calculation when making investment decisions (Hermes et al., 2007: 635; Brounen et al. 2004: 81, Batra & Verma, 2017: 38). Furthermore, while evaluating investment projects, capital cost plays crucial role in the calculation of dynamic methods, and managers are aware

of this importance (Stulz, 1999: 2). If the discount rate used when evaluating investment projects with dynamic methods is equal to or greater than the cost of capital, the investment project is accepted (Ertuğrul, 2009: 30). Accordingly, Stanley & Block (1984) who revealed that large-scale enterprises whose stocks are traded in the stock exchange should be able to accurately estimate the cost of capital and the cost of equity capital when evaluating their investment projects, obtained results supporting this situation in their studies and found that large-scale enterprises prefer dynamic capital budgeting methods. Some researchers supported this opinion by reaching the conclusion that large-scale enterprises use the real option method or dynamic methods when evaluating their investment projects (Scott & Petty, 1984; Payne et al., 1999; Ryan & Ryan, 2002; Brounen et al., 2004; Truong et al., 2008; Holmen & Pramborg, 2009; Baker et al., 2010; Rossi, 2014; Andres et al., 2015; Andor et al., 2015; Batra & Verma, 2017). However, Graham & Harvey (2001) and Ahmed (2013) found that large-scale enterprises use both dynamic and static methods when making investment decisions. Block (1997) on the other hand, found that the payback period method was used at a rate of 42.7% in his survey conducted on small-scale businesses that play an important role in creating employment in the United States. In addition, Lazaridis (2004) concluded that small and medium-sized enterprises prefer the payback period method. In this study, it has been determined that large-scale enterprises whose stocks are traded in Borsa Istanbul prefer the payback period method less. This situation shows that large-scale enterprises may give up preferring static methods.

5.3. Relationship Between Preferred Capital Budgeting Methods and Sectors

The size of the investments made in real assets and the importance of the investments differ according to the sectors (Baker et al., 2010: 10; Block, 2007: 259). The reason for this situation is that the technology used in the enterprises is different, the competitiveness between the enterprises belonging to the same sector, the knowledge and skills of the working personnel, the size of the investments made in fixed assets and the different risks belonging to the sectors (Leon et al., 2008: 186).

Truong et al. (2008) found that the most used method in the metal industry sector is the real option method, while industrial enterprises use both static and dynamic methods equally. In Rossi's (2014) applied to businesses in the manufacturing industry, retail, and service sectors; It has been concluded that the payback period method in the manufacturing industry and the net present value method in the retail and service sectors are the most used. Hartwig (2012) determined the sectors as manufacturing industry and others in his study. While the group of sectors specified as "others" preferred both static and dynamic methods in 2005; In 2008, they preferred to use only the profitability index method. While Sandahl & Sjögren (2003) found that only the finance and transportation sectors, among the sectors in their study, use the net present value method; they found that other sectors use the payback period method. Andres et al. (2015) found that the companies operating in the manufacturing industry preferred the payback period method and that the businesses operating in other sectors included in the study; They concluded that they preferred different dynamic methods. However, Leon et al. (2008) obtained the result that the capital budgeting methods used did not differ according to the sectors in the survey they conducted with 108 enterprises traded

in the Jakarta stock exchange. Similarly, Holmen & Pramborg, (2009) and Alleyne et al. (2018) did not find a significant relationship between the sectors of the enterprises they examined, and the capital budgeting methods used.

In this study, the results supporting the studies in the literature were determined. It has been determined that the enterprises operating in the textile industry in Turkey's Top 500 Industrial Enterprises prefer the net present value method more. It has been determined that enterprises operating in the chemical, pharmaceutical and petroleum industries prefer the internal rate of return method more. However, it has been determined that the enterprises operating in the basic metal industry prefer the net present value method less. It has been determined that businesses operating in the metal goods industry prefer both the net present value method and the real option method more. It has been determined that the companies whose stocks are traded in Borsa Istanbul and operating in the metal goods industry prefer the accounting return rate and internal rate of return methods rather than the payback period method. This situation shows that the companies operating in the metal goods industry prefer both static and dynamic methods. It has been determined that companies operating in the chemical, pharmaceutical and petroleum industries prefer the internal rate of return method more than the payback period method. This study clearly shows that companies operating in different sectors prefer dynamic and real option methods more than static methods.

5.4. The Relationship Between Preferred Capital Budgeting Methods and Financial Risk

In their study, Graham & Harvey (2001) argue that the reason why businesses that tend to use high financial leverage prefer more dynamic methods is because they are more careful while making capital investments, and they concluded that businesses using high leverage prefer dynamic methods when evaluating their investment projects. However, Daunfeldt & Hartwig (2014) and Ahmed (2013) revealed that businesses that use high financial leverage when evaluating investment projects are exposed to excessive pressure and because of this pressure, businesses try to save the initial costs they use while investing. This situation reveals that businesses tend to use static methods rather than dynamic methods.

As a result of the survey conducted by Hartwig (2012) on businesses operating in Sweden, it was concluded that businesses using high leverage prefer static methods such as payback periods. Holmen & Pramborg (2009) who support the idea that businesses use calculations that do not consider the time value of money, to get rid of this pressure as soon as possible, found that Swedish businesses use the payback period method. Ahmed (2013) found a positive and significant relationship between leverage ratio and both the payback period method, which is one of the static methods, and the net present value method, which is one of the dynamic methods. Leon et al. (2008) did not find a significant relationship between financial risk and the capital budgeting methods used. In this study, too No significant relationship was found between financial risk and preferred methods.

5.5. The Relationship Between Preferred Capital Budgeting Methods and Exports

In general, it is thought that the export-oriented production companies consider the risks in their investments. It is thought that exporting companies will prefer methods that take risk and uncertainty into account when investing because they are exposed to risks such as

currency, political, global and interest rates (Graham & Harvey, 2001: 204). In this context, businesses are expected to prefer dynamic methods or risk assessment methods when evaluating investment projects. However, Daunfeldt & Hartwig (2014) found a positive relationship between exports and the payback period method in their study, which suggested that there might be a positive relationship between exports and sensitivity analysis. Holmen & Pramborg (2009) revealed in their study that when managers consider political risk while making exports or foreign direct investments, static methods are preferred rather than dynamic methods because they are easy to calculate.

Andres et al. (2014) argued that on the contrary, overseas exporting companies prefer dynamic methods in their studies. Hermes et al. (2007) revealed that large-scale exporting enterprises prefer dynamic methods such as the net present value method. However, Hartwig (2012) did not find a significant relationship between exporting companies and the capital budgeting methods they use most. Graham & Harvey (2001) reached a similar conclusion in their study. In this study, however, it has been determined that exporting Turkey's Top 500 Industrial Enterprises prefer the net present value method, which is one of the dynamic methods, more.

5.6. Relation between Preferred Capital Budgeting Methods and Age of Firm

Especially since the companies whose stocks are traded on the stock exchange are subject to more regulation and market monitoring, businesses need to make more rigorous investments (Leon et al., 2008: 186). The operations and performances of these enterprises are analyzed and followed by local and foreign experts and investors (Daunfeldt & Hartwig, 2014: 108). This situation causes businesses with older company age to be exposed to more follow-up and examination compared to businesses with younger company age and leads businesses to be more sensitive when making investment decisions. This situation therefore reveals that the capital budgeting method used differs according to the age of the firm.

Ryan & Ryan (2002), Sandahl & Sjogren (2003), Leon et al. (2008), Singh et al. (2012), Daunfeldt & Hartwig (2014), and Ma'aji & Barnett (2019) found a positive and significant relationship between the age of the firm and the capital budgeting methods used. Ahmed (2013) stated that the dynamic methods of companies with an older age; on the other hand, it has been revealed that companies with a small company age (less than 5 years) prefer the payback period method the most among the static methods. Contrary to this situation, Batra & Verma (2017) found that businesses with a small age prefer dynamic methods. In addition, in their studies, the net present value method, which is one of the dynamic methods of the companies with a small age, and the companies with a large age of the company; They found that they preferred the internal rate of return method. In this study, it has been determined that companies with older firms in Turkey's Top 500 Industrial Enterprises prefer the real option method less. This situation can be shown that companies with older company age may prefer static or dynamic methods. However, it has been determined that among the companies whose stocks are traded in Borsa Istanbul, the older companies prefer both the real option and the payback period method more. In addition, it has been determined that among the companies whose stocks are traded in Borsa Istanbul, those whose firm age is older prefer both the accounting rate of return and the internal rate of return method less. This situation

shows that companies with older firm age did not give up the payback period method, which is one of the traditional calculation methods, but started to use the real option method, which is one of the new methods.

5.7. The Relationship between the Capital Budgeting Methods Preferred by the Companies whose Stocks are Traded in Borsa Istanbul and the Firm's Performance

In this study, the relationship between the capital budgeting methods preferred by the companies whose stocks are traded in Borsa Istanbul and firm performance has been determined. Price/Earnings (P/E) ratio, which is widely used in the literature, is used as an indicator of firm performance (Gürsoy & Aydoğan, 2002; Chang et al. 2008; Horasan, 2009; Birgili & Düzer, 2010; Nargelecekenler, 2011; Korkmaz & Karaca, 2013). A high P/E ratio indicates that the investor is very hopeful about the future of the business. Generally, high-capacity enterprises that grow fast and pay high dividends have a high P/E ratio (Gereklioğlu Düzakın, 2013: 81). The low P/E ratio shows that businesses ignore the results of their past studies that help them determine their future plans. It is important for businesses to see their deficiencies and to complete these deficiencies, to determine and control the factors affecting their performance and to use their resources in this direction in determining their future goals. For businesses to be successful in their long-term investments, it is important that decision-making managers in businesses make the right decisions and use the capital determined for investment rationally and optimally. It shows the necessity of using capital budgeting methods when evaluating investment projects (Bayyurt, 2007: 578; Esmer & Faruk, 2019: 629). Hartwig (2014) examined the relationship between preferred capital budgeting methods and firm performance but did not find a statistically significant result. This study carried out that it was tried to determine the relationship between the capital budgeting methods preferred by the companies whose stocks are traded in Borsa Istanbul and the performance of the company, but no statistically significant relationship was found.

6. Conclusion and Recommended

In this study, it has been determined that the most preferred capital budgeting method when evaluating the investment projects of Turkey's Top 500 Industrial Enterprises is the net present value method. This shows that businesses do not give up on choosing dynamic methods when evaluating investment projects. In addition, it was examined whether the real option method is a preferred method by the enterprises, and it was determined that the enterprises preferred this method in the second place. Furthermore, it is aimed to determine the relationship between the capital budgeting methods preferred by both Turkey's Top 500 Industrial Enterprises and companies whose stocks are traded in Borsa Istanbul and firm size, exports, year of establishment, financial risk, education level of managers, sector, and firm performance.

The findings indicated that a statistically significant relationship was determined between the education level, sector and firm age in both Turkey's Top 500 Industrial Enterprises and the companies whose stocks are traded in Borsa Istanbul, and the preferred methods. While there is no significant relationship was not found between the methods preferred by the companies

in Turkey's Top 500 Industrial Enterprises and the firm size, a significant relationship was found between the methods preferred by the companies whose stocks are traded in Borsa Istanbul and the firm size. A significant relationship was determined between the export and the methods preferred by the companies in Turkey's Top 500 Industrial Enterprises, but a significant relationship was not found between the companies whose stocks are traded in Borsa Istanbul and their export and firm performance. Finally, there is no significant relationship was found between the financial risk ratio of the companies in Turkey's Top 500 Industrial Enterprises and the companies whose shares are traded in Borsa Istanbul and the preferred methods.

This study was carried out on the enterprises in Turkey's Top 500 Industrial Enterprises that shape the development of the Turkish industrial sector. Fixed capital investments, which have an important place in the economic development of countries; it is thought to play a key role in many areas such as production, R&D, value-added products, and employment. Therefore, in this study, it has been revealed how businesses operating in markets where competition is intense are evaluating their investment projects.

This research is an important resource especially for managers who have authority in the evaluation of investment projects, and it is thought that it will offer a multiple perspective. in order to ensure continuity in the market and increase the well-being of shareholders, companies will always need to invest. As a result of the study, it was determined that the NPV method is the first preferred method. The fact that the NPV method is based on the assumption that the cash flows from the project can be reinvested at the same cost of capital allows business managers to use the same discount rate for all projects. This means that shareholders can reinvest their periodic cash flows at the same discount rate and take into account the opportunity cost. Additionally, this study, which examines the sample covering the whole of Turkey, can be repeated regionally. This study, which examines the manufacturing industry as a sector, can be repeated with smaller samples in different sectors. Finally, alternative variables such as target debt, number of managers, age of managers, working time of managers in the company, dividend payment rate in the study of Daunfeldt & Hartwig (2014) can be used. Thus, the relationship between these variables and the preferred capital budgeting methods can be revealed and contribute to the literature.

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Çıkar Beyanı: Yazarlar arasında çıkar çatışması yoktur.

Etik Beyanı: Bu çalışmanın tüm hazırlanma süreçlerinde etik kurallara uyulduğunu yazarlar beyan eder. Aksi bir durumun tespiti halinde Fiscaoeconomia Dergisinin hiçbir sorumluluğu olmayıp, tüm sorumluluk çalışmanın yazarlarına aittir.

Yazar Katkısı: Yazarların katkısı aşağıdaki gibidir:

Giriş: 2. yazar

Literatür: 1. yazar

Metodoloji: 1. yazar

Sonuç: 1. yazar

1. yazarın katkı oranı: %70. 2. yazarın katkı oranı: %30.

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Author Contributions: Author contributions are below;

Introduction: 2. author

Literature: 1. author

Methodology: 1. author

Conclusion: 1. author

1st author's contribution rate: 70%, 2nd author's contribution rate: 30%.