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Investigating the effect of corporate diversification on cash retention in companies listed on the Tehran Stock Exchange

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Abstract

This study was an attempt to investigate the effect of corporate diversification on cash retention. Diversification is a risk management method that combines different types of investments. Diversification is a model for developing a company by offering diverse products and services. This study is experimental and fundamental in terms of its purpose and correlational in terms of its nature. The study data were extracted from the observed values of eighty-nine stock companies during ten years from 2002 to 2021. The collected information is company-year and the purpose of the study is to test the effect of independent variables on the dependent variable to investigate the effect of corporate diversification on cash retention in companies listed on the Tehran Stock Exchange. According to the collected information and using the combined model of regression analysis, three models were fitted and three hypotheses were tested. The results obtained from the investigated models support the inverse effect of corporate diversification indices including commercial diversification index, commercial diversification dummy variable, and geographical diversification dummy variable on cash retention. A dummy variable is referred to as an indicator of technological changes at a certain point in time. However, the results did not support the effect of the geographic diversification index on cash retention.

Keywords: Corporate diversification, Commercial diversification, Geographical diversification, Cash retention.

Introduction

Diversification is a form of corporate strategy for companies used by many managers to improve their company's performance. Diversification seeks to increase profitability through greater sales volume achieved through new products and markets. Since the cash balance is one of the primary sources of the business unit, cost control and cash retention levels are crucial. This requires companies to define cash balance targets for each business activity and for the entire business activity. When the system of cash balance goals and cash flow control reports are used to compare the actual results with the set goals, the managers should be told what their roles and functions are in the cash flow of the business unit based on their responsibilities and whether the set goals have been achieved or not (Norbakhsh et al., 2023). Based on the balance theory, companies determine the optimal level of their cash by establishing a balance between the benefits and the cost of cash retention. In

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other words, companies adjust their optimal level of cash by determining the significance of the final costs and the final benefits of cash retention. In this study, the types of diversification are 1- Commercial or industrial diversification during which the company operates in several different fields. 2- Geographical diversification during which the company operates in several cities or several different countries. Here, companies with export sales have been considered. The impact of corporate diversification on its value has attracted the attention of economists. During the company's economic growth, as cash reserves increase, managers decide whether to distribute the cash to shareholders, spend it on internal expenses, use it for foreign acquisitions, or keep it (Khodadad Hatkeposhti, 2021). It is not clear how profit-seeking managers select between using and holding cash reserves. Information asymmetry theory, agency theory, balance theory, financing hierarchy theory, and free cash flow theory are among the theories related to the level of cash retention of companies (Jani et al., 2004). Based on the information asymmetry theory, reducing information asymmetry (for example, by increasing the quality of financial reporting) can reduce the level of cash retention by companies (Lin, 2023). Based on the agency theory, conflicts that lead to the identification of agency costs can be used to justify management's cash retention behavior. Based on this theory, the emergence of joint-stock companies is one of the biggest economic developments, and the separation of ownership from control is one of the results of this phenomenon (Mir et al., 2021). This separation has made it possible for managers to make decisions that are in line with their interests and the opposite of the interests of the shareholders. Based on the balance theory, companies determine the optimal amount of their cash by establishing a balance between the benefits and costs of cash retention. Based on this theory, the primary goal of the company is to create an optimal level of financial leverage by balancing the benefits of financing through debt (such as tax savings resulting from debt interest and reducing agency costs through the role of debt control), maximizing the value of the company. In this model, the capital structure moves toward a point that reflects the tax rate, asset composition, commercial risk, profitability, and bankruptcy regulations (Farham et al., 2021). Based on the theory of financing hierarchy, the manager has a tendency to accumulate cash so he can finance from within the company in the first stage and not refer to outside the company. Based on the free cash flow theory, managers are motivated to accumulate cash to increase the resources under their control and to benefit from the power of judgment and recognition regarding the company's investment decisions. The hierarchy of financing is one of the crucial subjects in the research of the financial affairs of companies. The financing hierarchy theory believes that the information asymmetry between managers and investors leads to a ranking to prioritize how to use financing resources. Companies prefer internal financing over external financing (i.e., the first step of the hierarchy), and if external financing is used, they will prioritize debt over equity (the second step of the hierarchy) (Luo et al., 2021). In this study, the factors

that determine the level of cash retention of companies are introduced based on the above theories, and their relationships are examined as independent variables, and the level of cash retention of companies is considered as a dependent variable. In this article, diversification on cash retention was investigated to evaluate the effect of corporate diversification on cash retention in companies listed on the Tehran Stock Exchange.

Theoretical Foundations and Background of Research

Several theories have been proposed about the factors affecting cash retention as follows:

Based on the hierarchy theory, companies prefer internal financing to external financing that is sensitive to information. This theory is based on the assumption that people inside the company are more aware than the shareholders. The managers may be forced to give up the profitable plans if the resources inside the company are not enough to finance the optimal investment plans and the information asymmetry hinders. In this case, cash is very valuable and the only opportunity to issue shares without losing market value occurs when there is no or very little information asymmetry (Drobetz et al., 2010). The free cash flow theory states that internal cash funds allow managers to avoid controlling the market. Paying shareholders reduces the power of the managers and they may be controlled and supervised if they need to provide capital by the capital markets. Thus, the managers work with the company's cash so they do not have to provide detailed information to the capital market (Jensen & Meckling, 2019). Based on the balance theory, companies determine the optimal amount of their cash by establishing a balance between the benefits and costs of cash retention. The significant point of this theory is that there is an optimal level of cash for companies in which managers with an active approach decide to keep cash based on a cost-benefit analysis (Thomas, 2002). Working capital management significantly affects the profitability and risk of companies and thus the value of companies. In other words, working capital management can be defined as the ability to balance profit and risk (Gitman, 1974). Companies can select one of the two primary working capital management strategies according to the relative advantages. They can minimize investment in working capital components by adopting a bold policy or think about increasing sales by adopting a conservative policy. The result of adopting a bold policy and minimizing working capital positively affects the profitability of companies since it is possible to reduce net current assets and total assets proportionately in this case. However, if the companies reduce their inventory too much, the possibility of losing their customers will increase.

Research Background

Previous studies have examined the impact of diversification on various factors, and various factors have been considered to be effective in cash retention, which we will discuss below:

(Doaei et al., 2015) investigated the relationship between corporate diversification and company value. They concluded that multi-part companies

significantly reduce shareholder wealth compared to single-part companies. (Dust et al., 2014) investigated the relationship between corporate diversification and workforce effectiveness. The results of this study showed an inverse relationship between corporate diversification and workforce effectiveness. (Anderson et al., 2009) investigated the impact of corporate diversification on company risk. They found that corporate diversification reduces the risk of some companies and increases others. However, it can be stated that it does not reduce the risk to the company. (Noravesh & Dadbeh, 2013) investigated the effect of the number of non-executive directors on the board of directors on cash retention. They reported that if the board of directors plays the corporate leader role in these countries, it is predicted that companies with stronger management structures will hold less cash after controlling other factors. (Rahmanian Koushkaki & Nazari, 2023) investigated the factors affecting cash. Their results revealed that the cash balance is positively affected by investment opportunities and cash flows and negatively affected by asset liquidity, financial leverage, and size. (Bhaduri, 2005) investigated the impact of diversification on performance (production efficiency) and concluded that geographical diversification increases the company's operational flexibility. (Maheshwari & Rao, 2017) investigated the effect of working capital management on the company's profitability. The mentioned study considered the factors of the number of banks, banking services, banks' methods of collecting fees, working capital management methods, and systems for speeding up the collection of claims. The results revealed a gap between the methods developed for working capital management and the methods used in practice.

(Yaghoobnezhad et al., 2011) investigated the relationship between cash flows and company stock returns. They also investigated the relationship between operational cash flows, free cash flows, and company stock returns. They also compared the information content of the operating cash flows and free cash flows in explaining the future returns of the stock. The results of this cross-sectional study revealed that there is no significant relationship between operating cash flow and stock returns. The results of this study at the level of panel data have also shown no significant relationship between operating cash flows and stock returns. Concerning free cash flows, at the level of cross-sectional data, the significant relationship between free cash flow and stock returns was confirmed. At the level of panel data, the significant relationship between free cash flows and stock returns was confirmed.

By selecting a sample including 283 companies from 2000-2005 and using the data of interim financial statements, (Ebrahimi Sarveolia & Jahanshahi, 2016) investigated the factors affecting the cash retention in companies listed on the Tehran stock exchange. The results revealed that accounts receivable, net working capital, inventories, and short-term liabilities are among the most significant factors that have a negative impact on cash retention. Company growth opportunities, dividends, cash flow fluctuation, and net profit respectively are among the most significant factors that have a positive impact on cash retention. However, there is not enough

evidence about the negative impact of long-term debt and the size of companies on cash retention. (Rasaiian et al., 2011) selected a sample including 78 companies listed on the Tehran Stock Exchange and investigated the impact of financial constraints on the sensitivity of cash flow. Using the criteria of company size, company life, dividend ratio, and business group, they showed that cash flows did not have a significant impact on the level of cash retention, and there was no significant difference between the sensitivity of cash flows of companies with financial constraints and companies without financial constraints.

Methods and Materials

This study investigated the impact of the explanatory variables of the commercial diversification index, commercial diversification dummy variable, geographical diversification index, geographical diversification dummy variable, change in cash, change in profit before interest and taxes, change in net assets, change in financial expenses, change in dividends, financial leverage, cost of new financing, and abnormal stock returns on cash retention. In this equation, four variables commercial diversification index, commercial diversification dummy variable, geographical diversification index, and geographical diversification dummy variable are considered independent variables, and other explanatory variables are considered control variables.

Dependent Variable

Cash retention is a dependent variable in this study. Cash retention is calculated using the Faulkender & Wang (2006) model (Equation 1).

$$CH = a + b1\times HERFIN + b2\times GEO + b3\times FDHERFIN + b4 \times FDGEO + b_5 \times EMV + b_6 \times NAMV + b_7 \times IEMV + b_8 \times DMV + b_9 \times LV + b_{10} \times NFMV + b_{11} \times RRIT \quad (1)$$

Independent variables

The independent variables of this study included commercial diversification and geographical diversification.

To examine commercial diversification, the Herfindahl index is used. It is calculated for all companies based on the distribution of sales of different business parts compared to the total business sales. The Herfindahl coefficient for company i in year t is calculated as follows:

$$HERF_{i,t} = \sum(SSale/Sale)^2$$

Where:

HERFi,t: sales revenue based on the Herfindahl index for company i in year t

SSale: Sale of a specific part of the company

Sale: the total sales of the company (that is, the sum of the sales of different parts)

HERF variable value is equal to 1 for single-part companies and less than 1 for multi-part companies. Thus, a smaller coefficient indicates a high level of corporate diversification.

We have used the ratio of export sales to total sales to examine geographical diversification. We consider companies that have export sales as geographically

diversified companies. In this study, due to the low level of export sales compared to the total sales of the companies listed on the Tehran Stock Exchange, the significance level was not considered.

$$\text{geographical diversification} = \frac{expoer\ sales}{total\ sales}$$

Development of Hypotheses

The hypotheses of this study are developed as follows:

Primary hypothesis 1: There is a relationship between corporate diversification and cash retention.

Sub-hypothesis 1: There is a relationship between business diversification and cash retention.

Sub-hypothesis 2: There is a relationship between geographical diversification and cash retention.

Methods

This study was an applied-experimental research in terms of its purpose and correlational research in terms of nature. The type of regression used in this study was multivariate regression and panel data. In this study, the panel data method was selected. To write the theoretical foundations of the study, the library method was used. Also, the information needed to calculate the research variables was obtained from the information published by the Tehran Stock Exchange Organization, Tadbir Pardaz and Rahavard Novin software, and other relevant internet sources. The statistical population of the study included the companies listed on the Tehran Stock Exchange from 2002 to 2011. In this study, the systematic elimination method was used to select the statistical sample. For this purpose, all the companies in the statistical population that met the following criteria were selected as the sample, and the rest were excluded:

1- They should not be among financial, leasing, and investment companies.

2- Their fiscal year ends on the last day of a given year and they have not changed the fiscal year during the study period.

3- The shares of these companies have been traded during the studied period.

4- Their operations should not stop during the study period.

Given the mentioned criteria, 98 companies were selected among the companies listed on the Tehran Stock Exchange.

Results

Descriptive Statistics

1) Descriptive indices of stock returns: Stock returns have 890 observations. This variable has a mean of 0.195, a standard deviation of 3.849, and a variance of 14.818 with a negative skewness, and a positive kurtosis

2) Descriptive indices of commercial diversification: Commercial diversification has 890 observations. This variable has a mean of 0.584, a standard deviation of 0.484, and a variance of 0.235 with positive kurtosis and skewness.

3) Descriptive indices of geographical diversification: Geographical diversification has 890 observations. This variable has a mean of 10.378, a standard deviation of 20.560, and a variance of 422.704 with positive skewness and kurtosis.

4) Descriptive indices of cash retention: Cash retention has 890 observations. This variable has a mean of 104276.285, a standard deviation of 453391.765, and a variance of 20556409265.319 with positive skewness and kurtosis.

5) Descriptive indices of change in cash: Change in cash has 890 observations. This variable has a mean of 0.001, a standard deviation of 0.018, and a variance of 0.0003 with positive skewness and kurtosis.

6) Descriptive indices of change in profit before unexpected items: Change in profit before unexpected items has 890 observations. This variable has a mean of -0.00007, a standard deviation of 0.004, and a variance of 0.0002 with a negative skewness, and a positive kurtosis.

7) Descriptive indices of change in net assets: Change in net assets has 890 observations. This variable has a mean of 0.008, a standard deviation of 0.229, and a variance of 0.052 with positive skewness and kurtosis.

8) Descriptive indices of change in financial costs: Change in financial costs has 890 observations. This variable has a mean of 0.0005, a standard deviation of 0.013, and a variance of 0.0001 with positive skewness and kurtosis.

9) Descriptive indices of change in dividend: Change in dividend has 890 observations. This variable has a mean of 0.0002, a standard deviation of 0.004, and a variance of 0.00001 with positive skewness and kurtosis.

10) Descriptive indices of financial leverage: Financial leverage has 890 observations. This variable has a mean of 1.108, a standard deviation of 13.347, and a variance of 178.139, with positive skewness and kurtosis.

11) Descriptive indices of the cost of new financing: The cost of new financing has 890 observations. This variable has a mean of 0.241, a standard deviation of 4.733, and a variance of 22.405 with positive skewness and kurtosis.

The calculated indices show that the observations are concentrated around the central tendency indices. The results of the description of variables studied in the research are shown in (Table 1).

Table 1. Descriptive indices of variables studied in the statistical sample

Variables	N	Mean	SD	Variance	Skewness	Kurtosis	Coefficient deviation	
							Skewness	Kurtosis
Stock returns	890	0.195	3.849	14.818	-1.405	99.000	-17.140	604.557
Commercial diversification	890	0.584	0.484	0.235	16.653	407.243	203.167	2486.894
Geographical diversification	890	10.378	20.560	422.704	3.072	9.523	37.484	58.153
Cash retention	890	104276.289	453391.765	205564092651.319	7.195	57.853	87.775	353.285
Change in cash	890	0.001	0.018	0.000	28.541	839.905	348.193	5129.004
Change in profit before	890	0.000	0.004	0.000	-13.372	396.107	-163.132	2418.888
Change in net assets	890	0.008	0.229	0.052	13.042	325.267	159.108	1986.290
Change in financial costs	890	0.000	0.013	0.000	29.777	887.751	363.275	5421.187
Dividend change	890	0.000	0.004	0.000	23.428	586.071	285.817	3578.932
Financial leverage	890	1.108	13.347	178.139	29.789	888.239	363.418	5424.169
The cost of new financing	890	0.241	4.733	22.405	25.246	675.657	307.996	4126.001

The value of the coefficient of determination indicated that about 62% of the changes in cash retention in companies listed on the Iran Stock Exchange are explained by the variables of commercial diversification index, commercial diversification dummy variable, geographical diversification index, geographical diversification dummy variable, change in cash, change in profit before unexpected items, change in net assets, change in financial expenses, change in dividends, financial leverage, cost of new financing, and stock returns. (Table 2) shows the results of this model.

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Table 2. The results of regression analysis for the effect of corporate diversification effectiveness on cash retention

Dependent variable: cash retention, number of rounds: 10, number of sections: 89, number of healthy observations: 890						
Variables			**Coefficient**	**Standard error**	**Statistic t**	**Sig**
β_0	C	Constant	132500.9	8227.799	16.10405	0.0000
β_1	HERFIN	Commercial diversification	-8520.137	3519.109	-2.421106	0.0157
β_2	GEO	Geographical diversification	54.51834	52.66485	1.035194	0.3009
	FD1	commercial diversification dummy variable	-18826.82	6619.485	-2.844152	0.0046
	FD2	Geographical diversification dummy variable	-10862.03	4399.393	-2.468983	0.0138
β_3	EMV	Profit before interest and additional tax	-266698.9	969587.0	-0.275064	0.7833
β_4	NAMV	Change in net assets	-545.5737	93306.99	-0.005847	0.9953
β_5	IEMV	Change in financial costs	1982150.	1501574.	1.320048	0.1872

Chow and Hausman test to examine the difference between intercepts of years and companies studied:

Since regression analysis was of a panel type, it was necessary to specify the position of the intercept for the studied times and the slope for the companies. To select whether to use the same or different intercept for the years and companies, the Chow test was used. Three models were used in this study. Since the equality of intercepts of the years was not significantly different in all three models, the intercept was fitted with the pooled method. Also, since the slope of the companies had a significant difference, it was fitted with the panel method and fixed effects. As shown in the table, the statistic of Chow's test or Limmer's test is smaller than the critical value, meaning that the pooled method for the periods is not rejected. However, the statistics related to the slope of the companies are larger than the critical value, and the pooled method for the model is rejected. Also, Hausman's test statistics were greater than the critical value, rejecting random effects and confirming fixed effects. (Table 3) shows the results of the tests.

Table 3. Results of testing the research models for the use of the pooled or panel models and the type of effects of the variables

Model number	Goal and test	Chow test			Hausman's test		
		Statistic f	Error level	Result	Chi-square test	Error level	Result
Primary model	Period test	1.834449	0.0586	Equal intercept	-	-	-
	Section test	21.394564	0.0000	Unequal slopes	19.888065	0.0402	Fixed effects
The first secondary model	Period test	1.204616	0.2884	Equal intercept	-	-	-
	Section test	21.076210	0.0000	Unequal slopes	18.440006	0.0052	Fixed effects
The second secondary model	Period test	1.347709	0.2081	Equal intercept	-	-	-
	Section test	20.630487	0.0000	Unequal slopes	21.221046	0.0066	Fixed effects

Testing hypotheses

1) Primary hypothesis: corporate diversification affects cash retention.

The results of this hypothesis were extracted based on the results of the equation and the primary regression model. In this test, the null hypothesis states that corporate diversification does not affect cash retention, while the opposite hypothesis states that corporate diversification affects cash retention. The null and opposite hypotheses are as follows:

$$CH = a + b1\times HERFIN + b2\times GEO + b3\times FDHERFIN + b4 \times FDGEO + b_5 \times EMV + b_6 \times NAMV + b_7 \times IEMV + b_8 \times DMV + b_9 \times LV + b_{10} \times NFMV + b_{11} \times RRIT$$

In this equation, variables related to corporate diversification including commercial diversification index, commercial diversification dummy variable, geographical diversification index, and geographical diversification dummy variable are considered independent variables, and other explanatory variables are considered control variables. According to the results obtained from the regression analysis with the panel model, the effect coefficient of the commercial diversification index on cash retention is -5820.137 and its calculated t-statistic with the value of -2.421 is smaller than the critical value of -1.96.

Thus, the null hypothesis is rejected at the 95% confidence level, and the opposite hypothesis is accepted. The effect coefficient of the dummy variable of commercial diversification on cash retention is -18826.82 and its calculated t-statistic with a value of -2.844 is smaller than the critical value -1.96. Thus, the null hypothesis is rejected at the 95% confidence level, and the opposite hypothesis (The inverse effect of the dummy variable of commercial diversification on cash retention) is accepted. The effect coefficient of the dummy variable of geographical diversification on cash retention is -10862.03 and its calculated t-statistic with a value of -2.468 is smaller than the critical value of -1.96. Thus, the null

hypothesis is rejected at the 95% confidence level and the opposite hypothesis (The inverse effect of the dummy variable of geographical diversification on cash retention) is accepted. The effect coefficient of the geographical diversification index on cash retention is 54.518 and the absolute value of its calculated t-statistic with a value of 1.035 is smaller than the critical value of 1.96. Thus, the null hypothesis is not rejected at the 95% confidence level. According to the results of the model and probability theory, it can be stated corporate diversification indices have a reverse impact on cash retention in Iranian stock companies.

2) The first sub-hypothesis: commercial diversification affects cash retention.

The results of this hypothesis were extracted based on the results of the equation and the first regression model. In this test, the null hypothesis states that commercial diversification does not affect cash retention, while the opposite hypothesis states that commercial diversification affects cash retention. The null and opposite hypotheses and equations are as follows:

CH=a+b1×HERFIN+$b_2\times FDHERFIN + b_3 \times EMV$ +$b_4\times NAMV + b_5 \times IEMV + b_6 \times DMV + b_7 \times LV + b_8 \times NFMV + b_9 \times RRIT$

In this equation, variables related to commercial diversification including the commercial diversification index and dummy variable of commercial diversification are independent variables and other explanatory variables are control variables. Based on the results obtained from the regression analysis with the panel model, the effect coefficient of the commercial diversification index on cash retention is -10323.76 and its calculated t-statistic is -3.266, which is smaller than the critical value of -1.96 and -2.58. Thus, the null hypothesis is also rejected at the 99% level of confidence in addition to the 95% level of confidence, while the opposite hypothesis (The inverse effect of commercial diversification on cash retention) is accepted. As a result, based on the probability theory, it can be stated that the commercial diversification index has an inverse and significant effect on cash retention in Iranian stock exchange companies.

The dummy variable of commercial diversification is specified with a code of 0 and 1, where code 1 represents the companies with commercial diversification. The effect coefficient of the dummy variable of commercial diversification on cash retention is -15,562.05 and its calculated t-statistic with a value of -2.166 is smaller than the critical value of -1.96. Thus, the null hypothesis is rejected at the 95% confidence level, while the opposite hypothesis (The inverse effect of the dummy variable of commercial diversification on cash retention) is accepted. Thus, commercial diversification leads to a reduction in cash retention (Table 4).

Table 4. The results of regression analysis for the effect of commercial diversification on cash retention

Dependent variable: cash retention, number of rounds: 10, number of sections: 89, number of healthy observations: 89						
Variables			**Coefficient**	**Standard error**	**Statistic t**	**Sig**
β_0	C	Constant coefficient	124488.3	6998.885	17.78687	0.0000
β_1	HERFIN	Commercial diversification	-10323.76	3160.503	-3.266493	0.0011
β_2	FD1	Dummy variable of commercial	-15562.05	7182.401	-2.166692	0.0306
β_3	EMV	Profit before interest and additional tax	-994759.0	825191.7	-1.205488	0.2284
β_4	NAMV	Change in net assets	-3882.244	89655.88	-0.043302	0.9655
β_5	IEMV	Change in financial costs	1657568.	1266810.	1.308459	0.1911
β_6	DMV	Change in dividends	221677.7	233929.7	0.947625	0.3436
β_7	LV	Financial leverage	-9.890943	2.275308	-4.347079	0.0000
β_8	NFMV	The cost of new financing	-5631.057	4293.538	-1.311519	0.1901
β_9	RRIT	Stock returns	32.87049	124.5597	0.263894	0.7919
Coefficient of determination			0.603876	Adjusted coefficient of determination		0.555361
Statistic F			12.44714	Durbin-Watson statistic		1.572043

3) The second sub-hypothesis: geographical diversification affects cash retention.

The results of this hypothesis were extracted based on the results of the equation and the second regression model. In this test, the null hypothesis states that geographical diversification does not affect cash retention, while the opposite hypothesis states that geographical diversification affects cash retention. The null and opposite hypotheses and equations are as follows:

CH=a+b1×GEO+$b_2\times FDGEO + b_3 \times EMV$ +$b_4\times NAMV + b_5 \times IEMV + b_6 \times DMV + b_7 \times LV + b_8 \times NFMV + b_9 \times RRIT$

In this equation, variables related to commercial diversification including geographical diversification index and geographical diversification dummy variable are independent variables and other explanatory variables are control variables. Based on the results obtained from the regression analysis with the panel model, the effect coefficient of the geographical diversification index on cash retention is -18.468 and the absolute value of its calculated t-statistic with a value of -0.394 is smaller than the critical value of 1.96. Therefore, the null hypothesis is not rejected at least at the 95% confidence level. As a result, based on the probability theory, it

cannot be stated that geographical diversification index has an inverse effect on cash retention in Iranian stock companies.

The dummy variable of geographical diversification is specified with a code of 0 and 1, and the code of 1 represents the companies that have been diversified geographically. The effect coefficient of the dummy variable of the geographical diversification on cash retention is -7869.24 and its calculated t-statistic with a value of -1.752 is smaller than the critical value of -1.64. Thus, the null hypothesis is rejected at the 90% confidence level, while the opposite hypothesis (The inverse effect of the dummy variable of the geographical diversification on cash retention) is accepted. Therefore, geographic diversification leads to a reduction in cash retention (Table 5).

Table 5. The results of regression analysis for the effect of geographical diversification on cash retention

Dependent variable: cash retention, number of rounds: 10, number of sections: 89, number of healthy observations: 890						
Variables			**Coefficient**	**Standard error**	**Statistic t**	**Sig**
β_0	C	Constant coefficient	110311.2	2892.449	38.13764	0.0000
β_1	GEO	Geographical diversification	-18.46878	21.65479	-0.852873	0.3940
β_2	FD2	Dummy variable of geographic	-7869.240	4491.785	-1.751918	0.0802
β_3	EMV	Profit before interest and additional tax	-1018276.	972304.2	-1.047281	0.2953
β_4	NAMV	Net additional assets	-10609.70	81721.22	-0.129828	0.8967
β_5	IEMV	Additional financial costs	3460574.	1718274.	2.013983	0.0443
β_6	DMV	Additional dividends	520917.0	305252.5	1.706512	0.0883
β_7	LV	Financial leverage	-10.85993	2.091316	-5.192868	0.0000
β_8	NFMV	The cost of new financing	-10812.16	5487.706	-1.970252	0.0492
β_9	RRIT	Stock returns	209.9544	167.6522	1.252321	0.2108
Coefficient of determination			0.608641	Adjusted coefficient of determination		0.560710
Statistic F			12.69813	Durbin-Watson statistic		1.556676

The (Table 6) of hypotheses and the results of null and opposite hypotheses and the result of the hypothesis test.

Table 6. Hypotheses and the results of null and opposite hypotheses and the result of the hypothesis test

Hypothesis	Independent variable	Dependent variable	Null hypothesis	Opposite hypothesis	Rest result
			$\beta = 0$	$\beta \neq 0$	
Primary hypothesis	Corporate diversification indices	Cash retention	✗	✓	Except for the geographical diversification index, the effect of the other three indices is inverse and significant.
The first sub-hypothesis	Commercial diversification indices	Cash retention	✗	✓	The effect of both indices is inverse and significant
The second sub-hypothesis	Geographical diversification indices	Cash retention	✗	✓	The effect of the dummy variable index is inverse and significant.

Discussion

According to the information collected from 89 companies on the Iranian Stock Exchange over ten years and using the regression analysis with the panel data, three models were fitted and three research hypotheses were tested. The results obtained from the studied models support the inverse effect of corporate diversification indices including commercial diversification index, commercial diversification dummy variable, and geographical diversification dummy variable on cash retention. However, the results did not support the effect of the geographical diversification index on cash retention. As a result, the fitted models with panel regression analysis supported the primary hypotheses, supported the second sub-hypothesis relatively, and supported the second sub-hypothesis fully. The results of the test and the hypothesis of the role of research variables along with the results of the null and opposite hypotheses are shown.

The first primary hypothesis of the study was: Does corporate diversification affect cash retention?

In this equation, variables related to corporate diversification including the commercial diversification index, commercial diversification dummy variable, geographical diversification index, and geographic diversification dummy variable are independent variables and other explanatory variables are control variables. According to the results obtained from the regression analysis with the panel model, the impact coefficient of the commercial diversification index on cash retention is -5820.137 and its calculated t-statistic with the value of -2.421 is smaller than the critical value of -1.96. Thus, the null hypothesis is rejected at the 95% confidence level, and the opposite hypothesis (The effect of commercial diversification on cash retention)

is accepted. The impact coefficient of the dummy variable of commercial diversification on cash retention is -18826.82 and its calculated t-statistic with a value of -2.844 is smaller than the critical value -1.96. Thus, the null hypothesis is rejected at the 95% confidence level, and the opposite hypothesis (The inverse effect of the dummy variable of commercial diversification on cash retention) is accepted.

The impact coefficient of the dummy variable of geographical diversification on cash retention is -10862.03 and its calculated t-statistic with a value of -2.468 is smaller than the critical value of -1.96. Thus, the null hypothesis is rejected at the 95% confidence level and the opposite hypothesis (The inverse effect of the dummy variable of geographical diversification on cash retention) is accepted. The impact coefficient of the geographical diversification index on cash retention is 54.518 and the absolute value of its calculated t-statistic with a value of 1.035 is smaller than the critical value of 1.96. Therefore, the null hypothesis is not rejected at the 95% confidence level. Based on the results of the model and probability theory, it can be stated that corporate diversification indices have an inverse effect on cash retention in Iranian stock companies. In corporate diversification, commercial diversification and geographic diversification are considered simultaneously. This means that companies that have expanded and diversified their products simultaneously and have expanded their product market. This causes the company to keep less cash and spend its cash on product diversification and geographical diversification. This result is completely consistent with the results of most of the previous studies. For example, using a sample of 28,563 companies from 1998 to 2009, (Mir et al., 2021) investigated the relationship between corporate diversification and cash retention and showed an inverse relationship between diversification and cash retention. The same results were also reported in the studies by (Lin, 2023) and (Anderson et al., 2000). However, the results of a study by (Thomas, 2002) who experimentally investigated the company according to the agency attitude showed that diversified companies have higher cash retention, which is inconsistent with the present study.

Conclusion

Based on the information collected from 89 companies on the Iranian Stock Exchange over ten years and using the panel model of regression analysis, three models were fitted and three research hypotheses were tested. The results obtained from the studied models support the inverse effect of corporate diversification indices including commercial diversification index, commercial diversification dummy variable, and geographical diversification dummy variable on cash retention. However, the results did not support the effect of the geographical diversification index on cash retention. Thus, the fitted models with panel model of regression analysis have supported the primary hypotheses and supported the second sub-hypothesis relatively, and the second sub-hypothesis fully. Presents the results of the test and the hypothesis of the role of the research variables along with the results of the null and opposite hypotheses.

Recommendations

Given the theoretical foundations and the obtained results, the following recommendations are presented:

By separating the sales section in the audited financial statements into two sections, domestic sales and foreign sales, and determining the rate of domestic sales by considering sales to different cities, future studies can investigate the effect of geographic diversification based on domestic geographic sales, not export sales, on cash retention, and other variables. Additionally, researchers can measure corporate diversification with other factors due to the newness of the study subject. The obtained results can improve the performance of companies.

Researchers can use the following suggested topics for future studies.

1. Investigating the relationship between corporate diversification and corporate governance
2. The effect of corporate diversification on stock returns
3. Investigating the relationship between corporate diversification and the company's capital cost

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