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A study on taking risk in Indian firms during the growth period: From the perspective of corporate performance and diversification

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Abstract

This study aims to ascertain the relationship between taking risks and diversification, as well as the relationship between taking risks and the firm performance of Indian enterprises throughout the growth period. The standard deviation of EBT/TA has been used as the taking risk index. The time lag between taking risk and firm performance was taken into account. The Herfindahl index was used as an indicator of business diversification, and the ratio of overseas sales was used as an indicator of regional diversification. The quantitative research results suggest that the relationship between taking risks and firm performance is positive for all Indian firms in the growth period, even when a time lag of one to four years is taken into account. Furthermore, the results suggest that a moderate level of business diversification is desirable and that further progress is desirable for regional diversification.

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1. Introduction

How should firms take risks in an uncertain business environment? How does a firm taking risk affect firm performance, especially during the growth phase of the firm's life cycle? Bromiley (1991) indicates that a firm taking risks has important implications for firm growth and survival. In addition, Sanders and Hambrick (2007) show that taking risks is a value-added behavior for firms, plays an important role in decision-making, and is important for firm performance and survival in the long run. In addition, Khatoon et al. (2023) state that not only expected returns but also risks must be considered in investment and other decisions.
However, while there are many analyses of factors affecting risk-taking, there are relatively few studies on the relationship between taking risks and firm performance. Thus, elucidating the relationship between company performance and taking risks in Indian firms during their growth phase is the primary goal of this study.
Regarding growing firms, Selling and Stickney (1989) stated that business diversification is associated with higher revenues and profitability and that growing firms are doing their best to establish a brand image and market share. They also state that firms expand more through innovation and diversification (Kazanjian and Drazin, 1989; Liao, 2006), and in addition, Mishra et al. (2022) state that firm diversification is closely related to the growth process. From the above, it is conceivable that firms in the growth phase are associated with diversification. Therefore, the second objective of this study is to clarify the relationship between taking risks and diversification and how taking risks should be conducted. Based on the above two objectives, we conduct a quantitative analysis focusing on the relationship between taking risks and corporate performance and taking risks and diversification in Indian companies during the growth period.

2. Review of previous studies

2.1 Previous studies on taking risk indicators

Previous research on risk-taking and corporate performance will be reviewed from two main perspectives: "indicators of risk-taking" and "the relationship between risk-taking and corporate performance." As a risk measure, the standard deviation of firm performance has been used in many previous studies. One of them is the standard deviation of Earnings Before Tax/Total Assets (Bhuiyan, Cheema, & Man, 2021; Sun, 2021; Kong, Tan, & Zhang, 2022; Tran, & Le, 2022; Ali, Wu, & Zhang, 2023; Bhuiyan, Liu, & Alam, 2023); the standard deviation of ROE (Alzayed et al. 2023) is also used. Regarding the standard deviation, the variation in returns obtained is expected to be higher when the risk chosen by the firm is higher. The standard deviation of analysts' earnings per share forecasts (Bromiley, 1991) is also used. Furthermore, the standard deviation of stock investment returns (Ali, Wu, & Zhang, 2023; Bhuiyan, Liu, & Alam, 2023) is used for standard deviations other than firm performance.
On the other hand, for other risk indicators that do not use standard deviations, the difference between the maximum and minimum return on assets (RA) (industry-adjusted, annual average) (Alzayed et al. 2023) and R&D expenditures (Bhuiyan, Liu, & Alam, 2023) indicators have been used in previous studies. As for R&D expenditures, they are considered to be risky investments (Ahmad & Khan, 2024).

2.2 Prior Studies on Taking Risk and Firm Performance

Sun (2021) finds that in 27 countries the relationship between taking risk (standard deviation of EBT/TA) and RA shows that highly profitable firms tend to have higher levels of risk-taking. Tran and Le (2022) analyzed the relationship between taking risks (standard deviation of EBT/TA) and economic growth (GDP). They find a positive correlation between taking risks

and economic growth. Alzayed (2023) also finds that corporate taking risk (standard deviation of EBT/TA, standard deviation of price-to-earnings ratio, and difference between maximum and minimum RA) is significantly positively correlated with corporate value (Tobin's Q.) Bhuiyan, Liu, & Alam (2023) find that corporate taking risk (standard deviation of EBT/TA, standard deviation of price-to-earnings ratio, and R&D expenses) in relationship to RA (t + 1) by dividing them into life cycles, and they find a significant negative correlation overall, a significant positive correlation in the growth phase (GROWTH), the maturity phase (MATURE), an introduction phase (INTRO), and a significantly negative correlation in the declining period (DECLINE).

2.3 Limitations in previous studies

Previous studies on the relationship between taking risk and firm performance focusing on firms in the growth phase are scarce; Bhuiyan, Liu, & Alam (2023) found that the growth phase (GROWTH) is positively correlated with firm performance, but a multi-year time lag in taking risk and firm performance analysis has not been conducted to account for the multi-year time lag in taking risk and firm performance.

The details of risk-taking, i.e., what type of taking risk is required, have not been clarified. Depending on the level of product and service differentiation of firms during the growth phase, firm profitability is said to begin to increase and peak during the maturity phase (Bhattacharya, Chang, & Li, 2020), but it is not clear what kind of taking risk is required for product and service differentiation.

3. Research Methods

3.1 Taking Risk Indicators

In this study, we employ the standard deviation of EBT/TA taking risk measure, which has been widely used in prior studies. For the standard deviation, we expect that the variation in returns obtained will be greater when the risk chosen by the firm is greater.

3.2 Definitions for Growth Companies

Regarding the life cycle of a company, Bhattacharya, Chang, and Li (2020) classified the life cycle of a company into eight cash flow patterns based on the sign (positive or negative) of the cash flows and further summarized them into five phases based on the cash flow status: introduction phase, growth phase, maturity phase, transformation phase, and decline phase.

This study focuses on Indian firms in the growth phase. As mentioned earlier, firms in the growth phase expand more through innovation and diversification (Kazanjian and Drazin, 1989; Liao, 2006), which suggests that more risk-taking is required for business expansion in the growth phase.

Table 1: Cash Flow Patterns by Life Cycle

	Introduction	Growth	Maturity	Change	Change	Change	Decline	Decline
Cash flows from operating activities	-	+	+	-	+	+	-	-
Cash flows from investing activities	-	-	-	-	+	+	+	+
Cash flows from financing activities	+	+	-	-	+	-	+	-

Prepared by authors based on Bhattacharya, Chang, & Li, (2020)

Bhattacharya, Chang, & Li's (2020) definition includes investment and financing cash flows in addition to operating cash flows and thus includes not only investments to improve firm

performance but also financing activities for investments. For the definition of the growth period, we use Bhattacharya, Chang, & Li's (2020) definition.

4. Relationship between taking risks and corporate performance

4.1 Hypothesis Setting

Based on the results of the previous research review, risk-taking, and characteristics of the growth period, one hypothesis is formulated as follows.

Hypothesis 1: Although there is a positive correlation between taking risk (standard deviation of EBT/TA) and firm performance for Indian firms in the growth period, the correlation is not negative or significant when multi-year time lags are considered.

Since the length of the time lag in which R & D affects business performance is about 2-5 years (Bo, 2016), it can be assumed that the length of the time lag in which taking risks also affects firm performance.

4.2 Methods of Analysis

(1) Dataset

Data from NIFTY are used from the fiscal year ended March 2009 to the fiscal year ended March 2023 (dependent variables: fiscal year ended March 2014 to the fiscal year ended March 2023, explanatory variables: fiscal year ended March 2009 to the fiscal year ended March 2018, not covered by finance (banking, securities, insurance)). The stock markets covered in the regression analysis are the National Stock Exchange, Bombay Stock Exchange, Calcutta Stock Exchange, and India International Exchange. From these exchanges, only firms in the growth period are selected for regression analysis.

(2) Regression analysis

Based on previous studies, the following multiple regression analysis is conducted in this study: Model 1 uses firm performance (year y + x (x = 0,1,2,3,4,5)) as the dependent variable and control variables as explanatory variables in addition to taking risk indicators. As for the dependent variable, the length of the time lag in which R&D affects performance is approximately 2-5 years (Bo, 2016), as mentioned above, and therefore, a time lag of 0-5 years was also established in this study based on previous studies. For the explanatory variables, we follow the previous study by Bhuiyan, Liu, & Alam (2023). Model 1 is defined as year y and industry i. Model 2 is defined as year y and industry i. Model 3 is defined as year y and industry i.

$$Model\ 1: Performance_{i,y+x} = \alpha_0 + \beta_1 RISK_{i,y} + \beta_2 SE_{i,y} + \beta_3 PB_{i,y} + \beta_4 LT_{i,y} + \beta_5 CC_{i,y} + \beta_6 \Delta SL_{i,y} + \beta_7 AGE_{i,y} + \beta_8 RS_{i,y} + \beta_9 Year\ dummy_y + \beta_{10} Industry\ dummy_y + \beta_{11} Market\ dummy_t + \varepsilon_{i,y}$$

The dependent variable is RA (y + x) as an indicator of firms' current and future performance, also from the previous study by Bhuiyan, Liu, & Alam (2023). The explanatory variable is the five-year standard deviation of individual firms' EBT/TA from the industry median (RISK) as a measure of risk-taking, as mentioned earlier. In addition, as control variables, we use the natural logarithm of shareholders' equity (SE), price book value ratio (PB), long-term debt/total assets (LT), capital expenditures/capital assets (CC), sales growth rate (Δ SL), the natural logarithm of (1 + (subject year - year of establishment in real terms)) (AGE), and (1 + (year in question - year of establishment in effect)), return on sales (RS), a year dummy, and an industry dummy. In addition, although not included in the previous study by Bhuiyan, Liu, & Alam (2023), we consider that the impact on corporate performance differs depending on the securities market to which a firm belongs and add a market dummy.

4.3 Analysis Results

The descriptive statistics and correlation coefficients in Table 2 show that although there is a strong correlation (r = 0.722) between RS and RA (y), the effect of multicollinearity in multiple regression analysis (VIFs < 2.199 (Table 3) and VIFs < 3.343 (Table 4)) is not serious and these variables and other variables can be used for further analysis.

Table 3 shows that RA (y), RA (y + 1), RA (y + 2), RA (y + 3), and RA (y + 4) are significantly and positively correlated at the 1% or 5% level for Indian firms in the growth period, even after accounting for the time lag between taking risk (standard deviation of EBT/TA) and firm performance as in hypothesis 1.

Table 2: Descriptive statistics and correlation coefficients (RA(t)) (values are Pearson's correlation coefficients)

	Mean	S.D.	1	2	3	4	5	6	7	8
RA	5.332	5.923								
RISK	0.027	0.032	0.290							
SE	9.801	1.825	-0.084	-0.329						
PB	2.206	7.536	0.073	0.157	-0.140					
LT	0.130	0.104	-0.114	-0.018	-0.057	0.082				
CC	0.068	0.057	0.096	0.162	-0.082	0.093	0.286			
ΔSL	0.082	0.568	0.209	0.318	-0.053	0.024	0.018	0.155		
AGE	3.823	0.648	-0.352	-0.415	0.427	-0.223	-0.083	-0.175	-0.131	
RS	4.759	6.329	0.722	0.104	0.085	0.024	-0.050	0.089	0.179	-0.161

Table 3: Results of regression analysis (Model1)

	RA（y）（n＝4,319）				RA（y＋1）（n＝4,315）				RA（y＋2）（n＝4,312）			
	β	y	Decision	VIF	β	y	Decision	VIF	β	y	Decision	VIF
(Constant)		15.698	***			13.11	***			13.938	***	
RISK	0.141	12.491	***	1.541	0.073	4.825	***	1.527	0.039	2.321	**	1.530
SE	-0.060	-4.506	***	2.186	-0.086	-4.732	***	2.185	-0.061	-2.976	***	2.199
PB	-0.008	-0.803		1.133	-0.040	-3.048	***	1.133	-0.089	-6.106	***	1.132
LT	-0.074	-6.815	***	1.430	-0.057	-3.900	***	1.435	-0.033	-2.020	**	1.434
CC	-0.016	-1.554		1.278	-0.030	-2.145	**	1.278	-0.010	-0.629		1.278
Δ SL	0.021	2.074	**	1.198	0.022	1.682	*	1.196	-0.006	-0.398		1.192
AGE	-0.149	-11.502	***	2.027	-0.140	-8.079	***	2.023	-0.142	-7.231	***	2.040
RS	0.718	69.275	***	1.302	0.502	36.053	***	1.296	0.300	19.162	***	1.297
R-squared	0.649				0.364				0.196			
Adjusted R-squared	0.644				0.355				0.186			

	RA（y＋3）（n＝4,324）				RA（y＋4）（n＝4,331）				RA（y＋5）（n＝4,331）			
	β	y	Decision	VIF	β	y	Decision	VIF	β	y	Decision	VIF
(Constant)		12.423	***			12.510	***			13.039	***	
RISK	0.040	2.420	**	1.435	0.039	2.232	**	1.543	-0.001	-0.071		1.539
SE	-0.061	-2.983	***	2.188	-0.037	-1.790	*	2.196	-0.078	-3.730	***	2.194
PB	-0.119	-8.070	***	1.132	-0.115	-7.703	***	1.135	-0.112	-7.402	***	1.133
LT	-0.005	-0.310		1.432	-0.026	-1.575		1.440	-0.008	-0.483		1.425
CC	-0.001	-0.053		1.263	0.023	1.419		1.285	0.020	1.237		1.279
Δ SL	-0.016	-1.111		1.107	-0.022	-1.457		1.199	-0.022	-1.391		1.193

AGE	-0.133	-6.705	***	2.052	-0.164	-8.196	***	2.045	-0.145	-7.118	***	2.048
RS	0.256	16.097	***	1.306	0.202	12.648	***	1.303	0.159	9.807	***	1.299
R-squared	0.176				0.163				0.139			
Adjusted R-squared	0.165				0.152				0.128			

***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.

4.4 Considerations

As in the previous study by Bhuiyan, Liu, & Alam (2023), firms in the growth phase showed positive correlations for RA (y), RA (y + 1), RA (y + 2), RA (y + 3), RA (y + 4),.
On the other hand, however, no significant results were obtained for RA (y + 5). As mentioned earlier, Bo (2016) stated that the length of time lag in which R&D affects business performance is about 2-5 years, suggesting that there is a time lag of up to 4 years in taking risks by Indian firms during the growth period.

5. Relationship between taking risks and diversification

The discussion in Section 4.4 also reveals that the relationship between taking risk and firm performance is positively correlated with firm performance even when the time lag (0-4 years) is taken into account. However, how should firms perform risk-taking? As mentioned earlier, firms in growth periods expand more through innovation and diversification (Kazanjian and Drazin, 1989; Liao, 2006), and Selling and Stickney (1989) found that business diversification leads to higher revenues and profit margins and that firms in the growth phase are more likely to brand image and market share. Mishra et al. (2022) further state that diversification is an important management strategy for the sustainable growth of firms and that diversification progresses as firms age. We analyze the relationship between taking risks and diversification.

5.1 Indicators of Diversification

Following the implications from the discussion in 4.4, this section analyzes taking risks and diversification. First, the Herfindahl index is used as an indicator of diversification in business. The Herfindahl index is 0 if the firm is a specialist in diversification, and becomes closer to 1 as the firm diversifies. In addition to the Herfindahl index, the entropy index is another major index that measures the degree of diversification. However, the entropy index is more reflective of the situation in which even a small amount of diversification is made in the development of the product and service sectors. However, this study focuses on the extent to which taking risks is undertaken and does not capture the development of product and service sectors since it identifies the reflection of investment in sectors other than the main product and service sectors. We also identify the extent to which diversification is related to risk-taking, rather than the extent to which diversification is related to risk-taking. The entropy index for a specialized firm with one business field is 0, meaning that the higher the value, the more diversified the firm is. Therefore, when analyzing the degree of diversification, the range of the Herfindahl index is $0 \leq H < 1.0$ and the degree is fixed, but the entropy index can be higher than 1.0, making it difficult to specify the degree.
In addition, since Amarasekara, Iyke, and Narayan (2022) showed that the relationship between diversification of R&D expenditures and economic growth (GDP) is an inverse U using the Herfindahl index, to clarify the inverse U, this study classified the Herfindahl index into five levels ($0 \leq H < 0.2$, $0.2 \leq H < 0.4$, $0.4 \leq H < 0.6$, $0.6 \leq H < 0.8$, $0.8 \leq H < 1.0$) using a dummy variable to classify the Herfindahl index. The Herfindahl index is a dummy variable that is used to indicate the degree of taking risk and diversification of a firm. The Herfindahl index is expressed as follows for firm i, business segment j, and year y.

$$Diversification\ index_{i,t} = 1 - \sum_{j}^{n} \left(\frac{Sales_{j,y}}{\sum_{j=1}^{n} Sales_{j,y}} \right)^2,$$

On the other hand, in addition to business diversification, regional diversification can also be

considered. By entering a large number of foreign markets, firms can realize economies of scale on a global scale (Erfan et al. 2022), and by acquiring information on foreign markets, they may benefit from transactions with a comparative advantage regarding resources in foreign markets (Luo, Maksimov, & Bu, 2021; Pattnaik, Singh, & Gaur, 2021; Qi, 2023; Rasheed, & Ahmed, 2023). Risk diversification and stabilization of earnings through regional diversification have also been described (Rasheed, & Ahmed, 2023). Furthermore, they state that firms with greater regional diversification may be able to withstand higher-risk investments (Mavroudi et al. 2023). In addition, regional diversification, considered from an investment perspective, may encourage firms to grow when, for example, the domestic market declines by building a portfolio of numerous foreign markets (Schmuck, Lagerström, & Sallis, 2022).

As an indicator of regional diversification, Ali et al. (2022) measure regional diversification by the ratio of overseas sales to total sales and the number of countries where overseas subsidiaries are located. In this study, we use the ratio of overseas sales, which can be obtained from NIFTY.

5.2 Hypothesis Setting

Based on the results of the previous research review, risk-taking, and characteristics of the growth period, the following two hypotheses are formulated.

Hypothesis 2: There is a positive correlation between the diversification index dummy ($0.4 \leq H < 0.6$) and taking risks for Indian firms in the growth period.

Hypothesis 3: There is a positive correlation between the ratio of overseas sales and taking risks for Indian firms in the growth period.

For hypothesis 2, we consider a moderate diversification index dummy ($0.4 \leq H < 0.6$) to be positively correlated, since the aforementioned previous study by Amarasekara, Iyke, and Narayan (2022) also shows an inverse U relationship. On the other hand, for hypothesis 3, we consider regional diversification to be positively correlated with the ratio of foreign sales since it is stated that regional diversification is linearly positively correlated with firm performance (Schmuck, Lagerström, & Sallis, 2022; Ibrahim, & Falkenbach, 2023).

Table 4: Results of Multiple Regression Analysis (Model 2 and Model 3)

	Herfindahl 0 0.2（n＝2.932）				Herfindabl 0.2 0.4（n＝2.932）				Herfindahl 0.4 0.6（n＝2.932）			
	β	y	Decision	VIF	β	y	Decision	VIF	β	y	Decision	VIF
(Constant)		24.782	***			24.955	***			24.619	***	
Herfindahl 0 0.2	-0.004	-0.277		1.088								
Herfindahl 0.2 0.4					0.002	0.112		1.073				
Herfindahl 0.4 0.6									0.031	2.046	**	1.052
SE	-0.213	-9.566	***	2.207	-0.213	-9.532	***	2.211	-0.210	-9.441	***	2.206
PB	-0.016	-0.982		1.133	-0.016	-0.974		1.132	-0.016	-1.029		1.133
LT	-0.086	-4.735	***	1.451	-0.086	-4.742	***	1.450	-0.084	-4.665	***	1.452
CC	0.049	2.877	***	1.277	0.049	2.874	***	1.279	0.049	2.877	***	1.276
ΔSL	0.331	20.870	***	1.113	0.330	20.868	***	1.113	0.331	20.924	***	1.113
AGE	-0.253	-12.199	***	1.915	-0.253	-12.215	***	1.904	-0.253	-12.224	***	1.904
RS	-0.033	-1.957	*	1.292	-0.034	-1.968	**	1.294	-0.033	-1.930	*	1.292
R-squared	0.352				0.352				0.353			
Adjusted R-squared	0.339				0.339				0.340			

	Herfindahl 0.6 0.8（n＝2.932）				Herfindabl 0.8 1.0（n＝2.932）				Overseas sales ratio（n＝1.866）			
	β	y	Decision	VIF	β	y	Decision	VIF	β	y	Decision	VIF
(Constant)		24.861	***			25.025	***			21.849	***	
Herfindahl 0 6 0.8	0.041	2.538	**	1.144								
Herfindahl 0.8 1.0					0.020	1.286		1.091				
Overseas sales ratio									0.210	8.846	***	1.630
SE	-0.205	-9.142	***	2.240	-0.218	-9.649	***	2.264	-0.207	-7.878	***	2.002
PB	-0.016	-1.000		1.132	-0.016	-0.988		1.132	0.185	5.465	***	3.343
LT	-0.085	-4.715	***	1.451	-0.087	-4.805	***	1.454	-0.039	-1.746	*	1.457
CC	0.048	2.809	***	1.278	0.049	2.898	***	1.277	0.041	1.855	*	1.404
ΔSL	0.331	20.926	***	1.113	0.330	20.860	***	1.113	0.001	0.025		1.550
AGE	-0.250	-12.078	***	1.909	-0.253	-12.217	***	1.904	-0.240	-10.127	***	1.624
RS	-0.035	-2.059	**	1.293	-0.033	-1.908	*	1.294	-0.040	-1.765	*	1.520
R-squared	0.353				0.352				0.377			

Adjusted R-squared	0.341				0.340				0.358			

***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.

5.3 Methods of Analysis

(1) Dataset

Unlike the analysis in Section 4.2, the target period for both dependent and explanatory variables is the period from March 2009 to March 2018, because the time lag is not taken into account. Other conditions are the same as in 4.2.

(2) Regression analysis

To clarify the relationship between taking risks and diversification, Model 2 and Model 3 add RISK as the dependent variable, the aforementioned diversification index dummy as an explanatory variable to Model 2, and the overseas sales ratio (OVSC) to Model 3.

$$Model\ 2: Risk_{i,y} = \alpha_0 + \beta_1 Herfindahl\ dummy_{i,t} + \beta_2 SE_{i,y} + \beta_3 PB_{i,y} + \beta_4 LT_{i,y} + \beta_5 CC_{i,y} + \beta_6 \Delta SL_{i,y} + \beta_7 AGE_{i,y} + \beta_8 RS_{i,y} + \beta_9 Year\ dummy_y + \beta_{10} Industry\ dummy_y + \beta_{11} Market\ dummy_t + \varepsilon_{i,y}$$

$$Model\ 3: Risk_{i,y} = \alpha_0 + \beta_1 OVSC_{i,y} + \beta_2 SE_{i,y} + \beta_3 PB_{i,y} + \beta_4 LT_{i,y} + \beta_5 CC_{i,y} + \beta_6 \Delta SL_{i,y} + \beta_7 AGE_{i,y} + \beta_8 RS_{i,y} + \beta_9 Year\ dummy_y + \beta_{10} Industry\ dummy_y + \beta_{11} Market\ dummy_t + \varepsilon_{i,y}$$

5.4 Analysis Results

As in Hypothesis 2, a positive and significant correlation at the 5% level was found between moderate diversification ($0.4 \leq H < 0.6$) and risk-taking. The diversification index dummy ($0.6 \leq H < 0.8$) was significantly and negatively correlated at the 5% level. On the other hand, Hypothesis 3 also led to a significant and positive correlation at the 1% level between OVSC and taking risks as hypothesized.

5.5 Considerations

Although some previous studies have found an inverse U shape between regional diversification and firm performance (Alakkas et al. 2023; Ibrahim, & Falkenbach, 2023), the increase in adjustment costs associated with regional diversification can be overcome by a learning curve in management methods, and thus, as mentioned earlier, regional diversification is linearly positively correlated with firm performance (Schmuck, Lagerström, & Sallis, 2022; Ibrahim, & Falkenbach, 2023).

On the other hand, in addition to the aforementioned study by Amarasekara, Iyke, and Narayan (2022), many previous studies have shown that business diversification has an inverse U-shaped relationship with firm performance (Schommer, Richter, & Karna, 2019; Sohl, Vroom, & McCann, 2020; Schmuck, Lagerström, & Sallis, 2022).

The relationship between taking risks and diversification is consistent with many previous studies on business and regional diversification. The relationship between taking risks and diversification of Indian firms during the growth period also suggests that a moderate level of diversification is desirable for business diversification, while a more advanced level of regional diversification is desirable for regional diversification.

6. Conclusion

6.1 Results of this study

In previous studies on risk-taking, Bromiley (1991) has established a time lag from a long-term perspective, but few previous studies have established a multi-year time lag. Based on Bo's (2016) previous study on time lags, this study focuses on Indian firms during the growth period and establishes a time lag between taking risk and firm performance, suggesting that there is a time lag of up to four years between taking risk and firm performance.

While previous studies have focused on the relationship between taking risks and firm performance, this study further focuses on the degree of taking risks and business diversification, and regional diversification of Indian firms during the growth period. The results suggest that Indian firms should diversify their business and geographic diversification based on a moderate portfolio with a Herfindahl index of $0.4 \leq H < 0.6$, rather than simply increasing their diversification.

6.2 Limitations and challenges of this study

While some studies have shown the advantages of diversification, others have shown its disadvantages. This is the diversification discount. Diversification discount is a phenomenon in which diversified firms are discounted in the stock market when compared to specialized firms. It indicates that diversified firms in the U.S. are undervalued by the stock market compared to specialized firms (Ahmed et al. 2023).

However, in the diversification discounting, the focus is on stock market valuation and not on firm performance or life cycle. Future research is required to elucidate more specific taking risk conditions (e.g., taking risk by industry in consideration of industry characteristics) and the impact on firms (e.g., valuation from the stock market).

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Conflicts of Interest

The authors have disclosed no conflicts of interest.

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