AN INVESTIGATION INTO THE DIVERSIFICATION-PERFORMANCE RELATIONSHIP AMONG PROPERTY-LIABILITY INSURERS

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ABSTRACT: *Extensive research exists on the relationship between diversification and financial performance of firms. Very few of these studies focus on the insurance industry. This paper seeks to provide empirical evidence on the relationship between property-liability insurers' product diversification and their risk-adjusted return using cross-section and time-series data for the years 1992 through 2000. The study findings indicate a U-shaped relationship between the extent of product diversification and risk-adjusted returns. In the first stage, the initial benefits of diversification are outweighed by the cost of diversification and hence result in a reduction in financial performance. However, as firms expand further, greater benefits of diversification are achieved, leading to a positive impact on financial returns. The results of the study show a consistent pattern using Herfindahl Index and Entropy Measures of diversification.*

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INTRODUCTION

The need to diversify operations across multiple business lines has been recognized by insurance firms for quite some time. In recent years, the increasing convergence of the financial marketplace, coupled with intense competition, has led to many insurers diversifying their operations. The diversification of firms has many managerial and public policy implications and has been one of the most researched topics in the literature. Insurance managers have cited the benefits of diversification to include the ability to cross-sell products, generate cost savings, enter new markets, create hybrid products, and enhance brand image, all while developing new sales channels (Business Insurance, 1998; National Underwriter, 2000; Best's Review, 2000). This trend in diversification is not limited to the U.S., but is also reflected in many international markets.

Academic interest in the topic of diversification is evident by the level of attention it has received over the last four decades. Numerous articles can be found in the fields of economics, finance, and strategic management. While this topic is rich in studies, many scholars concur on the fact that there is no agreement on the precise nature of the relationship between diversification and performance (e.g., Hoskisson and Hitt, 1990; Markides and Williamson, 1994; Palich, Cardina, and Miller, 2000). Despite the existence of these studies, very little attention has been given to the insurance industry, barring three exceptions: King (1974), Fiegenbaum and Thomas (1990), and Hoyt and Trieschmann (1991). The earliest empirical study on insurance firm diversification was by King (1974), who compared market

performance of 455 diversified and non-diversified insurance firms in Ohio and reported that diversified organizations place greater importance on research and development and advertising, while non-diversified firms were marginally more efficient[1]. He added that the significant factor explaining such performance differences was not the extent of diversification of the firm but whether the firm was diversified or not. While King's findings are significant, the study sample was limited to firms in Ohio in 1970.

Fiegenbaum and Thomas (1990) applied the concept of strategic groups to insurance firms for the period 1970 to 1984. They identified three groups of firms: diversified, focused life, and focused personal line firms. This study reported that a diversified strategy was associated with higher combined ratios but lower risk than the industry average. The focused personal line firms had average performance, while the focused life firms had performance below industry average. However, Hoyt and Trieschman (1994) reported that diversified insurers had lower returns and higher risk compared to the firms operating in either life-health or property-liability during the period 1973-1987. Despite the existence of these three studies, several unexplored avenues for research exist. First, existing studies' conclusions are drawn from a comparison of diversified and non-diversified firms or on the type of diversification strategy used. They do not test for the relationship between the extent of diversification and financial performance, which is the focus of the current study. Second, previous studies focus on time periods prior to 1987. Since then, the market has been experiencing rapid financial growth and technology innovation, as well as regulatory reform. Thus, a study with more recent data is needed.

[1] King (1974) measured efficiency through four ratios: loss ratio, expense ratio, combined ratio, and pure loss ratio.

This paper seeks to provide empirical evidence on the diversification-performance relationship among insurance firms. Specifically, the objectives of this study are to answer the following empirical question: *Is there any relationship between the extent of product diversification and financial performance of insurers? If yes, what is the type of relationship between diversification and performance of insurers?* This study will contribute to the body of literature in the insurance field in two important ways. First, it will be the first to use cross-sectional and time-series data in testing the relationship between the extent of diversification and financial performance relationship among property-liability insurance firms. While similar cross-sectional studies on diversification have included insurance firms in their sample (along with firms from other industries), industry-specific differences in diversification are usually lost as unexplained variance. One also needs to be careful in interpreting findings of studies using cross-industry samples, as it has been shown that the diversification-performance relationship fails to hold when industry characteristics are controlled (Christensen and Montgomery, 1981). Second, the findings of this study will provide a better understanding of the nature of the relationship between the extent of diversification and firm performance of property-liability insurers in the current environmental context, since it is based on data which is much more recent. Such findings will provide significant insight regarding developing competitive strategies.

LITERATURE OVERVIEW

In this study, diversification is defined as "the operations in different insurance product lines by an insurer." This section of the paper will build the theoretical underpinnings

of the logic of diversification and draw the reader to the findings relevant to this stream of literature[2].

Theoretical Underpinnings. Economies of scope and market power have been used to support the argument that diversified firms have competitive advantages. Economies of scope arise when a common asset can be shared across two or more product lines (Porter, 1985). These benefits can arise for an insurance company in several ways. For instance, a firm can gain economies of scope by using a single brand name to market products - allowing for sharing of brand name reputation as well as advertising costs. Research and development is another area where a firm can gain economies of scope. By operating in many segments, an insurer can leverage existing knowledge about its markets and customers to come up with bundled products based on customer needs. This type of activity has been referred to as "asset amortization", wherein the firm is able to distribute the cost of assets by spreading their usage across divisions (Markides and Williamson, 1994). The second advantage diversified firms enjoy is market power. Scherer (1980) and Caves (1981) argued that operating in multiple businesses gives a firm greater market power compared to a single-business firm. Diversification allows a firm to compete effectively on price as well as block entry of other firms in preferred industry segments. A diversified firm could do this through cross-subsidization across business lines, wherein profits from one business line are used to subsidize other business lines. The short-term losses suffered by the firm as a result are later compensated by price increases in the long run due to reduced competition. In conclusion, the

[2] The literature review reported in this paper is limited to studies that test for the relationship between diversification and performance, measured by profitability ratios/accounting measures of profitability (ROA, ROE, etc.). Many studies on this topic exist which test for the relationship between diversification and market value or stock market returns (e.g. Berger and Ofek, 1995). As this study does not focus on market value or stock market returns, they are not reviewed in this paper.

economies of scope argument calls for an internal focus wherein the diversified firm gains operational synergies, while the market power rationale presents an external focus as to why a diversified firm would be competitively better than single business competitors.

Apart from economies of scope and market power, firms can gain other advantages by operating in multiple segments of an industry. Such advantages include efficiencies due to learning curve, intra-firm product/process diffusion, and access to factors of production and distribution (e.g. lobbing) unique to an industry (Barney, 1997). An efficiently managed diversified firm also has access to internally generated surplus funds which should be less costly than external market funds (Froot, Scharfstein and Stein, 1994).

While there are benefits associated with diversification, if pursued to the extreme, these efforts can also lead to increased costs out of proportion to benefits gained. Riordan and Williamson (1985) suggested three costs that may increase as firms become more diversified. These costs include coordination costs (cost of governance, monitoring, and integration), incentive degradation (when employees undermine efforts and act in their own self-interest despite incentive systems), and bureaucratic distortions. In addition to the above costs, the top management of highly diversified firms may also find that it is increasingly difficult to give proper attention to all aspects of business that are dissimilar (Grant, Jammine and Thomas, 1988). The lack of focused attention to all lines of business increases the possibility that managers could make mistakes in decision-making. For instance, managers are more likely to fail to recognize new trends in a particular market segment in which the firm is operating and subsequently make decisions that are not appropriate based on prior experience. Another risk with diversification is that managers may be drawn to invest any free cash flow in projects

that might be undeserving, thereby creating organizational inefficiencies (Berger and Ofek, 1995; Jensen, 1996).

Empirical Findings. As indicated earlier, findings on the impact of diversification on performance do not show a consistent pattern in results. A review of the literature indicates four sets of findings to be prevalent[3]. One set of findings reports a positive relationship between diversification and performance (Miller, 1969; Rhoades, 1973; Carter, 1977). The second set of findings reports a negative relationship between diversification and performance (Imel and Helmberger, 1971; Markham, 1973; Rhoades, 1974; Grinyer, Yasai-Ardekani, Al-Bazzaz, 1980; Amit and Livnat, 1988). A third set of studies found no relationship between diversification and performance (Gort, 1962; Jones, Laudadio, Percy, 1977[4]; Ravenscraft, 1975; McDougall and Round, 1984; Montgomery, 1985). Finally, the fourth set of findings reported an inverted U-shaped relationship (Grant, Jammie, Thomas, 1988; Palich, Cardinal, and Miller, 2000). Palich, Cardinal, and Miller (2000) conducted a meta-analysis of fifty-five studies on the diversification-performance relationship[5]. Their analysis found conclusive support for the inverted U-shaped relationship wherein diversification is positively related to performance to a certain extent, after which it is negatively related.

In conclusion, theoretical reasons lead us to infer that diversification is desirable due to the many benefits offered and has the potential to influence performance positively, as long as managers are able to provide effective monitoring. Hence, the relationship between

[3] Three streams have characterized research on diversification and its relationship to performance. The first focuses on the type of diversification strategy (related vs. unrelated) and performance. The second focuses on the mode of diversification (acquisitions vs. internal development). The third, which is the focus of this study, tests for the type of relationship between the degree of diversification (i.e., continuous measures) and performance.

[4] No relationship between diversity and performance was found in consumer goods industries, whereas a negative relationship was found in producer goods industries.

[5] Palich, Cardinal, and Miller (2000) report that a total of 82 quantitative studies exist on the topic of diversification and

diversification and performance is contingent on how effectively diversification is managed. The inconsistent findings of past research make it hard to conclude as to how effective firms are in "managing" diversification. This study will perform two regression models wherein diversification and performance are tested for a linear and a quadratic relationship.

The empirical analysis investigates the following hypothesis:

The relationship between diversification and performance vary according to the extent of diversification undertaken by the firm, even though the exact nature of the relationship is to be determined.

RESEARCH METHODOLOGY

The empirical analysis is based on pooled cross-section and time-series data of U.S. property-casualty insurance companies that report to NAIC, for the years 1992 through 2000. Most company-specific information is derived from the NAIC database, with the exception of distribution system data. Data on the variable measuring distribution system (i.e. AGENCY) is obtained from Best's Key Rating Guide. The sample includes only firms that have non-missing values on all the variables under consideration; positive values for assets, surplus, net premiums written; organization form is stock or mutual; and obtained licenses from at least one state. Insurance companies may structure as a single insurer, or as affiliate of a large insurance group. Given that insurance groups may perform corporate strategies and practice risk management at the group level, instead of at the individual company level, insurers that belong to the same group are consolidated as one observation unit in our sample. In the case where multiple insurers are grouped as one unit, the values for dummy variables are based on the largest insurer in the group, and continuous variables are constructed by aggregating

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performance in the fields of finance, strategic management, and economics.

values of all insurers in the group. The final sample consists of 5,644 company units, which includes 1,806 insurance groups and 3,838 unaffiliated single companies.

The key explanatory variable of interest, product diversification, is measured by the Entropy Measure (Berry, 1975; Palepu, 1985). The Entropy Measure considers not only the number of products offered by a company but also the distribution of a company's share in each product line. When applied to the insurance industry, the Entropy Measure for product diversification can be defined as:

$$PDIV = \sum_{s=1}^{2} P_s \left(\sum_{l \in s} \frac{P_l}{P_s} ln \frac{P_s}{P_l} \right) + \left(\sum_{s=1}^{2} P_s \, ln \frac{1}{P_s} \right)$$

where s represents a different segment of the insurance industry (i.e. property-liability or life-health), l represents product line within the corresponding segment, and P_s and P_l represent the share of the insurer's premium in segment s and in product line l, respectively. As a result of the calculation, an insurer with an exclusive focus on a single product line (i.e. non-diversified) takes the value 0 for the *PDIV* measurement while a more diversified firm will have a higher value for the *PDIV* variable. The Entropy Measure allows us to quantify the level of product diversification as well as to differentiate firms that diversify within property-liability lines of business and those that diversify across both property-liability and Life-Health segments. While the Entropy Measure has been widely used in strategy literature, several studies have used the Herfindahl index to measure product diversification (e.g., Mayers and Smith, 1990; Garven and Lamm-Tennant, 2000; Powell and Summer, 2002)[6].

[6] The Herfindahl Index is calculated by 1- Σp_i^2, where p_i represents the percentage of a firm's net premium written on product line i.

Therefore, to increase convergent validity in our study, as a comparison, we also used the Herfindahl Index to measure the extent of product diversification.

In addition to the diversification variable, we also included three variables controlling for insurers' diversification strategies and classifying insurers into one of three categories: insurers that write personal lines only, commercial lines only, or both. As noted earlier, previous findings on this topic have indicated that the type of business insurers write influences performance (Fiegenbaum and Thomas, 1990; Hoyt and Trieschmann, 1991). Using personal line insurers as the omitted category, we included two dummy variables in our empirical models - one for insurers that write only commercial lines [COMM] and the other for insurers involved in both personal and commercial lines [BOTH]. Also included in the model is a dummy variable, LIFE, which equals one if the property-liability insurer also sells life insurance products.

Using previous research as a guide, several variables that are hypothesized to affect the performance of the insurer are included in the empirical models as control variables:

SIZE. Larger firms have a greater potential to gain scale and scope in operations. Cummins and Zi (1998) report that larger firms have higher economies of scope and scale. Consistent with results in previous literature, we use the natural logarithm of a firm's assets as a measure for firm size (Krishnaswami and Pottier, 2001). We expect a positive relationship between the size of an insurer [SIZE] and its performance.

GROUP. Insurance companies operate as a single firm or as affiliate of a large group. An insurer which is a member of a large group is able to manage diversification across product lines in a more effective manner, as it will be able to share and exchange resources

with other members of the group. Members of such groups will have less replication and greater efficiency in operations, as they can coordinate their resource deployment across other members (Colquitt, Sommer, and Godwin, 1999). An insurer who is an independent unit is likely to have fewer resources, and thereby will be less capable of handling diversification efficiently. A dummy variable is included in the model controlling for group affiliation. The value 1 is assigned to companies belonging to an insurance group [GROUP] and 0 otherwise. We expect that the sign of the group affiliation variable will be positive.

LICENSE. Mayers and Smith (1990) argue that operating across many geographic regions will require firms to allow for greater managerial discretion, thereby incurring higher costs in monitoring. However, a firm operating in many regions will also have a greater potential to gain higher operational revenue and profits, compared to firms concentrated in just a few states. Therefore, the relationship between the number of states an insurer operates in and its financial performance is unclear. The measure of geographic concentration used in study is the number of states in which a firm is licensed to operate [LICENSE][7].

ORGANIZATION FORM. The most common organizational forms among insurers are stock or mutual. As noted in the literature, agency costs vary between these two forms of organization structure (e.g., Fama and Jensen, 1983; Mayers and Smith, 1990; Pottier and Sommer, 1997). Stock companies face agency costs of managerial discretion, where the interests of owners differ from the interests of managers. However, the market for corporate control serves as a deterrent to managerial discretion, forcing managers to maximize performance. This pressure to maximize performance is far less in a mutual firm, since the

[7] This measure of geographic concentration is modified from the one used by Mayers and Smith (1990) and Garven and Lamm-Tennant (2000).

role of owner and policyholder functions are merged (Colquitt, Sommer, and Godwin, 1999). Therefore, we anticipate that stock companies will have better financial performance, other things equal. We dummy coded stock insurers [STOCK] as 1 and others as 0.

AGENCY. Insurers can use independent agency firms or other exclusive vertical channels for distribution. The independent agency system allows agents to perform a greater number of activities compared with exclusive vertical channels (Regan, 1997), and they often have a greater incentive to provide better services (Kim, Mayers, and Smith, 1996). However, the commission structure for an independent agency system may impose higher costs on insurers. We dummy coded distribution system 1 if it was an independent agency firm [AGENCY] and 0 otherwise.

INVESTMENTS and UNDERWRITING PERFORMANCE. An insurer's underwriting results and investment portfolio both influence the company's profitability. Therefore, we included two variables controlling for an insurer's underwriting and investment performance. We used combined ratio as a measure for underwriting performance [UNDERWRITE] and the percentage of assets held in bonds as a proxy for an insurer's investment portfolio [INVEST]. We expect companies with better performance in underwriting and investment to have higher financial returns.

Given the data structure, we employ one-way fixed-effect models to test the relationship between the insurer's level of diversification and financial performance. Fixed-effect models control for time-specific effects that are not otherwise controlled for by other variables included in the models[8]. To test the non-linear relationships between the extent of

[8] For more discussion on the fixed-effect model, see, for example, Greene (1997). One-way fixed-effect models in this study include time-specific intercepts. We also estimated the model, using pooled OLS regressions. The results of the OLS models

product diversification and financial performance, we include the measurement of product diversification [PDIV] and the square of PDIV, along with other control variables, in our models. We use risk-adjusted return-on-asset (ROA) as the measurement for a company's financial performance[9]. Risk-adjusted return-on-asset reflects a company's financial performance after adjusting for volatility of its return. This measurement is calculated by dividing a company's return-on-asset by its standard deviation of returns over the observation period[10]. Risk-adjusted measure is a more reasonable measure of performance, as firms with strong variation in earnings have lower market values (Grace, 1990).

The empirical model for testing the hypothesis can be written in the following form:

$$\begin{aligned} \textit{Risk Adjusted } ROA_{i,t} = {} & \alpha_t + \beta_1 PDIV_{i,t} + \beta_2 PDIV^2_{i,t} + \beta_3 COMM_{i,t} + \beta_4 BOTH_{i,t} \\ & + \beta_5 LIFE_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 GROUP_{i,t} + \beta_8 LICENSE_{i,t} + \beta_9 STOCK_{i,t} \\ & + \beta_{10} AGENCY_{i,t} + \beta_{11} INVEST_{i,t} + \beta_{12} UNDERWRITE_{i,t} + u_{i,t} \end{aligned}$$

where the subscript i represents the company, t represents time, α_t represents time-specific intercepts and $u_{i,t}$ is company-specific random error terms. The definitions and summary statistics of the sample are included in Table 1.

EMPIRICAL RESULTS

Table 2 shows estimations of the parameters from the fixed effect models[11]. Model specifications for both Entropy Measure and Herfindahl Index are reported. Two models were run on each diversification measurement: linear regression and quadratic regression. The empirical results show a non-monotonic relationship between the level of product

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are consistent with that of the fixed-effect models.

[9] The usage of ROA as a proxy for measurements of an insurer's financial performance is consistent with past research on diversification (e.g., Amit and Livant, 1988; Grant, *et al*, 1988).

[10] A similar approach was used by Browne, Carson, and Hoyt (2001).

Table 1
Variable Definitions and Basic Statistics

Variable	Definition	Mean	SD	Min	Max
ROA	Risk-adjusted return on asset	1.69	6.41	-32.74	315.14
PDIV (1)	Product diversification, as measured by Entropy Measure	0.62	0.59	0.00	2.32
PDIV (2)	Product diversification, as measured by Herfindahl Index	0.32	0.29	0.00	0.88
COMM	Dummy variable = 1 if a firm sells only commercial insurance products, 0 otherwise	0.34	0.47	0.00	1.00
BOTH	Dummy variable = 1 if a firm sells both commercial and personal insurance products, 0 otherwise	0.46	0.50	0.00	1.00
LIFE	Dummy variable = 1 if a firm sells life insurance products, 0 otherwise	0.14	0.35	0.00	1.00
SIZE	Natural log of total assets	17.08	2.24	11.18	25.78
GROUP	Dummy variable = 1 if a firm is a member of a group, 0 otherwise	0.32	0.47	0.00	1.00
LICENSE	Number of states in which a firm is licensed	9.13	15.35	1.00	55.00
STOCK	Dummy variable = 1 if stock company, 0 otherwise	0.56	0.50	0.00	1.00
AGENCY	Dummy variable = 1 if independent agency firm, 0 otherwise	0.52	0.50	0.00	1.00
INVEST	Natural log of percentage of assets in bonds	3.62	1.24	-10.90	4.60
UNDERWRITE	Combined ratio	104.36	43.64	32.50	195.82

diversification and firm performance. Such evidence was found in both types of diversification measurements. Likelihood ratio tests indicate that quadratic models are

[11] Time-specific intercepts are not reported here.

Table 2
One-Way Fixed Effect Models
(Dependent Variable = Risk-Adjusted ROA)

Variables	Entropy Measure		Herfindahl Index	
	Linear Model	Quadratic Model	Linear Model	Quadratic Model
Intercept	-7.0299***	-6.5245***	-7.1333***	-7.0145***
	(0.9831)	(0.9832)	(0.9828)	(0.9830)
PDIV	0.5140**	-3.0439***	0.1405	-3.5476***
	(0.2177)	(0.6131)	(0.4363)	(1.3672)
$PDIV^2$	-	2.1197***	-	4.9223***
		(0.3416)		(1.7294)
COMM	1.0522***	1.2475***	1.0693***	1.1641***
	(0.3740)	(0.3741)	(0.3743)	(0.3755)
BOTH	-0.0206	0.9265**	0.3364	0.6914
	(0.4161)	(0.4419)	(0.4200)	(0.4378)
LIFE	0.9355**	1.8793***	1.2664***	1.6655***
	(0.4737)	(0.4960)	(0.4769)	(0.4968)
SIZE	0.4451***	0.4165***	0.4532***	0.4465***
	(0.0594)	(0.0594)	(0.0593)	(0.0593)
GROUP	-0.1549	-0.0979	-0.1672	-0.1342
	(0.2360)	(0.2353)	(0.2361)	(0.2362)
LICENSE	0.0149**	0.0127	0.0171**	0.0160**
	(0.0070)	(0.0070)	(0.0070)	(0.0070)
STOCK	0.4516**	0.4033*	0.3721**	0.3831**
	(0.1847)	(0.1843)	(0.1844)	(0.1843)
AGENCY	-0.0289	-0.1039**	0.0043	-0.0336
	(0.1835)	(0.1833)	(0.1833)	(0.1837)
INVEST	-0.1491**	-0.1227	-0.1430*	-0.1360*
	(0.0770)	(0.0758)	(0.0761)	(0.0761)
UNDERWRITE	-0.0005	-0.0005	-0.0005	-0.0005
	(0.0013)	(0.0013)	(0.0012)	(0.0013)
-2 Log Likelihood	36739.4	36701.1	36744.9	36736.8

* Significant at 0.01 level.
** Significant at 0.05 level.
*** Significant at 0.10 level.
[+] Standard errors are given in the parentheses below coefficient estimates.

superior to linear models[12], which suggests that the quadratic term adds to the overall performance of the model. Therefore, we focus our discussion on the quadratic models. Figure 1 and Figure 2 show the relationships between the extent of product diversification and fitted ROA in linear and quadratic regressions for Entropy Measure models and for Herfindahl Index models, respectively.

Overall, the findings show that the degree of product diversification and an insurer's financial performance are positively related. More specifically, the significance of the squared term of product diversification suggests that the relationship between product diversification and a firm's risk-adjusted ROA is non-linear. As can be seen in the fitted graphs (as well as regression coefficients), in the early stage of product diversification, costs may outweigh the benefits of diversification and result in a negative impact on a company's financial performance. The extent of such a negative effect is reduced when a firm reaches a moderate level of diversification, and a highly diversified firm enjoys a greater return compared to a similar firm that is less diversified in product lines. Such evidence is found when we use either Entropy Measure or Herfindahl Index to measure product diversification.

Types of business that insurers write are found to be relevant to insurer performance. The results show that insurers involved in commercial lines have higher risk-adjusted return than insurers involved in only personal lines. Insurers that participate in both personal and commercial lines have higher risk-adjusted ROA than similar insurers that write only personal lines when Entropy Measure is used. It was also found that property-liability insurers that sell life insurance products have better financial performance than insurers that do not extend their

[12] When we compare the quadratic model with the linear model, the likelihood ratio statistic is 38.3 for Entropy Measure, and 8.1 for Herfindahl Index, whereas the $X^2_{0.05}(1) = 3.841$ which suggests quadratic models are better than linear models.

Figure 1
Product Diversification Measured by Entropy and Fitted Risk-Adjusted ROA

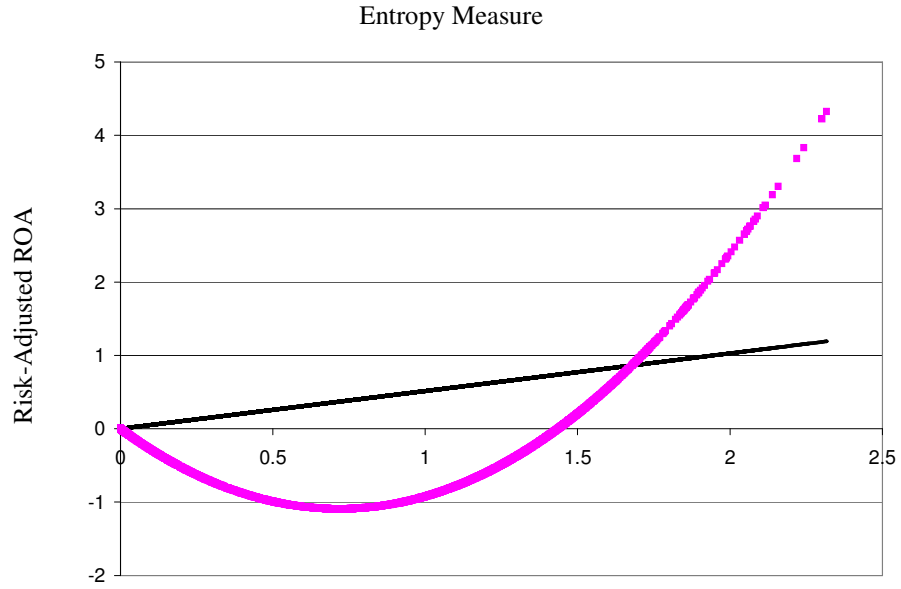
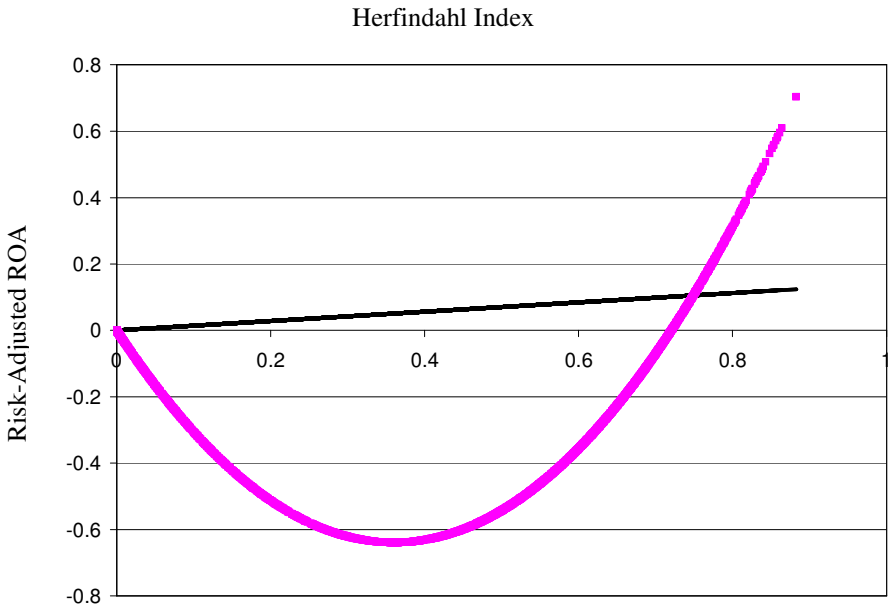


Figure 2
Product Diversification Measured by Herfindahl Index and Fitted Risk-Adjusted ROA



business to the life insurance segment. Regarding the remaining control variables, company size [SIZE] and organization form [STOCK] are both positively significant, which suggests that larger or stock insurers have relatively stronger financial performance. Agency variable is statistically significant with a negative sign in the Entropy Measure model, which suggests that insurers with independent agency systems have lower financial returns. The number of states in which an insurer is licensed [LICENSE] is positively significant in the Herfindahl Index model, which suggests that geographic diversification is beneficial with regard to financial performance.

To validate the non-linear relationship, we performed separate regressions for highly diversified firms and focused firms. We divided our sample into two sub-samples by the mean value of Entropy Measure. Group One (focused firm) includes firms with Entropy Measure less than 0.62, and Group Two (highly diversified firms) includes firms with Entropy Measure greater than 0.62. There are 2,925 and 2,719 observations in Group One and Group Two, respectively. The coefficients for regression results are presented in Table 3. The split sample regressions generally confirm the two-staged relationship between product diversification and firm performance. The coefficients of the variable product diversification [PDIV] for focused firms are negatively significant, which suggests that at lower levels of diversification a negative relationship between the extent of product diversification and financial performance exists. For highly diversified firms, however, PDIV is positively significant. Our results also show that competing in product lines other than personal lines help with an insurer's financial performance for focused firms. However, as a firm becomes highly diversified, the type of business it is in does not significantly affect its returns. Within focused firms, larger insurers,

Table 3
Fixed-Effect Models on Split Samples
(Dependent Variable = Risk-Adjusted ROA)

Variables	Focused Firms (Entropy Measure <= 0.62)		Diversified Firms (Entropy Measure >0.62)	
	Coefficient	Standard Errors	Coefficient	Standard Errors
Intercept	-2.5022***	0.6071	-13.1851**	6.2300
PDIV	-0.8156**	0.3742	1.2367**	0.5382
COMM	1.2587***	0.1843	0.0137	6.0089
BOTH	0.7146***	0.2328	0.1388	5.9837
LIFE	0.6239**	0.3046	0.9496	5.9909
SIZE	0.1519***	0.0372	0.8010***	0.1258
GROUP	0.4214***	0.1608	-0.8473*	0.4528
LICENSE	0.0114***	0.0050	0.0001	0.0129
STOCK	0.0093	0.1253	0.8120**	0.3631
AGENCY	0.1955	0.1207	-0.3473	0.3660
INVEST	0.0184	0.0436	-0.3327*	0.1931
UNDERWRITE	-0.0007	0.0007	0.0009	0.0049
-2 Log Likelihood	14730.4		19300.7	

* Significant at 0.01 level.
** Significant at 0.05 level.
*** Significant at 0.10 level.

insurers that belong to groups, or those that operate in multiple states have better financial performance, compared to their counterparts. For highly diversified firms, only company size and organization form matter. Within this group, larger insurers and stock insurers are found to have better financial performance than smaller or mutual insurers.

CONCLUSION

This study is one of the first that investigates the relationship between the extent of diversification and performance of property-liability insurers. Empirical models provide support for a non-monotonic relationship with two distinct slopes in the relationship between the extent of diversification and financial performance. In the initial stage of diversification, insurers face a reduction in financial return when they expand product lines. This is the point at which they are learning to adapt to new markets as well as investing in the development of newer products. At this stage, it is also likely that these firms have not reached adequate scale in operations to enjoy the benefits of diversification and thereby suffer from diseconomies in operations. Researchers have attributed the increased costs partially to exponential increases in the number of transactions within the firm (Jones and Hill, 1988). As a firm crosses a minimal threshold of diversification, the financial rewards from expansion outweigh costs incurred, and insurers are able to gain benefits from economies of scope and synergy by sharing across product lines.

The results of this study offer interesting implications for corporate strategy for insurers planning diversification. Our findings--the two-staged relationship between product diversification and financial performance--suggest that focused insurers planning on expanding product lines may be better off moving aggressively, in order to escape the initial stage wherein costs of diversification outweigh benefits. One way of achieving this is to pursue mergers or acquisitions. The empirical results of this study are fundamentally consistent with the previous literature, when taken together with the many divergent findings reported in research on diversification. As reported earlier, earlier research found positive,

negative, and inverted U-shaped relationships between product diversification and financial performance. One possible explanation is that previous research captured the slopes at different stages of diversification. It is also worth noting that this study measures performance using risk-adjusted returns while most previous studies did not consider the risk factor.

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