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## **EFFECTS OF CORPORATE DIVERSIFICATION ON ITS PERFORMANCE: THE CASE OF CROATIAN NON-LIFE INSURANCE INDUSTRY**

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***Abstract***

*Although a number of authors have tried to investigate different aspects of insurance industry, there is still little research done and evidence on the performance effect of diversification in either life or non-life insurance industry. This is especially true for the Croatian insurance industry. Therefore, the authors of this article find it valuable to investigate the relationship between product diversification and performance. In testing this relationship we employ different methods of financial performance and diversification assessment.*

***Key words:* Corporate diversification, performance, non-life insurance, Croatia**

### **I. INTRODUCTION**

Until the nineties of the last century, the Croatian insurance market was characterized by the presence of a small number of insurance companies mostly focused on the non-life insurance i.e. mandatory insurance. However, the switch to market economy is causing significant changes in the organization and functioning of this industry. Apart from changes in the number of companies and their (pre)targeting on different segments of insurance, some changes also occur in the legislation as well as in other aspects closely related to the operations of insurance companies. Specifically, the legislation is harmonized with the EU

regulations, private investors enter the market, foreign capital also enters the insurance industry, etc.

In a relatively short period of time more than 10 new investors appeared in the Croatian insurance market, and later on this number increased to more than 20. In addition to the earlier mentioned factors, this sudden expansion was influenced by high profits that were achieved in the insurance sector, as well as by the low entry barriers. Unsaturated market was also one of the reasons that attracted many players to the insurance sector. Similar processes were registered in other transition countries, i.e. the market was entered by many investors, market shares changed, the significance of some insurance segments that had not been developed or had been underdeveloped increased. In short, the insurance market in the last fifteen years has been very dynamic.

In response to market deregulation many competitors wanted to take advantage of new opportunities by diversification across multiple lines. However, the performance effects of this choice are still unclear. There are several reasons for that. Firstly, there is no consensus regarding diversification's effect on insurance performance. While the *conglomeration hypothesis* emphasizes the benefits associated with diversification and predicts a positive diversification-performance relation, the *strategic focus hypothesis* emphasizes benefits of specialization (and the costs of diversification) and predicts a negative diversification-performance relation. Secondly, almost all previous studies examined firms whose business activities span more than one industry while an extremely small number of studies analyzed the effect of corporate diversification in solely one industry in general, and in the non-life insurance industry in particular.

So, the purpose of this paper is to investigate the relationship between product diversification and company performance in Croatian non-life insurance industry. In testing this relationship we employed different financial performance indicators (i.e. ROA and ROE as a measure of profitability) and diversification assessment (i.e. entropy measure and HHI).

Research results indicate a negative relationship between diversification and insurer performance meaning that strategic focus hypothesis can be assigned to Croatian insurance industry.

## **II. CHARACTERISTICS OF CROATIAN INSURANCE MARKET**

There are 27 insurance and 2 reinsurance companies currently operating on the Croatian insurance market. Eight of them conduct exclusively life insurance business, nine of them non-life insurance, while there are ten companies doing both life and non-life insurance business. From the total of 12 companies that had permission to work in the insurance market in 1994, only 3 of

them were foreign owned, while on the day of 31/12/2008 from the total of 29 insurance and reinsurance companies, 18 of them were foreign owned and 11 were domestically owned. Foreign-owned insurance companies have impacted on the development of insurance business in Croatia. Namely, they have affected the growth of competitiveness of Croatian insurance companies, as well as the increase of quality and variety of products and services in insurance. It is to expect that the convergence of Croatia into the EU will continue to attract foreign capital to the Croatian insurance market and thus ensure its persistent growth and development.

Development of insurance market is an indicator of the degree of economic development of a certain country. As a rule, this market is most developed in the most developed countries (USA, UK, Japan ...). The degree of development of insurance industry in some country can be estimated on the basis of several indicators, among which the most important place belongs to the 1) *insurance density rate* i.e. gross written premium per capita and 2) *insurance penetration rate* i.e. gross written premium as a percentage of GDP. Changes of these indicators for the Croatian insurance market during the period between 1998 and 2008 can be clearly presented by Figure 1 and 2.

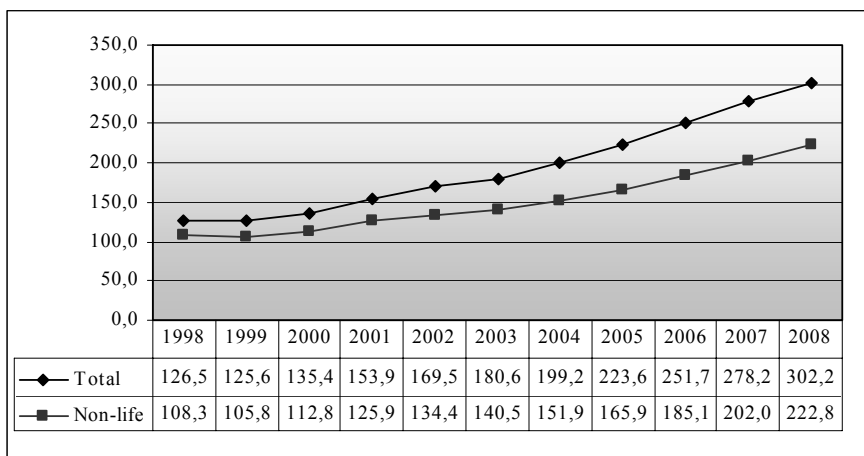
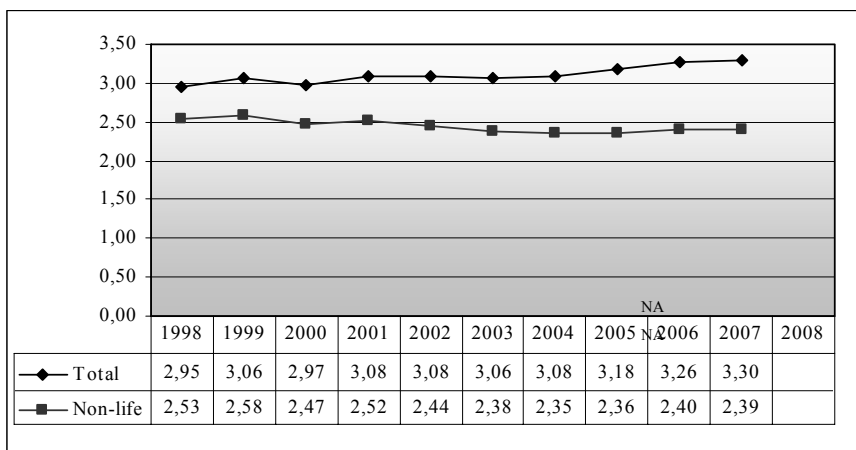


Figure 1. Insurance density rate (EUR)



NA=GDP for 2008 was not available at the time of performing this analysis

Figure 2. Insurance penetration rate (%)

The amount of premiums per capita (insurance density) in 2008 in Croatia was 302 EUR for total (all insurance companies) and 223 EUR for non-life insurance, which is well below the average of European countries. However, in relation to the situation of ten years before, premium per capita in 2008 was more than doubled. More precisely, the average rate of change was 9.17% for total and 7.55% for non-life insurance. These values indicate a significantly faster growth in the gross premium in life insurance compared to those in the non-life insurance. Furthermore, the total gross written premium in the analyzed period recorded a twice faster growth of GDP but its share in GDP remains relatively low.

Additional information about the size of the insurance industry, and non-life insurance in particular, can be reached through the *number* of insurance companies and the total (industry) *gross insurance premium*, whose numeric values are presented in the following table.

Table 1  
Number of insurance company and total gross written premium in Croatia

Year		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number of insurance companies	Total	22	25	26	24	23	24	24	23	20	23	27
	Non -life	20	22	24	21	19	20	20	18	16	18	19
Gross written premium (million EUR)	Total	569,4	572,1	593,4	682,7	753,2	802,2	884,2	993,3	1117	1235	1341
	Non -life	487,6	481,7	494,3	558,7	597,4	623,9	674,3	737,1	821,7	896,8	988,1

As it can be seen from the Table 1, during the analyzed period the total number of insurance companies varies between 20 and 27. After a noticeable growth of companies in 2000, during the next five years the number of companies was fluctuating between 23 and 24. The minimum of 20 companies is recorded in 2006, while only two years later, this value reaches its maximum of 27. A similar trend of growth and fall can be found within non-life insurance companies. The main reason for this variation can be assigned to the setting up of new insurance companies (this is especially true for the last two analyzed years) as well as disappearing of ongoing companies through mergers and acquisitions. Regarding the total gross written premium, the continuous growth trend of this indicator at a rate of 9% per annum is notable. However, it must be mentioned that although the gross written premium in non-life insurance shows a slight decrease in 1999 this is only due to exchange differences over the years, indeed when expressed in domestic currency, the constant growth of gross written premium during the years is evident. At the end of 2008, its value was 988 millions EUR, which was 102% more than in 1998.

### III. REASONS FOR DIVERSIFICATION

A great deal of literature discusses the reasons why companies decide to diversify and how diversification may affect a firm's performance. While various theories emphasize different reasons for diversification and empirical studies show a diverse impact on companies' performance, all economists agree with the following: When making decision about diversification, a company must recognize all the potential benefits and potential costs of such diversification. As long as diversification benefits exceed its costs, the diversification will be justified since it will improve company performance. Otherwise, diversification will be unprofitable for the company.

*Benefits* of corporate diversification will be reflected through a positive relationship between diversification and performance. Such benefits are commonly associated with economies of scope, larger internal capital markets, risk reduction and greater market power (Besanko et al., 2007; Montgomery, 1994). Scope economies can come from spreading a firm's underutilized organizational resources to new areas. Namely, a firm may possess specific resources that it cannot fully utilize in its current product market (e.g. optimal output level is high relative to market size) so it may choose to apply such resources in other product markets (Penrose, 1995). Also, diversification can create cost scope economies - fixed production costs are shared across several businesses within the firm (Teece, 1980). Assets such as a distribution system, reputation and customer loyalty may also provide rationale to diversify since its transfer to another business can generate revenue economies of scope. Firms also may diversify in order to create and utilize a larger internal capital market (i.e. generate funds from one business and invest it into another, or balance cash flows to avoid short term borrowings). This argument assumes that (due to information

asymmetries) internal capital markets are more efficient than external capital markets. Furthermore, diversifying into different line of business can lead to a reduction in risk and income volatility as long as the profit streams from different line businesses are not perfectly correlated. This risk reduction should increase prices that (risk-sensitive) customers are willing to pay (Cummins and Danzon, 1997; Liebenberg and Sommer, 2008). Finally, some authors argue that mutual involvement in more than one market may increase firm's incentives to cooperate rather than 'cheat'. Namely, close correspondence in market structures may raise the possibility of collusion between firms because it enables them to avoid the full rigors of competition by practicing 'mutual forbearance' (Li and Royston, 2004). As a result of collusion, companies reduce the intensity of competition and alter the market price in order to receive higher profits.

It is worth mentioning that managers may have non-performance based objectives that lead firms to become diversified. Precisely, due to separation of ownership and control in large modern corporation, managers' preferences regarding corporate actions may conflict with those of shareholders. There are several potential reasons why a firm's managers may benefit from undertaking acquisition (i.e. diversification) even if shareholders do not (Besanko et. al. 2007). First, managers may simply enjoy running large business. Such managers may promote firm grow or other objectives rather than profitability. Second, managers may pursue unrelated acquisition in order to increase their compensation. Third, managers may pursue unrelated acquisition in order to reduce the risk of poor performance and therefore risk of losing their jobs. Finally, some researchers argue that diversification is used as an escape route for firms in declining and low profit industries (Rumelt, 1986).

#### **IV. PREVIOUS RESEARCH**

Because of the various results obtained from different studies exploring the relationship between profitability and diversification, some of the recent inter-industry (Choi and Cowing; Chakrabarti et. al.; Kiker and Banning) and intra-industry (Li and Greenwood; Liebenberg and Sommer; Elango et al.) studies will be subsequently presented together with their main empirical results.

Choi and Cowing (2002) analyzed the relationships relating corporate diversification, concentration and performance for a group of 25 of the largest business groups (Korean chaebols) during the period of 1985–1995. In order to measure the impact of member firm concentration within the group, the authors used a Herfindahl-Hirschman index (HHI) of group concentration (HHFS). As a measure of chaebols diversification across industries, two variables were used: an HHI based on the chaebol asset shares for each industry within which the chaebol operates (HHDV) and the number of member firms in the group. Performance was measured as annual after-tax chaebol profit rate on total assets. The authors reported regression results using various model specifications. However,

regardless of model specifications chaebol concentration (HHFS) coefficient was always negative and generally significant at the 10 percent level, while HHDV was *insignificant* signalling that operating in a few versus many industries, did not appear to affect group profits.

Chakrabarti et. al. (2007) observed the impact of diversification on performance for firms operating in different institutional environments for the period from 1988 to 2003. On a sample of six East Asia countries at various stages of economic and institutional development they tested the hypothesis according to which less developed institutional environments provide greater benefits of diversification for firm performance. The authors used entropy and HHI as measures of diversification, while 1-year lag ROA was used as a measure of firm performance. Several control variables (firm size, age, current ratio, debt ratio and finally dummy variable - to distinguish between the period prior to the economy-wide shock) were also included in the model. Using a fixed-effects model they reported *negative* association between diversification and firm performance for the full sample, and different association across the analyzed countries. More precisely, their results suggested that diversification negatively impacted performance in more developed institutional environments while improving performance only in the least developed environments. Based on the obtained results, the authors furthermore concluded that the outcomes of diversification are influenced by institutional environments, economic stability and affiliation with business groups.

Kiker and Banning (2008) conducted meta-analysis in order to test the relationship between diversification and firm performance. They first compiled information on the diversification-performance linkage as in a qualitative review and then they computed a sample size-weighted mean correlation on the 34 studies included in the analysis. The results revealed the average correlation between diversification and firm performance to be *positive and significant* with value of 0.11, and the correlation corrected for measurement reliability was 0.18. They also revealed that the differences in results found in the primary studies used in their analysis are due to statistical artifacts and cannot be attributed to potential situation, sample or method specific moderators.

Li and Greenwood (2004) examined the effects of diversification on Canadian insurers' performance for the period from 1993 to 1998. In order to compare their analysis with previous research, they use ROA and ROE as a dependent variable in a panel data analysis model constituted of matrix of explanatory such as: Entropy, as a measure of diversification; Average MMC (multi-market contact) per rival, as a number of market niches in which the focal firm competes with its rivals; Similarity weighted MMC per rival, as the interaction term between  $s_{ij}$  (niche overlap index) and the variable of MMC per rival; and Relatedness weighted diversification. Additionally, as control variables they employ: Set of indicators to assess insolvency risk and investment risk faced by insurance firms; Total assets; Number of single-market-firm rivals, to control for the possible competitive pressure from single point rivals, and

Number of second-step firms, to control for the effect of firms that do not share direct market contact with a focal firm. After constructing 3 models (Model 1 - baseline, containing all of the control variables; Model 2 - in which Entropy was added; Model 3 – which included all of the remaining independent variables) the authors found Entropy coefficient to be *insignificant* in the last two models. They also find some evidence that market structuration as well as mutual forbearance provides advantage (the latter under specified conditions).

Liebenberg and Sommer (2008) developed a model that analyzes performance as a function of line of business diversification and other variables. The model was tested on a sample of the U.S. property-liability insurers over the period 1995-2004. Their results suggest that undiversified insurers consistently outperform diversified insurers. Specifically, they found a *diversification penalty* of at least 1 percent of return on assets or 2 percent of return on equity. The existence of a diversification penalty (and diversification discount) provides strong support for the strategic focus hypothesis. In order to test robustness of the results, they used alternative risk measures, alternative diversification measures and an alternative estimation technique. Conclusions remained the same. The authors also find some interesting results with respect to several of control variables used in the model. Firstly, they discover that both size and capitalization are positively related to accounting performance. These results support the hypothesis that customers are willing to pay more for insurance from insurers that have lower insolvency risk. Secondly, they find that mutual insurers are significantly less profitable than stock insurers. Thirdly, the coefficient on industry concentration was positive and significant in all models suggesting that firms operating in more concentrated business lines are able to charge higher prices and earn higher profits than firms in less concentrated lines. Lastly, they find that unaffiliated insurers consistently outperform aggregated insurer groups.

Elango et al. (2008) investigated the relationship shared by product diversification and firm financial performance using data drawn from U.S. property-liability insurance market over the 1994 through 2002 time period. After usage of lagged fixed-effect models they discovered two major things. First, they revealed *nonlinear relationship* between product diversification and firm performance. Second, when they used interaction variable of product and geographic diversification, they found a complex relationship between diversification and insurer performance results. The authors concluded that the relationship shared by product diversification and firm performance is significantly affected by levels of geographic diversification. Robustness tests using subsamples and market returns for public firms showed consistent results.

Summing up the results of the above presented researches regarding the relationship between company diversification and profitability, it is possible to perceive their inconsistency. While some studies find that the effect of diversification on company profitability is *positive and statistically significant*, others achieve contrary results – *negative and/or statistically insignificant*



relationship. So, the common conclusion of studies in this field continues to be unclear.

## V. SAMPLE DESCRIPTION, VARIABLES AND DATA ANALYSIS

*Sample description.* From a total of 25 companies that were active in the Croatian insurance industry in 2007, 8 of them were doing exclusively non-life insurance business (see table 2). In accordance with studies that excluded from analysis the firms that reported negative net premiums written (Liebenberg and Sommer, 2008; Elango et al., 2008) we excluded three firms that meet this criterion. Additionally, we also excluded one firm that had just started with its work. At the end, our sample consisted of the following four insurance companies: Croatia, Euroherc, Jadransko and Sunce that were analysed during the period from 2004 to 2007. These four companies, when observed together, on average realized more than 70% of annual total gross written premium in Croatian non-life insurance industry. As such, they constituted a sufficient representative sample for our analysis. An additional reason why we focused our analysis only on the non-life insurance (and not on the composite insurance as well) is the fact that for composite insurance it is difficult to measure the profitability of life vs. non-life segment separately, while the joint measure of profitability could lead to a wrong perception of the real success of operations in non-life insurance business.

Table 2

Number of insurance companies according to their business segments

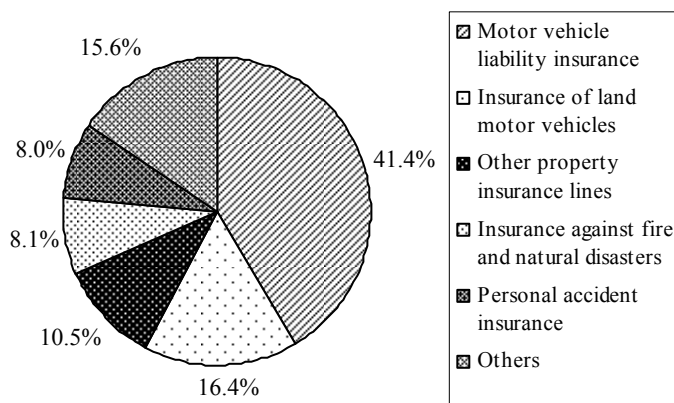
Year	2004	2005	2006	2007
Non - Life insurance	8	7	5	8
Life insurance	4	5	4	5
Composite	12	11	11	10
Reinsurance	2	2	2	2
Total	26	25	22	25

In order to get an insight into the structure of gross written premiums in the Croatian insurance industry, the Figure 3 provides graphical distribution of premiums by type of insurance in 2007. It reveals an unequal share distribution between different types of non-life insurance. Specifically, 5 types of insurance cover 84% of the total insurance portfolio. In the structure of the total gross written premiums, the highest proportion (41.3%) goes to "Motor vehicle liability insurance". This insurance line rose by 11% in 2007, and with gross written premium of 364 million EUR the line increased its market share by 0.5 percentage points. In "Insurance of land motor vehicles" the premium grew by

12% i.e. from 130 million EUR to 145 million EUR. The market share of this type of insurance also slightly increased from 15.9% to 16.3%. In comparison to 2007, "Insurance against fire and natural disasters" recorded an increase in premium by 13% as well as a slight increase in its market share (from 7.8% to 8.1%). However, two insurance lines ("Other property insurance lines" and "Personal accident insurance") marked decrease of their proportion in 2007. Both of these two lines recorded growth of their premiums, but this growth was not sufficiently large (in relation to the growth of the overall non-life insurance premium) to ensure the increase of their share in total gross premiums. In the category "Others", 10 types of insurance realized relative growth. Overall, it could be stated that although some insurance lines recorded increase/decrease in comparison to their value in the previous year, these changes were miniature, so that the picture of insurance lines distribution structure remained almost unchanged in 2007. Of course, this does not mean that the insurance market did not grow. On the contrary, non-life insurance market grew by 9.4%, meaning that approximately the same rate of increase was recorded in individual insurance lines.

Figure 3

Structure of non-life premiums by type of insurance in 2007



According to the Law on Insurance (NN 151/05) insurance companies can transact business from the 18 lines of insurance that are namely: (1) Personal accident insurance, (2) Health insurance, (3) Insurance of land motor vehicles, (4) Insurance of railway locomotives and rolling stock, (5) Insurance of aircrafts, (6) Insurance of vessels, (7) Insurance of goods in transit, (8) Insurance against fire and natural disasters, (9) Other property insurance lines, (10) Motor vehicle liability insurance, (11) Aircraft liability insurance, (12) Insurance of liability arising out of use of vessels, (13) Other liability insurance lines, (14) Credit insurance, (15) Suretyship insurance, (16) Insurance of miscellaneous financial

losses, (17) Insurance of legal protection, (18) Travel insurance. However, due to the extremely small value of gross written premium realized in some lines (i.e. a small share in the portfolio), Croatian Insurance Bureau aggregates these lines and publishes them in a form of six main lines: I. Accident (1); II. Health (2); III. Motor *casco* (3,4,5,6); IV Property (8,9); V. Motor TPL (10,11,12,13); VI. Other (7,14,15,16,17,18). This kind of aggregation was used in our analysis and it presented the basis for diversification measure construction.

*Variables definition.* In this paper we employ two different *measures of profitability*, ROA and ROE, for two reasons. First, the Croatian Financial Services Supervisory Agency (HANFA) in its annual publications also uses these indicators as basic profitability measures. Second, we wanted to ensure comparability of our results with the previous researches that in most cases were using these two measures. In accordance with the approach used by HANFA, ROA is calculated by dividing a company's after tax annual profits by its total assets. This indicator gives information of how effectively the company is converting the money it has to invest into net income. The second measure of profitability, ROE, is calculated as ratio of after tax profit and equity. Return on equity measures a company's profitability by revealing how much profit a company generates with the money shareholders have invested.

We measured *diversification* with the two widely used measures: entropy and HHI. The entropy measure is calculated as follows:

$$E = \sum_{i=1}^{18} P_i \cdot \ln \frac{1}{P_i} \quad (1)$$

where  $P_i$  is the percentage of an insurer's premiums written on product line  $i$ . If an insurance company operates in only one insurance line (i.e. exclusively focused company), coefficient of entropy will take the value zero ( $E = 0$ ). Likewise, a more diversified company (i.e. company that operates in several insurance lines) will have a higher value for the entropy measure. The maximum value that entropy measure can take in a situation where a company has the same shares in all lines, is calculated as natural logarithm of the insurance lines number in the industry.

As an alternative measure of diversification we used the Herfindahl Index which is calculated in the following way:

$$HHD = \sum_{i=1}^N P_i^2 \quad (2)$$

where  $P_i$  has the same meaning as earlier. The value of the index may range from 0 to 1. Higher index value indicates a greater degree of focus of the analyzed company. This is in contrast with the entropy measure, so in order to

ensure that selected two measures of diversification can be interpreted in the same way (regarding the signs) we have decided to slightly modify the latter index and

$$\text{rewrite it as } HHD = 1 - \sum_{i=1}^N P_i^2. \quad (3)$$

In order to control for firm-specific and market factors that may explain profitability variation across insurance companies, and also due to data availability, we included several additional *control variables*:

1) Firm size (Size). Economic literature suggests that higher profitability is inherent to large companies, meaning that parallel with the growth of company's size grows the company's profit. Some authors argue that larger firms are expected to be more diversified than smaller firms, and therefore safer, implying higher prices for larger firms (Sommer, 1996). Additionally, total assets size may act as an entry barrier to smaller insurers (Li and Greenwood, 2004). Therefore we have introduced a firm size variable into our model. This variable is measured as the natural logarithm of total assets.

2) Capitalization (Cap). Safer firms are able to command higher prices i.e. insureds are willing to pay a higher premium to one company than to another for the same insurance if the former company is less likely to become insolvent than the latter (Sommer, 1996). Firm capitalization is measured as the capital-to-asset ratio of the company.

3) Leverage (Lev). Leverage allows greater potential returns to the investor that otherwise would have been unavailable. At the same time, potential for loss is also greater because if the investment fails, the loan principal and all accrued interest on the loan still need to be repaid. The decision regarding the leverage of the company reflects management's choice between shareholders' return and risk. It will magnify the shareholders' earnings when the company's rate of return is higher than the cost of debt. Debt to equity is generally measured as the firm's total liabilities divided by shareholders' equity.

4) Industry concentration (WHHC). The SCP paradigm suggests a positive relationship between industry concentration and profitability. In order to test whether the insurers operating in more concentrated business lines are likely to benefit from higher prices and therefore profits, we first compute Herfindahl

concentration Index for each insurance line as  $HHC = \sum_{i=1}^N S_i^2$  where  $S_i$  is sales

share of each firm in an insurance line. Then, we calculate the weight measure of HHC (i.e. WHHC) while using as weight the share of gross premiums of a particular insurance type in the total premiums.

*Data analysis and empirical results.* In order to get an idea regarding the relation between diversification and profitability in Croatian insurance

companies, the Table 3 shows the changes in average value of companies' profitability and their level of diversification during the years.

Table 3

Average profitability and diversification in non-life insurance industry  
(2004-2007)

Variables \ Year	2004	2005	2006	2007
Average of ROE	22.11	12.35	6.73	7.10
Average of ROA	3.87	2.29	1.95	2.18
Average of 1-HHD	0.63	0.62	0.65	0.58
Average of ENTROPY	1.29	1.26	1.31	1.17

If there is a positive relation between company profitability and diversification, profitability measures should show the tendency of growth parallel with an increase of firm's diversification. However, it seems that in this analysis this is not so. Both measures of profitability (ROA and ROE) are showing reduction in their values over the years (the exception is the last analyzed year) and this trend of profitability is not accompanied by equivalent change in the degree of diversification of the companies.

The previous analysis provides some indications about the level of enterprises' profitability with respect to the level of how focused/diversified enterprises are. However, in order to get clear and reliable statistical results which describe profit-diversification relationship in an appropriate way one has to build a relevant statistical model. Therefore, the model used in this paper becomes:

$$\text{ROA or ROE} = f(\text{Entropy, HHD, WHHC, Size, Cap, Lev})$$

Table 4 shows estimations of the parameters from the OLS regression models while using both measures of profitability (ROA and ROE) as a dependent variable. Since the primary focus of this study is the effect of companies' diversification on its performance, we will first discuss these results. As noted earlier, when interpreting these results one must have in mind that higher level of "Entropy" or "1-HHD" measure denotes higher level of companies' diversification across insurance lines. As it can be seen from the table, both measures of diversification have negative and statistically significant influence on profitability. This negative relationship supports the strategic focus hypothesis: undiversified insurers are able to achieve greater profitability than diversified insurers. Influence of diversification on the insurance companies' profitability especially comes into play when ROE indicator is used as a measure of profitability. Also, the data indicate a stronger influence of diversification on profitability in a situation when the diversification is measured by modified Herfindahl index instead by Entropy. Our estimates of the "diversification penalty" are similar with the results obtained by Liebenberg and Sommer (2008); and Chakrabarti et. al. (2007). However, Liebenberg and Sommer model

accounting and market performance as a function of a binary diversification indicator and a range of some other performance correlates not included in our study.

Table 4

## Parameter estimates of regression models

Variables	Dependent variable = ROA		Dependent variable = ROE	
	Entropy measure	1-HHD	Entropy measure	1-HHD
(Constant)	-8,214 (0,588)	-10,997 (0,469)	-49,149 (0,598)	-64,385 (0,494)
Entropy	-4,281*** (0,009)	-	-23,599*** (0,015)	-
1-HHD	-	-9,045*** (0,008)	-	-49,571*** (0,0169)
WHHC	44,053* (0,062)	46,467** (0,050)	261,752* (0,071)	275,233** (0,059)
Size	-0,047 (0,867)	0,012 (0,967)	-0,264 (0,879)	,047 (0,979)
Cap	-13,465* (0,097)	-12,114 (0,129)	-107,057** (0,040)	-99,653** (0,053)
Lev	-0,597* (0,094)	-0,589* (0,097)	-3,299 (0,128)	-3,268 (0,132)
Adjusted R <sup>2</sup>	0,618	0,622	0,624	0,624
F	5,854*** (0,009)	5,940*** (0,008)	5,984*** (0,008)	5,974*** (0,008)
DW	2,129	2,174	2,157	2,188

Statistical significance at the 1%, 5% and 10% levels is denoted by \*\*\*, \*\* and \*, respectively

*Industrial concentration* (WHHC) coefficient is positive and statistically significant regardless of the chosen measure of profitability and/or diversification. Thus, for the sample of selected Croatian insurance companies the basic SCP hypothesis can be accepted: A greater degree of line concentration leads to a greater degree of companies' cooperation (collusion) and hence to achievement of higher profits. In other words, our results indicate that insurance companies operating in the more concentrated business lines are able to charge higher prices and earn higher profits than companies in less concentrated lines. Following Li and Greenwood (2004) such collusion is likely to depend upon the ability of companies to "read" the market properly, noting who their competitors are and what their responses to competitive initiatives are likely to be.

Despite our expectation *size* coefficient is insignificant suggesting that the company size, when measured by natural logarithm of companies' assets, does not affect companies' profitability. *Capitalization* coefficient is mostly significant but negative and therefore the hypothesis that the insureds are willing to pay a higher premium for particular insurance to a company that has lower insolvency risk can not be accepted in our case. The coefficient of *Leverage* has a negative sign and it is statistically significant only in models that use ROA as dependent variable. Because of low significance level of this variable, its adverse influence on profitability must be treated with caution. However, the possible explanation of the negative relationship between leverage and profitability in this study might be the interest expenses associated with a heavy debt load. If a firm is highly levered and its rate of return on the company's assets is lower than the cost of debt capital, it will naturally lead to lower profitability.

## VI. CONCLUSIONS

To the best of our knowledge, this study is among the few that explore the relationship between line-of-business diversification and performance for non-life insurers in general and Croatian insurance industry in particular. Although our sample consisted of small number of insurance companies, when these companies are observed together, they on average realize more than 70% of annual total gross written premiums in Croatian non-life insurance industry. As such, they constituted a sufficient representative sample for conducting our analysis.

In order to test the relationship between diversification and insurers' profitability we employed different measures of profitability (ROA and ROE) and alternative diversification measures (Entropy and 1-HHD). However, our results remain almost unchanged regardless of variables' specification. In each of the four presented regressions, relatively high value of  $R^2$  indicates that about 62 percent of the variation in company profitability is explained by selected model. Overall, our results indicate that both measures of diversification have negative and statistically significant influence on profitability. This negative relationship supports the strategic focus hypothesis meaning that undiversified insurers outperform diversified insurers. Influence of diversification on the insurance companies' profitability especially comes into play when ROE indicator is used as a measure of profitability. Also, the data indicate a stronger influence of diversification on profitability in a situation when the diversification is measured by modified Herfindahl index instead by Entropy.

We also find some interesting results regarding the control variables used in our analysis. Namely, positive and statistically significant coefficient of WHHC clearly indicates that insurance companies operating in the more concentrated business lines are able to charge higher prices and earn higher profits than companies in less concentrated lines. According to this finding, basic

SCP hypothesis can be accepted for our study. Despite our expectation *size* coefficient is insignificant suggesting that the company size, when measured by natural logarithm of companies' assets, does not affect companies' profitability. The coefficients of *Capitalization* and *Leverage* have negative size and they are mainly significant.

Finally, in order to get a clearer and possibly a better picture of the diversification-profitability relationship, we believe that in one of the future researches it would be advisable to increase the temporal dimension and also to extend the model by additional independent variables as that would certainly contribute to the better understanding not only of the relationship between diversification and profitability, but also of all the determinants affecting the operating performance of the company.

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## **UTJECAJI POSLOVNE DIVERZIFIKACIJE NA RADNI UČINAK TVRTKI: SLUČAJ HRVATSKE INDUSTRIJE NEŽIVOTNOG OSIGURANJA**

***Sažetak***

*Iako je izvjestan broj autora pokušao istražiti različite aspekte industrije osiguranja, ipak zanemarujući je broj istraživanja i dokaza o radnom učinku diverzifikacije u industriji životnog i neživotnog osiguranja. To se posebno odnosi na hrvatsku industriju osiguranja. Stoga autori ovog članka smatraju važnim istražiti vezu između diverzifikacije i učinka proizvoda. Prilikom ispitivanja ove povezanosti koristimo različite metode procjene financijskog učinka i diverzifikacije.*

***Ključne riječi: diverzifikacija poduzeća, radni učinak, neživotno osiguranje, Hrvatska.***

***JEL klasifikacija: G22***