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LIBERALISATION, MARKET CONCENTRATION AND PERFORMANCE IN THE NON-LIFE INSURANCE INDUSTRY OF EX-YUGOSLAVIA

Abstract

The aim of this paper is to examine market structure, liberalisation and performance relationship for the non-life insurance industry in the ex-Yugoslavia region. We use the country-specific fixed effects models for panel data allowing each cross-sectional unit to have a different intercept term serving as an unobserved random variable that is potentially correlated with the observed regressors. Three models are presented, each placing market structure, liberalisation and profitability in distinct surroundings defined by related control variables. The research results indicate strong influence of market structure and liberalisation on market profitability.

Key words: non-life insurance, market structure, profitability, ex-Yugoslavia region

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1.   INTRODUCTION

The region of ex-Yugoslavia encompass several independent countries that have same political, cultural, social and economic background and all of them have passed through the transition process, from planned to free market economies. The developments in the regional insurance market followed those of economies as a whole. Among the most important have been privatisation of state monopolies and reduction of barriers to trade and increased competition, that is market liberalisation. As a result of these changes and following the general trend toward global markets and risks, many foreign insurance companies entered the regional insurance market.

It is well known that liberalisation and privatisation facilitates the admission of foreign insurers that bring financial strength, know-how and managerial expertise that facilitate market development and competitiveness (e.g., Puri, 2007; and Dorfman, 2008). However, there is relatively little research on the issue of market concentration and liberalisation relationship with profitability in the field of non-life insurance. The available research on market concentration and profitability relationship is mainly focused on the United States' insurance market (e.g., Joskow, 1973; Carroll, 1993; Chidambaran, Pugel, and Saunders, 1997; Bajtelsmit and Bouzouita, 1998; Choi and Weiss, 2005) To our knowledge, the research focused on the issue of complex relationship between liberalisation, market concentration and profitability of the insurance market, even when the research has an international focus (e.g., Pope and Ma, 2008), for the ex-Yugoslavia region's countries is non existent.

The changes in profitability influenced by changes in market structure impose great challenges to domestic and foreign insurers regarding their business operations and strategies (for the idea of importance of analysing market structure and selection and formulation of strategies upon gained insight see Porter, 1980; Harrigan, 1981; and Barney, 1986). Also, the insight into this relationship is important for governments that with their policies aim to achieve that insurance is available and affordable for all (e.g. Rejda, 2005; and Dorfman, 2008) and "to mitigate the impact of significant market imperfections" (Harrington and Niehaus, 2004:106). The aim of this paper is to facilitate the expertise of decision makers on company and government level, regarding decisions concerned with market development and competitiveness, by investigating the relationship between liberalisation, market concentration and profitability of non-life insurance market in the ex-Yugoslavia region.

We apply linear country specific fixed effects model for panel data. Panel data encompass 5 countries of the ex-Yugoslavia region for the period 2004-2008. We have chosen fixed effects due to small number of control variables in each of three models for capturing the effects of unobserved variables that are potentially correlated with the observed regressors.

The article proceeds as follows. A review of pertinent literature is presented first, followed by a theoretical framework. Section 3 presents the data and methodologies employed in the analysis. The empirical results are presented in Section 4 followed by the conclusion.

2.   BACKGROUND INFORMATION ON REGIONAL INSURANCE INDUSTRY

The development of insurance and reinsurance in the region of ex-Yugoslavia had started later than in other European countries. The oldest traces of insurance in the region can be found in the middle ages in legal code of emperor Dusan, in Dubrovnik Republic there was the Law on marine insurance in 1562 with traces of insurance and in Montenegro in 1353 there were brotherhoods (*bratovstine*) for risk sharing. Despite the existence of these early traces the actual development of insurance in the region of ex-Yugoslavia, represented by organised risk sharing done by insurance companies, had not started until the late nineteen century. Insurance business have been firstly developed in regions that were part of the Austro-Hungarian Empire, namely Slovenia and Croatia, and later in other parts of the region of ex-Yugoslavia. The first insurance companies in the region of ex-Yugoslavia were established as branches of foreign companies, mainly Italian or Austrian, or as domestic companies but with a majority stake of foreign capital. Before the Second World War the largest companies in the region were "Jadransko" and "Assicurazioni Generali", established with majority foreign ownership, and "Jugoslavija" from Belgrade and "Croatia" from Zagreb, both with majority domestic ownership (Marovic, Kuzmanovic, Njegomir, 2009).

After the World War II Socialist Federal Republic of Yugoslavia (SFRJ) was formed. It consisted of six republics, now independent states: Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and Macedonia. In the paper, this area we consider as the ex Yugoslavia region. Since the establishment in 1945 till the breakup in 1991 Yugoslavian socio-economic order has been established firstly as centralised and later as decentralised with the leading role of the communist regime in all aspects of life and work, including insurance and reinsurance business. In 1990, legal framework was created that enabled transformation of insurance companies into market oriented businesses. After the introduction of the market system and war all former republics strived for their own economic prosperity.

Insurance industry development showed strong correlation with economic development in general (Njegomir and Stojic, 2010). Insurance industry development gained momentum during the period 2004-2008 as shown in Figure 1.
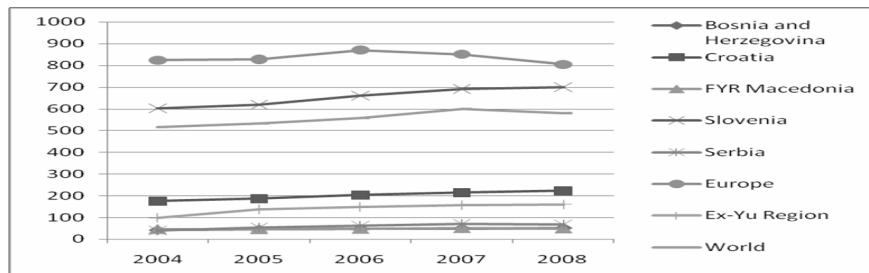
Source: authors' calculations Note: All monetary values have been denominated to 2008 euro value and adjusted for inflation by authors

Figure 1. Comparison of non-life insurance premium during the period 2004-2008 (in Euros per capita)

Figure 1 shows constant non-life insurance premium growth in the region while average worldwide and European premium volume showed decline starting from 2008 and 2007 respectively. However, all regional markets are still insufficiently developed, especially when compared with EU's average. It is also obvious that the most developed regional insurance market is Slovenian followed by Croatian and Serbian while insurance markets in Bosnia and Herzegovina and FYR Macedonia are the least developed.

The development of insurance business was facilitated by foreign insurers entry into regional markets (see Figure 2). The highest market share have been noted by insurance companies from Austria (e.g., Wiener Staedtische, Grawe and Uniqa), Italy (e.g., Assicurazioni Generali and Fondiaria Sai), Germany (e.g. Allianz) and other countries, mainly from the EU zone. Foreign companies were attracted by undeveloped insurance industries in the region that enabled them to benefit from their competitive advantage over local insurance companies.
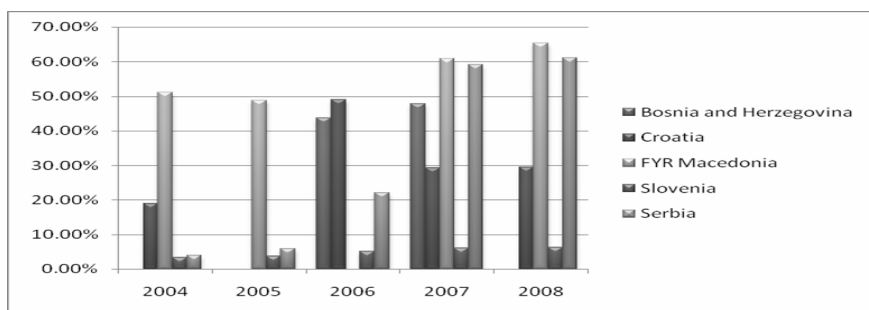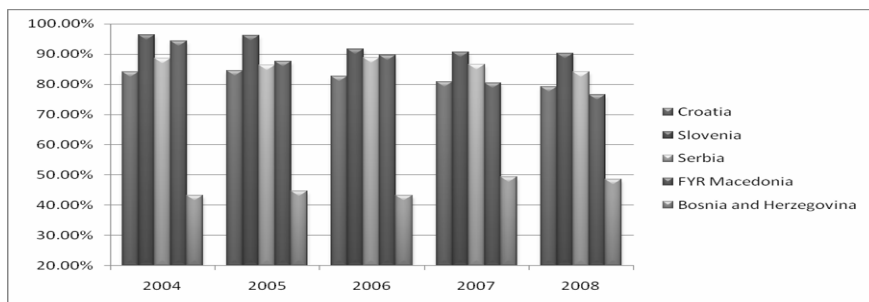

Source: authors' calculation.

Figure 2. The share of foreign in total non-life insurance premium in the region during the period 2004 - 2008

As shown in Figure 2, foreign companies' share in total non-life insurance premium have marked general upward trend during the period 2004-2008, with the exception of Croatian insurance industry, where foreign premium peaked during 2006 and then declined during 2007 and 2008. It is evident that foreign insurers are dominant in Macedonian and Serbian insurance industry. The lowest share of foreign insurers in total non-life premium is observed in Slovenia.

Finally, it must be emphasised that all national non-life insurance markets in the region of ex-Yugoslavia, except Bosnian and Herzegovinian, are highly concentrated, as shown in Figure 3.

Source: authors' calculation.

Note: Market concentration is measured as a ratio of market shares of five largest companies in every national market.

Figure 3. Non-life insurance market concentration during the period 2004 - 2008

Mild decline in market concentration is witnessed throughout the region for the observed period.

3.   PRIOR LITERATURE REVIEW

The market structure-conduct-performance (S-C-P) paradigm was developed by Mason (1939) and Bain (1951). The paradigm implies that market structure, characterised by features such as number of companies and their market shares, entry barriers and price elasticity of demand, directly and indirectly, by influencing business conduct, determined as competitive or collusive behavior of companies in making their decisions regarding issues such as pricing, advertising and research and development, influence market performance, indicated by factors such as profitability, efficiency and market growth. According to S-C-P hypothesis, higher profitability in any market is associated with anti competitive behavior induced by higher market concentration. Additionally, the existence of entry barriers reduces economic welfare (Bain, 1956), which can be optimal only in the presence of perfectly competitive markets (Samuelson, 1965). Thus, analysis of market structure, business conduct and performance relationship can facilitate optimal strategy decisions and devising competition laws, designed to

modify or prevent market structures that are linked with poor economic performance (Ferguson and Ferguson, 1994).

Following this paradigm, numerous studies that focus on market structure in order to explain its impact on business conduct and market performance have been done in industrial organisation economics and strategic management. Early studies, as reported by Weiss (1974) who reviewed 46 studies done for the United States, United Kingdom, Canada and Japan markets, found significant and positive relationship between market concentration and profitability. These and later studies refer to many different industries like agriculture (e.g. Bruce Marion, 1976), pulp and paper (e.g. Li, McCarthy and Urmanbetova, 2004), steel (e.g. Purkayastha, 2005) and tourism (e.g. Tung, Lin and Wang, 2009). However, most of the studies of the structure-conduct-performance hypothesis refer to banking industry. The results of these studies are inconsistent. Although most of the studies in various countries found evidence in support of the S-C-P paradigm as an explanation for the market behavior and performance (e.g. Alley, 1993; Molyneux and Forbes, 1995; Chowdhury, 1996; Katib, 2004; Sathye, 2005; Athanasoglou, Delis and Straikouras, 2006; and Tregenna, 2009) several studies found that market structure plays insignificant or weak role in explaining market performance in banking (e.g. Maniatis, 2006 and for a review of studies with these results see Shaffer, 2004).

The existing research literature of S-C-P hypothesis in insurance industry is relatively scarce in relation to that in banking. Additionally, it is mainly focused on the U.S. insurance market and results of these studies are inconsistent.

One of the first researchers in the insurance industry that studied S-C-P hypothesis was Joskow (1973). Examining the U.S. non-life insurance industry competitive structure, he found that despite competitive market structure insurers set prices through cartel-like rating bureaus. He concludes that the combination of state regulation, cartel pricing, and other legal peculiarities has resulted in the use of an inefficient sales technique, supply shortages, and over-capitalization. Chidambaran, Pugel, and Saunders (1997) empirically analysed the economic performance across 18 different lines of the U.S. property-liability insurance industry with major emphasis on the pricing of insurance and the cost of producing insurance. Their research results, based on the data covering 10-year period (1984-1993), support S-C-P relationship as they found that higher concentration leads to reduced level of pricing rivalry. Bajtelsmit and Bouzouita (1998) analysed relationship between performance and market structure in private passenger automobile insurance market in the U.S. in order to determine whether concentration within a state has a positive effect on insurer profitability. They used state premium data for the period 1984-1992 and measured performance with industry profitability. As their research results provides evidence of positive relationship between market concentration and profitability, they support the S-C-P paradigm in the context of private passenger automobile insurance. Pope and Ma (2008) examined complex relationship of liberalisation, market concentration

and profitability using regression methodology on the sample of 23 countries during the period 1996-2003. They used market profitability as a measure of performance. Their research results found support for S-C-P hypothesis although they concluded that the effect of market concentration on performance varies depending on the level of market liberalisation.

Caroll (1993) examined the relationship between market structure and performance for the U.S. workers' compensation insurance using data for the period 1980-1987. She tested S-C-P and efficient structure hypothesis. Research results found no support for either tested hypothesis. Choi and Weiss (2005) investigated the relationships among market structure and performance in property-liability insurers in the U.S. over the period 1992–1998 using data at the company and group levels. They tested not only S-C-P hypothesis but also efficient structure, relative market power and X-efficiency hypotheses. In order to examine the consolidation impact to companies as well as consumers they used two different performance measures, price and profit. Their research results indicate that efficiency is more important to control in examining performance of insurance industry than S-C-P relationship and that market share is rather negatively than positively related to price and profit. Thus, their research gives stronger support for the efficient structure hypothesis than for S-C-P hypothesis. Jedlicka and Jumah (2006) on the basis of the data for 52 Austrian insurance companies in 2003 examined whether higher market concentration leads to anti competitive behavior and thus higher profitability. Their research results have not found support for the S-C-P hypothesis in the Austrian insurance market. Liebenberg and Kamerschen (2008) examined South African auto insurance market on the basis of the data for the period 1980-2000. Their research found no support for S-C-P hypothesis as research results indicate no link between market structure, conduct, performance and/or market power.

The lack of consistency of the previous research results at the international level and the lack of similar study for the regional insurance industry, served us as a motivator for analysis on the topic.[1] While the main contribution of the research presented in this paper is original, as it presents the first study of S-C-P relationship in the non-life insurance industry in the region of ex-Yugoslavia, it also contains results that extend and complement those in existing literature on S-C-P paradigm related to insurance industry.

4.   THEORETICAL FRAMEWORK

Transition of S-C-P paradigm from industrial organisation to strategic management is attributed to Porter. Porter (1980) created a framework for analysing companies' competitive advantage and market power at industry or market level using five market forces (elements of market structure): industry (market) rivalry, threat of entry, threat of substitutes, bargaining power of suppliers and bargaining power of buyers. As market structure is considered to be the predominant determinant of relative market power and level of profit the

company can generate, the five forces model is intended to be used for analysing the market structure and selecting strategy that is appropriate to that structure. As this model is universal for all industries, it is applicable to analysis of S-C-P paradigm in the context of non-life insurance market (see Massey et al., 2005).

Insurance market encompasses insureds, insurers and intermediaries. It is specific in relation to other markets in the fact that insureds are simultaneously buyers of insurance and suppliers of capital to insurance companies, but their bargaining power in both roles is weak (Pope and Ma, 2008). As bargaining power of suppliers and bargaining power of buyers has little impact in insurance market, the remaining three market forces will be the subject of our empirical context, we include the state of development of national economy and differences in profitability across lines of insurance business.

We use the insurer's profit margin as defined by Carrol (1993):

$$\Pi/R = Profit/Revenue = (Premiums – Losses – Expenses + Investments)/Premiums = 1 – LR – ER + ROI,$$

where *LR* is loss ratio, *ER* is expense ratio and *ROI* is return on investment. Premiums observed are gross written premiums. Our measure of market profitability (*PR*) is proxied by *1 – LR – ER*. Due to lack of information on investment activities, instead of return on investment, we observe, as a control variable, the difference between money market interest rate and inflation rate (*ROI*).

Market rivalry between established companies, measured by the degree of concentration, is central force in Porter's (1980) examination of factors of competitive advantage. Bain (1951) considered performance to be a function of concentration and barriers to entry. Concentration can be measured in various ways, usually by concentration ratio and Herfindahl-Hirschman Index (HHI). Although, it is argued that HHI is more comprehensive (Hall and Tideman, 1967), we follow results of research obtained by Kwoka, Jr. (1979) who found no support for this argument. Also, this measure is commonly used in testing of S-C-P hypothesis in insurance (e.g. Joskow, 1973; Chidambaran, Pugel, and Saunders, 1997; Bajtelsmint and Bouzouita, 1998; and Pope and Ma, 2008). We measure concentration ratio (*CR*) as a ratio of market shares of five largest companies in every national market. As, S-C-P paradigm implies that higher concentration leads to monopoly (higher) profits, we hypothesise positive impact of concentration to profitability. Additionally, market rivalry can be measured by the number of companies operating in the market (*COM*). Latter ought to compete for the same customers and resources. It is held that rivalry intensifies if a larger number of companies are present in the market. On the basis of previous research in insurance related literature (e.g. Outreville, 2007; and Pope and Ma, 2008) we hypothesise negative relationship between number of insurers in the market and profitability.

Threat of entry relates to the degree of easiness for new competitors to enter the market. Previous research (e.g. Bain, 1956; Joskow, 1973; and Porter (1980)) indicate that the larger the barriers of entry the more monopolistic prices would be charged and thus greater profitability obtained. To control for this influence (*LIB*) we use Index of Economic Freedom. Provided by The Heritage Foundation this index is generated as average of 10 specific indexes that are generated on the basis of the analysis of 10 components of economic freedom, including trade, business, fiscal, monetary, labor, financial and investment freedom. The variable assesses each national market on a scale of 0-100, where higher values indicate a more liberalised environment. Considering the fact that liberalisation removes barriers of entry we can draw from Pope and Ma (2008) that liberalisation is negatively correlated with market profitability. However, the research by Oetzel and Banerjee (2008) suggests that liberalisation is positively correlated with profitability for all insurers. Thus, we do not hypothesise the relationship between market liberalisation and profitability. Bain (1956) observes the interactive relationship of entry barriers and market concentration. Following Ma and Pope (2003) we include a variable interacting market concentration and market liberalisation (*CRLIB*).[2]

Threat of substitutes depend on the availability of alternative products that can be used by buyers. Insurance is generally held as a unique product for risk transfer. Although alternatives exists, like transferring of risks to capital markets or self-insuring by captive companies formation, their use is still limited in scope (Njegomir, 2009) and really available only for largest commercial buyers (Massey, 2005). The only real alternative for insurance products, which are not obligatory by law, is restrain from buying them. As Cowling and Waterson (1976) theoretically identified inverse relationship between price elasticity and profitability, we measure threat of substitutes by price elasticity of demand (*EL*), that is, with the measure of demand response to the changes in price of insurance (δDemand/δPrice)[3]. We proxy the demand by using individual national market's insurance density (aggregate gross premium/population) and market price by using the inverse of loss ratio (for similar use see Meier, 2006; and Pope and Ma, 2008). Following theoretical contributions of Cowling and Waterson (1976) and Dorfman (2007), and empirical evidence (Swiss Re, 1993) we hypothesise negative relationship between price elasticity of demand for insurance and profitability.

The level of income and wealth are considered to be one of the most important factors that influence insurance market demand (e.g. Harrington and Niehaus, 2004; Skipper and Kwon, 2007). Empirical evidence (Swiss Re, 1993) implies that insurance demand varies with the level of gross domestic product (GDP), which implies that the larger GDP the larger insurance demand (for a review of research studies that found support for this relationship see Stephanie Hussels, Damian Ward and Ralf Zurbruegg, 2005). Following long established economic thought that the increase in demand will lead to price increase, we suppose that the increase in demand will lead to increase in insurers profitability.

However, supply will also increase, leading to gradual price decrease and the new equilibrium. Thus, as Pope and Ma (2008:956) argue, "the impact of the economy to insurance market profitability may be positive or negative, depending on market conditions and how quickly supply is able to adjust". For the impact of economy (*EC*) on insurance market profitability we control by using natural logarithm of GDP per capita, yet do not hypothesise the underlining relationship.

Finally, following Pope and Ma (2008) we include (*AL*) to control for the line of insurance with the largest market share and do not hypothesise its relationship with profitability.

5.   DATA AND METHODOLOGY

Our data cover 5 countries, which formerly were constituent republics of Socialist Federal Republic of Yugoslavia, over the time period 2004-2008.[4] Number of observations for each country varies between 5 and 7, depending on data availability. Descriptive statistics for each variable depicting market concentration, liberalisation and profitability relationship as well as expected sign of relationship are shown in Table 1.

Table 1

Descriptive Statistics and Expected Signs of Relationship

Variable	Sign	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
PR		0.13933	0.12125	0.40166	-0.00659	0.11623	1.02861	3.23089
CR	+	0.82079	0.86610	0.98163	0.43240	0.16571	-1.58656	4.19029
LIB	±	54.76667	54.40000	61.90000	44.70000	4.71650	-0.43600	2.32229
CRLIB	±	45.30270	44.60400	58.99613	19.35510	11.07723	-0.99964	3.21660
EL	-	-1.15392	0.45148	12.15854	-21.94798	7.23934	-1.45461	5.71394
AL	±	0.53550	0.56096	0.74151	0.34921	0.11895	0.13305	2.15912
COM	-	15.44444	15.00000	24.00000	6.00000	4.86220	0.03276	2.27051
ROI	±	0.02163	0.01400	0.08500	-0.02600	0.02806	0.49246	2.55781
EC	±	8.71556	8.92466	9.84707	7.79067	0.78201	0.13183	1.36870

Source: authors' calculations

Data are obtained from various sources. Premium, loss, expense, market share of first five and total number of insurance companies data are obtained from individual countries' regulatory bodies and national insurance associations. Interest rate, inflation rate and GDP data are obtained from European Bank for Research and Development (EBRD) economic statistics and forecasts published

for each year in *Transition Report*. Population data are obtained from individual countries' statistical offices, except for Bosnia and Herzegovina, the only country that hadn't census since 1991, which is outdated, thus we use EBRD's estimates of total population excluding refugees abroad. Index of economic freedom data, that depicts threat of new entrants, is obtained from The Heritage Foundation. Finally, data for exchange rates of national currencies against the euro are obtained from individual countries' central banks. All monetary values have been denominated to 2008 euro value and adjusted for inflation by authors.

Given the cross-sectional and time-series data, we use country specific fixed effects panel data regression model with common coefficients across all cross-section members of the pool. The general equation to be estimated is:

$$y_{it} = \alpha_i + \boldsymbol{x_{it}}\beta + u_{it}\,,$$

where y_{it} is a scalar dependent variable, i.e. profitability, $\boldsymbol{x_{it}}$ is a $K \times 1$ vector of independent variables, u_{it} is a scalar disturbance term, I indexes country in a cross section, and t indexes time measured in years. Since the error terms u_{it} are potentially serially correlated and heteroskedastic, we propose an autoregressive process of first order: $u_{it} = \rho u_{it-1} + e_{it}$, where e_{it} is white noise. Model incorporates White's consistent covariance matrix (White, 1980), for dealing with heteroskedasticity.

Model 1 incorporates the state of economy and it's return on investment as environment in which we observe influences of market liberalisation and concentration on overall profitability. Namely, we estimate the equation:

$$(PR)_{it} = \alpha_i + \beta_1(CR)_{it} + \beta_2(LIB)_{it} + \beta_3(CRLIB)_{it} + \beta_4(EC)_{it} + \beta_5(ROI)_{it} + u_{it}$$

Model 2 focuses on testing S-C-P hypothesis through the prism of competitors and their dominant line of insurance:

$$(PR)_{it} = \alpha_i + \beta_1(CR)_{it} + \beta_2(LIB)_{it} + \beta_3(CRLIB)_{it} + \beta_4(COM)_{it} + \beta_5(AL)_{it} + u_{it}$$

Finally, *Model 3* concerns the threat of substitutes and it's possible influence on testing the S-C-P hypothesis. The equation, and parameters to be estimated is given by:

$$(PR)_{it} = \alpha_i + \beta_1(CR)_{it} + \beta_2(LIB)_{it} + \beta_3(CRLIB)_{it} + \beta_4(EL)_{it} + u_{it}$$

6.   EMPIRICAL RESULTS

The models used in this study have been introduced at the end of previous chapter. In this section we present original results and interpretations concerning all of the observed models.

Model 1 focuses on explanatory variables of S-C-P hypothesis when influenced by the state of economy. The results of the empirical analysis for *Model 1* are presented in Table 2.

Table 2

Parameter estimates from *Model 1*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR	1.16516	0.65249	1.78570	0.08930
LIB	0.02320	0.00893	2.59803	0.01720
CRLIB	-0.03231	0.01200	-2.69183	0.01400
EC	-0.26059	0.09627	-2.70689	0.01360
ROI	-0.65327	0.43532	-1.50066	0.14910
R-squared	0.94162	Mean dependent var		0.14554
Adjusted R-squared	0.91534	S.D. dependent var		0.12700
S.E. of regression	0.03695	Sum squared resid		0.02731
Log likelihood	62.45778	F-statistic		80.64013
Durbin-Watson stat	1.65751	Prob(F-statistic)		0.00000

Source: authors' calculations

Note: Dependent Variable: PR. Country specific intercepts have been omitted from the table.

The coefficients of key variables, market concentration (*CR*) and liberalisation (*LIB*), are both with positive signs and statistically significant at 10% level. Additionally, partial correlation coefficient between *CR* and *LIB* is strongly negative. Treating the *LIB* as an exogenous variable, we find that the increase in *LIB* decreases *CR*. Thus, with the increase of liberalisation the overall profitability decreases, as a result of reduced collusive behavior of market competitors. These results are consistent with previous studies that found support for the S-C-P hypothesis (e.g. Chidambaran, Pugel, and Saunders, 1997; Bajtelsmit and Bouzouita, 1998; and Pope and Ma, 2008).

Both the return of investment (*ROI*) and strength of economy (*EC*) have negative and significant sign. The negative sign of *ROI* is in line with other studies (e.g. Pope and Ma, 2008). However, the negative sign of *EC* is unexpected as it is usually associated with high income countries. Thus, when observing market concentration and liberalisation relationship with market profitability in relation to the state of economy, the latter shows greater influence.

Recall that *Model 2* observes the influence of market liberalisation and concentration on profitability, with respect to number of competitors in the market. The results of the empirical analysis for *Model 2* are presented in Table 3.

Table 3

Parameter estimates from *Model 2*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR	2.00733	0.96648	2.07695	0.05160
LIB	0.02576	0.00726	3.54805	0.00210
AL	-0.07479	0.30921	-0.24187	0.81150
COM	0.01199	0.00447	2.68300	0.01470
CRLIB	-0.04337	0.01698	-2.55403	0.01940
R-squared	0.90922	Mean dependent var		0.13608
Adjusted R-squared	0.86622	S.D. dependent var		0.11800
S.E. of regression	0.04316	Sum squared resid		0.03539
Log likelihood	56.12452	F-statistic		47.57397
Durbin-Watson stat	1.95769	Prob(F-statistic)		0.00000

Source: authors' calculations

Note: Dependent Variable: PR. Country specific intercepts have been omitted from the table.

The coefficients of key variable significant at 5% level. As with previous model, partial correlation coefficient between *CR* and *LIB* is strongly negative. Thus, the empirical results of Model 2 support the S-C-P hypothesis.

The book-of-business distribution variable (*AL*) is found to be negative, but insignificant. The number of competitors in the market (*COM*) is found to be positive and significant. This suggest that with the increase of number of competitors in the market the profitability should increase. The positive sign of *COM* is unexpected as previous studies (e.g. Pope and Ma, 2008) indicate that with the increase of the number of competitors the profitability should decrease. However, when observing market concentration and liberalisation relationship with market profitability in relation to the number of competitors, the latter shows lower influence.

The focus of interest in *Model 3* was to test the S-C-P hypothesis through prism of threat of substitution. The results of the empirical analysis for *Model 3* are presented in Table 4.

Table 4

Parameter estimates from *Model 3*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR	1.54111	0.72476	2.12638	0.04760
LIB	0.01770	0.00680	2.60416	0.01790
CRLIB	-0.03659	0.01297	-2.82107	0.01130
EL	0.00222	0.00126	1.76872	0.09390
R-squared	0.90413	Mean dependent var		0.13933
Adjusted R-squared	0.86152	S.D. dependent var		0.11623
S.E. of regression	0.04325	Sum squared resid		0.03367
Log likelihood	51.96242	F-statistic		56.58515
Durbin-Watson stat	1.46267	Prob(F-statistic)		0.00000

Source: authors' calculations

Note: Dependent Variable: PR. Country specific intercepts have been omitted from the table.

The coefficients of key variables, market concentration (*CR)* and liberalisation (*LIB)*, are both with positive signs and statistically significant at 5% level. As with previous models, partial correlation coefficient between *CR* and *LIB* is strongly negative. The price elasticity of demand, as the remaining control variable, is found to have positive impact on profitability, yet is not found to be statistically significant at 5% level. The results support the S-C-P hypothesis.

We use estimated coefficients of *Model 1* to plot the 3D image (see Figure 4), i.e. to illustrate the effects of market concentration and liberalisation on market profitability, ceteris paribus. We notice that for low levels of liberalisation (A-B), concentration has a mild, yet positive impact on profitability, which is in support of S-C-P hypothesis. However, as level of liberalisation increases (A-C), we see that at the most liberalised levels, the increase in market concentration has actually negative impact on profitability (C-D). These findings are similar to previous research (see for example, Jacquemin, de Ghellinck and Huveneers, 1980).
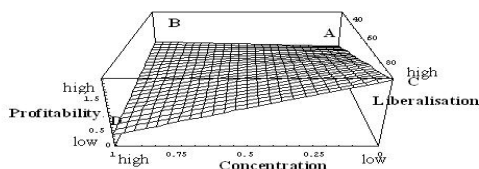
Source: authors' calculations

Figure 4. 3D plot in profitability-concentration-liberalisation space

7.   CONCLUSION

This research study examines the relationships among market structure liberalisation and performance in property-liability market of ex-Yugoslavia region for the period covering 2004-2008. The region encompass non-life insurance industries in five countries: Bosnia and Herzegovina, Croatia, FYR Macedonia, Serbia and Slovenia. We use three models for capturing influences of market structure and liberalisation on market profitability. The S-C-P hypothesis is tested from three distinct points of interest. Firstly, market structure, liberalisation and performance are put in relation with the strength of economy and corresponding rate of return. Model 2 connects former with the number of competitors and their dominant line of insurance. Finally, Model 3 uses the threat of substitutes as a control variable.

The research results of all three models show support for the S-C-P hypothesis. These results are important for governments that wish to achieve affordable and available insurance for all. Governments interfere in insurance markets by pro-competitive and pro-liberalising policies. Our findings could facilitate their decision making as they suggest that greater liberalisation influences the decrease in concentration and indirectly decrease in profitability, thus providing the achievement of greater social welfare. Additionally, research results could provide insurance companies a useful comparison across different national markets across ex-Yugoslavia region, thus enabling them to formulate optimal competitive strategies. Furthermore, companies would be able to anticipate consequences of changes in government policies.

Possible limitation of the research results appear in Model 1 where the explanatory variable of concentration ratio is found not to be significant at 5% level. At the same time, the state of economy shows dominant influence on market profitability. Additionally, the implications of the results related to short-term changes in market structure have not been taken into account. Further research should involve testing of alternative hypothesis, namely efficient structure hypothesis, in pursue of higher significance levels of explanatory variables. In addition, further research should include a greater number of countries helping gaining more consistent estimators.

Endnotes

1. Although three additional hypotheses emerged, the most tested among them, especially in the banking industry, being efficient structure hypothesis that requires firm specific examination (see Choi and Weis, 2005), we limit our discussion to S-C-P hypothesis as we test S-C-P relationship at the regional market level.

2. CRLIB is obtained by multiplying CR with LIB

3. Relative change of demand (δDemand) is defined as (Demand $_{t+1}$ − Demand $_t$)/Demand $_t$. δPrice is defined in analogue way.

4. Countries included in our analysis include the following: Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Slovenia and Serbia. Montenegro was omitted due to lack of relevant available data.

REFERENCES

Alley, W.A. (1993), "Collusion versus Efficiency in the Japanese Regional Banking Industry", *Economic Studies Quarterly,* Vol. 44, No. 3.

Athanasoglou, P.P. Delis, M.D., and Staikouras C.K. (2006), "Determinants of Bank Profitability in the South Eastern European Region", *The Journal of Financial Decision Making,* Vol. 2, No. 2.

Bain, J.S. (1951), "Relation of Profit-Rate to Industry Concentration: American Manufacturing, 1936-1940", *Quarterly Journal of Economics,* Vol. 65, No. 3.

Bain, J.S. (1956), *Barriers to New Competition: Their Character and Consequences in Manufacturing Industries*, Cambridge, MA: Harvard University Press.

Bajtelsmit, V.L. and Bouzouita, R. (1998), "Market Structure and Performance in Private Passenger Automobile Insurance", *Journal of Risk and Insurance,* Vol. 65, No. 3.

Barney, J.B. (1986), "Types of competition and the theory of strategy: Toward an integrative framework", *Academy of Management Review,* Vol. 11, No. 4.

Cameron, A.C., and Trivedi, P.K. (2005), *Microeconometrics: Methods and Applications*, New York: Cambridge University Press.

Carroll, A.M. (1993), "An Empirical Investigation of the Structure and Performance of the Private Workers' Compensation Market", *Journal of Risk and Insurance,* Vol. 60, No. 2.

Chidambaran, N.K., Pugel, T.A. and Saunders, A. (1997), "An Investigation of the Performance of the U.S. Property-Casualty Insurance Industry", *Journal of Risk and Insurance,* Vol. 64, No. 2.

Choi, B.P. and Weiss, M.A. (2005), "An Empirical Investigation of Market Structure, Efficiency, and Performance in Property-Liability Insurance", *Journal of Risk and Insurance,* Vol. 72, No. 4.

Chowdhury, A.R. (1996), "An empirical test of the structure-conduct-performance paradigm in the Asian and Pacific basin countries", *Journal of the Asia Pacific Economy,* Vol. 1, No. 2.

Cowling, K. and Waterson, M. (1976), "Price-Cost Margins and Market Structure", *Economica,* Vol. 43, No. 171.

Dorfman, M.S. (2008), *Introduction to Risk Management and Insurance*, Upper Saddle River, NJ: Pearson Education, Inc.

Ferguson, P.R. and Ferguson, G.J. (1994), *Industrial Economics and Perspectives*, London: Macmillan.

Hall, M. and Tideman, N. (1967), "Measures of concentration", *Journal of Statistical Association,* Vol. 62, No. 317.

Harrigan, K.R. (1981), "Barriers to entry and competitive strategies", *Strategic Management Journal,* Vol. 2, No. 4.

Harrington, S.E. and Niehaus, G.R. (2004), *Risk Management and Insurance*, New York, NY: The McGraw-Hill Companies, Inc.

Hussels, S., Ward, D. and Zurbruegg, R. (2005), "Stimulating the Demand for Insurance", *Risk Management and Insurance Review*, Vol. 8, No. 2.

Jedlicka, L. and Jumah, A. (2006), "The Austrian Insurance Industry: A Structure, Conduct and Performance Analysis", Institute for Advanced Studies, Economic Series Working Paper 189.

Jacquemin, A., de Ghellinck, E. and Huveneers, C. (1980), "Concentration and Profitability in a Small Open Economy", *Journal of Industrial Economics,* Vol. 29, No. 2.

Joskow, P.L. (1973), "Cartels, Competition and Regulation in the Property-Liability Insurance Industry", *Bell Journal of Economics and Management Science,* Vol. 4, No. 2.

Katib, M.N. (2004), "Market Structure and Performance in the Malaysian Banking Industry: A Robust Estimation", Paper presented at the 8th Capital Markets Conference, Indian Institute of Capital Markets, Navi Mumbai.

Kwoka, J.E.Jr. (1979), "The effect of market share distribution on industry performance", *The Review of Economics and Statistics,* Vol. 61, No. 1.

Li, H., McCarthy, P. and Urmanbetova, A. (2004), "Industry Consolidation and Price-Cost Margins - Evidence from the Pulp and Paper Industry", available from: http://www.cpbis.gatech.edu/research/findings/Industry%20Consolidation%20and%20Price-Cost%20Margins.pdf

Liebenberg, A.P. and Kamerschen, D.R. (2008), "Structure, Conduct and Performance Analysis of the South African Auto Insurance Market: 1980-2000", *South African Journal of Economics,* Vol. 76, No. 2.

Ma, Y. and Pope, N. (2003), "Determinants of International Insurers' Participation in Foreign Non-Life Market", *Journal of Risk and Insurance,* Vol. 70, No. 2.

Maniatis, P. (2006), "Market Concentration And Industry Profitability: The Case Of Greek Banking", *International Business & Economics Research Journal,* Vol. 5, No. 10.

Marion, B. (1976), "Application of the Structure, Conduct, Performance Paradigm to Subsector Analysis", N.C. Project 117 Working Paper No. 7.

Marovic, B., Kuzmanovic, B. and Njegomir, V. (2009), *Osnovi osiguranja i reosiguranja*, Beograd: Princip press.

Mason, E.S. (1939), "Price and Production Policies of Large-Scale Enterprise", *American Economic Review*, Supplmenet 29, No. 1.

Massey, R. et al. (2005), "The Application of Strategic Models to Non-Life Insurance Markets", Paper presented at 32nd Annual GIRO Convention, Imperial Hotel, Blackpool.

Meier, U.B. (2006), *Existence and Causes of Insurance Cycles in Different Countries: Four Empirical Contributions.* Bern: Haupt Verlag AG.

Molyneux, P. and Forbes, W. (1995), "Market structure and performance in European banking", *Applied Economics,* Vol. 27, No. 2.

Njegomir, V. (2009), "Traditional and alternative risk transfers as methods of insurance risk management." PhD diss. University of Novi Sad.

Njegomir, V. and Stojic, D. (2010), "Does insurance promote economic growth: the evidence from ex-Yugoslavia region", *Economic Thought and Practice*, Vol. 19, No. 1.

Oetzel, J.M. and Banerje, S.G. (2008), "A case of the tortoise versus the hare? Deregulation process, timing, and firm performance in emerging markets", *International Business Review,* Vol. 17, No. 1.

Outreville, J.F. (2007), "Players and driving forces in world insurance services: locations and governance", In *Trade and development aspects of insurance services and regulatory frameworks*, ed. Mina Mashayekhi and Deepali Fernandes, New York: United Nations Conference on Trade and Development.

Pope, N. and Ma, Y. (2008), "The Market Structure-Performance Relationship in the International Insurance Sector", *Journal of Risk and Insurance,* Vol. 75, No. 4.

Porter, M.E. (1980), *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: The Free Press.

Puri, L. (2007), "Introduction to the trade and development aspects of insurance services and regulatory frameworks", In *Trade and development aspects of insurance services and regulatory frameworks*, ed. Mina Mashayekhi and Deepali Fernandes, 1-5. New York: United Nations Conference on Trade and Development.

Purkayastha, S. (2005), "Structure Conduct Performance (SCP) Paradigm and the Indian Steel Industry: An Analysis", *The Icfai University Journal of Industrial Economics,* Vol. 2, No. 3.

Rejda, G.E. (2005), *Principles of Risk Management and Insurance*, Upper Saddle River, NJ: Pearson Education, Inc.

Samuelson, P.A. (1965), *Foundations of economic analysis*. Valley Forge, MA: Atheneum.

Sathye, M. (2005), "Market Structure and Performance in Australian Banking", *Review of Accounting and Finance,* Vol. 4, No. 2.

Shaffer, S. (2004), "Patterns of competition in banking", *Journal of Economics and Business,* Vol. 56, No. 4.

Skipper, H.D. and Kwon, W.J. (2007), *Risk Management and Insurance: Perspectives in a Global Economy*, Oxford: Blackwell Publishing, Ltd.

Swiss Re. (1993), "The Effects of Price Adjustment on Insurance Demand", Zurich: Sigma No. 5.

Tregenna, F. (2009), "The fat years: the structure and profitability of the US banking sector in the pre-crisis period", *Cambridge Journal of Economics,* Vol. 33, No. 4.

Tung, G., Lin, C. and Wang, C. (2009), "The Market Structure, Conduct, Performance Paradigm Reapplied to the International Tourist Hotel Industry", paper presented at the International Symposium on Finance and Accounting in Asia, Kuala Lumpur.

Weiss, L.W. (1974), "The Concentration-Profits Relationship and Antitrust", in *Industrial Concentration: The New Learning*, ed. Harvey J. Goldschmid, Michael H. Mann and Fred J. Weston, 184-233. Boston: Little, Brown & Company.

White, H. (1980), "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica*, Vol. 48, No. 4.

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LIBERALIZACIJA, KONCENTRACIJA TRŽIŠTA I PERFORMANSE U INDUSTRIJI NEŽIVOTNOG OSIGURANJA NA TERITORIJU BIVŠE JUGOSLAVIJE

Sažetak

Svrha ovog rada je da ispita veze u strukturi tržišta, liberalizacije i performansi u industriji neživotnog osiguranja na teritoriju bivše Jugoslavije. Koristimo panel podatke i primjenjujemo panel regresijski model sa fiksnim efektima za svaku pojedinačnu zemlju. U radu su prezentirana tri modela koja tržišnu strukturu, liberalizaciju i profitabilnost promatraju u različitim okruženjima definiranim kontrolnim varijablama. Rezultati istraživanja ukazuju na snažan utjecaj strukture tržišta i liberalizacije na profitabilnost.

***Ključne riječi:** neživotno osiguranje, tržišna struktura, profitabilnost, teritorij bivše Jugoslavije.*

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