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MARKET STRUCTURE, BROKERS, AND INSURER PERFORMANCE: EVIDENCE FROM THE NON-LIFE INSURANCE MARKET IN NORTH MACEDONIA

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Abstract

The existing literature on the relationship between insurance market structure and insurer performance neglects the role of intermediaries in affecting insurers' behavior. This article aims to fill this gap by examining the relationship between brokerage market structure and insurer performance in the non-life insurance market in North Macedonia. Using unique data about bilateral premium flows between insurers and brokers for the period 2013 – 2022, we construct an insurer-level measure of competition to encapsulate the variation in the competition considering both types of market players, insurers and brokers. We find that collaboration with more competitive brokers distorts insurers' oligopolistic behavior, enforcing a more competitive environment, improving insurers' efficiency and driving down insurance prices. The *findings provide policy implications for regulators and policymakers regarding how a less restrictive regulatory environment for intermediaries may impact insurers' behavior in more concentrated markets.*

Keywords: non-life insurance, market structure, brokerage markets, performance, North Macedonia

1. INTRODUCTION

The relationship between market structure and insurer performance has been extensively examined in the past three decades (Alhassan, Addisson & Asamoah, 2015; Bajtelsmit & Bouzouita, 1998; Chidambaran, Pugel & Saunders, 1997; Cole, He & Karl, 2015; Janků & Badura, 2021; Pope & Ma, 2008; Srbinoski, Poposki & Čibej, 2021; Weiss & Choi, 2008). The existing literature largely focuses on the impact of the market competition of insurers on their performance without considering other players in the market. Based on the conventional price theory, the lack of competition may lead to collusive behavior of dominant insurers, enabling them to earn abnormal profits at the expense of consumer welfare. This view neglects the role of matchmakers in distorting the oligopolistic behavior of insurance markets. The contingent commissions received by intermediaries may incentivize less competitive insurers to compete more effectively as the intermediary's compensation will be aligned with the underwriting quality of the business (Cummins & Doherty, 2006). Hence, more competitive intermediary markets may induce greater competition between insurers, expanding the insurance demand through lower premiums (Karaca-Mandic, Feldman & Graven, 2018).

This article examines the relationship between brokerage market structure and insurer performance in the non-life insurance market in North Macedonia. We use unique firm-level data for the Macedonian insurance market, including bilateral premium flows between insurers and brokers for 2013 – 2022. The Macedonian insurance market presents a peculiar setting regarding the interplay between insurers and intermediaries. Firstly, insurers are predominantly foreign-owned by larger multinational firms, while brokers are domestic-owned and have information and knowledge advantages in the local insurance market. Secondly, the brokerage market is more dynamic and more competitive in terms of the number of players and their market share. Thirdly, the role of brokers in expanding the insurance demand is growing as the market lacks an insurance culture and is largely limited to mandatory lines of business (such as motor insurance). Finally, the regulatory framework does not limit the practice of contingent commission payments and does not impose any cap on those payments.

This article contributes to at least three domains. Firstly, we add to the structure-performance literature by considering the role of brokers in affecting the market structure. The extant literature generally uses typical measures of market competition considering only the variation of market shares of insurers (Alhassan et al., 2015; Bajtelsmit & Bouzouita, 1998; Chidambaran et al., 1997; Cole at al., 2015; Janků & Badura, 2021; Pope & Ma, 2008; Srbinoski et al., 2021; Weiss & Choi, 2008). Drawing from the literature which examines inter-organizational alliances (Lin, Yang & Arya, 2009), we develop a measure of competition, a weighted Herfindahl-Hirshman index, by considering the role each broker plays in the insurer-broker network in terms of the number of partners and the extent of business collaboration. Secondly, to the best of our knowledge, Karaca-Mandic et al. (2018) is the only study that examines the impact of brokerage market structure on insurance demand and pricing by focusing on the US health insurance market for small firms. Karaca-Mandic et al. (2018) use the number of brokers that serve small firms per 100,000 people for different geographic regions as a proxy of brokerage market competition. We utilize a measure of competition encapsulating the variation in the competition considering both types of market players, insurers and brokers, and add to this literature by examining the effects of competition on insurer performance. Finally, the study provides policy implications for regulators in North Macedonia regarding the current non-restrictive regulatory framework for brokers.

This paper proceeds as follows. The next section reviews the existing literature on the market structure and insurer performance and develops the study hypothesis about the effect of brokerage market structure on insurer performance. This is followed by a section describing the data and methodology and a subsequent section for our empirical estimation results and key findings. The final section offers conclusions.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The discussion on the link between market structure and performance revolves around three key hypotheses. The structure-conduct-performance (SCP) hypothesis assumes that firms collide, driving the market concentration up, to jointly maximize their profitability (Bain, 1951; Stigler, 1964). The relative market power (RMP) hypothesis suggests that market leaders with well-differentiated product portfolios enjoy higher market power, enabling them to charge higher prices and inflate their profits (Rhoades, 1985). Finally, the efficient structure (ES) hypothesis presumes that more efficient firms can charge lower prices and increase market concentration, leading to a positive relationship between market concentration and firm performance (Demsetz, 1973; Peltzman, 1977). While these hypotheses have been largely examined for the banking industry, empirical evidence also exists for the insurance industry.

The early evidence of the existence of a positive relationship between market concentration and insurer performance comes from the US property-liability insurance markets (Bajtelsmit & Bouzouita, 1998; Chidambaran et al., 1997). The literature assumes that the positive link arises due to the market environment being conducive to collusion between market players. The evidence of the SCP hypothesis exists even in separate lines of business (Cole et al., 2015), and its presence depends on the extent of market liberalization (Pope & Ma, 2008; Njegomir & Stojić, 2011). However, the positive link can also be attributed to the improved efficiency of certain insurers, resulting in higher market concentration. The extant literature failed to provide clear evidence which separates the SCP from the ES hypothesis.

On the other hand, the researchers implemented alternative approaches to explain the positive link between market structure and the financial performance of insurers. For instance, Alhassan et al. (2015) find that efficiency measures are positively related to the insurer performance measures in Ghana, providing support to the efficient structure hypothesis. Liebenberg and Kamerschen (2008) explore the relationship between various market concentration measures and insurance prices in the South African auto insurance market, but they fail to find any statistically significant relationship. Finally, a series of studies explore how market concentration, market power, and efficiency measures affect the price, profit and performance of insurers to disentangle the SCP, RMP and ES evidence. For instance, Choi and Weiss (2005) discover that cost-efficient firms charge lower prices and earn higher profits in the US property-liability insurance market. Similarly, Berry-Stölzle, Weiss and Wende (2011) provide support for the ES hypothesis in the European property-liability insurance market.

The extant literature neglected the role of brokers in stimulating competition between insurers, affecting their pricing and performance. Theoretically, the existence of contingent commissions allows insurers to affect brokers' advice to customers and expand their market shares and profitability (Inderst & Ottaviani, 2012a, 2012b). The inter-organizational alliance literature suggests that insurers may partner with intermediaries based on firm network status and resource complementarity (Lin et al., 2009). Contingent commissions may incentivize cooperation between insurers and brokers to maximize their joint profits. Insurers will tend to cooperate with brokers who have considerable market power to expand their market shares and profitability (Hofmann & Nell, 2011). Thus, the collusion between dominant insurers and intermediaries stimulates higher profitability via higher prices (in line with the SCP hypothesis).

On the other side, insurers cooperate with intermediaries to amplify their premium income and reduce operating costs based on the resource dependence perspective (Yu & Shiu, 2014). The strategic alliance brings benefits for insurers and intermediaries in terms of business growth, knowledge sharing and cost reduction. Contingent commissions bring efficiency gains to the insurers who use them (Ghosh & Hilliard, 2012). Based on the contingent commission payments, brokers are incentivized to better match client risk type with insurer risk appetite, resulting in improved risk selection for insurers. The empirical literature provides evidence that contingent commissions lead to better underwriting results (Regan & Kleffner, 2010) and the general financial performance of insurers (Ma, Pope & Xie, 2014). Hence, more competitive intermediary markets enhance insurers' efficiency, enabling them to charge lower prices and earn higher profits (in line with the ES hypothesis).

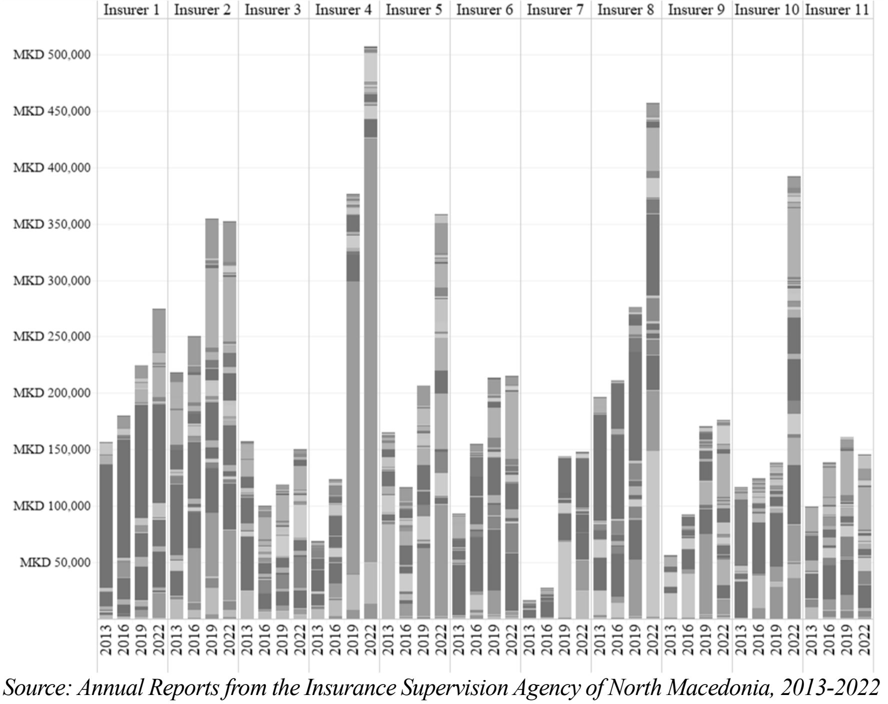
3. DATA AND METHODOLOGY

3.1. Data, sample and main variables

The Macedonian non-life insurance market has a peculiar setting for examining the relationship between the competitiveness of intermediary markets and insurer performance. Firstly, insurers are dominantly owned by foreign multinational insurance groups, while brokerage firms are with dominant domestic capital. Secondly, the brokerage market is more competitive and dynamic in terms of frequent entrance and exit of new players compared to the competition among insurers, which does not have significant market entrance/exit dynamics. For the period of analysis, the number of non-life insurers stays constant. Thirdly, the low insurance culture limits insurers to underwrite mainly in mandatory or semi-mandatory lines of business such as motor third-party liability (MTPL) insurance, thus highlighting the role of brokers in expanding insurance demand, especially in non-mandatory lines. Finally, the regulatory framework does not limit the practice of contingent commission payments and does not impose any cap on those payments.

We collect the data from the Macedonian insurance industry reports issued by the Insurance Supervision Agency (ISA) of North Macedonia. The sample includes 110 firm-year observations for 11 non-life insurers from 2013 to 2022. Additionally, we extract the premium flows between each insurer and each broker for the given year. Such data enables us to construct an insurer-level variable on the competitiveness of brokerage markets. Figure 1 illustrates the GWP generated by brokers for each insurer in 2013, 2016, 2019, and 2022. The figure shows that the structure of the broker-generated GWP for each insurer is dynamic and differs from one insurer to another. For instance, we observe that Insurer 4 generated a significant part of its GWP from a dominant broker in 2019 and 2022, while Insurer 8 had a more diversified broker-generated GWP in the same years. In the following text, we define the main variables and the methodological approach.

Figure 1 Insurers' GWP generated by brokers (each broker marked with a different color) during 2013, 2016, 2019 and 2022 (in thousands MKD)



Source: Annual Reports from the Insurance Supervision Agency of North Macedonia, 2013-2022

Performance measures. Following the previous studies, we use widely used performance measures, such as return on assets (ROA) and return on equity (ROE) (Liebenberg & Sommer, 2008). However, higher profitability may result from higher risk-taking; thus, many studies adjust the performance measures for the estimated risk. The general approach is to correct the performance measure by its variability over a given period. Alternatively, a risk measure is included in the regression to control for the risk level. We primarily use the latter approach due to the practicality in the interpretation of the effect of diversification on performance. Thus, we calculate the standard deviation of the ROA and ROE over 3-year periods and include it as a control variable in the corresponding regressions. Additionally, the price can capture any collusive behavior as a measure of performance (Choi & Weiss 2005). We use the ratio of premiums earned divided by the incurred losses (inverse of net loss ratio) as a proxy for insurance price (Cummins & Danzon, 1997).

Competitiveness of brokerage market. We construct an insurer-level variable to assess the competitiveness of the brokerage market. We use the weighted sum of each broker's shares in the insurer's broker-generated GWP multiplied by the Herfindahl-Hirschman Index of each broker's business concentration regarding its partners. Primarily, we calculate each broker's $(b = 1, \ldots, n)$ participation in each firm's $(i = 1, \ldots, 11)$ broker-generated GWP (BGWP) in each year (t).

$$w_{ibt} = \frac{BGWP_{ibt}}{BGWP_{it}} \tag{1}$$

Using w_{ibt} as weights, we then calculate the weighted sum of a firm's exposure to brokers with more or less concentrated partner portfolios.

$$HHI_{bt} = \sum_{i=1}^{11} \left(\frac{BGWP_{ibt}}{BGWP_{bt}}\right)^2 \tag{2}$$

$$WBHHI_{it} = \sum_{b=1}^{n} w_{ibt} * HHI_{bt} \tag{3}$$

The lower the value of the $WBHHI_{it}$, the insurer has more exposure to brokers collaborating with more partners (insurers). Hence, the negative sign between $WBHHI_{it}$ and performance measures (ROA and ROE) and the positive sign between $WBHHI_{it}$ and price suggests that competitive brokers stimulate a competitive environment among insurers, enforcing improved efficiency, which results in lower prices for insureds (ES hypothesis). On the other side, the positive relationship between $WBHHI_{it}$ and performance measures and $WBHHI_{it}$ and price indicates the existence of collusive behavior between dominant brokers and insurers, resulting in higher profitability supported via higher prices (SCP hypothesis).

3.2. Control variables

Firm size. To control for revenue scope economies, we use the natural logarithm of total assets as a proxy for firm size. Larger firms tend to benefit more from revenue scope economies compared to smaller firms. The previous literature finds a positive relationship between firm size and financial performance and efficiency (Cummins & Nini, 2002; Elango, Ma & Pope, 2008; Liebenberg & Sommer, 2008; Učkar & Petrović, 2022).

Market share. To control for the relative market power (RMP) hypothesis, we use the market share of insurers based on GWP. The positive relationship between the market share and performance, as well as between market share and price, assumes the ability of insurers to increase the prices as their market share increases, resulting in higher profitability (Choi & Weiss 2005).

Capitalization. Financial stability enables insurers to set up higher premiums and earn higher profits (Sommer, 1996). The extant literature used several measures of firm capitalization, such as capital-to-asset ratio (Krivokapic, Njegomir & Stojic, 2017) and policyholder surplus-to-asset ratio (Liebenberg & Sommer, 2008). Similarly, we use the capital-to-asset ratio. A higher ratio designates a more stable insurer.

Diversification. To estimate the extent of product diversification of insurers, we use the Herfindahl-Hirschman Index. We calculate the Herfindahl-Hirschman Index (HHI) based on the Gross Premium Written (GWP) for each insurer ($i = 1, \dots, 11$) across all lines of business ($j = 1, \dots, 18$) in each year (t). We consider all business classes within the non-life segment.[1] The lower the value of HHI_{it}, the insurer's product portfolio is more diversified. Thus, if the relationship between HHI_{it} and performance measures is negative, then the portfolio diversification stimulates higher profitability (Berry-Stölzle, Hoyt & Wende, 2013; Che & Liebenberg, 2017; Che, Liebenberg, Liebenberg & Powell, 2017; Lee, 2017; Meador, Ryan & Schellhorn, 2000).

$$HHI_{it} = \sum_{j=1}^{18} \left(\frac{GWP_{ijt}}{GWP_{it}}\right)^2 \tag{4}$$

Business growth. Abnormal business growth may increase the riskiness of an insurer's underwriting portfolio without proper time to adjust its risk-based capital or surplus to offset the inflow of new premiums (Killins, 2020). To control for business growth, we calculate the growth of the number of insurance contracts sold.

Cost efficiency. Conditional on market competitiveness, more efficient firms may earn higher profits without charging higher prices (Weiss & Choi, 2008). Thus, cost efficiency enables insurers to gain a larger market share and support their profitability. We use the share of administrative costs and other non-commission costs charged in the total GWP as a proxy for cost efficiency. Lower values should indicate greater efficiency.

3.3. Regression methodology

We employ a robust methodological approach due to the structure of our data and potential endogeneity issues. The (panel) data allows us to use fixed-effect models to control for time-specific effects in case of unobserved variable bias. Rather than using the Hausman test to decide on the appropriate model, we estimate both fixed-effect and random-effect models and report the latter in the appendix.

[1] The non-life insurance classes are Accident, Health, Motor vehicles (Casco), Railway vehicles (Casco), Aircrafts (Casco), Vessels (Casco), Cargo, Property (fire and nat. forces), Property (other), Motor third-party liability (MTPL), Aircraft third-party liability, Vessel third-party liability, General liability, Credit, Suretyship, Financial losses, Legal expenses, and Travel assistance.

We initially estimate simple OLS fixed-effects models, abstracting from potential endogeneity problems. However, endogeneity issues may arise due to potential simultaneity bias. The broker selection strategy may also depend on the unobserved demand for insurance (Karaca-Mandic et al. 2018). Thus, we employ fixed-effects two-stage least squares regressions using instrumental variables (FE IV-2SLS).[2] In the first stage, we regress the competitiveness measure on the other independent and selected instrumental variables. In the second stage, we estimate Equations (5) and (6) using the predicted values of the competitiveness measure estimated in the first stage.

$$PERF_{i,t} = \beta_0 + \beta_1 WBHHI_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CAPITAL_{i,t} + \beta_4 MSHARE_{i,t} + \beta_5 EFF_{i,t} + \beta_6 DIVER_{i,t} + \beta_7 BGROWTH_{i,t} + \beta_{8-16} YEAR_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$PRICE_{i,t} = \beta_0 + \beta_1 WBHHI_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CAPITAL_{i,t} + \beta_4 MSHARE_{i,t} + \beta_5 EFF_{i,t} + \beta_6 DIVER_{i,t} + \beta_7 BGROWTH_{i,t} + \beta_{8-16} YEAR_{i,t} + \varepsilon_{i,t} \quad (6)$$

The use of the 2SLS methodology requires a selection of valid instruments. The validity of the instruments assumes that the instruments have a high partial correlation with the competitiveness measures and are uncorrelated with the error term. We test the instrument validity using Hansen's J-test of overidentifying restrictions. The null hypothesis under Hansen's J-test is that the instruments are uncorrelated with the error term (i.e., exogenous). The data allows us to construct potential instruments by focusing on the movements in the brokerage market. In North Macedonia, insurers are predominantly owned by multinational corporations, whereas brokers are locally owned and hold a significant informational advantage in the domestic insurance market. Thus, we use the share of GWP generated through brokers as a measure of exposure to the competitive brokerage market. Additionally, we construct the weighted sum of each broker's shares in the insurer's broker-generated GWP multiplied by the Herfindahl-Hirschman Index of each broker's business diversification.[3] The product specialization strategy of brokers depends on their capabilities to compete more effectively despite their potential disadvantages in terms of size (Cummins & Doherty, 2006). Thus, some brokers may evolve as niche players by focusing on certain product lines or industries, reshaping the intermediary market structure. Finally, we devise the share of claims in court as a measure of insurance trust. The rising tendencies in this measure may suggest lower trust between the insurer and insureds, constraining the role of matchmakers to expand their business with certain insurers. The definitions and summary statistics of the selected variables are included in Table 1.

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[2] The fixed-effects models are estimated by the IV-2SLS fixed-effects panel data method using the xtivreg2 command in STATA which allows for the estimation of only fixed-effects and first-differences models (Schaffer, 2020). We estimate both, the fixed-effects and random-effects models with clustered standard errors.

[3] To calculate the last instrument, we use the following steps. Primarily, we calculate each broker's ($b = 1, \dots, n$) participation in each firm's ($i = 1, \dots, 11$) broker-generated GWP (BGWP) in each year (t) (see, Equation (1)). Then, we calculate the extent of portfolio diversification of each broker using the following equation:

$$BHHI_{bt} = \sum_{j=1}^{18} \left(\frac{BGWP_{bjt}}{BGWP_{bt}}\right)^2 \quad (7)$$

Finally, we then calculate the weighted sum of a firm's exposure to brokers with more or less diversified portfolios.

$$WBDHHI_{it} = \sum_{b=1}^{n} w_{ibt} * BHHI_{bt} \quad (8)$$

Table 1 Variable definitions and basic statistics

Variable	Definition	Obs	Mean	Std. Dev.	Median
ROA	Return on assets	110	.009	.065	.020
ROE	Return on equity	110	-.023	.365	.064
PRICE	Inverse net loss ratio	110	2.011	.333	2.009
WBHHI	Weighted Herfindahl-Hirschman Index of insurer's business with competitive brokers	110	.277	.077	.257
SIZE	Natural logarithm of total assets	110	14.006	.495	14.090
MSHARE	Insurer's share of total market GWP	110	.091	.035	.094
CAPITAL	Capital-to-assets ratio	110	.307	.109	.293
DIVER	Herfindahl-Hirschman Index of insurer's portfolio	110	.398	.175	.364
EFF	Share of administrative and other non-commission costs in GWP	110	.355	.076	.359
BGROWTH	Growth of the number of contracts sold	110	.064	.161	.061
STDEV_ROA	Standard deviation of ROA (3-year_	110	.027	.036	.015
STDEV_ROE	Standard deviation of ROE (3-year)	110	.139	.265	.047
SBROKER	Share of premium generated via brokers	110	.251	.098	.232
WBDHHI	Weighted Herfindahl-Hirschman Index of insurer's business with diversified brokers	110	.184	.054	.171
ITRUST	The share of claims in court	110	.046	.024	.040

Source: Authors' calculations

4. EMPIRICAL RESULTS

We report the estimated effects of brokerage market competition on ROA (models 1 and 4), ROE (models 2 and 5) and PRICE (model 3) using the FE OLS method in Table 2. We follow the risk-adjustment approach in models 4 and 5 by including risk measures to control for risk levels. The WBHHI is consistently negatively related to ROA and ROE, although it is only statistically significant at the 5% and 10% confidence level in models 1 and 4, respectively. On the other hand, WBHHI is positively related to the PRICE, however, it is not statistically significant. The F-statistic shows that the models are properly estimated. The results are robust after the inclusion of risk controls. We find similar results in the RE OLS models (see Table A1 in the appendix). Despite the weaker evidence, the negative relation between WBHHI and ROA and the positive between WBHHI and PRICE support the efficient structure hypothesis. Namely, the collaboration with more competitive brokers (lower WBHHI) distorts insurers' oligopolistic behavior, enforcing a more competitive environment, improving insurers' efficiency and performance, and driving the insurance prices down.

Table 2 Impact of intermediary market competition (WBHHI) on ROA/ROE/PRICE (FE OLS regressions)

	(1)	(2)	(3)	(4)	(5)
Dependent variables	ROA	ROE	PRICE	ROA	ROE
WBHHI	-0.215**	-0.837	0.519	-0.209*	-0.799
	(-2.436)	(-1.163)	(1.416)	(-2.133)	(-1.110)
SIZE	0.075	0.843**	0.066	0.072	0.749**
	(1.297)	(2.805)	(0.173)	(1.124)	(2.449)
MSHARE	0.743	5.058	-1.467	0.782	5.000
	(1.324)	(1.193)	(-0.563)	(1.453)	(1.247)
CAPITAL	0.357***	3.306***	1.902***	0.340***	2.870**
	(5.185)	(3.259)	(7.981)	(3.836)	(2.995)
EFF	-0.246**	-0.975	-0.335	-0.244**	-1.077
	(-2.383)	(-1.284)	(-0.688)	(-2.435)	(-1.246)
DIVER	0.255	1.790	0.383	0.249	1.617
	(1.470)	(1.369)	(0.532)	(1.420)	(1.312)
BGROWTH	-0.002	0.262	0.037	-0.006	0.261
	(-0.074)	(1.350)	(0.137)	(-0.169)	(1.080)
STDEV_ROA				-0.074	
				(-0.490)	
STDEV_ROE					-0.250
					(-1.343)
Constant	-1.183	-13.557**	0.443	-1.125	-11.980**
	(-1.331)	(-2.690)	(0.078)	(-1.155)	(-2.346)
Observations	110	110	110	110	110
Number of insurers	11	11	11	11	11
Year dummies	Included	Included	Included	Included	Included
R-squared	0.481	0.535	0.543	0.482	0.555
F-statistic	4.81	5.96	6.16	4.50	6.01

Note: The dependent variables are ROA (Models 1 and 4), ROE (Models 2 and 5) and PRICE (Model 3). WBHHI is the weighted sum of each broker's shares in the insurer's broker-generated GWP multiplied by the Herfindahl-Hirschman Index of each broker's business concentration regarding its partners. SIZE is the natural logarithm of insurer's assets. MSHARE is the insurer's share of total market GWP. CAPITAL is the capital-to-assets ratio. DIVER is the Herfindahl-Hirschman Index of insurer's portfolio. EFF is the share of administrative costs and other non-commission costs charged in the total GWP. BGROWTH is the growth of the number of contracts sold. STDEV_ROA/STDEV_ROE is the standard deviation of ROA/ROE in the previous three years. Robust t-statistics are given in the parentheses below the coefficient estimates. Statistical significance at the 1%, 5%, 10% and 15% levels is denoted by ***, **, * and †, respectively.

Source: Authors' calculations

Table 3 Impact of intermediary market competition (WBHHI) on ROA/ROE/PRICE (IV FE 2SLS regressions)

	(1)	(2)	(3)	(4)	(5)
Dependent variables	ROA	ROE	PRICE	ROA	ROE
WBHHI	-0.391*	-1.979	1.950†	-0.376*	-1.739
	(-1.724)	(-1.262)	(1.446)	(-1.671)	(-1.241)
SIZE	0.071	0.812**	0.106	0.071	0.728**
	(1.358)	(2.010)	(0.297)	(1.345)	(2.040)
MSHARE	1.262*	8.436*	-5.701	1.222*	7.778*
	(1.819)	(1.837)	(-1.162)	(1.854)	(1.891)
CAPITAL	0.293**	2.887***	2.427***	0.297***	2.549***
	(2.511)	(2.675)	(3.570)	(2.647)	(2.873)
EFF	-0.220*	-0.804	-0.550	-0.222*	-0.931
	(-1.809)	(-1.235)	(-0.742)	(-1.856)	(-1.406)
DIVER	0.332***	2.288**	-0.241	0.325**	2.036**
	(2.591)	(2.533)	(-0.285)	(2.500)	(2.444)
BGROWTH	0.000	0.281	0.013	0.000	0.276
	(0.009)	(1.295)	(0.051)	(0.001)	(1.146)
STDEV_ROA				-0.004	
				(-0.017)	
STDEV_ROE					-0.236
					(-1.292)
Observations	110	110	110	110	110
Number of insurers	11	11	11	11	11
Year dummies	Included	Included	Included	Included	Included
R-squared	0.444	0.497	0.476	0.450	0.529
F-statistic	3.39	2.59	7.33	3.52	2.67
Hansen J (p-value)	0.7380	0.8865	0.2258	0.7336	0.8944

Note: The dependent variables are ROA (Models 1 and 4), ROE (Models 2 and 5) and PRICE (Model 3). WBHHI is the weighted sum of each broker's shares in the insurer's broker-generated GWP multiplied by the Herfindahl-Hirschman Index of each broker's business concentration regarding its partners. SIZE is the natural logarithm of insurer's assets. MSHARE is the insurer's share of total market GWP. CAPITAL is the capital-to-assets ratio. DIVER is the Herfindahl-Hirschman Index of insurer's portfolio. EFF is the share of administrative costs and other non-commission costs charged in the total GWP. BGROWTH is the growth of the number of contracts sold. STDEV_ROA/STDEV_ROE is the standard deviation of ROA/ROE in the previous three years. Robust t-statistics are given in the parentheses below the coefficient estimates. Statistical significance at the 1%, 5%, 10% and 15% levels is denoted by ***, **, * and †, respectively.

Source: Authors' calculations

We re-run Equations 5 and 6 using a more robust methodological approach, fixed-effects two-stage least squares regressions with instrumental variables (FE IV-2SLS). We report the results in Table 3. Similarly, the F-statistic shows that the models are properly estimated, and the Hansen J-test shows that the assumption of exogenous instruments is not violated. The coefficient of WBHHI is consistently negative but statistically significant at a 10% confidence level in the ROA models. On the other hand, the coefficient of WBHHI stays positive and becomes significant at a 15% confidence level in the PRICE regression. The results provide support for the efficient structure hypothesis suggesting that insurers, working with more competitive brokers, secure higher profitability via lower prices and more efficient practices.

Our results corroborate the findings of Karaca-Mandic et al. (2018) that more competitive agent/broker markets expand insurance demand and reduce insurance prices. Higher competition among brokers reduces search costs in the insurance markets and limits unethical behavior and unfair practices. Similarly, insurers are able to reduce their operating costs by exploiting the resource interdependence between them and intermediaries to jointly sell insurance products (Yu & Shiu, 2014). As the Macedonian insurance market does not impose any restrictions on contingent commissions, those arise as an important mechanism for sustaining competitive brokerage markets and enhancing insurance market efficiency. This is in line with the claim of Cummins, Doherty, Ray and Vaughan (2006) that contingent commissions should not be illegal because they play an important role in aligning the incentives of market participants, resulting in reduced informational asymmetry and enhanced market stability. Furthermore, Regan and Kleffner (2010) and Ma et al. (2014) discovered that the extent of usage of contingent commissions improves the underwriting and financial performance of insurers.

5. CONCLUSION

The multidimensional role of insurance brokers as “market makers” in improving insurance market efficiency has been widely discussed (Cummins & Doherty, 2006). However, no empirical evidence exists on the role of brokerage markets on insurer performance. Most of the studies are concerned with the relationship between insurance market structure and insurer performance, particularly examining two competing hypotheses from the industrial organization literature, the structure-conduct-performance (SCP) hypothesis and the efficient structure (ES) hypothesis. This study investigates the relationship between brokerage market structure and insurer profitability for the non-life insurance market in North Macedonia by using unique data about bilateral premium flows between insurers and brokers for the period 2013 – 2022. Since both SCP and ES predict a positive relationship between market concentration and performance, we use the dynamics in the insurer-broker network to differentiate between the hypotheses. We find support for the ES hypothesis as a more competitive brokerage market improves insurers' efficiency, which translates into lower prices for insureds and higher profitability for insurers.

The study provides policy implications in two domains. Firstly, the current non-restrictive regulatory environment for brokers in North Macedonia enables the entrance and thriving of numerous smaller brokers, which increases the competition among brokers, limiting the potential of collusive behavior between dominant insurers and dominant brokers. Imposing restrictions, for example, a cap on contingent commissions, may instigate the market exit of smaller brokers, which may negatively affect the consumer welfare through higher insurance prices in the long term, despite the short-term reduction of insurers' commission costs. Secondly, regulators should not be concerned with the effects of future consolidation in the insurance market as long as intermediary markets remain highly competitive.

In spite of these contributions, the study is not without its limitations. First, the analysis is confined to North Macedonia's non-life insurance market, which naturally restricts the generalizability of the findings to other countries or regions with different market structures and regulatory environments. Second, the methodological approach (e.g., panel models and instruments to address endogeneity), while rigorous, rests on assumptions that, if even slightly violated, could introduce bias or affect the precision of the results. Third, the study relies on data from available reports (2013 – 2022), and although these are the most recent and comprehensive data accessible, they may not capture every aspect of broker–insurer interactions or reflect very recent market changes, underscoring a data limitation. These constraints warrant caution in interpreting the results and point to avenues for future research, such as examining alternative markets, applying alternative analytical techniques, or incorporating more up-to-date and granular data to validate and extend the present findings in broader contexts.

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APPENDIX

Table A1 Impact of intermediary market competition (WBHHI) on ROA/ROE/PRICE (RE OLS regressions)

	(1)	(2)	(3)	(4)	(5)
Dependent variables	ROA	ROE	PRICE	ROA	ROE
WBHHI	-0.248***	-1.148†	0.271	-0.215**	-1.120*
	(-2.841)	(-1.614)	(0.876)	(-2.062)	(-1.684)
SIZE	0.038	0.205	0.151	0.027	0.015
	(1.206)	(1.058)	(0.938)	(0.839)	(0.136)
MSHARE	0.499	4.313	-1.299	0.268	1.579
	(0.867)	(1.074)	(-0.574)	(0.570)	(0.751)
CAPITAL	0.239***	1.936*	1.507***	0.161**	0.718
	(3.003)	(1.935)	(5.377)	(2.185)	(1.344)
EFF	-0.328***	-1.736**	-0.466	-0.338***	-1.854**
	(-3.727)	(-2.534)	(-0.901)	(-3.472)	(-2.431)
DIVER	0.145	1.142*	0.314	0.085	0.423
	(1.412)	(1.670)	(0.784)	(1.130)	(1.238)
BGROWTH	-0.025	0.218*	-0.028	-0.049†	0.178
	(-0.841)	(1.685)	(-0.117)	(-1.474)	(0.334)
STDEV_ROA				-0.417**	
				(-2.189)	
STDEV_ROE					-0.624***
					(-3.257)
Constant	-0.521	-3.451	-0.538	-0.287	0.222
	(-1.207)	(-1.262)	(-0.225)	(-0.673)	(0.155)
Observations	110	110	110	110	110
Number of insurers	11	11	11	11	11
Year dummies	Included	Included	Included	Included	Included
R-squared	0.4869	0.3563	0.4962	0.5828	0.5733
Wald Chi-squared	80.57	70.41	100.73	102.99	123.61

Note: The dependent variables are ROA (Models 1 and 4), ROE (Models 2 and 5) and PRICE (Model 3). WBHHI is the weighted sum of each broker's shares in the insurer's broker-generated GWP multiplied by the Herfindahl-Hirschman Index of each broker's business concentration regarding its partners. SIZE is the natural logarithm of insurer's assets. MSHARE is the insurer's share of total market GWP. CAPITAL is the capital-to-assets ratio. DIVER is the Herfindahl-Hirschman Index of insurer's portfolio. EFF is the share of administrative costs and other non-commission costs charged in the total GWP. BGROWTH is the growth of the number of contracts sold. STDEV_ROA/STDEV_ROE is the standard deviation of ROA/ROE in the previous three years. Robust t-statistics are given in the parentheses below the coefficient estimates. Statistical significance at the 1%, 5%, 10% and 15% levels is denoted by ***, **, * and †, respectively.

Source: Authors' calculations

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TRŽIŠNA STRUKTURA, UČINAK BROKERA I OSIGURAVATELJA: DOKAZI S TRŽIŠTA NEŽIVOTNOG OSIGURANJA U SJEVERNOJ MAKEDONIJI

Sažetak

Postojeća literatura o odnosu između strukture tržišta osiguranja i učinka osiguravatelja zanemaruje utjecaj posrednika na ponašanje osiguravatelja. Cilj je rada popuniti ovaj nedostatak u postojećim istraživanjima ispitivanjem odnosa između strukture brokerskog tržišta i učinka osiguravatelja na tržištu neživotnog osiguranja u Sjevernoj Makedoniji. Koristeći se jedinstvenim podacima o bilateralnim tokovima premija između osiguravatelja i brokera za razdoblje 2013. – 2022., konstruiramo mjeru konkurencije na razini osiguravatelja kako bismo obuhvatili varijacije u konkurenciji uzimajući u obzir obje vrste sudionika na tržištu, osiguravatelje i brokere. Utvrdili smo da suradnja s konkurentnijim brokerima narušava oligopolističko ponašanje osiguravatelja, potičući konkurentnije okružje, poboljšavajući učinkovitost osiguravatelja i snižavajući cijene osiguranja. Nalazi pružaju preporuke za regulatore i donositelje politika o tome kako manje restriktivno regulatorno okružje za posrednike može utjecati na ponašanje osiguravatelja na koncentriranijim tržištima.

Ključne riječi: neživotno osiguranje, tržišna struktura, brokerska tržišta, učinak, Sjeverna Makedonija.

JEL klasifikacija: D43, L10, G22, G24.