




Competition reduces profitability: the case of the Indian life microinsurance industry

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Abstract

We aim to understand the effect of market and firm-level concentration on return on equity in the Indian life microinsurance industry (LMI). This research is one of the first attempts to empirically test structure–performance issues in India. Using data on 14 companies that remained active in the LMI market during 2009–2019, we demonstrate that firms in the Indian LMI market scored better on profitability measures whenever competitive pressures were lower. We calculate Herfindahl–Hirschman concentration indexes (HHI), market share and entropy measures and use panel data techniques to find a positive effect of concentration and a negative effect of market share. We conclude that LMI-specialised insurers in India perform better than diversified insurers.

Keywords Concentration · Competition · Life microinsurance · Market share · Return on equity · Profitability

Introduction

Structural reforms introduced in the life insurance industry in the year 2000 in India have helped create a well-organised, competitive and efficient system. The consequent entry of private players has changed the market structure of the industry, bringing down the monopoly of the erstwhile public insurer. Despite impressive

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Table 1 Growth of the life insurance and microinsurance business

	2008–2009	2009–2010	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019
Asset size of the life insurance industry (in USD billion)	123.89	163.92	193.34	264.63	303.85	338.26	385.87	431.13	477.65	
Insurance density (USD)	41.2	47.7	55.7	42.7	44	43.2	46.5	55	55	
Insurance penetration (%)	4	4.6	4.4	3.17	2.6	2.72	2.72	2.76	2.74	
Total life insurance premiums (in USD billion)	29.98	35.89	39.42	38.81	44.36	49.61	56.57	62.03	68.7	
LMI premiums (in USD million)	32.79	54.3	38.62	44.28	46.56	45.15	67.38	193.7	437.53	
Lives covered under LMI (millions) (group)	12.55	16.84	15.25	13.98	23.15	29.25	32.24	58.90	121.30	
Number of policies issued under LMI (individual) (thousand)	2152.1	2983.9	3650.9	5036.13	816.36	910.94	956.16	839.11	865.09	

Source IRDAI handbook on insurance statistics: 2010–2011, 2014–2015, 2018–2019



growth in the life insurance industry over the years, India has one of the lowest insurance densities and penetration rates (IRDAI 2013, 2018) (Table 1). There is a protection gap of USD 27 billion and growth potential in premium earnings of USD 40 billion (Swiss Re 2010). With the objective of improving insurance outreach, the Insurance Regulatory and Development Authority of India (IRDAI) enacted Micro-insurance Regulations (2005) that mandate insurance companies to mobilise at least 7% of net premiums underwritten from rural and informal sectors of India. Under these regulatory requirements and competitive landscape, life insurers have tried to reap economies of scope by diversifying into custom-designed life microinsurance (LMI) segments that cater to the needs of the low-income population. We see that LMI insurers are usually subsidiaries of resourceful conglomerates in the financial services industry, with the capability to design and launch hybrid products and share expertise and technology for cost-effectiveness.

Insurers consider LMI as ‘business by force’ under ‘rural and social sector obligation’ and try to achieve obligatory business with a half-hearted approach, instead of looking at LMI as a lucrative and commercially viable market. LMI must therefore be profitable to cater to large demand from rural and social sectors. Intuitively, an immediate response could be to lower the barriers to entry to accommodate more players and make the market more competitive in the process. We argue that this increase in competition may well be counter-productive, for it could entail lower returns for shareholders. Therefore, as per the structure–conduct–performance hypothesis (SCP) (Bain 1951), we can expect LMI insurers to be less profitable. If insurers withdraw from the loss-making LMI segment, an increase in market concentration and accompanying higher market power would hurt the financially vulnerable population. However, when meeting IRDAI’s regulatory requirements, insurers face a trade-off between persistence and reasonable profit. An understanding of the financial performance of companies in the LMI market will be useful to commercial insurers in assessing LMI diversification as a business generator that goes beyond ‘compliance’ and resource expenditure for accelerating sales growth in the LMI market. Although SCP has generally been investigated in the financial services industry, empirical testing of SCP and the relative market hypothesis (RMP) in the LMI market is limited. This paper contributes to the existing literature by empirically testing SCP and RMP using data from the LMI sector in India during 2010–2019. We also include several control variables that could affect the structure–performance relationship, such as size, investment income, premium growth, market share and solvency ratio. We provide evidence that supports the SCP hypothesis that higher market concentration (measured by entropy and concentration ratio) leads to a higher return on equity (ROE), and product diversification indeed generates lower profits for shareholders.

The life microinsurance market in India

As per IRDAI directives, LMI in India could be a term or endowment contract sold either on a group or an individual basis with a sum assured varying between USD 66.94 to USD 2677.65. Nearly two thirds of life insurance companies (14



companies) offer LMI in India. Private insurers predominantly offer group products, whereas the public insurer focuses on the individual segment (IRDAI 2018). The public insurer alone had a market share of 94.2% in the LMI market in 2010 (IRDAI 2010). In 2019, the top four private companies toppled its monopoly by controlling over 89% of the market share (IRDAI 2018). The LMI business in India is growing rapidly: premiums collected increased from USD 32.79 million in 2008–2009 to USD 437.53 million in 2018–2019 (IRDAI 2013, 2018). The number of lives covered under LMI has grown ten-fold from 12.55 million in 2008–2009 to 121.3 million in 2018–2019 (Table 1) (IRDAI 2018). As the silent offspring of life insurance and microfinance institutions (MFI), LMI insurers have adopted the partner–agent model. They have utilised the capability of MFIs in reaching out to the poor population owing to their widespread networks and expertise in offering microcredit (Dror et al. 2006, 2009; Chandhok 2009). However, the challenges of low value and high cost of operation, administration and distribution, inadequate experience in the low-income market segment, non-availability of data for actuarial loss estimation and stringent regulatory policies reduce its attractiveness to commercial insurers. Many private insurers or channel partners have not prioritised microinsurance because of less-developed distribution networks, high costs of operation and distribution, a lack of actuarial data and the high level of claims. Only 64% of life insurers are competing in the LMI segment as an obligatory necessity and the remaining companies are fulfilling the obligation by offering conventional rural insurance, i.e. high-premium policies focusing on the affluent rural population (and not LMI) (Mukherjee et al. 2012).

Review of related literature

Porter's five forces model (1980) explicates the relation between market structure and performance. Market power and the consequent higher profits originate from the degree of market concentration (i.e. market rivalry). Market power, expressed as the difference between price and marginal cost, would be higher when a few large firms of disparate sizes operate. There are two hypotheses on market–power theory: SCP and RMP.

The SCP hypothesis predicts a positive relationship between market concentration (few firms and considerable barriers to entry) and profitability due to higher market power derived from collusion among the few large firms in fixing high prices (Bain 1951; Stigler 1964; Njegomir and Stojic 2010; Berger 1995). The earliest study in the insurance sector by Joskow (1973) observed price setting by cartel-like bureaus despite competitive features. Higher market concentration (structure) induces anti-competitive behaviour (conduct), such as price agreements, and generates higher profits (performance) but lower economic welfare. Collusive behaviour is evident in industries characterised by few firms, high entry barriers and greater price elasticity of demand, where incumbents cooperate with others in setting the prices to maximise their financial and market performance.

Several studies focused on the banking industry support the SCP hypothesis that anti-competitive behaviour is associated with better performance (Bajtelmsmit and



Bouzouita 1998; Sathye 2005; Samad 2008; Pilloff and Rhoades 2002; Mohammed et al. 2015; Jibao et al. 2010; Simatele et al. 2018; Tan 2016; Goddard et al. 2009; Jeon and Miller 2005). Other empirical analyses of the property and liability insurance industry in the U.S. (Chidambaran et al. 1997), the life insurance sector in Ghana (Alhassan et al. 2015) and the non-life insurance industry in Eastern European countries (Njegomir and Stojic 2010) support the SCP hypothesis. Moreover, high entry barriers in heavily concentrated markets increase price–cost margins for leading firms (Guedri and McGuire 2011). Since a few large incumbents control the market, mutual familiarity and restraint hint toward possible collusion (Ojima et al. 2018; Pal and Scrimatore 2016; Mohammed et al. 2015). If the SCP hypothesis were to be true, one would expect a positive and significant relationship between concentration (measured by weighted concentration ratio and entropy) and financial performance.

The RMP hypothesis proposes that firms with significant market share and differentiated products command market power to control prices and thereby earn higher profits (Shepherd 1982; Jeon and Miller 2005; Beck et al. 2003). Price manipulation to achieve maximum profits or price leadership would defy competitive norms and create significant entry barriers for new entrants. Higher market share, when assumed to be synonymous with better quality, provides market power to large firms to engage in rent-seeking behaviour. Market power is then exercised by insurers in non-stringent but competitive conditions (Weiss and Choi 2008). If the RMP hypothesis is true, a positive and significant relation between market share and performance is expected. Another variant of market power is the Quiet Life Hypothesis (Hicks 1935), which proposes a negative correlation between market power and efficiency; companies with a significant market share become complacent and ignore controlling costs. An increase in market power thus results in deterioration in efficiency and lower profitability. A few studies, mainly focused on the banking industry, provide evidence against the SCP and the RMP hypotheses by observing no impact of collusive behaviour on profit (Berry-Stölzle et al. 2012; Liebenberg and Sommer 2008; Athanasoglou et al. 2008; Sahile et al. 2015).

Intra-industry diversification or specialisation and its impact on financial performance have been the focus of several studies. Yet, the economic value of diversification is not fully understood due to complex interlinkages between several strategies, including the degree of geographical diversification adopted by the firm (Cummins and Nini 2002; Li and Greenwood 2004; Elango et al. 2008; Liebenberg and Sommer 2008; Cummins et al. 2010; Pavic and Pervan 2010; Berry-Stölzle et al. 2012; Cole and Karl 2016). The scope and scale economies culminate in higher market power and predatory pricing in addition to a positive diversification–performance relationship (Tece 1980; Olaosebikan 2013; Kozak 2011; Cummins et al. 2001). Few studies also observe difficulties in an effective transfer of skills, knowledge and resources across product lines that would increase the cost of coordination of interdependent tasks related to product line extension and input adjustment and modification. Ultimately, this would strain the diversification–performance relationship, especially in bureaucratic companies (Zhou 2011; Zahavi and Lavie 2013; Rawley 2010).



Large firms often perform better than small firms due to scale economies, market share and brand image (Shim, 2011; Cummins and Nini 2002); thus, firm size can strengthen the relationship between diversification and performance (Pangboonyanon and Kalasin 2017; Liebenberg and Sommer 2008). Some studies could not establish any association between size and firm performance (Adams and Buckle 2000). Rapid growth in premiums has been found to increase underwriting and solvency risk and depletion of reserves, and thus negatively affects profitability (Kim et al. 1995; Chen and Wong 2004; Ana-Maria and Ghiorghe 2014). Thus, we expect LMI insurers to register a higher premium growth and lower profits for shareholders. As per IRDAI licensing requirements, LMI insurers are expected to have adequate equity and higher solvency ratios. Solvency ratio and profitability are positively linked; higher equity capital represents capital adequacy and is often associated with higher profitability (Charumathi 2012; Athanasoglou et al. 2008; Malik 2011). Profitability also depends on the income earned from the investments (II) of the insurance fund (i.e. liabilities) (Chen and Wong 2004; Akotey et al. 2013).

Data and methodology

We quantify profitability (measured by ROE and risk-adjusted ROE) of all the individual LMI providers in India in the periods 2009–2010 to 2018–2019. For robustness, we also look at three different measures of the degree of competition measured by the intensity of product concentration: (1) Herfindahl–Hirschman concentration index (HHI); (2) weighted sum of the insurer's exposure to industry share (WCON) across all insurance product lines; and (3) entropy, which depends on the market share of a given firm in each product category.

The HHI measures product concentration as the proportion of premiums underwritten in each product line divided by the total premiums earned by the company (Liebenberg and Sommer 2008; Cole and Karl 2016; Krivokapic et al. 2017). Most studies have used the HHI to measure the competitiveness of firms; the greater the value, the more significant are the chances of collusion for monopoly profits (Pilloff and Rhoades 2002; Petria et al. 2015; Goddard et al. 2004). A high HHI indicates that concentration of business in certain product lines provides market power to charge higher premiums, better efficiency in claims and underwriting operations and a consequent greater potential for super-normal profits. A positive regression coefficient of the HHI indicates a positive relation between product concentration (specialisation) and performance. The calculation of the HHI involves two steps: we first calculate the yearly net premiums written of each product line as a proportion (percentage) of the total net premiums written for each insurer. Then, the squares of these percentages are added to arrive at the HHI (Liebenberg and Sommer 2008; Cummins and Nini 2002; Lee 2017). Market power, revealed as the price-marginal cost margin, is positively correlated with the HHI.

Entropy measures product diversification by considering the weighted distribution of the share of premiums written by the company in each product line (Krivokapic et al. 2017)—the coefficient will be zero for an exclusively focused insurer. Also, a modified measure of concentration that uses weights on the HHI



(WCON) across all insurance product lines is used to measure market concentration; a lower value indicates exposure to more competition. Few studies use market share as a percentage to total industry premiums written to measure efficiency (Liebenberg and Sommer 2008). In the present study, WCON was measured by multiplying an insurer's market share in each line of business in the life insurance industry with the HHI (Krivokapic et al. 2017).

Financial performance is measured by ROE and risk-adjusted ROE, which corrects for the impact of risk taking on returns (Browne and Hoyt 2001; Krivokapic et al. 2017). Risk-adjusted ROE was calculated by dividing ROE by the standard deviation of the observed ROE. There is a negative relationship between ROE and diversification (Cummins and Nini 2002). In comparison with focused firms, diversified firms reported 2% and 1% lower ROE and return on assets, respectively (Liebenberg and Sommer 2008).

Secondary data was collected from the Handbook on Insurance Statistics, published by IRDAI, which includes data on policyholders' accounts, shareholders' accounts and balance sheets. Of the 24 insurance players in India during our period of study, we only focus on those that were involved (even if for a short time) in the LMI segment. There were only five between 2007 and 2008, and IRDAI started publishing LMI statistics in its yearly Handbook on Insurance Statistics from 2008 to 2009. Hence, the period 2009–2010 to 2018–2019 was selected for the study. The sample consists of 14 life insurers, resulting in a total of 140 firm-year observations. The data include both time and cross-sectional elements.

We model ROE as a non-deterministic function of product diversity (specifically, whether a firm offered life and health (micro) insurance products in addition to its activities in the microinsurance sector, namely LHM), firm size (natural log of assets) and the measures of competitiveness using the following regression specification:

$$ROE_{it} = \alpha_0 + \alpha_1 LifeHealthMicro_{it} + \alpha_2 Competitiveness_{it} + X_i \beta + \mu_i + \varepsilon_{it}, \quad (1)$$

where the left-hand side is the ROE of firm i ($i \in \{1, 2, \dots, I\}$) in year t ($t \in \{1, 2, \dots, T\}$), where $I=14$ and the time period ranges from 2009–2010 to 2018–2019. *LifeHealthMicro* is a dummy variable that signifies whether a firm also offers life and health products in addition to LMI, associated with the coefficient α_1 . Similarly, *Competitiveness* represents a measure of market competitiveness associated with the coefficient α_2 . X_i is the vector of other observable covariates (firm size, II, solvency ratio, premium growth), associated with the coefficient vector β . The regression constant is α_0 and ε_{it} is the stochastic error term. Finally, μ_i represents the time-invariant (and unobserved) firm fixed effects that capture unobserved managerial abilities of the firms (Table 2). Note that this regression strategy is specifically tailored to the feature of the market that requires firms to operate in the LMI segment. Note that if firms 'volunteered' to operate in the LMI market, then there will be a (self) selection bias. In this case, our econometric strategy would fail to identify the true effects of market structure on profitability. This is because the unobserved factors that go



Table 2 Regression model: competition reduces return on equity

Dependent variable:	Fixed effects	Fixed effects (risk-adjusted)	Fixed effects (risk-adjusted)	Random effects	Random effects (risk-adjusted)	
	(1)	(2)	(3)	(4)	(5)	
Return on equity						
Period	-0.007 (0.010)	-0.011 (0.016)	-0.007 (0.010)	-0.010 (0.015)	0.008 (0.008)	0.012 (0.012)
L, H and M=1	-0.040 (0.062)	-0.058 (0.091)	-0.039 (0.062)	-0.057 (0.091)	-0.099 (0.070)	-0.145 (0.103)
Size	0.241*** (0.074)	0.354*** (0.109)	0.241*** (0.075)	0.354*** (0.110)	0.103*** (0.033)	0.152*** (0.048)
II ratio	-0.070 (0.057)	0.103 (0.083)	0.071 (0.057)	0.104 (0.083)	0.099 (0.072)	0.145 (0.106)
Solvency ratio	-0.015 (0.012)	-0.022 (0.018)	-0.014 (0.012)	-0.021 (0.018)	-0.005 (0.014)	-0.008 (0.020)
Market share	-3.510* (2.020)	-5.150* (2.965)	-3.445* (2.020)	-5.053* (2.964)		
Premium growth	-0.003 (0.021)	-0.005 (0.031)	0.003 (0.021)	-0.005 (0.031)	-0.006 (0.025)	-0.009 (0.037)
HHI	0.0001** (0.000)	0.0001** (0.000)				
Entropy			-0.349* (0.192)	-0.513* (0.281)		
WCON					1.253*** (0.134)	1.839*** (0.198)
Constant	-3.399*** (1.157)	-4.989*** (1.699)	-2.778*** (0.985)	-4.077*** (1.446)	-1.386*** (0.433)	-2.034*** (0.635)
Observations	140	140	140	140	140	140



Table 2 (continued)

Dependent variable:	Fixed effects	Fixed effects (risk-adjusted)	Fixed effects	Fixed effects (risk-adjusted)	Random effects	Random effects (risk-adjusted)
Return on equity	(1)	(2)	(3)	(4)	(5)	(6)
R-squared	0.3234	0.3232	0.3057	0.305	0.895	0.895
P-value for joint significance	0.0005	0.0005	0.0005	0.0005	0.000	0.000

Source Authors' calculation

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively. Robust standard errors are given in parentheses



into the decision to operate in the LMI market may be correlated with our observed regressors.

Results

Descriptive statistics

As the results in Table 3 depict, the average ROE is about 0.31, the solvency ratio is 3.6 (SD = 2.07) and market share varies from 6.3% to 17%. The values for HHI (mean = 9651.13, SD = 567.83), WCON (mean = 0.18, SD = 0.45) and entropy (mean = 0.81, SD = 0.11) indicate lower competition. On average, companies register 21% growth in premiums (SD = 89%).

Regression results

The provision of products may well be correlated with unobserved managerial ability (among other firm-specific characteristics). In order to account for the possibility of inter-firm heterogeneity, we difference out the firm-specific fixed effects (columns 1 and 2 in Table 2, where the dependent variables are ROE and risk-adjusted ROE, respectively), and find that the firms that offered LMI when the market was competitive were indeed less profitable (in these columns, the coefficient of HHI is positively significant, meaning that more concentration led to higher profitability on average). We then repeat the regression exercise (columns 3 and 4, where the dependent variables are ROE and risk-adjusted ROE, respectively) and come to the same inference. The coefficient of entropy is negatively (although marginally) significant (greater competition leads to lower ROE). Finally, we introduce WCON using a random effects regression (columns 5 and 6, where the dependent variables are ROE and risk-adjusted ROE, respectively). This time, the (positive) coefficient of WCON is extremely significant, leading

Table 3 Descriptive statistics

	Mean	SD	Minimum	Maximum
Size (INR billion)	1724.5	5409.3	2.63	31118.11
Investment income ratio	0.68	1.47	-0.85	8.41
Solvency ratio	3.6	2.07	1.5	12.5
Market share	0.063	0.17	0.01	0.75
Premium growth	0.21	0.890	-0.27	10.4
HHI	9651.13	567.83	6073.6	9998.8
WCON	0.18	0.45	0.001	2.01
Entropy	0.81	0.11	0.001	0.674
ROE	0.31	0.84	-0.42	4.31
Risk-adjusted ROE	0.45	1.24	-0.62	6.33

Source Authors' calculation; IRDAI Handbook 2013, 2019



us to infer that lower competition levels are associated with higher measures of profitability.

Discussion

The Indian LMI market is curiously characterised by a positive coefficient of concentration (WCON and HHI) and a negative coefficient of market share and entropy. Using panel data techniques, we demonstrate that firms in the LMI market scored better on ROE when competitive pressures were lower. This supports the SCP hypothesis that in a more concentrated environment, insurers have higher ROE. This hints that the positive effect is due to market power more than relative market efficiency (the effect of which is presumably differenced out with unobserved managerial ability). Bain (1951), and subsequently several scholars (Clarke 1984; Demsetz 1973), have established a consistent positive association between concentration and profitability. Prior studies have found support for the SCP hypothesis by observing higher profits and price agreements in concentrated insurance markets (Chidambaran 1997; Bajtelsmit and Bouzouita 1998; Pope and Ma 2008; Njegomir and Stojic 2010; Jeon and Miller 2005). Industry concentration would ensure antitrust regulation to improve efficiency, whereas competition motivates companies to become efficient and thereby increases profits.

By observing a positive coefficient for HHI in the regression models predicting a ROE, we confirm that specialised insurers (offering LM rather than LHM) perform better than those diversifying into several products, in contrast to the findings of a few studies (Liebenberg and Sommer 2008; Krivokapic et al. 2017). Specialisation increases returns for shareholders when the firms focus on one or two products and substantially gain from the competitive advantage over diversified firms by using complementary resources for research and development, technological innovation and product line extensions. Focused firms can reduce the costs of input adjustment, coordination, training and administration and enhance service quality; the resultant market power transmits into higher profits. Earlier studies have advocated product specialisation for better financial performance (Cummins and Nini 2002; Liebenberg and Sommer 2008; Shim 2011; Lee 2017; Cummins et al. 2010; Pavic and Pervan 2010; Chidambaran et al. 1997; Choi and Weiss 2005). Management policies could improve market contestability by incentivising innovation and value creation in the LMI segment.

A negative relation between market share and ROE implies that insurers are not able to exert market power to produce higher returns for shareholders. Therefore, our results do not support the RMP hypothesis in the LMI market. Few studies have found a negative correlation between market share and profits (Choi and Weiss 2005). Prices in the LMI market are regulated and non-competitive, so insurers holding a substantial market share in such a relaxed environment would be less diligent in controlling costs, using better technology or engaging in proficient management. Our earlier study (Savitha et al. 2019) established LMI insurers to be less technically efficient compared to specialised firms (with no relation



between market share and efficiency scores). Technical inefficiency may therefore very well translate into reduced profits.

The size of the insurance company directly affects ROE; we see that, all else being equal (i.e. controlling for product portfolio), firm size does offer an efficiency advantage (significantly positive coefficient of size in all the six regression columns in Table 2). Large insurers have adequate human and capital resources, which can reduce the cost of risk in-house through ‘natural diversification’, and reap the benefits from economies of scale and scope. Few studies have found larger insurers to perform better than small insurers owing to scale economies and lower marketing and product launch costs (Zainudin et al. 2018; Olaosebikan 2013). We observe insignificant effects of premium growth, solvency ratio and investment income (Zainudin et al. 2018). The finding that these variables have no significant effect on ROE is contrary to the results of Kim et al. (1995), Ana-Maria and Ghiorghe (2014) and Charumathi (2012), which broadly showed that rapid premium growth caused increases in underwriting risk, insolvency levels and the insurance company’s volume of technical reserves.

Conclusion

Despite regulatory initiatives to encourage competition in the Indian life insurance industry, existing barriers to entry (not every player is licensed to sell insurance) make this market somewhat less competitive. The results of the study are consistent with the SCP hypothesis that a highly concentrated LMI market provides a higher ROE for shareholders. Therefore, policymakers should consider whether concentration in the LMI market leads to unwarranted market power, merger activity, unethical behaviour and collusion among specialised firms who might engage in exploitative practices, ignoring the interests of the insured. The reduction in market pressure motivates focused companies to specialise in a few related products, and thus promotes innovation and development of the LMI market. However, management policies and procedures should oversee the harmful pricing practices usually seen in concentrated markets to ensure that insurance is affordable and available to the low-income population.

Although this paper is one of the first to attempt to understand concentration–specialisation–performance relations in the LMI market, its findings and implications should be understood in light of certain limitations. LMI products are a custom-designed, context-specific solution to the insurance needs of the Indian low-income population, hence the generalisability of our findings may well be limited. Another limitation is the measurement of concentration as HHI, WCON and entropy, which were calculated by considering the share of premiums of each business of the total earned premiums of a company, and not the sum of squared market shares. One final concern may relate to the relatively moderate size of the data, which has direct implications on the strength of inference. The size of the data is consistent with the method of binding frontiers (Banerjee 2015), which satisfies a few general sample properties that come directly from robust concentration inequalities. These properties translate to inferences associated with very high power (Banerjee 2020) under



very general conditions that do not assume any specific functional form of the joint distribution of the observed variables in question. This makes our strength of inference fairly robust even though the sample sizes are not so large. Future research could focus on examining price-setting objectives, the working of SCP, RMP or the efficient structure hypothesis in the general insurance market in India, refining the concept of market structure in different LMI markets and studying the influence of geographical diversification on performance.

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Compliance with ethical standards

Conflict of interest On behalf of all authors, I state that there is no conflict of interest.

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