

THE PERSISTENCE OF INSURERS PROFITABILITY

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Abstract

Most of the academic researches have analyzed the persistence of profit for the manufacturing and (non-financial) services sector. These studies were mainly conducted in advance market economies. In order to shed some light on the issue of persistence in corporate rates of return, this research aims to examine the persistence of profitability of *financial entities* i.e. non-life insurance companies operating in an *emerging market economy*, Croatia. In order to determine persistence of insurers' profitability, a Markov Chains stochastic process is applied on the profitability classes that were formulated based on the changes of insurers' ROA (return on assets) indicator during the period from 2002 to 2011. The empirical results showed that profit persistence was more likely to occur within moderate profit classes/states.

Key words: *Persistence of profitability, Insurance industry, Croatia*

1. INTRODUCTION

Firm profitability has always attracted the attention of numerous practitioners and academics around the world. However, researches related to the persistence of firm profitability started to emerge during the 1980s when Mueller published his seminal article about the profits in the long run. To date, a number of studies have analyzed the persistence of profit for the manufacturing and (non-financial)

services sector, but most of them have been conducted in advance market economies. On the other hand, empirical findings for the emerging countries have been scarce.

Having in mind that insurance industry (together with many other industries) in Croatia has undergone significant regulatory and structural changes over the last two decades, the investigation of the profitability persistence become even more important. Namely, the stronger is the persistence of profit, the lower is the intensity of competition, and the slower is the convergence or speed of adjustment process toward the mean profit of the industry i.e. toward the competitive ideal. Further to previous, and as known from (micro)economic theory, consumers will benefit (in terms of lower price and/or higher quality of services/products) only if effective competition operates on the market.

Therefore, the aim of this research is to examine the persistence of profitability of financial entities i.e. non-life insurance companies operating in an emerging market economy, Croatia. In order to determine persistence of insurers' profitability, a Markov Chains stochastic process is applied on the profitability classes that were formulated based on the changes of insurers' ROA (return on assets) indicator during the period from 2002 to 2011. Due to the implemented methodology, the probability of insurer's transition from one to any other profitability class *in the short run* was revealed, as well as it was revealed the probability that insurer will be in any profitability class *in the long run*, regardless of its initial profitability.

This paper is organized as follows. The next section provides insight into the importance of insurance industry and presents conceptual frame of the profit persistence concept. A brief review of the relevant prior literature is also presented within this section. Section 3 is devoted to the empirical framework as well as to the results and implication of the analysis. The final section concludes the study.

2. PERSISTENCE OF PROFITABILITY IN CROATIAN INSURANCE INDUSTRY

2.1. The importance of insurance industry

As a part of a financial system, insurance companies perform important functions in the domain of financial intermediation. The most significant ones are providing of insurance and channelling of funds across time and space while managing various financial risks. The first function encompasses underwriting of different kind of actuarial risks that individuals and businesses are exposed to, and compensation of those risks that exposed units have suffered from the losses. The later one is focused on reducing problems of transaction costs and information asymmetry, contributing to more efficient resources allocation from those units who do not have a productive uses of them to those who do have. In this way, and according to the endogenous growth theory, insurance companies may affect

economic growth through channels of marginal productivity of capital, saving rate, technological innovations and the cost of the intermediation (Levine, 1997). Numerous empirical studies confirm positive contributions of insurance industry to economic growth (for comprehensive review of the researches one could refer to Outrevielle, 2012). However, the important prerequisite for achieving such contributions is the competitive market environment which encourages insurance companies to perform their functions more efficiently. Taking this important fact into consideration, there is a question on the characteristics of the Croatian insurance industry, especially non-life insurance segment, on which our research is based on. Namely, in the last two decades the insurance industry has been experienced important regulatory and structural developments. The changes in the insurance regulation (that started in 1994) were mainly focused on enabling free insurance market through lessening the barriers and on improvements in the supervisory of insurance companies' operations. As results of these developments in (de)regulation and liberalization, the processes of demonopolisation and consolidation have occurred and the foreign insurers' participation has been increased. Namely, the market share of the largest (state owned) company was almost halved in the period from 1998 to 2011. The number of the insurance companies raised from 12 in 1994 to 27 in 2011 out of which 20 companies operated in non-life insurance market (10 insurers specialized in non-life insurance and 10 composite companies). Simultaneously, foreign ownership grew in the importance. From 3 foreign owned companies in 1994, their number rose to 15 in 2011. The share of the companies with foreign ownership operating in life insurance market accounted for 76% of the premiums, while the same share for non-life insurance was 35% in 2011. Although mergers and acquisitions occurred in the analyzed period from 2002 to 2011, they did not significantly change market shares of the companies. Herfindahl-Hirschman index in terms of total insurance premiums was 956.7 in life insurance market and 1,821.2 in non-life insurance market in 2011, indicating unconcentrated market and moderate level of concentration, respectively. The average profitability of insurance companies expressed by return on assets was 0.43 in life insurance business and 2.00 % in non-life insurance. Although the insurance market is still undeveloped, all above mentioned trends have contributed to some improvements in performing insurance companies' functions and to the variety and quality of the insurance products, as well as to the market growth. The life insurance penetration rose from 0.43 in 1998 to 0.86 in 2006 and, due to the crisis, it declined to 0.70% of GDP in 2011. The same indicator for non-life insurance was 1.52; 2.4 and 2.00% of GDP, respectively (Croatian Insurance Supervisory Agency, 2004; Swiss Re, 1999 – 2012; Croatian Financial Services Supervisory Agency, 2012; Croatian Insurance Bureau, 2012).

2.2. Conceptual frame and previous literature

Empirical investigation of the dynamics of firms' profitability represents essence of the persistence of profit theory, since profits are generated in the process of competition. Early academic researches on competition and its influence on firms' performance were static in their nature (Goddard et al., 2011). Contrary to that, this paper uses time-discrete *Markov Chain* stochastic approach which enables us to determine persistence of insurers' profitability in short-run as well as in long-run through assessing the probability of insurer's transition from one to any other previously define profitability class. This represents a deviation from the static framework prevalent in most of the empirical researches based on structure-conduct-performance (SCP) paradigm and the New industrial organization approach (NEIO). As stated by Pakes, Mueller's model is motivated largely by the controversy between the SCP's and "new learning's" explanation of profitability differences (Pakes, 1987). In his seminal article about the profits in the long run, Muller takes competition as a dynamic process in which the process of entry and exit erodes profits in the long run (Muller, 1986). Since competitive environment will erode abnormal profits, profitability of competing firms will not be persistent and differences in profits among firms will disappear in the long run (Aslan et al. 2010). Alternatively, if competition is not intense, firms earning above average profits will be able to maintain the same level of profits in the subsequent periods implying the presence of persistence of profits (Kaplan and Çelik, 2008).

Although persistence of firm profitability are widely investigated in manufacturing sector (see for example: Muller, 1986; Rumelt, 1991; Kambahampati, 1995; McGahan and Porter, 1999; Yurtoglu, 2004; Schumacher and Boland, 2005, Tarziján and Eylerts, 2010; Aslan et al. 2010) and to a lesser extend in banking sector (e.g. Agostino et al., 2005; Knapp et al., 2006; Bektas, 2007; Athanasoglou et al, 2008; Kaplan and Celik, 2008; Goddard et al. 2011;) no previous literature deals directly with the profit persistence in insurance industry. In the insurance sector, a greater attention has been given to the variables that influence insurers' profitability than to the issue of the nature and intensity of competition. Furthermore, most of the previously mentioned studies investigated the persistence of profit in developed countries, while only limited number of them explored the persistence phenomena in developing countries. However, findings from these studies are of great importance to understand the theory behind the persistence of profits. Therefore, a brief review of earlier research (regardless of whether they are performed in manufacturing or in the financial sector of the developed/developing countries) is presented in subsequent paragraphs.

In describing and analyzing the separate profit series, Mueller focused attention on the dynamics of profit process and the relative importance of the different factors that affect it (Muller, 1986). The similar analysis was conducted by Muller again in 1990. As a result of analyzing the dynamics of

company profits for seven developed economies during the 1960s-1980s, he found a high degree of profit persistence in all these economies (Muller, 1990). Kambahampati carried out research on the intensity of competition for developing country such as India and the result of the analysis showed that quite a large number of analyzed industries experience above average profits that persist over time. (Kambahampati, 1995). Using the panel data method to test for persistency in the Turkish banking sector, Bektas found that the long run mean profit rate is very close to zero and hence concluded that in the long run persistency of profits does not exist (Bektas, 2007). Similar findings were reported by Kaplan and Celik while they were investigating the intensity of competition in Turkish banking sector for the period of 1980 to 1998. The authors found that the short term persistence of profits is moderate and above normal profits disappear in the long-run implying the presence of high competition in the banking industry (Kaplan and Celik, 2008). Goddard et al. tested for the persistence of profit using bank-level data from 65 countries. The results of the GMM estimation of a first-order autoregressive model revealed that the speed of profit convergence varies between countries, with banks in developed countries showing slightly higher persistence on average than those in developing countries (Goddard et al. 2010).

3. EMPIRICAL ANALYSIS

3.1. Data and methodology

The analysis encompassed all Croatian non-life insurance companies that were active during the 2002-2011 period. As a result of the new companies' entrance, M&A activities and liquidations, the total number of analyzed insurers was changing over the years from 16 to 20. The data for individual insurers were collected from *Annual Reports* published by the Croatian Financial Services Supervisory Agency (HANFA). Since HANFA uses ROA indicator as a basic profitability measure, we perform analysis by using a ratio of after tax income and total assets as a main indicator of insurers' profitability.

In order to evaluate persistence of profitability of insurance companies in Croatia, we applied the time-discrete *Markov Chain* with finite state space. A Markov chain is a mathematical system that undergoes transitions from one state to another, between a finite or countable number of possible states. It is a random process usually characterized as memoryless: the next state depends only on the current state and not on the sequence of events that preceded it. This specific kind of "memorylessness" is called the Markov property.

With the intention to meet all requirements of the Markov process, based on the structure of available data, the insurers' profitability classes were defined. Profitability classes were formulated based on the

changes of ROA (return on assets) indicators for the period from 2002 to 2011. Depending on the transition from one class of profitability to some of the other classes of profitability, the persistence of insurers' profitability for the afore-mentioned period was determined. Four basic classes/groups were formulated: *unprofitable* insurers (those who have a negative value of ROA indicator), *low-profitable* insurers (ROA indicator takes the value up to 1%), *moderately profitable* insurers (ROA indicator is in the range between 1% and 3%) and *profitable* insurers (ROA is higher than 3%). The table below shows the classes of profitability.

Table 1: Classes of profitability

Profit classes	ROA
Non-profitable insurers	ROA<0%
Low-profitable insurers	0%<ROA<1%
Moderately profitable insurers	1%<ROA<3%
Profitable insurers	ROA>3%

3.2. Empirical results

Application of the Markov Chain methodology, together with defined classes or states of profitability, allowed us to obtain results which are shown below. The marginal homogeneity test (table 2) shows that the number of insurers transition from one profit class to another (from year to year) were significant at p-value less than 10% in the period from 2005 to 2006 (when there were 6 of them), from 2007 to 2008 (when there were 9 of them), from 2009 to 2010 (when there were 6 transitions) and from 2010 to 2011 (when there were 10 of them). It should be emphasized that in period from 2007 to 2008, 78% of transition were from more to less profitable insurances. Due to crisis the decreasing insurances profitability is expected. However, in transition period from 2009 to 2010, 83% of transitions were in favour of passes from lesser to higher profit class, as well as it was from 2010 to 2011.

Table 2: Marginal Homogeneity Test

Transition period	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Distinct Values	4	4	4	4	4	4	4	4	4
Off-Diagonal Cases	9	4	8	6	9	9	4	6	10
Observed MH Statistic	21	9	18	19	23	26	7	10	28
Mean MH Statistic	20	9,5	19,5	15,5	24,5	21,5	8	12,5	31,5
Std.Deviation of MH Statistic	1,732	1,323	1,658	2,062	2,062	2,398	1,000	1,500	1,803
Std.MH Statistic	0,577	-0,378	-0,905	1,698	-0,728	1,877	-1,000	-1,667	-1,941
Asymp.Sig (2-tailed)	0,564	0,705	0,366	0,090	0,467	0,061	0,317	0,096	0,052

Source: Authors' calculations

Table 3a: Matrix of transition probabilities for pre-crisis period (2002-2007)

From/ To	State 1	State 2	State 3	State 4	Total
State 1	0,35	0,40	0,15	0,10	1
State 2	0,10	0,62	0,28	0	1
State 3	0,05	0,23	0,61	0,11	1
State 4	0,17	0,17	0,17	0,49	1
Initial Prob.	0,25	0,25	0,25	0,25	1

Source: Authors' calculations

Table 3b: Matrix of transition probabilities for crisis period (2008-2011)

From/ To	State 1	State 2	State 3	State 4	Total
State 1	0,74	0,21	0,05	0	1
State 2	0,08	0,46	0,38	0,08	1
State 3	0	0,08	0,46	0,46	1
State 4	0	0	0,33	0,67	1
Initial Prob.	0,25	0,25	0,25	0,25	1

Source: Authors' calculations

Table 3a) and 3b) show the probabilities obtained by the stochastic transition probabilities matrix for the pre-crisis period (2002-2007) and for crisis period (2008-2011). The transition probabilities matrix shows the probability of transition from one to any other profitability class. What must be taken into account is that the transition probabilities matrix refers to a *short term* period. In case of high profit persistence, all elements on the main diagonal of the matrix should be close to one. According to the obtained results, it can be concluded that in the Croatian insurance sector there is a moderately high persistence of profits. According to the off-diagonal elements, the highest probability (40%) refers to the transition from the first to the second profitability class. The probability for transition from the first (non-profit class) to the third or fourth profit class in a short period is small.

However, it's evident that the probabilities of the main diagonal of the stochastic matrix for the second and third profitability class is significantly less during the crisis period compared to the period before the crisis. It is also evident that the probability of remaining in the first class in the period of crisis is very high due to further negative effects of crises on the already non profitable insurances companies.

Table 4: Equilibrium probability

	State Name	Steady State Probability		Recurrence Time	
		Pre-crisis period (2002-2007)	Crisis period (2008-2011)	Pre-crisis period (2002-2007)	Crisis period (2008-2011)
1	State 1	0,1179	0,0195	8,4813	51,2709
2	State 2	0,3996	0,0634	2,5024	15,7756
3	State 3	0,3779	0,3767	2,6465	2,6548
4	State 4	0,1046	0,5404	9,5586	1,8504

Source: Authors' calculations

Table 4 shows the equilibrium probabilities, i.e. the probabilities that insurers will be in any profitability class *in the long term*, regardless of the initial state of insurers. In the table observed, the highest probability refers to the assumption that insurers will be in the second profitability class as well as in the third profitability class, where the probability amounts to 39.96% and 37.79% in pre-crisis period. The probability that some of the insurers will operate with above-average profits, i.e. that they will be in the fourth profitability class, regardless of their prior profitability state, amounts only to 10.46%. The calculation of reciprocal values of probabilities obtained (1/state probability) reveals how much time it takes to return in a particular profitability state. The recurrence time of insurers in a highest-profitable class, on average, would last 9.55 years, meaning that it would take approximately ten years for return to the same class in pre-crisis period.

Table 5 a,b,c,d,: The probability for the transition of insurances from one profit class to the remaining 3 classes of profitability in the next year

a)			
State	Initial State Probability	Resulted State Probability	
		Pre-crisis period (2002-2007)	Crisis period (2008-2011)
State 1	1	0,1870	0,5644
State 2	0	0,4395	0,2560
State 3	0	0,2730	0,1398
State 4	0	0,1005	0,0398

b)			
State	Initial State Probability	Resulted State Probability	
		Pre-crisis period (2002-2007)	Crisis period (2008-2011)
State 1	0	0,1110	0,0960
State 2	1	0,4888	0,2588
State 3	0	0,3594	0,3800
State 4	0	0,0408	0,2652

c)			
State	Initial State Probability	Resulted State Probability	
		Pre-crisis period (2002-2007)	Crisis period (2008-2011)
State 1	0	0,0897	0,0064
State 2	0	0,3216	0,0736
State 3	1	0,4627	0,3938
State 4	0	0,1260	0,5262

d)			
State	Initial State Probability	Resulted State Probability	
		Pre-crisis period (2002-2007)	Crisis period (2008-2011)
State 1	0	0,1683	0
State 2	0	0,2958	0,0264
State 3	0	0,2601	0,3729
State 4	1	0,2758	0,6007

Source: Authors' calculations

However, when insurers leave the second or third state it needs 2 and half years to go back to that state, while in crisis period it takes more time to return to the observed states. From Tables 5 a) – d) it is evident that if the insurers initial state is in the second or third profitability class then it is most likely to stay in these states in the next year. These probabilities are reduced in crisis period, while the probabilities of transition to the first and fourth state are increased in crisis period in comparison to the pre-crisis period.

4. CONCLUSION

Using the transition probabilities matrix and probabilities obtained from formulated profitability classes, it could be concluded that profit persistence was more likely to occur in insurance companies with moderate profit (ROA between zero and 3%). The empirical results showed that in the long run it is more likely that insurances companies will be in the second or third state in pre-crisis period regardless of their initial state. This means that there is a high profitability persistence of insurers in middle classes. However, due to the crisis these probabilities were reduced in comparison to transition probabilities for the classes of extreme low or extreme high profitability. The first state probability of negative returns to asset is significantly increased in crisis period, as well as the probability of the fourth state (with ROA greater than 3%). The probability of approximately 60% of staying in the fourth state in the next year if the insurer is in the same state in the current year should be interpreted with caution since 2 of 3 insurers remained in that profitability class.

REFERENCES

- Agostino, M., Leonida, L. and Trivieri, F. (2005), “Profits persistence and ownership: evidence from the Italian banking sector”, *Applied Economics*, 37, pp. 1615–1621.
- Athanasoglous, P.P., Brissimis, S.N. and Delis, M.D. (2008), “Bank-specific, Industry-specific and Macroeconomic Determinants of Bank Profitability”, *Journal of International Financial Markets Institutions and Money*, 18, pp. 121-136.
- Aslan, A., Kula, F. and Kaplan, M. (2010), “New Evidence on the Persistence of Profit in Turkey with First and Second Generation Panel Unit Root Tests” *Middle East Technical University Studies in Development*, Vol. 37, iss. 1, pp. 25-40.
- Croatian Insurance Bureau (2012), “Croatian insurance market – 2011”, Zagreb, <http://www.huo.hr/> [Accessed 18/09/12]
- Croatian Insurance Supervisory Agency (2005), “Izvjješće o stanju u djelatnosti osiguranja i radu Direkcije za nadzor društava za osiguranje u 2004”, Zagreb, <http://www.vlada.hr/> [Accessed 18/09/12]
- Croatian Financial Services Supervisory Agency (2012), “Annual report – 2011”, Zagreb, <http://www.hanfa.hr/> [Accessed 07/12/12]

- Goddard, J., Liu, H., Molyneux, P. and Wilson, O.S.J. (2011), "The persistence of bank profit", *Journal of Banking and Finance*, Vol. 35, iss. 11, pp. 2881-90.
- Kambahampati, U. S. (1995), "The persistence of profit differentials in Indian industry", *Applied Economics*, 27, pp. 353-361.
- Kaplan, M. and Çelik, T. (2008), "The Persistence of Profitability and Competition in the Turkish banking sector", [<http://iibf.erciyes.edu.tr/dergi/sayi30/mkaplan.pdf>], pp. 157-167.
- Knapp, M., Gart, A. and Chaudhry, M. (2006), "The impact of persistence and mean reversion of bank profitability on post-merger performance in the banking industry", *Journal of Banking & Finance*, 30, pp. 3503-3517.
- Levine, R. (1997), "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, Vol. 35, pp. 688-726.
- Mueller, D.C. (1986), *Profits in The Long Run*, Cambridge University Press, Cambridge.
- Mueller D. (1990), *Profits and the process of competition. The dynamic of profits. An international comparison*, Cambridge University Press.
- McGahan, A.M. and Porter, M.E. (1999), "The persistence of shocks to profitability", *Review of Economics and Statistics*, 81, pp. 143-153.
- Yurtoglu B. B. (2004), "Persistence of firm-level profitability in Turkey", *Applied Economics*, 36, pp. 615-625.
- Outreville, J. F. (2012), "The Relationship Between Insurance and Economic Development: 85 Empirical Papers for a Review of the Literature", *Risk Management and Insurance Review*, Early view (Online Version of Record published before inclusion in an issue), Article first published online: 14 September 2012.
- Pakes, A. (1987), "Mueller's profits in the long run", *Rand journal of economics*, Vol.18, No.2, pp.319-332.
- Rumelt, R. (1991), "How Much Does Industry Matter?", *Strategic Management Journal*, 12, pp.167-85.
- Ruiz I. (2003), "About the theory and empirical analysis of "the persistence of profit" and its applicability to Colombia", *Ecos de Economía*, 16, pp. 65 - 76.
- Schmalensee, R. (1985), "Do Markets Differ Much?", *American Economic Review*, 75, pp. 341-51.
- Schumacher . K. and Boland, M.A. (2005), "The Persistence of Profitability among Firms in the Food Economy", *American Journal of Agricultural Economics*, Vol. 87, No. 1, pp. 103-115.
- Swiss Re (1999-2012), "Sigma", Zurich
- Tarziján, J. and Eylerts I. (2010), "Persistence of profitability in Latin America: Explaining the differences among countries, industries and firms", *Academia, Revista Latinoamericana de Administración*, 44, pp. 99-114.