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Research Article

THE IRAN INSURANCE INDUSTRY'S STRUCTURE AND ITS WELFARE COSTS

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ABSTRACT
Iran insurance industry has changed in recent years. In this paper, the structure of industry and welfare costs of it in 2002-2013 was examined. To study the structure of industry used the concentration indicators. All of Iran insurance industry lines were classified into six lines or groups. In the all of them and in total Iran insurance industry the degree of concentration which measured by Herfindahl-Hirschman Index (HHI) declined from 2002 to 2013 and has become more competitive Iran insurance environment. For calculating welfare cost in Iran insurance industry in the period 2002-2013 used of Harberger approach. For this purpose the price elasticity of insurance products is estimated with of Almost Ideal Demand System (AIDS). The result show that Demand for personal, cargo and other elastic and for auto, third party and fire is relatively inelastic. In the case of welfare cost the result show that for total of insurance industry (I) and for all insurance lines or groups (except third party) the share of welfare costs have been decreasing over time.

Keywords: *Welfare Cost, Concentration, Structure, Iran Insurance Industry*

INTRODUCTION
With the entry of private insurance companies in the insurance industry since 2003 and the privatization of some government insurance companies, the Iran insurance industry has been in a tight competition, so that the number of insurance companies from 5 companies in 2002 reached to 29 companies in 2003.
With the increasing number of insurance companies, the Iran insurance industry structure in various lines has changed and the market has moved into the competitive market. According to economic theory, to any distance away from the is competitive market, more cost imposed on consumers, So that consumers to obtain the product must pay more of the marginal cost and this is non-optimal allocation of resources. The gap between price and marginal cost lead to non-optimal allocation of resources and reduction of social welfare.
As a result of the move from market competitive to market monopoly incurred social cost that in economic theory that is welfare cost. So cost welfare cost is outcome of non-optimal allocation of resources and in all non-competitive markets is exist.
Structure of Iran insurance industry has changed and moved to a competitive market, so welfare costs in the industry have been changed. Therefore in this paper, the structure of Iran insurance industry and welfare costs in each of lines has studied
To study the structure of the insurance industry, the Herfindahl-Hirschman index has been used and to calculate the welfare costs Harberger method has been used. The number of insurance companies at 1979-2002 in Iran was 5 companies with government ownership but From 2003 onwards insurance industry environment has changed and by The legislator allowed to insurance companies with private ownership, so from 2003 onwards to gradually increase the number of insurance companies in the country so that in 2013 number of insurance companies has reached to 29 companies. Statistics and information required are derived from statistical yearbook.

Literature
Kadiyali and Sriram (2008) have investigated the structure of manufacturing industry and retail units of the industry's products. Results showed that competition at the retail level somewhat reduce the market power factories and thus the Adjusted Herfindahl-Hirschman index for smaller amounts than usual Herfindahl Hirschman takes.

Seelanatha (2010). Has investigated the improving productivity, efficiency and competitiveness in the Sri Lanka banking industry. The findings suggest that has a positive relationship between the structure and performance of the banking industry in Sri Lanka and also a positive relationship between market share and profitability of the banking industry.

Tash *et al.*, (2009) has estimated the welfare cost of monopoly structure in Iran insurance market. The results of this study indicate that insurance market structure in Iran is an effective monopoly. As a result Harberger index, Posner and Kalyng and Mueller in 2004 shows that there are the high social welfare costs on insurance services, because of the effective monopoly imposed.

Structure of Iran Insurance Industry

"Market Structure" shows how the industry in a specific market is organized (Stiglitz, 1993), and is best shown through measuring market concentration. However, there are different viewpoints on how to measure market concentration. Concentration ratios are important as they capture structural characteristics of a market (Bikker and Haaf, 2002). The concept of industrial concentration has been extensively argued in the economic literature.

Measures of Market Concentration

Despite many different approaches to its measurement, general agreement prevails about the constituting elements of concentration measures, i.e. the number of operating units and the distribution of firm sizes. In general, the concentration indices (CI) can be expressed in form of (1):

$$CI = \sum_{i=1}^{n} s_i w_i \qquad (1)$$

Table 1: Concentration Indices and Their Characteristics

Index type	w_i weight	Typical features	Range
Concentration ratio of K firm $CR_k = \sum_{i=1}^{k} s_i$	$w_i = 1 \ for \ \ i \geq k$ $w_i = 0 \ for \ \ i < k$	Takes only large firms in to account. Arbitrary cut off	$0 < CR_i \leq 1$
Herfindhal-Hirschman $HHI = \sum_{i=1}^{n} s_i^{\,2}$	$w_i = s_i$	Considers all firms, sensitive to new entries	$\frac{1}{n} \leq HHI \leq 1$
Hall-Tideman $HTI = 1 / (2\sum_{i=1}^{n} i s_i - 1)$	firms ranking from largest to smallest	mphasizes on absolute number of banks	$0 \leq HTI \leq 1$
Rosenbluth $RI = 1 / (2\sum_{i=1}^{n} i s_i - 0.5)$	firms ranking from smallest to largest	Sensitive to changes in the size distribution of small firms	$0 \leq RI \leq 1$
comprehensive index of industrial concentration $CCI = s_i + \sum_{i=2}^{n} s_i^{\,2}(1+(1-s_i))$	$w_i = 1 \ for \ \ s_i$ $w_i = (s_i + (s_i - s_i^{\,2}))$ $for \ \ i > 1$	Addresses relative dispersion and absolute magnitude, suitable for cartel market	$0 \leq CCI \leq 1$

- Whereas s_i and w_i represent the market share of firm I and the associated weight; respectively, and n shows the number of firms in the industry (Bikker and Haaf, 2002). However, as the weighting scheme of the indices determines its sensitivity towards changes at the tail-end of the firm size distribution, it is important to specify w_i accurately. In this respect, Marfels (1971) distinguishes four ways of weighing:

- Share of K dominant firm is weighted as unity and otherwise, zero (i.e. w_i =1 for $i \le k$ and $w_i = 0$ for $i > k$).
- firms' market shares are used as their own weights $w_i = s_i$. So, the larger the markets share would mean the greater weights attached.
- Ranking firms in ascending or descending order and then using the rank of the individual firms as weights (i.e. $w_i = i$).
- Using the negative of each firm's market share logarithm as the weight(i i.e. $w_i = -\log s_i$). In this regard, a smaller absolute weight is thus attached to larger market shares.

Considering (1) and what mentioned about the methods of weighting, there are different concentration indices represented in table (1).

The Concentration of Iran Insurance Industry

Iranian Insurance companies will be active in 15 lines that in this study were divided into six groups as follows: Fire (F), cargo (C), auto (A), third party (T), personal (including life and health) (P) and other insurance lines (including energy, accident, engineering, liability, credit, currency, aircraft, ships and other insurance lines) (O).

Herfindahl-Hirschman Index used to calculate the the degree of concentration which is relatively comprehensive to other indicators. The computational results of the HHI are given in Table 2.

Table 2: Herfindahl-Hirschman Index by insurance groups in Iran insurance industry

YEAR	F	C	A	T	P	O	INDUSTRY(I)
2002	39%	36%	35%	45%	42%	48%	40%
2003	39%	32%	30%	42%	36%	36%	36%
2004	32%	29%	30%	40%	33%	33%	34%
2005	30%	22%	33%	38%	32%	30%	33%
2006	29%	26%	31%	32%	34%	31%	31%
2007	29%	18%	27%	30%	25%	25%	27%
2008	24%	21%	25%	30%	23%	25%	26%
2009	26%	18%	26%	28%	19%	24%	24%
2010	30%	13%	29%	26%	26%	21%	25%
2011	27%	25%	28%	28%	25%	20%	24%
2012	23%	10%	24%	25%	23%	20%	24%
2013	22%	13%	24%	24%	22%	20%	23%

HHI results indicate that the degree of concentration in all insurance groups in 2013 decreased compared with 2002, which represents an increase of the competitiveness in Iran insurance industry at the time. The entry of private insurance companies in the country lead to HHI have suddenly declined In 2003 and 2004 compared to 2002, But then the insurance industry with a moderate growth has moved to the decline of concentration.

Welfare Costs

In many cases, to estimate of welfare cost in an industry with structure of monopoly or non competitive assumed that inputs are used as effectively competitive markets. At this time, the welfare cost caused by the monopoly is the area of the triangle ABC in Figure 1.

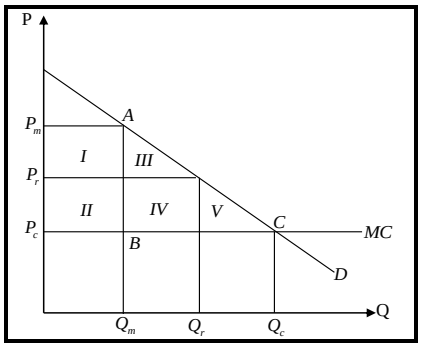

Figure 1: Price gap in terms of competitive and monopoly and welfare triangle

There are many differences in the calculation of this triangle, some like Harberger it just considered to deviate from competitive production, and assume the welfare cost is the area of the ABC triangle. Others, such as Cowling & Muller addition to deviate from competitive production, consider the cost that monopoly imposes on society, in the calculations of welfare cost. Therefore in addition to ABC triangle, advertising costs by monopoly is also into account. Others, like Posner and Tullock assumed that transfer of interests between producers and consumers and the adverse effects caused Enforcement of regulation into account.

According to the Figure 1. Harberger (1954) was used to calculate the welfare cost of equation 2:

$$S_j(ABC) = \frac{1}{2} d\,p_j d\,q_j \qquad \Rightarrow S_j = \frac{1}{2} p_j\, q_j\, \eta_j t_j^2$$
$$that \;\; t_j = dp_j / p_j \quad \& \quad \eta_j = \frac{p_j dq_j}{q_j dp_j} \tag{2}$$

That η_j is price elasticity. In this paper used of harberger approach for calculating welfare cost in Iran insurance industry in the period 2002-2013. According to Equation 2, the first step in calculating welfare costs in the insurance industry to calculate the price elasticity of insurance products. For this purpose the demand for insurance products will be estimated.

Estimating of Demand Function for Insurance Lines

Given that in this study, Iran insurance industry is divided into six lines or group, to estimate the demand function used systematic approach. So that used of Almost Ideal Demand System (AIDS) for Estimating of demand function in insurance lines. Algebraic AIDS Form based on equation 3.

$$V_i = \alpha_i + \sum_{j=1}^{n} \gamma_{ij} \ln P_j + \beta_i \ln\left(\frac{M}{P}\right) \qquad , \quad i,j = 1,2,\dots,n \tag{3}$$

N is the number of lines insurance, V_i is their contribution, P_j is price index of insurance line, M is the total premium and & P is Stone index.

In this paper that we have six insurance lines or group the Stone index (or P) is calculate as:

$$\ln P = \sum_{j=1}^{6} V_j \ln P_j \tag{4}$$

In the Almost Ideal Demand System, because of the relationship between disturbance terms in the equations, classical assumptions are violated and therefore the method of seemingly unrelated regression (SUR) used for estimating (Ebrishemi. 2009).

In the Almost Ideal Demand System, price elasticity of demand, are calculated as follows:

$$\varepsilon_{ii} = -1 + \frac{\gamma_{ii}}{V_i} - \beta_i \quad , i = 1,2\dots 6 \tag{5}$$

In order to increase the level of significance, the period 1981-2013 has been chosen. For estimating used of seemingly unrelated regression (SUR) and constraints of symmetry and homogeneity and adding-up composed to the model.

According to model, the price elasticity of demand by six insurance lines is showen in table 3.

Demand for personal, cargo and other elastic and for auto, third party and fire is relatively inelastic, although price elasticity for fire and auto insurance is near one.

Table 3: The price elasticity of demand by insurance lines

Insurance line	F	C	A	T	P	O
price elasticity	-0.9	-1.0	-0.9	-0.7	-1.1	-1.1

The results from stationary of disturbance terms in the table 4 are summarized. According to the pesaran & shin test, the null hypothesis of a unit root of disturbance terms, to be rejected.

Table 4: The results from stationary of disturbance terms

	prob	Statistic
Im, pesaran and shin w-test	0.04	-1.7

The Welfare Costs of Performance in Iran Insurance Lines

In this paper used of harberger approach for calculating welfare cost in Iran insurance industry in the period 2002-2013. In the equation 2 harberger for the calculation of t_j that represents the price distortions, Used to have the ratio of profit to sales. Because

$$t_j = dp_j / p_j = q\, dp_j / p_j\, q \cong \frac{\pi}{R} \quad (6)$$

That π is profit and R is sales. In this paper the premium is used instead R .

According to this explanation, the welfare costs of performance in Iran insurance lines as a proportion of the premium has been given in table 5. The result show that For total of insurance industry (I) and for all insurance lines or groups (except third party) the share of welfare costs have been decreasing over time.

Table 5: Welfare costs in the insurance industry by lines in terms of the share of premium

	F	C	A	T	P	O	INDUSTRY(I)
2002	28%	39%	14%	1%	15%	23%	13%
2003	26%	43%	13%	1%	17%	28%	14%
2004	24%	42%	13%	2%	5%	26%	11%
2005	25%	37%	7%	1%	4%	12%	7%
2006	27%	35%	4%	2%	12%	15%	9%
2007	31%	40%	7%	1%	12%	26%	10%
2008	18%	32%	10%	2%	8%	21%	8%
2009	25%	27%	9%	2%	5%	14%	6%
2010	25%	33%	6%	2%	5%	18%	7%
2011	27%	23%	5%	4%	3%	25%	8%
2012	18%	22%	7%	6%	4%	24%	8%
2013	18%	23%	6%	4%	2%	10%	5%

The Relationship between the Concentration and Welfare Costs in Iran Insurance Industry

The previous survey was found that the degree of concentration and relative welfare costs in the ira insurance industry decreased over time (2002 – 2013). Now the question that arises is that what is the relationship between welfare costs and degree of concentration in the insurance industry? To answer the question, was used the correlation coefficient.

The Results extracted from the correlation coefficient between the welfare costs of and Concentration indicator (Which measured with HHI) by insurance lines and the insurance industry was shown in the table 6.

Table 6: The correlation coefficient between the welfare costs of and HHI

	F	C	A	T	P	O	I
F	0.63						
C		0.66					
A			0.35				
T				-0.66			
P					0.67		
O						0.26	
I							0.82

In the table 6 character (I) represent insurance industry.
According to the results, the correlation coefficient between the degree of concentration and welfare costs for the insurance industry and entire insurance lines (other than third party line) is positive, which indicates that With the increasing number of insurance companies and reducing the concentration level, lost welfare costs dropped in Iran insurance industry.
The trend of third party line in table 5 and the correlation coefficient between the welfare costs of and HHI of that in table 6 is unusual with other insurance lines and total insurance industry. The reasons for this are:
1- third party line is Compulsory for owners of vehicles.
2- The third party premium based on tariff while in others lines the premium is non-tariff.
3- The high amount of loss in the third party because of fraud in this line is high.
4- Improving the quality of roads and highways in Iran.
5- Increase the quality of vehicle.
6- More efficient traffic monitoring tools.
7- use of advanced tools to monitor in transport, such as the installation of cameras in the streets and roads of the country's that the amount of damages road in third party in recent years reduced compared to previous periods.

Discussion and Conclusion

The insurance industry has not grown in Iran as potential so that the insurance indicators show this issue, index-like penetration, share of compulsory insurance and life insurance in portfolio of the Iran insurance industry. However since 2003 with the arrival of private insurance companies and the privatization of many former state-owned insurance companies, the structure of Iran insurance industry has changed.
One of the achievements of the arrival of private insurance companies in the insurance industry which was examined in this research, enhance the competitiveness or, in other words reduce the degree of concentration in the all of insurance lines. With increasing competition it is expected that prices close to marginal cost and consumers pay a lower price for purchasing the product. For this purpose this study proposed the concept of welfare costs and those are additional costs that should pay by consumers because of the lack of full competition for the product, because in competitive market prices paid by consumers is equal to the marginal cost of production.
All of Iran insurance industry lines were classified into six lines or groups in the study that include: Fire (F), cargo (C), auto (A), third party (T), personal (P) and other (o). In the all of them and in total Iran insurance industry the degree of concentration which measured by Herfindahl-Hirschman Index (HHI) declined from 2002 to 2013 and has become more competitive Iran insurance environment.
The proportion of welfare cost in total insurance industry and in five lines decline over time, which indicates as a result of enhance the competitiveness in the insurance industry welfare cost has declined.

REFERENCES

Abrishami Hamid (2010). *Fundamentals of Econometrics*, sixth edition (Tehran University Press).
Alston JM *et al.*, (1994). Estimating Elasticitys With the Linear Approximate Almost Ideal Demand System: Some Monte Carlo Results. *The Review of Economics and Statistics* **76**.

Bikker JAK Haaf (2002). Competition and Concentration and Their Relationship: An Empirical Analysis of the Banking Industry. *Journal of Banking & Finance* **26** 2191-2214.
Harberger AC (1654). Monopoly and Resource Allocation. *American Economic Review* 11–91.
Insurance Industry Statistical Yearbook (1999-2013). The Central Insurance of I.R.I.
Marfels C (1971), "A Guide to the Literature on the Measures of Industrial Concentration in the Post–war Period. *Zeitschrift fur Nationalokonomie* **31** 483-505.
Seelanatha L (2010). Market Structure, Efficiency and Performance of Banking Industry in Sri Lanka. *Banks and Bank Systems* **5**(1).
Stiglitz Joseph E (1663). *Principles of Economics,* 1st edition (Norton Pub.).
Tash Mohammad Nabi and Fiozi Nesim (2009). Estimate the welfare cost effective monopoly in the insurance industry of Iran. *Iranian Economic Research* **38** 133-155.
Tullock G (1967). The Welfare Costs of Tarrifs, Monopolies, and Theft. *Western Economic Journal* **5** 224-32.