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THE EFFECT OF ICT ON INSURANCE INDUSTRY IN SELECTED COUNTRIES

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ABSTRACT

The main purpose of this paper is to examine theoretical relationship between the level of ICT impact on insurance industry in selected average income countries[1] by using panel data for the period 2002-2010. The results of estimation by fixed effects panel and GMM method indicated that the effect of the number of mobile users (per hundred people) as an ICT index on insurance and financial services (% of commercial service exports) as an insurance industry index is positive and significant. In the other word, with the improvement and development of information and communication technology, the insurance industry is also faced with the development and prosperity and vice versa in the absence of information and communication technology boom of the insurance industry will be reduced. Accordingly the usage of ICT in insurance industry will cause increased production capacity, specialization of activities and improvement in the speed and quality of services. In general perspective, electronic insurance provides customers' access to insurance services by using safe intermediates and without physical present.

[1] Group of selected countries: Costa Rica, Ukraine, India, Romania, Peru, Colombia, Paraguay, Iran, Dominican, Turkey, Azerbaijan, Mexico, Pakistan, Malaysia, El Salvador, Uruguay, Thailand, Brazil and Argentina

JEL CLASSIFICATION & KEYWORDS

■ G22 ■ C33 ■ ICT ■ INSURANCE ■ FIXED EFFECT METHOD ■ GMM

INTRODUCTION

Insurance industry is an important part of the economy and a supporting system of financial markets. The funds appropriated from the sales of various insurance policies, leads to economic prosperity, creating employment & long-term and profitable investments. On the other hand, insurance industry by compensating losses due to adverse events and providing insurance coverage against various risks/claims supports all sectors of the economy. Thus, it provides the security and safety of the community and its people (Rekovska, 2001). In recent years, usage of information and communication technology as a centerpiece of global developments is undeniable and causes to expedite things done. Nowadays, in any business, such as e-banking, e-learning and e-insurance we can find the signs of IT and Internet as a key tool, make it possible to use effective and efficient utilization of information within the organization.

An important application of information and communication technology, the use of these technologies for re-engineering: the architecture of the insurance industry, increasing the speed of access to information, greater efficiency and better service to the customer. The ICT has developed an electronic insurance. Other major usage of ICT is in the service sectors such as banking, insurance, marketing, trade, education and tourism cause a lot of advantages for them. Applying information and communication technology in the insurance industry for rapid access of information and use it for decision making and planning is essential. So, a lot of developing countries are trying to code and implement electronic insurance projects, adapt to the realities of the new environment and benefit from its advantages. In fact, if the insurance plan is designed and implemented so efficiently and purposefully, the public and private sectors of insurance industry have profound institutional reforms. Insurance services are sensitive to information, which means that the flow of information between different parts of customers and insurance companies is necessary.

ICT is emerging as a phenomenon with its own attractions and has an important role in insurance market. Development of e-trade makes insurers more than product orientation to customer orientation. Since search costs for policy holders is less, Transparency in pricing, products quality and insurance services increases. In this regard, the main purpose of this article has examined the effect of ICT on Insurance industry in selected average income countries. For the following hypothesis test, the fixed effect panel and generalized method of moments (GMM) has been adopted.

- The number of mobile users (per hundred people) as an ICT index on insurance and financial services (% of commercial service exports) as an insurance industry index is positive and significant.

Once, the theoretical basis and history of the report are discussed, the Model adopted is estimated by E-Views 6 and finally, Suggested political policy will be introduced.

Electronic insurance results of development in ICT. The usage of ICT in insurance industry increases production capacity, specialization of activities and improves speed and quality of services. In general perspective, electronic insurance provides customers access to insurance services by using safe intermediates and without physical presence. According to another definition, e-insurance is application of information technology and redesigning business procedure in order to provide optimal insurance services and facilitating inter-action between people and insurance industry.

E-insurance is divided into two areas. The first area offers the electronic services in a way that removes the barriers of traditional methods and replaces them with easy access methods. The second area involves the simplification and improvement of business process and insurance operation in a way that reduces the operational needs and expectations of insurance industry. The Internet provides an opportunity for insurance companies, recently entered this market to avoid costly and lengthy process of traditional sales network. It should be noted that the sale of insurance

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products via the Internet- especially for complex insurance products with high value that need some advices and information- is inappropriate (Diblller, 2002).

The history of insurance industry shows that, in the past, brokers and agents contacted insurers and this sales network was expensive for newcomer insurer companies. Nowadays, the internet has made it possible for new insurance companies to achieve low cost insurance market. Furthermore, internet increases market transparency, ease of access to information about kind and price of insurance services on the internet (Adams, 2005).

The close relationship between ICT and insurance industry due to the widespread use of ICT globally, are due to the following reasons:

- Increased speed and quality of insurance services to policy holders of insurance companies.
- Increased speed and accuracy of data entry for policy holders and insurers for better and faster insurance services.
- Processing of recorded information, in order to reduce human errors and increase the speed of decision-making.
- Reduce fraud and disadvantages of phony and illegal services.
- Increase the ability of insurance companies to establish contacts with international insurers to use global knowledge and expertise.
- The emergence of new risks with new insurance requirements.
- Updates Insurance mechanized system on the latest hardware and software.
- Elimination of lengthy and costly process of issuing insurance policies, call center and Increases accuracy in insurance activities.
- Speed up the process of issuing insurance policies and pay damages " compensation".

Literature Review

There are many empirical studies which focus on relationship between financial development and economic growth. In the literature these studies are, mostly about the relationship between stock market and economic growth or the relationship between banking sector and economic growth. On the other hand, studies are scarce about analysis of the relationship between insurance sector and economic growth.

Due to this reason, the aim of the paper of Ilhan & Bahadir (2011) is testing the role of insurance in economic growth. Twenty-nine countries' data in the period: 1999 - 2008 are used. As a result it is established that, the insurance sector and the economic growth are positively inter- related.

Haiss & Sumeji (2007) have investigated both the impact of insurance investment and premiums on GDP growth in Europe and conducted a cross-country panel data analysis from 1992 to 2005 for 29 European countries. They found a positive impact of life insurance on GDP growth in 15 EU countries, among which were Switzerland, Norway and Iceland. For the New EU Member States from Central and Eastern Europe, they found a larger impact for liability insurance. Furthermore their findings emphasized the impact of the real interest rate and the level of the economic development on the insurance-growth nexus. They argued that the insurance sector needed to be paid more attention in financial sector analysis and macroeconomics policy.

The paper by Han, li, Moshirian, & Tian (2010) investigates the relationship between insurance development and economic growth by employing GMM models on a dynamic panel data set of 77 economies for the period 1994–2005. Insurance density is used to measure the development of insurance. Controlled by a simple conditioning information set and policy information set, we can draw a conclusion that insurance development is positively co-related with economic growth. The sample is then divided into developed and developing economies. For the developing economies, the overall insurance development, life insurance and non-life insurance development play a much more important role than they do for the developed economies.

Kugler & Ofoghi (2005) examine long run relationship between insurance market size and economic growth in United Kingdom for the period from 1966 to 2003 for long-term insurance, and from the period 1971 to 2003 for general insurance (from 1991 to 1997 for marine aviation transport insurance and reinsurance). In comparison to Ward and Zurbruegg, who used aggregated variable in their estimation (total written premium) due to possibility of co-integration. They used disaggregated data for the measure of market size. Namely, net written premium for each market in insurance industry, for the United Kingdom is used as a measure of market size for that market. The market is divided into long-term insurance market, that includes life insurance, annuities, individual pensions and other pensions, and general business insurance market including motor, accident and health, liability, property, pecuniary loss, marine aviation and transport insurance and reinsurance. Using Johansen's co-integration test the authors found a long relationship between development in insurance market size and economic growth for all components of insurance market. Causality in short run exists from life, life and pecuniary loss insurance to economic growth. There is evidence of bi-directional causal relationship in the long run between economic growth and insurance market size for the three insurance categories, with more powerful causality running from economic growth to insurance development than causality from the other direction.

Rasoolian, Fathnejad, & Nadeali (2009) in a study entitled The Role of Communication and information technology on development of Electronic Insurance describes the insurance industry is dependent on information. The study sample of community consisted managers and IT experts. The results show that all the indexes have a great impact on development of electronic insurance.

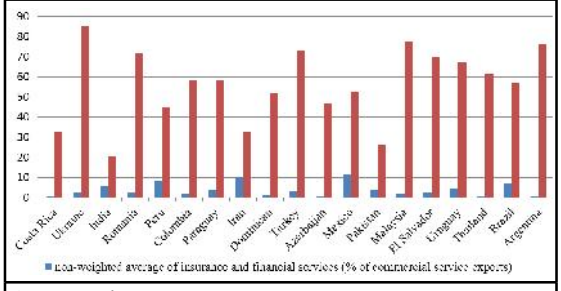
Jafari Samimi & Kardgr (2006) in an article entitled Insurance Development and Economic Growth: A Theoretical and Empirical Analysis of the Iranian economy during 1953-2006 causal relationship between insurance development and economic growth in the economy from an empirical perspective. To determine the model of causality tests and error correction models and co integration of variables in the model is used. Experimental results of this study shows causal relationship from economic growth to verify insurance and life insurance.

Salatin & Eslambolchi (2013) investigated the impact of political developments (civil liberties index and political rights index) on tax revenues index in some selected countries of Middle East for the period of 1990-2010. Results of hypothesis testing with generalized method of moments (GMM) in selected countries of Middle East between 1990 and 2010 indicated that Political development had significant effect on tax revenue.

Analysis of the Trend Variables

In following, the trend of insurance and financial services (% of commercial service exports) as an insurance industry index and the number of mobile users (per hundred people) as an ICT index in selected countries. These data are derived from WDI in selected average income countries from 2002-2010.

Figure 1: Analysis the trend of non-weighted average of insurance and financial services (% of commercial service exports) as an insurance industry index and non-weighted average of the number of mobile users (per hundred people) as an ICT index in selected average income countries. (2002-2010)



Source: Authors

According to Figure 1 in the selected average income countries Mexico, Iran and Peru have the best and Azerbaijan has the worst indexes in non-weighted average of insurance and financial services (% of commercial service exports) as an insurance industry index for the period: 2002-2010.

Furthermore, in selected average income countries Ukraine, Malaysia and Argentina have the best and India has the worst indexes in non-weighted average of the number of mobile users (per hundred people) as an ICT index for the period: 2002-2010.

Introducing the model

The present research is based on the studies by Haiss & Sumeji (2007) and Han et al. (2010). This was also with consideration of different variables' effect, utilizing the following formula:

$$Insurance_{i,t} = \beta_0 + \beta_1(Mobile_{i,t}) + \beta_2\ (Unemployment_{i,t}) + \beta_3\ (Populationgrowth_{i,t}) + \beta_4\ (Inf_{i,t}) + U_{i,t} \quad (1)$$

$$Insurance_{i,t} = \beta_0 + \beta_1(Insurance_{i,t-1}) + \beta_2\ (Mobile_{i,t}) + \beta_3\ (Unemployment_{i,t}) + \beta_4\ (Populationgrowth_{i,t}) + \beta_4\ (Inf_{I,t}) + U_{i,t} \quad (2)$$

In These formulas:

Insurance: The insurance and financial services (% of commercial service exports) as an insurance industry index;

Mobile: the number of mobile users (per hundred people) as an ICT index;

Unemployment: the annual net rate of Unemployment;

Population growth: The annual net Rate of Population growth;

Inf: The annual net rate of inflation;

U: Error Term;

i,t: Country and Time.

In this study, before estimating the model, panel's unit root test has been utilized to investigate stationary or non-stationary variables. The results are demonstrated in table 1. Table 1 shows, according to Levin, Lin and Chu statistics, Insurance Index, Mobile Index, The annual net Rate of Unemployment, the annual net rate of population growth and The annual net rate of inflation, are stationary in level. Therefore, null hypothesis of existence of unit root is rejected. As a result, stationary of data related to the selected average income countries, will be confirmed prior to the analysis of the research model.

Table 1: Analysis the stationary or non-stationary of variables in selected average income countries

Regression	Levin, Lin & Chu (P Value)	Results
INF	0.0003	I_0
POPULATIONGROWTH	0	I_0
UNEMPLOYMENT	0.0045	I_0
MOBILE	0.0001	I_0
INSURANCE	0	I_0

Source: Authors

Furthermore, According to Table 2 and 3 results of the co-integration test of Equation 1 and Equation 2, also shows that there is a long term relation between the variables used in formulas.

Table 2: The results of co-integration test of Equation 1

Regression	t-Statistic	(P-value)
Kao Test	-2.8291	0.0023

Source: Authors

Table 3: The results of co-integration test of Equation 2

Regression	t-Statistic	(P-value)
Kao Test	-2.4553	0.0070

Source: Authors

In order to estimate Equation 1 it is necessary to study the static panel estimation method for a particular type of data in combined - sectional setting. At first, F-statistics were used separately for each of the countries to determine the presence (or absence) of interception. According to Table 4, F-statistics were calculated to test the null hypothesis rejection using ordinary least squares and have a different

Table 4: Results of estimating the Effect of the number of mobile users (per hundred people) as an ICT index on insurance and financial services (% of commercial service exports) as an insurance industry index with fixed effects method in selected average income countries (2002-2010)

Dependent Variable: Insurance and Financial services (% of commercial service exports)	
Variables	**Coefficients (T statistic)**
C	1.00 (1.8555)
MOBILE	0.0071 (1.8735)
UNEMPLOYMENT	0.1124 (2.0388)
POPULATIONGROWTH	0.1601 (0.3749)
INF	-0.0107) (-0.9800)
R^2	0.92
F statistics	F (18.94)= 58,64 P-value= [0.0000]
Hausman Statistic	CHISQ(4)= 11.1130 P-value= [0.0253]

Source: Authors

intercept (fixed or random effects method) in terms of the model. Then, we used Hausman test to use the fixed effects or random-effects method of estimation. According to the statistics χ^2 obtained from the calculation of the regression in Table 4, Null hypothesis of random effects method of estimation is rejected with a probability of 99 percent.

To continue, estimate of the Equation 2 in the selected average income countries, with fixed effects panel and "GMM" – generalized method of moments - was used along with relying on the dynamic panel test. "GMM" method has been used in recent macroeconomics and financial studies. It, has a lot of advantages, for instance, researchers such as Beck, Levine & loayza (2000), have used this method to eliminate the time series data variations and have found that very useful. GMM estimator is calculated individual specific effects in the model by entering a relevant delayed variable as an explanatory variable. It allows a better control on endogenous of the explanatory variables. Table 5 shows the results of estimation.

Table 5: Results of estimating the Effect of the number of mobile users (per hundred people) as an ICT index on insurance and financial services (% of commercial service exports) as an insurance industry index with GMM method in selected average income countries (2002-2010)

Dependent Variable: Insurance and Financial Services (% of commercial service exports)	
Variables	**Coefficients (T statistic)**
INSURANCE -1	0.2121 (4.4802)
MOBILE	0.0060 (4.1000)
UNEMPLOYMENT	0.0721 (3.1539)
POPULATIONGROWTH	0.0223 (0.8026)
INF	-0.0231 (-7.0084)
J-Statistic	43.38

Source: Authors

The results of static model with regional fixed effects and dynamic regression with generalized moment model (GMM) in Tables 4 and 5 indicate that:

- The relationship between lagged variable of insurance and financial services index (% of commercial service exports) and insurance and financial services index (% of commercial service exports) in dynamic regression is positive and significant.
- The correlation between the number of mobile users (per hundred people) as an ICT index and insurance and financial services (% of commercial service exports) as an insurance industry index in both fixed affects and dynamic regressions in selected average income countries, are positive and significant. Therefore, with the improvement and development of information and communication technology, the insurance industry is also faced with the development and prosperity and vice versa in the absence of information and communication technology boom of the insurance industry will be reduced. Accordingly the usage of ICT in insurance industry will cause increased production capacity, specialization of activities and improvement in the speed and quality of services. In general perspective, electronic insurance provides customers' access to insurance services by using safe intermediates and without physical present. According to another definition, e-insurance increases application of information technology and redesign business process in order to provide optimal insurance services and facilitating interaction between people and insurance industry. However, in the absence of such a system, the performance of the industry and the challenges face serious obstacles due to inefficient bureaucracy, the boom will decrease.
- The annual unemployment rate has a positive and significant relationship with insurance and financial services (% of commercial service exports) as an index of insurance industry in selected middle- income countries, in both dynamic and static estimation. Therefore, with rising unemployment, especially about unemployment insurance, the insurance industry has developed. Unemployment insurance enhances welfare of unemployed. Because the ability of" consumption" for people who have lost their jobs will be saved. While avoiding a decline in demand of goods and services, and preventing more workers to join the unemployed army. Thus, extending unemployment benefits will increase the tendency to arrange for unemployment insurance policies.
- The relationship between annual rate of population growth and insurance and financial services (% of commercial service exports) as an index of insurance industry in selected muddle income countries, in dynamic estimation is positive and significant. In other words, increasing population and active population and thus more labor force, leads to more applicants of insurance market beside other markets.
- The correlation between the annual inflation rate and insurance and financial services (% of commercial service exports) as an index of insurance industry in selected average income countries, in dynamic estimation is negative and significant. As inflation rises, the values of money and peoples' purchasing power have declined. Therefore, demand of insurance market along with other financial markets will reduce.
- Statistics of "Sargan Test" indicates that: Distribution of equal degrees of freedom to excessive restrictions, causes the null hypothesis, "which states that, residuals are correlated with instrumental variable", to be rejected. According to the results of this test, the instrumental variables used in estimation of the models are reliable, thus, the authenticity of the end results are verified for analysis and definition.

Conclusion

Results of estimating the Effect of the number of mobile users (per hundred people) as an ICT index on insurance and financial services (% of commercial service exports) as an insurance industry index with fixed effects estimation and GMM method in selected average income countries in 1998-2010 shows that:

The hypothesis about positive and significant correlation between the number of mobile users (per hundred people) as an ICT index and insurance and financial services (% of commercial service exports) as an insurance industry index is acceptable.

This research concludes that Electronic insurance leads to developments in ICT. The usage of ICT in insurance industry increases production capacity, specialization of activities and improves speed and quality of services. In general

perspective, electronic insurance provides customers access to insurance services by using safe intermediates and without physical presents. According to another definition, e-insurance is application of information technology and redesign business process in order to provide optimal insurance services and facilitating interaction between people and insurance industry.

The following suggestions are in that effect:

- By E-insurance, insurance companies provide the opportunity for policyholders to complete an insurance policy through the website and negotiate the terms on it and make it possible to pay premium via credit cards and internet.
- Claims of damage Via Web site and E-mail and electronic forms, and Physical forms are replaced. Also it is recommended that insurance companies to compensate the damages via electronic payment system.
- Providing the fields for public access to the internet.
- Dispatch of Insurance companies' manager to the worlds' leading electronics insurance conferences.
- Attracting sufficient expertise of ICT and E-insurance in insurance industry
- Performing training programs for the human resources in the field of computers, internet and e-insurance/commerce.
- Revise and expand rules/regulations for the easy/comfortable receipt of unemployment insurance benefits.

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