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Insurance Premium and Economic Growth: Evidence from OECD Countries

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ABSTRACT

In this study that covers 1983-2011 periods, per capita insurance premiums and per capita real GDP relationship was investigated for 13 OECD countries (USA, Germany, Australia, Belgium, Finland, France, Holland, Spain, Switzerland, Italy, Iceland, Japan and Norway). Stationarity of series are determined with linear Levin, Lin and Chu (2002), Im, Pesaran & Shin (2003) and Maddala-Wu (1999), non-linear Uçar & Omay (2009) panel unit root tests. In the paper in which the Emirmahmutoğlu & Köse (EK) panel causality test (2011) was used, least one panel causality was determined from insurance premiums to GDP. Sequential panel selection method which was developed by Chortareas and Kapetanios (2009) was used and this causality occurred for respectively France, Iceland, Italy and Spain and there was no findings observed for the other countries. The findings of this study have an important place for insurance sector in economy and it also supports the findings obtained in literature.

Keywords: Insurance, Economic Growth, OECD Countries, Panel Unit Root Test, Panel Causality Test.

Jel Codes: G22, O16, C33

Sigorta Primi ve Ekonomik Büyüme Arasındaki İlişki: OECD Ülkeleri Üzerine Bir Araştırma

ÖZET

1983-2011 dönemlerini ele alan bu çalışmada 13 OECD ülkesi (ABD,Almanya,Avustralya, Belçika, Finlandiya, Fransa, Hollanda, İspanya, İsviçre, İtalya, İzlanda, Japonya, Norveç)) için kişi başına sigorta primleri ile kişi başına GSYİH arasındaki ilişki araştırılmıştır. Serilerin durağanlık mertebeleri doğrusal Levin, Lin & Chu (2002) Im, Pesaran & Shin (2003) ve

Maddala-Wu (1999); doğrusal olmayan Uçar & Omay (2009) panel birim kök testleriyle belirlenmiştir. Emirmahmutoğlu & Köse panel nedensellik testi (2011)'nin kullanıldığı çalışmada sigorta primlerinden GSYİH'ya doğru en az bir panel nedenselliğin olduğu saptanmıştır. Chortareas and Kapetanios (2009)'un geliştirdiği Ardışık Panel Seçim Method'u kullanılarak bu nedenselliğin sırasıyla Fransa, İzlanda, İtalya ve İspanya için gerçekleştiği, diğer ülkeler içinse herhangi bir bulguya rastlanmadığı görülmüştür. Çalışmamızın bulguları sigorta sektörünün ekonomi içerisinde önemli bir yere sahip olduğunu göstermekte ve literatürde yapılmış çalışmaları destekler niteliktedir.

Anahtar Kelimeler: Sigorta, Ekonomik Bügüme, OECD Ülkeleri, Panel Birim Kök Test, Panel Nedensellik Testi

Jel Kodları: G22, O16, C33

I. INTRODUCTION

With rapidly globalizing world, changing the life of the individuals in the last century and increasing earnings in parallel to this, it has led to an increase in the motives of the individuals and their property protection. This situation has increased the share of insurance in the financial sector (Outreville, 1990; Lee and Chiu, 2012; Horng et. al., 2012; Lee et. al, 2013; Chang et.al 2013; Akinlo, 2013). Such that, it increased 7.5 times in life insurance premium production in the world and 3.9 times in non-life insurance during 1985-2007 periods (Lee, 2012; Chang et. al. 2013). According to Arena (2008), the premium production between 1997 and 2004 has increased up to 82%. The insurance sector in developing countries has grown more rapidly when compared to developed countries. Figure 1 shows global real direct premium growth between 1980 to 2015 in the world.

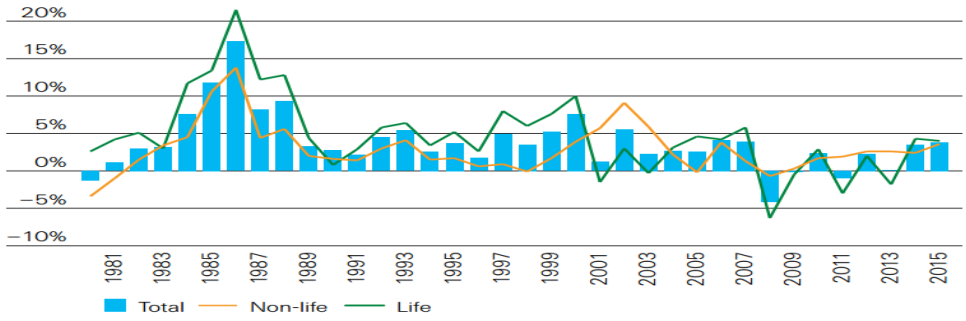

Figure 1. Global Real Direct Premium Growth, 1980-2015Source: Swiss Re Economic Research&Consulting

The relationship between economic growth and financial growth was investigated by several studies in the literature (Arestis and Demetriades, 1997; Levine and Zervos, 1998; Khan and Senhadji, 2000; Ward and Zurbruegg, 2002; Merton, 2004; Beale et al.2004; Giannetti et al. 2002; Rousseau and Wachtel, 1998, 2005; Fink et.al., 2005; Ying-jun and Ye-ting, 2008; De Fiore and Uhlig, 2011; Zhengtang, 2011; Chang and Lee, 2012; Outreville, 2013). According to the idea expressed for the first time in United Nations Trade and Development Conference in 1964, national insurance and reinsurance market is a characteristic feature of economic growth (Outreville, 1990; Kugler and Ofoghi, 2005). Insurance sector is not an economic unit that only offers insurance against the risk of people and organizations to face and it also helps to macro-economic data to bring employment and foreign exchange (Outreville, 1996).

A classical theory about economic growth is based on the idea that is about the economy needs to be developed as technological, otherwise it cannot grow (Nejad and Kermani, 2012; Horng et. al., 2012). More recently an alternative theory occurred; a development and growth in a sector may affect other sectors in the economy. That's why, so many governments invest in bank and insurance sector and prefer the way to affect other sectors in the economy in a positive way (Hussel and Zurbuegg, 2005; Heiss and Sümegi, 2008; Horng et. al., 2012).

In this context, the insurance sector that grows rapidly and that has a characteristic feature of economic growth has emerged as a subject of an academic research. Several studies made by panel data analyses and time series has tested hypothesizes that was about the insurance sector affects the economic growth. A research of academic studies that examines the relationship between insurance premiums and GDP will be made in this study and then it will be tested whether there is a causality relationship between these two variables or not.

II. LITERATURE REVIEW

Outreville (1990) examined 55 developing countries in his study and reached the finding about insurance market's importance was low in economy. Ward and Zurbruegg (2000) studied the 1961-1996 periods of OECD countries, found the granger reason of economic growth of the insurance sector for some countries but there was no situation for the other countries. Haiss and Sümegi (2008) studied 15 countries that are the members of European Union and found that the insurance premiums had a positive impact on GDP for Switzerland, Norway and Iceland.

Boon (2005) studied Singapore market and coincided a unidirectional causality from insurance to GDP. Nejad and Kermani (2012) studied Iranian market and coincided a unidirectional causality from the development of insurance sector to economic growth. Both Richard and Victor (2013) and Akinlo (2013) studied Nigerian markets that support these findings and they found that insurance premiums were a granger cause of GDP. This situation indicates that insurance is an important factor for economic development in both countries. Vadlamannati (2008) studied Indian markets in a similar manner and found that development and reforms in the insurance sector had a non-strong but positive effect on economic growth. Kugler and Ofoghi (2005) studied United Kingdom's market and found a causality relationship between insurance premiums and GDP. Adams et. al. (2009) studied Swedish market and did not found any causality relationship.

Arena (2008) used generalized method of movements (GMM) in the study and studied 28-year period between 1976 and 2004 and found that both life insurances and non-life insurances had positive strong impact on economic growth. Avram et. al. (2010) that studied 93 countries using GMM reached similar findings. Han, Li, Moshirian and Tian (2010) used GMM dynamic panel estimations and found that non-life insurance impact on economic growth was higher when compared to life insurance.

Lee (2011) examined intercommunion between insurance enterprises and economic growth for 10 OECD countries in 27-years (1976-2006) period. In his study, he used heterogeneous panel cointegration test. He found insurance enterprises and economic growth present both the long-run and short-run bidirectional causalities at OECD countries. Lee and Chiu (2012) used panel smooth transition regression model and examined the effect of real income on insurance premiums in 28-years period belong to 36 countries. As a result of the study, it was found that the effect of real income on insurance premiums was stronger. Lee et. al. (2013) panel seemingly unrelated regressions augmented Dickey-Fuller (SURADF) used Pedroni panel cointegration and panel granger causality tests and found unidirectional causality from insurance premiums to real GDP both in short and long terms.

Chang et. al. (2013) used bootstrap panel granger causality test and identified different test results according to the countries. The causality was found one-way from insurance markets to the globalization in Japan, there was bi-directional causality in India, South Korea and Thailand and there was no causality relationship in Malaysia, Indonesia, Philippines and Singapore. Moreover, Chang et. al. (2013) examined 10 OECD countries

and they found different results from each other in their studies. While the causality from all insurance activities to economic growth is found for France, Japan, Netherlands, Switzerland and UK, this relation is bi-directional for America. There was no causality finding for Belgium, Canada, Italy and Sweden.

III. ECONOMETRIC METHODOLOGY

Emirmahmutoğlu & Köse panel causality test (2011) (EK) can be expressed as an extended version for the panel of the causality test of Toda Yamamoto (1995). While some regulations are made for ADF (1979) unit root test's probability values in the panel unit root test of Maddala-Wu (MW) (Gürsoy and Yılancı, 2013), the same regulations are made for the probability values that have been obtained from Toda Yamamoto (1995) test in EK panel causality test. At the first stage, the following estimated model is made:

$$y_{i,t} = \mu_i + A_{i1}y_{i,t-1} + \ldots + A_{ik}y_{i-k_1} + \sum_{j=k_i+1}^{k_i+dmax_i} A_{ij}y_{i,t-j} + e_{i,t}$$

$i = 1,2,\ldots..,N$

$t = 1,2,\ldots...,T$

Here "i" shows the cross-sectional units while "t" expresses the time period. In addition, the bootstrap simulation methodology to Granger causality test for cross-sectional dependent panels is used. The optimal lag length is obtained by using information criteria. While the basic hypothesis shows that there is no causal relationship in the panel, alternative hypothesis shows that there is a granger causality relation between at least one of the series. The test statistic is calculated as follows:

$$\lambda = -2\sum_{i=1}^{N} \ln(p_i)$$

For $i = 1,2,\ldots..,N$

This test also shows suitability to the chi-square distribution and critical values are determined by bootstrap simulation method.

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III. DATA AND EMPIRICAL FINDINGS

The data of our study consists of annual premium per person during 1983-2011 of 13 OECD countries (USA, Germany, Australia, Belgium, Finland, France, Holland, Spain, Switzerland, Italy, Iceland, Japan and Norway) and real GDP figures. These data is derived from www.stats.oecd.org official OECD website. All the data were introduced to the analyses by obtaining their logarithmic transformations in order to avoid the problem of heteroscedasticity. While examining the relationship between insurance industry and macroeconomic variables of insurance premiums, it was supported by several studies that there was a variable (Arena, 2008; Chen et. al., 2012; Ward and Zurbruegg, 2000).

In our study, in order to determine stationaries of the series, linear panel unit root tests Levin, Lin & Chu (2002) (LLC) Im, Pesaran & Shin (2003) (IPS), Maddala-Wu (1999) (MW) and non-linear Uçar-Omay (2009) (UO) panel unit root tests were used.

Table 1. Results of Panel Unit Root Test

Insurance Premium	Statistic	Prob.	GDP	Statistic	Prob.
Levin, Lin & Chu	-4.22***	0.00	Levin, Lin & Chu	-0.69	0.24
Im, Pesaran & Shin	-5.15***	0.00	Im, Pesaran & Shin	-2.64***	0.00
Maddala-Wu	76.19***	0.00	Maddala-Wu	44.13**	0.02
Uçar & Omay	-2.80***	0.00	Uçar & Omay	-1.65**	0.02

*** indicate significance at the 1% level. ** indicate significance at the 5% level. * indicate at the 10% level.

While the insurance premium values appear stable at the level for all tests, GDP are at the level of 1% for IPS test, static at the level of 5% for MW and UO tests and non-stationary at the level for LLC test.

Per person real GDP figures give different results for different panel unit root tests. Therefore, instead of using the Dumitrescu & Hurlin panel causality (2012) test which is panel version of standard Granger causality test, Toda Yamamoto (1995) test panel's extension EK panel causality test (2011) is used. Because Toda Yamamoto (1995) causality both can test the causal relationship between the both series in different levels and also can prevent the loss of data by using difference forms. The same situation is valid for EK panel causality test (2011).

While applying the EK causality test, the bootstrap distribution of Fisher test statistics is derived from 10,000 replications and the optimal lag length is determined from Schwarz Bayesian criteria.

Table 2. Results of Emirmahmutoğlu & Köse Panel Causality Test

			Bootstrap Critical Values		
		Fisher test value	**%1**	**%5**	**%10**
GDP >>> INS		41.983	61.432	48.711	43.568
INS >>> GDP		50.103**	59.119	47.071	42.295
		GDP >>> INS		**INS >>> GDP**	
Countries	**K_i**	**W_i**	**P_i**	**W_i**	**P_i**
USA	1	0.997	0.318	0.162	0.687
Germany	1	0.000	0.997	0.111	0.740
Australia	1	2.168	0.141	0.505	0.477
Belgium	3	2.840	0.417	1.588	0.662
Finland	1	2.083	0.149	0.231	0.631
France	1	0.204	0.651	12.086	0.001***
Holland	4	11.313	0.023**	7.724	0.102
Spain	1	0.029	0.866	3.508	0.061**
Switzerland	1	0.074	0.786	0.014	0.904
Italy	3	12.768	0.005***	10.144	0.017**
Iceland	3	9.205	0.027**	12.008	0.007***
Japan	1	0.001	0.978	0.006	0.941
Norway	1	1.657	0.198	0.779	0.377

*** indicate significance at the 1% level. ** indicate significance at the 5% level. * indicate at the 10% level. Ki show optimal lag length.

According to the results of EK panel causality test (2011), there is a causality of at least one panel granger that is unidirectional from 5% level of insurance premiums to GDP. This situation supports the ideas that insurance sector found an important place in economy. Moreover, Chortareas and Kapetanios (2009) Sequential Panel Selection Method (SPSM) was used for this series. Firstly, France which has the highest wald statistic is removed from the panel and retest the remaining series of panel. This process continued until the null hypothesis was not declined. In this

context, it was found that this causality was valid respectively France, Iceland, Italy and Spain.

IV. CONCLUSION

In this study, searching the relationship between insurance premiums and real GDP, firstly stationary of series are determined by linear to Levin, Lin and Chu (2002), Im, Pesaran & Shin (2003) and Maddala-Wu (1999), non-linear Uçar & Omay (2009) panel unit root tests. Owing to panel unit root tests gave different results from each other, EK panel causality test (2011) that applies causality for panel data is used and the relationship between insurance premiums and real GDP was discussed. In this study where OECD countries were examined, the annual data between 1983 and 2011 were used as a data set. This causality was seen respectively France, Iceland, Italy and Spain by SPSM in this study where a unidirectional causality was seen from insurance premiums to GDP

In our study, it is supported generalized method of moments (GMM) was used by Arena (2008) and Avram et al. (2010) findings and there was a causality from insurance premiums to GDP. In addition, bootstrap panel causality test was used by Chang et. al. (2013) that was developed by Konya (2006) and there was a causality from insurance premiums to real GDP for France in the study made for OECD countries. Moreover Haiss and Sümegi (2008) found causality from insurance premiums to real GDP for Iceland that supported our findings. As can be seen, our empirical findings are similar to many studies in the literature.

The most important point of this paper is that it has an important role in macroeconomic structure of insurance sector. Because the relationship between finance and economic sectors was emphasized several times in the past studies. In this context, insurance sector that can be defined as a sub-branch of the finance has an impact on economic growth and that cannot be ignored.

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