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Insurance market penetration and economic growth in Eurozone countries: Time series evidence on causality

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Abstract

This paper examines the causal relationship between insurance market penetration and per capita economic growth in 19 Eurozone countries for the period 1980–2014. We use three different indicators of insurance market penetration (IMP), namely life insurance penetration, non-life insurance penetration, and total (both life and non-life) insurance penetration. We particularly emphasize on whether Granger causality exists between these variables both ways, one way, or not at all. Our empirical results perceive both unidirectional and bidirectional causality between IMP and per capita economic growth. However, these results are mostly non-uniform across the Eurozone countries during this selected period. The policy implication is that the economic policies should recognize the differences in the insurance market and per capita economic growth in order to maintain sustainable growth in the Eurozone.

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Keywords: IMP; Per capita economic growth; Granger causality; Eurozone countries

JEL codes: L96; O32; O33; O43

Introduction

In the previous years, both policy makers and academicians have increasingly paid attention to the linkage¹ between financial development and economic growth (Adeniyi, Oyinlola, Omisakin & Egwaikhide, 2015; Adu, Marbuah & Mensah, 2013; Ahmed, 2016; Beck, Levine & Loayza, 2000; Levine, 2003; Rault, Sova, Sova & Caporale, 2014; Samargandi, Fidrmuc & Ghosh, 2015; Zhang, Wang & Wang, 2012). Financial development is

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¹Pagano (1993) summarizes that financial development promotes economic growth via three paths: channel more savings to investment, raise marginal productivity of capital and encourage savings.

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commonly defined in terms of aggregate size of the financial sector, its sectorial composition, and a range of attributes of its individual sub-sectors that determine their effectiveness in meeting the various economic agents' requirements to enhance their wealth. Key financial institutions include the central bank, commercial banks, merchant banks, saving institutions, mortgage entities, pension funds, stock markets, and other financial market institutions (Zaman, Izhar, Khan & Ahmad, 2012). Consequently, financial development-growth linkage represents all activities undertaken by the above-mentioned financial institutions and their relationship with economic growth (see, *inter alia*, Ang, 2008; Demetriades and Hussein, 1996; Hassan, Sanchez & Yu, 2011; IMF, 2005; Levine, 1997; Peia and Roszbach, 2015; Thornton, 1994).

While there is extensive research on financial development-economic growth nexus (see, inter alia, Christopoulos and Tsionas, 2004; Levine, 2005; Levine, Loayza & Beck, 2000), the existing literature provides constricted coverage for the insurance market activities and its connotation with economic growth.² However in reality, like other financial services such as banks and stock markets, insurance market activities³ play a key role in economic growth (Outreville, 1996; Pradhan, Arvin & Norman, 2015). We provide the following justification to highlight the importance of insurance market activities towards the economic growth. First, through financial transfers and indemnification activities, insurance services foster and enhance the economic growth (see, inter alia, Ward & Zurbruegg, 2000); and second, life insurance products encourage long-term savings and the reinvestment of substantial funds in public and private sector projects (see, inter alia, Beck & Webb, 2003), which is again growth-enhancing. Furthermore, there are likely to be different effects on economic growth from life and non-life insurance markets given that the two types of insurance activities protect households and corporations from diverse kinds of risk. Precisely, life insurance companies encourage long-term investments over short-term investments as is the case for non-life insurance companies. Hence, life and non-life insurance activities affect economic growth in diverse ways. In contrast, compared to the demand-following theory, the demand of life and non-life insurance markets may be endorsed by providing more capital and merging risk with the development of local economy (see, inter alia, Browne & Kim, 1993; Liu & Chiu, 2012; Liu, He, Yue & Wang, 2014; Outreville, 1990).

Given the importance of insurance market towards economic growth, this study makes an attempt to examine the causal nexus between the two in order to establish the actual fact; that is, "*how do insurance market activities cause per capita economic growth*?" To this purpose, we put different specifications of insurance market activities and study their impact on per capita economic growth. The main moto is to analyze whether the insurance market activities promote economic growth or it is the economic growth that promotes the insurance market activities. The focus of this paper is on Eurozone⁴ countries during the period 1980–2014. The choice of this *group* is mostly due to "territorial efficiency". The argument is that this group has smaller countries, having more homogenous population and smaller territories to control, have better institutions and are more prone to reach political consensus (see, for instance, Robinson, 1960). The prominence of this territory effects has undeniably been highlighted by the new economic geography approach (see, for instance, Krugman, 1991). While it postulates the importance of increasing returns to scale and hence a priori bestows an advantage to large countries, it also takes into account the location, structure and density of "economic activity" (usually higher in smaller countries) [see, for instance, Alouini, 2009].

The results of this investigation can be used in a number of ways. *First*, the importance of a more developed insurance sector will be emphasized for the policymakers in each of the Eurozone countries. The importance of the insurance sector is underlined by the fact that it relates directly to economic growth (and therefore prosperity) of a country. *Second*, the eminence of insurance sector within the economic system of a country should act as inducement for the insurance sector itself to promote and enhance their activities. *Third*, the development of insurance sector

²The following earlier studies provide the linkage between insurance market and economic growth: Adams, Andersson, Andersson, and Lindmark (2009), Arena (2008), Chen, Lee, and Lee (2012), Boon (2005), Curak, Loncar, and Poposki (2009), Haiss and Sumegi (2008), Han, Li, Moshirian, and Tian (2010), Horng, Chang, and Wu (2012), and Lee, Huang, and Yin (2013).

³Additionally, unlike other financial services, there is relatively fewer empirical research on the relationship between insurance market and economic growth. In fact, it can be said that this subject (the insurance-growth linkage) has hardly ever been explored in great depth (see, *inter alia*, Vadlamannati, 2008).

⁴Eurozone is an economic group, which was set up in 1957, when the Treaty of Rome created the European Economic Community. This group is a subset of European Union that have fully incorporated the euro as their sole national currency. Currently, Eurozone includes 19 member countries, namely Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain (see, *inter alia*, Pegkas, 2015). The choice of this group, for our empirical investigation, is mostly due to lack of literature in this study area, and subsequent data availability in the insurance market.

could also lead to an increase in the living standards of the general population as more individuals can be integrated to become the clients of banking sector and other financial institutions. *Fourth*, with the growth of insurance sector and development in the living standards of a country's population, there is possibility of reduction in unemployment levels in the economy (though this will not be statistically tested in the present study).

The residual of the paper is sketched as follows.

Section 2 provides an outline of insurance market in the Eurozone countries. Section 3 offers the literature review, relating to the causal nexus between insurance market activities and economic growth. Section 4 presents the proposed hypothesis, variables, data and model. Section 5 provides empirical results and discussion thereof. Finally, we summarize and conclude in Section 6.

An outline of insurance market in the Eurozone countries

As highlighted above, insurance market and economic growth are widely interdependent on each other in the phases of economic development (Pradhan et al., 2015). There are two ways we can address the link between insurance market and economic growth: *First*, the regional disparity between insurance market activities and economic growth; and *second*, the causal relationship between the two. This paper deals with both these issues for the 19 Eurozone countries during the period 1980–2014.

However, this section presents a brief overview of insurance market in Eurozone countries and stylized facts on the insurance markets covered in this study. The discussion of this issue will give a theoretical clue to establish the empirical relationship between insurance market activities and economic growth in these selected countries. In other words, before examining the empirical investigation between insurance market activities and economic growth, there is a need to observe their regional status across the Eurozone.

It can be noted that, like financial markets in general, the coverage of insurance market is very wide. There are many insurance market activities that can demonstrate the coverage and status of insurance market. In general, there are two most important insurance market activities that can show the status of insurance market. These are insurance market density and insurance market penetration (IMP). Both are again projected in three different ways, namely life insurance, non-life insurance, and total insurance (both life and non-life). This paper specifically concentrates on IMP^5 activities and their causal linkage with economic growth in the above-selected Eurozone countries.

Typically, we intend to examine here the trend and regionalization of IMP activities in the Eurozone. We highlight here three activities of IMP, namely life insurance penetration (LIP), non-life insurance penetration (NIP), and total insurance (both life and non-life) penetration (TIP). The detailed discussion of these variables⁶ is available in Table 1.

The trend of IMP activities is available in Tables 2.1 and 2.2. Table 2.1 presents the trend of IMP at the absolute level (represented in US dollars), while Table 2.2 presents the trend of IMP at the relative level (expressed as a percentage of gross domestic product [GDP]). The trend of these activities is observed at four different time periods from 1980 to 2014. These are- Period 1: 1980–2000, Period 2: 2001–2007, Period 3: 2008–2014, and Period 4: 1980–2014. These four classifications are with reference to global financial crisis in the year 2007–2008. We present here the salient features of IMP activities across Eurozone countries.

First, the level of non-life insurance penetration (NIP), in absolute terms, is fairly high in contrast to life insurance penetration (LIP). This is true for most of the Eurozone countries except Belgium, Finland, and France. Additionally, in countries like France and Germany, the total insurance penetration (TIP) is relatively high compared to other countries in this group.

Second, the volume of LIP is comparatively high in the countries like France, Germany, Italy and the Netherlands, while it is reasonably low in Latvia, Estonia, Lithuania, Cyprus and Malta.

Third, the volume of NIP is considerably high in Germany, France, Italy and the Netherlands, while it is low in Estonia, Lithuania, Latvia, Cyprus and Malta.

Fourth, the size of TIP is relatively high in Germany, France, Italy and the Netherlands, while it is considerably low in Estonia, Lithuania, Latvia, Malta and Cyprus.

⁵The consideration of IMP is due to the involvement of measurement error in insurance density and that too because of exchange rate fluctuations (see, *inter alia*, Park, Borde & Choi, 2002).

⁶We use annual data of these variables for both regionalization and causality investigation. These were obtained from the *World Development Indicators* of the World Bank and *Sigma Economic & Research Consulting* of Switzerland.

Table 1			
Definition	of	variables.	

VARIABLES	DEFINITION
LIP	Life insurance penetration : This is direct domestic life premiums in US Dollars [an absolute measure] and expressed as a percentage of gross domestic product [a relative measure].
NIP	Non-life insurance penetration: This is direct domestic non-life premiums in US Dollars [an absolute measure] and expressed as a percentage of gross domestic product [a relative measure].
TIP	Total insurance penetration: It includes direct domestic premiums, both life and non-life, in US Dollars [an absolute measure] and expressed as percentage of gross domestic product [a relative measure].
PEG	Per capita Economic growth: Percentage change in per capita gross domestic product.

Note 1: Life insurance is a form of insurance coverage that pays out premiums to the insured or their specified beneficiaries upon a certain accident (Chen, Cheng, Pan & Wu, 2013; Lee and Chiu, 2012; Lee, Chang & Chen, 2012; Pan, Chang & Su, 2012; Pradhan et al., 2015).

Note 2: Non-life insurance essentially consists of insurance policies that protect the insured against losses and damages other than those covered by life insurance such as property, motor, marine, transport, pecuniary loss, and aviation (Chen et al., 2013; Lee and Chu, 2012; Lee et al., 2012; Pan et al., 2012; Pradhan et al., 2015).

Table 2.1 The trends of insurance market penetration (in USD) in Eurozone countries.

	LIP				NIP				TIP			
Countries	P1	P2	Р3	P4	P1	P2	Р3	P4	P1	P2	Р3	P4
Austria	2642	7485	9554	4993	4823	9035	12,963	7293	7465	16,520	22,517	12,286
Belgium	4072	22,810	25,514	12,108	5735	12,254	15,373	8966	9807	35,065	40,886	21,075
Cyprus	118	311	471	227	93	324	590	238	211	635	1060	466
Estonia	8	78	101	58	48	189	326	176	56	267	427	233
Finland	4502	12,421	20,908	9367	1902	3334	5046	2817	6403	15,754	25,955	12,184
France	41,862	12,9524	175,053	86,032	32,272	62,454	93,058	50,465	74,133	191,977	268,111	136,498
Germany	35,280	80,293	112,922	59,825	52,565	97,403	129,304	76,880	87,854	177,696	242,296	136,705
Greece	536	2115	2870	1319	651	2186	3668	1561	1187	4301	6538	2880
Ireland	3163	26,738	40,736	15,392	1695	8031	8976	4418	4858	34,769	49,713	19,811
Italy	10,926	74,655	111,640	43,814	18,270	42,116	53,040	29,993	29,195	116,770	164,680	73,807
Latvia	12	19	44	23	83	264	430	243	95	283	475	266
Lithuania	19	109	145	88	58	261	315	205	77	370	460	292
Luxembourg	1418	9789	24,420	7793	392	1381	3353	1184	1811	11,178	28,272	8976
Malta	50	170	990	440	85	263	1553	691	134	433	2543	1132
Netherland	11,589	28,633	28,331	18,546	10,485	34,567	74,563	28,117	22,014	64,200	102,894	46,663
Portugal	1082	8272	13,261	4956	1682	4783	5589	3083	2763	13,055	18,850	8039
Slovakia	123	565	1312	599	281	837	1445	783	404	1403	2756	1381
Slovenia	109	489	819	427	595	1225	1942	1172	704	1714	2761	1578
Spain	5682	24,744	36,188	16,796	9812	30,093	40,568	20,019	17,494	54,837	76,757	36,815
Panel	6589	22,643	31,887	14,884	7449	16,369	23,795	12,542	14,038	39,012	55,682	27,427

Note 1: LIP is life insurance penetration; NIP is non-life insurance penetration; and TIP is total insurance penetration.

Note 2: P1 is 1980-000; P2 is 2001-2007; P3 is 2008-2014; and P4 is 1980-2014.

Fifth, for all the three insurance penetration indicators, Estonia, Lithuania, Latvia, Malta and Cyprus record the lowest coverage in all four time periods. On the other hand, France, Germany, Italy and the Netherlands record the higher IMP coverage in all four time periods.

Sixth, NIP, represented as a percentage of GDP, is fairly high in comparison to LIP. This is true in most of the Eurozone countries and for all time periods. However, in countries like the Netherlands, Ireland, France and Finland, we find TIP is fairly high in comparison to other countries.

Seventh, the coverage of LIP in terms of GDP is relatively high in Ireland, Finland and France, while it is low in Latvia, Lithuania, Estonia and Greece.

Table 2.2					
The trends of insurance	market penetration	(as a percentage of	of GDP) in	Eurozone	countries

	LIP				NIP				TIP				
Countries	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4	
Austria	1.64	2.68	2.41	1.99	3.31	3.14	3.11	3.23	4.94	5.75	5.40	5.19	
Belgium	1.99	6.43	5.21	3.47	2.79	2.66	2.66	2.74	4.76	8.93	7.60	6.16	
Cyprus	1.87	2.12	2.03	1.95	1.84	1.93	2.32	1.96	3.61	3.88	4.17	3.77	
Estonia	0.18	0.55	0.46	0.37	1.09	1.47	1.53	1.34	1.26	2.02	2.01	1.72	
Finland	4.30	6.87	8.00	5.48	1.92	1.77	1.90	1.89	6.13	8.38	9.80	7.32	
France	3.30	6.47	6.43	4.50	2.86	2.93	3.08	2.92	6.08	9.20	9.28	7.34	
Germany	2.13	3.10	3.21	2.52	3.32	3.58	3.48	3.34	5.30	6.58	6.59	5.82	
Greece	0.49	0.95	1.01	0.68	0.71	0.97	1.28	0.88	1.18	1.89	2.28	1.54	
Ireland	4.87	7.16	6.36	5.61	3.09	2.62	1.99	2.78	7.91	9.54	8.03	8.26	
Italy	1.00	4.43	4.87	2.39	1.69	2.30	2.24	1.92	2.66	6.48	7.21	4.35	
Latvia	0.33	0.15	0.22	0.24	1.89	2.43	2.13	2.14	2.22	2.59	2.35	2.38	
Lithuania	0.20	0.41	0.34	0.31	0.49	1.07	0.73	0.75	0.68	1.48	1.07	1.06	
Luxembourg	1.29	1.46	2.85	1.79	2.21	2.04	1.94	2.04	3.58	3.50	4.88	4.05	
Malta	1.28	2.70	2.90	2.37	2.18	2.33	1.51	1.99	3.46	4.95	4.30	4.32	
Netherland	3.76	5.14	3.65	4.03	3.58	5.27	8.60	4.92	7.17	10.1	11.9	8.70	
Portugal	1.76	4.49	5.77	3.56	2.27	2.66	2.32	2.36	4.15	7.04	7.83	5.99	
Slovakia	0.67	1.31	1.39	1.05	1.55	1.94	1.49	1.69	2.21	3.22	2.85	2.69	
Slovenia	0.56	1.42	1.72	1.13	3.24	3.68	3.84	3.54	3.80	5.07	5.46	4.66	
Spain	1.53	2.57	2.57	1.92	2.13	2.91	2.77	2.42	3.63	5.41	5.25	4.31	
EZP	1.74	3.18	3.23	2.39	2.21	2.51	2.58	2.36	3.93	5.59	5.70	4.72	

Note 1: LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel. Note 2: P1 is 1980–2000; P2 is 2001–2007; P3 is 2008–2014; and p4 is 1980–2014.

Eighth, the coverage of NIP in terms of GDP is considerably high in the Netherlands, Slovenia, Germany and Austria, while it is relatively low in Greece, Estonia, Lithuania and Slovakia.

Ninth, the coverage of TIP in terms of GDP is noticeably high in the Netherlands, Ireland, Finland and France, while it is conspicuously low in Lithuania, Greece, Estonia and Latvia.

The above observations are true for most of the time periods (P1-P4). Additionally, the extent of regional variation measured through coefficient of variation has been declining in the Eurozone countries, which is reflected in all the time periods.

Insurance market penetration is fairly high in some countries like France, Germany, and Finland; while it is fairly low in some other countries like Latvia, Estonia, Lithuania, Cyprus and Malta. This typical insurance penetration trend is more or less similar to economic growth trend represented by per capita gross domestic product and is considerably true for most of the Eurozone countries. In other words, like IMP, the status of economic growth⁷ is typically high in like group of countries such as Germany and Finland and moderately low in other similar group of countries such as Estonia, Lithuania, and Latvia. This hypothetically signals that IMP and per capita economic growth can get together and cause each other in the process of economic development. In the next section, we empirically validate this claim in the context of the 19 Eurozone countries, both at individual country level and at the panel level.

Literature review

The typical issue of this study is to know whether Granger causality exists between these variables in both ways, one way, or not at all. The policy implications will be different with respect to the actual findings. In analogy to other financial activities⁸-economic growth nexus (see, *inter alia*, Alhassan & Biekpe, 2016; Greenwood & Jovanovic, 1990; King and Levine, 1993; Jung, 1986; Levine, 2005; Levine et al., 2000; Lucas, 1988; Patrick, 1966; Pradhan,

⁷The trend of economic growth is not reported here due to space restriction and can be available on demand.

⁸It is with respect to banking sector, stock market, and bond market activities.

Table 3						
Summary of studies on the connection	between	insurance	market	and	economic grov	wth.

Research Studies	Study Area	Sample Type	Time Period	Data Type	Major Findings	Insurance Type
Adams et al. (2009)	Sweden	[1]	1830–1998	[d]	SLH	[b]
Akinlo (2013)	Nigeria	[1]	1986–2010	[d]	NEH	[b]
Alhassan and Biekpe (2016)	[1]	1990-2010	[d]	DFH, SLH,	[b]	
8 African countries				FBH		
Alhassan and Fiador (2014)	Ghana	[1]	1990–2010	[d]	SLH	[b]
Boon (2005)	Singapore	[1]	1991-2002	[e]	SLH	[b]
Chang et al. (2014)	10 OECD	[1, 2]	1979–2006	[d]	SLH, DFH, FBH, NEH	
	countries				[b]	
Chau et al. (2013)	Malaysia	[1]	1970-2002	[d]	NEH	[b]
Ching et al. (2010)	Malaysia	[1]	1997-2008	[e]	DFH	[b]
Guochen and Wei (2012)		China	[2]	2006-2011	[e] SLH, DFH, FBH, NEH [b]	
Ghosh (2013)	India	[1]	1990-2008	[e]	SLH	[b]
Jahromi and Goudarzi (2014)	Iran	[1]	1981-2011	[d]	FBH	[b]
Kugler and Ofoghi (2005)		United Kingdom [1]	1966–2003	[d]	DFH, SLH, FBH	[b]
Nejad and Kermani (2012)	Iran	[1]	1960-2010	[d]	NEH	[a]
Omoke	(2014)	Nigeria	[1]	1970-2008	[d]	NEH [a]
Pradhan et al. (2014)	G-20 countries	[2]	1980-2012	[d]	DFH, FBH	[a, b]
Pradhan et al. (2015)	34 OECD countries	[2]	1988–2012	[d]	FBH	[a, b]
Ward and Zurbruegg (2000) 9 OECD countries	[1]	1961–1996	[d]	DFH, FBH	[b]	
Yinusa and Akinlo (2013)	Nigeria	[1]	1986-2010	[d]	NEH	[b]

Note 1: SLH is supply-leading hypothesis, indicating unidirectional causality from insurance market to economic growth; DFH is demandfollowing hypothesis, indicating unidirectional causality from economic growth to insurance market; FBH is feedback hypothesis, indicating bidirectional causality between insurance market and economic growth; NEH is neutrality hypothesis, indicating absence of causality between insurance market and economic growth.

Note 2: 1 indicates individual country analysis, 2 indicates panel data analysis, d indicates annual data, e indicates monthly/ quarterly data, a represents insurance density, and b represents insurance penetration.

Bahmani & Kiran, 2014; Uddin, Sjo & Shahbaz, 2013), the causality between insurance market activities and economic growth can be represented in four possible hypotheses (see, *inter alia*, Lee et al., 2013; Ward & Zurbruegg, 2000).

The first strand is *supply-leading hypothesis (SLH)*, which contends the unidirectional causality from insurance market activities to economic growth. The studies supporting this *SLH* are Adams et al. (2009), Alhassan and Biekpe (2016), Alhassan and Fiador (2014), Boon (2005), Chang, Lee, and Chang (2014), Ghosh (2013), Guochen and Wei (2012), Kugler and Ofoghi (2005), Lee (2011), Lee et al. (2013), Pradhan et al. (2015), and Ward and Zurbruegg (2000). The second strand is *demand-following hypothesis (DFH)*, which contends the unidirectional causality from economic growth to insurance market activities. The studies supporting this *DFH* are Alhassan and Biekpe (2016), Beck and Webb (2003), Chang et al. (2014), Ching, Kogid, and Furuoka (2010), Guochen and Wei (2012), Kugler and Ofoghi (2005), Pradhan et al. (2015), and Ward and Zurbruegg (2000). The third strand is *feedback hypothesis (FBH)*, which combines the first two strands (*DFH* and *SLH*) and depicts a bidirectional relationship, representing that both economic growth and insurance market activities can cause each other. The studies supporting this *FBH* are Alhassan and Biekpe (2016), Beck and Webb (2003), Guochen and Wei (2012), Kugler and Ofoghi (2005), Pradhan et al. (2015), and Ward and Zurbruegg (2000). The fourth strand is the *neutrality hypothesis (NEH)*, which contends that insurance market activities and economic growth are independent of each other. The studies supporting this *hypothesis are Akinlo* (2013), Chang et al. (2014), Chau, Khin, and Teng (2013), Guochen and Wei (2012), Nejad and Kermani (2012), and Yinusa and Akinlo (2013). The summary of these past studies are presented in Table 3.



Fig. 1. Proposed Model and Hypotheses Note 1: H_{A1} , $_{B1}$: Insurance market activities in any year Granger-cause economic growth, leading to the occurrence of supply-leading hypothesis of insurance-growth nexus. H_{A2} , $_{B2}$: Economic growth in any year Granger-causes insurance market activities, leading to the occurrence of demand-following hypothesis of insurance-growth nexus. Note 2: Insurance market activities cover life-insurance penetration, non-life insurance penetration, and total (both life and non-life) insurance penetration.

Proposed hypotheses and econometric analyses

This study deploys Granger causality test to examine the relationship between insurance market activities and economic growth using a sample of 19 Eurozone countries⁹ in the period 1980–2014. We intend to test the following hypotheses:

 $H_{A1, B1}$: Other things being equal, insurance market activities in any year Granger-cause economic growth, leading to the occurrence of supply-leading hypothesis of insurance-growth nexus.

 $H_{A2, B2}$: Other things being equal, economic growth in any year Granger-causes insurance market activities, leading to the occurrence of demand-following hypothesis of insurance-growth nexus.

Fig. 1 depicts the causal relations between insurance market activities and economic growth.

As discussed above, we deploy three IMP activities (such as LIP, NIP, and TIP) and per capita economic growth (PEG) to validate these two hypotheses ($H_{A1, B1}$ and $H_{A2, B2}$). So there are three cases we would like to observe the linkage between insurance market and economic growth. These are: Case 1, dealing with the linkage between LIP and PEG; Case 2, dealing with the linkage between NIP and PEG; and Case 3, dealing with the linkage between TIP and PEG. In each case, we deal with relative measures of IMP¹⁰ and per capita economic growth. All these variables (LIP, NIP, TIP, and PEG) were converted into their natural logarithms for estimation purpose. Table 4 provides descriptive statistics of these variables and their correlation matrix (1).

Following similar approach in previous literature (e.g. Garcia, 2012; Adams et al., 2009; Arena, 2008; Webb, Grace, & Skipper, 2002), the study uses the following regression model to examine the causal relationship between insurance market penetration¹¹ and per capita economic growth.

(1)

$PercapitaEconomicGrowth_{it} = \alpha_{it}InsuranceMarketPenetration_{it}^{\beta li}e^{\varepsilon_{it}}$

where, i = 1, 2... 19 represents an individual country in the Eurozone panel; t = 1980... 2014 refers the time period; and ε_{ii} is an independent and normally distributed random error with a zero mean and a finite heterogeneous variance (σ_i^2) .

Noticeably, other variations of Eq. (1) are also witnessed to change the dependent variable from per capita economic growth to insurance market penetration. When we looked for individual country analysis, the subscript 'i' was then removed from Eq. (1). The involvement of β_{1i} represents the long-run elasticity estimates of per capita economic growth with respect to insurance market penetration. The task was to estimate the parameters in Eq. (1) and to observe the causal nexus between insurance market penetration and per capita economic growth. If $\beta_{1i} > 0$, we

⁹The countries included in this investigation process are highlighted in Section 2.

¹⁰That is with respect to direct domestic premiums in USD (for life, non-life, and total) as a percentage of gross domestic product.

¹¹It includes LIP, NIP and TIP, separately.

Table 4						
Descriptive	statistics	and	correlations	on	the	variables.

	Variables		Correlations with PEG				
Countries	LIP	NIP	TIP	PEG	LIP	NIP	TIP
Austria	-1.72/0.14	-1.48/0.02	-1.28/0.04	1.22/0.04	0.10*	0.16*	0.16*
Belgium	-1.55/0.29	-1.56/0.02	-1.23/0.15	1.22/0.04	0.23*	0.02	0.23*
Cyprus	-1.67/0.13	-1.89/0.15	-1.45/0.11	1.19/0.09	0.20*	0.30*	0.02
Estonia	-2.40/0.21	-1.66/0.06	-1.59/0.07	1.23/0.40	0.16*	0.31*	0.27*
Finland	-1.28/0.17	-1.72/0.03	-1.14/0.12	1.22/0.11	0.18*	0.44*	0.21*
France	-1.42/0.29	-1.54/0.02	-1.15/0.15	1.21/0.04	0.15*	0.52*	0.21*
Germany	-1.61/0.11	-1.48/0.04	-1.23/0.07	1.22/0.06	0.18*	0.29*	0.22*
Greece	-2.24/0.19	-2.06/0.12	-1.83/0.15	1.18/0.11	0.01	0.45*	0.22*
Ireland	-1.27/0.12	-1.58/0.10	-1.08/0.07	1.25/0.10	0.10*	0.29*	0.04
Italy	-1.83/0.51	-1.68/0.07	-1.40/0.24	1.20/0.07	0.50*	0.39*	0.53*
Latvia	-2.72/0.17	-1.64/0.07	-1.60/0.06	1.28/0.25	0.15*	0.11*	0.10*
Lithuania	-2.42/0.14	-2.09/0.14	-1.92/0.13	1.18/0.43	0.10*	0.04	0.10*
Luxembourg	-1.74/0.15	-1.69/0.04	-1.40/0.07	1.22/0.11	0.62*	0.35*	0.59*
Malta	-1.66/0.19	-1.70/0.11	-1.36/0.09	1.22/0.08	0.29*	0.10**	0.21*
Netherland	-1.42/0.13	-1.32/0.17	-1.05/0.12	1.21/0.04	0.34*	0.32*	0.11*
Portugal	-1.52/0.30	-1.60/0.03	-1.24/0.16	1.20/0.07	0.40*	0.23*	0.42*
Slovakia	-1.99/0.18	-1.77/0.06	-1.56/0.08	1.27/0.09	0.17*	0.20*	0.10*
Slovenia	-1.90/0.16	-1.43/0.03	-1.30/0.06	1.23/0.12	0.39*	0.69*	0.51*
Spain	-1.83/0.39	-1.62/0.10	-1.39/0.18	1.22/0.06	0.10*	0.19*	0.20*
EZP	-1.73/ 0.43	-1.63/ 0.20	-1.34/ 0.25	1.22/ 0.13	0.10*	0.31*	0.30*

Note 1: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 2: * is statistical significance at 5% level.

Note 3: Values reported here are the natural logs of the variables.

can recommend that an increase in insurance market penetration will likely cause an increase in per capita economic growth.

However, on the basis of study objectives, the vector error correction model (VECM) is additionally deployed to know the Granger causal relationship between insurance market penetration and per capita economic growth. We array the VECM differently for Eurozone individual country analysis and at the panel analysis.

The study uses the following VECMs to notice the long-run and short-run causality between insurance market penetration and per capita economic growth, predominantly for Eurozone individual country analysis.

$$\Delta Percapita Economic Growth_{t} = \left(\sum_{i=1}^{p} \alpha_{1i}L^{i}\right) Percapita Economic Growth_{t} + \left(\sum_{j=1}^{q} \beta_{1j}L^{j}\right) Insurance Penetration_{t} + \mu_{1}ECT_{t-1} + \varepsilon_{1t}$$

$$(2)$$

The testable hypotheses are:

$$H_0: \beta_{1j = 0}; \text{ and } \mu_l = 0$$
 for $j = 1, 2, ..., q$

 $H_A: \beta_{1j \# 0}; \text{ and } \mu_I \# 0$ for j = 1, 2, ..., q

$$\Delta InsurancePenetration_t = \left(\sum_{i=1}^p \alpha_{2i} L^i\right) InsurancePenetration_t +$$

$$\left(\sum_{j=1}^{q} \beta_{2j} L^{j}\right) Percapita Economic Growth_{t} + \mu_{2} ECT_{t-1} + \varepsilon_{2t}$$

 $(\mathbf{3})$

The testable hypotheses are:

$H_0: \beta_{2j} = 0; \text{ and } \mu_2 = 0$	for $j = 1, 2,, q$
$H_A: \beta_{2i \# 0}; \text{ and } \mu_2 \# 0$	for j = 1, 2,, q

where,

 ECT^{12} is error correction term and it is derived from long-run cointegration equation;

p and q are lag lengths for the estimation;

 Δ is the first difference operator; and

 ε_{1t} and ε_{2t} are independent and normally distributed random error with a zero mean and a finite heterogeneous variance.

This study follows the SBIC¹³ statistics to decide the optimum lag length of these two models. The inclusions of ECT_{t-1} (in both Eqs. 2 and 3) depends upon the condition of order of integration and the cointegrating relationship between insurance market penetration and per capita economic growth. Hence, we first deploy unit root test¹⁴ and cointegration test¹⁵, both at the individual country level and the panel level, to know the order of integration and the presence of cointegrating relationship between the insurance market penetration and per capita economic growth. We use Augmented Dickey Fuller unit root test (ADF¹⁶) for both individual country analysis and panel setting. On the other hand, Johansen (Johansen, 1988) and Fisher (Maddala and Wu, 1999) cointegration tests are deployed for individual country analysis and panel analysis respectively. These tests are widely used in most of econometrics text books and hence, discussion of these tests are not available here due to space restriction.

Empirical results and discussion

The discussion starts with the stationarity issue of variables such as LIP, NIP, TIP, and PEG and their cointegrating relationships. First, by using the unit root tests, we reject the null hypothesis of unit root at the first difference but not for the levels (see Table 5). This indicates that insurance market penetration (LIP, NIP, and TIP) and per capita economic growth (PEG) are all non-stationary at the level data but are stationary at the first difference. This is true for all the 19 Eurozone countries, both by individual country and at the panel setting. This suggests that both insurance market penetration and per capita economic growth are integrated of order one [i.e. I (1)], which opens the possibility of cointegration between the two.

In the next step, using cointegration tests, we find that IMP¹⁷ and PEG are cointegrated, suggesting the existence of long run relationship between insurance market penetration and per capita economic growth (see Table 6.1). This finding is consistent with the findings of earlier studies by Petkovski and Jordan (2014), and Pradhan et al. (2016). However, cointegration between insurance market penetration and per capita economic growth does not exist in some Eurozone countries. These are Cyprus, Estonia, Finland, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Slovakia, and Spain. The summary of these findings are categorically highlighted in Table 6.2.

Having confirmed the existence of cointegration between the variables, the next step is to determine the direction of causality between insurance market penetration and per capita economic growth. The vector error correction model (VECM¹⁸) was deployed to test the presence of cointegration between insurance market penetration and per capita economic growth, and simple vector autoregressive (VAR¹⁹) model was deployed for the absence of cointegration

¹⁷It involves the inclusion of LIP, NIP, and TIP, separately.

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¹²The involvement of ECT_{t-1} in the model depends upon the presence of cointegration between insurance market penetration (for LIP, NIP, or TIP) and per capita economic growth (PEG). ECT_{t-1} will be removed in the estimation process, if these two (insurance market penetration and PEG) are not cointegrated.

¹³SBIC stands for Schwarz Bayesian Information Criterion (see Schwarz, 1978).

¹⁴It is to know whether a time series variable is non-stationary and possesses a unit root (see Bhargava, 1986).

¹⁵It is to know the relationship between the two non-stationary time series variables. If these two time series variables each have a unit root, that is I(1), but a linear combination of them is stationary, I(0), then the series are said to be cointegrated (see Engle & Granger, 1987).

¹⁶See Dickey and Fuller (1981) for individual country setting and Kao (1999) for the panel setting.

¹⁸We test the robustness of the empirical results. However, these test results are not reported here due to space constraints.

¹⁹The test of robustness of the empirical results are not reported here due to space constraints.

Table 5	
Results of unit root test.	

	Variables								
Countries	LIP LD/ FD	NIP LD/ FD	TIP LD/ FD	PEG LD/ FD					
Austria	-1.26/-5.43*	0.71/-3.93*	-0.56/-5.62*	-0.30/-5.44*					
Belgium	-0.46/-3.02*	0.22/-6.98*	-1.48/-2.20**	-0.17/-6.39*					
Cyprus	-0.68/-6.35*	-2.34/-3.45*	-1.51/-5.64*	-0.59/-10.2*					
Estonia	-1.73/-2.99*	0.19/-5.18*	-0.19/-5.29*	-0.89/-5.58*					
Finland	-2.29/-4.58*	-1.11/-4.23*	-2.55/-4.92*	-0.49/-6.19*					
France	-0.18/-6.36*	-1.47/-3.50*	0.30/-6.53*	-0.26/-6.21*					
Germany	-0.20/-5.16*	-1.19/-5.14*	-0.48/-5.18*	-0.35/-5.63*					
Greece	-1.26/-4.83*	-2.78/-3.35*	-6.60/-4.01*	-2.37/-5.42*					
Ireland	-1.17/-6.07*	0.68/-4.25*	-0.76/-6.34*	-0.08/-5.90*					
Italy	-0.91/-5.03*	1.20/-4.36*	-4.15/-5.28*	-0.67/-7.37*					
Latvia	0.48/-3.80*	-0.22/-2.72*	-0.06/-2.84*	-0.41/-4.59*					
Lithuania	-0.29/-3.82*	-0.97/-4.16*	-0.73/-4.24*	-0.74/-3.70*					
Luxembourg	-1.25/-6.19*	0.82/-2.88*	-1.50/-4.44*	-0.23/-6.52*					
Malta	-1.85/-3.69*	0.25/-5.91*	-0.56/-4.94*	-0.19/-6.43*					
Netherlands	0.49/-10.1*	-1.29/-6.12*	-1.69/-6.22*	-0.12/-6.53*					
Portugal	-1.81/-5.14*	-0.96/-5.31*	-1.81/-4.35*	-1.93/-5.12*					
Slovakia	-0.86/-2.24**	-0.06/-3.94*	-0.77/-1.57***	-0.15/-6.24*					
Slovenia	-1.76/-2.17**	-0.14/-5.52*	-0.80/-3.60*	-0.46/-4.99*					
Spain	-1.95/-3.68*	-2.01/-5.23*	-1.80/-5.75*	-0.09/-6.31*					
EZP	34.6/ 81.8*	30.0/ 101.2*	46.6/ 67.0*	32.9/ 144.7*					

Note 1: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 2: ADF is Augmented Dickey Fuller test statistics.

Note 3: The investigation is done at three levels- no trend and intercept, with intercept, and with both intercept and trend. The results are more or less uniform; however, the reported statistics in the table presents the ADF statistics at no trend and no intercept.

Note 4: * is statistical significance at 1% level; ** is statistical significance at 5% level; and *** is statistical significance at 10% level.

between the two. The estimated results of this sections are reported in Tables 7.1–7.3. Table 7.1 reports both short-run and long-run estimates²⁰ of VAR/VECM, while Tables 7.2 and 7.3 report the summary of short-run Granger causality results.

The analysis is based on three individual indicators of insurance market penetration (such as LIP, NIP, and TIP) and per capita economic growth (Case 1–3). Coming to long-run estimates²¹, we find the presence in a few situations and absence in other situations. This is noticeably true while studying Granger causality form insurance market penetration (LIP/ NIP/ TIP) to per capita economic growth, and vice versa (see Table 7.1). On the contrary, we have discrepancy experience in the context of short-run Granger causality between insurance market penetration (LIP/ NIP/ TIP) and per capita economic growth. The results of this section are analyzed under three different cases, depending upon the use of three IMP activities, namely life insurance penetration, non-life insurance penetration, and total-insurance penetration.

Case 1:. Between life insurance market penetration and per capita economic growth

As expected from the literature, the results of this case certify that Granger causality between life insurance market penetration (LIP) and per capita economic growth (PEG) are non-uniform and varying from country to country. For countries like Austria, Belgium, Estonia, Ireland, Italy, Lithuania, and the Netherlands, we find the support of *supply-leading hypothesis (SLH)* of insurance-growth nexus. This ensures the presence of unidirectional Granger causality from life insurance market penetration to per capita economic growth [LIP = > PEG] and is consistent with the findings of earlier studies by Adams et al. (2009), Alhassan and Fiador (2014), Boon (2005), Chang et al. (2014),

²⁰The availability of ECT is in the case of VECM only.

²¹It is with respect to the significance of error correction term in VECM case only.

Table 6.1		
Results of cointegration	test.	

	Variables (with PEG)						
Countries	LIP		NIP	NIP		TIP	
	$ \begin{split} & \lambda_{Tra} \\ r = 0; r = 1/r \\ & \leq 1; r = 2 \end{split} $	$\begin{array}{l} \lambda_{Max} \\ r = 0; r = 1/r \\ \leq 1; r = 2 \end{array}$	$ \begin{array}{c} & \\ \lambda_{Tra} \\ r = 0; r = 1/r \\ \leq 1; r = 2 \end{array} $	$\begin{array}{l} \lambda_{Max} \\ r = 0; r = 1/r \\ \leq 1; r = 2 \end{array}$	$ \begin{array}{c} \hline \lambda_{Tra} \\ r = 0; r = 1/r \\ \leq 1; r = 2 \end{array} $	$\begin{array}{l} \lambda_{Max} \\ r=0;r=1/r \\ \leq 1;r=2 \end{array}$	
Austria	21.3*/3.10	18.2*/3.10	22.1*/4.26*	17.8*/4.26*	18.2*/2.02	16.2*/2.02	
Belgium	18.2*/1./1	16.3*/1./1	27.8*/8.20*	19.6*/8.20*	1/.8*/1.58	16.3*/1.58	
Cyprus	8.34/1.98	6.37/1.98	7.03/0.09	6.94/0.10	7.68/1.03	6.65/1.03	
Estonia	18.1*/3.1/	14.8*/3.17	11.3/1.39	9.91/1.39	14.2/2.40	11.8/2.40	
Finland	12.8/0.42	12.4/0.42	22.7*/7.21*	15.5*/7.21*	12.5/0.44	12.1/0.44	
France	24.3*/3.37	16.9*/3.37	28.3*/6.49*	21.8*/6.49*	19.7*/7.12	16.6*/7.12*	
Germany	19.3*/4.49*	14.8*/4.49	25.8*/3.66	22.1*/3.46	20.9*/4.21	16.7*/4.21	
Greece	12.2/4.13	10.43/4.13	8.67/0.22	8.46/0.22	10.7/0.24	10.5/0.25	
Ireland	11.3/0.94	10.30/0.94	9.52/0.56	8.96/0.56	9.75/0.91	9.35/0.91	
Italy	19.6*/2.26	17.3*/2.26	18.4*/3.68	14.7*/3.68	23.1*/4.35	18.8*/4.35	
Latvia	11.5/2.80	8.67/2.80	9.67/3.16	6.51/3.16	6.48/0.47	6.01/0.47	
Lithuania	58.9*/19.7*	39.3*/19.7	12.9/1.20	11.8/1.20	28.7*/10.8*	17.8*/10.8*	
Luxembourg	13.8/1.39	13.4/1.39	26.2*/6.85*	19.3*/6.85*	7.25/0.62	6.63/0.62	
Malta	6.82/0.59	6.23/0.59	11.9/3.12	8.80/3.12	13.1/3.40	9.74/3.40	
Netherlands	25.8*/2.07	23.8*/2.07	21.5*/0.08	21.4*/0.08	26.4*/2.36	24.0*/2.36	
Portugal	18.*/6.69*	15.4*/6.69*	18.6*/2.03	16.6*/2.03	15.8*/0.68	15.1*/0.68	
Slovakia	30.7*/8.39*	22.4*/8.33	16.8*/4.51*	14.3/4.51	29.2*/7.04*	22.2*/7.04*	
Slovenia	16.9*/4.04	14.8*/4.04	15.2*/5.44*	14.8*/5.44*	15.6*/5.69 *	15.0*/5.69*	
Spain	8.77/0.43	8.34/0.43	20.5*/8.41*	14.7*/8.41*	9.28/0.84	8.44/0.84	
EZP	175.8*/134.1*	171.1*/134.1*	148.5*/105.5*	113.7*/105.5*	133.9*/104.8*	111.4*/104.8*	

Note 1: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 2: r is the co-integrating vector.

Note 3: The cointegration test conclusions are reported on the basis of Johansen and Juselius test.

Note 4: We observe statistical significance at 5% level.

Guochen and Wei (2012), Kugler and Ofoghi (2005), and Alhassan and Biekpe (2016). The support of *demand-following hypothesis* (*DFH*) of insurance-growth nexus is observed in Germany, Greece, Portugal and Slovakia. This ensures the presence of unidirectional Granger causality from per capita economic growth to life insurance market penetration [PEG = > LIP)] and is consistent with the findings of earlier studies by Alhassan and Biekpe (2016), Chang et al. (2014), Ching et al. (2010), Guochen and Wei (2012), and Pradhan et al. (2015). The support of the *feedback hypothesis* (*FBH*) of insurance-growth nexus is recognized in France, Luxembourg, Slovenia, and the panel of Eurozone countries. This ensures the presence of bidirectional causality between life insurance market penetration and per capita economic growth [LIP < = > PEG] and is consistent with the findings of earlier studies by Chang et al. (2014), Pradhan et al. (2015), and Alhassan and Biekpe (2016). We also find the support of *neutrality hypothesis* (*NEH*) of insurance-growth nexus from Cyprus, Finland, Latvia, Malta, and Spain. This ensures the absence of causality between life insurance market penetration and per capita economic growth nexus from Cyprus, Finland, Latvia, Malta, and Spain. This ensures the absence of causality between life insurance market penetration and per capita economic growth [LIP < # > PEG] and is consistent with the findings of earlier studies by Akinlo (2013), Chang et al. (2014), Chau et al. (2013), Guochen and Wei (2012), and Nejad and Kermani (2012).

Case 2:. Between non-life insurance market penetration and per capita economic growth

Like the previous case, the Granger causality between non-life insurance market penetration (NIP) and per capita economic growth is non-uniform and varying across the Eurozone countries. The support of *SLH* [NIP = > PEG] is observed from Belgium, Estonia, Ireland, Italy, Luxembourg and the Netherlands. This observation is consistent with the verdicts of former studies by Adams et al. (2009), Alhassan and Fiador (2014), Boon (2005), Chang et al. (2014), Guochen and Wei (2012), Kugler and Ofoghi (2005), and Alhassan and Biekpe (2016). The support of *DFH* [PEG

Table 6.2			
Summary	of cointegration	test	results.

Cointegrated			Not Cointegrated			
Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	
Austria (1) Belgium (1)	Austria (2) Belgium (2)	Austria (1) Belgium (1)	Cyprus (0)	Cyprus (0)	Cyprus (0)	
Estonia (1)	Finland (2)		Finland (0)	Estonia (0)	Estonia (0) Finland (0)	
France (1) Germany (2)	France (2) Germany (1)	France (1) Germany (2)	Greece (0) Ireland (0)	Greece (0) Ireland (0)	Greece (0) Ireland (0)	
Italy (1)	Italy (1)	Italy (1)	Latvia (0)	Latvia (0)	Latvia (0)	
Lithuania (2)	Luxembourg (2)	Lithuania (2)	Luxembourg (0) Malta (0)	Lithuania (0) Malta (0)	Luxembourg (0) Malta (0)	
Netherlands (1) Portugal (2) Slovakia (2) Slovenia (2)	Netherlands (1) Portugal (1) Slovakia (2) Spain (2)	Netherlands (1) Portugal (1) Slovakia (2) Slovakia (2)	Spain (0)	Slovakia (0)	Spain (0)	
EZP (2)	EZP Panel (2)	EZP panel (2)				

Note 1: Case 1: cointegration between LIP and PEG; Case 2: cointegration between NIP and PEG; and Case 3: cointegration between TIP and PEG.

Note 2: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 3: 0 stands for absence of cointegration between insurance market penetration (LIP/ NIP/ TIP) and per capita economic growth, 1 stands for presence of one cointegrating vector between insurance market penetration (LIP/ NIP/ TIP) and per capita economic growth, and 2 stands for presence of two cointegrating vectors between insurance market penetration (LIP/ NIP/ TIP) and per capita economic growth. *Note 4:* Parentheses indicate number of cointegrating vector (s).

Note 5: Results are derived on the basis of Table 5 results.

= > NIP] is perceived from Austria, Greece, Latvia, Portugal, and the Eurozone panel. This finding is consistent with the verdicts of former studies by Alhassan and Biekpe (2016), Chang et al. (2014), Ching et al. (2010), Guochen and Wei (2012), and Pradhan et al. (2015). The support of *FBH* [NIP < = > PEG] is found in France, and Slovenia. This outcome is consistent with the findings of former studies by Chang et al. (2014), Pradhan et al. (2014, 2015), and Alhassan and Biekpe (2016). The support of *NEH* [LIP < #> PEG] is found in Cyprus, Finland, Germany, Lithuania, Malta, Slovakia, and Spain. This finding is consistent with the findings of former studies by Akinlo (2013), Chang et al. (2014), Chau et al. (2013), Guochen and Wei (2012), and Nejad and Kermani (2012).

Case 3. Between Total Insurance Market Penetration and Per Capita Economic Growth

Like the previous two cases, the Granger causality between total (both life and non-life) insurance market penetration (TIP) and per capita economic growth are again non-uniform and varying across the Eurozone countries. The sustenance of *SLH* [TIP = > PEG] is detected from Austria, Belgium, Estonia, Ireland, Italy, Lithuania,

Table 7.1	
Results of Granger causality test.	

	Case 1		Case 2		Case 3	
Countries	Short-run Dependent Var	Long-run iables	Short-run	Long-run	Short-run	Long-run
	PEG/ LIP	PEG/ LIP	PEG/ NIP	PEG/ NIP	PEG/ TIP	PEG/ TIP
Austria	5.93*/0.98	-3.52*/-0.99	0.37/4.95*	-2.80*/-1.04	4.87*/1.92	-3.20*/-1.04
Belgium	6.50*/0.78	-3.79*/-0.64	4.11*/1.05	-3.57*/-0.66	5.91*/0.85	-3.60*/-0.22
Cyprus	1.13/0.18	-/-	2.43/2.54	-/-	1.51/1.48	-/-
Estonia	15.3*/2.64	-3.80*/-0.91	8.62*/0.15	-/-	18.6*/0.41	-/-
Finland	0.37/1.27	-/-	0.37/1.27	-2.05/-0.14	0.43/2.46	-/-
France	10.7*/5.47*	-2.37/-3.40	3.61*/4.27*	-1.76/-2.26	8.89*/2.63	-2.86*/0.58
Germany	1.51/4.82*	-11.3*/1.02	1.12/2.13	-4.84*/2.08	0.64/5.29*	-4.19*/1.87
Greece	0.50/4.10*	-/-	1.26/3.61*	-/-	1.35/6.57*	-/-
Ireland	5.87*/2.33	-/-	5.30*/1.83	-/-	6.55*/4.04*	-/-
Italy	20.1*/1.20	-3.84*/-0.20	4.57*/2.32	-2.06/-0.17	21.9*/2.07	-2.86*/0.50
Latvia	1.79/0.99	-/-	2.36/4.65*	-/-	2.48/2.03	-/-
Lithuania	4.21*/0.37	-/-	1.16/1.09	-/-	4.30*/0.41	-/-
Luxembourg	7.61*/4.18*	-/-	14.9*/2.37	-1.58/0.62	12.9*/0.96	-1.07/-3.15*
Malta	1.47/0.19	-/-	0.68/1.10	-/-	0.23/2.71	-/-
Netherlands	3.76*/1.77	-3.80*/-0.81	6.67*/0.82	-4.85*/-0.34	4.64*/0.66	-4.29*/0.59
Portugal	2.31/3.47*	-1.38/-0.03	0.53/8.67*	-1.49/-0.35	1.96/7.53*	-2.85*/2.21
Slovakia	2.12/8.29*	-0.83/-0.52	1.78/0.29	-2.87*/0.52	0.10/1.67	-0.62/-0.27
Slovenia	3.52*/3.44*	-2.84*/0.73	7.97*/4.01*	-/-	4.76*/4.71*	-2.56/0.89
Spain	2.36/0.33	-/-	0.03/1.53	-0.10/-0.42	2.35/0.98	-/-
EZP	28.3*/7.49*	-12.5*/-1.57	0.51/4.84*	-11.7*/-1.08	8.97*/7.67*	-12.3*/-1.84

Note 1: Case 1: cointegration between LIP and PEG; Case 2: cointegration between NIP and PEG; and Case 3: cointegration between TIP and PEG.

Note 2: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 3: The short-run causality is detected through Wald statistics, while long-run causality is detected through statistical significance of error correction term.

Note 4: '*' indicates the statistical significance at 5% level.

Luxembourg, and the Netherlands. This outcome is steady with the findings of past studies by Adams et al. (2009), Alhassan and Biekpe (2016), Alhassan and Fiador (2014), Boon (2005), Chang et al. (2014), Ghosh (2013), Guochen and Wei (2012), Kugler and Ofoghi (2005), and Ward and Zurbruegg (2000). The sustenance of *DFH* [PEG = > TIP] is detected from Germany, Greece, and Portugal. This outcome is steady with the findings of past studies by Alhassan and Biekpe (2016), Chang et al. (2014), Ching et al. (2010), Guochen and Wei (2012), and Pradhan et al. (2015), and Ward and Zurbruegg (2000). The support of *FBH* [TIP < = > PEG] is found in France, Slovenia, and the Eurozone panel. This outcome is steady with the findings of past studies by Alhassan and Biekpe (2016), Pradhan et al. (2015), and Ward and Zurbruegg (2000). The sustenance of *NEH* [TIP < # > PEG] is found in Cyprus, Finland, Latvia, Malta, and Slovakia. This outcome is steady with the findings of past studies by Akinlo (2013), Chang et al. (2014), Chau et al. (2013), Guochen and Wei (2012), Nejad and Kermani (2012), and Yinusa and Akinlo (2013). The summary of all these findings, relating to Cases 1–3 are presented in Table 7.3.

Conclusion and policy implications

This study explored the causal nexus between insurance market activities²² and per capita economic growth for the Eurozone countries using time series data from 1980 to 2014. The pivotal memo from our study for the academicians and policy-makers alike is that implications drawn from research on per capita economic growth that excludes the

 $^{^{22}}$ It restricts to insurance market penetration only and that too to the coverage of life insurance penetration, non-life insurance penetration, and total insurance penetration.

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	Growth				
Countries	Case 1	Case 2	Case 3		
Austria	SLH	DFH	SLH		
Belgium	SLH	SLH	SLH		
Cyprus	NEH	NEH	NEH		
Estonia	SLH	SLH	SLH		
Finland	NEH	NEH	NEH		
France	FBH	FBH	FBH		
Germany	DFH	NEH	DFH		
Greece	DFH	DFH	DFH		
Ireland	SLH	SLH	SLH		
Italy	SLH	SLH	SLH		
Latvia	NEH	DFH	NEH		
Lithuania	SLH	NEH	SLH		
Luxembourg	FBH	SLH	SLH		
Malta	NEH	NEH	NEH		
Netherlands	SLH	SLH	SLH		
Portugal	DFH	DFH	DFH		
Slovakia	DFH	NEH	NEH		
Slovenia	FBH	FBH	FBH		
Spain	NEH	NEH	NEH		
EZP	FBH	DFH	FBH		

Note 1: Case 1: Granger causality between LIP and PEG; Case 2: Granger causality between NIP and PEG; and Case 3: Granger causality between TIP and PEG.

Note 2: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 3: SLH indicates the unidirectional Granger causality from insurance market penetration to per capita economic growth; DFH indicates the unidirectional Granger causality from per capita economic growth to insurance market penetration; FBH indicates the bidirectional Granger causality between insurance market penetration and per capita economic growth; and NEH indicates no Granger causal flow between insurance market penetration and per capita economic growth.

Note 4: Results are derived on the basis of Table 7.1 results.

dynamic interrelation of these two variables will be imperfect. This conjoined relationship between insurance market penetration and per capita economic growth is the stand point of our study and will guide the future research on this topic.

Our study acknowledges the mixed evidence on the interrelationship between insurance market penetration and per capita economic growth in the 19 Eurozone countries, both at individual country level and at the panel level. In some instances, insurance market guides the per capita economic growth, lending support of *supply-leading hypothesis* of insurance-growth nexus. In other instances, it is the per capita economic growth nexus. There are also instances, where insurance market and per capita economic growth guide each other, lending support to *feedback hypothesis* of insurance-growth nexus. Additionally, there are also instances, where insurance market and per capita economic growth do not guide each other, lending support to *neutrality hypothesis* of insurance-growth nexus. The summary of these findings (i.e. the occurrence of all four hypotheses) is in line with Chang et al. (2014),²³ and Guochen and Wei (2012).²⁴

The study consequently recommends that in order to stimulate economic growth, attention must be paid to the policies that promote the insurance market. This requires an efficient allocation of financial resources combined with wide-ranging movement in the insurance market. That means the financial markets and the insurance industry can

²³In the context of 10 OECD countries for the period 1979–2006.

²⁴In the context of China for the period 2006–2011.

Supply-leading hypothesis of insurance-growth nexus			Demand-following hypothesis of insurance-growth nexus			
Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	
Austria		Austria		Austria		
Belgium	Belgium	Belgium		Finland		
Estonia	Estonia	Estonia	Germany		Germany	
Finland			Hungary			
France	France	France	Ireland			
Germany				Latvia		
Ireland	Ireland	Ireland	Portugal	Portugal	Portugal	
Italy	Italy	Italy	Slovakia			
Lithuania		Lithuania		EZP		
	Luxembourg	Luxembourg				
Netherlands	Netherlands	Netherlands				
Slovenia	Slovenia	Slovenia				
Feedback hypoth	esis of insurance-growt	h nexus	Neutrality hypo	thesis of insurance-grow	th nexus	
Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	
France	France	France	Cyprus	Cyprus	Cyprus	
Luxembourg			Finland	Finland	Finland	
	Portugal			Germany		
EZP		EZP	Greece	Greece	Greece	
			Latvia		Lativa	
				Lithuania		
			Malta	Malta	Malta	
				Slovakia	Slovakia	
			Spain	Spain	Spain	

Table 7.3			
Summary	of Granger	causality	test results.

Note 1: Case 1: Granger causality between LIP and PEG; Case 2: Granger causality between NIP and PEG; and Case 3: Granger causality between TIP and PEG.

Note 2: PEG is per capita economic growth; LIP is life insurance penetration; NIP is non-life insurance penetration; TIP is total insurance penetration; and EZP is Eurozone panel.

Note 3: Results are derived on the basis of Table 7.2 results.

help allocate capital, a scarce resource, to the most productive uses, which fosters the economic growth and benefits society. For instance, competition not only leads to economic efficiency, it offers an automatic mechanism for fulfilling consumer needs and wants for creating a larger variety of choices. Moreover, competition compels insurers to improve their products and services, thus it further benefits buyers. A *perfectly* competitive market – one in which new entrants enter and exit the market with ease, buyers and sellers are perfectly informed, and all sellers offer identical products at the same prices – requires no government direction or oversight to accomplish these desirable social goals. Perfect competition, however, is an ideal that cannot be realized in practice (see, for more details, Skipper, Starr, & Robinson, 2000). Additionally, establishing a well-developed financial system, particularly with reference to the insurance market activities can facilitate further investment and easier means of raising capital to support the economic activities. Given the opportunity of reverse causality or bi-directional causality for some instances, policies that increase the economic growth (such as actions to increase investment) would be desirable to heighten the insurance market coverage.

In sum, it is suggested that government should play a more positive role to nurture the insurance market and then integrate the same with economic growth. Undoubtedly, in this dynamic era, many countries have accepted the importance of financial markets for high economic growth and accordingly, they have increased their effort towards refining their financial systems. The earlier focus was on both banking and stock markets to stimulate the financial market and their link with economic growth. So the urgent need is to focus on insurance market by removing some of the obstacles in the insurance market- economic growth nexus, such as tax and regulatory framework, and drive

towards more insurance market activities to enhance the economic growth. Government of these countries should pay higher attention to bring the stable financial environment in order to promote the insurance-growth nexus in the Eurozone.

The study is restricted to insurance market penetration only and hence, it is one of the limitations of this empirical research progression. The future scope of the study can be compiled by incorporating both insurance market penetration and insurance market density. Likewise, the inclusion of macroeconomic determinants to this insurance-growth nexus can add another striking tally to this empirical research.

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References

- Adams, M., Andersson, J., Andersson, L., & Lindmark, M. (2009). Commercial banking, insurance and economic growth in Sweden between 1830 and 1998. Accounting, Business and Financial History, 19(1), 21–38.
- Adeniyi, O., Oyinlola, A., Omisakin, O., & Egwaikhide, F. O. (2015). Financial development and economic growth in Nigeria: Evidence from threshold modelling. *Economic Analysis and Policy*, 47(3), 11–21.
- Adu, G., Marbuah, G., & Mensah, J. T. (2013). Financial development and economic growth in Ghana: Does the measure of financial development matter?. *Review of Development Finance*, 3(4), 192–203.
- Ahmed, A. D. (2016). Integration of financial markets, financial development and growth: Is Africa different?. *Journal of International Financial Markets, Institutions and Money*, 42(3), 43–59.
- Akinlo, T. (2013). The causal relationship between insurance and economic growth in Nigeria (1986–2010). Australian Journal of Business and Management Research, 2(12), 49–57.
- Alhassan, A. L., & Biekpe, N. (2016). Insurance market development and economic growth. *International Journal of Social Economics*, 43(3), 321–339.
- Alhassan, A. L., & Fiador, V. (2014). Insurance-growth nexus in Ghana: An autoregressive distributed lag bounds cointegration approach. *Review of Development Finance*, 4(2), 83–96.
- Alouini, O. (2009). Country size, economic performance and the political economy of the Euro zone: An empirical study of the size divide. Berlin: Humboldt Universitat. Working Paper, No. 2009-01.
- Ang, J. B. (2008). Survey of recent developments in the literature of finance and growth. Journal of Economic Surveys, 22(3), 536–576.
- Arena, M. (2008). Does insurance market activity promote economic growth? A cross-country study for industrialized and developing countries. *Journal of Risk and Insurance*, 75(4), 921–946.
- Beck, T., & Webb, I. (2003). Economic, demographic, and institutional determinants of life insurance consumption across countries. *The World Bank Economic Review*, 17(1), 51–88.
- Beck, T., Levine, R., & Loayza, N. (2000). Finance and source of growth. Journal of Financial Economics, 58(1-2), 261-300.
- Bhargava, A. (1986). On the theory of testing for unit roots in observed time series. The Review of Economic Studies, 53(3), 369–384.
- Boon, T. K. (2005). Do commercial banks, stock markets and insurance market promote economic growth? An analysis of the Singapore economy (Working Paper). Singapore: Nanyang Technological University.
- Browne, M. J., & Kim, K. (1993). An international analysis of life insurance demand. The Journal of Risk and Insurance, 60(4), 616–634.
- Chang, T., Lee, C. C., & Chang, C. H. (2014). Does insurance activity promote economic growth? Further Evidence based on bootstrap panel Granger causality test. *The European Journal of Finance*, 20(12), 1187–1210.
- Chau, W. H., Khin, A. A., & Teng, K. L.L. (2013). Economic development cointegration and malaysian life and general insurance consumption. *Australian Journal of Basic and Applied Sciences*, 7(10), 538–546.
- Chen, P. F., Lee, C. C., & Lee, C. F. (2012). How does the development of life insurance market affect economic growth? Some international evidence. *Journal of International Development*, 24(7), 865–893.
- Chen, S. S., Cheng, S. C., Pan, G., & Wu, T. P. (2013). The relationship between globalization and insurance activities: A panel data analysis. *Japan and the World Economy*, 28(3), 151–157.
- Ching, K. S.C., Kogid, M., & Furuoka, F. (2010). Causal relation between life insurance funds and economic growth: Evidence from Malaysia. *ASEAN Economic Bulletin*, 27(2), 185–199.
- Christopoulos, D. K., & Tsionas, E. G. (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73(1), 55–74.
- Curak, M., Loncar, S., & Poposki, K. (2009). Insurance sector development and economic growth in transition countries. *International Research Journal of Finance and Economics*, 34(3), 29–41.
- Demetriades, P. O., & Hussein, K. A. (1996). Does financial development cause economic growth? Timeseries evidence from 16 countries'. Journal of Development Economics, 51(2), 387–411.
- Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica*, 49(4), 1057–1072. Engle, R. F., & Granger, C. W.J. (1987). Cointegration and error correction: representation, estimation and testing. *Econometrica*, 55(2), 251–276.

- Garcia, M. T.M. (2012). Determinants of the property-liability insurance market: Evidence from Portugal. *Journal of Economic Studies*, 39(4), 2012.
- Ghosh, A. (2013). Does life insurance activity promote economic development in India: An empirical analysis?. *Journal of Asia Business Studies*, 7 (1), 31–43.
- Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy*, 98(5), 1076–1107.
- Guochen, P. and Wei, S.C. (2012). The Relationship between Insurance Development and Economic Growth: A Cross-Region Study for China. Paper presented at 2012 China International Conference on Insurance and Risk Management, held at Qingdao, during July 18–21, 2012.
- Haiss, P. R., & Sumegi, K. (2008). The relationship between insurance and economic growth in Europe: A theoretical and empirical analysis. *Empirica*, 35(4), 405–431.
- Han, L., Li, D., Moshirian, F., & Tian, L. (2010). Insurance development and economic growth. *The Geneva Papers on Risk and Insurance*, 35(2), 183–199.
- Hassan, K. M., Sanchez, B., & Yu, J. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of Economics and Finance*, 51(1), 88–104.
- Horng, M. S., Chang, Y. W., & Wu, T. Y. (2012). Does insurance demand or financial development promote economic growth? Evidence from Taiwan. *Applied Economics Letters*, 19(2), 105–111.
- International Monetary Fund (2005). Indicators of Financial Structure, Development, and Soundness. Chapter 2. Online available at: (http://www.imf.org/external/pubs/ft/fsa/eng/pdf/ch02.pdf).
- Jahromi, P. B., & Goudarzi, H. (2014). The study of cointegration and causal relationship between macroeconomic variables and insurance penetration ratio. Asian Economic and Financial Review, 4(7), 853–863.
- Johansen, S. (1988). Statistical analysis of cointegration vectors. Journal of Economic Dynamics and Control, 12(2-3), 231-254.
- Jung, W. S. (1986). Financial development and economic growth: International evidence. *Economic Development and Cultural Change*, 34(2), 336–346.
- Kao, C. (1999). Spurious regression and residual based tests for cointegration in panel data. Econometrics, 90(1), 1-44.
- King, R., & Levine, R. (1993a). Finance and growth: Schumpeter might be right. The Quarterly Journal of Economics, 108(3), 717-737.
- Krugman, P. (1991). Increasing returns and economic geography. Journal of Political Economy, 99(3), 483-499.
- Kugler, M. and Ofoghi, R. (2005). Does Insurance Promote Economic Growth? Evidence from the UK. Paper presented at the Money Macro and Finance (MMF) Research Group Conference. United Kingdom.
- Lee, C. C. (2011). Does insurance matter for growth: Empirical evidence from OECD countries. The B E Journal of Macroeconomics, 11(1), 1–26.
- Lee, C. C., Chang, C. P., & Chen, P. F. (2012). Further evidence on property-casualty insurance premiums: Do multiple breaks and country characteristics matter?. Japan and the World Economy, 24(3), 215–226.
- Lee, C. C., Tsong, C. C., Yang, S. J., & Chang, C. H. (2013). Investigating the stationarity of insurance premiums: International evidence. *The European Journal of Finance*, 19(4), 276–297.
- Lee, C., Huang, W., & Yin, C. (2013). The dynamic interactions among the stock, bond and insurance markets. North American Journal of Economics and Finance, 26(3), 28–52.
- Levine, R. (1997). Financial development and economic growth: Views and agenda. Journal of Economic Literature, 35(20), 688-726.
- Levine, R. (2003). More on finance and growth: More finance, more growth?. Federal Reserve Bank of St Louis Review, 85(6), 31-46.
- Levine, R. (2005). Finance and growth: Theory and evidence. In: P. Aghion, & S. Durlauf (Eds.), *Handbook of economic growth*. Amsterdam: Elsevier Science.
- Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality analysis and causes. *Journal of Monetary Economics*, 46 (1), 31–77.
- Liu, C. C., & Chiu, Y. B. (2012). The impact of real income on insurance premiums: Evidence from panel data. *International Review of Economics* and Finance, 21(1), 246–260.
- Liu, G., He, L., Yue, Y., & Wang, J. (2014). The linkage between insurance activity and banking credit: Some evidence from dynamics analysis. *North American Journal of Economics and Finance*, 29(3), 239–265.
- Lucas, R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22(3), 3-42.
- Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and new sample test. *Oxford Bulletin of Economics and Statistics*, 61(S1), 631–652.
- Nejad, H. R., & Kermani, S. A. (2012). The relation between insurance development and economic growth in Iran. *Finance Management*, 47, 9079–9087.
- Omoke, P. C. (2014). Insurance market activity and economic growth: Evidence from Nigeria. Asian Economic and Financial Review, 1(4), 245–253.
- Outreville, F. J. (1990). The economic significance of insurance markets in developing countries. *The Journal of Risk and Insurance*, 57(3), 487–498.
- Outreville, F. J. (1996). Life insurance markets in developing countries. The Journal of Risk and Insurance, 63(2), 263-278.
- Pagano, M. (1993). Financial markets and growth: An overview. European Economic Review, 37(2-3), 613–622.
- Pan, G., Chang, H., & Su, C. (2012). Regional differences in development of life insurance markets in China. *Emerging Markets Review*, *13*(4), 548–558.
- Park, H., Borde, S. F., & Choi, Y. (2002). Determinants of insurance pervasiveness: A cross-national analysis. *International Business Review*, 11, 79–96.
- Patrick, H. (1966). Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14(2), 174–189.

Pegkas, P., (2015). The impact of FDI on economic growth in Eurozone countries. Journal of Economic Asymmetries 12(2), 124-132.

- Peia, O., & Roszbach, K. (2015). Finance and growth: Time series evidence on causality. Journal of Financial Stability, 19(3), 105–118.
- Petkovski, M., & Jordan, C. (2014). An analysis of non-life insurance determinants for selected countries in Central and South Eastern Europe: A co-integration approach. *Romanian Journal of Economic Forecasting*, 17(3), 160–178.
- Pradhan, R. P., Arvin, M. B., & Norman, N. R. (2015). Insurance development and the finance- growth nexus: Evidence from 34 OECD countries. Journal of Multinational Financial Management, 31, 1–22.
- Pradhan, R.P., Arvin, M.B., Norman, N.R., Nair, M., & Hall, J.H., (2016). Insurance penetration and economic growth nexus: cross-country evidence from ASEAN. *Research in International Business and Finance* 36, 447-458.
- Pradhan, R. P., Bahmani, S., & Kiran, M. U. (2014). The dynamics of insurance sector development, banking sector development, and economic growth: Evidence from G-20 countries. *Global Economics and Management Review*, 19, 73–96.
- Rault, C., Sova, A., Sova, R., & Caporale, G. M. (2014). In: Arouri (Ed.), Financial development and its effects on economic growth: A dynamic analysis (pp. 811–824). A Handbook on Emerging Markets and the Global Economy: A Handbook on Emerging Markets and the Global Economy, 2014.
- Robinson E.A.G. (1960). The Economic Consequences of the Size of Nations. Proceedings of the 1957 International Economic Association Lisbon Conference, London: Macmillan.
- Samargandi, N., Fidrmuc, J., & Ghosh, S. (2015). Is the relationship between financial development and economic growth monotonic? Evidence from a sample of middle-income countries. *World Development*, 68(1), 66–81.
- Schwarz, G. E. (1978). Estimating the dimension of a model. Annals of Statistics, 6(2), 461-464.
- Skipper, H. D., Starr, C. V., & Robinson, J. M. (2000). Liberalisation of insurance markets: issues and concerns. OECD insurance and private pensions compendium for emerging economies. Paris: Organisation for Economic Co-operation and Development (OECD).
- Thornton, J. (1994). Financial deepening and economic growth: Evidence from Asian economies. Savings and Development, 18(1), 41-51.
- Uddin, G. S., Sjo, B., & Shahbaz, M. (2013). The causal nexus between financial development and economic growth in Kenya. *Economic Modelling*, 35(3), 701–707.
- Vadlamannati, K. C. (2008). Do insurance sector growth and reforms affect economic development? Empirical evidence from India. Journal of Applied Economic Research, 2(1), 43–86.
- Ward, D., & Zurbruegg, R. (2000). Does insurance promote economic growth? Evidence from OECD countries. *Journal of Risk and Insurance*, 67 (4), 489–506.
- Webb, I.P., Grace, M.F. and Skipper, H.D. (2002). The Effect of Banking and Insurance on the Growth of Capital and Output. Centre for Risk Management and Insurance, Working Paper, No. 02-1. Robinson College of Business, Georgia State University, Atlanta.
- Yinusa, O., & Akinlo, T. (2013). Insurance development and economic growth in Nigeria, 1986–2010. Journal of Economics and International Finance, 5(5), 218–224.
- Zaman, K., Izhar, Z., Khan, M. M., & Ahmad, M. (2012). The relationship between financial indicators and human development in Pakistan. *Economic Modelling*, 29(5), 1515–1523.
- Zhang, J., Wang, L., & Wang, S. (2012). Financial development and economic growth: Recent evidence from China. *Journal of Comparative Economics*, 40(3), 393–412.