Impact of Insurance on Economic Growth in Algeria during the Period 1990-2017

أثر التأمين على النمو الاقتصادي بالجزائر للفترة 1990-2017

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Received: 30/09/2019
Accepted: 23/11/2019

Abstract:

This paper examines the relationship between insurance sector penetration and economic growth in Algeria from 1990 to 2017. The fully Modified Ordinary Least Squares (FMOLS) was adopted given the different order of integration of the variables of interest. After estimating a growth model. Cointegration test shows a long run relationship to exist among insurance sector, banking, trade openness and inflation rates in Algeria over the period of the study. The long run and the short run dynamics further confirm the positive and significant contribution of insurance on economic growth in Algeria.

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; Financial Development; Cointegration; FMOLS.

Jel Classification Codes: G0, G22, O47.

ملخص

تدرس هذه الورقة العلاقة بين قطاع التأمين والنمو الاقتصادي بالجزائر خلال الفترة 1990 إلى 2017. حيث تم اعتماد طريقة المربعات الصغرى المصححة كليا من خلال اختبار التكامل بين متغيرات الدراسة، وهذا بعد تقدير نموذج النمو. حيث أظهرت نتائج التكامل على المدى الطويل وجود علاقة بين قطاع التأمين، القطاع البنكي، الانفتاح التجاري ومعدلات التضخم بالجزائر خلال فترة الدراسة. وعليه تؤكد المعلمات على المدى الطويل والقصير العلاقة الموجبة والمعنوية بين التأمين والنمو الاقتصادي بالجزائر.

وعليه فإن نتائج هذه الدراسة تبرز أهمية قطاع التأمين الاقتصادي، وتتوافق مع ما نتائج الدراسات النظرية السابقة.

الكلمات المفتاحية: تأمين؛ نمو اقتصادي؛ تطور مالي؛ تكامل؛ مربعات صغرى مصححة كليا.

تصنيف JEL: G0, G22, O47.

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Introduction:

According to the finance-growth nexus theory financial development improve economic growth through channels of productivity of capital, efficiency of channeling saving to investment and saving rate as technological innovation (Levine, 1997, p. 688).

The importance of insurance like other financial institutions such as banking and the stock market is vital for the sustainable economic growth of any country. (Din, Angappan, & Baker, 2017, p. 501). The importance of insurance cannot be denied in economic outlook, for instance insurance spending is 6.23% of world's GDP. (Swiss-Re, 2016, p. 15) More precisely, insurance spending for developed countries is around 8-11% whereas it is 2-4% for developing countries. (Din, Angappan, & Baker, 2017, p. 502).

Researchers who explored the relationship between financial sector and economic growth mainly focused either on banking sector or stock market (Horng, Chang, & Wu, 2012, p. 105); (Levine, 1997, p. 688); (Merton & Bodie, 1995, p. 2). The empirical studies on the relationship between insurance sector and economy are more recent and relatively less extensively studied as compared to the relationship between banking, stock markets and economic growth (Concha & Taborda, 2014, p. 34); (Arena, 2008, p. 930). So it is necessary to investigate the interconnection between insurance activity and economic growth sustainability while studying the impact of financial sector on economic growth of a country.

The objective of this study is evaluating long run relationship between insurance sector and economic growth for Algeria. The remainder of this article is organized as follows. The next section presents literature review in the field of insurance and economic growth. Then methods used in this study are discussed followed by the research findings. The final section concludes the article.

Literature Review:

While there is extensive research on financial development economic growth nexus (Levine, 1997, p. 690), the existing literature provides constricted coverage for the insurance activities and its connotation with economic growth. However in reality, like other financial services such as bank and stock markets, insurance activities play a key role in economic growth. We provide the following justification to highlight the importance of insurance sector towards economic growth.

As (Favara, 2003, p. 4) note, research efforts so far have not examined the impact of other financial effects on economic growth in similar depth. Compared to the vast focusing on bank, stock and bond markets and their respective environment, the insurance sector has hardly been investigated in its role vis-à-vis economic growth. The few research efforts on the insurance-growth nexus, while emphasizing the importance of the topic, concentrated on a few countries over fairly short or distant

time horizons (Catalan, Impavido, & Musalem, 2000, p. 2); (Ward & Zurburegg, 2000, p. 266). Only are concerned with contagion and other possible negative effects the insurance sector can transmit onto the economy. (Kugler & Ofoghi, 2005, p. 4).

And (Ward & Zurburegg, 2000, p. 267) examine the relationship between economic growth over the period of 1961 to 1996 for nine OECD countries. The long-term and short-term dynamics between insurance and economic growth were examined. Long-term relationships are found for Australia, Canada, France, Italy and Japan. On Other hand, (Webb, Grace, & Skipper, 2002, p. 3) examine the impact of financial intermediaries (banks) on economic growth, the result shows that insurance and banking promote capital stock productivity and drive the level of output and investment.

Also (Arena, 2008, p. 935) tests whether there is a causal relationship between insurance sector and economic growth. Using the generalized method of moments (GMM) for dynamic models of panel data for 55 countries between 1976 and 2004 insurance sector has a positive and significant causal effect on economic growth.

(Eze & Okoye, 2013, p. 65) in their paper use cointegration test and error correction model to examine the impact of insurance practice on the growth of Nigerian economy. Insurance premium capital, total insurance investment and insurance sector development are used as measures of insurance development. The paper concludes that there is a significant positive effect of insurance practice on the growth of Nigerian economy. In addition (Mergoum, Kelthoum; Hassani, Hocine; Himrane, Mohammed;, 2018, pp. 1-2) found that the "bancassurance" can contribute to the development of life insurance in Algeria by their theoretical analysis and through the integration of banks and insurance companies in economy to improve the quality of financial services in Algeria.

Researchers also found a long-term relationship between insurance and economic growth. Using Vector Error Correction Model (VECM). (Ghosh, 2013, pp. 38-41) found that insurance industry has a significant and positive effect on economic growth for India. The same result was also recorded by (Ching, Kogid, & Furuoka, 2010, pp. 187-190) who conducted a similar study in Malaysia using VECM. Both (Ghosh, 2013, pp. 41) and (Ching, Kogid, & Furuoka, 2010, pp. 187-190) also applied Granger Causality test to examine the direction of the relationship. (Ching, Kogid, & Furuoka, 2010, pp. 185-187) found that there was a unidirectional relationship in which only economic growth effects the insurance development as opposed to (Ghosh, 2013, p. 41), who found that insurance influence economic growth.

(Chau, Khin, & Teng, 2013, p. 539) extended the analysis in Malaysia by looking into the short and long-term relationship of insurance on economic growth over the period of 32 years ending on 2012. The authors applied co-integration and Granger Causality models and found that insurance penetration coupled with labor force have a significant effect on economic growth in the short-run.

Based on the literature presented above, where the numerous researchers (Arena, 2008, p 935); (Ward & Zurburegg, 2000; Webb, Grace, & Skipper, 2002, p.

3); (Ching, Kogid, & Furuoka, 2010, p. 190); (Chau, Khin, & Teng, 2013, p. 540); (Ghosh, 2013, p. 41) found a significant positive relationship between insurance and economic growth, it is hypothesized that:
Insurance sector significantly affects economic growth in Algeria.

Methodology

In this paper, annual series are generated for the period 1990-2017. Data on real GDP (LnGDP), insurance penetration (LnIns), trade openness (LnOP), banking sector (LnBnk) and inflation rates (LnInf), were retrieved from World Bank data. Gross Domestic Product is used as a proxy of income as constant 2010 US$. Insurance penetration is measured by insurance services imports bop current US$. Trade Openness is the sum of exports and imports of goods and services measured as share of gross domestic product in percent. Banking sector is the ratio of bank liquid reserves to bank assets in percent. Inflation as measured consumer prices in percent. All variables are expressed in natural logarithm.

In terms of methodology, the construction of the empirical model specification in order to capture the hypothesis suggested in theoretical relationship between Gross Domestic Product and Insurance Penetration, Trade Openness, Banking Sector and Inflation Rates. As stated earlier the objective of the present study is to empirically examine the influence of insurance sector on sustainable growth.

One important econometric issue is the verification of the existence of the long-run equilibrium relationship among variables. This can be maintained by employing the Johansen co-integration approach (1991) or Engle-Granger procedure (1987). The Johansen approach is based on the use of the Vector Autoregressive models (VAR), whereas the Engle-Granger procedure is based on testing the stationarity of the regression residuals. However, there is a difference between the two approaches; the EG procedure did not allow the testing of the hypothesis on the co-integrating relationships themselves, but Johansen approach tests the hypothesis of the long run equilibrium relationships. Another important issue is to determine the order of integration of each series I(d) of variables. This can be done by applying ADF test (unit root test).

It is required that the stationarity property of the time series be investigated to ensure the use of OLS or not. This station is due to the fact most of the macroeconomic variables are non-stationary, and hence, the estimation of parameters using OLS obtains a very high R2, and the rise of spurious regression problem may be generated by a non-stationary process. The Augmented Dickey-Fuller (ADF) test is used. The ADF test takes the following form:

$$\Delta y_t = a_0 + \sigma y_{t-1} + \sum_{j=1}^{m} \beta j \Delta y_{t-1} + \varepsilon_t \qquad (01)$$

The test for a unit root is a test of significance of the coefficient of (Y*t-1*) and one cannot reject the hypothesis of unit root when the ADF test-statistic (t-statistic) is less (in the absolute value) than the Mackinnon critical values.

The starting point of cointegration is that the variables are integrated of order one, I(1), it is required to determine existence of at least one linear combination I(0) of these variables that is a stable and non-spurious relationship exist among variables. The Johansen co-integration method was used to determine the number of co-integrated vectors for any given number of non-stationary variables of the same order. Since the Johansen test is very sensitive to the lag length employed in the VECM, the Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC) statistics are employed to determine the optimal lag length.

A linear model representing the relationship between insurance and sustainable growth is as follows, where all variables are in natural logarithms, as indicated by a leading « Ln » in variable names :

$$LnGDP = \beta_0 + \beta_1 LnINS + \beta_2 LnOP + \beta_3 LnBNK + \beta_4 LnINF + u_t \qquad (02)$$

Various modern econometric techniques were introduced to investigate the existence of a long-run relationship among variables. The study uses the Fully modified ordinary least squares (FMOLS) approach to investigate the relationship between Insurance Sector and Gross Domestic Product, as Trade Openness, Banking Sector and Inflation Rates in Algeria. The FMOLS method produces reliable estimates for small sample size and provides a check for robustness of the results.

Fully modified ordinary least squares was developed by Phillips and hansen (Phillips & Hansen, 1990, p. 100), has advantages such as correcting for endogeneity and serial correlation effects. (Narayan & Narayan, 2007, p. 104) Mathematical derivation of the FMOLS model is given in Phillips and Hansen (1990) and not discussed here for brevity. Advocated by stock and watson (1993) (Stock & Watson, 1993, p. 785), DOLS is employed to estimate long-run equilibria that is corrected for potential simultaneity bias among explanatory variables. (Narayan & Narayan, 2007, p. 106)

The fully modified OLS (FMOLS) estimation is based on a direct non-parametric correction and dynamic OLS (DOLS) estimation (Saikkonen, 1991, p. 4), where the correction is achieved by running lead and lag augmented regressions. In this paper we consider FMOLS estimation which requires consistent estimators of the bias terms, this technique modifies least squares to account for serial correlation effects and test for the endogeneity in the regressors that result from the existence of co-integrating relationships. (Shahbaz & Rukhsana, 2008, p. 1455)

Data and Empirical Analysis

This study used annual data from Algeria for the period from 1990 until 2017. In the empirical study, variables such as economic growth, insurance penetration, trade openness, banking and inflation rates were used. The natural logarithm of all variables was taken into account and added to the model.

The integration order of the variables is examined by employing ADF unit root test with only the intercept, and with the intercept and trend.

Table N°1.
The Results of the ADF Unit Root Test

	ADF			
Variables	**Intercept**		**Trend and intercept**	
	t-statistic	P value	t-statistic	P value
LnGDP	1.168220	0.9970	-3.754905	0.0355
d(LnGDP)	-4.788187	0.0007	-4.594488	0.0059
LnINS	-1.385779	0.5741	-2.064172	0.5415
d(LnINS)	-6.974088	0.0000	-4.282927	0.0132
LnOP	-1.665181	0.4368	-1.181271	0.8944
d(LnOP)	-4.861183	0.0006	-4.872145	0.0031
LnBNK	0.908134	0.9940	-1.892742	0.6305
d(LnBNK)	-5.125136	0.0003	-5.580987	0.0006
LnINF	-2.358058	0.1624	-2.419807	0.3619
D(LnINF)	-7.648952	0.0000	-7.677737	0.0000

Note: Critical values are indicated by 1%.

Source: Prepared by researcher based on outputs. (E-views-10)

The results of the ADF unit root test are given in **table N°1**. According to the test results, it was found that sample statistics of LnGDP, LnINS, LnOP, LnBNK and LnINF variables are lower than the critical values in absolute terms, meaning the null hypotheses (H_0: ... *has unit root*) are not rejected and variables were not stable at level. By taking the difference, all variables became stable at the first level I(1).

Table N°2.
Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	74.86374	NA	3.19e-09	-5.374133	-5.132192	-5.304463
1	184.4350	168.5712*	4.97e-12*	-11.87962*	-10.42797*	-11.46159*
2	196.3160	13.70883	1.74e-11	-10.87046	-8.209104	-10.10409

*indicates lag order selected by the criterion LR is sequential modified LR statistics FPE denotes Final prediction error
AIC refers to Akaike information criterion SC is Shwarz information criterion HQ denotes Hannan-Quinn information criterion

Source: Prepared by researcher based on outputs. (E-views-10)

A maximum of two period lag is taken to find the appropriate lag length as the present study is using annual data and on the basis of Shwarz information criterion and Hannan-Quinn information criterion a one period lag is taken.

Johansen Cointegration test results are tabulated in **Table N°3**.

Table N° 3.
Result of Johansen's Cointegration Test

	Trace test		
Null Hypothesis	**Alternative Hypothesis**	**Test Statistic**	**P value**
r*=0	**r≤1**	**107.3638**	**0.0000**
r*=1	**r≤2**	**59.95366**	**0.0025**
r=2	**r≤3**	**27.22153**	**0.0963**
r=3	**r≤4**	**11.85655**	**0.1639**
	Max. eigenvalue test		
Null Hypothesis	**Alternative Hypothesis**	**Test Statistic**	**P value**
r*=0	**r≤1**	**47.41012**	**0.0007**
r*=1	**r≤2**	**32.73213**	**0.0099**
r=2	**r≤3**	**15.36499**	**0.2641**
r=3	**r≤4**	**11.84496**	**0.1166**
Cointegration Vector : LnGDP=+0.554867 LnINS* + 0.433061 LnOP*** +0.016539 LnBNK+ 0.000587 LnINF***			
[0.04979]	**[0.10151]**	**[0.01256]**	**[0.00642]**

Note: r* is the number of cointegrating vectors under the null hypothesis. Figures in brackets are t-statistics.

Source: Prepared by researcher based on outputs. (E-views-10)

The results of cointegration analysis show that the trace statistics and maximum Eign values are greater than the critical values at 5 percent and 10 percent level of significance respectively, for no cointegration (r=0) and less than the critical values for at least two cointegration (r≤2). Hence it is evident that there is two cointegrating vector among the variables included in the model. In other words, there is two long run equilibrium relationship between LnGDP, LnINS, LnOP, LnBNK and LnINF of Algeria.

The next step is where equation (02) is estimated to examine the long-run relationship among the variables. As suggested by (Narayan & Narayan, 2007). Since the observations are annual, we choose 1 as the maximum order of lags in the FMOLS and estimate for the period of 1990-2017. The calculated F-statistics for the cointegration test is displayed in **Table 4**. The critical value is reported together in the same table which based on critical value suggested by (Narayan & Narayan, 2007).

Table N°4.
FMOLS results

Method : Fully Modified Least Squares (FMOLS)				
Variable	Coefficient	Std. Error	t-statistic	Prob
LnINS	0.202226	0.029375	6.884200	0.0000
lnOP	0.064621	0.059111	1.093220	0.2861
lnBNK	-0.093290	0.006567	-14.20663	0.0000
LnINF	-0.005009	0.003051	-1.641505	0.1149
C	11.94130	0.115351	103.5213	0.0000
R-Squared	0.985261	Adjusted R-Squared		0.982581

Source: Prepared by researcher based on outputs. (E-views-10)

Regarding the insurance penetration and the banking sector variables are significant, the trade openness is positive but not significant at 5%, while inflation rates is negative and not significant. As a result a 1% increase in GDP leads to 0.20% increase in insurance penetration, and 0.09% decrease in banking sector. The close of long-run coefficient for all estimations confirm the robustness of the estimated results.

Conclusion

Economic, endogenous and static theory of risk and insurance premised that financial institutions promote economic growth through different mechanisms such as intermediation role and efficient allocation of resources. This article investigates whether insurance industry, being part of the financial system, promotes economic growth for Algeria.

Results reveal that insurance sector and banking are statistically significant at 5 per cent confidence level, but the trade openness and inflation rates are not significant. The possible reason for this insignificant relationship between trade openness and economic growth might be that the banking industry is an emerging industry. Results indicate also insignificant relationship between inflation rates and economic growth. Theories and previous studies about the relationship between inflation and economic growth have shown that there might be no relationship (Sidrauski, 1967).

In sum, it is suggested that government should play a more positive role to nurture the insurance sector and then integrate the same with economic growth. Undoubtedly, in this dynamic area, 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 Algeria need to focus on insurance industry by removing some of the obstacles in the insurance market- economic growth nexus, such as tax and regulatory framework, and drive towards more insurance industry activities to enhance to economic growth, and decrease inflation rates. Algerian government should pay higher intention to bring the stable financial environment in order to promote the insurance-growth nexus. The study is restricted to insurance 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 macroeconomic determinants to this study can add other variables to this empirical research.

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How to cite this article:

Hallam, Z., (2020). Impact of Insurance on Economic Growth in Algeria during the Period 1990-2017, ***Dirassat Journal Economic Issue***, 11(1). pp.521-530.