An econometric study on the role of reinsurance in improving the accounting results of Algerian insurance companies.

دراسة قياسية حول دور إعادة التأمين في تحسين النتائج المحاسبية لشركات التأمين الجزائرية.

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Abstract:

The aim of this study is to measure the role of reinsurance ceded premiums in improving the accounting results of Algerian insurance companies between 2009 and 2018 through the use of panel data, based on analytical descriptive approach, by using the annual reports of the Algerian Finance Ministry on the insurance activity. We concluded that there is a positive impact between the reinsurance ceded premiums and the accounting results of Algerian insurance companies. The more reinsurance ceded premiums, the more the accounting results increases in Algerian insurance companies and this result fit with economic theory.

Keywords: Reinsurance; ceded premiums; accounting results; insurance companies; panel data.

Jel Classification Codes: C23; G32; G22; O11.

مستخلص:

تهدف هذه الدراسة إلى قياس دور حجم الأقساط المتنازل عنها في إطار عمليات إعادة التأمين في تحسين النتائج المحاسبية لشركات التأمين الجزائرية خلال الفترة 2009-2018 من خلال استخدام نماذج بانل وبالاعتماد على المنهج الوصفي التحليلي، والبيانات مأخوذة من التقارير السنوية لوزارة المالية عن نشاط التأمين في الجزائر. تم التوصل من خلال هذه الدراسة إلى وجود أثر إيجابي بين حجم الأقساط المتنازل عنها والنتائج المحاسبية لشركات التأمين الجزائرية، حيث كلما زاد حجم الأقساط المتنازل عنها كلما ارتفع النتائج المحاسبية لشركات التأمين الجزائرية، وهو ما يتماشى مع مخرجات النظرية الاقتصادية.

الكلمات المفتاحية: إعادة التأمين؛ أقساط متنازل عنها؛ النتائج المحاسبية؛ شركات التأمين؛بيانات بانل.

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تصنيف JEL: C23 ؛ G23 ؛G22؛ O11.

Introduction

Insurance companies rely on the law of large numbers to help estimate the value and frequency of future claims they will pay to policyholders. When it works perfectly, insurance companies run a stable business, consumers pay a fair and accurate premium, and the entire financial system avoids serious disruption.

Reinsurance ceded refers to the portion of risk that a primary insurer passes to a reinsurer. It allows the primary insurer to reduce its risk exposure to an insurance policy it has underwritten by passing that risk to another company. Primary insurers are also referred to as the ceding company while the reinsurance company is also called the accepting company. In exchange for taking on the risk, the reinsurance company receives a premium, and pays the claim for the risk it accepts.

Algerian authorities are interested in reinsurance activity due to its international nature. It is a factor that can either attract or reduce the outward flow of hard currency. Laws issued may affect the insurance market for both ceding company and central reinsurance company.

The problem of this research was formulated through the following question:

What is the impact of reinsurance ceded premium on the accounting results of Algerian insurance companies?

To answer this question, the following hypothesis have been proposed:

There is a positive impact between the reinsurance ceded premiums and the insurance margin of the Algerian ceding companies.

Research objectives: This study aims to achieve the following points:

- Identify the basics of reinsurance;
- Describe the structure of the insurance and reinsurance market in Algeria; and evolution of the reinsurance in Algeria;
- Analyze the reinsurance in Algeria;
- Measure the impact of reinsurance ceded premium on the insurance margin of Algerian ceding companies.

Research methodology: In order to investigate the purpose of the study, the study was based on an **analytical descriptive approach**.

The data was obtained from the annual reports of the Ministry of Finance on insurance activities in Algeria and the financial reports of the Central Reinsurance Company between the years 2009 and 2018. Statistical data was analyzed by using EVIEWS and Microsoft Excel to calculate averages and graphs.

1. Concept and definition of reinsurance:

1.1. Reinsurance: The reinsurance is a contract in which an insurance company (the primary insurer or reinsured) cedes to another insurance company (the reinsurer) all or half of the risk of loss. In return for agreeing to indemnify the reinsured for losses that may occur, the reinsurer receives premiums from the reinsured.(Kyriaki, 2013, p. 19) A reinsurance process is a contractual arrangement between a reinsurer and a professional insurer (called cedant), who alone is completely responsible to the policyholder, under which, in return for remuneration, the former bears all or part of the risks assumed by the latter and agrees to reimburse according to specified conditions all or part of the sums due or paid by the latter to the insured in case of claims. .(Deelstra & Guillaume, 2014, p. 45) Reinsurance is a contract in which an insurance company (the primary insurer or reinsured) cedes to another insurance company (the reinsurer) all or half of the risk of loss. In return for agreeing to indemnify the reinsured for losses that may occur, the reinsurer receives premiums from the reinsured.(Noussia, 2013, p. 19) Essentially, reinsurance can be characterized as insurance to face larger risks for insurance companies that the latter cannot handle on their own.(Chasseray, Eldin, & Lefebvre, 2017, p. 15)

1.2. Importance of Reinsurance

• It helps increase the underwriting capacity of an insurance company, where an insurance company, when insuring part or all of its insurance business, can accept some insurances that exceed its retention limit, and then it can reinsure the excess limit with another insurance company;
• It contributes to the stability of profits where reinsurance can reduce the effects of large fluctuations in the financial results of the insurance company due to changes in economic and social conditions and natural disasters faced by the country in which the insurance company is located;
• It reduces the unearned premium provision, as the reinsurance operation reduces the amount of the earned premium provision required by law.
• It protects against losses as the reinsurance operation provides protection reduces losses, as the reinsurance company pays part or all of the losses that exceed the company's retention limit;

• It excludes certain types of insurance, as reinsurance allows the transfer of the insurer's obligations from the applicable insurance to another insurer, and the insurer remains financially responsible for covering the insurance policies;

• It helps receive advice and assistance from the reinsurer as the reinsurer provides assistance related to pricing, retention limits, and policy cover;

• It helps protect insurance companies from bankruptcy. If an insurance company insures a significant risk, it may go bankrupt when the risk occurs, but when it reinsures that risk with one or more reinsurance companies, the reinsurance companies will pay a certain percentage of the loss that equals to the percentage that was accepted for reinsurance. This will keep an insurance company in a safe position;

• Reinsurance methods are divided into proportional and non- proportional insurance agreements. The proportional agreements determine the share that the company wants to bear from the size of the insurance, and place the remaining balance with the reinsurance company. Under such agreements, several insurance companies are used and insurance premiums and losses are distributed proportionally among the insurance or reinsurance companies. As for the non-proportional agreements, they depend on the loss ratio that the insurance company wants to bear. (Almubaydeen, 2020, p. 309)

1.3. The Purpose of reinsurance: An insurance company (or ceding company because they cede the risks) purchases a reinsurance treaty from a reinsurance company. A reinsurer company's roles are to: protect the insurer's own funds against the outcome deficit, contribute to increasing the insurer's solvency margin, increase the underwriting possibilities, decrease the insurance company's need for funds and assist in better risk management. Reinsurance provides coverage for all kinds of risks. The reinsurance companies diversify the risks by having a portfolio spread over risk and geography. The reason insurance companies buy reinsurance is to eliminate the financial responsibility for the risks they've taken on. It allows them to free economic and risk capital that they put aside to pay for the losses, worry less about the solvency problems that they face as well as reduce their risk of bankruptcy. They help in stabilizing insurance by absorbing some of their losses. By doing so, it allows for the companies to reduce their risk exposure and their own capital requirement. With the aid of reinsurance, insurers will face today's risks and remain solvent, as well as keep new customers' rates competitive. The cedants (insurance companies) have an option to purchase reinsurance often if the risk they face is high or unpredictable or if they are specialist insurers with a fairly limited range of

risk diversification. In these situations, they rely heavily on reinsurance. (Chasseray, Eldin, & Lefebvre, 2017, pp. 16-17)

1.4. The role of Reinsurance: Why an insurance firm is keen to purchase reinsurance? The key role of insurers is to take risks. This is similar to the business model of other financial organizations, and both forms leverage the capital provided by shareholders through raising debt. However, insurers raise debt by selling policies to insureds, which makes the debt very risky (due to uncertainty around the timing and severity of claims), whereas financial debt would typically rather have pre-determined expiry and face value. This leveraging activity is a competitive advantage, but also makes the companies vulnerable to distress and insolvency, creating demand for risk management. Among the available risk management tools, risk transfer through reinsurance then plays an important role in improving the company's overall risk profile. (Albrecher, Beirlant, & Teugels, 2017, p. 2)

The main motivations for the insurer to buy reinsurance as a means of risk transfer (several of which are not independent of each other) are:

● **Stabilizing the accounting results:** Entering a reinsurance contract reduces the volatility of the cedent's financial result, as random losses are replaced by a (typically deterministic) premium payment. That is, reinsurance can be a means to steer the volatility of an insurance company towards a desired level, and the latter can have particular advantages (e.g., with respect to taxes, capital requirements and market expectations). (Albrecher, Beirlant, & Teugels, 2017, pp. 2-3)

● **Reducing required capital:** Reducing the aggregate risk will reduce the required capital to bear such risks, and in view of capital costs this may be desirable. Concretely, if the reinsurance premium (together with the administration costs) is smaller than the gain resulting from the corresponding reduction of capital, the reinsurance contract is desirable. In fact, due to the ongoing shift towards risk-based regulation, the notion of capital and its management becomes a central issue for insurance companies, and reinsurance then should be understood as a tool in this context. This corresponds to an important finance function of reinsurance as a substitute for capital, freeing up capacity. (Albrecher, Beirlant, & Teugels, 2017, p. 3)

● **Increasing underwriting capacity:** In the presence of a reinsurance contract, only a certain part of the risk is assumed by the insurer, and hence under otherwise identical conditions an insurance company can afford to underwrite more and larger policies, which may be desirable for various reasons, including market share targets, testing and entering of new markets,

gaining (data) experience in certain business lines or regions etc. It also can lead to enhanced liquidity. (Albrecher, Beirlant, & Teugels, 2017, p. 3)

● **Support in risk assessment, pricing, and management:** In certain situations an insurance company does not have enough data points or manpower available to analyze the risks (in particular their tails), and passing on those risks to an entity with respective experience is a natural procedure, which is often much cheaper than dealing with such risks by other means. This also includes business expansions to new regions or business lines, in which the reinsurer may already have experience from earlier activities. In fact, reinsurance contracts often have a certain consultancy component, as the reinsurer may share its expertise and data on the respective risks with cedent. (Albrecher, Beirlant, & Teugels, 2017, p. 4)

On the society level, reinsurance allows insurers to write more business, which makes insurance more broadly available and affordable. This can foster economic growth and increase stability at large. Reinsurance enables risks to be insured that otherwise would not be insurable, and assigning premiums to (i.e., quantifying) risks can also provide incentives for more risk-adequate behavior and possibly risk prevention. For all these reasons, reinsurance serves as a tool to increase the efficiency of the marketplace. When designing reinsurance contracts, all these aspects will play some role. The goal of this book is to focus on the actuarial elements involved in the process as well as the statistical challenges that appear in this context. (Albrecher, Beirlant, & Teugels, 2017, p. 4)

2. Reinsurance in Algeria.

2.1. Definition: The Algerian legislator defined reinsurance as contract or treaty, it is an agreement by which the insurer or ceding company discharges to a reinsurer or assignee all or part of the risks it has insured. In matters of reinsurance, the insurer remains solely liable to the insured. (ORDONNANCE N ° 95-07, 1995) Reinsurance is a transaction by which an insurer insures itself with a company (reinsurer) for some or all of the risks it has guaranteed, in return for the payment of a premium. (Conseil National de la Comptabilité, 2011, p. 107)

2.2. The History of reinsurance in Algeria: The development of reinsurance in Algeria is shown in the table below:

Table number (1): The History of reinsurance in Algeria.

The date	The Event
Before	The Reinsurance operations were not in Algeria. The French public government

1962	was responsible for insurance and/or reinsurance activity in Algeria.
1962	The creation of the CAAR as the first Algerian insurance company.
1963	According to the order 63-197 of June 8th 1963, the reinsurance operations were covered by the CAAR company, with insurance companies in the Algerian market ceded 10% of the total premiums.
1966	The monopoly of all insurance and reinsurance by the Algerian State under Executive Decree N° 66-127.
1973	The creation of the Central Reinsurance Company "CCR" by the Order N° 73-54 of October 1st, 1973.
1995	Under Executive decree n°95-409, of December 9th, 1995, relating to compulsory reinsurance cession, The minimum cession rates of the risks to be reinsured are determined as following: 80% for industrial risks; 40% for risks of transport; 25% for other risks.
1998	According to Executive Decree No. 312-98 of 30/09/1998, the Insurance companies are obliged under current regulations to cede a portion of premiums to the Central Reinsurance Company (CCR), for all lines of business, as follows: 10% for industrial risks; 5% for transport risks; 5% for other risks.
2002	Under Decision No. 43 of the Ministry of Finance on July 29th , 2002: - The compulsory cession instituted by Order 95/07 relating to insurance is made to the benefit of the national reinsurer (CCR). - A right of priority is granted to CCR over all facultative cessions. In order to benefit from this right, CCR must offer equal if not better conditions than those offered by foreign reinsurers. - Reinsurance assignments must be made to reinsurers rated, at least, BBB.
2004	The CCR company benefits from a State guarantee for the reinsurance coverage of the risks of natural disasters.
2006	The Algerian legislator approved Article 208 of Law No. 06-04 issued on February 20th, 2006 amending and supplementing Ordinance No. 95-07: It can be instituted the responsibility of the approved insurance companies to make a compulsory assignment on the reinsurance risks. The minimum rate, the beneficiary of this cession as well as the conditions and modalities of application of this article shall be specified by regulation".
2009	The minimum capital of reinsurance companies is set at five (5) billion dinars.
2010	Executive Decree No. 10-207 of September 9th, 2010, amending and supplementing Executive Decree No. 95-409 of December 9th , 1995, relating to compulsory ceding in reinsurance, sets the minimum rate of compulsory ceding of risks to be reinsured at 50% for the benefit of the (CCR).
2011	Executive Decree n° 11-422 of December 8th, 2011 approving authorization to exercise, on Algerian insurance market, issued to foreign reinsurance brokers.
2013	Executive Decree No 13-114 and 13-115 of March 28th, 013 on the regulated commitments of insurance and/or reinsurance companies.

Source: Prepared by researchers, based on the executive decrees listed in the table above.

2.3. The Characteristics of reinsurance in Algeria:

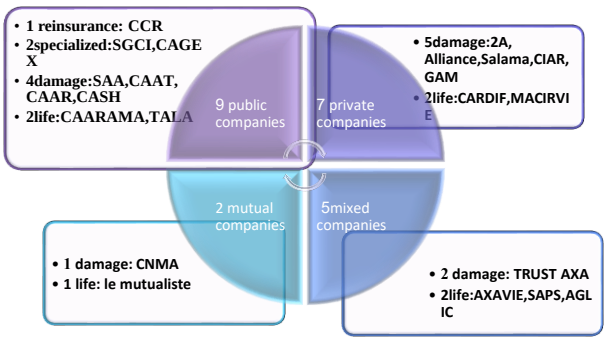
- The reinsurance activity in Algeria is carried out mainly by the Central Company of reinsurance (CCR), which remains the sole operator specialized in reinsurance on the Algerian market;
- The obligatory cession in favor of the CCR, fixed at a minimum of 50%, of the amount of reinsurance ceded;
- A right of priority for the CCR in facultative cessions. The benefit of this right is acquired when the CCR presents offers of reinsurance equal to or better than those obtained on the market international reinsurance;
- Use of foreign reinsurers with a minimum rating of BBB in order to promote reinsurance programs with high sufficient levels of security. (Ministère des finances, 2018, p. 28)

3. The Study variables:

3.1. The Algerian insurance market: There are 23 companies in Algerian insurance market divided as follows:

- One company is specialized in reinsurance (CCR);
- Two companies are specialized in the insurance of real estate credit and (SGCI); export credit (CAGEX);
- Twelve companies are specialized in damage (Non-life) insurance;
- Eight companies are specialized in life insurance.

Figure number (1): Structure of the Algerian insurance market.



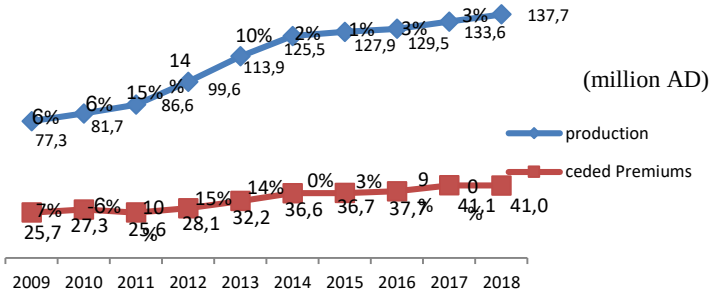
Source: (Ministère des finances, 2018, p. 6)

Overall, these companies generated sales 143.7 billion AD, broken down as follows:

- Direct insurance: 137.7 billion AD, including 12.7 billion AD in insurance
- Specialized insurance: 1.7 billion AD.
- Reinsurance: 4.3 billion AD (the international acceptances carried out by CCR). (Ministère des finances, 2018, p. 7)

3.2. The Change in global reinsurance ceded premiums 2009-2018: The changes of the premiums cessions by the Algerian insurance companies and compare it to the total production in the following figure:

Figure number (2): The Global ceded premiums in Algeria (2009-2018)

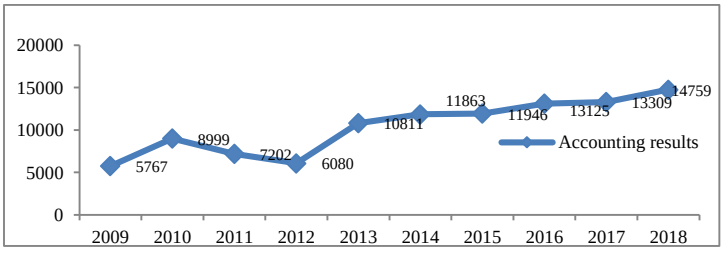


Source: Prepared by researchers based on the Ministry of Finance reports on insurance activity in Algeria for the years 2009-2018.

- In general, the more total production, the more ceded premiums;
- The cession process is a transfer of premiums from insurance companies to reinsurance companies;
- The cession rate of insurance companies in general ranges between 28 and 34%, which indicates that insurance companies retention's between 66 and 72% of the written premiums;
- In the period between 2009-2018, the average retention rate for the insurance companies is 70% of total premiums issued, this indicates their capacity to take risks; In return the average cession rate for it is 30%.

3.3. The accounting results of Algerian insurance companies (2009-2018): The changes of the accounting results of Algerian insurance companies between 2009-2018 in the following figure:

Figure number (3): The Global accounting results of Algerian insurance companies (2009-2018) (Unit: million AD)



Source: Prepared by researchers based on the Ministry of Finance reports on insurance activity in Algeria for the years 2009-2018.

For the 2018 financial year, the net accounting results increased by 13%. Their amount increased from 13.3 billion DA in 2017 to 14.7 billion DA in 2018.

A large dispersion is noted between the different companies as regards the accounting results obtained.

4. The econometric study "the impact of reinsurance ceded premiums on the insurance margin of Algerian ceding companies".

4.1. Description of the study model: Panel model was adopted, which is defined as a cross-sectional time-series dataset, which, ideally, provides repeated measurements of a certain number of variables over a period of time on observed units, such as individuals, households, firms, cities, and states. (Eom, Sock, & Xu, 2006, p. 572). This is based on the studies that dealt with the topic of research in whole or in part, and it is related to study of "the impact of reinsurance operations on earnings management in the 16 Jordanian insurance companies listed on the Amman Stock Exchange for the period 2014-2018" (Almubaydeen, 2020) and study of "Reinsurance and Systemic Risk: The Impact of Reinsurer Downgrading on Property-Casualty Insurers". (Park & Xiaoying, 2014).

4.2.The stabilization of variable study: The table below reveals stability testing.

Table number (2): The examining stabilization.

degree	variables	Stability testing									Decision
		LLC			ADF			PP			
		With constant	With constant &general trend	Without constant &general trend	With constant	With constant &general trend	Without constant &general trend	With constant	With constant &general trend	Without constant &general trend	
At level	Accounting results	-11.6230 (0.0000)	-2.98924 (0.0014)	-2.52408 (0.0058)	35.6052 (0.4872)	32.5468 (0.4399)	53.8627 (0.1037)	33.5237 (0.5917)	100.776 (0.0000)	36.2129 (0.7222)	No stability
	R.ceded premiums	-0.52935 (0.2983)	0.37158 (0.6449)	0.35370 (0.6382)	62.2583 (0.0227)	43.5727 (0.4044)	52.9184 (0.1205)	35.6936 (0.7428)	35.3520 (0.7561)	19.1356 (0.9991)	No stability
First difference	Accounting results	-2.50385 (0.0061)	-2.31009 (0.0104)	-7.83090 (0.0000)	56.2169 (0.0051)	35.3269 (0.3138)	90.0103 (0.0000)	178.453 (0.0000)	166.410 (0.0000)	207.420 (0.0000)	Stable
	R.ceded premiums	-0.33443 (0.6310)	-5.77768 (0.0000)	-2.90089 (0.0019)	71.7702 (0.0028)	80.8881 (0.0003)	121.249 (0.0000)	133.948 (0.0000)	170.032 (0.0000)	195.791 (0.0000)	Stable
Second difference	Accounting results	-1.70763 (0.0439)	-2.78547 (0.0027)	-13.8079 (0.0000)	67.7388 (0.0002)	39.5911 (0.1673)	145.416 (0.0000)	245.372 (0.0000)	188.016 (0.0000)	278.967 (0.0000)	Stable
	R.ceded premiums	-6.49113 (0.0000)	-6.13428 (0.0000)	-5.23091 (0.0000)	125.181 (0.0000)	90.8576 (0.0020)	203.128 (0.0000)	255.892 (0.0000)	224.248 (0.0000)	326.155 (0.0000)	Stable

Source: Prepared by researchers.

All tests show that time series are unstable at the level and stable in the first and second differences as indicated the table above.

4.3. Test of common integration "PEDRONI": After testing the stability of unit root, we turn to common integration test as shown in the following table:

Table number (3): "PEDRONI" Test.

PEDRONI Test			
Com.AR	Statistic	Statistical Weighted	Probability
V	0.409372	-0.783590	0.7834
RHO	-2.826930	-1.626052	0.0520
PP	-7.506034	-5.209982	0.0000
ADF	-1.822145	-1.839122	0.0329
Indiv.AR	Statistic		Probability
RHO	0.255421		0.6008
PP	-8.358724		0.0000
ADF	-1.663003		0.0482

Source: Prepared by researchers.

The above table indicates that there are 7 tests of PEDRONI common integration less than 0.05 and there are only 3 values more than 0.05. So there is common integration of the study variables.

4.4. The Available Models: The table below shows the evaluation results of three panel data models: Pooled Regression Model (PRM), Fixed Effects Model (FEM) and Random Effects Model (REM). Then we perform tests to determine the appropriate model for this study:

Table number (4): The three panel data models.

The dependent variable: Accounting results			
Period: 2009-2018	/ n=10/		Total observations =210
Explanatory variables	PRM	FEM	REM
constant	132.4368 (0.0066)	76.63892 (0.0767)	88.42507 (0.4971)
Reinsurance ceded premiums	0.158756 (0.0000)	0.193590 (0.0000)	0.186232 (0.0000)
Number of observations	210	210	210
R-squared	0.325366	0.899176	0.253175
Adjusted R-squared	0.322122	0.887914	0.249585
Prob (F- statistic)	0.000000	0.000000	0.000000

Source: Prepared by researchers (Appendices 1,2 and 3).

The table shown that all models results are close to each other, reinsurance ceded premiums has positive moral effect on accounting results of 15 to 19%. And the explanatory power for Pooled Regression Model estimated

32% and Random Effects Model estimated 25%, whereas fixed effects model has more explanatory power, estimated at 95% However, it results from adding the dummy variables.

4.5. The appropriate model: To choose between suggested models, we rely first on "LM test Breusch-Pagan".

4.5.1.LM test: Breusch- Pagan test has two hypothesis:

Null hypothesis (H_0): Random or fixed effects model is the appropriate model; when the testing shows less than 5% significant moral.

The Alternative hypothesis (H_1): Pooled effects model is the appropriate model, when the testing shows more than 5% significant moral.

The results were as follows:

Table number (5): The LM test

Lagrange multiplier (LM) test for panel data
Date: 08/21/20 Time: 09:08
Sample: 2009 2018
Total panel observations: 210
Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	654.4660 (0.0000)	2.512622 (0.1129)	656.9786 (0.0000)
Honda	25.58253 (0.0000)	-1.585125 (0.9435)	16.96873 (0.0000)
King-Wu	25.58253 (0.0000)	-1.585125 (0.9435)	12.93530 (0.0000)
GHM	-- --	-- --	654.4660 (0.0000)

Source: output of eviews 10.

The test showed that, it doesn't have to rely on alternative hypothesis, which provide that the pooled regression model is the appropriate model, where the significant moral was less than 5% estimated at 0.000%, and we have to choose between the fixed and random effects model. In order to choose between them we rely on Hausman test.

4.5.2. The Hausman test: The Hausman test is used for the differentiation between fixed and Random effects model. The null hypothesis based on random effect capacity is the most efficient:
H_0: Random effects model is the appropriate model;
H_1: Fixed effects model is the appropriate model.
The results were as follows:

Table number (6): The Hausman test

Kind of test	Value of test	P.value
Hausman test	0.447633	0.5035

Source: Prepared by researchers. (appendice 5)

The above table indicates that the value of probability is 0.5035 which is greater than 0.05, so we accept H_0 and reject H_1, means the Random effects model is the appropriate model.

5.6.Explanation: After the selection tests, we conclude that the appropriate model is Random effects model:

Table number (7): The appropriate model (Random effects model)

Dependent variable : Accounting results	
Period: 2009-2018 n=10	
Explanatory variables	Random effects model
Constant	88.42507 (0.4971)
Reinsurance ceded premiums	0.186232 (0.0000)
Number of observations	210
R-squared	0.253175
Adjusted R-squared	0.249585
Prob (F- statistic)	0.000000

Source: Prepared by researchers

The estimated model's equation:

$$\boldsymbol{Accounting\ results_t} = \mathbf{88.425} + \mathbf{0.186}\ \boldsymbol{Reissurance\ ceded\ premiums_t} + \boldsymbol{\varepsilon_t}$$

Where the value of R-squared was 0.253175, the model explains 25% of dependent variable. And the rest are down to other factors.

The results showed that Reinsurance ceded premiums variable had a positive impact on dependent variable (accounting results of ceding companies) and at significant moral 0.05

We note that the value of coefficient of determination is equal to 0.25 that means 25% of changes in accounting results of ceding companies caused by reinsurance ceded premiums, also Fisher's statistical value and its accompanying probability that equal 0.0000 which is less than 0.05 indicate that the model as a whole has a statistical significance at 5%, through the results we note that the value of reinsurance ceded premiums is 0.186232.

If the reinsurance ceded premiums value increases by 1 million AD, the accounting results of ceding companies increments by 186232 AD; this effect is statistically significant because the value of statistical probability of ''Student" T-test is 0.0000 which is less than 0.05. (appendice3)

Conclusion: Through our study, we concluded that:

- The Algerian insurance and reinsurance companies have a high retention capacity Insurance companies in Algeria cede more than the obligatory cession rate to the CCR which reduces outward flow of hard currency therefore raising the turnover of the CCR Company;
- The insurance companies cede risks that are beyond their capacity to protect themselves and achieve a positive accounting results;
- We concluded that there is a positive impact between the reinsurance ceded premiums and the accounting results of the Algerian insurance companies;
- The more the reinsurance ceded premiums, the more the insurance margin increases in Algerian ceding companies.

This study suggests the following recommendations and suggestions:

✓ Review within the rate of legal ceded imposed on Algeria insurance companies

✓ Expand the acceptance operations within the frame work of insurance companies.

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Appendices:

Appendice 1

Dependent Variable: RESULTAT_COMPTABLE
Method: Panel Least Squares
Date: 08/21/20 Time: 08:58
Sample: 2009 2018
Periods included: 10
Cross-sections included: 21
Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REASSURANCE	0.158756	0.015851	10.01575	0.0000
C	132.4368	48.23782	2.745496	0.0066

R-squared	0.325366	Mean dependent var	386.7381
Adjusted R-squared	0.322122	S.D. dependent var	721.8989
S.E. of regression	594.3634	Akaike info criterion	15.62234
Sum squared resid	73479711	Schwarz criterion	15.65421
Log likelihood	-1638.345	Hannan-Quinn criter.	15.63522
F-statistic	100.3152	Durbin-Watson stat	0.233891
Prob(F-statistic)	0.000000		

Appendice 2

Dependent Variable: RESULTAT_COMPTABLE
Method: Panel Least Squares
Date: 08/21/20 Time: 08:58
Sample: 2009 2018
Periods included: 10
Cross-sections included: 21
Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REASSURANCE	0.193590	0.024781	7.811917	0.0000
C	76.63892	43.05692	1.779944	0.0767

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.899176	Mean dependent var	386.7381
Adjusted R-squared	0.887914	S.D. dependent var	721.8989
S.E. of regression	241.6863	Akaike info criterion	13.91202
Sum squared resid	10981504	Schwarz criterion	14.26267
Log likelihood	-1438.762	Hannan-Quinn criter.	14.05377
F-statistic	79.84002	Durbin-Watson stat	1.635751
Prob(F-statistic)	0.000000		

Appendice 3

Dependent Variable: RESULTAT_COMPTABLE
Method: Panel EGLS (Cross-section random effects)
Date: 08/21/20 Time: 08:59
Sample: 2009 2018
Periods included: 10
Cross-sections included: 21
Total panel (balanced) observations: 210
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REASSURANCE	0.186232	0.022207	8.386010	0.0000
C	88.42507	129.9927	0.680231	0.4971

Effects Specification

	S.D.	Rho
Cross-section random	567.8426	0.8466
Idiosyncratic random	241.6863	0.1534

Weighted Statistics

R-squared	0.253175	Mean dependent var	51.58726
Adjusted R-squared	0.249585	S.D. dependent var	278.6273
S.E. of regression	241.3652	Sum squared resid	12117484
F-statistic	70.51242	Durbin-Watson stat	1.467448
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.315620	Mean dependent var	386.7381
Sum squared resid	74541186	Durbin-Watson stat	0.238550

Appendice 4

Pedroni Residual Cointegration Test
Series: RESULTAT_COMPTABLE REASSURANCE
Date: 08/21/20 Time: 09:04
Sample: 2009 2018
Included observations: 210
Cross-sections included: 21
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	0.409372	0.3411	-0.783590	0.7834
Panel rho-Statistic	-2.826930	0.0023	-1.626052	0.0520
Panel PP-Statistic	-7.506034	0.0000	-5.209982	0.0000
Panel ADF-Statistic	-1.822145	0.0342	-1.839122	0.0329

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	0.255421	0.6008
Group PP-Statistic	-8.358724	0.0000
Group ADF-Statistic	-1.663003	0.0482

Appendice 5

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.447633	1	0.5035

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
REASSURANCE	0.193590	0.186232	0.000121	0.5035

Cross-section random effects test equation:
Dependent Variable: RESULTAT_COMPTABLE
Method: Panel Least Squares
Date: 08/21/20 Time: 08:59
Sample: 2009 2018
Periods included: 10
Cross-sections included: 21
Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	76.63892	43.05692	1.779944	0.0767
REASSURANCE	0.193590	0.024781	7.811917	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.899176	Mean dependent var	386.7381
Adjusted R-squared	0.887914	S.D. dependent var	721.8989
S.E. of regression	241.6863	Akaike info criterion	13.91202
Sum squared resid	10981504	Schwarz criterion	14.26267
Log likelihood	-1438.762	Hannan-Quinn criter.	14.05377
F-statistic	79.84002	Durbin-Watson stat	1.635751
Prob(F-statistic)	0.000000		