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Estimating the Demand Function of Civil Liability Insurance of Vehicle Owners Against Third Parties in Iran (Period of 1979-2012)

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Abstract: In this research, the methods of vector auto-regression or Auto-Regressive Distributed Lag Model (ARDL), error correcting model of ECM, vector regression of VAR, Johansen-Juselius co-integration test, engel-granger causality have been used in order to discuss and study the effective factors on the demands for the third person insurance and the way of how to affect and the amount of affections of each of these influencing factors and also to considerate short term and long term relations between the variables during 1357-1391 and in order to considerate the durability of factors unit root tests of variables DF and ADF in eviews and microfit software have been utilized. Regarding to this matter that the ratio of logarithm of gross domestic product to basic prices is positive means that the demands for the third person insurance is such an ordinary goods and because this ratio 0.698 is between zero and one (0<0.698>1) it can be concluded the income elasticity is greater than zero and less than one. Regarding to being less than one and also regarding to calculations done, the third person insurance is considered as an indispensable goods and a pivotal service. In the other side regarding to the ratio of the variable of logarithm with respect to the surplus value of the services of financial and monetary institutions to basic prices is achieved as a price variable which is equaled to absolute value -0.317 that this negativity is corresponded with theoretical foundations and principles of demand which means that there is a reverse relation between price variable (premium rate) and the demand for the third person insurance. The amount (size) of this ratio shows that for instance with a 100% change in variable, the demand for the third person insurance changes about 32% in the opposite direction and this indicates the influence of price factor in the demand for the third person insurance.

Key words: ARDL, ECM, VAR, effective, demand

INTRODUCTION

In the competitive market and with the entry of private insurance companies in country's insurance market, consumers of insurance services have more freedom to choose their insurer, so pay attention to the effective factors in the customers' demand such as their demands and tastes in order to expand market share and penetration in potential markets is an imperative and inevitable issues for insurers. The subject of this is "estimating the demand function of civil liability insurance of vehicle owners against third parties in Iran (period of 1979-2012)". In this study, we have tried to introduce the factors affecting demand for third party insurance and then determine the direction and intensity of each of them on the demand for third party insurance.

PROBLEM STATEMENT

Motor vehicles and common examples are including devices that in spite of providing comfort and interests for owners, would inflict harm to others or third parties. That is why the issue of compensation the losses incurred by these devices has long been considered. With the increasing development of technology in toda's world and consequently, increase the level of social welfare, use of cars even in the daily affairs of man has increased greatly and today, transportation and mobility is impossible without a vehicle and ownership of a private car which was previously a luxury item has become an indispensable commodity. Apart from the advantages of cars and all kinds of vehicles, a significant increase in the number of cars has created serious problems for humans and the environment (such as other technologies). These problems include: environmental pollution, traffic, deaths caused by vehicle crashes and so on and they have a significant impact on creating social problems.Thus, investigate and find solutions to the problems related to these vehicles and its related human, psychological and social affairs is very important and have been placed in priorities. In order to reduce accidents, the safety of vehicles and law enforcement, to reduce or neutralize the

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Table 1: Vehicles covered by third party insurance

Years	The number of vehicles (millions)	The number of third part insurance (million)	The percentage of covered vehicles by insurance (%)
2008	19.4	11.9	61
2009	21.4	12.7	59
2010	23.5	13.6	58
2011	26.0	15.1	58
2012	28.0	16.0	57

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detrimental effect that occurs after an incident or accident (mainly, these negative effects are highly effective at the community level), the need for a public cooperation called Civil Liability Insurance Policy for owners of motor vehicles against third parties is quite tangible.

In Iran, almost all insurance companies offer third party insurance to insurers and the general public are also very familiar with this type of insurance policy because many of them have motor vehicles and it is compulsory (such as insurer's obligations, financial and physical coverage). Unfortunately, despite the fact that the third party insurance was approved 45 years ago but according to the statistics provided by the authorities including the central insurance and law enforcement agencies, approximately 43% of cars in our country do not have third party insurance. In the Table 1, the percentage of vehicles covered by third party insurance and a decreasing trend from 2008-2012 is shown.

This volume of vehicles without third party insurance is a disaster and leads to lack of physical and financial security for owners of vehicles and third parties ranging from cars and pedestrians. The major conclusions from the lack of third party insurance are as follows:

- A number of drivers are in prison for involuntary manslaughter resulting from the accident and they are unable to pay the blood money which in some cases led to the collapse of their families and the problems arising from this issue
- In some cases, the culprit driver escape after the occurrence of accident because he do not have third party insurance, etc.

Car insurance with the mentioned characteristics, considered a social and political problem and in advanced countries, especially America, the relevant organizations (representing policyholders, union of insurers, association of lawyers and government representatives) are facing each other with different perspectives to resolve technical and political issues related to car Insurance (Karimi, 2014).

Considering that the aim of this study is to estimate demand for third party insurance in Iran, in addition to obligation to buy the insurance we are going to examine other effective factors such as premium rate, increasing the rate of compensation, amount of damage, loss ratio, number of units sold and other items that enable us reduce the negative consequences of not having a third party insurance in society and therefore, provide confidence and physical and financial security.

NECESSITY AND IMPORTANCE OF THE ISSUE

With regard to the role of automobiles in modern life and the large number and severity of accidents and their physical and financial losses, the responsibility caused by traffic accidents is one of the most important issues in civil liability and claims arising from it. Therefore, in many countries, legislatures have taken actions to identify and explain the responsibilities arising from traffic accidents by considering goals such as supporting victims of traffic accidents, facilitate compensation and maintain a proactive and preventive aspects of the rules (Farahani and Khany, 2014).

According to the statistics presented above by the central insurance and law enforcement officials currently about 43 percent of vehicles around the country do not have any compulsory third party insurances and traffic accidents will lead to financial, physical and legal problems for the culprit party and injured party. In addition, the statistics regarding the vehicles covered by third party insurance has been declining; that is with increasing number of vehicles, the percentage of vehicles covered by third party insurance has declined. Although, the car has undeniably offered many advantages to human life. However, potentially, this is a murder tool and lives and properties threatened by this tools. So, the owner, according to law, be obliged to procure third party insurance for his vehicle. This volume of uninsured vehicles in country's roads can be studied from different aspects and at different levels. In this study, we have tried to introduce the factors affecting demand for third party insurance and then determine the direction and intensity of each of them on the demand for third party insurance.

RESEARCH BACKGROUND

There are two research backgrounds which are as given bellow:

- Foreign background (Table 2)
- Domestic background (Table 3)

Table 2: Foreign background

Research title	Years	Researchers	Research findings
International analysis of the relationship between insurance premium rate and income	1988	Binstok, Dickinson and Khajarya	Relationship between insurance premiums and GDP is positive and income elasticity is greater than one
Investigate the relationship between insurance, financial development and market structure in developing countries	1992	Atroyl	Relationship between the received insurance premiums and GDP is positive and income elasticity is greater than one
The relationship between insurance and economic growth	2006	Hayes and Siomji	There is weak evidence to prove that life insurance supports economic growth

Table 3: Domestic background

Research title	Years	Researchers	Research findings
Estimate the demand for fire insurance in Iran	2003	Rezaei	The findings suggest that changes in national income, population and the paid damages have a direct effect on the demand for fire insurance
Estimate the demand function for professional liability insurance of doctors	2009	Khani Gharey-Gapi	Insurance premiums has the greatest impact on the demand for professional liability insurance for doctors and thereafter, number of branches and representations, national income and the paid compensation have the most influence
Estimated the demand function for car insurance in Iran	2012	Pashaei	The variables of national income, the wholesale price index of machinery and vehicles, the amount of paid compensation, population and the number of branches and representations have a significant positive effect on the demand for car insurance

Theoretical foundations of demand function of third party insurance: Consumer behavior theory and demand theory are advanced topics in economics. Ideally, a specific utility function should be determined and on the assumption that consumers seek to maximize utility, the estimated demand function is achieved by maximizing this function compared to budget constraint. Based on the theories of micro-economics, we focus on extracting demand function by maximizing the utility function.

In a hypothesis with two commodities in which consumer consumes insurance q_t and other commodity X_t like as the representative of other products and services, the demand function of third party insurance is obtained through the following process: it is assumed that consumer's utility function is as follows:

$$U = U(X_t, q_t)$$

Given that consumers maximize their utility by using these products and at the level their budget, we have:

$$I = P_q.q + P_x.X$$

where, q_t and X_t are dosage and P_q and P_x are the prices of insurance and other products and I is disposable income at time t. Using lagrange multipliers and taking into consideration the budget constraint, consumer's utility function will be maximized in relation to budget constraint which is as follows:

$$L = U(q_t, x_t) + ?[I - P_q.q - P_x.X]$$

After derivative of the utility function in relation to variables (amounts ingested) and λ, we have:

F.O.C:

$$\frac{\partial L}{\partial q_t} = U_1 - \lambda P_t = 0 \rightarrow U_1 = \lambda P_t$$

$$\frac{\partial L}{\partial X_t} = U_2 - \lambda P_t = 0 \rightarrow U_2 = \lambda P_t$$

$$\frac{\partial v}{\partial \lambda} = I_t - P_q, q_t - P_x, X_t = 0 \rightarrow P_q, q_t + P_x, X_t = I$$

The marginal utility values U_1 and U_2 is consumer of insurance and other goods and services which be obtained by solving the system of the above equations (X_t, q_t, λ). Here, the demand function for third party insurance is derived from following function:

$$Q = f(I, P_q, P_x)$$

where, Q is the number of third party insurance issued or the entire premium for third party insurance are the dependent variables and the earnings variables (I), product price insurance (P_q) and the price of other goods (P_x) will appear as independent variables in this function.

Given that the purpose of estimating the demand function is the analysis of price-income elasticity then it is better to have a linear and logarithmic function as a demand function for insurance. So, if the original shape of the demand function is specified as follows:

$$Q_t = \propto . I_t^{\propto_1} . P_q^{\propto_2} . P_x^{\propto_3} . e^{ut}$$

As a result, a logarithmic equation will be as follows:

$$Ln\, Q_t = Ln \propto + \propto_1 Ln I_t + \propto_2 Ln P_q + \propto_3 Ln p_x + U_t$$

Features of this function is that each dividing the estimated regression coefficient calculate the price-income elasticity (Heidari, 2004).

DEMAND FOR THIRD PARTY INSURANCE

Demand for third party insurance like any other commodity resulted from analysis of consumer behavior based on maximizing the utility function of consumers which is influenced by purchase, consumption of goods and services due to the limitations and constraints of budget; third party insurance is one of them. The demand for this insurance arises from the risks that affect the owners of motor vehicles. Third party insurance focuses on compensation for policyholder's civil liability that his negligence for vehicle usage has caused financial and personal injury. In fact, third party insurance is a subjective and qualitative service. And indeed, it is a kind of provision that the insurer buys it as soon as pay the premiums and conclusion of the contract. However, in the event of damage or non-occurrence of damage, the insured deliver the coverage at the beginning of the contract and would hold it for the duration of the contract.

To illustrate the changes in third party insurance, appropriate quantitative variables should be implemented. Overall, what initially appears is that because this provision is made for malpractice of policyholder, so the total number of policyholders requested in proportion to the total coverage. Given that each policyholder is protected against a specific amount of intensity, a specific weight belongs to him. As a result, the weighted sum of the variables used to calculate this variable. But what is the corresponding degree or weight? Or in other words, what factor can be used to solve the problem? A proposal to solve this problem is the premium rate. Since, the amount of the premium rate is proportional to the severity of the risk, so the weight is nothing but premium rates associated with it because premium rate, theoretically, commensurate with the risk exposure and also coverage of commitment. On the other hand, we know that net premiums per year is obtained by multiplying the number of insured persons in the insurance premium rate. According to the mentioned issues, the suitable variable that its variations is proportional to changes in aggregate demand of third party insurance is the total insurance premiums received by insurance companies. In simpler terms in the theory of insurance, insurance premiums is exactly proportional to the coverage of commitment offered by the insurance companies, so the variations of insurance premiums could very well show the changes in the value of the demanded commodity. Recall that the use of total insurance premium as total demand is based on two assumption: the amount of the insurance premium rates should be commensurate with hazard intensity and these changes in rates should be inalterable over time.

Recall that the use of total insurance premium as total demand is based on two assumption: the amount of the insurance premium rates should be commensurate with hazard intensity and these changes in rates should be inalterable over time. For example, the insurance premium would increase by increasing the insurance premium rates without any changes in the coverage. However, in case of breach of the second hypothesis this problem can be solved by dividing the total insurance premiums on index of changes in insurance premiums rates (Gapi and Ghanbari, 2010).

IDENTIFY THE DEMAND FUNCTION

In general, a lot of economic and non-economic factors influence on demand for third party insurance but in this study we tried to excerpts of which that have a major impact and theoretical basis.

Price (total received insurance premiums): The first factor that affects the demand for each type of product is its price and third party insurance is not an exception and its price (premium rate) is a very important factor affecting the demand. According to the law of demand, the price of a non-giffen product has an indirect effect on demand and third party insurance as a regular product is no exception. Thus, changes in premium rates of third party insurance have an indirect effect on the demand (Gapi and Ghanbari, 2010).

For vehicles designed to carry human beings and its allowed capacity counting driver is six persons, the tariff of insurance premium for every thousand rials in total physical and financial obligations of the insurer for any person determined as follows (Table 4-7).

Price elasticity is used to evaluate the impact of price on the quantity demanded. Two factors pushing third party insurance towards the inelasticity are:

- Compulsory
- Lack of substitute goods

Table 4: Third party insurance premiums for personal vehicles (capacity of up to six people)

Rows	Type of vehicle	Rate per thousand
1	Less than four cylinders	3/6
2	Four cylinders	5
3	More than four cylinders	5/6

Sobat (2014)

Table 5: Third party premium rates for public transport vehicles (capacity of up to six people)

Rows	Type of vehicle	Rate per thousand
1	With a capacity of seven persons including driver	10/3
2	Minibus with a capacity of sixteen persons including driver	13/2
3	Bus with a capacity of twenty seven persons including driver and co-driver	20/2

Sobat (2014)

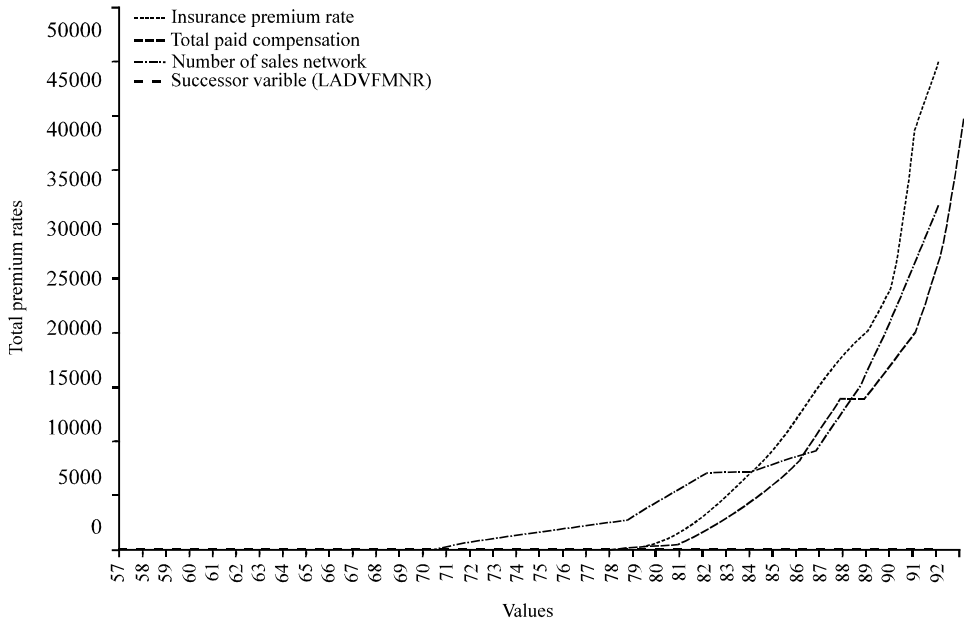

Fig. 1: Compare the trend of variables

Table 6: Third party premium rates for cargo vehicles

Rows	Loading capacity	Rate per thousand
1	Up to one ton	4/4
2	One to three tons	5/3
3	Three to five tons	6/7
4	Five to ten tons	8/6
5	Ten to twenty tons	10
6	More than twenty tons	10/6

Sobat (2014)

Table 7: Third party premium rates for all types of motorcycles

Rows	Type of motorcycle	Rate per thousand
1	Motorbike	0/9
2	Gear motor with one cylinder	1/1
3	Gear motor with two cylinders	1/2
4	Gear motor with three wheels or side car	1/3

Sobat(2014)

Third party insurance premiums rates in the time domain (1979-2012) was constant and despite the fact that their effect on the quantity demanded is undeniable but entering the premium rate in the model as the price is not possible because of its constant and calculation of their intensity (price elasticity). In order to solve this problem, substitute price index (proxy) was used which is obtained by dividing the value-added services of monetary and financial institutions to nominal prices and value-added services of monetary and financial institutions to base prices.

Income (GDP to basic prices): Other variable that can affect the demand of any commodity is income; that is called national income at the macro level and plays its role by shifting the demand curve. Due to changes in accordance with the type of product, the changes in income can be either in same direction or in opposite direction. Income elasticity is a tool which can indicate the direction and intensity of the relationship between the quantity demanded and income. Percentage change in quantity demanded relative to the percentage change in income is called income elasticity. If the value of income elasticity is greater than zero, this is a normal goods; if it is less than zero, this is an inferior goods and if this is equals to zero, the goods is independent from income, this mean that the demand is essential for that at every level of income. Normal goods is divided into two categories of luxury and necessary. If the income elasticity is larger than one it is luxury and if it is between zero and one, the product would be necessary (Gapi and Ghanbari, 2010).

Number of insurance companies, branches, agencies and brokerages: Network sales constitute a large proportion of the portfolio in the insurance industry and through proper functioning and scientific marketing, their important role in the development of insurance in the country becomes evident.

Total compensation: Total losses (physical and financial) payment of insurance companies in the field of third party insurance. As can be seen in the above figures, the variables such as total premium rates, the successor prices, GDP to basic prices, the number of companies, branches, agencies and brokerages and the compensation have a upward trend during the period 1979-2012. According to the explanation of variables, comparing the variables shown in Fig. 1.

RESULTS OF THE MODEL RESEARCH

Stationary of variables: Based on tests performed, we conclude that the null hypothesis about the existence of unit root for the variables of LPREMDEF, LGDPR, LLOSSDEF rejected at 95% confidence level while it doesn't rejected for the variables of LADVFMNR and LAGENCY at the 95% level. Thus, three variables of LPREMDEF, LGDPR AND LLOSSDEF converge from zero at level data and two variables of LADVFMNR and LAGENCY converge with one difference-making. In other words, the first three variables in the level data are stationary and other variables in first differences are stationary.

Autoregressive distributive model ARDL: Estimation results of first model with regression method with wide intervals listed in Fig. 2. As can be seen, determination coefficient is 99720/0 which reflects the explanatory power of the model is very high. Also, all variables are statistically significant at the 95% confidence level and have a high statistical reliability.

According to these results, the test regarding the presence or absence of long-term relationship needs to be done, if the sum of the coefficients of the variables associated with the dependent variable is less than one, dynamic pattern will tend towards long-term equilibrium model which the table below shows the same subject. Null hypothesis and the opposite hypothesis for the aforementioned test is as follows:

$$H_0 = \sum_{t=1}^{p} \beta_t - 1 \geq 0,$$

$$H_1 = \sum_{t=1}^{p} \beta_t - 1 < 0$$

The numbers in parentheses at the top of the estimated output table obtained by using ARDL that means ARDL (2, 1, 2, 0, 3) and they used to represent optimized interrupt rates for dependent variables and the explanatory variables. For research about presence or absence of convergence relationship between the studied variables, it is necessary that the dependent variable has at least one interruption. This condition is provided in the table above. So, we can test the presence or absence of long-term relationship which is as follows:

$$\frac{S_{t=1}^{p}\hat{\beta}_1 - 1}{S_{t=1}^{p}\delta\hat{\beta}_1} = \frac{\hat{\beta}_1 - 1}{\delta\hat{\beta}_1} = \frac{0.06235 - 1}{0.27852} = -3.336$$

Autoregressive Distributed Lag Estimates
ARDL(2,1,2,0,3) selected based on Schwarz Bayesian Criterion

Dependent variable is LPREMDEF
31 observations used for estimation from 1361 to 1391

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LPREMDEF(-1)	.32587	.15446	2.1098[.049]
LPREMDEF(-2)	-.26352	.12406	-2.1241[.048]
LADVFMNR	.060566	.15858	.38193[.707]
LADVFMNR(-1)	-.35842	.19062	-1.8803[.076]
LGDPR	1.7103	.43306	3.9492[.001]
LGDPR(-1)	-.23581	.52355	-.45041[.658]
LGDPR(-2)	-.81992	.41326	-1.9840[.063]
LLOSSDEF	.56516	.11287	5.0070[.000]
LAGEN	.29842	.27894	1.0698[.299]
LAGEN(-1)	.038315	.37894	.10111[.921]
LAGEN(-2)	-.86276	.30455	-2.8329[.011]
LAGEN(-3)	1.1117	.22902	4.8540[.000]
INPT	-13.0226	4.9497	-2.6310[.017]

R-Squared	.99720	R-Bar-Squared	.99534
S.E. of Regression	.10321	F-stat. F(12, 18)	534.4908[.000]
Mean of Dependent Variable	2.7153	S.D. of Dependent Variable	1.5112
Residual Sum of Squares	.19174	Equation Log-likelihood	34.8395
Akaike Info. Criterion	21.8395	Schwarz Bayesian Criterion	12.5186
DW-statistic	1.9728		

Diagnostic Tests

Test Statistics	LM Version	F Version
A:Serial Correlation	*CHSQ(1)= .0010891[.974]	*F(1, 17)= .5973E-3[.981]
B:Functional Form	*CHSQ(1)= .20527[.650]	*F(1, 17)= .11332[.741]
C:Normality	*CHSQ(2)= .68431[.710]	Not applicable
D:Heteroscedasticity	*CHSQ(1)= .76815[.381]	*F(1, 29)= .73685[.398]

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

Fig. 2: Estimated model by using ARDL

The result is a kind of t-statistic that its quantity can be compared with the amount of critical parameters provided by Banerjee, Dolado and master to carry out the intended test (these critical values are found in most books on econometrics). According to the above equation, statistic calculations in this model is equal to -3.366 because it is higher than the critical value of Banerjee, Dolado and master in terms of obsolete value, so the null hypothesis that represents lack of long-term relationship in favor of the opposite hypothesis (long-term relationship) be rejected.

Error correction model: There is an error correction model that fits any long-term relationship and it can related the short-term fluctuations of variables to their long-run equilibrium values. The results of which can be seen in the table below. Error correction coefficient in the model is estimated -0.93764. This indicates that in every year approximately 94% of the imbalance shall be adjusted in the next period, due to this factor is very high, suggesting that adjustment in the balance is very fast (Fig. 3).

It can be seen that error correction coefficient is close to one and statistically significant. This coefficient is negative, indicating that imbalances would towards balance in long-term periods. This coefficient shows that in every period about 94% of imbalances in third party insurance be resolved, this result emphasizes on a high speed movement toward balance.

Long-term relationships by using ARDL:

$$\begin{aligned}\text{LPEREMDEF} = &-13.88 - 0.317\text{LADVFMNR} + \\ &0.698\text{LGDPR} + 0.602\text{LLOSSDEF} + \\ &0.624\text{LAGEN}\end{aligned}$$

Since, the estimated long-run model is explained and illustrated in a logarithmic format, the elasticity values can be expressed by the coefficients of the variables. In this regard, the coefficients of the variables LADVFMNR and LGDPR, respectively are the price elasticity and income elasticity of dement for third party insurance.

Since, the income elasticity is equal to 0.698 and this value is between 0 and 1 (1>0.698>0) as a result, third party insurance is a basic or essential goods (Table 8).

Also, considering that the price elasticity of demand for third party insurance is equal to (-0.317), it is placed in a low elasticity area. This little elasticity can be justified according to the law of civil liability insurance for owners of motor vehicles against third parties.

Error Correction Representation for the Selected ARDL Model
ARDL(2,1,2,0,3) selected based on Schwarz Bayesian Criterion

Dependent variable is dLPREMDEF
31 observations used for estimation from 1361 to 1391

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dLPREMDEF1	.26352	.12406	2.1241[.046]
dLADVFMNR	.060566	.15858	.38193[.706]
dLGDPR	1.7103	.43306	3.9492[.001]
dLGDPR1	.81992	.41326	1.9840[.060]
dLLOSSDEF	.56516	.11287	5.0070[.000]
dLAGEN	.29842	.27894	1.0698[.297]
dLAGEN1	-.24889	.21725	-1.1457[.265]
dLAGEN2	-1.1117	.22902	-4.8540[.000]
dINPT	-13.0226	4.9497	-2.6310[.016]
ecm(-1)	-.93764	.13152	-7.1291[.000]

List of additional temporary variables created:
dLPREMDEF = LPREMDEF-LPREMDEF(-1)
dLPREMDEF1 = LPREMDEF(-1)-LPREMDEF(-2)
dLADVFMNR = LADVFMNR-LADVFMNR(-1)
dLGDPR = LGDPR-LGDPR(-1)
dLGDPR1 = LGDPR(-1)-LGDPR(-2)
dLLOSSDEF = LLOSSDEF-LLOSSDEF(-1)
dLAGEN = LAGEN-LAGEN(-1)
dLAGEN1 = LAGEN(-1)-LAGEN(-2)
dLAGEN2 = LAGEN(-2)-LAGEN(-3)
dINPT = INPT-INPT(-1)
ecm = LPREMDEF + .31766*LADVFMNR -.69805*LGDPR -.60275*LLOSSDEF -.624
57*LAGEN + 13.8886*INPT

R-Squared	.82848	R-Bar-Squared	.71413
S.E. of Regression	.10321	F-stat. F(9, 21)	9.6602[.000]
Mean of Dependent Variable	.12417	S.D. of Dependent Variable	.19304
Residual Sum of Squares	.19174	Equation Log-likelihood	34.8395
Akaike Info. Criterion	21.8395	Schwarz Bayesian Criterion	12.5186
DW-statistic	1.9728		

R-Squared and R-Bar-Squared measures refer to the dependent variable
dLPREMDEF and in cases where the error correction model is highly
restricted, these measures could become negative.

Fig. 3: Error correction

Table 8: Lonng-term estimation of pattern by using ARDL (ARDL (2, 1, 2, 0, 3) selected based on Schwarz Criterian)

Regressors	Coefficient	Standard errorr	t-ratio (Prob.)
LADVFMNR	-0.31766	0.11688	-2.7179 (0.014)
LGDPR	0.69805	0.34455	2.0259 (0.058)
LLOSSDEF	0.60275	0.10691	5.6380 (0.000)
LAGEN	0.52457	0.15864	3.9370 (0.001)
INPT	-13.88860	4.34670	-3.1952 (0.005)

Dependent variable is LPREMDEF; 31 observations used for estimation form 1361-1391

CONCLUSION

According to the results of the above study, all the variables affecting the demand for third party insurance has been investigated and all of them show a significant effect. In this context, sales agents (companies, subsidiaries, agents and broker offices) and the amount of compensation paid by insurance companies have a positive and significant effect on the demand for this type of insurance, so that the severity and impact of these two variables is too high.

In addition to these two variables, variables of price (insurance premiums) and the income level of demanders is also strictly conforming and affecting the demand for this type of insurance in the framework of demand theory. In addition, since the coefficient of income represents the income elasticity and it is equal to 0.69, it is concluded that the third party insurance is an essential commodity. On the other hand, the price coefficient reflects the price elasticity of demand and it is equal to (-0.317), meanwhile showing the inverse relationship between price and quantity demanded and the law of demand is clearly established in this respect but given that in connection with this type of insurance, there is a mandatory civil liability for owners of motor vehicles against third party, the elasticity of demand for this type of insurance is relatively low and the size of the resulting price elasticity confirms this claim.

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