

## Evaluating Health Insurance Performance and its Role in Economic Growth

Ragab Abouhamad Ameen\*

### Abstract

Performance evaluation is one of the most important tools that demonstrates the close link between actual and target performance. It is an important means of helping to predict financial crises, and it is also one of the most important tools that supervisory and Control Authority rely on to monitor the implementation of the state's general policy for the insurance sector.

Health insurance contributes to the growth of the insurance industry, especially in recent years, it has become of great importance both economically and socially. Its importance increases, especially from the perspective of comprehensive economic growth.

The results indicate that there is a significant relationship between the development of health insurance and economic growth and a significant relationship between written premiums and paid claims. Average health insurance premiums, accounted represent approximately 56% of the total insurance market premiums. The coefficient of variation in the rates of change in gross health insurance premiums is lower than the rates of change in total premiums for the market as a whole. The average annual increase in health insurance premiums is higher than in the insurance market as a whole.

The coefficient of variation in the rates of change of paid claims is higher than the rates of change in total premiums for the market as a whole.

**Keywords:** Evaluating performance, Health insurance, Premiums, claims, economic growth.

---

\*Assistant Professor, Insurance Department, Faculty of Commerce, Beni Sufe University

## تقييم أداء التأمين الصحي ودوره في النمو الاقتصادي

### الملخص

يُعد تقييم الأداء من أهم الأدوات التي تُظهر العلاقة الوثيقة بين الأداء الفعلي والمستهدف. كما أنه يُعدّ وسيلة مهمة للمساعدة في التنبؤ بالآزمات المالية، ومن أهم الأدوات التي تعتمد عليها أجهزة الإشراف والرقابة في متابعة تنفيذ السياسة العامة للدولة. ويساهم التأمين الصحي في نمو قطاع التأمين، لا سيما في السنوات الراهنة، حيث اكتسب أهمية بالغة اقتصاديًا واجتماعيًا، وتزداد تلك الأهمية، لا سيما من منظور النمو الاقتصادي الشامل. واتضح من نتائج البحث وجود علاقة إيجابية بين تطور التأمين الصحي والنمو الاقتصادي، وعلاقة ذات دلالة إحصائية بين إجمالي أقساط التأمين المكتتبة والمطالبات المدفوعة.

**الكلمات المفتاحية:** تقييم الأداء، التأمين الصحي، النمو الاقتصادي، الأقساط، المطالبات.

## Introduction

Health insurance is important in providing health security to individuals and their families. It covers financial losses from accident, medical expenses, disability or accidental death and dismemberment, due to illness or surgery, by spreading the financial burden of risk over a large number of people, to provide money to pay for health care benefits. Therefore, health insurance is one of the most important systems recommended by the World Health Organization, due to its increasing importance in providing health care to all members of society.

Despite this importance, the conflict that exists between an insured, an insurer, and a medical service provider may cause medical expenses to increase more than expected. In addition, many risk factors can affect medical expenses. These factors can increase the probability and the costs of medical services.

## Research problem

- The obvious increase in the cost of treatment, surgeries, and rates of chronic diseases.
- The average claims paid ratio was 77% of the average written premiums, (during the study period).
- The need to continuously evaluate premiums and claims so that the system is not exposed to financial crises that affect the fulfillment of its obligations towards beneficiaries.
- There are gaps in the quality of health services provided to beneficiaries.
- The current system focuses on resources and staff rather than on the patients.

## Research Objectives

- Evaluating health insurance results by studying the growth of written premiums and paid claims.

- Highlighting the importance of health insurance in economic growth and development with its economic and social axis.
- Predicting the values of written premiums and paid claims over the ten years following the study period.
- Clarifying the importance of health insurance.
- To offer the findings, recommendations and conclusions.

### **Research Importance**

- Research importance comes from the importance of health insurance itself in protecting individuals from the financial burdens resulting from illnesses; they may not be able to bear on their own, especially in current years.
- The research addresses one of the most important topics and the possibility of predicting expected premiums and claims in the next years.
- Health insurance acquired the largest share in the Saudi insurance market. The written premiums represent 59.01% of the total premiums of the insurance sector and paid claims 70.7% of the total market claims for year 2023 (Insurance Authority Report, 2023).
- Health insurance is a basic segment of the Saudi economy. Its contribution to the gross domestic production reached 0.77% at 2023.
- The research will try to answer:
  - What is the relationship between the development of health insurance and economic growth?
  - What is the relationship between the written premiums and paid claims?

### **Research Methodology**

The research adopts the analytical approach through studying and analyzing health insurance and its role in economic growth.

- The deductive approach: It is represented in books, scientific researches, Articles.
- The inductive approach: Statistical analysis (Used SPSS software suite to calculate some descriptive statistics regarding the different data variables) of the data related to the results of health insurance published in annual reports of insurance Authority.
- Data analysis was performed using regression analysis and forecasting models.

### **Scope of study**

The study is concerned with health insurance, focusing on KSA, with the aim of analysis of paid claims and written premiums.

- The data obtained covers 15 years (2009 to 2023).

### **Statistical tools**

Descriptive statistical analysis is used, Mean, Standard Deviation, coefficient of variation, (Coefficient of Variation (CV) is a measure of relative dispersion, and comparing data sets based on their relative degree of dispersion, the higher its value, the greater the degree of dispersion around the mean.

Data with a higher coefficient of variation have greater relative dispersion, indicating a lower degree of homogeneity, and vice versa, it is the ratio of the standard deviation to the mean, which explain the relative variability within a sample), Regression analysis and Durbin-Watson test.

Estimating regression models generally requires detecting and addressing standard problems, including autocorrelation, to obtain the best unbiased linear estimates. Therefore, the following assumptions must be met: the mean of the random error term is equal to zero, the values of the random error term are independent, the variance of the random error term is constant, the random error term is less than the independent variables, the random error term follows a normal distribution

with a mean of zero and a constant variance, and the independent variables are not random.

The used SPSS statistical analysis was performed using (SPSS version 20)  $P \leq 0.05$  was at the accepted significance level.

### **Scientific contribution for research**

- Research is an applied study of a system that is important to individuals and society.
- Based on the fact that performance evaluation is one of the most important objectives of the Supervision and Control Authority, ensuring the system's ability to fulfill its obligations towards beneficiaries.
- Performance evaluation also provides information necessary to measure and analyze the outcomes and is an important means of predicting a system's ability to meet its obligations. In addition, by evaluating performance, financial crises can be avoided.
- Research concludes with results and recommendations that contribute to increasing insurance awareness of the importance of health insurance and evaluating its performance so that the best possible benefits can be provided to beneficiaries.

### **Theoretical framework**

Insurance has become one of the most important pillars of economic development, especially due to the momentum and economic challenges witnessed in the current years, at the local and global levels, which necessitated fundamental reforms in the financial sector in KSA to suit and achieve the goals of Vision 2030. In response to this came strategic vision of health insurance sector, with the aim of keeping pace with economic reforms and economic openness, which depends on diversifying sources of income. As an inevitable result of these changes came the strategy for developing health insurance sector, which

contributes to achieving goals of Kingdom's vision 2030, which aims to work on improving the health care that the beneficiary gets, leading to an increase in his contribution to economic growth rates and raising the level of his productivity. Therefore, the past few years have witnessed a remarkable transformation in the health insurance system in KSA after the approval of the Custodian of Two Holy Mosques for the transformation of Health Ministry in its performance to the corporate system within the framework of a plan aimed at privatizing health sector in KSA and working on the comprehensive health insurance program. Therefore, the Council of Health Insurance issued implementing regulations of Cooperative Health Insurance Law, which contains a rule that states that medical insurance is mandatory for all workers in the private sector, (Council of Health Insurance, 2018). This law contributes to making health insurance the most important type compared to other types of insurance in Saudi insurance sector, the performance indicators of health insurance sector reflect the extent of development recorded by this sector during year 2023 compared to previous year, as its gross written premiums reach 59% of gross written premiums in Saudi insurance market as a whole (Saudi Insurance Market Report 2023).

The fourth pivotal initiative of the financial transformation program focuses on ensuring the imposition of compulsory health insurance to reduce fraudulent practices and continue developing the existing insurance sector, including increasing total written premiums, and reducing cost-to-income ratio, which constitutes an opportunity to achieve greater depth and spread of this sector, support the opportunities of companies operating in it towards greater strength and expansion, in its services for the benefit of beneficiaries of insurance services. And the imposition of compulsory health insurance leads to an increasing rate of health insurance coverage in KSA.

## **The Relationship between financial sector and economic growth**

Many researchers have addressed the importance and role of the non-banking financial sector in economic growth as the following;

Rajan & Zingales (1996) explained in their study that the non-banking financial sector contributes to economic growth for many reasons, including: -

- Reducing the cost of obtaining financing for capital activities.
- Contribute to financing the establishment of leading companies to provide innovative products with the aim of economic development.
- The inefficiency of the financial sector mainly and directly affects the economy's ability to direct investments towards companies with high added value, including the effect in growth and economic development. It was a confirmation of what was highlighted by King & Levin (2010) study, which showed the impact of the financial sector on the rate of economic growth. The study concluded that the higher level of economic growth and is a positive indicator for predicting the growth rates of the economy.

Lensink (2001) confirmed this in his study of the development of the financial sector and its impact on economic performance and concluded that the higher the level of development of the financial sector leads to a better economic level, that is, there is a positive relationship between the development of the financial sector and the level of economic performance. He also confirmed that the development of financial services leads positively to avoid the negative aspects that may come from the uncertainty of some economic policies; it plays an important role in treating the negative economic and social effects, especially in the stages of economic transformation. Levine



(2016) showed in the case of legal system of the hourly account, as the relationship between the components of the financial sector, and relationship between commercial relations and the commercial sector must be an integrative relationship in providing financial services for economic growth, this came in confirmation of what was previously explained by Rajan & Zingales (1996), where they explained that relying on the banking sector more than the non-banking financial services sector leads to a negative impact, based on the fact that bank financing does not contribute effectively to financing new projects with risks associated with the nature of these projects, especially if it introduces innovative new products, which limits economic development and economic growth. This was also confirmed by Hellwing (1998), Sahay (2015), where the two studies showed that the control of the banking sector more than the non-banking financial sector leads to a negative impact on economic activity, and that the ability of the financial sector to influence economic growth decreases by increasing the size of the banking sector over non-bank financial sector account. Confirmed by Langfield (2016), where he showed in his study that the interest in developing banking sector without the non-banking sector led to an increase in systemic risks and a decrease in economic growth rates because of an imbalance and a decrease in the effective directing of savings and project financing, and this leads to a negative impact on economic growth in the country. This was confirmed by Durusu (2017), where he demonstrated the importance of the non-bank financial sector in economic growth and recommended the need to pay attention to its development, which contributes to faster economic growth, as the non-bank financial sector provides risk management and insurance services to all segments of society, and this is also what he reached Demirguc (2009).

From the above, it became clear how important the development of the non-banking financial sector, including insurance sector, especially in the current economic transformations in KSA, which aim to diversify sources of income, which require the development of an integrated and comprehensive strategy for the insurance sector, especially health insurance system, this is what Kingdom's Vision 2030 advocated, which contributes effectively to protecting the economy from financial crises and maintaining its stability.

Despite the importance of health insurance sector and its role in economic growth, Saudi health care system faces many challenges which require new strategies and policies of the Saudi Ministry of Health (MOH) as well as effective cooperation with other sectors. However, health services improvement, in addition to other factors such as improved education, improved living conditions, and increased health awareness among the community, contributed to improving health care indicators, in KSA.

Despite the steps taken by the Saudi Ministry of Health to reform the comprehensive health insurance system, it faces many challenges that still exist. Such as, shortage of Saudi health professionals, financing, cost of health care, especially, considering the current inflation, the underutilization of the potential of electronic health strategies, the diversity of diseases, high demand resulting from free services, poor accessibility to some health care facilities, cooperative health insurance system, the privatization of public hospitals, the tendency to use the electronic health system. To meet these challenges and to improve the quality of health care services, Saudi Ministry of Health has set a national strategy for health care services, focuses on information systems development;

diversifying sources of financing, local health care professionals; Human workforce development, activating the role of Ministry of Health in supervising and controlling health services, encouraging the private sector to participate in providing health care and improving the quality of preventive and curative care; inclusion of all regions of KSA in the provision of health care services. So, Ministry of Health and other related sectors should coordinate their efforts to implement and ensure the success of this strategy. It will be supervised by the Saudi Council of Health Services.

### **The Need for health insurance**

Recently, Medicare or medical costs have been rising year over year. Therefore, health insurance is one of the important means of obtaining emergency health care and surgical operations. It offers great flexibility in terms of covering illness or surgeries.

### **Importance of health insurance**

- Spreading social reassurance to the beneficiaries of the health services provided by the health insurance system.
- Equality of access to health services and achieving a kind of relative justice.
- Providing health care services and trying to remove the cost barrier between the patient and the medical services.
- Contribute to providing new job opportunities in health insurance companies and institutions.
- Providing financial resources to finance medical care expenses, especially in light of the obvious increase in its cost.
- Improving the quality of health services, including those who provide them.

- Direction for the optimal use of resources and technical works that contribute to the provision of health services.
- Focus on key health priorities (Communicable diseases, reproductive health, and children).
- Providing integrated medical service at the lowest possible cost.

**From the foregoing**, it has become clear how important it is to develop the insurance sector, in light of the current economic transformations, which requires the development of an integrated and comprehensive strategy for the insurance sector, especially health insurance, this is what Kingdom's Vision 2030 advocated, which contributes effectively to protecting the economy from financial crises and maintaining its stability.

The expansion in the insurance sector actively contributes to supporting the economy and its growth in a more efficient manner, one of the most important axes is the expansion of health insurance in the direction towards comprehensive health insurance, which aims to extend to all members of society, as they are the mainstay in the economic and social development of the state, an individual's health is one of his basic rights, and he has the right to obtain health services with the best possible quality and efficiency, this requires providing non-traditional insurance benefits and providing the best possible coverage for all members of society, which is known as the horizontal and vertical expansion of health insurance system. From it, the hypothesis of the importance of developing health insurance sector is validated, because of its major role in development, both economic and social. This development in the current system requires legislative frameworks aimed primarily at maximizing the solvency of insurance companies, which can practice health insurance, in a manner that guarantees the protection of the rights of the beneficiary.

## Healthcare system in KSA

One of the main goals that the Saudi government focuses on is providing health care services to its citizens, the increase in funding of the health sector and the consequential modernization of the Saudi healthcare system, coupled with the considerable economic growth rate and upgrade of its healthcare facilities, the country's health system, based on performance (Albejaidi, 2010). Although, the Saudi healthcare system is challenged by several factors, but the country's healthy economic profile and favorable government policies have enabled Saudi Arabia to join the ranks of the top 25 countries in the world, in terms of ease of doing business and is also a member of the G20.

Ministry of Health is responsible for the overall supervision of the healthcare facilities, both in the public and private sectors. After for the government was able to establish the necessary infrastructure of primary health care, and the development of human resources by providing scholarship opportunities for Saudis to pursue jobs in the medical field. Therefore, in the current years, KSA is witnessing a great renaissance in the field of Health care, where Ministry of Health is making all possible efforts to lay the foundations for health services and provide them to each beneficiary.

Furthermore, the private sector in KSA provides healthcare services for a fee, and its facilities are found throughout KSA, (Hospitals, pharmacies, medical laboratories, physiotherapy centers, clinics, dispensaries, etc.). Since 1975, the authorities in KSA have been encouraging investments from both foreign and local businesses into the country's health sector through various incentives (Albejaidi, 2010).

Despite these efforts, share of the private sector in the provision of healthcare services is insignificant when compared to the public sector.

The following table shows the percentage of private sector participation in hospital beds and number of hospitals.

**Table: 1 Ratios of the private sector in the health Saudi Insurance Market, 2017 to 2022.**

Years	2017	2018	2019	2020	2021	2022	Average Ratio
Hospitals	32.4%	33 %	33%	33.1%	32 %	33.7 %	<b>32.87%</b>
Beds	24.1%	25 %	24.9 %	24.7%	23.2%	25.2%	<b>24.52%</b>

Source: Ministry of Health, annual reports, over period 2017- 2022.

The private sector accounts for 24.52% of hospital beds and 32.87% of the hospitals, so the private sector's contribution needs to increase. (Annual reports, 2017:2022).

### **Growth of health insurance**

Health insurance has become one of the largest insurance sectors in KSA, both in terms of written premiums and claims. Therefore, the researcher examines the rates of change in written premiums and paid claims for the health insurance system and the insurance market as a whole. As the following: -

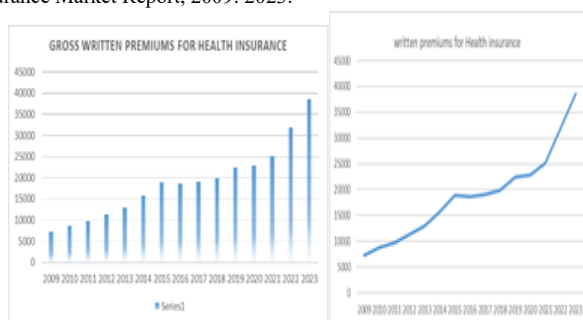
#### **a. Growth of gross written premiums**

The following table shows the growth rates of gross written premiums, Ratios of health insurance to the market, and the ratios of health insurance to the market after excluding health insurance premiums.

Table: 2 growth rate of gross written premiums

Years	Health insurance		The Saudi insurance market as a whole		Ratios of health insurance to the market as a whole %	The ratios of health insurance to the market after excluding health insurance premiums. %
	Gross written premiums	Rates of change %	Gross written premiums	Rates of change %		
2009	7292.0	—	14610.1	—	49.9	99.64
2010	8690.1	19.2	16387.4	12.2	53.3	112.90
2011	9708.4	11.7	18503.6	12.9	52.5	110.38
2012	11285.4	16.3	21173.8	14.4	53.3	114.13
2013	12895.0	14.3	25239.5	19.4	51.1	104.46
2014	15720.5	21.9	30482.2	20.8	51.6	106.50
2015	18966.8	21.7	36496.3	19.7	52	108.20
2016	18630.3	(2)	36855.3	.01	50.5	102.22
2017	19035.6	2.2	36503.2	(1)	52.1	108.98
2018	19883.4	4.2	35014.5	(4)	56.8	131.41
2019	22,474.9	13	37890.5	8.2	59.3	146
2020	22,836.8	1.6	38778.7	2.3	58.9	143.2
2021	25,109.3	9.95	42,030.5	8.38	59.7	148.4
2022	31,829.8	26.76	53,356.2	26.94	59.65	147.86
2023	38,625.6	21.35	65,459.1	22.68	59.01	143.9
Mean	18865.59	13.01	33918.73	11.64	54.644	121.879
Standard deviation	8667.61	8.879	13805.59	9.703	3.7541	18.970
Coefficient of variation	0.4594	0.682	0.407	0.834	0.0687	0.156

Source: Saudi Arabian Monetary Agency, General Administration for Supervision of Insurance Companies, Saudi Insurance Market Report, 2009: 2023.



It is clear from the previous table the following:

- Health insurance premiums accounted for around 59% of total insurance premiums in the market in 2019 to 2023.
- Health insurance premiums growth rate has highest growth rate of 2022 in 26.76%, and lowest value for 2016 in (2%).
- The average ratio of health insurance premiums to the overall insurance market was 54.64% with a standard deviation of 3.75 and a coefficient of variation of 6.87%, during the study period.
- Mean value of premiums is SR 18865.59 million, with a coefficient of variation of 46%. This means that the variance of the data is 46% of its mean value.
- The increase rates for the years 2016 to 2018 are lower than those in previous years.
- The average ratios of health insurance premiums to the overall insurance market, excluding health insurance premiums, was 122% with a standard deviation of 18.97 and a coefficient of variation of 15.6%, during the study period.
- Coefficient of variation degree in the rates of change in gross health insurance premiums is lower than that of total insurance premiums in the insurance market as a whole.
- The average annual increase in health insurance premiums was 13%, with a standard deviation of 8.88 and a coefficient of variation of 68.2%, while it is 11.64%, for the total Saudi insurance market, with a standard deviation of 9.7 and a coefficient of variation of 83.4%, which means that the average annual increase in health insurance premiums is higher than in the market as a whole, and the coefficient of variation is lower.



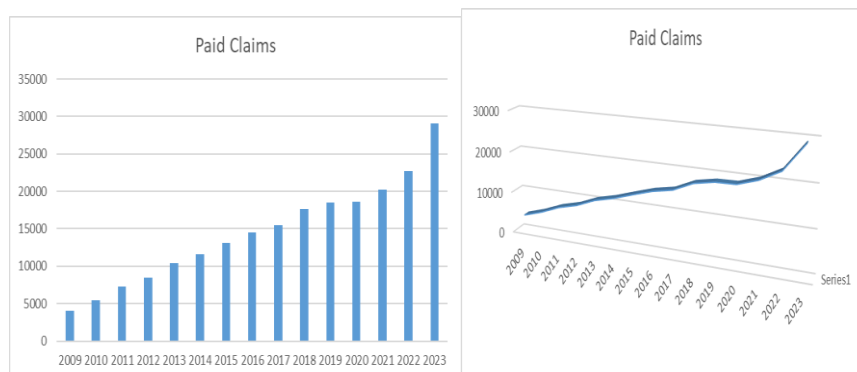
### b. Growth of paid claims

The following table shows the rates of change in paid claims for health insurance, the rates of change in claims for the insurance market as a whole, and the ratios of health insurance claims to insurance market claims.

Table: 3 growth rate of paid claims (Value in million Saudi riyals)

Years	Health insurance		The Saudi insurance market as a whole		Ratio of health insurance claims to the market as a whole %
	Paid Claims	Rates of change %	Paid Claims	Rates of change%	
2009	4010.0	---	7255.4	—	55.27
2010	5440.2	36	8513.8	17.34	63.90
2011	7297.4	35	11485.3	34.90	63.54
2012	8511.8	17	13615.3	18.55	62.52
2013	10405.2	23	16995.5	24.83	61.22
2014	11567.2	12	20313.7	19.52	56.94
2015	13106.1	14	24517.6	20.69	53.46
2016	14547.8	11	26069.2	6.33	55.80
2017	15479.2	7	26556.0	1.87	58.29
2018	17628.9	14	27,236.8	2.56	64.72
2019	18,540.9	5.2	28453.2	4.47	65.16
2020	18,664.6	0.6	26909.5	-5.43	69.36
2021	20,217.5	8	29837.8	10.88	67.76
2022	22,758.2	19.74	33958.1	13.81	67.02
2023	29,071.4	27.74	41,106.8	21.05	70.72
Mean	14483.1	16.45	22854.93	13.67	62.379
Standard Deviation	6890.99	10.77	9648.797	10.43	5.390
Coefficient of Variance	0.476	0.655	0.422	0.763	0.086

Source: Saudi Arabian Monetary Agency, General Administration for Supervision of Insurance Companies, Saudi Insurance Market Report, 2009:2023.



From the previous table we conclude the following:

- The rates of change in paid claims for health insurance reached its highest growth rate in 2023 at 27.74%, and its lowest value in 2020 at 0.6%.
- Mean value is SR 14483.093 million, with a coefficient of variation of 47.6%, standard deviation of 6890.99. This means that the variance of the data is 47.6% of its mean value, which means that the average annual increase is not similar to some extent.
- The increase rates for the years 2017, 2019, 2020 and 2021 are lower than those in previous years.
- Coefficient of variation value in the rates of change in health insurance claims is higher than in the insurance market as a whole.
- The average annual rates of change in health insurance claims were 16.45%, with a standard deviation of 10.77 and a coefficient of variation of 65.5%, while it is 13.67%, with a standard deviation of 10.43 and a coefficient of variation of 76.3%, for the Saudi insurance market, which means that the average annual increase in health insurance claims is higher than in the market as a whole, and the coefficient of variation is lower.

The following table shows health insurance premiums and paid claims, with the aim of knowing the relationship between them and get at the equation from which the expected claims can be predicted through written premiums.

Table: 4 written premiums and paid claims

Value in million Saudi riyals

Years	Written Premiums	Paid Claims
2009	7292.0	4010.0
2010	8690.1	5440.2
2011	9708.4	7297.4
2012	11285.4	8511.8
2013	12895.0	10405.2
2014	15720.5	11567.2
2015	18966.8	13106.1
2016	18630.3	14547.8
2017	19035.6	15479.2
2018	19883.4	17628.9
2019	22,474.9	18,540.9
2020	22,836.8	18,664.6
2021	25,109.3	20,217.5
2022	31,829.8	22,758.2
2023	38,625.6	29,071.4

Source: Saudi Arabian Monetary Agency, General Administration for Supervision of Insurance Companies, Saudi Insurance Market Report, 2009:2023.

It is clear from the results of the statistical analysis that the linear function model, the quadratic function model, and the cubic function model meet the conditions in terms of the value of the coefficient of determination, the value of F, and the degree of significance. (SPSS program results in the research appendix.)

### Criteria for selecting the efficient model

- Coefficient of determination ( $R^2$ ) demonstrates the effectiveness of the model. It shows the proportion of the dependent variable that can be explained by the independent variable. The closer the value is to one, the more it indicates the efficiency and effectiveness of the model in predicting the expected values, the closer the value is to zero, the weaker the model is and the less effective it is in predicting. It takes a value between zero and one.
- Correlation coefficient (R) explains the strength and direction of the relationship between two variables, (X) as the independent variable and the dependent variable (y), and takes the values  $-1 \leq R \leq 1$ .
- Testing the significance of the regression equation model fitting of data. The larger F value is and the smaller the Sig.  $\leq 0.05$ , F value is, the more it indicates the ability of time to predict the values of the dependent variable.
- Durbin-Watson statistic (DW) is a test statistic used in statistics to detect autocorrelation in the residuals from a regression analysis, e.g., which is used to detect the presence of autocorrelation in the residuals of a regression model under the following hypotheses:
  - Null Hypothesis ( $H_0$ ): There is no correlation among the residuals.
  - Alternative Hypothesis ( $H_1$ ): The residuals are auto correlated.

The test statistic for this test is approximately equal to  $2*(1-r)$  where r is the sample autocorrelation of the residuals. Therefore, the test statistic will always be between 0 and 4 where:

- A test statistic of 2 indicates no serial correlation.
- The closer the test statistics is to 0, the more evidence of positive serial correlation.

- The closer the test statistics is to 4, the more evidence of negative serial correlation.
- Test statistic values between the range of 1.5 and 2.5 are considered normal. (Values outside of this range could indicate that autocorrelation is a problem).
- $0 < DW < 1.5 \Leftrightarrow$  positive correlation.
- $DW > 2.5 \Leftrightarrow$  Negative correlation.
  - **The assumptions of the Durbin-Watson test are:**
    - Errors are normally distributed with a mean value of 0
    - All errors are stationary.

Assuming a simple linear model

$$Y = a + bX + \epsilon \text{ (\epsilon: Random error)}$$

$$Y = - 290.129 + 0.783 X + \epsilon$$

But looking at the results of the Durbin-Watson statistic test, it is clear that the statistical value of the test is 0.956 which is less than 1.5. Therefore, there is a positive autocorrelation between the residuals,  $R=0.985$ , therefore the data must be processed to get the optimal model. (Assuming the linear regression model is valid and therefore valid for the previous year).

**The data was modified as shown in the following table:**

Table: 5 modified data for written premiums and paid claims

Premiums(P)	P(t-1)	P- (r*Pt-1))	C	C (t-1)	C- (r*Ct-1)
8690.1	7292	1507.48	5440.2	4010	1490.35
9708.4	8690.1	1148.6515	7297.4	5440.2	1938.803
11285.4	9708.4	1722.626	8511.8	7297.4	1323.861
12895	11285.4	1778.881	10405.2	8511.8	2021.077
15720.5	12895	3018.925	11567.2	10405.2	1318.078
18966.8	15720.5	3482.1075	13106.1	11567.2	1712.408
18630.3	18966.8	-51.998	14547.8	13106.1	1638.2915
19035.6	18630.3	684.7545	15479.2	14547.8	1149.617
19883.4	19035.6	1133.334	17628.9	15479.2	2381.888
22474.9	19883.4	2889.751	18540.9	17628.9	1176.4335
22836.8	22474.9	699.0235	18664.6	18540.9	401.8135
25109.3	22836.8	2615.052	20217.5	18664.6	1832.869
31829.8	25109.3	7097.1395	22758.2	20217.5	2843.9625
38625.6	31829.8	7273.247	29071.4	22758.2	6654.573

Prepared by the researcher based on the primary data

By conducting Durbin- Watson test on the modified data, the results show that the statistical value of the test is 2.138; it is between 1.5 and 2.5.  $R = 0.734$ ,  $\text{Sig.} = 0.003$ , Therefore, the correlation is normal and there is no problem with the data.

From this, the estimated regression equation can be obtained.

$$Y = 782.378 + 0.484 X$$

(X refers to Written Premiums, Y refers to Paid Claims)

(Where  $R^2 = 0.538$ ,  $F = 13.98$ ,  $\text{Sig.} = .0003$ )

### From forecasting models;

#### - Regression

Regression analysis is a predictive method that explores the relationship between a dependent variable and an independent variable. Different regression models (Forecasting models) have been used to estimate written premiums and claims, depending on historical data.

Predictive ability of the model, Value of  $R^2 = 0.913$ , Sig. 0.001  $F = 136.327$  which explains 91% relationship between time, paid claims and written premiums. The expected values of written premiums and paid claims for the following 10 years are shown in the following table;

**Table 5: Expected written premiums and claims for the next ten years**  
(Value in million Saudi riyals)

Years	Expected premiums	Expected claims
2024	33680.39	26581.75
2025	35532.23	28094.08
2026	37384.08	29606.42
2027	39235.93	31118.75
2028	41087.78	32631.08
2029	42939.63	34143.41
2030	44791.48	35655.75
2031	46643.33	37168.08
2032	48495.18	38680.41
2033	50347.03	40192.75

Source: Forecasting model results.

## FINDINGS

- Health insurance, accounted for 59% of the 2023 total market gross written premiums.
- The growth rate of Health Insurance premiums has highest growth rate of 2022 in 26.76%, and lowest value for 2016 in (2%).
- Mean value of premiums is SR 18865.59 million, with a coefficient of variation of 46%.
- The increase rates for the years 2016, 2017, and 2018 are lower than those in previous years.

- Coefficient of variation degree in the rate of change in gross health insurance premiums is lower than that of total insurance premiums in the insurance market as a whole.
- The average annual increase in health insurance premiums is higher than in the market as a whole.
- In 2023, paid claims increased by 27.74%
- The growth rate of paid claims has highest growth rate of 2023 in 27.74%, and lowest value for 2020 in 0.06%.
- The average annual for paid claims increase is not similar to some extent.
- The increase rates for the years 2017, 2019, 2020 and 2021 are lower than those in previous years in paid claims.
- Coefficient of variation degree in the rate of change in health insurance claims is higher than in the insurance market as a whole.
- The average annual increase in Health insurance claims was 16.45%, while it is 13.67%, for the total Saudi insurance market.

## **SUGGESTIONS**

- Promoting and spreading awareness of the importance and objectives of health insurance.
- Increasing the coordination between insurance companies and healthcare providers.
- Explaining the negative impact of fictitious claims on the benefits the system provides to beneficiaries
- Providing health care services based on value.
- Introducing standards that show the extent to which the performance of the comprehensive health insurance system meets the needs of community members.



- Establishing unified standards for the practice and management of health services to achieve justice among beneficiaries.
- Raising the quality and diversity of health services, which is known as vertical expansion.
- Using modern technology to provide a database for the elements of the comprehensive health insurance system.
- Everyone should be covered by the health insurance.

### CONCLUSIONS

- People are always vulnerable to injury and diseases caused by their daily activities.
- Everyone should be covered by some form of health insurance, especially with the clear growth of the Saudi health insurance sector, since the economic reforms that the KSA has witnessed in recent years.
- The development of health insurance has a positive impact on economic growth.
- The need to raise awareness of the importance of health insurance and work to prevent the submission of fictitious claims.
- The growth of health insurance contributes to the provision of high-quality medical care to beneficiaries.

## REFERENCES

- Albejaidi, Fahd Mohammed (2010). Healthcare System in Saudi Arabia: An Analysis of Structure, Total Quality Management and Future Challenges, *Journal of Alternative Perspectives in the Social Sciences () Vol 2, No 2*, 794-818.
- Al-Hanawi, M. K. (2021). "Decomposition of inequalities in out-of-pocket health expenditure burden in Saudi Arabia." *Social Science & Medicine* 286, October 2021, 114322.
- Demirgüç -Kunt, A. and Levine, R., (2009). Finance and inequality: Theory and evidence. *Annual Review of Financial Economics, Volume 1*, pp.287-318.
- Durusu-Ciftci, D., Ispir, M.S. and Yetkiner, H., (2017). Financial development and economic growth: Some theory and more evidence. *Journal of Policy Modeling*, 39(2), pp.290-306 .
- Tapay, Nicole, and Colombo, Francesca. (2004), Private Health Insurance in Australia. Case Study. *OECD Health Working Papers No. 8. AndrePascal. 75775Paris, CEDEX16. France. copyright OCED.*
- Gurgu, Henryk I. and Lach, L., (2012). Financial development and economic growth in Poland in transition: causality analysis. *Finance a úvěr-Czech Journal of Economics and Finance*, 62, 2012, no. 4
- King, R.G. and Levine, Ross, (2010). Financial Intermediation and Economic Development: Schumpeter might be right. *The quarterly journal of economics*, 108(3), pp.717-737. (Published online by Cambridge University Press: 04 August 2010), (<https://doi.org/10.1017/CBO9780511752056.011>)
- KSA MoH VRO, Business Case for the Health System Reform Component of the Kingdom of Saudi Arabia's Vision 2030 Program, May 2017.
- Langfield, S. and Pagano, M., (2016). Bank bias in Europe: effects on systemic risk and growth. *Economic Policy, Volume 31, Issue 85, January 2016, Pages 51–106*, <https://doi.org/10.1093/epolic/eiv019>.
- Lensink, R., (2001). Financial development, uncertainty and economic growth. *De Economist*, Volume 149 (3), pp.299-312.

- Levine, R., (2016). Financial development and growth: where do we stand? *Estudios De Economía*, 26 (2), pp. 113–136. Retrieved from (<https://estudiosdeeconomia.uchile.cl/index.php/EDE/article/view/41037>).
- Rajan, R.G. and Zingales, L., 1996. Financial dependence and growth (No. w5758). *The American Economic Review*. (<https://www.jstor.org/stable/116849>).
- Sahay, R., Čihák, M., N'Diaye, P. and Barajas, A., (2015). *Rethinking financial deepening: Stability and growth in emerging markets*. *Revista de Economía Institucional*, 17(33), pp.73-107 .
- Tetsuo Fukawa. (2002) Public Health Insurance in Japan.. The International Bank for Reconstruction 1818 H Street, N. w. Washington, D.C.20433.U. S. A
- Saudi Central Bank (2022) Annual report 2022, Riyadh, available: <https://www.sama.gov.sa/en-/Insurance/Pages/Publications.aspx>.  
Insurance Authority (2023) Annual report 2023, Riyadh, available ([https://www.ia.gov.sa/Documents/sector\\_report/Insurance\\_Market\\_Report\\_2023\\_Ar.pdf](https://www.ia.gov.sa/Documents/sector_report/Insurance_Market_Report_2023_Ar.pdf)).

## Regression

[DataSet0]

### Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	premiums <sup>b</sup>	.	Enter

a. Dependent Variable: claims

b. All requested variables entered.

### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.985 <sup>a</sup>	.970	.968	1235.27965	.956

a. Predictors: (Constant), premiums

b. Dependent Variable: claims

### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	644963799.26	1	644963799.26	422.673	<.001 <sup>b</sup>
	Residual	19836905.451	13	1525915.804		
	Total	664800704.71	14			

a. Dependent Variable: claims

b. Predictors: (Constant), premiums

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-290.129	786.180		-.369	.718
	premiums	.783	.038	.985	20.559	<.001

a. Dependent Variable: claims

## Regression

[DataSet0]

### Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	premiums <sup>b</sup>	.	Enter

a. Dependent Variable: claims

b. All requested variables entered.

### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.734 <sup>a</sup>	.538	.500	1036.35924	2.138

a. Predictors: (Constant), premiums

b. Dependent Variable: claims

### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15016916.537	1	15016916.537	13.982	.003 <sup>b</sup>
	Residual	12888485.774	12	1074040.481		
	Total	27905402.310	13			

a. Dependent Variable: claims

b. Predictors: (Constant), premiums

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	782.378	425.814		1.837	.091
	premiums	.484	.129	.734	3.739	.003

a. Dependent Variable: claims

## Variable Processing Summary

		Variables	
		Dependent claims	Independent premiums
Number of Positive Values		14	13
Number of Zeros		0	0
Number of Negative Values		0	1 <sup>a</sup>
Number of Missing Values	User-Missing	0	0
	System-Missing	0	0

a. The Logarithmic or Power model cannot be calculated. The minimum value is -51.998.

## Model Summary and Parameter Estimates

Dependent Variable: claims

Equation	R Square	Model Summary				Parameter Estimates	
		F	df1	df2	Sig.	Constant	b1
Linear	.538	13.982	1	12	.003	782.378	.484
Logarithmic <sup>a</sup>	.	.	.	.	.	.	.
Inverse	.001	.011	1	12	.920	1998.212	8151.784
Quadratic	.652	10.304	2	11	.003	1664.790	-.327
Cubic	.693	7.528	3	10	.006	1086.617	.943
Compound	.435	9.250	1	12	.010	1061.813	1.000
Power <sup>a</sup>	.	.	.	.	.	.	.
S	.002	.022	1	12	.886	7.415	-4.844
Growth	.435	9.250	1	12	.010	6.968	.000
Exponential	.435	9.250	1	12	.010	1061.813	.000
Logistic	.435	9.250	1	12	.010	.001	1.000