

Investigating the effect of macroeconomic variables on insurance industry performance

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Abstract

On the one hand, the insurance industry is considered one of the development indices and one of the most important economic entities, and on the other hand, it supports the activities of other entities. Therefore, the current research aimed to investigate the effect of macroeconomic variables on the performance of the insurance industry. The statistical population is the research of managers and employees of insurance companies. Based on Morgan's table, 415 people were selected as a sample. In this study, independent variables include fluctuations in the inflation rate, exchange rate, and liquidity while the dependent variable is insurance industry performance. The tool of the present research is a researcher-made questionnaire, whose validity and reliability were examined. Testing the hypotheses of the research was done with structural equations using Amos software. Data from 2015 to 2018 was considered for macroeconomic variables. Path analysis results showed that the significance values show higher than 1.96, so the significance of the path between two variables can be confirmed and the existence of this relationship can be confirmed. All research hypotheses are accepted. Finally, macroeconomic factors have an effect of 0.79 on a company's performance. As an economic entity, the insurance industry has an important role in the economy of countries, and the higher the share of the insurance industry in the gross domestic product (GDP) and its penetration rate, the more developed the economy of that country will be.

Keywords: Macro Variables, Insurance Company's Performance, Exchange Rate, Inflation Rate, Liquidity Growth
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1 Introduction

One of the basic goals of countries is to achieve sustainable economic growth and development. In the economic literature, capital is considered the lifeline of an economic system, and its formation as the most important determining factor of economic growth and development has been emphasized a lot. Also, today, risk has gained wide dimensions and all small and large companies are constantly facing different types of risk. Therefore, if the society's economy wants to reach growth and development, it is necessary to provide the required conditions in the field of equipping capital and financing, as well as in the issue of risk and its management. The lack of development in the financial sector is one of the reasons why poorer countries show a desire to reduce their total production more than more developed economies. This effect is especially intense in sudden contractions. The capital market, money market, and insurance

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market as the main elements of the financial sector, have significant roles in the economy of countries. Due to the importance of these markets, governments consider it necessary to regulate some aspects of this market, especially the role of insurance.

Uncertainty is a fact of life. What is examined in microeconomics and macroeconomics books on the decisions of consumers and producers is based on this assumption that there is a safe economic environment with complete information. But in the real world, the economy is full of uncertainty of economic factors. Therefore, in the presence of uncertainty, the emergence of different behaviors compared to economic theories can be seen [4].

In the last few months, the economic downturn has caused changes in the economic and social environment of the world with its comprehensive scope and consequences. With the emergence of the recent unemployment events and financial failures in the headlines of the world news, insurance companies will undoubtedly face challenges that may be a threat to their existence or risk-taking level [3].

Among the topics related to production and investment, perhaps none is as complicated as the issue of uncertainty and solutions to overcome it. In fact, despite the world full of uncertainty and risk, any investment is irrational unless it is possible to reduce this uncertainty using various tools or at least distribute its consequences among more people. This is why insurance is known today as the backbone of investment and their prosperity is considered a guarantee for production stability [11]. It is not possible to understand the causes for the low level of investment and production in Iran without analyzing the position of the insurance industry and its current situation in the Iranian economy.

Today, the insurance industry has a wide impact on macroeconomic variables in addition to its main function, which is the timely payment of damages according to the type of insurance policy in the event of an accident, and these two elements influence each other, and macroeconomic decisions have a direct effect on insurance and it can affect its growth [8]. Of course, what affects the insurance industry is not only economic variables but also cultural, social, political, and legal variables are important. In today's world, insurance is considered one of the important economic tools and it is used in many ways so that insurance companies are considered as investment poles in the world [9]. Because the issue of uncertainty in Iran's economy and its impact on other sectors, especially the insurance sector, has attracted less attention, there are many fields of study for the country's economic researchers in this direction. Therefore, in this research, an attempt has been made to examine the insurance sector and the effects induced by the country's economic uncertainty. Hence, according to the importance of examining the insurance situation in economic downturn conditions, by examining the effect of macroeconomic variables (growth rate, inflation rate, unemployment rate), they have a significant relationship on insurance industry performance.

2 Theoretical foundations of the research

The macroeconomic variables examined in this research include inflation rate, exchange rate, and liquidity.

2.1 Inflation rate

Inflation is a complex phenomenon and has various dimensions. In a simple definition, common and accepted by most economists, inflation is a situation where the general level of prices increases continuously and over time, so the element of time and the continuity of the increase in the general level of prices is very important in the definition of inflation. The remarkable thing about inflation is that despite there being a specific definition of inflation, there is no single point of view regarding the causes of inflation. Some economists believe that the main source of inflation is excessive growth of money volume, another group believes excessive demand in the commodity market is the reason, others believe cost-push and increase in the price of factors of production are the causes, and finally some other think that structural factors and existing bottlenecks in various sectors, the weakness of agricultural sectors and foreign trade is the reason. In addition, the role and contribution of the listed factors in inflation may be different at various times. In general, the excess of aggregate demand for supply causes an increase in the general level of prices, but inflation refers to an increase in the general level of prices only if it is continuous and self-sustainable. Some economists believe that the costs imposed by inflation on society are much more serious than the costs caused by the slowdown of economic growth [15]. High and unstable inflation disrupts the price allocation system and disruption of income distribution in society. On the other hand, the instability of inflation not only damages the credibility of macroeconomic policymakers, especially the central bank, but its continuation can also cause acute cases of political instability in the country. The set of mentioned factors reflects the fact that, firstly, inflation is an undesirable phenomenon that can cause serious damage to the economy in the long term periods. Secondly, inflation is affected by many structural factors in the economy, which makes it difficult to identify and combat it. In addition, since inflation and economic growth move in parallel in the short term, the fight against inflation may lead to losses in the short term, such as the slowing

down of the economic growth rate, but in the medium and long term, controlling inflation leads to improvement of economic growth and employment. Iran's economy has always been exposed to a high inflation rate in the past years. Despite the relative decrease in inflation in the years leading up to 2010 after the implementation of the subsidy targeting program and the unprecedented expansion of international sanctions on various sectors of Iran's economy, the lack of foreign exchange resources caused by the financial and exchange restrictions imposed on the country and the considerable growth of the exchange rate and, as a result, the increase in total product cost in the country, the inflation rate has increased again [14].

2.2 Liquidity

Liquidity, or more correctly, money volume, is the sum of money and quasi-money. Liquidity means the sum of banknote and coins and demand deposits in a country. The difference between liquidity and money volume of a country is in people's time or saving deposits in banks. The growth of money and liquidity has found an increasing and unstable trend in recent decades, while the discipline and stability of liquidity are considered the main condition for the economic stability of a country. The importance of liquidity stability and discipline is such that in structural adjustment programs, it is considered a goal and an evaluation index as well as a means of achieving other goals [2].

The process of money creation and liquidity creation in different governments has always been increasing rapidly due to the lack of coordination of expenses and incomes. In recent years, due to the double budget deficit in the 10th and 11th of Iranian governments, money creation by the central bank has been an easy but harmful way that the governments have chosen, and the result is a limitless increase in liquidity in the economy. Each unit of money creation by the central bank is multiplied five to six times by the coefficient called the money multiplier, and it rapidly increases the liquidity volume in the economy. Only one of the effects of this process is the occurrence of inflation in the economy [7].

2.3 Fluctuations in the exchange rate

Analyzing and investigating the persistence of inflation is very important for making decisions and making appropriate policies. Inflation is one of the important economic problems of Iran in the last three decades. The evaluation of inflation rate statistics based on the consumer goods and services index over the past 34 years shows that the country has been facing double-digit inflation for most of the years. The average inflation rate in 1981- 1990, 1991-2000, and 2001-2010 are 18%, 24%, and 16.9%, respectively. These values indicate high inflation in Iran's economic life during the last 3 decades. Today, the dynamics of inflation and the behavior of this variable have been taken into consideration in many economic studies, and in this field, the study of the persistence of inflation is of particular importance [10]. Since the exchange rate is the factor that connects the domestic economy with the outside world, every country is in search of determining the equilibrium exchange rate or guiding the exchange rate to its desired level according to the predicted goals. In this regard, a famous point of view in the international economy states that the exchange rate deviation from its equilibrium value creates costs for the domestic economy [12]. Exchange rate deviations cause fluctuations in prices, and the more fluctuations in the exchange rate, the more fluctuations in prices follow, and fluctuations in prices, in turn, have costs; For example, the nominal value of the national currency has decreased and people will look for assets whose real value is more stable [1].

2.4 Company's performance

Institutions and organizations and executive bodies, with any mission, goals, and vision they have, ultimately operate in a national or international territory and are required to respond to customers, clients, and stakeholders, so that a company whose goal is to make a profit and the satisfaction of the customer should be responsible on its goal the full and accurate implementation of legal duties and helping to achieve the goals of development and excellence of the country. Therefore, evaluating performance results is considered an important strategic process [5]. The quality and effectiveness of management and its performance is the determining and vital factor for the realization of the development and welfare programs of the society. Proving services, producing numerous products, and supplying finances from sources have created sufficient sensitivity to investigate the realization of goals, continuous improvement of quality, improvement of customer and citizen satisfaction, and the performance of the organization and management and employees. If the performance evaluation is done from a process point of view correctly and continuously, it leads to the improvement and accountability of the executive bodies and public trust in the performance of the organizations and the efficiency and effectiveness of the government in the government sector. In the non-governmental sector, it also improves resource management, and customer satisfaction, helps national development, creates new capabilities and sustainability, and promotes the international level of companies and institutions [6].

2.5 Evaluation criteria of company financial performance

Evaluation criteria of performance can be divided into two categories, accounting and economic according to accounting concepts and economic concepts. In accounting criteria, a company’s performance is evaluated according to accounting data while in economic criteria, a company’s performance is evaluated according to the power to earn profits from existing assets and potential investment, and considering the rate of return and cost of capital rate. The evaluation criteria for the company’s performance are as follows.

The accounting standards for evaluating the company’s performance are earnings, growth earnings, dividend per share, cash flows, earnings per share and financial ratios, price-to-book ratio, and Tobin’s Q ratio.

The economic standards for evaluating the company’s performance are economic value added (EVA), market value added (MVA), and refined economic value added (REVA) [13].

According to the research literature, the following assumptions can be made:

- Fluctuations in the exchange rate have a positive and significant effect on the insurance industry’s performance.
- Fluctuations in the inflation rate have a positive and significant effect on the insurance industry’s performance.
- Fluctuations in liquidity have a positive and significant effect on the insurance industry’s performance.

3 Research methodology

The method of this study is a quantitative-survey one. The statistical population of the research is managers and employees of insurance companies. Based on Morgan’s table, 415 people were selected as a sample and the data required for the research was considered in the conceptual model. The independent variable is the factors of economic uncertainty, for its calculation, macroeconomic variables include liquidity, inflation rate, and exchange rate, and the dependent variable is insurance industry performance. In this research, testing the hypotheses was done with structural equations with the SEM method using Amos software, and data from 2015 to 2018 was considered for macroeconomic variables.

The structural equation model is one of the new statistical methods and one of the most robust multivariate analysis methods, and its main application is in multivariate subjects. Multivariate analysis refers to a series of analysis methods whose main feature is the simultaneous analysis of several independent variables with several dependent variables. Structural equations are from the multivariate regression family, which allows researchers to test a set of regression equations simultaneously (Eq. (3.1)).

$$n_t = \beta_1 + \beta_2 m_t + \beta_3 g_t + \varepsilon_{1t} \tag{3.1}$$

The model should be named according to the number of parameters of the model and the parameters should be entered into the model (Eqs. (3.2)—(3.7)):

$$n_t = \beta_{11} + \beta_{12} m_t + \beta_{13} p_t + \varepsilon_{2t} \tag{3.2}$$

$$n_t = \frac{\{(\beta_1 \beta_{13} - \beta_{11} \beta_3) + \beta_{13} \beta_2 g_t - \beta_3 \beta_{12} m_t - \beta_3 \beta_{14} n_{t-1} + (\beta_{13} \varepsilon_{1t} - \beta_3 \varepsilon_{2t})\}}{\beta_{13} - \beta_3} \tag{3.3}$$

$$p_t = \frac{\{(\beta_1 - \beta_{11}) + \beta_2 g_t - \beta_{12} \beta_{12} m_t - \beta_{14} n_{t-1} + (\varepsilon_{1t} - \varepsilon_{2t})\}}{\beta_{13} - \beta_3} \tag{3.4}$$

$$\begin{aligned} erf(x) &= \frac{2}{\sqrt{\pi}} \int_0^x e^{-t^2} dt. \\ n &= \max(n_1, n_2) \end{aligned} \tag{3.5}$$

where:

$$\begin{aligned} n_1 &= \left\lceil 50 \left(\frac{j}{k}\right)^2 - 450 \left(\frac{j}{k}\right) + 1100 \right\rceil \\ n_2 &= \left\lceil \frac{2}{2H} \left(A \left(\frac{\pi}{6} - B + D\right) + H + \sqrt{\left(A \left(\frac{\pi}{6} - B + D\right) + H \right)^2 + 4AH \left(\frac{\pi}{6} + \sqrt{A} + 2B - C - 2D\right)} \right) \right\rceil \end{aligned} \tag{3.6}$$

where:

$$A = 1 - p^2$$

$$B = \text{parcsin}\left(\frac{p}{2}\right)$$

$$C = \text{parcsin}(p)$$

$$D = \left(\frac{\delta}{z_1 - \alpha/2 - z_1 - \beta}\right)^2$$

where j is the number of observed variables, k is the number of latent variables, ρ is the estimated Gini correlation for a normal random vector of variables, δ is the predicted effect size, α is the corrected type I error rate, β is the type II error rate, and z is a standard score.

$$F(x; \mu, \sigma^2) = \frac{1}{2} \left[1 + \text{erf} \left(\frac{x - \mu}{\sigma\sqrt{2}} \right) \right], \tag{3.7}$$

where μ is the mean, σ is the standard deviation, and erf is the error function. Now the same steps can be done using the software.

- The Goodness-of-fit tests

As their name suggests, goodness-of-fit tests are used to determine whether a particular distribution is well-fitted. Calculating goodness-of-fit statistics also helps to rank the fitted distributions according to how well they fit the data.

- The first index- RMESA

$$RMESA = \frac{\sqrt{(X^2 - df)}}{\sqrt{[df(N - 1)]}} \tag{3.8}$$

- The second index- GFI

$$GFI = 1 - \frac{F(S, \sum(\hat{\theta}))}{F(S, \sum(\cdot))} \tag{3.9}$$

- The third index – AGFI

$$AGFI = 1 - \frac{k(k + 1)}{2d} (1 - GFI) \tag{3.10}$$

4 Research findings

4.1 Confirmatory factor analysis of variables

First, to enter the structural equations, the research tools must be subjected to confirmatory analysis to determine the validity of the construct. To confirm each of the variables, also the items related to each of them, confirmatory factor analysis was used. Confirmatory factor analysis is used to determine the appropriateness of the measurement model. Confirmatory factor analysis is a theory-testing model, where the researcher starts his analysis with a previous hypothesis.

4.1.1 Confirmatory factor analysis of variables related to fluctuations in the inflation rate

To determine the validity of variables related to the inflation rate, confirmatory factor analysis was used. The output of Amos software shows that all factor loadings are higher than 0.3. According to the output of Amos software, the calculated value of χ^2/df is 2.07, the presence of χ^2/df smaller than 5 indicates the appropriate fit of the model, and the root mean square error of approximation (RMSEA) estimate should be less than 0.08, which is presented in the model This value is equal to 0.066. The amount of GFI, AGFI, CFI, and NFI indicators should be more than 0.9, which is higher than the set value in the model under review. Therefore, the data of this research fits well with the factor structure of this scale, and this indicates the alignment of the questions with the variables related to fluctuations in the inflation rate (see Table 1).

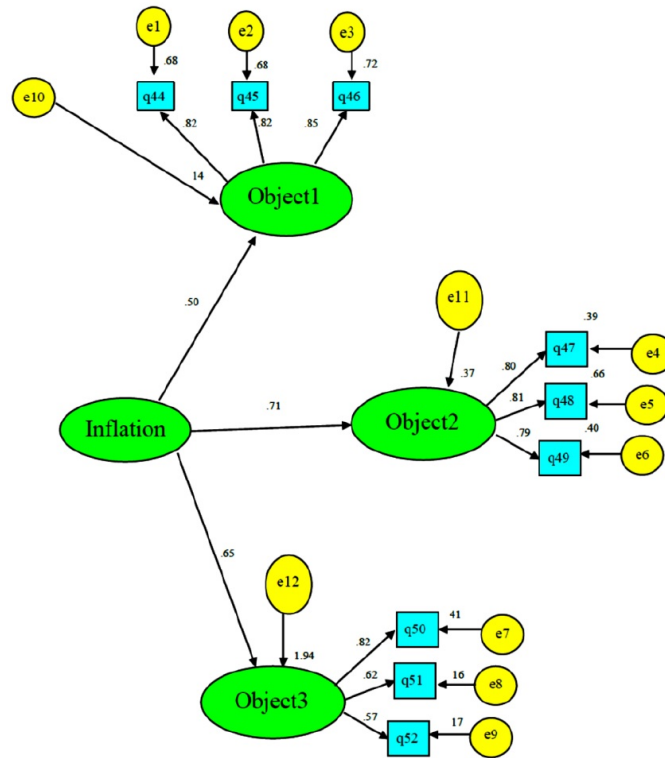


Figure 1: Path analysis of variables related to the inflation rate

Table 1: Fitness indices of variables related to the inflation rate

Characteristic	Estimated Value	Criterion Value
Chi-Square to Degrees of Freedom Ratio χ^2/df	2.07	$\chi^2/df < 5$
Root Mean Square Error of Approximation (RMSEA)	0.066	$RMSEA < 0.08$
The Goodness of Fit Index (GFI)	0.93	$GFI > 0.9$
Adjusted Goodness of Fitness Index (AGFI)	0.91	$AGFI > 0.9$
Comparative Fitness Index (CFI)	0.96	$CFI > 0.9$
Normal Fitness Index (NFI)	0.94	$NFI > 0.9$

4.1.2 Confirmatory factor analysis of variables related to fluctuations in liquidity

To determine the validity of variables related to the inflation rate, confirmatory factor analysis was used. All factor loadings are higher than 0.3. According to the output of Amos software in Table 3, the calculated value of χ^2/df is 1.80, the presence of χ^2/df smaller than 5 indicates the appropriate fit of the model, and the root mean square error of approximation (RMSEA) estimate should be less than 0.08, which is presented in the model This value is equal to 0.057. The amount of GFI, AGFI, CFI, and NFI indicators should be more than 0.9, which is higher than the set value in the model under review. Therefore, the data of this research fits well with the factor structure of this scale, and this indicates the alignment of the questions with variables related to fluctuations in liquidity (see Table 2).

Table 2: Fitness indices of variables related to fluctuations in the exchange rate

Characteristic	Estimated Value	Criterion Value
Chi-Square to Degrees of Freedom Ratio χ^2/df	1.80	$\chi^2/df < 5$
Root Mean Square Error of Approximation (RMSEA)	0.057	$RMSEA < 0.08$
The Goodness of Fit Index (GFI)	0.94	$GFI > 0.9$
Adjusted Goodness of Fitness Index (AGFI)	0.92	$AGFI > 0.9$
Comparative Fitness Index (CFI)	0.98	$CFI > 0.9$
Normal Fitness Index (NFI)	0.97	$NFI > 0.9$

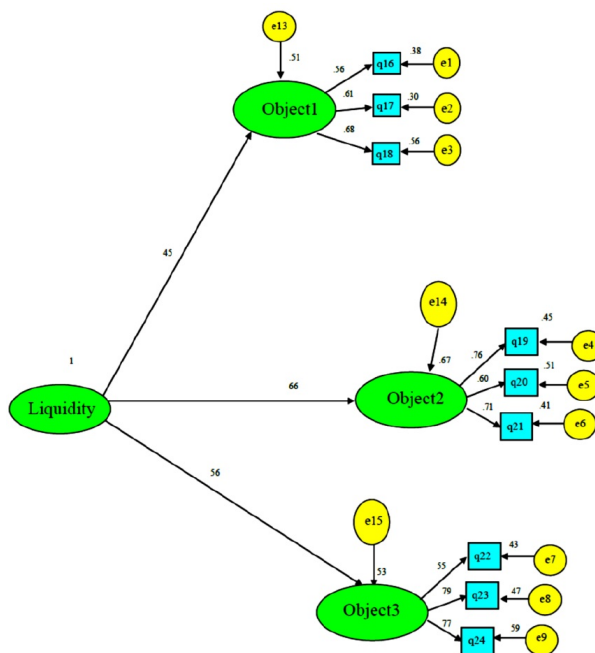


Figure 2: Path analysis of variables related to fluctuations in liquidity

4.1.3 Confirmatory factor analysis of variables related to fluctuations in the exchange rate

The numbers on the paths are factor loadings. All factor loadings are higher than 0.3. According to the output of Amos software in Table 4, the calculated value of χ^2/df is 1.54, the presence of χ^2/df smaller than 5 indicates the appropriate fit of the model, and the root mean square error of approximation (RMSEA) estimate should be less than 0.08, which is presented in the model. This value is equal to 0.047. The amount of GFI, AGFI, CFI, and NFI indicators should be more than 0.9, which is higher than the set value in the model under review. Therefore, the data of this research fits well with the factor structure of this scale, and this indicates the alignment of the questions with variables related to fluctuations in the exchange rate (see Table 3).

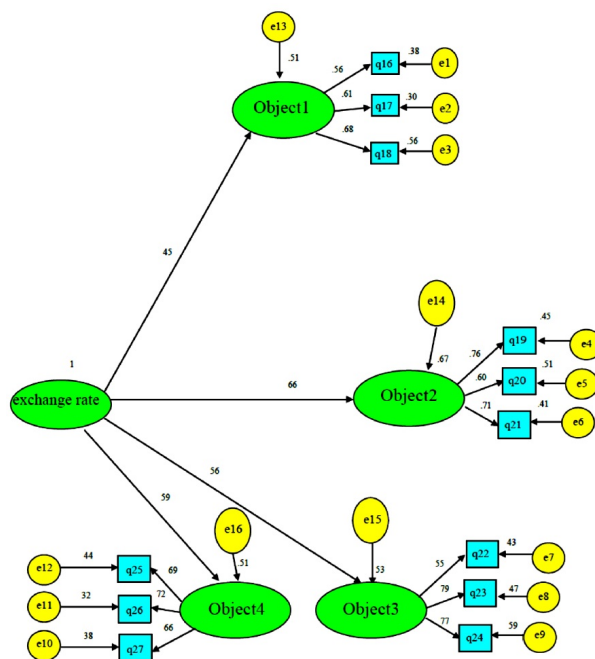


Figure 3: Path analysis of the variables related to fluctuations in the exchange rate

Table 3: Fitness indices of the variables related to fluctuations in the exchange rate

Characteristic	Estimated Value	Criterion Value
Chi-Square to Degrees of Freedom Ratio χ^2/df	1.54	$\chi^2/df < 5$
Root Mean Square Error of Approximation (RMSEA)	0.047	$RMSEA < 0.08$
The Goodness of Fit Index (GFI)	0.96	$GFI > 0.9$
Adjusted Goodness of Fitness Index (AGFI)	0.94	$AGFI > 0.9$
Comparative Fitness Index (CFI)	0.99	$CFI > 0.9$
Normal Fitness Index (NFI)	0.98	$NFI > 0.9$

4.2 Analyzing the model and checking the fit of the proposed research model

Fit criteria are one of the most important steps in structural equation modeling analysis. These criteria answer the question of whether the model represented by the data confirms the measurement model of the research or not. To answer this question, many fit criteria have been introduced in structural equation modeling methodology.

1. Chi-Square to Degrees of Freedom Ratio (χ^2/df): In the Chi-Square test, the compatibility hypothesis of the desired model is investigated by the covariance pattern between the observed variables. Its smaller values, i.e. less than 3, indicate more fitness. The quantity of χ^2 is highly dependent on the sample size, and a large sample increases the quantity of χ^2 more than it can be attributed to the wrongness of the model.
2. The goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI): These indices show the extent of the relative amount of variances and covariance that are explained by the model. Both criteria vary between 0 and 1, the closer they are to 1, the better the fit of the model with the observed data is.
3. Root Mean of Residuals (RMR): In this index, the residuals of the observed variances and covariance are compared with the estimations made in the model. Its smaller values indicate a better fit. Models in which this value is less than 0.05 have a very high fit, but values between 0.05 and 0.08 are also suitable for a good model.
4. Root Mean Square Error of Approximation (RMSEA): This index is 0.050 or less for good models, and a model in which this index is 0.10 or more has a poor fit.

Table 4 shows the status of these indicators.

Table 4: The results of the fit indices of the research model

Fit Criteria	RMSEA	RMR	CFI	NFI	AGFI	GFI	$\frac{\chi^2}{df}$
Value	0.090	0.133	0.845	0.887	0.841	0.835	2.858

The results show the appropriate fit of the proposed model. After testing the measurement models, it is now necessary to provide a structural model showing the relationship between the research variables. Using the structural model, research hypotheses can be examined. In this research, the structural equation modeling has been evaluated using Amos software in the form of diagram (4):

According to the figure 4 and the significance coefficients, since the CR value (Critical Ratio) must be greater than 1.96 or less than -1.96 to reject or confirm the relationships, the value of the parameter between these two domains in the model is not considered important. Also, the values between these two values indicate that there is no significant difference in the value calculated for the regression weights with zero value in the 95 percent confidence interval. Since the significance values show higher than 1.96, the significance of the path between two variables can be confirmed and the existence of this relationship can be confirmed. Finally, macroeconomic factors have an effect of 0.79 on a company's performance.

5 Conclusion

Based on the results of the research, it can be said that the exchange rate is one of the key macroeconomic variables that affect different sectors of the economy from various aspects (especially its fluctuations). Therefore, fluctuations in the effective real exchange rate harm the value added of economic sectors. In particular, they fluctuate the production of the mentioned 4 sectors. Exchange shocks, like the economic variables examined in this research, cause uncertainty and negative effects on performance.

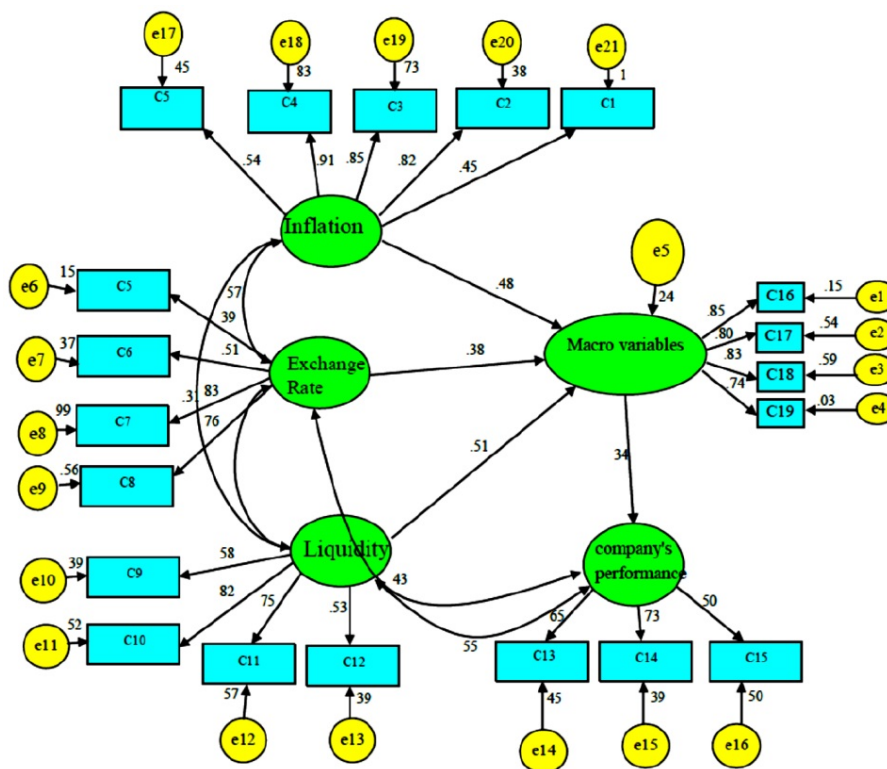


Figure 4: The diagram of the standard coefficients of the research model based on structural equations with Amos software

In recent years, there has always been a great desire among economists to study economic growth and the factors affecting it. Inflation is one of the factors affecting economic growth. Inflation is one of the most important harmful economic phenomena in a country. Most economists and politicians believe that the major losses caused by inflation are due to the uncertainty of inflation; the results of the research are consistent with the results of the current research.

The inflation rate in different societies can be considered a positive or negative phenomenon depending on the conditions of each society, but if the inflation shocks lead to uncertainty of inflation, this uncertainty imposes a large burden on economic enterprises by disrupting the optimal allocation of resources and the functioning of the price system. Under the influence of these costs and the rational behavior of economic agents in determining the expected inflation, the inflation rate may also increase. The results of the research are also consistent with the results of the current research.

Economic and sometimes non-economic policies of governments are one of the most important factors that cause uncertainty in the economy. These policies, along with changes in resources, preferences, and technology, make the results of economic agents' decisions ambiguous. Also, exchange rate changes as a key element affect other costs of production, and due to the degree of dependence of production on intermediate goods and imported capital in developing countries and the role of exchange in supplying these goods, have caused the study of the effects of exchange rate uncertainty to give a clearer picture of the country's economic conditions. The results of the research are also consistent with the results of the current research.

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