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Evaluating the Role of Annual Budget Items and Economic Indicators in Realizing the Resistive Economy Goals

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Abstract: The aim of this study was to investigate the role of the Iran's annual budget in realizing the resistive economy goals by examining the annual budget items, including realized revenues and realized expenditures between the years 2007 and 2016 and their relationship with important economic indicators, including economic growth, unemployment rate, inflation rate and Dollar exchange rate. Using regression and analysis of variance, this study investigated the budget items separately with each of the mentioned economic indicators and tested the possible linear relationship between them. This study was conducted according to the assumptions of the regression method and analysis of variance and the results showed that the annual budget items (realized revenues and realized expenditures) had no linear relationship with economic indicators of economic growth, unemployment rate and inflation rate, and the correlation coefficient between them was non-significant. However, realized revenues and realized expenditures over the past ten years showed a linear relationship with the economic indicator of the dollar exchange rate and the correlation coefficient between them was significant. It suggested that dollar exchange rate has changed over the past ten years that can be related to changes in budget items during this period. Therefore, the result of this study could introduce the annual budget of the country as a tool for government, through which it can predict and control the exchange rate in the next years using the changes in the items of revenues and expenditures of annual budget. Due to high fluctuations in the exchange rate in the country over the past months and its significant negative effects on other economic indicators, it seems that predicting and controlling the exchange rate through applying changes in annual budget items can be a step towards the realization of the resistive economy goals.

Keywords: Annual budget, Economic indicators, Regression

Introduction

The external and international pressures on Iran's economy over the last years and imposing numerous sanctions against it by foreign countries and international organizations have led to a concept called resistive economy, which means the establishment of the form of economy to neutralizing external pressures and ensuring the economic growth and development of the community in long-term. In order to achieve this goal, it is necessary to define the resistive economy and determine its goals properly and identify the ways to achieve them. The studies conducted on the resistive economic have considered the factors such as lifestyles, optimal use of e-Commerce tools, entrepreneurship, reform of the banking system, the development of non-oil exports, reforming the people`s behavioral rules, public participation in small-scale industries, mass media and development of the agricultural and rural sector effective in realizing the goals of the resistive economy. Due to the novelty of resistive economy subject and as most of the studies conducted in this area have been limited tomiscellaneous books and articles on resistive economy and the role of the annual budget of the country in achieving the goals of economic resistive has been overlooked, this study was conducted with the aim of identifying the factors affecting the realization of the goals of resistive economy and the optimal use of it in achieving the resistive economy in the country. Accordingly, this study tried to evaluate the relationship between the budget items and economic indicators over the last ten years. In this regard, the role of the annual budget in improving the economic branches and finally achieving the goals of the resistive economy was tested.

Economic indicators such as economic growth rate, employment rate, inflation rate and foreign exchanges rate in one country reflect the economic situation of that country, in which improving economic indicators will boost the economy. Hence, identifying the effective factors in improving economic indicators is important. Regardless of the factors such as increasing GDP and increasing domestic and foreign investment, which have a direct impact on the improvement of these indicators, other factors might affect these indicators. Recognizing these factors can improve

economic indicators and can be helpful in achieving the goals of the resistive economy. One of the financial tools of government is the annual budget of the country. As a short-term financial plan, the government predicts its revenues and expenditures for one year and tries to receive the revenues predicted in the budget during the year and spends its expenditures based on what has been projected in the budget, since the economy of Iran is largely dependent on the economic activity of the government. Government revenues and expenditures are expected to influence the economic indicators. Thus, evaluating the effect of economic indicators on real revenues and real expenditures of government can highlight the role of annual budget in improving economic indicators. This study sought to find to what extent economic indicators are correlated with governmental revenues and expenditures. For this purpose, the following hypotheses have been presented, which included two main hypotheses, each of which consisted of four sub-hypotheses as follow:

Main hypothesis 1: Realization of the annual budget revenue affects the economic indicators.

Sub-hypothesis 1-1: Realization of the annual budget revenue affects economic growth of the country

Sub-hypothesis 1-2: Realization of the annual budget revenue affects annual inflation rate.

Sub-hypothesis 1-3: Realization of the annual budget revenue affects annual employment rate.

Sub-hypothesis 1-4-: Realization of the annual budget revenue affects exchange rate.

Main hypothesis 2: The control of annual budget expenditures affects the economic indicators

Sub-hypothesis 2-1:The control of annual budget expenditures affects the country economic growth

Sub-hypothesis 2-2:The control of annual budget expenditures affects the annual inflation rate

Sub-hypothesis 2-3:The control of annual budget expenditures affects the employment rate

Sub-hypothesis 2-4:The control of annual budget expenditures affects the exchange rate

Theoretical fundamentals and literature of the study

Theoretical foundations of the study

The annual budget of the country: The annual budget of the country is in fact a government`s financial plan for a fiscal year that includes the prediction of revenues and other sources of funding to finance the plan expenditures as well as operations that should be performed to achieve the government`s legal goals. It also includes the government`s goals and policies that must be realized through the budget. In the public budget of the government, financial resources including public revenues, such as tax revenues and the funds derived from the sale of oil and gas, etc., as well as proprietary revenues are predicted on one hand, and the expenditure credits and the ownership of the capital assets needed to perform the current activities and development projects and plans and capital of government organizations are determined on the other hand (Babakhani, 2015).

Realized revenues of the government: The realized revenues of the government include all revenues received by the government over a fiscal year. It is submitted to the Islamic Consultative Assembly in the form of budget bill of the relevant year. It should be noted that the realized revenues of the government are not necessarily equal to the revenues predicted in the annual budget. In this research, the government` a annual revenues have been derived from the budget bill.

Government expenditures: Government expenditures are all expenditures of the government during one fiscal year submitted to the Islamic Consultative Assembly in the form of budget bill. It should be noted that the realized expenditures of the government are not necessarily equal to the expenditures predicted in the annual budget. In this research, the annual expenditures of the government were derived from the budget bill.

Economic growth: What is economic growth? What is the meaning of positive economic growth? How is it calculated? In general, the growth rate of an economic variable is the ratio of the increase in that variable to its initial value and economic growth is equal to growth in gross domestic product, which have been discussed in this research.

The economic growth process is characterized through two factors:

Economic growth factors

Economic growth factors include:

Natural resources: Availability of abundant natural resources is necessary. However, for economic growth, in addition to abundant resources, properly and optimally use of these resources should be considered in order to minimize the waste of resources and increase the period of using the resources.

Capital concentration: It means the storage of physical reproducible factors in the production process. Capital concentration is a key factor in the economic growth process. On the one hand, capital concentration affects the demand and creates efficiency for future production on the other hand. For this reason, capital concentration and accelerating its process is necessary to increase national production, so that it can cope with increasing population.

Technological developments and advances: It means the technological changes associated with the evolution of production methods and the innovation and the use of new methods in production. Technological changes increase the productivity of labor and return on assets and other factors.

Production organizing: Production organizing plays a major role in economic growth. Production organizing means the maximum use of production factors in economic activities, which contribute to the factors of production (capital and labor) and increases their returns.

Division of labor and production scale: Allocation and division of labor increases the productivity of the workforce. It leads into large-scale production and industrial development in the country.

Underlying changes: Underlying changes represent the transition from traditional agricultural community to a modern industrial sector. It involves growing the transfer of existing social institutions, existing social thinking, and motivating. Such changes will result in increased job opportunities, increased labor productivity, increased capital concentration and increased use of the new scientific resources and, finally, improved production.

Non-economic growth factors of these factors include social factors, social thinking, values, institutions, customs and norms that do not affect economic growth.

Human factors: Human resource is an important factor in modern economic growth. However, economic growth does not depend merely on the size and number of human resources, but depends on its efficiency.

Political and organizational factors

Political and institutional factors play a major role in the new economic growth. The economic growth of Britain, West Germany, United States, Japan, France and the Netherlands, partly are due to the political stability of the bureaucracy and the strong administrative structure of these countries since the nineteenth century.

Unemployment rate: The unemployment rate in the country is the ratio of the number of qualified unemployed people to the total number of those who can work.

Inflation rate: It is a change in the price of commodities from one period to the other. It is announced by the Central Bank of Iran and other Statistics Center of Iran of the country. In this research, the rates announced by the Central Bank of Iran were used.

Exchange rate: It refers to the value of foreign currencies versus the currency of the Iran country. In this research, the value of the foreign exchange of the United States dollar and Iranian Rial were investigated over the past 10 years between 2007 and 2016. Thedollar value of each year in this study was calculated by summing up monthly rates announced by the Central Bank of Iran each year and divided by twelve.

The studies conducted on resistive economy have considered the factors such as lifestyle, the optimal use of e-commerce tools and entrepreneurship, reforming the banking system, the development of non-oil exports, reforming the behavior rules of people and the participation of people in the small industries, public sector, and the development of agriculture and rural sector effective in realizing the goals of the resistive economy.

Due to the novelty of resistive economy subject and as most of the studies conducted in this area have been limited tomiscellaneous books and articles on resistive economy and the role of the annual budget of the country in achieving the goals of economic resistive has been overlooked, this study was conducted with the aim of identifying the factors affecting the realization of the goals of resistive economy and the optimal use of it in achieving the resistive economy in the country. As most of the present scholars believe that the realization of the goals of the resistive economy is directly related to the improvement of economic indicators such as economic growth, employment rate, inflation rate and foreign exchange rate, in this study, the possible relationship between these indicators and government`s revenue and expenditure items in the last ten years was investigated. If this relationship was confirmed, more attention should be paid to the annual budget items in the coming years in order to achieve the goals of the resistive economy.

Research literature

Over the last years, with the intensification of pressures caused by international economic sanctions, the Iran's economy has been affected by specific conditions. The Supreme Leader of Iran has emphasized on resistive economy over the last years, having a full knowledge of the intensification of pressure on the Islamic Republic of Iran. A resistive economy means minimizing dependencies on other countries and supporting domestic production (SalehzadehNobari, 2013). Since the year 2016 was called as "resistive economy, action and practice" and due to unprecedented sanctions against Iran's government and nation, resistive economy is one of the essential components in achieving the goal of e-commerce. During the last decade, the rapid growth of e-commerce, which is the main characteristic of modern economics, has played a key role in the development of societies, so that e-commerce accounts for a large part of global trade and it has paved the way for faster economic growth. With the tools available in e-commerce, the speed and quality of work and transparency of work have increased in the community and, consequently, the possibility of achieving economic independence and creating new opportunities have increased (Sorkh Par, 2016). The resistive economy issue has been highlighted in many organizations in recent years following the statements of Supreme Leader of Iran in this regard. Organizations, in line with achieving the goals of the system, are obliged to adhere to its implementation and design and implement their own plans based on it (Mashhadi Hasan Mirzay-e Shirazi, 2017). The only optimal strategy for coping with economic sanctions against Iran is the strategy announced by the Supreme Leader under the title of resistive economy. Resistive economy strategy is an active and strong economic strategy adopting an interactive approach to use all environmental capacities of the community to establish it. Resistive economy seeks to strengthen the economy, remove the damages, and restore and repair the existing inefficient structures and institutions (SalehzadehNobari, 2016). Reduced dependency on oil economy and moving toward a

resistive economy is a new approach that can provide comprehensive progress and development for the country. Non-oil exports play a major role in increasing national production and, finally, per capita income, and increased exports have been the main economic policy of the Iran's government over the last few decades (Daemi, 2016). Paying attention to the process of privatization in developing countries suggests that these countries, as developed industrial countries, require government intervention in special period of their growth (Mardani, et al., 2019). People play key role in realizing the resistive economy, so that the public economy is one of the components of resistive economy. Paving the ways for involvement of people in oil sector and refining it, is an appropriate solution to cope with oil sanctions in the country and, as a result, increasing the resistance of Iran's economy against the external threats (Umusali, 2013). The media can manage and direct public thoughts and have educational and promotional function. Following the announcement of the general policies of resistive economy by the Supreme Leader, mass media mission as the most effective media tool educates the components of the resistive economy to the people and authorities (Saeedifar, 2017). The sanctions imposed on the Islamic Republic of Iran, which have continued since the victory of the Islamic Revolution, has seriously threatened the economic system of the country. The threat to the economic system can directly threaten the national authority and national security. Thus, the problems caused by sanctions can jeopardize the Islamic system. All of the conditions created by sanctions led to the emergence of a new area for the continuation and manifestation of the national and economic authority of the country. This area has been manifested by the emergence of a concept called resistive economy (Shamsi, 2017). With an emphasis on resistive economy policies, it is very important to pay attention to the agricultural and rural sector (KarimiEtemad, 2016). The resistive economy model means the proper economic decision-making methods in situations of sanctions, pressure and shortage of resources in the community, so that this style would lead to economic boom. The aim of this research was investigating the pathology of realization of the resistive economy model. This research was an applied study in terms of objective and a descriptive study in terms of nature of its subject. The library method was used for collecting information on basic concepts. The concept of economics and the resistive economy model was first discussed. Then, the existing damages were identified using the obtained information. Finally, it was stated that planning for fully and successfully implementation of this model required the elimination of existing belief, behavioral, cultural and psychological damages (Mohebi, Saber and Rajab Akbarzadeh, 2012).

Methodology

The present research was an applied study in terms of objective, as it developed an applied knowledge in a particular area. Additionally, the present study was a correlational research in terms of methodology and the nature of the research. In this research, the goal was to determine the relationship between variables. For this purpose, appropriate indicators were selected based on the measurement scale of the variables. As the type of the relationship tested in this study was correlational, linear regression analysis has been used to determine the level of the effect of independent variables on dependent variables.

The steps of the research implementation were as follows:

1-First, the research hypotheses have been determined in the form of correlation between dependent and independent variables.

2-Then, the metrics needed to test the research hypotheses were calculated using the data collected based on the methods and formulas introduced for each of them.

3-After fitting the regression model, the results were compared with the expected results.

4- Finally, the reason for the rejection or confirmation of the hypotheses was analyzed.

This research was conducted within the framework of deductive-inductive arguments, meaning that the model constructed hypotheses and indices with logical reasoning, which was confirmed by the observed data. It means that they were tested with real data. The method used in this research was regression and analysis of variance. Using this method, the linear relationship between the two variables could be observed. The main idea of the analysis of variance was based on showing the rate of total variations in a statistical set as the sum of several items, which each of them could be attributed to a specific source of variations. If variations can be attributed to x in the regression, the linear relationship between X and y would be rejected (Statistics and its use in management p. 211).

Research model and operational definition of the variables

The research model has used the following variables to evaluate the correlation between the variables in the first and second hypotheses

1-Realized revenues of studied 10-year budget

2-Realized expenditures of studied 10-year budget

Dependent variables of the study

1-Economic growth rate

2-The unemployment rate of the country

3-Inflation rate

2- Dollar exchange rate

Methods and tools of data analysis

Methods and tools for data analysis were the methods of calculation of mean, variance, standard deviation and other statistical criteria.

Inferential statistics

Residual error test

This test is used to examine the suitability of the regression method by displaying the independent variable X and the residual error on the coordinate axis. In this type of display, the independent variable is shown on the horizontal axis, and the rate of residual is shown on the vertical axis (3-7). If the residuals be almost dispersed linearly, the used model would be suitable. If the variance of the residuals increases with increasing the values of X, the variance would not be fixed and the second assumption of the error term E would be violated. In this case, the linear model would not be suitable. If the type of dispersion of the residuals be in the form of a curve, the nonlinear model would be suitable.

Descriptive statistics of data

The descriptive statistics of the research variables has been presented in the following table:

Table 1. Descriptive statistics of the research variables

Description of variables	mean	median	max	min	SD
Realized revenues (first independent variable)	7015.000 Billion Rials	7300.000 Billion Rials	9404.000 Billion Rials	3794.000 Billion Rials	1862.000 Billion Rials
Realized expenditures (second independent variable)	7101.000 Billion Rials	7284.000 Billion Rials	9195.000 Billion Rials	3685.000 Billion Rials	1768.000 Billion Rials
Economic growth rate (first dependent variable)	0.911%	3.18%	7.84%	-5.8%	4.91%
Inflation rate (second dependent variable)	19.02%	17%	.34.7%	9%	8.81%
Unemployment rate (third dependent variable)	11.86%	12.25%	13.5%	10.4%	1.06%
Dollar exchange rate (fourth dependent variable)	17190 Rials	11647 Rials	31483 Rials	9274 Rials	5946 Rials

Inferential statistics

The relationship between the independent variable x and the residual error y-$\hat{y}$for all the research hypotheses has been presented below. The analysis of each residual error test has been presented in each chart:

Table 2. The relationship between independent variable x and residual error y-$\hat{y}$(economic growth)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized revenuex	5507.000 billion Rials	6732.000 billion Rials	7970.000 billion Rials	3794.000 billion Rials	5053.000 billion Rials	6277.000 billion Rials	8249.000 billion Rials	9404.000 billion Rials	7867.000 billion Rials	9297.000 billion Rials
Residual error	%5.23	-1.08%	1.71%	2.96%	0.37%	-8.05%	-7.12%	3.82%	-3.10%	5.47%

Although the dispersion of the points was almost linear, it seems that with increasing x values, points became more dispersed, indicating that the residual error variance was not fixed. In this case, the second assumption of the suitability of the linear regression method was violated.

Table 3. The relationship between independent variable x and residual error y-$\hat{y}$ (inflation rate)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized revenuex	5507.000 billion Rials	6732.000 billion Rials	7970.000 billion Rials	3794.000 billion Rials	5053.000 billion Rials	6277.000 billion Rials	8249.000 billion Rials	9404.000 billion Rials	7867.000 billion Rials	9297.000 billion Rials
Residual error	-1.51%	6.21%	-7.66%	-8.52%	1.32%	11.04%	16.41%	-2.01%	-6.62%	-8.67%

Dispersion of points was almost linear. It confirmed the suitability of the linear regression method in terms of the relationship between independent variable and residual error.

Table 4. The Relationship between independent variable x and residual error y-$\hat{y}$ (unemployment rate)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized revenuex	5507.000 billion Rials	6732.000 billion Rials	7970.000 billion Rials	3794.000 billion Rials	5053.000 billion Rials	6277.000 billion Rials	8249.000 billion Rials	9404.000 billion Rials	7867.000 billion Rials	9297.000 billion Rials
Residual error	-1.46%	-1.48%	0.11%	1.42%	0.3%	0.29%	-1.37%	0.64%	0.6%	0.7%

Dispersion of points was almost linear. It confirmed the suitability of the linear regression method in terms of the relationship between independent variable and residual error.

Table 5. The relationship between independent variable x and residual error y-$\hat{y}$ (Dollar exchange rate)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized revenuex	5507.000 billion Rials	6732.000 billion Rials	7970.000 billion Rials	3794.000 billion Rials	5053.000 billion Rials	6277.000 billion Rials	8249.000 billion Rials	9404.000 billion Rials	7867.000 billion Rials	9297.000 billion Rials
Residual error	-2336	-6540	-10795	5078	1102	-2199	-82	594	9328	5849

Dispersion of points was almost linear. It confirmed the suitability of the linear regression method in terms of the relationship between independent variable and residual error.

Table 6. The relationship between independent variable x and residual error y-$\hat{y}$ (economic growth)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized expenditur ex	6479.000 billion Rials	6732.000 billion Rials	7914.000 billion Rials	3685.000 billion Rials	5313.000 billion Rials	6253.000 billion Rials	8228.000 billion Rials	9374.000 billion Rials	7836.000 billion Rials	9195.000 billion Rials
Residual error	%5.73	%-1.2	%1.52	%3.35	%0.7	%-7.94	%-7.33	%3.44	%-3.26	%5.08

Although the dispersion of the points was almost linear, it seems that with increasing x values, points became more dispersed, indicating that the residual error variance was not fixed. In this case, the second assumption of the suitability of the linear regression method was violated.

Table 7. The relationship between independent variable x and residual error y-$\hat{y}$ (inflation rate)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized expenditur ex	6479.000 billion Rials	6732.000 billion Rials	7914.000 billion Rials	3685.000 billion Rials	5313.000 billion Rials	6253.000 billion Rials	8228.000 billion Rials	9374.000 billion Rials	7836.000 billion Rials	9195.000 billion Rials
Residual error	%-1.16	%6.06	%-7.52	%-9.56	%0.94	%10.75	%16.65	%-1.46	%-6.49	%-8.22

Although the dispersion of the points was almost linear, it seems that with increasing x values, points became more dispersed, indicating that the residual error variance was not fixed. In this case, the second assumption of the suitability of the linear regression method was violated.

Table 8. The relationship between independent variable x and residual error y-$\hat{y}$ (unemployment rate)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized expenditur ex	6479.000 billion Rials	6732.000 billion Rials	7914.000 billion Rials	3685.000 billion Rials	5313.000 billion Rials	6253.000 billion Rials	8228.000 billion Rials	9374.000 billion Rials	7836.000 billion Rials	9195.000 billion Rials
Residual error	%-1.44	%-1.50	%0.15	%1.20	%0.21	%0.23	%-1.31	%1.04	%0.64	%0.82

Dispersion of points was almost linear. It confirmed the suitability of the linear regression method in terms of the relationship between independent variable and residual error.

Table 9. The relationship between independent variable x and residual error y-$\hat{y}$ (Dollar exchange rate)

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Realized expenditurex	6479.000 billion Rials	6732.000 billion Rials	7914.000 billion Rials	3685.000 billion Rials	5313.000 billion Rials	6253.000 billion Rials	8228.000 billion Rials	9374.000 billion Rials	7836.000 billion Rials	9195.000 billion Rials
Residual error	%-5573	%-6197	-10325 %	%6029	%579	%-1736	%238	%871	%9712	%6404

Dispersion of points was almost linear. It confirmed the suitability of the linear regression method in terms of the relationship between independent variable and residual error.

Testing research hypotheses

Section 1: Investigating the relationship between realized revenues of budget and economic indicators Investigating the relationship between realized revenues of budget and economic growth of the country

The realized revenues of the country annual budget for the years 2007 to 2016 (derived from budget bill of the mentioned years) and economic growth rate (Statistics Center of Iran) during the mentioned period have been presented respectively from left to right of table:

Table 10. Realized revenues of the budget and economic growth rate

Realized revenue x (thousand billion Rials)	5507	6732	7970	3794	5053	6277	8249	9404	7867	9297
Economic growth rate(%)	7.84	0.83	3.16	6.38	3.2	-5.8	-5.8	4.6	-1.6	6.3

Calculations:

$$\sum x = 70150 \text{ ، } \sum y = 19.11 \text{ ، } \sum xy = 119315 \text{ ، } \sum x^2 = 523300862 \text{ ، } \sum y^2 = 253.69$$

$$\bar{x} = 7015 \text{ ، } \bar{y} = 1.911 \text{ ، } b = -0.000047 \text{ ، } a = \bar{y} - b\bar{x} = 5.211$$

The regression line equation is as a = y + bx, that is y = 5.211-0.00047 x. The hypothesis test for the linear relationship between x and y at a significant level of 5% is as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: $\beta = 0$

A linear relationship between x and y h1: $\beta \neq 0$

test statistic

$$sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (253.69) - \frac{1}{10}(19.11)^2$$

$$SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}(\sum y)^2$$

$$= 5.211(19.11) + (-0.00047)(119315) - 1.10(19.11)^2 = 6.98$$

$$SSE = SST - SS(Tr) = 217.17 - 6.98 = 210.19$$

Analysis of variance table:

Source of variations	Sum of squares	df	Mean of squares	F
treatment	6.98	1	6.98	0.27
error	210.19	10-2=8	26.27	-
sum	217.17	10-1=9	-	-

Critical value

$$F_{a.1.n-2} = F_{0.05.1.8} = 5.32$$

-Decision making: Since F = 0.27 was smaller than the critical value, then hypothesis $\beta = 0$ couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and the country economic growth rate between the years 2007 and 2016.

$$r^2 = 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} = 1 - \frac{210.19}{21717} = 1 - 0.97 = 0.03$$

The correlation coefficient 0.03 showed that only 3% of variations in y can be explained by x variation.

Investigating the relationship between realized revenues of budget and annual inflation rate of the country

The realized revenues of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the annual inflation rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right of table as follows:

Table 11. Realized revenues of the budget and annual inflation rate

Realized revenue x (thousand billion Rials)	5507	6732	7970	3794	5053	6277	8249	9404	7867	9297
Annual inflation rate (%)	18.4	25.4	10.8	12.4	21.5	30.5	34.7	15.6	11.9	9.0

Calculation

$$\sum x = 70150 \text{،} \sum y = 190.2 \text{،} \sum xy = 1315765 \text{،} \sum x^2 = 523300862 \text{،} \sum y^2 = 4316.68$$

$$\bar{x} = 7015 \text{،} \bar{y} = 19.02 \text{،} b = -0.00059 \text{،} a = \bar{y} - b\bar{x} = 23.16$$

The regression line equation was as a = y + bx, that is y = $23.16 - 0.00059x$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: $\beta = 0$

A linear relationship between x and y h1: $\beta \neq 0$

Test statistic

$$sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = \left(\frac{4316}{68}\right) - \frac{1}{10}\left(\frac{190}{2}\right)^2 = 669.07$$

$$SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}\left(\sum y\right)^2$$

$$= 23.16(190.2) + (-0.00059)(1315765) - \frac{1}{10}(190.2)^2 = 11.13$$

$$SSE = SST - SS(Tr) = 699.07 - 11.13 = 687.94$$

Analysis of variance table

Source of variations	Sum of squares	df	Mean of squares	F
treatment	11.13	1	11.13	0.13
error	687/94	10-2=8	86	-
sum	699.07	10-1=9	-	-

Critical value

$$F_{a.1.n-2} = F_{0.05.1.8} = 0.13$$

Decision making: Since F = 0.13 was smaller than the critical value, then hypothesis $\beta = 0$ couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and the country economic growth rate between the years 2007 and 2016

$$r^2 = 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} = 1 - \frac{687.94}{699.07} = 1 - 0.98 = 0.02$$

The correlation coefficient 0.02 showed that only 2% of variations in y can be explained by x variation.

Investigating the relationship between realized revenues of budget and unemployment rate of the country

The realized revenues of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the annual unemployment rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right sides of table as follows:

Table 12. Realized revenues of the budget and unemployment rate

Realized revenue x (thousand billion Rials)	5507	6732	7970	3794	5053	6277	8249	9404	7867	9297
Unemployment rate (%)	10.5	10.4	11.9	13.5	12.3	12.2	10.4	12.6	12.4	12.4

Calculation

$$\sum x = 70150 \text{،} \sum y = 118.6 \text{،} \sum xy = 829743.2 \text{،} \sum x^2 = 523300862 \text{،} \sum y^2 = 1416.84$$

$$\bar{x} = 7015 \text{،} \bar{y} = 11.86 \text{،} b = -0.00007 \text{،} a = \bar{y} - b\bar{x} = 12.35$$

The regression line equation was as a = y + bx, that is $\boldsymbol{y = 12.35 - 0.00059x}$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: β = 0

A linear relationship between x and y h1: β ≠ 0

Test statistic

$$\boldsymbol{sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (1416.84) - \frac{1}{10}(118.6)^2 = 10.24}$$

$$\boldsymbol{SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}\left(\sum y\right)^2}$$

$$\boldsymbol{= 12.35(118.6) + (-0.00007)(829743.2) - \frac{1}{10}(118.6)^2 = 0.03}$$

$$\boldsymbol{SSE = SST - SS(Tr) = 10.24 - 0.03 = 10.21}$$

Analysis of variance table

Source of variations	Sum of squares	df	Mean of squares	F
treatment	0.03	1	0.03	0.02
error	10.21	10-2=8	1.27	-
sum	10.24	10-1=9	-	-

Critical value

$$\boldsymbol{F_{a.1.n-2} = F_{0.05.1.8} = 5.32}$$

Decision making: Since F = 0.02 was smaller than the critical value, then hypothesis β = 0 couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and the country economic growth rate between the years 2007 and 2016.

$$\boldsymbol{r^2 = 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} = 1 - \frac{10.21}{10.24} = 1 - 0.99 = 0.01}$$

The correlation coefficient of 0.01 showed that only 1% of variations in y can be explained by x variation.

Investigating the relationship between realized revenues of budget and Dollar exchange rate

The realized revenues of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the dollar exchange rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right of table as follows:

Table 13. Realized revenues of the budget and Dollar exchange rate

Realized revenue x (thousand billion Rials)	5507	6732	7970	3794	5053	6277	8249	9404	7867	9297
Dollar exchange rate (%)	9274	9603	9929	10351	11034	12260	21674	26624	29671	31483

Calculation

$$\boldsymbol{\sum x = 70150 ،\ \sum y = 171903 ،\ \sum xy = 1322116090 ،\ \sum x^2 = 523300862 ،\ \sum y^2 = 3706156}$$

$$\boldsymbol{\bar{x} = 7015 ،\bar{y} = 17190 ،b = 3.7 ،a = \bar{y} - b\bar{x} = -8765}$$

The regression line equation was as a = y + bx, that is $\boldsymbol{y = -8765 + 3.7x}$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: β = 0

A linear relationship between x and y h1: β ≠ 0

Test statistic

$$\boldsymbol{sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (3706156865) - \frac{1}{10}(171903)^2 = 751092724}$$

$$\boldsymbol{SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}\left(\sum y\right)^2}$$

$$\boldsymbol{= -8765(171903) + (3.7)(1312116090) - \frac{1}{10}(171903)^2 = 430035597}$$

$$\boldsymbol{SSE = SST - SS(Tr) = 751092724 - 430035597 = 321957127}$$

Analysis of variance table

Source of variations	Sum of squares	df	Mean of squares	F
Treatment	430035597	1	430035597	10/72
error	321957127	10-2=8	40132141	-
sum	751092724	10-1=9	-	-

Critical value

$$F_{a.1.n-2} = F_{0.05.1.8} = 5.32$$

Decision making: Since F = 10.72 was smaller than the critical value, then hypothesis β = 0 couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and the country economic growth rate between the years 2007 and 2016.

$$r^2 = 1 - \frac{\sum(y-\hat{y})^2}{\sum(y-\bar{y})^2} = 1 - \frac{321057127}{751092724} = 1 - 0.43 = 0.57$$

The correlation coefficient 0.57 showed that only 57% of variations in y can be explained by x variation.

Investigating the relationship between realized expenditures and economic indicators

Investigating the relationship between realized expenditures and economic growth

The realized expenditures of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the economic growth rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right sides of table as follows:

Table 14. Realized expenditures of the budget and economic growth rate

Realized expenditure(thousand billion Rials)	6479	6732	7914	3685	5313	6253	8228	9374	7836	9195
Economic growth rate (%)	7.84	0.83	3.16	6.38	3.2	-5.8	-5.8	4.6	-1.6	6.3

Calculation

$$\sum x = 71009 ، \sum y = 19.11 ، \sum xy = 126425 ، \sum x^2 = 532358645 ، \sum y^2 = 257.97$$

$$\bar{x} = 7101 ، \bar{y} = 1.911 ، b = -0.00033 ، a = \bar{y} - b\bar{x} = 4.254$$

The regression line equation was as a = y + bx, that is $y = 4.254 - 0.00033x$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: β = 0

A linear relationship between x and y h1: β ≠ 0

Test statistic

$$sst = \sum(y-\bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (257.97) - \frac{1}{10}(19.11)^2 = 221.45$$

$$SS(Tr) = \sum(\hat{y}-\bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}(\sum y)^2$$

$$= 4.254(19.11) + (-0.00033)(126425) - \frac{1}{10}(19.11)^2 = 3.05$$

$$SSE = SST - SS(Tr) = 221.45 - 3.05 = 218.04$$

Analysis of variance table

Source of variations	Sum of squares	df	Mean of squares	F
treatment	3.05	1	3.05	0.11
error	218.4	10-2=8	27.26	-
sum	221.45	10-1=9	-	-

Critical value

$$F_{a.1.n-2} = F_{0.05.1.8} = 0.11$$

Decision making: Since F = 0.11 was smaller than the critical value, then hypothesis β = 0 couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and the country economic growth rate between the years 2007 and 2016.

$$r^2 = 1 - \frac{\sum(y-\hat{y})^2}{\sum(y-\bar{y})^2} = 1 - \frac{218.4}{221.45} = 1 - 0.98 = 0.02$$

The correlation coefficient 0.02 showed that only 2% of variations in y can be explained by x variation.

Investigating the relationship between realized expenditures of the budget and inflation rate

The realized expenditures of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the economic growth rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right sides of table as follows:

Table 15. Realized expenditures of the budget and annual inflation rate

Realized expenditure (thousand billion Rials)	6479	6732	7914	3685	5313	6253	8228	9374	7836	9195
Annual inflation rate (%)	18.4	25.4	10.8	12.4	21.5	30.5	34.7	15.6	11.9	9.0

Calculation

$$\sum x = 71009 ، \sum y = \frac{190}{2} ، \sum xy = 1334068 ، \sum x^2 = 532358645 ، \sum y^2 = 4316.68$$

$$\bar{x} = 7101 ، \bar{y} = 19.02 ، b = -0.00086 ، a = \bar{y} - b\bar{x} = 25.13$$

The regression line equation was as a = y + bx, that is $y = 25.13 - 0.00086x$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: $\beta = 0$

A linear relationship between x and y h1: $\beta \neq 0$

Test statistic

$$sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (4316.68) - \frac{1}{10}(190.2)^2 = 699.07$$

$$SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}\left(\sum y\right)^2$$

$$= 25.13(190.2) + (-0.00086)(1334068) - \frac{1}{10}(190.2)^2 = 14.82$$

$$SSE = SST - SS(Tr) = 699.07 - 14.82 = 684.25$$

Analysis of the variance table

Source of variations	Sum of squares	df	Mean of squares	F
Treatment	14.82	1	14.82	0.17
error	684.25	10-2=8	85.53	-
sum	699.07	10-1=9	-	-

Critical value

$$F_{a.1.n-2} = F_{0.05.1.8} = 0.17$$

Decision making: Since F = 0.17 was smaller than the critical value, then hypothesis $\beta = 0$ couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and the inflation rate between the years 2007 and 2016.

$$r^2 = 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} = 1 - \frac{684.25}{699.07} = 1 - 0.98 = 0.02$$

The correlation coefficient 0.02 showed that only 2% of variations in y can be explained by x variation.

Investigating the relationship between realized expenditures of the budget and unemployment rate

The realized expenditures of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the economic growth rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right of table as follows:

Table 16. Realized expenditures of the budget and unemployment rate

Realized expenditure (thousand billion Rials)	6479	6732	7914	3685	5313	6253	8228	9374	7836	9195
Unemployment rate (%)	10.5	10.4	11.9	13.5	12.3	12.2	10.4	12.6	12.4	12.4

Calculation

$$\sum x = 71009 ، \sum y = 118.6 ، \sum xy = 838472 ، \sum x^2 = 532358645 ، \sum y^2 = \frac{1416}{84}$$

$$\bar{x} = 7100.9 ، \bar{y} = 11.86 ، b = -0.00013 ، a = \bar{y} - b\bar{x} = 12.78$$

The regression line equation was as a = y + bx, that is $= \mathbf{12.78 - 0.00013}x$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: β = 0

A linear relationship between x and y h1: β ≠ 0

Test statistic

$$\boldsymbol{sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (1416.84) - \frac{1}{10}(118.6)^2 = 10.24}$$

$$\boldsymbol{SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}\left(\sum y\right)^2}$$

$$\boldsymbol{= 12.78(118.6) + (-0.00013)(838472) - \frac{1}{10}(118.6)^2 = 0.11}$$

$$\boldsymbol{SSE = SST - SS(Tr) = 10.24 - 0.11 = 10.13}$$

Analysis of variance table

Source of variations	Sum of squares	df	Mean of squares	F
treatment	0.11	1	0.11	0/09
error	10.13	10-2=8	1.27	-
sum	10.24	10-1=9	-	-

Critical value

$$\boldsymbol{F_{a.1.n-2} = F_{0.05.1.8} = 0.09}$$

Decision making: Since F = 0.09 was smaller than the critical value, then hypothesis β = 0 couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and unemployment rate between the years 2007 and 2016.

$$\boldsymbol{r^2 = 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} = 1 - \frac{10.13}{10.24} = 1 - 0.99 = 0.01}$$

The correlation coefficient 0.01 showed that only 1% of variations in y can be explained by x variation.

Investigating the relationship between realized expenditures of the budget and Dollar exchange rate

The realized expenditures of the annual budget of the country from 2007 to 2016 (derived from the budget bill of the mentioned years) and the economic growth rate of the country (Statistics of Central Bank of Iran) during the mentioned period have been respectively presented from left to right of table as follows:

Table 17. Realized expenditures of the budget and Dollar exchange rate

Realized expenditure (thousand billion Rials)	6479	6732	7914	3685	5313	6253	8228	9374	7836	9195
Dollar exchange rate (%)	9274	9603	9929	10351	11034	12260	21674	26624	29671	31483

Calculation

$$\sum x = 71009 \text{ ، } \sum y = 171903 \text{ ، } \sum xy = 1326635794 \text{ ، } \sum x^2 = 532358645 \text{ ، } \sum y^2 = 3706156$$

$$\bar{x} = 7100.9 \text{ ، } \bar{y} = 17190.3 \text{ ، } b = 3.767 \text{ ، } a = \bar{y} - b\bar{x} = -9559$$

The regression line equation was as a = y + bx, that is $y = -9559 + 3.767x$. The hypothesis test for the linear relationship between x and y at a significant level of 5% was as follows:

Hypotheses:

Lack of a linear relationship between x and y h0: β = 0

A linear relationship between x and y h1: β ≠ 0

Test statistic

$$sst = \sum (y - \bar{y})^2 = \sum y^2 - \frac{1}{n}\left(\sum y\right)^2 = (3706156865) - \frac{1}{10}(171903)^2 = 751092724$$

$$SS(Tr) = \sum (\hat{y} - \bar{y})^2 = a\sum y + b\sum xy - \frac{1}{n}\left(\sum y\right)^2$$

$$= -9559(171903) + (3.676)(1326635794) - \frac{1}{10}(171903)^2 = 399152118$$

$$SSE = SST - SS(Tr) = 751092724 - 399152118 = 351940606$$

Analysis of variance table

Source of variations	Sum of squares	df	Mean of squares	F
Treatment	399152118	1	399152118	9.07
error	351940606	10-2=8	43992576	-
Sum	75192724	10-1=9	-	-

Critical value

$$F_{a.1.n-2} = F_{0.05.1.8} = 9.07$$

Decision making: Since F = 9.07 was smaller than the critical value, then hypothesis β = 0 couldn`t be rejected. In other words, there was not sufficient evidence for confirming the linear relationship between x and y.

Result: There was no sufficient evidence to confirm a linear relationship between the realized revenues of the annual budget and Dollar exchange rate between the years 2007 and 2016.

$$r^2 = 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} = 1 - \frac{351940606}{75192724} = 1 - 0.47 = 0.53$$

The correlation coefficient 0.53 showed that only 53% of variations in y can be explained by x variation.

Conclusion and recommendations

As stated in the fourth chapter, research hypotheses examined the linear relationship between budget items (realized revenues and realized expenditures) and economic indicators (economic growth rate, inflation rate, unemployment rate and dollar exchange rate). Its results have been summarized in the table below.

Table of the results of evaluation of research hypotheses

Research hypotheses	result
Main hypothesis 1: Realization of the annual budget revenue affects the economic indicators.	rejected
Sub-hypothesis 1-1: Realization of the annual budget revenue affects economic growth of the country	rejected
Sub-hypothesis 1-2: Realization of the annual budget revenue affects annual inflation rate.	Rejected
Sub-hypothesis 1-3: Realization of the annual budget revenue affects annual employment rate.	rejected
Sub-hypothesis 1-4-: Realization of the annual budget revenue affects exchange rate.	confirmed
Main hypothesis 2: The control of annual budget expenditures affects the economic indicators	Rejected
Sub-hypothesis 2-1:The control of annual budget expenditures affects the country economic growth	Rejected
Sub-hypothesis 2-2:The control of annual budget expenditures affects the annual inflation rate	Rejected
Sub-hypothesis 2-3:The control of annual budget expenditures affects the employment rate	rejected
Sub-hypothesis 2-4:The control of annual budget expenditures affects the exchange rate	confirmed

Conclusion

This study intended to investigate the role of country annual budget in realizing the goals of resistive economy through investigating annual budget items, including realized revenues and realized expenditures during the years 2017 to 2016 and their relationship with economic indicators such as economic growth, inflation rate, unemployment rate, and Dollar exchange rate. Using regression method and analysis of variance, the present study investigated the budget items separately for economic indicators and tested the possible linear relationship among them. This study was conducted according to the assumptions of the regression method and analysis of variance and its results showed that annual budget items and realized revenues and expenditures did not have a linear relationship with economic growth indicators and unemployment rate and inflation rate and the correlation coefficient of them was non-significant. However, realized revenues and expenditures over the 10 years showed a linear relationship with economic indicator of Dollar exchange rate and the correlation coefficient between them was significant. It reflected that the changes on Dollar exchange rate over the mentioned10 years can be associated with changes in budget items in this period. Hence, the result of this study could introduce the annual budget of country as a tool for government in order to predict and control the exchange rate in next years using the changes in the revenues and expenditures of the annual budget.

Recommendations for future studies

As changes and fluctuations of the exchange rate in recent months have caused economic crises and caused negative effects on other economic indicators, it is recommended for future studies to investigate the relationship between Dollar exchange rate as a dependent variable and possible factors of exchange rate changes such as level of exports of the country, Rial liquidity of the country, the level of private and public investment as independent variables over a period of ten or twenty years. These studies in the future can help the government control exchange rate fluctuations.

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