

*Original Research*

# The Role of Budget Deficit and Government Debt in Financing-Economic Growth of Selected Developing Countries

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## Abstract

Investigation of budget deficit and government debt relationship with economic growth is one of the important topics in macroeconomic literature; Hence, the present study examined the role of budget deficit and government debt on financing the economic growth in 40 developing countries between 2010-2019. In this regard, the economic growth was defined as a function of financial development, budget deficit, government debt, government expenditure, human capital, inflation rate, trade freedom, and the interaction of budget deficit and government debt with financial development. To examine the relationships between variables, the panel data econometric model and the feasible generalized least squares method were used. The estimation results showed that in developing countries, financial development had a positive and budget deficit and government debt had a negative and significant effect on the economic growth. Also, the interaction effect of budget deficit and government debt with financial development on economic growth was negative and significant that showed budget deficit and government debt play a negative role in positive relationship between financial development and economic growth. In addition, government expenditure, human capital, and trade freedom had a positive and significant effect on economic growth, while the inflation rate effect on economic growth was not significant.

**Keywords:** Budget Deficit, Government Debt, Economic Growth, Developing Countries, Panel Data.

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## Introduction

Based on growth theories, financial development influences economic growth through two different but complementary channels involving capital accumulation and an increase in productivity. The first channel focuses on the ability of the financial system to mobilize savings for productive investments, as well as increasing capital accumulation and production. The second channel focuses on the significance of new financial technologies. New financial technologies decrease the asymmetry of information, which is a barrier to the efficiency of financial resource allocation and the monitoring of investment projects (King & Levine, 1993).

Empirical studies on financing-economic growth indicated that financial development could stimulate economic growth while its effect varies in developed and developing countries (Rioja & Valev, 2004). The correct understanding of financing-economic growth is required for the economic planning and policy-making of developed and developing countries. Financing is a required condition for economic growth, but it is not enough. In order to take advantage of the economic benefits related to financial development, countries should establish an appropriate environment for stimulating economic growth. This issue requires an increase in institutional quality, as well as the decrease and stability of the inflation rate.

In most developing countries such as Iran, the presence of governments, whether quantitatively (volume of activities) or qualitatively (depth of activities) in economic and social fields, has always been increasing, considering that the private sector lacks the necessary efficiency and effectiveness. In this regard, the government in these countries has played a key role in achieving significant goals such as economic growth. The role of governments in the economy has various levels. The need to discuss the financial system of the government increases with the increasing role of government in the economy since governments use various tools of the financial system such as debt and budget in order to achieve economic goals (Gill & Pinto, 2005).

As mentioned, financial development is a required condition for economic growth, and developing countries should evaluate the effect of this variable along with the variables of government debt and budget deficit on economic growth to use the economic benefits of financial development. In this regard, such countries can identify the effect of neutralizing this variable on growth and the approaches to the improvement of optimal benefits from financial development. Most of the studies have separately considered the effect of the budget deficit and government debt on economic growth and disregarded their interactive effect on financial development. In this regard, this study investigates the role of the budget deficit and government debt in financing-economic growth in developing countries. This study is of significance in two ways: -1Evaluating the factors affecting economic growth, which provides the context for pursuing the programs and policies for stimulating economic growth in developing countries, and 2- Analyzing the interactive effect of the budget deficit and government debt with financial development on economic growth which determines the platforms of applying the effects of financial development.

## Theoretical foundations

The government's financial policies are highly significant for stabilizing, reducing economic fluctuations, reallocating resources, redistributing wealth, etc. With the increase in the budget deficit and government debt, the concerns about the role of financial policy in the economy increase as the increase of budget deficit and the accumulation of government debt, as well as its financing through borrowing, can leave various effects on macroeconomic variables. The high level of government debt is considered a barrier to economic growth, while its settlement through borrowing can stimulate inflation. According to the Keynesian standpoint, government debt can reduce national savings and capital accumulation. Nevertheless, the Ricardian view states that government debt equals taxes, and if consumers are futuristic, government debt will have no effect on national savings. Government debt is regarded as a concern when the budget deficit is so big that the debt-to-GDP ratio increases. In this case, the government debt affects financial development and forced succession increases to the extent that balancing the budget requires the establishment of inflation and imposition of additional taxes (Eskandaripour, Mahmoudinia, & Yousefi, 2019). Output is a function of activities in the private sector and the government in the short term when the level of economic output is assumed stable. Eq. 1 shows that production ( $Y$ ) equals the total private sector consumption ( $C$ ), private sector investment ( $I$ ), net government investment ( $G$ ) and net export ( $X$ ). In other words, Eq. 1 indicates that production is achieved from the sum of private sector consumption, private sector investment, and net government activities. Based on Eq. 2, the net government budget deficit ( $G$ ) equals the difference between spending ( $S$ ) and revenues ( $R$ ). If the central bank makes no intervention in the monetary policy framework, the net budget deficit must be financed by borrowing (government debt).

$$Y = C + I + G + X \quad (1)$$

$$G = S - R \quad (2)$$

Since the levels of production and consumption are constant, the increase in government investment results in a reduction in private sector investment, net exports, or their combination. The increase in government borrowing leads to the reduction of private sector investment which is called the "outsourcing effect" and reflects the shift from private sector investment toward government investment. The increase in government borrowing from foreign sources reduces net exports and results in an increase in the money supply in the short term. Fiscal expansion enhances the money demand and results in increased interest rates (Congressional 2020). The government can select the establishment of a budget deficit in the short term for several reasons. Financing the budget deficit through increasing government debt increases the spending level in the entire economy. According to most economists, this can be an appropriate tool in the short term to develop a stimulating effect in a specific industry or the entire economy. In this approach, the government can apply increased spending and decreased taxes in order to provide job opportunities, increase private sector spending, and decrease the severity of economic recession periods. The efficiency of financing the budget deficit with the help of creating debt decreases when it leads to the "outsourcing effect" or when the government financing fails to create a new economic activity and merely substitutes for

the private sector budget. The reduction of budget deficit when the economy is acting close to full potential or with full potential can prevent the "outsourcing effect" of private sector investment which results in many positive consequences in the long term. Furthermore, deficit financing can be applied as part of a structural budget-balancing strategy which changes the level of taxes and government spending in order to reduce the effect of business cycles. In addition, smoothing the budget changes probably results in reduced adverse consequences of deficit economic shocks for businesses and society (Driessen, 2019). In the long term, when economic output is influenced by supply-side policies, the effect of government borrowing on economic growth depends on how the borrowed amounts are used in comparison to the use of savings (e.g., increased private sector investment or net exports) while no borrowing has been conducted. As Eq. 3 shows, economic growth or change in production ( $Y\Delta$ ) is a function of human power ( $L$ : the number of people and their working hours), physical capital ( $K$ : such as equipment, machinery, etc.) and capabilities or technical progress ( $A$ ) which determine human resources productivity and physical capital productivity.

$$\Delta Y = f(\Delta L, \Delta K, \Delta A) \quad (3)$$

Assuming that human resources are not sensitive to fiscal policies, the effect of government debt on economic growth depends on how additional government activities can affect physical capital, human capital productivity, and physical capital productivity in comparison to the case where borrowed amounts are spent on increasing private sector investment or net exports. If the government activity (financing of government spending by creating debt) increases the above-mentioned factors more than the replaced activity, debt financing will leave a positive effect on economic growth. The long-term economic potential will reduce if the government activity has less effect on the above-mentioned factors than the replaced activity. A change in the level of government debt results in the movement of economic resources during periods of time, which are sometimes known as temporal transitions. The current resources of the government increase, and the future resources of the government decrease by disseminating debt by the government. Borrowing is limited by the money available for investment at a given point in time. Such limitation means that the amount of government debt to production cannot increase unlimitedly. Thus, the government debt will be unsustainable if the government debt-to-output ratio increases continuously in the long term. This occurs when the growth of debt accumulation prevents economic growth, which can leave adverse consequences, including reduced production, increased unemployment, higher inflation, higher private interest rates, and a currency depreciation (Heller, 2005).

## Method

In the present study, the variables of economic growth, financial development, budget deficit, moderator of a budget deficit model, government debt, moderator of government debt model, government spending, the human capital of education type, inflation rate, and trade freedom were used according to a study by Ehigiamusoe & Lean, (2020) to evaluate the relationship between budget deficit and government debt in financing-economic growth of developing countries. The required data were collected from the World Bank and the International Monetary Fund for 40 developing countries during 2010-2019. The

names of the studied countries are shown in Table 1. These countries and time periods were selected according to the availability of data.

Table 1. Names of selected developing countries

Row	Country	Row	Country	Row	Country	Row	Country
1	Benin	11	Ghana	21	Moldova	31	Philippines
2	Burkina Faso	12	Guinea	22	Madagascar	32	Russia
3	Bangladesh	13	Honduras	23	Mexico	33	Rwanda
4	Belarus	14	Indonesia	24	Mali	34	Sudan
5	Cameron	15	India	25	Mozambique	35	Senegal
6	Columbia	16	Iran	26	Niger	36	Chad
7	Dominica	17	Kenya	27	Nigeria	37	Thailand
8	Algeria	18	Kyrgyzstan	28	Nepal	38	Turkey
9	Ecuador	19	Laos	29	Pakistan	39	Ukraine
10	Egypt	20	Morocco	30	Peru	40	South Africa

In order to study the relationship between the variables, the experimental model was defined as Eqs. 4 and 5:

$$gdp_{it} = \beta_1 + \beta_2 fin_{it} + \beta_3 def_{it} + \beta_4 fd1_{it} + \beta_5 gov_{it} + \beta_6 edu_{it} + \beta_7 cpi_{it} + \beta_8 trd_{it} + e_{it} \quad (4)$$

$$gdp_{it} = \beta_1 + \beta_2 fin_{it} + \beta_3 deb_{it} + \beta_4 fd2_{it} + \beta_5 gov_{it} + \beta_6 edu_{it} + \beta_7 cpi_{it} + \beta_8 trd_{it} + e_{it} \quad (5)$$

In the above-mentioned equations, gdp represents economic growth (gross domestic product per capita in US dollars), fin represents financial development (ratio of credits paid to the private sector to GDP), and def shows budget deficit (ratio of budget deficit to GDP), fd1 represents the moderator of budget deficit model (the interactive effect of budget deficit with financial development), deb indicates government debt (the ratio of foreign debt accumulation to GDP), fd2 indicates the moderator of government debt model (the interactive effect of the government debt with financial development), and gov shows government spending (the ratio final government expenditure to GDP). In addition, edu represents human capital of education type (enrollment rate at the secondary level), cpi shows inflation rate (based on consumer price index (2010=100) and trd shows trade freedom (ratio of total exports and imports to GDP). The analyses of the present study are based on the econometric model of panel data. Panel data refer to the data which include  $N$  cross-sections in  $T$  year. In other words, such data are a combination of cross-sectional data and time series. If the time series equal all the cross-sections, the panel data will be balanced type, and if the time series are not equal for all the cross-sections, the panel data will be unbalanced. In general, Eq. 6 represents a model with panel data:

$$Y_{it} = \alpha_{it} + \sum_{k=1}^m \beta_{kit} X_{kit} + e_{it} \quad (6)$$

Eq. 6 shows the cross-section and  $i = 1, 2, \dots, N$  shows the year. Furthermore,  $Y_{it}$  represents the dependent variable for the  $i$ -th cross-sectional unit in the year  $t$  and  $X_{kit}$  represents the  $k$ -th independent variable for the  $i$ -th cross-sectional unit in the year  $t$ . In addition,  $e_{it}$  shows the error term (Gujarati, 2004). Evaluating the stationarity of the variables is conducted using the Levin-Lin-Chu unit root test, which is a combination of the advanced Dickey-Fuller test and time trend. In order to determine the type of data (pool or panel), the Leamer test was used. Further, the Hausman test was applied to determine the panel data model (fixed and random) and the Wooldridge test was also used to check the presence of serial correlation. The Pesaran test was used to check the presence of cross-sectional correlation, and the Likelihood Ratio was applied to evaluate the variance of heterogeneity.

## Results

This section compares the average of significant variables such as GDP per capita, financial development, the budget deficit (surplus) and foreign government debt in Iran and selected developing countries. Figures 1 to 4 present the average of the above-mentioned variables, respectively. According to Figure 1, GDP per capita in developing countries has had a relatively stable trend, while in Iran, it has reached a lower level with a fluctuating and downward trend compared to developing countries during the last year. The difference between GDP per capita in Iran and developing countries has dropped over time, not due to the increase in GDP per capita in developing countries but due to the decrease in GDP per capita in Iran. The average GDP per capita equals 5630 dollars in Iran and 3370 dollars in developing countries during the studied period.

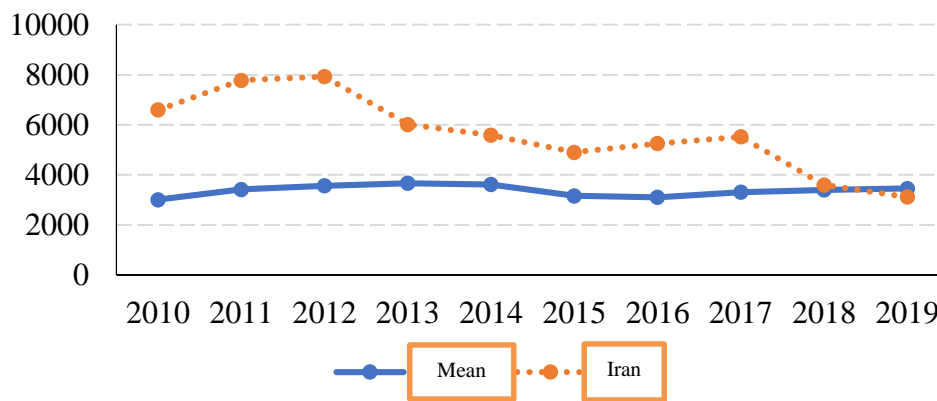


Figure 1. GDP per capita (US dollars)

Figure 2. indicates that the ratio of credits paid to the private sector to GDP in Iran has always been higher in comparison to developing countries. The difference has increased during recent years due to the upward trend of this ratio in Iran and its relatively stable trend in developing countries. The average ratio of credits paid to the private sector to GDP has been equal to 52.6% in Iran and 36.2% in developing countries during the studied period.

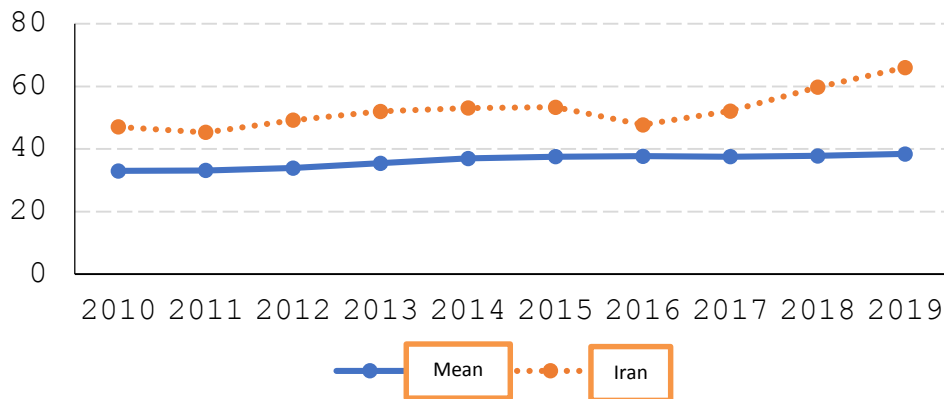


Figure 2. The ratio of credits paid to the private sector to GDP (percentage)

The ratio of budget deficit (surplus) to GDP in Iran and developing countries during 2010-2019 is shown in Figure 3. As can be observed, developing countries have always had a budget deficit in the studied period while Iran has experienced a budget surplus at the beginning of this period and a budget deficit in the middle and end of the studied period. The ratio of budget deficit (surplus) to GDP in Iran has a considerable downward trend. In recent years, this ratio in Iran has surpassed that of developing countries. Nevertheless, the ratio of budget deficit to GDP has been equal to -1.3% in Iran and -3.4% in developing countries.

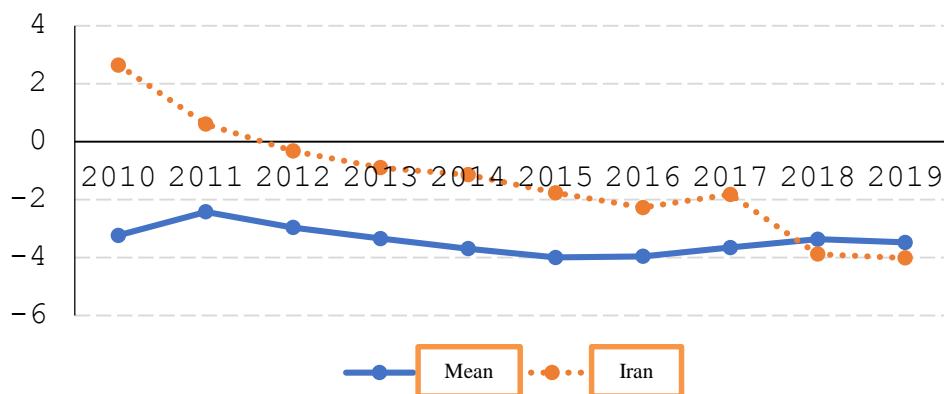


Figure 3. Ratio of budget deficit (surplus) to GDP (percentage)

The ratio of foreign debt to GDP in Iran and developing countries during the studied years is shown in Figure 4. Based on this figure, the ratio of foreign debt to GDP has an increasing trend in developing countries and a decreasing trend in Iran. In addition, the difference between the ratio of foreign debt to GDP in Iran and developing countries has been very large, so the average ratio of foreign debt to GDP in Iran is 2.2% in Iran and 36.6% in developing countries.

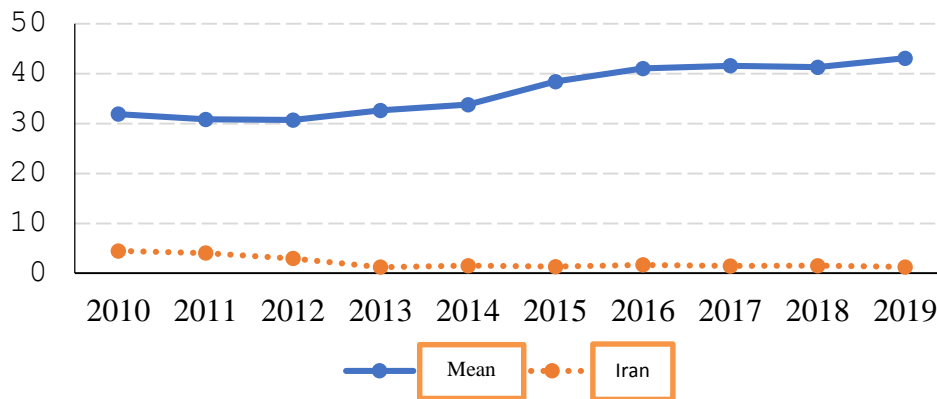


Figure 4. Ratio of foreign debt to GDP in Iran and developing countries (percentage)

As mentioned, the Levin-Lin-Chu test was applied to investigate the stationary of the variables, and the results of this test are presented in Table 2. Based on the results, the null hypothesis or the presence of a single root in all the variables is rejected, and all of them are at the stationary level. In other words, all of the variables are  $I(0)$ , and there is no need to conduct the co-integration test.

Table 2. Results of the Levin-Lin-Chu test

Variable	T statistics	P-value
Per capita income	-13.62	0.0000
Financial development	-11.31	0.0000
Budget deficit	-8.29	0.0000
Financial development $\times$ budget deficit	-7.41	0.0000
Government debt	-21.83	0.0000
Financial development $\times$ government debt	-8.88	0.0000
Government spending	-15.95	0.0000
Human capital	-7.27	0.0000
Price index	-9.63	0.0000
Trade openness	-10.73	0.0000

*Results of the first model test and estimation: budget deficit*

Table 3 shows the results of pre-estimation tests in the first model or Eq. 4. The results of the Leamer test for determining the type of panel data indicated that the null hypothesis as the existence of pool data is rejected and the alternate hypothesis as the existence of panel data is accepted. The results of the Hausman test indicated that the fixed effects model is preferred for the estimation of the first model. Based on Pesaran, Wooldridge and Likelihood Ratio tests, there is a cross-sectional correlation, serial correlation, and variance heterogeneity in the first model, respectively.



Table 3. The results of pre-estimation tests in the first model

Test	Statistics	P-value	Result
Leamer (F statistics)	79.78	0.0000	The null hypothesis (pool data) is rejected
Hausman ( $X^2$ statistics)	56.33	0.0000	The null hypothesis (inefficiency of the fixed effects model) is rejected
Pesaran (z statistics)	12.84	0.0000	The null hypothesis (lack of cross-sectional correlation) is rejected
Wooldridge (F statistics)	627.29	0.0000	The null hypothesis (lack of serial correlation) is rejected
Likelihood Ratio( $X^2$ statistics)	711.84	0.0000	The null hypothesis (lack of variance heterogeneity) is rejected

Since there was a serial correlation, cross-sectional and variance heterogeneity in the research model, the Feasible Generalized Least Squares (FGLS) method was used for the estimation. The results related to the first model estimation using the FGLS method are shown in Table 4. Based on the  $X^2$  statistic and its probability level, the model is well fitted. In addition, the  $R^2$  coefficient indicates that about 70% of the changes in per capita income can be explained by the independent variables of the first model.

Table 4. Results of the first model estimation

Variable	Coefficient	Z statistics	p-value
<i>fin</i>	2.335	5.29	0.000
<i>def</i>	-0.314	-2.18	0.030
<i>fdl</i>	-2.712	-5.67	0.000
<i>gov</i>	7.862	2.46	0.014
<i>edu</i>	5.345	8.83	0.000
<i>cpi</i>	-2.223	-0.85	0.394
<i>trd</i>	0.357	5.02	0.000
$R^2 = 0.693$		$(0.000) X^2 = 527.10$	

Based on the results in Table 4, financial development has a significant positive effect on economic growth, but the budget deficit has a significant negative effect on economic growth. Furthermore, the interactive effect of budget deficit with financial development on economic growth is significantly negative, indicating that budget deficit weakens the positive effect of financial development on economic growth. According to the results of the first model, government spending, human capital and trade freedom have a significant positive effect on economic growth, while the effect of the inflation rate on economic growth is insignificant. As can be observed, government spending and human capital are the most significant drivers of economic growth in developing countries.

*Results of the second model test and estimation: government debt*

Similar to the first model, the pre-estimation tests were estimated in the second model or Eq. 5, the results of which are reported in Table 5. The results of the Leamer and Hausman tests indicated that the data are of panel type in the second model, and the fixed effects model is more appropriate for estimating this model. In addition, the results of the Pesaran, Wooldridge, and Likelihood Ratio tests indicated the presence of cross-sectional correlation, serial correlation and variance heterogeneity, respectively.

Table 5. Results of pre-estimation tests in the second model

Test	Statistics	P-value	Result
Leamer (F statistics)	80.59	0.0000	The null hypothesis (pool data) is rejected
Hausman (X <sup>2</sup> statistics)	36.92	0.0000	The null hypothesis (inefficiency of the fixed effects model) is rejected
Pesaran (z statistics)	11.078	0.0000	The null hypothesis (lack of cross-sectional correlation) is rejected
Wooldridge (F statistics)	388.31	0.0000	The null hypothesis (lack of serial correlation) is rejected
Likelihood Ratio(X <sup>2</sup> statistics)	727.86	0.0000	The null hypothesis (lack of variance heterogeneity) is rejected

In this model, the FGLS method is applied for estimating the second model due to the existence of serial correlation, cross-sectional dependence, and variance heterogeneity. The results of the second model estimation using the FGLS method are shown in Table 6. The model estimation was conducted well based on the X2 statistic and its probability level. In addition, the R2 coefficient shows that 75% of the changes in per capita income can be explained by the independent variables related to the second model.

Table 6. Results of the second model estimation

Variable	Coefficient	Z statistics	P-value
<i>fin</i>	1.869	4.29	0.000
<i>deb</i>	-2.090	-2.79	0.005
<i>fd2</i>	-1.972	-3.87	0.000
<i>gov</i>	8.334	2.78	0.000
<i>edu</i>	8.095	8.39	0.000
<i>cpi</i>	-0.228	-1.52	0.128
<i>trd</i>	0.251	4.24	0.000
R <sup>2</sup> = .0.725		(0.000)X <sup>2</sup> = 355.68	

Based on the results of Table 6, financial development has a significant positive effect on economic growth in the second model, while government debt has a significant negative effect on economic growth. Here, the interactive effect of debt on financial development on economic growth is significant negative, implying that government debt weakens the positive effect of financial development on economic growth. In the second

model, government spending, human capital and trade freedom have a significant positive effect on economic growth, while the effect of the inflation rate on economic growth is insignificant.

### **Conclusion and suggestions**

The present study aimed to investigate the role of the budget deficit and government debt in financing the economic growth of developing countries. In order to achieve the research objective, economic growth was defined as a function of financial development, budget deficit, government debt, government spending, human capital, inflation rate and trade freedom, according to Ehigiamusoe & Lean (2020). Furthermore, the interactive effect of budget deficit on financial development and the interactive effect of government debt on financial development on economic growth were regarded. The required data were collected from the World Bank and the International Monetary Fund. The research model was estimated using the econometric panel model and the FGLS method for 40 developing countries during 2010-2019. The results of the model estimation indicated that financial development has a significant positive effect on economic growth in developing countries, while the budget deficit and government debt have a significant negative on economic growth. In addition, the interactive effect of budget deficit with financial development and government debt with financial development on economic growth is significant negative, indicating that budget deficit and government debt play a negative role in the positive relationship between financial development and economic growth. Government spending, human capital, and trade freedom have a significant positive effect on economic growth, while the effect of the inflation rate on economic growth is insignificant. The obtained results are consistent with most of the previously conducted studies (except for the inflation rate). Although government financial policies in developed countries are highly critical for stabilizing, reducing economic fluctuations, reallocating resources, redistributing wealth, etc., in most developing countries, such as Iran, the government budget deficit and the accumulation of government debts are so large that influences the financial development. In addition, the forced succession increases so much that balancing the budget needs the tools such as borrowing, creating inflation and imposing additional taxes. In this regard, it is regarded as a barrier to the positive effect of financial development on economic growth. Based on the results of this study on the positive effect of financial development on economic growth, economic planners and policymakers in developing countries are recommended to pay more attention to financial development and consider the private sector the center of the financial development process. The negative effect of budget deficits on economic growth makes it necessary to consider the budget balance. A budget deficit is not inherently a negative phenomenon but requires management. In this regard, it is suggested to finance the budget deficit through tax revenues. Regarding the negative effect of government debt on economic growth, economic policymakers should consider the optimal level of government debt, prevent the creation of long-term debts, and spend short-term debts to invest in infrastructure projects. Due to the positive effect of government spending, human capital, and trade freedom on economic growth, government spending should be conducted to maintain financial discipline and increase efficiency and effectiveness. In addition to the revision in educational policies, the approach of education should be changed to a hybrid education (scientific-practical), and the contexts for liberation from

the single-product economy should be provided to prevent trade deficit by developing the exports.

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