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Economic Effects of Receiving IMF Loans in D8-Group Countries (Panel Data Approach)*

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Abstract

Economic growth is a major goal for developing countries; governments therefore strive to create favorable conditions and allocate necessary resources for the prosperity of their nations. This study examines the impact of International Monetary Fund (IMF) loans, along with other macroeconomic variables, on the economic growth of selected countries in the D8 group. The study utilizes panel data covering the period from 2001 to 2020, and employs a panel data method to investigate the effects of explanatory variables on growth. The research findings indicate that IMF loans have had a positive impact on the economic growth of member countries. Furthermore, IMF loans have contributed to the promotion of structural reforms and trade liberalization, which further enhances economic growth. Other variables, such as foreign direct investment, labor, and exports also had a positive impact on economic growth in the D8 countries. However, an increase in inflation rate has been found to have an adverse impact on economic growth. Therefore, economic policymakers in the D8 countries should seek loans for economic growth from the IMF and invest in projects that promise high returns. This study contributes to the existing literature on the relationship between IMF loans and economic growth in developing countries, and provides valuable insights for policymakers in D8 countries. The findings suggest that prudent borrowing, along with strategic investment in high-return projects, can help these countries achieve sustained economic growth.

Keywords: D8 Countries, Economic Development, IMF loans, Inflation, Panel Data

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1. Introduction

Each country strives to achieve economic growth; one of the most important preoccupations of governments is therefore providing the right conditions for economic growth. In order to achieve this goal, it is necessary to recognize and understand the factors affecting economic growth. One of the influencing factors of economic growth is the existence of capital. As a result, countries suffering from lack of capital and domestic resources have always looked for foreign resources to increase investment and economic growth. Foreign investments provide access to the latest technologies, increase the availability of capital, and create employment opportunities, all of which contribute to economic growth, making foreign investment an important factor in the economic development of countries. This is because foreign resources can provide a larger amount of capital to invest in infrastructure, technology and other growth initiatives. Additionally, foreign resources can provide a larger and more reliable pool of skilled labor, which can further inspire economic growth. One of the important ways to provide capital for solving this challenge, is foreign loans. Since the existence of capital alone is not enough for economic development, therefore, efficient management is required for the optimal use of borrowed capital (Fallahi et al., 1396 [2017 A.D.], p. 100).

In order to achieve economic growth and the optimal use of foreign borrowing, it is necessary to provide a series of basic conditions and criteria. If these criteria are not met, even the least significant amount of foreign borrowing can have a negative effect on economic growth. The first criterion is known as the "efficiency criterion". This criterion states that foreign borrowing should be invested in projects where the final capital return is higher than the

global interest rate. The second criterion related to the basic conditions for receiving foreign borrowing is the "transfer criterion". This criterion asserts that the debtor country must be able to provide the foreign currency needed for interest repayment by increasing export goods or substituting imports. However, this must not lead to a change in exchange rates to the detriment of the country. The third criterion is called the "conversion criteria", which maintains that if foreign borrowing is sufficiently allocated to productive investments, the payment of foreign borrowing interest can be made without reducing economic growth. Using foreign borrowing to cover consumption expenses will not only decrease economic growth, but the interest payments on foreign borrowing will also be heavy for the indebted country (Alizadeh et al., 1394 [2015 A.D.], pp. 8-9).

There are several forms of borrowing, including receiving loans from foreign countries, both from the public and private sectors, pre-sale of products and raw materials, purchasing on credit, and selling government bonds on global markets (Jafari et al., 1395 [2017 A.D.], p. 90). Foreign borrowing contributes to the economic growth of countries through capital accumulation, human resource development, and infrastructure development. In many countries, the amount of domestic savings does not meet the investment requirements, and the value of export earnings is lower than the value of imported goods. Therefore, countries with such a financial gap take loans from international sources. Experts believe that if a country uses its borrowing credits to support productive investments and maintain economic stability, it can accelerate economic growth and increase its ability to repay its debts in the future (Fallahi et al., 1396 [2017 A.D.], p. 100).

In general, there are two opposing views regarding the impact of

foreign borrowing and debt on economic growth. One perspective suggests that countries can increase their capacity and stimulate economic growth through foreign borrowing. However, the other viewpoint maintains that foreign borrowing has a negative impact on a country's capacity and economic growth. In addition to these two views, a third perspective has emerged that combines elements from both. This perspective asserts that the relationship between foreign borrowing and economic growth is theoretically ambiguous, and cannot be analyzed using linear models. Proponents of this perspective believe that increasing foreign loans up to a specific and optimal level can promote economic growth. However, after reaching this level, further increases in foreign borrowing may actually reduce economic growth (Alizadeh et al., 1394 [2015 A.D.], pp. 2-3).

This research seeks to investigate the impact of International Monetary Fund (IMF) loans on the economic growth of the D8 countries from 2001 to 2020. The D8 countries include Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey. The research utilizes the cross-sectional data technique to analyze the data. The main objective of this research consists of examining the effect of inflation, foreign direct investment, labor, and exports on the economic growth of the D8 countries. The research will seek to determine the relationship between IMF loans and economic growth of the D8 countries, as well as the impact of inflation, foreign direct investment, labor, and exports on the economic growth of these countries. The findings of this research will be used to inform policy decisions, and enhance the decision-making processes in the region. The purpose of this research is therefore to determine the effect of the size of the International Monetary Fund (IMF) loan, foreign direct investment (FDI),

inflation rate, and export labor on the economic growth of the D8 countries. The following hypotheses have been made to answer the main research questions in this paper:

- The research findings suggest that IMF loans have a significant negative impact on the economic growth of the D8 countries.
- Foreign direct investment (FDI) has a positive effect on the economic growth of the D8 countries.
- Inflation has a significant negative impact on the economic growth of the D8 countries
- Labor has a positive effect on the economic growth of the D8 countries.
- Export has a positive effect on the economic growth of the D8 countries.

This research is organized into five parts. After the introduction, the second section will discuss the theoretical literature as well as the experimental studies conducted in this field. The third section will introduce the research method, model, and data used. The fourth part will present the estimation results, and finally, the research will be concluded by summarizing the findings.

1. 2. Literature Review

Iran, Pakistan, Indonesia, Malaysia, Turkey, Nigeria, Egypt, and Bangladesh are part of the D8 group, which includes developing Muslim countries. The Group agreement was concluded in order to establish strong economic relations, strengthen the influence of these countries on the world market, and establish a dialogue with industrialized countries. Among the most significant goals of this group include: Improving the position of these countries on the world market, diversifying and creating new opportunities in

business relations, providing a prosperous and better life for the people of the member countries, and increasing participation at the international level (Varahrami et al., 1394 [2016 A.D.], pp. 41-42). In the following discussion, we review the theoretical literature and empirical studies conducted in relation to the effect of loans on economic growth.

The importance of developing financial institutions and economic growth, among other factors, is considered a key to economic development. According to the perspective of the classical school, the financial sector and the real sector of the economy are two inseparable sectors. Therefore, in order to achieve high economic growth, an efficient, complete and powerful financial market is needed. On the other hand, by examining the path of growth and development in developed countries, we find that these countries have a strong financial market. It seems that in developing countries, the growth of the financial sector will lead to economic growth. With the expansion of financial markets, the possibility of investment has increased in different sectors. This increases the return on investment and ultimately leads to economic growth. In addition, with the expansion of financial markets, the private sector is encouraged to save part of the income. On its own, if these saved funds are directed to profitable and high-yield business activities, they can cause economic growth (Akbarian & Heydaripour, 1388 [2009 A.D.], pp. 45-46).

Furthermore, one of the basic problems of the majority of developing countries is the lack of financing of their development projects from domestic financial resources. In this sense, foreign financial sources are sought to finance these projects, in part with loans from other countries. Investigating the relationship between the loans paid by foreign and domestic financial institutions on

economic growth is one of the most crucial issues that has always been the focus of economic analysts and policy makers after the Second World War, based on which, they can make the necessary decisions. For the optimal use of the conducted studies, the following experimental studies can be mentioned:

Loans play a crucial role in increasing economic growth; however, an increase in irrational lending poses a risk of inflation. Excessive lending by financial and banking institutions to non-productive sectors leads to an unnecessary increase in the money supply and inflation. On the other hand, banks and financial institutions that restrict lending cause a drop in production and, consequently, higher inflation. The relationship between the general level of prices and the amount of money in circulation has been proven for a long time by Friedman's Monetary Theory, which holds that an increase in money supply causes an increase in prices (Dhungana & Pradhan, 2017; Johnson, 2015). Therefore, to achieve economic growth and optimize the use of loans, the D8 countries must meet the conditions and criteria described above. Even the smallest loan may have a negative impact on the economic growth of these countries if these criteria are not met.

Zhilaei Aghdam et al. (1399 [2020 A.D.]) conducted a review of a study titled "Investigating the Effect of Government External Debt on the Economic Growth of 58 Developing Countries with Middle to High Income during the Period of 1985 to 2008". The researchers examined the long-term impact of foreign debt on the economic growth of selected countries using the co-integration approach and dynamic panel data model. The results of their study suggest that external debt has a negative effect on the economic growth of the countries in the sample. This finding is consistent with the theoretical framework in the literature, which states that

government external debt can reduce economic growth by crowding out private investment and increasing the cost of capital.

Additionally, the group average approach by Sons and Smith was employed in panel data for long-term estimation. The results obtained from this research indicate a long-term equilibrium relationship between the variables of the model. The human capital index, government income, financial balance, and the degree of openness of the economy have a positive effect on economic growth, while the government's foreign debt to real GDP ratio and population growth have a negative effect on the economic growth of the studied countries.

Fallahi et al. (1396 [2017 A.D.]) investigated the effect of foreign debt on Iran's economic growth using a non-linear Markov-switching approach during the period from 1980 to 2016. Their analysis revealed that a high debt-to-GDP ratio had a negative effect on economic growth, while a low debt-to-GDP ratio had no significant effect. The authors also discovered that economic growth was more sensitive to changes in foreign debt when the economy was in a contractionary phase. In addition to examining the effect of total external debt on economic growth, external debt was divided into two sectors: public and private, and the effect of each on economic growth was examined. As part of this research, the relationship between variables in the two regimes was modeled. The results obtained from this research revealed that foreign debt had a negative effect on Iran's economic growth in both regimes. Furthermore, the results indicated that external debt from the public sector had a negative effect, while debt from the private sector had a positive effect on economic growth. Consequently, the negative effect of foreign debt on economic growth was caused by the negative effect of public sector debt.

Fallahi et al. (1396 [2017 A.D.]) conducted a study titled "Examining the Effect of Foreign Debt on Iran's Economic Growth, Emphasizing the Role of Macroeconomic Policy." Using the co-accumulation approach based on their model, the study investigated the effect of foreign debt on growth at wide intervals between 1980 and 2013. The results obtained from this research indicate that foreign debt has a negative effect on Iran's economic growth. However, this negative effect can be reduced or even reversed by using appropriate economic policies. Additionally, other results of this research indicate that the increased use of bilateral foreign debts negatively affects economic growth.

Jafari et al. (1395 [2017 A.D.]) conducted a study examining the threshold effect of foreign debts on the economic growth of the D8 countries. They used the Panel Smooth Transition Regression model (PSTR) during the period from 1991 to 2013. For this purpose, the variable of total foreign debt as a percentage of GDP was used to estimate the model, and the results obtained from this research indicate that there is a non-linear relationship between the investigated variables. According to the results, the threshold limit is 34.12%, and the slope parameter is 1.83%. In the first regime, foreign debts have a small negative impact on economic growth. However, after crossing the threshold, in the second regime, the negative impact of foreign debts on the economic growth of the studied countries increases.

Yadollahzadehtabari and Nazari (1394 [2015 A.D.]) conducted a study titled "The Effect of Foreign Debt and Macroeconomic Indicators on Economic Growth in Iran" using a self-regression econometric model with a distribution break during the period of 1359 to 1391. This research investigated the effect of bilateral and multilateral external debt (borrowing from international

institutions) along with some macroeconomic variables on growth. The results obtained from this research revealed that, in the short and long term, bilateral foreign debt has a positive but insignificant effect, whereas multilateral debt has a positive and significant effect on Iran's economic growth.

Alizadeh et al. (1394 [2015 A.D.]) conducted a study investigating the effect of foreign debt on the economic growth of Iran from 1981 to 2015, using the smooth transition regression model (STR). The results of the study indicated that foreign debt has a negative effect on economic growth in a two-regime structure with a threshold of approximately 18,770 million dollars. The magnitude of this effect increases as the threshold level is crossed, entering the second regime. Nazari and Yadollahzadatabati (1393 [2014 A.D.]) conducted a study titled "The Effect of Macroeconomic Indicators and External Debt on Iran's Economic Growth." Using the self-regression econometric model with a distribution break, the researchers investigated the effect of external debt on growth during the period of 1981 to 2013. The results of the study showed that in the long term, multilateral debt and open trade have a positive and significant effect on economic growth, while inflation rate, public sector debt to the central bank, and the war variable have a negative and significant effect.

Mowlaei and Golkhandan (1393 [2014 A.D.]) conducted a study on the long-term and short-term effects of budget deficits on Iran's economic growth, with a focus on foreign debts. Using the Johansen-Juselius co-accumulation method and the vector error correction model (VECM), the study examined the relationship between budget deficits and economic growth in Iran between 1981 and 2012. Results indicated that the ratio of budget deficits to GDP had a significantly negative effect on economic growth in the long

term and a significantly positive effect in the short term. Furthermore, the study found that the long-term effect of foreign debt on economic growth was significantly negative, while the effect of public sector investment on economic growth was significantly positive.

Zamanian et al. (1394 [2016 A.D.]) conducted a study on the effect of foreign debt on the economic growth of developing countries. The study used panel data from 2003 to 2013 and the generalized moments model to examine the short- and long-term effects of foreign debt on growth. Results indicated that long-term foreign debt and budget deficits have a negative and significant effect on the economic growth of developing countries, while short-term debts and exports have a positive effect. Tehranchian (1376 [1997 A.D.]) conducted a study titled "Examining the Effect of Foreign Debt on the Economic Growth of Developing Countries with an Emphasis on Iran." This research examined the effect of foreign debt on the economic growth of developing countries using two cross-country patterns for 35 selected countries from 1985 to 1993 and a time series pattern for Iran from 1359 to 1372. The results indicated that the external debt of developing countries had a negative effect on their gross domestic investment and a negative relationship with economic growth.

Courage Mlambo (2022) analyzed China's loans to African countries from 2000-2017 using pattern least squares normal corrections and pattern least squares normal dynamic corrections for data analysis and result analysis. The study found a positive relationship between loans and economic growth, particularly when China participates in government-related financial projects in the country.

Opoku Adabor (2022) investigated the asymmetric rate of economic growth for direct objects from 1970 to 2019 using patterns with delay distributions and nonlinear regression (NARDL) to analyze asymmetric data over short and long durations. The study revealed that a positive rate loan has a negative effect on economic growth, resulting in a decrease of 0.151% and 0.213%, while a negative rate loan has an even more significant negative effect, resulting in a decrease of 0.214% and 0.677%.

Misiri et al. (2021) studied the relationship between general debt and economic growth in Kosovo from 2007 to 2019. The study found an independent relationship between gross production, cash flow, internal debt, foreign debt, and cash flow, suggesting that general debt has a positive effect on economic growth. Ibrahim and Farah (2020) investigated the long-term effect of government public debt on economic growth in Somalia from 1990 to 2016 using the Johanso-Jusilius cointegration method. The study found a negative and significant relationship between government foreign debt and economic growth in the long term.

Panagiotis Pegkas (2019) investigated the effect of public debt on Greek economic growth from 1970 to 2016 using a soft threshold transition model. The study found that the optimal limit of government public debt is 23.5%, and a percentage higher than this will reduce economic growth. Chen et al. (2018) conducted a study on the optimal level of government investment and debt to GDP in 65 selected developed countries based on panel data. The study found that each country has an optimal level of investment and government debt, and exceeding this level will adversely affect economic growth (Zhilaei Aghdam et al., 1399 [2020 A.D.], p. 168).

Chehrazi Madrasedh and Nejati (1396 [2017 A.D.]) used the ARDL method to analyze the effect of domestic and foreign debt on economic growth from 1980 to 2012. The study found that domestic debt has a negative effect on economic growth in the short and long term, while foreign debt has a positive effect on economic growth in the long term. Additionally, exports and productivity of all production factors have a positive and significant effect on economic growth in the short term.

Puente-Ajovin and Sanso-Navarro (2015) investigated the effect of external debt on economic growth in 16 OECD member countries from 1998 to 2009 using the Granger causality test. The study found that external debt of governments has a negative effect on economic growth, while external debt of the private sector has a small positive effect. Ramadan and Eatzaz (2014) examined the impact of external debt on Pakistan's economic growth from 1970 to 2009. The study found that foreign debt negatively affects Pakistan's economic growth, but macroeconomic policies can reduce or even reverse this impact.

Nawaz et al. (2012) conducted research on the effect of foreign debt in the short and long term on economic growth in Pakistan. For this purpose, the effect of foreign debt was estimated using the Johansen cointegration test and the Granger causality test from 1980 to 2010. The results obtained from this research indicate that there is a long-term equilibrium relationship between external debt and economic growth. In addition, in the short term, there is a two-way causal relationship between external debt and economic growth.

Safdari and Abouei Mehrizi (2011) investigated the effect of external debt and other variables on Iran's economic growth from

1974 to 2007. For this purpose, they examined the effect of foreign debt, private investment, government investment, and imports on Iran's GDP using the vector autoregression (VAR) model. The results obtained from this research show that foreign debt has a negative effect on GDP and private investment. Furthermore, government investment has a positive relationship with private investment.

Reinhart and Rogoff (2010) investigated the effect of external debt on economic growth in 20 economically advanced countries. They divided the ratio of foreign debt to GDP of the studied countries into the following four groups: countries with a ratio of foreign debt to GDP of less than 30%, countries with a ratio of foreign debt to GDP between 30% and 60%, countries with a ratio of foreign debt to GDP between 60% and 90%, and countries with a ratio of foreign debt to GDP greater than 90%. The results obtained from this research illustrate that the existence of a debt ratio up to the threshold of 90% does not create a contradiction between external debt and economic growth. However, in countries whose ratio of debt to GDP is more than 90%, this amount of debt slows down the economic growth of the countries under review.

Jayaraman and Leu (2009) conducted a study titled "Investigating the Impact of Foreign Debt on the Economic Growth of 6 Selected Countries along the Pacific Ocean." They used the panel data method to examine the effect of foreign debt from 1988 to 2004. In order to estimate the regression equation, they considered the GDP variable as the dependent variable. The results obtained from this research indicate that the external debt variable and the openness of the economy have a positive and significant effect on the economic growth of the investigated countries. Moreover, the budget deficit variable has a negative and significant

effect on economic growth. Mutasim Ahmed Abdelmawla Mohamed (2005) investigated the effect of foreign debt on the economic growth of Sudan using the ordinary least squares method from 1978 to 2001. The results obtained from this research indicate that foreign debt and inflation had a negative effect on the economic growth of this country. In this sense, the ratio of rapid growth of debt to real GDP has increased the budget deficit. This budget deficit has had a negative effect on the economic growth of Sudan. In other words, this budget deficit has forced Sudan to take on more international loans.

Iqbal and Zahid (1998) investigated the effect of foreign debt on the economic growth of Pakistan from 1960 to 1997 based on the ordinary least squares method. The results obtained from this research reveal that foreign debt has a negative effect on the economic growth of Pakistan. Additionally, the researchers emphasize that high economic growth can be achieved using internal resources instead of external ones. Therefore, in this research, the authors recommend using domestic resources for economic growth.

Balima and Sokolova (2021) examined 994 estimates of the effects of IMF programs on economic growth as reported by 36 studies. The mean reported effect is positive, but the estimates vary widely.

Lutete (2021) examined the impact of IMF credit use and its conditions on economic growth performance in 12 South African countries from 1999-2019. The results from the analysis conclude that overall, the use of IMF credit has no statistical significance on economic growth. However, when certain conditions are met, the GDP responds positively.

Biglaiser and McGauvran (2022) investigated the effects of IMF loan conditions on poverty. Using a sample of 81 developing countries, from 1986 to 2016, they found that IMF loan arrangements containing structural reforms contribute to more people being trapped in the poverty cycle, as the reforms involve deep and comprehensive changes that tend to raise unemployment and lower government revenue.

The empirical studies on the effect of foreign debt on economic growth can be divided into two groups: the first group estimates a negative effect of foreign debt on economic growth, while the second group reports a positive effect. Additionally, a third group of studies finds that external debt has a positive effect on economic growth up to a certain threshold level, beyond which it has a negative effect. Based on the literature review, it is clear that different studies take different approaches to analyzing the relationship between loan rates and economic growth in different countries. This research has examined the methods, time periods, locations, and data used in

various studies. However, there is no research that specifically focuses on the impact of international cash desk loan payments on economic growth in member countries of the D8 organization. The existing research falls into the first two categories mentioned above, which either report a negative or positive relationship between foreign debt and economic growth.

1. 3. Research Methodology

In this research, we investigate the effect of loans paid by the International Monetary Fund and other variables on the economic growth of eight member countries, including Iran, Pakistan,

Indonesia, Turkey, Nigeria, Bangladesh, and Egypt, using the panel method. The reason for Malaysia's exclusion from this research is the lack of data related to debt from the International Monetary Fund, as Malaysia has no history of borrowing from the International Monetary Fund. Thus, it is impossible to use the panel method to analyze the economic growth of the country in relation to IMF loans. In this study, the explanatory variables are assumed to be IMF loans, inflation rate, exports, labor force, and external direct investment. The dependent variable used from 2001 to 2020 is Real GDP. The structural form of panel data includes observations of multiple phenomena across multiple cross-sections, such as individuals, countries, and time periods, with our observations consisting of N countries and T time periods.

$$(1) \quad Y_{it} = \beta_{1it}X_{1it} + \dots + \beta_{kit}X_{kit} + \dots U_{it} \dots$$

$$Y_{it} \quad i = 1, \dots, N \quad , \quad t = 1, \dots, T$$

In the above relationship, β_{1it} is the parameters to be estimated, and X is the line vector (1xk) of the explanatory variables. β is the column vector of the regression coefficients, which can be found by minimizing the sum of the squared residuals. In this study, we investigate the impact of loans from the International Monetary Fund (IMF) and other macroeconomic variables on the economic growth of the selected countries using the panel data method.

$$(2) \quad \text{Growth} = \beta_0 + \beta_1 \text{credit} + \beta_2 \text{inf} + \beta_3 \text{fdi} + \beta_4 \text{le} + \beta_5 \text{ex}$$

In the above equation, the variables include GDP growth, credit, International Monetary Fund (IMF) loan, inflation rate, foreign direct investment (FDI), labor force (LE), and exports (EX). It

should be noted that the logarithmic form of variables was used in the model estimation. As mentioned previously, this study used the amount of IMF loan as an independent variable, and the data are presented in Table (1).

Table 1. Amount of Loan from IMF in Billion \$

Years	Iran	Pakistan	Egypt	Turkey	Nigeria	Indonesia	Bangladesh
2010	19.2	2.1	38.1	27.7	58.2	4.3	4.1
2011	18.2	96.9	37.1	52.4	57.2	4.3	27.1
2012	19.2	68.7	38.1	51.2	57.2	4.3	21.1
2013	19.2	11.5	38.1	64.1	58.2	4.3	49.1
2014	6.2	0.5	3.1	55.1	42.2	86.2	46.1
2015	97.1	35.6	24.1	48.1	32.2	74.2	61.1
2016	91.1	23.7	85.3	44.1	25.2	66.2	54.1
2017	3.2	66.7	4.7	52.1	38.2	82.2	62.1
2018	98.1	27.7	22.9	48.1	33.2	75.2	53.1
2019	97.1	9.8	1.13	48.1	31.2	73.2	41.1
2020	5.2	9.8	3.2	54.1	94.5	85.2	1.2

Source: Authors' Calculation

The above table indicates that Pakistan, Indonesia, Egypt, Turkey, Iran, Nigeria, and Bangladesh have had the largest share of loans paid by the International Monetary Fund during the years 2010 to 2020 among the countries investigated in this research. It should be noted that Pakistan has the largest share of borrowing from the International Monetary Fund, while Bangladesh has the smallest share. Additionally, it can be observed from the table that Egypt's loan volume was low in the early years, but in recent years, this amount has increased. This could be attributed to Pakistan's higher borrowing needs due to its large population and recent

political instability, while the more stable political climate and smaller population in Bangladesh have made this country less dependent on borrowing from the IMF. Egypt's higher loan volume in recent years is likely due to the country's economic growth and increasing need for external funds.

2. Model Estimation

Before estimating the model, it is necessary to examine the unit root test of the variables used in this research.

2. 1. Unit Root Test

The stationary variables have an equilibrium trend towards which they move over time. If the variables in the model are constant, then they will have an equilibrium state; otherwise, the variables will be non-stationary. When the variables are stationary, there may exist an equilibrium relationship in the long run, which is known as the cointegration relationship. In such a case, a mean linear combination of variables is obtained, which represents the equilibrium or cointegration relationship. Cointegration is a solution to the indeterminacy problem that describes the long-term relationship between variables (Suri, 1395 [2016 A.D.], pp. 1020, 1053). On the other hand, if non-stationary data is used in the model estimation, the statistical inference will not be valid if the variance, mean, and covariance of the variables are not independent. The Shin-Im Pesran test is used to determine the significance or non-significance of the time series variables used in the model. The results of the unit root test for the variables are given in Table (2). Based on the results of this test, it can be

concluded that the inflation rate, gross domestic product, foreign direct investment, and exports are stationary. The International Monetary Fund loan and labor force are stationary in the first difference.

Table 2. Unit Root Test

Unit root Test – Im, Pesaran, Shin			
Variable	Test statistics	P-Value	Degree of convergence
LGDP	-1.47982	0.0695	I(0)
LCREDIT	-3.83863	0.0001	I(1)
INF	-5.45247	0.000	I(0)
LFDI	-3.90538	0.0000	I(0)
LLE	-1.54724	0.0609	I(1)
LEX	-2.97989	0.0014	I(0)

Source: Authors' Calculation

As mentioned above, if the variables are not stable, the problem of dummy regression may occur in the model. In addition, if the variables are not stable, but have cointegration, it is still possible to estimate the model. In this case, there is a long-term relationship between the independent variables and the dependent variables. To investigate the long-term relationship between variables, the Engel-Granger test is used. As illustrated in table (3), the Engel-Granger test was rejected at a probability level of 5%, indicating that there is a long-term relationship between the independent variables and the dependent variable.

Table 3: Engle Granger Test Using Regression Residuals

Test method	Test statistics	P-Value
Im, Pesaran, Shin	-5.22432	0.0000

Source: Authors' Calculation

The following section discusses the residual effects test. The fixed effects test is used to determine whether there are separate

intercepts for the countries under investigation. If the significance level is less than 5%, panel data estimation is used. If the significance level is greater than 5%, the ordinary least squares model is used. Based on the fixed effects test, the results indicate that the panel data estimation method is appropriate for the analyzed data. As illustrated in Table (4), the obtained probability value is below 5%, indicating the rejection of the ordinary least squares estimation method and the acceptance of the panel data method.

Table 4. Fixed Effects Test Results

	Test statistics	P-Value
Cross-section F	13.598628	0.0000
Cross-section Chi-square	69.038339	0.0000

Source: Authors' Calculation

On the other hand, the Hausman test is used to select a fixed or random effects model. According to the Hausman test, if the significance level is less than 5%, the model estimation method is fixed effects. If the significance level is greater than 5%, the model estimation method is random effects. As illustrated in Table (5), the probability value obtained is below 5%, indicating the rejection of the random effects model, as well as the confirmation of the fixed effects model for the model estimation method.

Table 5. Hausman Test Results

	Test statistics	P-Value
Cross-section random	81.262310	0.0000

Source: Authors' Calculation

The final tests that need to be checked before estimating the

equation are the presence of correlation and the heterogeneity of variance. The Breusch-Pagan test is used to measure the heterogeneity of variance, while the Durbin-Watson test is used to detect the autocorrelation. Table (6) presents the results of these tests, which indicate the presence of both heterogeneity of variance and autocorrelation in our data. Therefore, the EGLS Panel method was used to address these issues and correct for the autocorrelation and heterogeneity of the variances.

Table 6. Breusch Pagan and Durbin Watson test

Variable	Test statistics	P-Value	Test result
Breusch-Pagan test,	31.93175	0.0000	Confirmation of variance heterogeneity
Durbin Watson test	0.287475		Confirmation of autocorrelation

Source: Authors' Calculation

Table 7 reveals that loans provided by the International Monetary Fund (IMF) have had a positive impact on the economic growth of the recipient countries. This effect is statistically significant, with a 1% increase in growth observed in these countries.

The coefficient for the loan rate variable is 0.06, indicating that a 1% increase in the loan rate of the International Monetary Fund would result in a 0.06% increase in economic growth. This contradicts Hypothesis 1, which suggests a direct correlation between the loan rate increase and economic growth. However, many countries have demonstrated a positive relationship between foreign borrowing and economic growth, supporting the view that

borrowing from abroad can be a powerful tool for economic development.

Foreign direct investment (FDI) has a significant positive effect on economic growth at the one percent level, with a coefficient of 0.12. This confirms Hypothesis 2, which assumes that FDI has a positive impact on economic growth. Therefore, providing a suitable platform for investment in these countries can increase investment and lead to economic growth.

Inflation has a significant negative impact on economic growth at the one percent level, with a coefficient of -0.01, confirming Hypothesis 3. As inflation increases in these countries, economic growth decreases sharply, in line with economic theory.

There is a significant positive effect of the labor force on economic growth at the one percent level, with a coefficient of 2.23, confirming Hypothesis 4. This suggests that economic growth will be strongly influenced by an educated, skilled, and specialized workforce in these countries.

Exports also contribute significantly to economic growth at the one percent level, with a coefficient of 0.14, confirming Hypothesis 5. Trade liberalization and strengthening international trade indicators can lead to increased economic growth in these countries, in accordance with existing economic theory.

The coefficients of determination indicate that macroeconomic indicators, such as loan rate indexes, FDI indexes, inflation indexes, labor force indexes, and export indexes can accurately predict changes in economic growth. Thus, the model has a high degree of explanatory power.

Table 7. Estimated Model

VARIABLE	COEFFICIENT	TEST STATISTICS	P-VALUE
DEBT	0.067797	7.454051	0.0000
FOI	0.126057	10.28368	0.0000
INF	-0.013119	-10.56387	0.0000
Labor	2.238836	27.87160	0.0000
Export	0.142545	3.400894	0.0009
Fixed coefficient	-20.56825	-20.76005	0.0000
R ²	0.976579	Adjustment R ²	0.974566
Statistics F	485.1922	F P-Value	0.000000
	Durbin Watson		1.248908

Source: Authors' Calculation

According to the results of this research, the loan provided by the International Monetary Fund has a positive effect on the economic growth of the selected D8 member countries. The loan allows these countries to finance their development projects, which in turn boosts their economic growth. Furthermore, access to capital markets facilitated by the loan further contributes to their economic growth. In addition, studies conducted by other researchers, such as Nazari and Yadollahzadehtabari (2014), Yadollahzadehtabari and Nazari (1394 [2015 A.D.]), and Jayaraman and Leu (2009) have also found a positive correlation between government size and economic growth. However, studies by Zhilaei Aghdam et al. (1399 [2020 A.D.]), Fallahi et al. (1396 [2017 A.D.]), Alizadeh et al. (1394 [2015 A.D.]), Mowlaei and Golkhandan (1392 [2013 A.D.]), Panagiotis Pegkas (2019), Puente–Ajovin and Sanso-Navarro (2015), and Safdari and Abouei Mehrizi (2011) have reported negative results.

3. Conclusion

In this research, the effect of IMF loans on the economic growth of selected D8 member countries such as Iran, Pakistan, Indonesia, Egypt, Turkey, Nigeria, and Bangladesh has been investigated using the panel data method during the period of 2001-2020. The variables used in this research include gross domestic product, loans paid by the International Monetary Fund, foreign direct investment, labor force, exports, and inflation rate. Based on the results of this research, IMF loans, foreign direct investment, labor, and exports have a positive impact on the economic growth of selected D8 countries. On the other hand, inflation has a negative effect on economic growth. The positive impact of IMF loans, foreign direct investment, labor, and exports can be attributed to the inflow of new capital, skills, and resources into the countries, which help to spur economic growth. The negative effect of inflation is likely due to the fact that it increases the cost of goods and services and decreases purchasing power, which slows down economic growth.

As revealed in the results, the loans paid by the International Monetary Fund have a positive effect on the economic growth of the countries under review. This is due to the fact that loans help to stimulate the economy by providing extra resources to invest in infrastructure, create jobs, and boost consumer spending. This, in turn, leads to an increase in GDP and economic growth. Therefore, the member countries of D8 should take measures to manage and flow financial capital for investment. They should also invest this financial capital in projects that have high efficiency. By investing in projects that have high efficiency, it will help the countries to increase their GDP and make the most of the loan money given to them by the International Monetary Fund. This will help the

countries to become more self-sufficient and will also give them better access to global markets.

It is recommended that the countries of the D8 group provide an appropriate platform for exchange based on the positive impact of exports on economic growth. This platform can be based on indicators such as supporting investors, stabilizing exchange rates, facilitating licensing, and controlling inflation. Furthermore, many complex laws and regulations are among the obstacles that reduce the value of exports. Therefore, it is possible to facilitate the growth of exports by removing legal obstacles. Moreover, the results of this study indicate that inflation negatively affects an economy's growth. Inflation can increase the cost of production, which can make it more expensive for companies to expand and invest. This can make it harder for companies to increase their exports, resulting in a decrease in economic growth. Additionally, by removing legal obstacles, governments can make it easier for companies to export their goods, leading to greater economic growth. Therefore, it is suggested that controlling inflation should be the priority of economic policymakers.

Based on the results of the research, therefore, foreign direct investment has a positive effect on economic growth. Thus, it is necessary for the executive department of these countries to identify investment opportunities within various sectors of the economy and society. These projects should be introduced to investment organizations. Finally, the results indicate that the labor force has a positive impact on economic growth in the investigated countries. This is an indication of having a specialized, efficient, technical, and trained labor force. Because the importance of human resources in production and service is considered a significant factor; it can be argued that the target countries pay maximum attention to the training of human resources.

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