The impact of imports and macroeconomic variables on the economic growth in Iran

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Abstract: Given the importance of economic growth, it is essential to investigate the effective factors in this regard. The economic growth literature suggests that various factors affect this variable. This study is conducted with the aim at investigating the impact of imports and macroeconomic variables on the economic growth in Iran during 1981-2011. Therefore, this study is applied in terms of objective and has Ex-Post Facto type according to the data collection method and the combined data is utilized in data analysis. This research considers the imports divided into capital, intermediate and consumer goods. The obtained findings of regression model indicate that the variables included in the model, except for the growth rate of consumer goods imports, significantly affected the economic growth over the studied years. Thus, with one unit increase in inflation rate, the Gross Domestic Product (GDP) is reduced by 0.183 units. With one unit increase in the exchange rate, the GDP is decreased by 0.039 units. Furthermore, with one unit increase in the imports of capital goods, the GDP is increased by 0.017 units and with one unit increase in the imports of intermediate goods, the GDP is increased by 0.031 units. Moreover, the inflation variable had the greatest impact on the economic growth during target period.
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Introduction

Since the primary study by Barro (1991), the interest in empirical research on the growth has been seriously increased. The main aim of this type of literature is to identify the variables which have a sustainable impact on the economic growth; for instance, the studies by Levine and Renelt (1992), King and Levine (1993), Sala-i-Martin (1997), and Sachs and Warner (1997). There are a wide range of economic growth determinants in the economic theory and it is significantly important to identify the proper explanatory variables. Based on the macroeconomic indicators of Iran, the economy growth rate was 4.1 percent during the 1991-2009. (World Development Indicators, 2010) The inflation is one of the most important variables in the growth literature and there is more or less the theoretical and empirical evidence for existence of this relationship in both the classical and Keynesian paradigm models. Some examples of empirical studies which have confirmed the existence of this relationship are we the studies by Khan and Senhadji (2000), Fountas, Karanasos, and Kim (2006), Vale (2005) and Wilson (2006). The literature in this regard has lead to a wide range of results including the negative impact of inflation on the growth, the interaction between them, the negative impact of inflation on the short-term growth and its ineffectiveness in long term or its effect after about the inflation threshold. The exchange rate is another macroeconomic variable which can affect the economic growth rate. A change in exchange rate leads to a series of different and even conflicting changes in inner and outer economies and its outcome can have the positive or negative impact on the performance of local economy. (Ghaffari, 2013) The type of production structure in the economics of developing countries is in a way that less attention is paid on the use of technology and the production is done based on the use of primary and intermediate imported sources. Given the production technology in developing countries, the basic and intermediate production materials play the major roles in production. Therefore, the governors are willing to pay a large sum of money for imported basic and intermediate materials in developing countries to support the manufacturing sector and reduce dependence on the imports from other countries in order to achieve their economic goals. In such these circumstances, an increase in the exchange rate can have detrimental effects on the manufacturing sector. (Ghaffari, 2013).

The import is discussed in terms of foreign trade. Unlike the goods export and its role in economic growth, as considered by most of the researchers, the import is a subject less considered in studies and

models. According to Alfred Marshall's viewpoint (1890), the foreign trade is considered as the determinant of economic progress in countries because is leads to the widened dimensions of market resulting in the increased global production as well as rising the internal and external economic savings. The research by Balassa (1978) has been one of the most basic experimental studies on the impact of foreign trade on the economic growth. He found that the export growth had a positive impact on the economic growth. In a study on about 31 developing countries, Feder (1982) argued that the export growth would lead to the increased economic growth either by side effects or increased productivity. Kruger (1983) argued that a reduction in the capital goods imports reduced the GDP growth rate, but the reduced imports of intermediate goods and raw materials affected the production and employment. Uğur (2008) indicated that despite a mutual relationship between the GDP and imports of capital goods and raw materials, a mutual relationship existed between the GDP and imports of consumption goods and other types of goods; and the main flow was from the GDP to the imports of consumption goods and other types of goods. The results of study by Chen and Dong (2012) also confirm the positive impact of import and export on the economic growth. The studies on the situation of Iran indicates that the impact of intermediate and capital imports on the GDP was positive and significant in short and long term during 1970-2007, but there was no significant impact by the consumer imports on the GDP. (Hadian, 2009)

Since the import function has different structures in terms of capital, intermediate and consumer goods, and the impact of each one is different on the economy, thus the accurate identification of impact by each group of goods on the economic growth can help to adopt the economic and trade policies with greater efficiency. Given the cases above, the main question of this study investigates the effect of import and macroeconomic variables (exchange and inflation rates) on the economic growth in Iran.

Materials and Methods

This research is applied in terms of objective and is considered as the Ex post facto research. Using the panel data and utilizing Eviews 7 software, the data of time series is estimated (1981-2011). In combined data method, F limer test is applied for choosing either the panel or combined methods. In the case of selecting a panel method test, Hausman test is utilized to select either the fixed or random effects. Besides, for a stationary test of variables, Dickey-Fuller test is utilized in the case of applying the combined method; and Hadri method is utilized while using the panel method. Afterwards, the reliability test of variables, homogeneity of variance, cointegration test and Durbin-Watson are investigated.

Research findings

Stationary test of research variables

As shown in Table (1), the Prob of IPS Statistics is less than the significance level of 1%, 5% and 10%, it can be concluded that the hypothesis of non-stationary GDP variable is rejected and this variable is stationary at the significance levels of 1%, 5% and 10%.

Table 1. Unit root stationary test results for GDP variable at the significance levels

Variable	PP - Fisher Chi-square		ADF- Fisher Chi-square		Im, Pesaran and Shin W-stat		Levin, Lin & Chut	
	Probability level	Calculated statistics	Probability level	Calculated statistics	Probability level	Calculated statistics	Probability level	Calculated statistics
GDP growth rate	0.000	664.098	0.000	489.717	0.000	-9.52348	0.000	-27.3128

The summary of stationary test results by IPS unit root test at the model time series for other study variables is presented in Table (2).

Table 2. Results of IPS Stationary Test on research variables

Variable	IPS	Prob*	Result	Degree
Inflation rate	-3.66679	0.000	Stationary	I (0)
Exchange rate	-4.53019	0.000	Stationary	I (0)
Growth rate of capital goods imports	-8.50069	0.000	Stationary	I (0)
Growth rate of intermediate goods imports	-9.05377	0.000	Stationary	I (0)
Growth rate of consumer goods imports	-13.0636	0.000	Stationary	I (0)

Therefore, the final result of stationary test indicates that other research variables become stationary at the first order difference or level, thus the target model can be fitted by determining the stationary degree of variables, so it will have no problem for model. Furthermore, since that all variables of model are stationary, it is not necessary to perform the cointegration test.

Chow test results

As observed, the Prob is less than 5% and the hypothesis of equal y-intercept is not rejected. Thus, the fixed effects model is selected as the preferred model at this stage. Now, the fixed effects model should be tested against the random effects model. Hausman test is used in this regard.

Table 3. Results of Chow Test

Model	F	Prob *
GDP growth rate	605.166386	0.000

Hausman test

As shown, the Prob is more than 5% of the null hypothesis indicating the lack of relationship between the individual effects and explanatory variables is not rejected. Therefore, the fixed effects model approach should be applied to estimate the model.

Table 4. Results of Hausman Test

Model	Chi-Sq. Statistic	Prob*
GDP growth rate	2269.702871	0.095

Results of regression model estimation

As shown in Table (5), the value of R^2 statistics (R-squared) of coefficient of determination in the model indicates that 0.69 of changes in the dependent variable (GDP) can be explained by explanatory variables. According to the results of estimating the coefficients of independent variables, namely, the inflation rates, exchange rate, and import rate, and the significance level of less than 0.5, it can be concluded that there is a significant relationship between these variables and GDP at the significance level of 0.95. With one unit increase in inflation rate, the Gross Domestic Product (GDP) is reduced by 0.183 units. With one unit increase in the exchange rate, the GDP is decreased by 0.039 units. Furthermore, with one unit increase in the imports of capital goods, the GDP is increased by 0.017 units and with one unit increase in the imports of intermediate goods, the GDP is increased by 0.031 units. It should be noted that the growth rate of consumer goods imports has not been statistically significant; however, a negative coefficient on this variable indicates that as the result of one unit increase in imports of consumer goods, the GDP is decreased by 0.026.

Table 5. Results of model estimation considering the fixed effects

Variables	Coefficient	t statistics	prob
Constant value	4.062	34.3	0.000
Inflation rate	-0.183	2.51	0.005
Exchange rate	-0.039	6.41	0.000
Growth rate of capital goods imports	0.017	4.56	0.000
Growth rate of intermediate goods imports	0.031	14.61	0.000
Growth rate of consumer goods imports	-0.026	-7.56	0.6249
R-squared: 0.690783; Adjusted R-squared: 0.656984 Durbin-Watson stat.: 2.438067			

Residual term reliability

According to the Table (6), since Dickey-Fuller statistic for residual term of model is less than the critical value, it can be concluded that the residual term or model error is stationary at all levels.

Table 6. Dickey-Fuller test results for residual term

	Dickey-Fuller statistic	Maximum MacKinnon critical statistic	Result
Residual term regression	-1.826570	-6.423637	Null hypothesis rejected

Durbin-Watson co-integration regression test

According to the Durbin-Watson regression model (2.4), it can be concluded that the cointegration (long-term relationship) is confirmed between variables in the model. Therefore, it is shown that the simple regression above indicates the long-term equilibrium relationship between variables in the model. In other words, the estimated coefficients are not true only in the short term, but they can also be used in the long-term analysis of relationships.

Table 7. Critical values of CRDW test

Critical quantity	Significance level
0.352	1%
0.308	5%
0.222	10%

Conclusion

Given the importance of economic growth, it is essential to investigate its effective factors. Economic growth literature suggests that this variable is affected by several factors one of which is the inflation. The inflation, which is one of the major problems particularly in developing countries, has adverse effects on the economic growth and development process. Therefore, it is essential to investigate the effects of inflation in economic growth. According to the principles of economic growth models (with an emphasis on the role of inflation), there are various points of view in terms of economic sects and the relationship between inflation and growth is consistent or conflicting.

According to Keynesian theory, the monetary policies can change the production level due to the incomplete flexibility of wage in the short term. In fact, since the nominal wages are less flexible, the increased amount of money (or liquidity) will increase the price level, decrease the real wages and thus enhance the employment and production levels. Therefore, applying the expansionary monetary policy in the short term will raise the prices and production level. In Neo-Keynesian patterns, the expansionary monetary policies have no impact on the production level in the long term and just increase the prices. From the perspectives of Keynesians, due to the slow adjustment of real wages, the inflation through redistribution of income from workers (with a tendency to lower savings) to the employers (with a tendency to higher savings) increases the economic growth.

Based on the theory by traditional monetarist, the increase in the money supply or applying the expansionary policies in the short term can enhance the production level, but the economy returns to the initial equilibrium in the long term and the effects of increased money supply are only reflected in higher prices. According to the new monetarists' sect (Friedman, etc.), the adaptive expectations cause a positive relationship between inflation and growth in the short term, but there is no relationship between these two variables in the long term. By raising the rational expectations, new Classics have found that there is no relationship between the inflation and growth in the short and long term. Unlike all the above theories, the findings of this research indicate that the inflation variable had a significant negative impact on the economic growth of Iran during 1981-2011, so that it had the highest impact factor (-0.183) in comparison with other models included in the model. Thus, it can be concluded that the high types of inflation are detrimental to economic growth, but this effect is distinct from other devastating effects of inflation on the social structure and other institutions of community. Therefore, the necessity for controlling and targeting the inflation can be introduced as one of the main macroeconomic objectives.

In terms of trade dynamic dimensions, Haberlar considered providing the material tools necessary for capital goods, machinery, raw materials and intermediate goods and thus the technology transfer as the indirect benefits or dynamic interests of foreign trade. The technology transfer from outside reduces the ratio of additional capital to the product as far as the economic growth rate depends on the capital accumulation and investment efficiency. The lower ratio of additional capital to the product accelerates the total economic growth rate. According to the research findings, there is a negative relationship between the imports of consumer goods and economic growth rate and this is consistent with the relevant theories in this regard. Furthermore, a percent decrease in the imports of consumer goods will increase the economic growth rate by 2.6 percent. It should be noted that according to the research findings, the impact of importing the consumer goods on the economic growth has been greater than the imports of capital goods.

According to the review of different theories in the field of exchange rate volatility and economic growth, despite the fact that some of the theories have emphasized on the negative relationship between the exchange rate volatility and economic growth, there are other theories which do not approve this relationship. For instance, Clark (2004) found a negative correlation between exchange rate volatility and economic growth, while De Grauwe and Schnabel (2005) emphasized on a positive correlation between the exchange rate and economic growth. The findings of this study indicate that there is a significant negative relationship between the exchange rate and economic growth, so that a percent decrease in the exchange rate will increase the economic growth by 3.9 percent.

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