Examining the Effect of Foreign Direct Investment and Import/Export of Goods on Japan's GDP During 1977-2012, Using GMM

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ABSTRACT: In this study, the effect of import/export of goods on Japan's gross domestic product (GDP) has been examined. In order to carry this out, the time period of 1977 to 2012 is selected based on generalized method of moments (GMM). The generalized method of moments is one of the most efficient methods for estimating the impact of inputs. This is because this method takes account of the endogeneity of inputs and their being affected by the growth trend. Findings indicate a positive and meaningful impact on GDP from export of goods and a negative and meaningful impact on it from import of goods.
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INTRODUCTION

Foreign commerce consists of two components – imports, and exports. In reckoning of the national revenue, the exports usually increase and the imports usually decrease this revenue. Although it may be possible that in the process of development the absolute value of imports doesn't decrease, it is possible for the composition of these imports to change. This is especially due to the fact that countries attempt to increase the domestic products by adopting approaches for replacing imports and approaches directed at increasing the exports. In the world's current economic structure, imports have a significant role in determining the strategy for economic development. On the one hand, imports are important as one of the effective factors in GDP, on the other hand they are significant as one of the more important items of any country's payments. Due to this, any alteration in the country's volume of imports affects the domestic products and ultimately the country's growth and development. But in economics, it is unavoidable that one should find ways to make imports rational so that they can adopt appropriate import policies in the global village. Therefore it is necessary to find the factors affecting imports to shed light on the mechanism of fluctuations and changes of imports against variations in the explanatory variables. In analysis of macro issues and setting economic policies, examining the import demand function has a great significance in determining the pattern for macroeconomics and effectiveness and efficiency of commercial policies of the country. In this regard, one of the major issues of concern for the import of goods is examining the factors affecting it (Dadgar, Y., & Nazari, R., 1389).

Exports of countries form part of the international commerce. In fact, one way of obtaining foreign exchange and therefore economic development is export of goods and services. As well as an impact on obtaining foreign revenue, export expansion has other positive results. Industries of the country can increase the volume of their production and so benefit from increased efficiency and decreased cost price. Larger markets make allotting resources to projects and fields that were previously unfeasible because of the limitations of the national market possible. On the other hand, expansion of exports create more job opportunities and an increase in skills. The significance and importance of exporting of goods and services has made countries to identify the tools and factors affecting the exports and try to expand them (Elahi, Sh., Hasanzadeh, A., 1387).

Commercial flows have been one of the most important subjects of empirical studies in the last fifty years.

One of the reasons for this emphasis is the extensive applicability of income and price elasticity in regards of setting the policies. As the World Trade Organization (WTO) has become more active, freedom of commerce has shown itself as one of the major matters of concern for governments, especially in developing countries, when setting policies. In regard of freedom of commerce, the belief is that economic growth and development increases via advances in technology and expertise, and international commerce makes it possible to become experts in production of goods and services by creating incentives and competition and forwarding changes.

The import demand function is one the most important basic relationships between variables in macroeconomics. Most of the empirical studies can be categorized by two different definitions in regards of defining the import demand function. First is the traditional definition of the import demand function in which the demand for imports is linked to the national revenue and the relative price of the imports (i.e. the ratio of import prices to national prices). The other definition considers the demand for imports in circumstances of limitations of foreign exchange and takes account of these limitations directly in the equation for import demand.

Literature review

Sarode (2012), in his article, examined the effect of foreign direct investment (FDI) on capital account and GPD of India. Results of his research show that foreign direct investment in India not only changes its GPD, but also affects commerce situation and balance of payments. He also examined the effect of current and capital accounts during the period of 1997-2011 and showed that foreign direct investment has a negative impact on the current account and a positive impact on the capital account of India. Halmos (2011) examined the relationship between foreign direct investment, exports, GPD, and income inequality in Eastern Europe. He reached the conclusion that there is a positive and meaningful relationship between an increase in income inequality and an increase in foreign direct investment. Results of this research also showed that an increase in exports will decrease wages in these countries. Yang and Wang (2010), in their article, examined the effect of economic growth in logistics industry on foreign direct investment in China. They reached the conclusion that investment in the logistics sector has a direct relationship with foreign direct investment. Oksuzler (2009) examined the effect of instability of exchange rates on the fixed investment of the private sector in Turkey during the period of 1970-2004 using autoregressive integrated moving average (ARIMA) and co-integration models. According to his results, instability of real exchange rates have a negative but statistically not meaningful effect on investment of the private sector. Laura Alfaro (2007), in an article entitled 'How does FDI promote economic growth?', selects three classes of countries with strong, average, and weak financial structures for the years 2000-2003 and reaches the conclusion that in countries with average structures, FDI has a stronger impact on economic growth of the host country compared to a country with a weak financial structure. Furthermore, the stronger the financial structures are, the more extensive the relationship between the local businesses and the businesses supplying FDI will be. Schmidt and Bruhl (2006), in an article, have shown the effect of instability of exchange rates and changes in the exchange rates on foreign direct investment. This research studies U.S. in the period of 1984-2004 and examines industrial and non-industrial foreign direct investment in America during this period compared to 6 other countries. Then by using changes in the real exchange rates as an index for determining the exchange rate risk, identifies the negative impact of the exchange rate risk on FDI in all industries. Results showed that the increasing trend of FDI is dependent on an increase in the host countries' currency capital. Abdul-Malek and Zubaidi (2006) examined the various effects of capital flow on the growth trend of East Asia. Results of their research show the positive impact of FDI on economic growth in both short-term and long-term periods, affirming the previous observations. They have shown that the impact of FDI on economic growth is more significant than the national savings. Furthermore, some evidence suggest better efficiency of the inflow of FDI compared to domestic investment. Townsend (2003), in a PhD thesis entitled 'Does FDI accelerate economic growth in less developed countries?', reached the conclusion that FDI has a positive impact on economic growth of developing countries, but for less developed countries he couldn't reach a clear verdict. Slater and Ford (2001) examined the effects of FDI on economic growth of the countries of Association of Southeast Asian Nations (ASEAN) during 1970-1996 and finally reach the conclusion that foreign direct investment not only stimulates economic growth in countries but also has a greater impact compared to human capital and technologic factors.

Type of research

The purpose of applied research is testing theoretical concepts in real-life situations and solving tangible problems. The results of this type of research are objective and clean-cut. Educational research are generally applicable. The current study falls in the category of applied research regarding the purpose and goal it pursues. This is because it searches for a basis for solving a problem in real-life.

Scopes
Topical scope
The topical scope is examining the relationship of foreign direct investment and import/export of goods with gross domestic product (GDP).

Geographical scope
The geographical scope of this study is Japan.

Time scope
The time scope of this study is between the years 1977 to 2012 and annual data from the World Bank are used.

Research goal
The goal of this study is to examine the relationship of foreign direct investment and import/export of goods with Japan's gross domestic product during 1977-2012.

Research queries
This study, in accordance with its topical scope, aims to answer the following questions:
Does export of goods impact gross domestic product?
Does import of goods impact gross domestic product?

Assumptions
In this study, data about the values of import/export of goods and GDP are considered. Also in order to test the assumption of the research, the generalized method of moments is used. Assumptions in this study can be seen below.
The assumptions of this study are:
Export of goods have an impact on gross domestic product.
Import of goods have an impact on gross domestic product.

Definition of operational variables
Table 1 sets out the independent and dependent variables.

Table 1. The independent and dependent variables

Variable	Type	Role
Foreign direct investment	Quantitative	Dependent
Import of goods	Quantitative	Dependent
Export of goods	Quantitative	Dependent

Data needed and the procedure for obtaining that data
The data needed to determine the research variables needed are as follows:
The annual value of Japan's import and export of goods during 1977-2012 based on the current exchange rate of American dollar, and also the rate of Japan's gross domestic product during 1977-2012 based on the current exchange rate of American dollar.
In order to analyze and infer statistically, the credible and well known econometrics software Eviews is used.

The testing method and model for the assumptions
Correlation examinations are carried out to find out about relationships between the variables, but in doing this we do not necessarily aim to find the causal relations. In correlation examinations, the emphasis is on finding a relationship between two sets of data. These are data that have been gathered about one variable in two populations or circumstances, or are data gathered about two or several variables in the population.
This is a correlation study, because the relationship of the variables of foreign direct investment, and import/export of goods with the gross domestic product is examined. In this study the main objective is to determine if there is a relationship between the variables foreign direct investment and gross domestic product, and if there is, what the extent of it is. The type of the relationship between these variables is expressed as the correlation coefficient (R). The coefficient of determination (R^2) is used to illustrate the percentage of the relationship between these variables and the gross domestic product.
The model used to test the assumptions is as below:

The linear regression model is fitted, the coefficient of determination is calculated, and a testing the levels of significance of the independent variables is carried out and analyzed. The model used based on the research assumption is:

$$X_i = \beta_0 + \beta_2 K_i^d + \beta_3 K_i^g + \varepsilon$$

In this equation, the independent variables are: K_i^d export of the goods, K_i^g import of the goods, and ε the error of the test.

Results of estimating the research model using the generalized method of moments

The model is estimated for the period of 1977-2012 based on data from the World Bank. The results can be seen in table 2:

GDP=-9.50×Import-17.79×Export

Table 2. Results of estimation using the general method of moments

Variables	Coefficients	Standard error	Ratio of t	Value of P
Import of goods	-9.50	1.82	-5.22	0.00
Export of goods	17.79	1.68	10.55	0.00
Coefficient of determination (R^2)=0.78		The adjusted coefficient of determination=0.77		
Durbin-Watson		0.53		
J-statistics		3.05		
Probability of J-statistics		0.22		

It can be seen that the values of the coefficient of determination, the adjusted coefficient of determination, Durbin-Watson statistic, and J-statistics prove the model to be meaningful and valid.

Interpretation of the results

Export of goods: The impact of import of goods on the gross domestic product has been positive and meaningful and it is 17.79, meaning that with a 1 percent increase in foreign direct investment, the GPD increases by 17.79 percent.

Import of goods: The impact of export of goods on the gross domestic product has been negative and meaningful and it is -9.50, meaning that with a 1 percent increase in foreign direct investment, the GPD decreases by 9.50 percent.

CONCLUSION AND SUGGESTIONS

Import of goods has a positive and meaningful impact while export of goods has a negative and meaningful impact. Care should be taken to combine these two with other variables and to identify the mechanisms affecting them to achieve greater economic prosperity by managing them properly.

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