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An Empirical Analysis on U.S. Foreign Trade and Economic Growth

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Abstract

This study used data ranging from 1960-2010 in order to test the relationship between U.S. foreign trade and its economic growth. The Granger Causality Tests show that there exists a bi-directional relationship between American exports and its GDP, while exists only a single-directional relationship between American imports and its GDP. It indicates that American imports didn't Granger cause American GDP growth. That is to say, even if taking several measures to protect and reduce its imports, U.S. can not achieve the goal of promoting its economic growth.

Keywords: U.S.; Foreign trade; Economic growth; Granger causality test

1. Introduction

Since the financial crisis, the United States launched anti-dumping, anti-subsidy and other special safeguard clauses to limit its imports and reduce trade deficit in order to recover its economy. This kind of practice has seriously harmed its partners' legitimate interests. Moreover, whether American imports have restrained its economic growth still needs a further inspection.

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This study focuses on the study of the relationship between American foreign trade and its economic growth so as to analyze whether America's protective policy is appropriate or not. The variables we choose are U.S. imports, exports and GDP.

2. Method and Data

2.1. Research method

Generally, when explaining the relationship among several variables, one of the traditional methods is to establish a structured simultaneous equation model. The shortcoming of this method is that this model must be established strictly on economics theory. However, because the economic theory has its limitation in explaining the dynamic relationship between variables, a better solution is to establish a Vector Regression Model (VAR). VAR model is a kind of non-structured equation model, whose biggest advantage is that we can establish the model directly regardless of the economic theory. After several tests, it's convenient to judge the dynamic relationship among variables accurately.

The specific analysis is as follows: step one, we conduct the unit root test on the time series data to explore its stationary; step two, we establish the VAR model to determine the maximum lag and to further explore the Johansen co-integration relationship; step three, we conduct the Granger causality test to find the causal relationship between variables.

2.2 Data source

The study used data ranging from 1960-2010. The time series variables selected are U.S. gross domestic product (GDP), exports (EX) and imports (IM). All data are collected from U.S. Bureau of Economic Analysis (BEA).The data processing software for this empirical analysis is Eviews 6.0.

Considering the influence of price fluctuation, we need to process on the original data in order to eliminate the influence of price change. Then, we take natural logarithm sequence on these variables, namely into LGDP, LEX and LIM.

3. Empirical analysis

3.1 The unit root test

When establishing a time series model, OLS models require the time series to be stationary to avoid spurious regression. A standard method to test the stationarity of the time series variables is to conduct unit root test. We choose the ADF unit root test. Test results see table 1.

The result of ADF unit root test shows that variables LGDP, LEX, and LIM are all non-stationary series, after an order difference, they are single time series of the order. Because the multivariable system has already held the condition of establishing VAR model, we establish the VAR model directly. In order to determine the biggest lag order, we do test on the model's lagging structure. There exist 5 test methods, AIC (Akaike) information criterion inspection, SC (Schwarz) information criterion, LR (Sequential modified LR test statistic) information criterion, FPE (Final prediction error) information criterion and the HQ (Harman-Quinn) information criterion. We specifically examine these five methods. (See table 2)

Test results show that the maximum lag order number is 2 under the 5 information criterion. Therefore, we can build Vector Autoregression Models VAR (2) acco rdingly. From the perspective of the fitting effect of the model, we can see the coefficient R_2 is 0.998454, which reflects the model fitting well. From the