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Term Paper

Time Series Analysis

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The impact of foreign investment on economic growth

**Abstract**

Foreign Investment is strategic step for country due to lack of capital and technology transfer. Many policy makers and academics contend that Foreign investment can have important positive effects on a host country’s development effort. This research examines the impact of Foreign Investment on Economic growth in Republic of Armenia.

**Methodology**

This research uses data from Central Bank of Armenia to gain detail number of foreign direct investment (FDI) flows, export , transfers and data from Statistical Committee Of Armenia to gain detail number of seasonally adjusted Real GDP. The investment inflows has been minus with outflow. The type of data is time series data.

The econometric method will be used in this research is multiple linear regression model with ordinary least square method. The general purpose of multiple regressions is to learn more about the relationship between several independent or predictor variables and a dependent variables. The analyze process will utilize by Stata.

**Data analyze**

The descriptive analysis from overall data result in the table below, this is result from Stata which shows number of data, minimum, maximum, mean, standard deviation.

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According to the data all variables use data in 38 quarters from first quarter of 2013 till second quarter 2022. The minimum number of foreign direct investment is -109.1102 million dollars and the maximum number is 364.6295 million dollars. The minimum number of Seasonally adjusted Real GDP is 2552.805 million dollars and the maximum number is 4630.718. Standard deviation of GDP is 5.29 times higher than standard deviation of FDI.

According to the theoretical methodology, in the first step of the empirical evaluation we need to check stationarity of variables. “Stationarity” means maintaining a constant mean and variance across different time frames.

**stationarity graph**



The stationarity of the studied time series was checked using the Unit Root test. The values of the Dickey-Fuller statistics show that among the studied variables no one is stationary, because for a time series data to be stationary the Z(t) should have a large negative number. p-value should be significant at least on 5% level. Neither of these conditions are met in these tests.

If a time series has a unit root problem, the first difference of such time series is ‘stationary’. Therefore, the solution here is to take the first difference of the REALGDP time series, but the first difference also none stationary, so in regression was used second order differences of variables.

Autocorrelation is the presence of a series correlation in a time series data set. It implies that the time series (Seasonally adjusted real GDP) can serially correlate with its own prior values. To check the autocorrelation of variables was used correlogram.

 

 

It can be seen from the graphs that REALGDP\_d2 is autocorrelated with its lagged series at lags 1, FDI\_d2 is autocorrelated with its lagged series at lag 1, Export\_d2 is autocorrelated with its lagged series at lags 2 and 4 , Transfers\_d2 is autocorrelated with its lagged series at lags 1 and 3.

The following model was estimated by the OLS, and quantitative estimates of the relationship between the observed variables were obtained. The results of the regression analysis are presented in the table below. The lag length of the model and variables was obtained by AIC criterion. lagGDP is lag of RealGDP\_d2 at lag 1, lagFDI and lagTransfers are lags of FDI\_d2 and Transfers\_d2 at lag 3 respectively.

RealGDP\_d2 = -10.9 + 0.4lagGDP + 0.64lagFDI + 1.37lagTransfers+0.38Export\_d2



The R-squared of our model is 0.55, which means that our independent variables’ fluctuations explain dependent variable fluctuation by 55%. The P values of variables are lagGDP is 0.013, lagFDI – 0.022, lagTransfers – 0.006, which means that all of them are statistically significant at 5%.

Time series data requires some diagnostic tests in order to check the properties of the independent variables. The normality test helps to determine how likely it is for a random variable underlying the data set to be normally distributed.

The graph below shows the distribution of residuals



From the graph it is obvious that residuals are nearly normally distributed.

If heteroscedasticity is present in the data, the variance differs across the values of the explanatory variables and violates the assumption. This will make the OLS estimator unreliable due to bias. To check heteroscedasticity was used the White test. The results from the white test are shown below.



The figure above shows that the probability value of the chi-square statistic is more than 0.05. Therefore the null hypothesis of constant variance can not be rejected at a 5% level of significance. It implies there is no heteroscedasticity in the residuals.

The presence of autocorrelation in the data causes and correlates with each other and violates the assumption, showing bias in the OLS estimator. To check the autocorrelation was used The Breusch-Godfrey LM test because it has advantage over the classical Durbin-Watson D test.  The Durbin-Watson test relies upon the assumption that the distribution of residuals is normal whereas the Breusch-Godfrey LM test is less sensitive to this assumption. Another advantage of this test is that it allows to test for serial correlation through a number of lags besides one lag which is a correlation between the residuals between time t and t-k (where k is the number of lags).



Since from the above table, chi2 is not less than 0.05 , the null hypothesis can not be rejected. In other words, there is no serial correlation between the residuals in the model.

**Conclusion**

As conclusion we can say that FDI, export and transfers have major effect in economic growth of Armenia. But the effect of FDI and Transfers on GDP growth is lagged, meanwhile export has immediate effect on GDP.

**References**

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