Effects of terms of trade on growth performance of India

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ABSTRACT

This study investigates the effect of terms of trade on economic growth of India by using the annual time series data from the period of 1980 to 2010. The ARDL bound testing cointegration confirms the significant positive relationship between terms of trade and economic growth in the long run as well as in the short run. Results of Granger causality, Toda and Yamamoto Modified Wald causality and variance decomposition tests confirm the bidirectional causal relationship between terms of trade and economic growth in India. Rolling window estimation indicates that the terms of trade is having positive long-run coefficients throughout the sample period. Results of CUSUM and CUSUM of square suggest that there is no structural instability in the residuals of equation of economic growth in short run. It is suggested that beneficial terms of trade is better for economic growth in India. At this stage we can set the direction of future research that the relationship between commodity groupwise and countrywise bilateral terms of trade with economic growth should be analyzed. These results would be helpful for policy makers of India to frame growth enhancing countrywise as well as commodity-wise trade policies.

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1. Introduction

In India during the last three decades, trend shows that terms of trade has improved. In the 1980's the average terms of trade was 84, in the 1990's it increased to 105 and in the decade of 2000 the average terms of trade marginally improved and became 107. Similarly, in the 1980's the average growth in real GDP was 6%, in 1990's it again sustained at 6% and in the decade of 2000's in increased to 7.3%. The question is that, is the commodity terms of trade correlated with economic growth? This study examines this question by using long time series annual data of India covering the period from 1980 to 2010.

Most of the empirical studies have been conducted under Prebisch-Singer (PS) hypothesis.[2] Perbish-Singer hypothesis[3] argues that the terms of trade of primary product specialization countries will weaken over time as compared to the countries that specialize in manufactured goods. Declining of terms of trade is one of the main reason of income gap between developed and developing countries. Increase in terms of trade would lead to increase in investment and thus economic growth will increase.

Many studies have been conducted to find Herzberger–Laursen–Metzler (HLM) effect.[4] HLM effect[5] argued that the declining in terms of trade will lead to reduce the real income and lower income will lead to lower savings and investment. Consequently, it affects the current account. Jawaid and Waheed (2011) explain the channel between terms of trade and economic growth. According to them, increase in terms of trade results in efficient allocation of resources which leads to high productivity and economic growth. Higher economic growth makes ground for a country to move their resources to research and development and this leads to quality improvement in the country. Consequently, export prices increase resulting to further improvement in terms of trade. In most of the empirical studies cross country data[6] has been used to analyze the relationship between terms of trade and economic growth, India is mostly not included in these cross country studies. However, some time series are also done on the same subject.[7] The objective of this study is to examine the effect of terms of trade on economic growth of India.

The rest of the paper is organized as follows: following introduction Section 2 reviews some selected studies, Section 3 discusses empirical strategy, Section 4 shows estimations and results, Section 5 shows results of rolling window estimation, Section 6 discusses the

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[4] Arize (1996), Otto (2003), Bouakez and Kano (2008), Hamori (2008) and Misztal (2010).
[5] See Harberger (1950) and Laursen and Metzler (1950).
[6] Sea Bleaney and Greenaway (2001) and Cashin and Mecdermott (2002a,b).
[7] See Wong (2004, 2010) and Fatima (2010).

results of cumulative sum and cumulative sum of square estimations, Section 7 shows the results of causal relationship between terms of trade and economic growth and the final section concludes the study and provides some policy implications.

2. Review of literature

Many studies suggest the positive effect of terms of trade and negative effect of volatility of terms of trade on economic growth. In this section some selected studies are discussed.

Arize (1996) uses the cointegration technique to empirically examine the long-run impact of terms of trade on trade balance by using the data of 16 countries from the period 1973 to 2004. The results suggest the positive relationship between terms of trade and trade balance in most of the countries.

Mendoza (1997) uses the panel estimation method on the data of 40 industrial and developing countries from the period 1971 to 1991 to empirically examine the endogenous growth model. The findings suggest the positive impact of rate of change of terms of trade on economic growth. The negative relationship is found between volatility of terms of trade and economic growth. Sensitivity analysis confirms the robustness of the results.

Kaneko (2000) uses endogenous growth model with two factors, physical and human capital to investigate the relationship between specialization pattern and growth rate of growing economy. Results suggest the positive and significant relationship between terms of trade and economic growth in a country that specializes in consumption commodities. Furthermore, if a country specialized in capital commodities, the economic growth is not affected by the terms of trade.

Bleaney and Greenaway (2001) use stochastic endogenous growth model to empirically examine the impact of terms of trade, exchange rate and their volatilities on growth and investment. They use panel estimations on the data of 14 Sub-Saharan African countries from the period 1980 to 1995. Volatility of terms of trade and real exchange rate is estimated by using Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model. Results show that improvement in terms of trade and less over value exchange rate have significant positive effect on growth and investment while, significant negative relationship is found between volatility of terms of trade and economic growth.

Hadass and Williamson (2001) use the data of 19 countries to empirically investigate the relationship between terms of trade and economic growth from the period of 1870 to 1940. The findings indicate that the positive movement in terms of trade reduces economic growth of primary product exporters. They concluded that variation in terms of trade explain not more than one fifth of economic growth in prewar period.

Cashin and Mcdermott (2002b) use the different quarterly time series data of five OECD countries to analyze the relationship between current account balance and terms of trade shocks.[8] They used Structural vector autoregression (SVAR) model. The results of Canada, United Kingdom and United States show only a small share of volatility in current account balance by the shocks of terms of trade. On the other hand in Australia and New Zealand terms of trade shocks are found to have significant proportion of variation in current account balance.

Wong (2004) uses the cointegration and error correction technique to analyze the long-run and short-run relationship between terms of trade and economic growth in Malaysia. Annual time series data has been used from the period 1965 to 2002. The results of cointegration confirms the significant positive long-run relationship between terms of trade and economic growth. The results of error correction model

also confirm the positive and significant relationship between terms of trade and economic growth of Malaysia in the short run.

Cakir (2009) empirically examines the relationship between terms of trade and economic growth by using the panel data of 18 emerging economies over the period of 1990 to 2004. Generalized methods of moments (GMM) has been used. Results indicate the significant positive relationship between terms of trade and economic growth.

Wong (2010) uses the annual time series data of Japan and Korea from 1996 to 2003 and 1971 to 2006 respectively to empirically examine the relationship between terms of trade and economic growth. To find the long-run relationship Johansen cointegration technique has been used. The results suggest that the real GDP per capita and terms of trade are mutually determined. Results also indicate the significant negative relationship between volatility of terms of trade and GDP per capita in both countries.

Jawaid and Waheed (2011) investigate the impact of terms of trade and its volatility on economic growth by using cross country data of 94 countries over the period 2004 to 2008. Results indicate the significant positive impact of terms of trade and its volatility on economic growth. Sensitivity analyses have been used to check the robustness of initial results. The results were found robust despite the inclusion of additional variables in basic model and use of various proxies for volatility of terms of trade.

3. Empirical framework

After reviewing the theoretical and empirical work, the model to examine the impact of terms of trade on economic growth is derived using the production function framework. The production function in general form as follows:

$$Y = f(A, L, K) \tag{3.1}$$

Where Y is the real gross domestic product, L is the labor force, K is the capital stock and A is the total factor productivity. It has been assumed that effect of terms of trade on economic growth operates through A.[9]

$$A = g(TOT) \tag{3.2}$$

Substituting Eq. (3.2) in Eq. (3.1)

$$Y = f(L, K, TOT) \tag{3.3}$$

The empirical models for estimations are developed as follows:

$$GDP_t = \beta_0 + \beta_1 LAB_t + \beta_2 CAP_t + \beta_3 TOT_t + \varepsilon_t \tag{3.4}$$

Where, ε_t is the error term, GDP is the real gross domestic product, LAB is the total labor force and TOT represents the terms of trade. Real gross fixed capital formation as percentage of GDP has been used as a proxy for capital stock because of unavailability of data of capital stock.[10] The expected signs for labor and capital stock are positive while, the sign of TOT is to be determined. Annual time series data have been used from 1980 to 2010. All data are gathered from World Bank's official database[11] and different issues of economic surveys of India. All variables are used in logarithm form.

3.1. Unit root test

Augmented Dickey Fuller (ADF) and Phillip Perron (PP) unit root test are used to examine the stationary properties for long-run

[8] For Canada (1970:2–1997:4); for Australia from 1970:2–1997:2; for New Zealand (1980:2–1997:2); for the United Kingdom (1970:2–1997:4); and for the United States (1973:2–1997:4).

[9] See, Kohpaiboon (2003) Jawaid and Raza (2012).
[10] See, Balasubramanyam et al. (1996), Barro (1999) and Kohpaiboon (2003).
[11] The web link of data source is http://data.worldbank.org/indicator.