

FINDING THE NEXUS BETWEEN ECONOMIC GROWTH AND TERMS OF TRADE: WITH REFERENCE TO INDIAN ECONOMY

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Abstract: Trade has been considered an essential contributor to economic growth for a long. However, whether a country benefits from the trade or not is measured by the terms of trade. It is the ratio of domestic export price to import price. The theories of Prebisch–Singer (PS) hypothesis and Harberger–Laursen–Metzler (HLM) effect in economic literature explore the effect of trade terms on the growth of an economy through its impact on foreign exchange earnings, the balance of payments and output. This study has investigated the relationship between Economic Growth, Net Barter Terms of Trade (NBTT), Labour Force and Gross Capital Stock for the period 1990–2018. The results show that there is a significant positive impact of NBTT on GDP. Employing the ARDL bound test, it is found that there exists a long-run association among the variables. The magnitude of the impact of terms of trade on Economic growth is examined using the DOLS approach.

Keywords: Economic Growth, Labour Force, Capital Stock, ARDL Bound Test, Net barter terms of trade

1. PRELUDE:

The ratio of domestic export price and import price is known as a country's terms of trade. The terms of trade tell us the rate at which we can trade the goods of one country for the goods of another. The *terms of trade* are sometimes called the *real exchange rate*. In literature, we can find three terms of trade: income terms of trade, net barter terms of trade, and single and double factor terms of trade. The net barter terms of trade can be viewed as a ratio of export price index and import price index multiplied by 100 $[(P_x/P_m) \times 100]$. Terms of trade deteriorate when the import price increases relative to the export price and vice versa.

The existing literature provides two different types of results regarding the impact of terms of trade on economic growth. Many studies reported that terms of trade negatively impact economic growth, whereas others stated that terms of trade positively impacted economic growth.

The theories that describe the relationship between economic growth and terms of trade are mainly Prebisch–Singer (PS) hypothesis and Harberger–Laursen–Metzler (HLM) effect. According to the Prebisch - Singer hypothesis, countries specialised in primary production experience in terms of trade decline relatively more than the manufacturing products countries specialising in countries over time. The Harberger–Laursen–Metzler effect suggests that the improvement in terms of trade impact positively the balance of payments and output and income.

The finding of the study by Mendoza (1997) show that terms of trade positively impacted the economic growth.

Wong (2009) studied the impact of terms of trade and ToT on the economic growth of Japan and Korea. They found that real GDP per capita and terms of trade are jointly determined. Moreover, less volatile ToT are essential for economic growth, which is consistent with Mendoza's findings (1997).

Jawaid and Waheed (2011) examined the effect of terms of trade and its volatility on economic growth for 94 developed and developing countries five years average data from 2004–2008. The results show the significant positive impact of terms of trade on economic growth. Furthermore, volatility of terms of trade has a significant positive effect on economic growth.

Kalumubu and Sheefeni (2014) examined the factors leading to changes in terms of trade and the impact of terms of trade on the economic growth of Namibia using time series data for the period 1980–2012. The results indicate a negative relationship between TOT and economic growth.

Olomola, Akani and Dada and Temitope (2017) examined the effect of real exchange rate and exchange rate volatility on the trade balance in 14 Sub-Saharan African countries from 2006 to 2016. The results show that real exchange rate and exchange rate volatility positively and significantly affect the trade balance. Furthermore, domestic income has a positive and significant effect, and foreign income hurts the trade balance.

Jebran, Iqbal, Rao and Ali (2017) examined the impact of terms of trade on economic growth for Pakistan for the period 1980–2013. The results indicate a short run as well as long run effects of terms of trade on economic growth.

Jebran, Iqbal, Bhat and Rao (2018) studied the effect of terms of trade on China's economic growth using time series data for the period 1980-2013. The results show a significant and adverse effect of terms of trade on economic growth both in the short and long run. Furthermore, positive short-run and long-run effects of labour and capital are found on economic growth. The notable finding is that terms of trade deterioration are essential for enhancing the economic growth of China.

2. OBJECTIVES:

- a. To examine whether there exist any cointegrating relationship between Economic Growth, Net Barter Terms of Trade, Labour Force and Gross Capital Stock.
- b. Also, to analyse the impact of terms of trade on economic growth of India both in the short and long run.

3. SIGNIFICANCE OF THE STUDY:

In the era of globalisation, no economy can remain cut off from the rest of the world. Over the years, there have been changes in India's trade composition. Manufacturing products dominated primary products dominated earlier India's export and import. However, since the 1980s, India's export basket has diversified with various high-value new items.

India's foreign trade policy changes have given a new and diversified dimension to India's trade composition. The consequences of these changes are relevant for India as trade is considered an important engine and contributor to the growth and development of a country. Terms of trade are crucial in knowing whether a country is benefited from the trade or not. Moreover, a highly productive labour force and a more extensive capital stock are essential for the economic development of a country. The importance of capital formation was highlighted by Prof. Ragnar Nurkse in breaking the vicious circle of poverty in poor, Less Developed Countries. Hence, this study has been undertaken to understand the relationship between Economic growth and terms of trade along with labour force and capital stock.

4. METHODOLOGY:

In this paper, we formulated Economic Growth (EG) as a function of total capital stock (CS), Terms of Trade (ToT) and Total labour force (LF), which can be expressed as:

$$EG_t = f(ToT_t, LF_t, CS_t) \tag{1}$$

Equation (1) is expressed in log-linear form as follows:

$$\ln EG_t = \beta_0 + \beta_1 \ln ToT_t + \beta_2 \ln LF_t + \beta_3 \ln CS_t + \varepsilon_t \tag{2}$$

The expected sign of the β_1 is to be determined. Moreover, the β_2 and β_3 are expected to be positive.

5. DESCRIPTION AND SOURCES OF DATA:

The paper is based on the data collected from secondary sources. The variables under consideration for the analysis are Gross Domestic Product (GDP) at constant 2014 US dollar is used as a proxy of Economic Growth, Total labour force (LF), Gross Capital Formation (GCF) as a percent of GDP is used as a proxy for Total Capital Stock and Net Barter Terms of Trade (NBTT) as a proxy of terms of trade. The time-series data of these variables mentioned above have been collected over 30 years from 1990 to 2019. Data of all variables have been collected from the World Bank Databank.

TABLE 1. DESCRIPTIVE STATISTICS

VARIABLES	Mean	Standard Deviation	Maximum	Minimum	Observations
<i>LGDP</i>	27.76	0.535	28.67	26.95	29
<i>LLF</i>	19.85	0.14	20.05	19.57	29
<i>LNBT</i>	4.58	0.10	4.78	4.40	29
<i>LGCF</i>	3.44	0.17	3.74	3.17	29

NOTES: All data are transformed in natural logarithm form. LGDP represents the natural log of Gross Domestic Product, LLF represents Natural Log of Total Labour Force, LGCF represents natural Log of Gross Capital Formation, and LNBT represents Natural Log of Net Barter Terms of Trade.

In Table 1, the descriptive statistics of the variables under consideration are given. We can see that the mean of the LGDP series is 27.76, with a standard deviation of 0.535. The mean and standard deviation of LLF, LNBT and LGCF series are 19.85 and 0.14, 4.58 and 0.10, 3.44 and 0.17, respectively.

6. ECONOMETRIC MODELS:

This paper analyses the short-run and long-run impact of Terms of trade on the economic growth of India. Before proceeding to the cointegration, we check the stationarity of the variables using the Augmented Dickey-Fuller unit root test. In the following table, we have presented the result of ADF. For estimation, the optimal lag length is selected automatically using the Schwarz Information criteria and all the variables are transformed into natural logarithm form.

Variables	Level [I(0)]		First Difference [I(1)]		Second Difference [I(2)]	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend
<i>LGDP</i>	1.98	-3.29	-5.35***	-5.43***	---	---
<i>LNBT</i>	-3.4**	-2.41	---	-4.39***	---	---
<i>LLF</i>	-1.45	-2.11	-1.73	-1.95	-4.87***	-4.77***
<i>LGCF</i>	-1.25	-1.35	-6.09***	-6.28***	---	---

NOTES: *** denotes statistically significant at 1% level, ** denotes statistically significant at 5% level.

Source: Author's Calculation.

In Table 2, it is seen that the variables *LGDP*, *LNBT* and *LGCF* are stationary at a 1% level of significance in the first difference while because the equation includes intercept and both intercept and a linear trend (except *LNBT*), that is *I(1)*. However, the variable *LNBT* is stationary at a 5% significance level, considering that the equation includes only intercept. However, on the other hand, the variable *LLF* is stationary at the second difference *I(2)* while because the equation includes intercept and both intercept and a linear trend. So, we can conclude from the unit root test that this model is a mixture of *I(0)*, *I(1)* and *I(2)* variables. Hence, it will be appropriate to use the ARDL bound test approach to check the cointegration and Error correction approach to check the short-run impact of the variables on the dependent variable. Further to check the magnitude by which the Terms of trade impacted the economic growth, we use the DOLS approach.

7. RESULTS AND DISCUSSIONS:

7.1. RESULT OF COINTEGRATION:

Cointegration shows that if there exists any long-run relationship between the variables. The long-run equilibrium is said to exist if the variables under consideration move together. Since the variables under consideration are not integrated of the same order thus, here, we use the ARDL bound testing approach to check the cointegration. The null hypothesis is that there is no cointegration among the variables.

F-Statistic	Level of significance	Critical values of bounds	
		I (0)	I (1)
109.84	1%	3.65	4.66
H ₀ : No level relationship.			
Source: Author's Calculation.			

In Table 3, it is found that *F – statistic* is 109.84 and greater than the upper bound which signifies that there exists a long-run association among the variables.

7.2. COINTEGRATION VECTOR ESTIMATION:

After testing and establishing the cointegration among the variables, the long-run cointegration vector can be tested by the Dynamic Ordinary Least Square (DOLS) method. It is less biased than FMOLS estimators in small samples.

We used the DOLS method to estimate the long-run cointegrating vector between Net-Barter Terms of Trade and Economic growth. For estimation, the following model (Equation 3) is used:

$$y_t = \alpha + x_t\beta + \sum_{j=-q_1}^{q_2} c_j\Delta x_{t+j} + u_t \quad (3)$$

Where t denotes the period, q_1 shows maximum lag length, q_2 shows the maximum lead length, x_t is the vector of all independent variables, and u_t denotes the error term. In order to know the magnitude by which NBTT is affecting the GDP, we are estimating model (3), taking fixed lag and lead (1, 0).

TABLE 4. DYNAMIC OLS RESULT			
Variable	DOLS (1, 0)		
	Coefficient	Standard Error	t statistics
<i>LNBTT</i>	6.073	0.065	93.8***
Dependent Variable: LGDP			
NOTES: *** denotes statistically significant at 1% level.			
Source: Author's Calculation.			

Looking at the result in Table 4, we find that the NBTT significantly impacts the GDP. We can see that the slope coefficient is 6.073, meaning that a 1% change in NBTT will increase the GDP by 6.073%.

7.3. ERROR CORRECTION AND SHORT-RUN EQUATION RESULT:

After testing cointegration and estimating the long-run cointegrating vector, in this section, we use ARDL (1, 0, 0, 0) model to estimate the short-run impact of the variables NBTT, Labour Force and Gross capital formation on the GDP. The following model (Equation 4)) is used to estimate the short-run coefficients:

$$\ln GDP_t = \alpha_i + \beta_{1i} \sum_{i=0}^p \Delta \ln GDP_{t-i} + \beta_{2i} \sum_{i=0}^{q_1} \Delta \ln NBTT_{t-i} + \beta_{3i} \sum_{i=0}^{q_2} \Delta \ln GCF_{t-i} + \beta_{4i} \sum_{i=0}^{q_3} \Delta \ln LF_{t-i} + u_t(4)$$

Moreover, it presented the short-run error correction mechanism to estimate the speed of adjustment.

TABLE 5. SHORT-RUN EQUATION RESULT			
Variables	ARDL (1,0,0,0)		
	Coefficient	Standard Error(SE)	t – statistics
<i>LGDP(-1)</i>	-0.047471	0.024161	-1.964782*
<i>LNBTT</i>	0.123029	0.036813	3.341977***
<i>LGCF</i>	0.056332	0.028277	1.992162*
<i>LLF</i>	0.219184	0.101567	2.158030**
α	-3.733251	1.393721	-2.678621
<i>ECT(-1)</i>	-0.047471	0.001870	-25.39106***
Dependent Variable: LGDP			
NOTES: *** significant at 1% level. ** significant at 5% level. * significant at 10% level.			
Source: Author's Calculation.			

The error correction term is -0.047, which signifies that the previous year deviation from long-run equilibrium is corrected at a speed of 4.7%. Also, this result signifies that the Net barter terms of trade (NBTT), Gross Capital Formation (GCF) and Labour Force (LF) has a significant and positive impact on the Gross Domestic Product (GDP).

7.4. VARIANCE DECOMPOSITION:

Variance decomposition enables us to determine how much of the variability of the dependent variable is explained by the variance of lagged dependent variable and how much is explained by the independent variable.

TABLE 6. VARIANCE DECOMPOSITION OF GDP			
Period	Standard Error	Δ LGDP	Δ LNBTT
1	0.015669	100.0000	0.000000
2	0.016775	87.28900	12.71100
3	0.017132	84.10127	15.89873
4	0.017206	83.71558	16.28442
5	0.017261	83.21342	16.78658
6	0.017266	83.21953	16.78047
7	0.017272	83.15877	16.84123
8	0.017272	83.15735	16.84265
9	0.017273	83.15252	16.84748
10	0.017273	83.15148	16.84852
NOTE: Δ represents the first difference of the variables.			
Source: Own calculation.			

The above table (Table 6) shows the variance decomposition analysis of the variable GDP taking Net barter terms of trade as an independent variable representing the 10-years forecast variance of GDP. Here, we can see that its innovation explains more than 83% of the innovation of the GDP in the tenth period. The contribution of Net barter terms of trade is about 16.85% ($\approx 17\%$) over the period.

8. CONCLUSION AND POLICY IMPLICATIONS:

In this paper, we have seen cointegration among the variables GDP, Terms of trade, total labour force and gross capital formation. Further analysis of the impact of net barter terms of trade (NBTT) on GDP shows that GDP is affected by the NBTT. Also in the short-run, a 1% increase in net barter terms of trade increases the GDP by 12%. This result is consistent with Harberger–Laursen–Metzler (HLM) effect, which states that an improvement in the trade leads to the improvement in balance of payments of a country and, in turn, affects income and employment.

REFERENCES:

- [01] Wong, H. T. (2009). Terms of trade and economic growth in Japan and Korea: an empirical analysis. *Empirical Economics*, 38(1), 139–158. DOI: 10.1007/s00181-009-0259-9
- [02] Jawaid, S. T., & Waheed, A. (2011). Effects of Terms of Trade and its Volatility on Economic Growth: A Cross Country Empirical Investigation. *Transition Studies Review*, 18(2), 217–229. DOI: 10.1007/s11300-011-0201-7
- [03] Ekinci, R., Tüzün, O., & Kahyaoğlu, H. (2015). The Relationship of Terms of Trade and Economic Growth: The Turkish Case. *Optimum Ekonomi Ve Yönetim Bilimleri Dergisi*, 2(2), 83-100. DOI: 10.17541/oeymbd.53001
- [04] Akani, O. P., & Temitope, D. J. (2017). Real Exchange Rate, Exchange Rate Volatility and Trade Balance in Sub-Saharan African Countries: A Generalised Moment (GMM) Approach. *International Journal of Scientific Research and Management*, 5(11), 7395–7403. DOI: 10.18535/ijstrm/v5i11.08
- [05] Jebran, K., Iqbal, A., Rao, Z. U. R., & Ali, A. (2017). Effects of Terms of Trade on Economic Growth of Pakistan. *Foreign Trade Review*, 53(1), 1–11. DOI: 10.1177/0015732516663315
- [06] Jebran, K., Iqbal, A., Bhat, K.-U., & Ali, A. (2018). Effect of Terms of Trade on Economic Growth of China. *Emerging Economy Studies*, 4(2), 157–168. DOI: 10.1177/2394901518795068
- [07] Sekkat, K. and Varoudakis A. (1998). Exchange-Rate Management and Manufactured Exports in Sub-Saharan Africa. OECD Development Centre Technical Papers No 134.
- [08] Hayakawa, K. and Fukunar, K. (2009). The effect of exchange rate volatility on international trade in East Asia. *Journal of the Japanese and International Economies*, 23(4), 395-406.
- [09] Bhagwati, J. N., & Brecher, R. A. (1980). National welfare in an open economy in the presence of foreign-owned factors of production. *Journal of International Economics*, 10(1), 103–115.
- [10] Kaneko, A. (2000). Terms of trade, economic growth, and trade patterns: a small open economy case. *Journal of International Economics*, 52(1), 169–181. Pooja Nagpal., (2022). Organizational Commitment as an Outcome of Employee Engagement: A Social Exchange Perceptive using a SEM Model. *International Journal of Biology Pharmacy and Allied Science*. January, Special Issue, 2022, 11(1): 72-86. <https://doi.org/10.31032/IJBPAS/2022/11.1.1008>.
- [11] Pooja Nagpal., Kiran Kumar., A.C. & Ravindra., H. V. (2020). Does Training and Development Impacts – Employee Engagement? *Test Engineering and Management*, the Mattingley Publishing Co., Inc., 83. 19407 – 19411. ISSN: 0193-4120.
- [12] Pooja Nagpal., Kiran Kumar., A. C. & Ravindra., H. V. (2020). Perceived Organizational Support and Employee Engagement. *Test Engineering and Management*, 83, the Mattingley Publishing Co., Inc., 900-904. ISSN: 0193-4120.
- [13] Pooja Nagpal., Namitha Rajput, et al., (2021), An inclusive systematic investigation of human resource management practice in harnessing human capital. *Materials Today: Proceedings*, 2021, ISSN 2214-7853, <https://doi.org/10.1016/j.matpr.2021.07.362>.
- [14] Pooja Nagpal., Kiran Kumar., A.C. & Ravindra., H.V. (2020). Employee Engagement - Impact of Demographic Variables in Indian IT Sector. *Purakala* 31 (32), 136-142. ISSN: 0971-2143.