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Foreign Debt, Trade Openness, Labor Force and Economic Growth: Evidence from Sri Lanka

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Abstract

This study examines the role of foreign debt, trade openness and labor force in the economic growth of Sri Lanka, by employing the Johansen maximum likelihood approach of cointegration. It analyzes the data for the period, 1950-2006. The study finds that there is a cointegration relationship between economic growth and foreign debt, trade openness and labor force. Further the results suggest that in the long run, labor force, trade openness and foreign debt have a positive impact on economic growth of Sri Lanka.

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This study examines the role of foreign debt, trade openness and labor force in the economic growth of Sri Lanka, by employing the Johansen maximum likelihood approach of cointegration. It analyzes the data for the period, 1950-2006. The study finds that there is a cointegration relationship between economic growth and foreign debt, trade openness and labor force. Further the results suggest that in the long run, labor force, trade openness and foreign debt have a positive impact on economic growth of Sri Lanka.

Introduction

The factors affecting economic growth in developing countries have been a topic of continuing debate over the last few decades. These factors include foreign debt, labor force and trade openness. It is argued that foreign debt works in form of capital, labor force contributes to the national output, and trade openness contributes to the improvement of overall economic growth. In early 1960s and 1970s, economists have argued that foreign capital and its proper utilization is one of the factors that contribute to economic growth in developing countries. Geiger (1990), Chowdhury (1994), Karagol (1999), Were (2001), Kalima (2002), Pattillo *et al.* (2004), and Schclarek (2004) studied the role of foreign debt in economic growth in different countries. Ram (1985), Summers (1997), Rodríguez and Rodrik (2000), Afonso (2001), Hamori and Razafimahefa (2003), and Strydom (2003) studied the relationship between trade openness and economic growth. Pissarides (2000), Krichel and Levine (2002), Stadler (2003), and Mortensen (2004) explored the role of labor force in economic growth. The findings of these studies show varying results and it has been concluded that the effectiveness of labor force on economic growth differs from country-to-country. The main objective of this paper is to investigate the role of these three variables—foreign debt, trade openness and labor force—in the economic growth of Sri Lanka, by using the time series data for the period, 1950-2006. Sri Lanka is an interesting case study because of two reasons. First, Sri Lanka followed different economic policies, the economy was closed until 1978 and was liberalized thereafter, and second, despite the changes in government and internal conflict, the liberal economic policies have been continuously applied for the past 30 years. The contribution of this paper is different from the previous studies in two ways.

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Firstly, it uses a longer time series data, and secondly, it aims at investigating the joint role of foreign debt, trade openness and labor force in economic growth when most of the other papers have investigated the individual role of these variables in economic growth. Next, the paper provides a brief summary of theoretical considerations on role of foreign debt, trade openness, and labor force in economic growth. This is followed by the explanation of the methodology of the paper and the data used for estimation. Next, the paper discusses the empirical results and finally concludes.

Theoretical Considerations

As mentioned earlier most of the previous studies have analyzed the individual role of the variables—foreign debt, trade openness and labor force—in economic growth. Foreign debt in developing countries can be used to acquire technology and other factors of production to increase employment opportunities and national productivity. Labor force is another key determinant of economic growth being a major factor of production. Trade openness indicates the degree of trade liberalization which motivates the two-way flow of goods and technology in the economy.

In the 1990s, a number of studies investigated the phenomenon of high external indebtedness of developing countries to find out whether it had negatively affected the performance of those countries. Geiger (1990) argues that there is a statistically significant inverse relationship between debt burden and economic growth for the Latin American countries. Chowdhury (1994) investigated the varying effects of external debt on economic growth of seven selected countries—Bangladesh, Indonesia, Malaysia, Philippines, South Korea, Sri Lanka and Thailand—using the panel data for the period, 1970-1988. He concluded that the external debt of developing countries is not a primary cause of economic slowdown. Karagol (1999) studied the relationship between economic growth, external debt service and capital inflow in Turkey and suggested that the direct effect of external debt on the economic growth is negative, but the favorable indirect effects outweigh the direct effects. Were (2001) analyzed the magnitude and structure of Kenya's external debt examining its impact on economic growth and private investment and concluded that external debt has a negative impact on economic growth of Kenya. Kalima (2002) explored that debt burden has an adverse impact on the economic development process of most of the African countries. Pattillo et al. (2004) analyzed the different channels through which the debt affects economic growth, using a large panel of 61 developing countries for a period of 30 years and concluded that, the impact on growth differs as the level of debt varies. Schclarek (2004) investigated both linear and nonlinear relationships between debt and economic growth of developing as well as industrial countries. He concluded that there is a significant negative relationship between external debt and economic growth in the developing countries, but there is no such relationship in the case of industrial countries.

Several studies have analyzed the role of foreign trade in economic growth. Ram (1985) argued that the exports can motivate higher level of output employing labor and capital and that exports may lead to a more efficient allocation of resources in terms of comparative advantage and production efficiency so that economic growth can occur. Summers (1997) analyzed the relationship between external trade and growth in Australia and Canada, concluding that imports

and exports play different roles in economic growth of Canada and Australia. Import plays a significant role in Canada but no evidence was found to support the export-led growth in Australia. Rodríguez and Rodrik (2000) concluded that open trade policies in the sense of lower tariff and non-tariff barriers to trade are significantly associated with economic growth. Afonso (2001) suggested that trade openness tends to be beneficial to growth, as it facilitates exchange of technology and enhances the flow of goods and services. Strydom (2003) concluded that the impact of international trade on economic growth has always not been encouraging in South Africa. Hamori and Razafimahefa (2003) applied a time series analysis to four African countries and emphasized that the size of the economy and the importance of trade relative to the GDP significantly determine the effects of trade on growth.

Some studies have examined the contribution of the labor force to economic growth. Pissarides (2000) concluded that human capital plays a key role in economic growth and the more skilled labor force in a nation, the more is the prosperity. Krichel and Levine (2002) explored that labor mobility in an open market has a positive effect on growth. Stadler (2003) emphasized on the quality of labor force rather than quantity for economic growth. He emphasized on subsidizing education and qualification of the labor force, and argues that it is the increase in qualification and not increase in quantity of the labor force that plays the decisive role in growth. Mortensen (2004) emphasized the role of labor saying that the reforms improve labor performance and help to reduce unemployment on one hand and it encourages investment in research and development required for long-term growth, on the other. Auboin (2004) concluded that the relationship between trade, debt and finance is important for economic growth with reference to Mexico, Asia, and some countries in South America. Paudel and Shrestha (2006) concluded that trade openness has a significant positive association, labor force has a significant negative association and external debt has no such significant association with economic growth in Nepal.

General Model and Methodology

Foreign debt, trade openness and labor force play a vital role in accelerating the overall economic growth of a nation. In this study, real gross domestic product (GDPR) is employed as the proxy of economic growth and as the dependent variable in the model. The independent variables are foreign debt (FD), labor force (LF) and real total trade, i.e., trade openness (RTT). Among the independent variables, total trade is the sum of total exports and imports. To examine the impact of these three variables on the economic growth, the following relationship is tested:

$$LGDPR_t = \alpha + \beta LFD_t + \delta LRTT_t + \phi LLF_t + e_t \qquad \ldots(1)$$

where,

$GDPR$ = Real Gross Domestic Product (a proxy for the economic growth)

FD = Foreign Debt

RTT = Real Total Trade (Export + Import)

LF = Labor Force

L represents the natural logarithm of the variable

Foreign debt, total trade (trade openness) and labor force are expected to have a positive impact on economic growth, therefore, the coefficients β, δ and ϕ are expected to be positive, i.e., $\beta \succ 0$, $\delta \succ 0$, and $\phi \succ 0$. The theory suggests that properly used foreign debt acts as a lubricant in the economy creating more employment opportunities and increasing the national output that can be used for domestic use as well as for export. In a similar way, labor force contributes to the economy as each and every nation and firm need the work force to run its production activities. Employed labor force and properly used foreign debt jointly contribute to increase the national output. Trade openness explores the opportunities for the domestic resources to make their way into the international market, on one hand and on the other, people can import the consumable products to upgrade their living standard, while the firms and industries can import technology and capital products. The coefficients of all these three variables are expected to be positive, because as these three exogenous variables increase simultaneously, the economy of the country grows rapidly and that ultimately helps to enhance the standard of living of the people and the overall development. However, one thing should be noted here, that if the volume of imports is excessively higher compared to the volume of exports, then total trade may have a negative impact on the economy. If imports include a greater volume of consumer goods and services instead of capital goods and technologies, it may not be favorable for economic growth although it represents openness of the economy.

We use annual data for the period, 1950-2006. Data were obtained from various issues of annual reports of Central Bank of Sri Lanka. GDP has been measured at constant price (1996 = 100) in million rupees, foreign debt is measured in million dollars, and the data for real total trade have been obtained in million rupees by combining import and export trade, which have been converted into real value by dividing by import and export price indices (1990 = 100), and labor force is measured in thousand.

Model Estimation and Testing Hypothesis

To establish cointegration among economic growth and foreign debt, trade openness and labor force variables we have to check, at a preliminary stage, whether each series is integrated and has a unit root or not, by using the Dickey Fuller (DF), Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. Different tests are performed assuming the 'presence of a unit root' (non-stationary variable) in the null hypothesis (H_0), and a stationary variable in the alternative hypothesis (H_a). If the calculated statistic is higher than the McKinnon's critical value (DF, ADF and PP test) and asymptotic critical value (KPSS test), then we do not reject H_0 and the concerned variable is non-stationary, if not, it is stationary. First, tests at levels and then at first differences were carried out. Each series starts with the most flexible specification of test equation that includes an intercept and a trend:

$$\Delta Z_t = \alpha_1 + \alpha_2 t + \gamma Z_{t-1} + \sum_{j=1}^{k} \beta_j \Delta Z_{t-j} + \varepsilon_t$$

where Δ is the first difference operator, Z is the variable of interest, α_1 represents the intercept term, t is the time trend, ΔZ_j are the augmented terms, k is the appropriate lag length of the

augmented terms and ε_t is the white noise error term. The ADF test is essentially the test for checking the significance of the coefficient γ in the above equation. The DF test is performed without the augmented term. In order to select the lag length k, we start with a maximum lag of six and bring it down to the appropriate lag by examining the Akaike Information Criterion (AIC) and Schwarz Criterion (SC) for DF, ADF and PP test and the same lag length is taken for the KPSS test.

Table 1: Tests of the Order of Integration of Variables				
Variable	Tests with a Constant			
Level	DF	ADF	PP	KPSS
LLF	−1.11	−1.33	−0.94	0.91
LFD	−0.48	−0.49	−0.27	0.91
LRTT	0.77	0.99	0.96	0.65
LGDPR	1.71	1.49	1.73	0.92
Critical Value	−2.92	−2.92	−2.92	0.46

Table 2: Tests of the Order of Integration of Variables				
Variable	Tests with a Constant and a Trend			
Level	DF	ADF	PP	KPSS
LLF	−1.59	−2.47	−1.98	0.18
LFD	−1.03	−1.40	−1.50	0.13
LRTT	−0.72	−0.51	−0.60	0.22
LGDPR	−2.39	−2.51	1.66	0.21
Critical Value	−3.50	−3.50	−3.50	0.15

Table 3: Tests of the Order of Integration of Variables				
Variable	Tests with a Constant			
Difference	DF	ADF	PP	KPSS
LLF	−3.83	−5.24	−3.72	0.10
LFD	−5.73	−3.97	−6.45	0.18
LRTT	−7.57	4.34	−7.91	0.40
LGDPR	−5.85	−3.71	−6.12	0.29
Critical Value	−2.92	−2.92	−2.92	0.46

Table 4: Tests of the Order of Integration of Variables				
Variable	Tests with a Constant and a Trend			
Difference	DF	ADF	PP	KPSS
LLF	−3.83	−5.27	3.76	0.05
LFD	−5.69	−3.94	−6.40	−
LRTT	−8.11	−4.82	−8.27	0.09
LGDPR	−6.26	4.11	−6.54	0.04
Critical Value	−3.50	−3.50	−3.50	0.15

Unit root tests have been conducted for all time series to know their nature and conform whether they are stationary or non-stationary, by applying the DF, ADF, PP and KPSS test methods. The results of the order of integration of each variable are summarized in Tables 1, 2, 3 and 4. Table 1 shows that all the variables are non-stationary at the level. Table 2 suggests that all variables are non-stationary except for LFD in KPSS test with a constant and a trend. Table 3 presents the summary of the test results of differences with a constant and all the tested variables are stationary, and the same result is explored in Table 4 with a constant and a trend. Therefore, it is concluded that all the variables are I(1) at 5% level of significance.

Once the tests of integration (that is unit root tests) are performed, it is possible to implement the cointegration test to check the existence of a stable long-run relationship between economic growth and foreign debt, trade openness and labor force. The cointegration test between economic growth and foreign debt, trade openness, and labor force is based on Vector Autoregression (VAR) approach initiated by Johansen (1988).

According to Johansen (1988), a p-dimensional VAR of order k can be specified as follows:

$$Z_t = \alpha + \Pi_1 Z_{t-1} + \Pi_2 Z_{t-2} + \ldots\ldots\ldots\ldots + \Pi_k Z_{t-k} + \varepsilon_t$$

This expression can be rewritten as:

$$\Delta Z_t = \alpha + \Pi_k Z_{t-k} + \sum_{i=1}^{k-1} \theta_i \Delta Z_{t-i} + \varepsilon_t$$

Here Π and θ are $p \times p$ matrices of unknown parameters and ε is the white noise term.

Johansen and Juselius (1990) developed two likelihood ratio tests—the maximum eigenvalue test, which evaluates the null hypothesis of r cointegrating vectors against the alternative of $(r+1)$ cointegrating vectors and the trace test, which evaluates the null hypothesis of, at most, r cointegrating vectors versus the general null of p cointegrating vectors. In the case of a bivariate VAR, the null hypothesis is that there is 'no cointegration' between the variables and the alternative one states the existence of only one cointegrating vector.

Table 5: Cointegration Test Using Johansen Procedure				
Variables		Max. Eigenvalue Test	Trace Test	Result
LGDPR, LFD, LRTT and LLF	$r=0$	29.42 (27.42)	49.45 (48.88)	Cointegrated
	$r=1$	11.23 (21.12)	20.02 (31.54)	
	$r=2$	5.85 (14.88)	8.79 (17.86)	
	$r=3$	2.94 (8.07)	2.94 (8.07)	

Table 5 presents the cointegration results for foreign debt, trade openness, labor force, and economic growth. Maximum eigenvalue and trace statistics show that there is one cointegrating vector among the variables and suggest that there exists a cointegration relationship between economic growth and foreign debt, trade openness and labor force. The cointegration relation is given by:

$$LGDPR = 0.07LFD + 0.29LRTT + 1.32LLF$$

The results prove that all these variables have a positive relationship with economic growth in the long run. The elasticity of foreign debt is 0.07, which points out that foreign loans and grant are not a very effective way of enhancing economic growth in Sri Lanka. Trade openness has a significant contribution in economic growth, which is shown by its elasticity of 0.29. Among these variables, labor force has the strongest positive relationship with economic growth. Labor force makes a significant contribution to economic growth as shown by its elasticity of 1.32.

Conclusion

The main objective of this paper is to explore the role of foreign debt, trade openness and labor force in economic growth of Sri Lanka. For this purpose, the paper analyzes the time series data for the period, 1950-2006. Using the DF and ADF unit root test procedures, the time series data is identified to be integrated of order one. As all the selected variables are integrated of order one, the Johansen cointegration approach is employed to detect the cointegration relationship among the variables. It is found that there is a cointegration relationship between economic growth and foreign debt, trade openness and labor force. The results show that in the long run, among the variables, labor force is the main contributor to economic growth of Sri Lanka. Trade openness and foreign debt also have a positive relationship with economic growth, however, their long-run coefficients are smaller compared to the long-run coefficient of labor force. ❖

References

1. Afonso Oscar (2001), "The Impact of International Trade on Economic Growth", FEP Working Papers 106, Universidade do Porto, Faculdade de Economia do Porto.

2. Auboin Marc (2004), "The Trade, Debt and Finance Nexus: At the Crossroads of Micro- and Macroeconomics", World Trade Organization, Geneva, Switzerland.

3. Central Bank of Sri Lanka, *Annual Report*, Various Years, http://www.centralbanklanka.org/AR2005data/Chap2.pdf

4. Chowdhury Khorshed (1994), "A Structural Analysis of External Debt and Economic Growth: Some Evidence from Selected Countries in Asia and the Pacific", *Applied Economics*, Vol. 26, pp. 1121-1131.

5. Geiger L T (1990), "Debt and Economic Development in Latin America", *The Journal of Developing Areas*, Vol. 24, pp. 181-194.

6. Hamori Shigeyuki and Razafimahefa Ivohasina F (2003), "Trade and Growth Relationship: Some Evidence from Comoros, Madagascar, Mauritius and Seychelles", http://www.asafas.kyoto-u.ac.jp/asafbook/pdf/no_03/p174_185.pdf

7. Johansen Soren and Juselius Katarina (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, Vol. 52, No. 2, pp. 169-210.

8. Kalima Barbara (2002), "Gender and Debt", African Forum and Network on Debt and Development, June.

9. Karagol Erdal (1999), "External Debt and Economic Growth Relationship", Working Paper, University of Balikesiv.

10. Krichel T and Levine P (2002), "The Economic Impact of Labour Mobility in an Enlarged European Union", University of Surrey.

11. Mortensen Dale T (2004), "Growth, Unemployment, and Labour Market Policy", Northwestern University.

12. Pattillo Catherine, Poirson Helene and Ricci Luca (2004), "What are the Channels Through Which External Debt Affects Growth?", International Monetary Fund.

13. Paudel Ramesh C and Shrestha Min B (2006), "The Role of External Debt, Total Trade and Labour Force in Economic Growth: The Case of Nepal", *The Business Review*, Vol. 5, No. 2, pp. 130-136, Cambridge.

14. Pissarides Christopher (2000), "Labor Markets and Economic Growth in the MENA Region", London School of Economics.

15. Ram R (1985), "Export and Economic Growth: Some Additional Evidence", *Journal of Economic Development and Cultural Change*, Vol. 33, pp. 415-425.

16. Rodríguez Francisco and Rodrik Dani (2000), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence", Mimeo, http://ksghome.harvard.edu/~drodrik/skepti1299.pdf

17. Schclarek Alfredo (2004), "Debt and Economic Growth in Developing and Industrial Countries", Department of Economics, Lund University.

18. Stadler Manfred (2003), "Innovation and Growth: The Role of Labor-Force Qualification", *Wirtschaftswissenschaftliche Fakult¨at der Eberhard Karls Universit¨at T¨ubingen*.

19. Strydom P D F (2003), "International Trade and Economic Growth in South Africa", The Economic Society of South Africa.

20. Summers Peter M (1997), "Trade and Growth in Settler Economies: Australian and Canadian Comparisons", Melbourne Institute Working Papers 9/97.

21. Were Maureen (2001), "The Impact of External Debt on Economic Growth and Private Investment in Kenya", Kenya Institute for Public Policy Research and Analysis.