Dynamic Growth Linkages among Sectoral GDPs:
Evidence from Sri Lanka

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Introduction

Sri Lankan economy has been experiencing structural changes in sectoral composition over the last few decades. The contribution of the agricultural sector to national GDP has been fast declining and service sector has been showing remarkable improvements. The emergence of Sri Lanka from agricultural to service-driven economy during the mid-1990s is an important milestone, changing production linkages across sectors in contributing to economic growth. Amidst the increasing globalization, the interrelationships between economic units appeared to be getting stronger and this has led to improve the sectoral linkages among the major sectors in the economy.

As a result of industrialization resulting in the emergence of the contribution of non-agricultural sectors to national GDP, many economists developed the interest in studying the linkages between the major economic sectors: agriculture, industry and services. 'The concept of sectoral linkage, which evolved from Hirschman's theory of 'unbalanced growth', has been recognized as playing a crucial role and providing substantial contributions towards guiding the appropriate strategies for future economic development' (Saikia 2011).

So far there were no in-depth analyses on sectoral dynamic growth linkages in Sri Lanka. An in-depth understanding of sectoral growth dynamics becomes more important for policy makers. Therefore this study is a contribution to the existing literature. The use of studying these dynamic linkages between sectors is found to be very important in development planning to achieve a balanced sectoral development within the country.

Objectives

The main objective of this paper is to study the dynamic growth linkages among three sectors in Sri Lanka. The objective is achieved by studying the long run relationship and the causal relationship between the three major sectors on the economy for the period of 1960-2011.

Methodology

The graphical analysis (scatter plot, line graph, Confidence Ellipse, Nearest Neighbor fit) is used to identify the basic features of the variables and to identify the relationship between selected variables. ADF test and PP test, ESR and KPSS are used to test the characteristics of the time series variables. Moreover, a co-integration technique and error correction models are employed to study the long run equilibrium and short run behavior. In addition, Granger causality method is used to identify the direction of causal relationship. The variables used in this study are Agriculture, Industry and Services Gross Domestic product (GDP) at current market prices taken from the Central Bank Annual Report 2011.

Results

The confidence ellipse of agriculture and industrial sector shares indicates a high degree of negative association whereas industry and service sector shares show a weak positive association. Agriculture and service sectors also indicate a high degree of negative association.

The LOESS Fit (Nearest Neighbor Fit) graph exhibits that growth rate linkages between agriculture and industry are positive and weak. Industry and services growth rates records a strong positive relationship. Agriculture and Services growth rates also have a weak positive relationship. The above linkages of growth rates between sectors are non-linear.

Inter temporal correlation results show that there exists a high positive correlation(r=0.66) between industrial and service sector growth rates whereas agriculture & industry sectors growth rates (r=0.38) and agriculture and services growth rates (0.28) have a weak but statistically significant correlation.

Engel-Granger (EG) co-integration test results show that there is strong long run equilibrium relationship amongst each other, in a bivariate framework. Short run changes in Industry GDP have a positive impact on short run changes in Agriculture GDP. Agriculture-service growth rates are also having long run equilibrium. Furthermore, industry and service sector growth rates are co-integrated.

The Error Correction Model results of agriculture and industry equation indicate that error correction coefficient is -0.167 and is statistically significant. It shows the speed of the agriculture growth towards the equilibrium state. It indicates that 17 percent of the previous error is corrected in the current year. The short run impact of industrial sector on agriculture is statistically significant. The error correction results for agriculture and

service sectors, the error correction coefficient is -0.164 which is statistically significant. The short run impact of service sector on agriculture is (0.186) also statistically significant.

The Granger Causality test indicates that the industrial growth causes agriculture growth and is statistically significantly (p value=0.0013). Agriculture growth does not granger cause industry growth but, service sector statistically significantly granger cause agricultural growth (p value=0.05). Industrial growth does not granger cause service sector growth. However, it is important to note that although industry growth does not cause service growth rate, industrial output granger cause service output.

Conclusion and Policy recommendations

The high positive correlation between industrial and the services sectors suggests that there exists a strong linkage between the two sectors thus; development in one will positively affect the other. Services sector has emerged as the growth driver of the economy.

Cointegration analysis results indicate that in long term, all sectors growth is highly linked. Growth rate graphical behavior indicates that growth of all three sectors converges. It could be derived that the growth of industrial and services sectors would be able to generate sufficient development in the agricultural sector. In fact, Agriculture-linked industrial sector and agriculture-linked services sector will benefit the growth and the development of agricultural sector. Thus, it is favorable if government policies were service and industry-oriented as development of these two sectors will generate growth in agricultural sector through forward and backward linkages between sectors.

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