

ANALYSIS OF COINTEGRATION RELATIONSHIP BETWEEN THE NEW COLOMBO CONSUMER'S PRICE INDEX (CCPI (N)) AND THE OLD CCPI

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Introduction

Inflation is very important in monetary policy, and it is used to adjust the salaries and wages periodically. To calculate the inflation the percentage change of Consumer's Price Index (CPI) is considered. The CPI is a measure of change in the cost of purchasing a fixed basket of goods and services at a fixed number of outlets over time, and it is calculated using Laspeyres' price index formula in which the prices of different commodities are weighted together with their shares of consumption. In Sri Lanka, Colombo Consumer's Price Index (CCPI) has been used as an official measure of inflation since 1953 considering 1952(=100) as the base year. To calculate CCPI five major baskets of goods were used such as Food, Clothing, Fuel and Light, Rent, Miscellaneous, and the weighing pattern is based on the Colombo Family Budget Survey of 1949-1950. Since the index is very old it could not represent the current consumer price changes effectively. So the new index called New Colombo Consumer's Price Index (CCPI(N)) with base year 2002(=100) is implemented to get good price sensitivity and as a better consumer price indicator. The CCPI (N) is calculated using 10 major groups such as (i) Food and Non-Alcoholic

Beverages, (ii) Clothing and Footwear, (iii) Housing, Water, Electricity Gas and other Fuels, (iv) Furnishing, H/H Equipment and Routine Maintenance of the House, (v) Health (vi) Transport, (vii) Communication, (viii) Recreation and Culture, (ix) Education and (x) Miscellaneous Goods and Services and based on year 2002 weights.

In the literature the Johansen Co integration is applied to test the long-run relationship between two stationary time series, and unit root test is widely used to test the stationarity of the time series. The stationary linear combination is called the co integrating equation. Benbouziane and Benamar (2004) have identified a co integration relationship between money supply and CPI, where money supply is the total amount of money available in an economy at a particular point in time. Since it affects the price level and inflation, changes in money supply have been monitored by public and private-sector analysts.

The aim of this study is to find the relationship between the two price indices using the available data from 2003-2008. A long-run relationship is investigated by applying the Johansen Co integration test, and short-run relationship is investigated by Error-

Correction model. Eviews software is used to analyze the data. Since CCPI is replaced by the new CCPI (N) in Sri Lanka, it is important to investigate whether there is any significant relationship between these two indices.

Methodology

The data for CPI and CCPI (N) were collected from the website of the Department of Census and Statistics and Monthly Bulletin issued by the Central Bank of Sri Lanka. CCPI contains 5 major groups and the new Colombo Consumer's Price Index (CCPI(N)) contains 10 major groups as stated above. First data were transformed by taking the natural log, and then to understand the pattern of data, time series plots of the logarithms of two series were used. The Augment Dickey-Fuller (ADF) test was applied to test the stationarity of the logarithm of the two series. Since the two series were integrated of the same order, the co integration test was applied. Co integration relationships were analyzed using Johansen co integration test and the stationarity of the linear combination. Since the co integration was observed, the Error Correction Model (ECM) was fitted. ECM was used to investigate the short-run relationships between the two series, and to predict Colombo Consumer's Price Indices.

Results and Discussion

The upward trends in the time series plots (Figure 1-Appendix) of the logarithm of the CCPI (LCCPI) and logarithm of the CCPI (N) (LCCPI (N)) indicate that they are not stationary. The critical values of the variables LCCPI (N) and LCCPI are

larger in absolute value than the ADF test value at the 5 % significance level also confirm that the data are non-stationary. Since the series contains trend, "intercept and trend" option was used for the unit root test. The first difference was applied to make data stationary. Then the critical values of the first difference of the variables are less in absolute value than the ADF test value at the 5 % significance level. This indicates the stationarity of the two series, and hence the variables LCCPI(N) and LCCPI are said to be cointegrated of order 1, *i.e.* I(1). Figure 2 (Appendix) presents the overlaid plots of LCCPI(N) and LCCPI after applying the first difference in the same graph, and it also demonstrates the co-integration relationship between the two series To confirm this, Johansen co integration test and the ADF test of residuals were used. Since the Likelihood ratio of the first two Eigen values are greater than the critical values at the 5 % significance level, it can be concluded that there is a long-run relationship between LCCPI(N) and LCCPI.

Using the normalized co integration coefficients the co integration regression can be written as $LCCPI(N) = 0.882661 LCCPI - 2.491890$. This shows that a 1 % increase in LCCPI increases LCCPIN by 0.88 %, and therefore the change of increase in LCCPIN is less with compared to LCCPI. Then the error correction model (ECM),

$$D(LCCPIN) = -0.0369*(LCCPIN(-1) - 0.8827*LCCPI(-1) + 2.4919) + 0.1167*D(LCCPIN(-1)) + 0.2207 *D(LCCPIN(-2)) + 0.4201*D(LCCPIN(-3)) +$$

$0.1118 * D(LCCPI(-1)) - 0.1299 * D(LCCPI(-2)) - 0.1185 * D(LCCPI(-3)) + 0.0046$,
 is fitted to determine the short-run relationship between LCCPI(N) and LCCPI, where D(.) represents the change in the respective variable. This model suggests that about 4 % of disequilibrium “corrected” each month by changes in LCCPI (N), and about 41% of disequilibrium “corrected” each month by changes in LCCPI. Now by using ECM, predicted CCPI (N) values were obtained, and plotted (Figure 3-Appendix) to compare them with actual values. It shows that there are some slight deviations from actual values during September 2004 to June 2009, and again September 2008 afterwards. One of the reasons for these deviations may be the change of increase in LCCPIN is less with compared to LCCPI.

Appendix

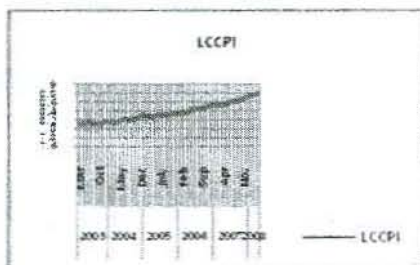


Figure 1. The plot of LCCPI (N) and LCCPI Vs Time

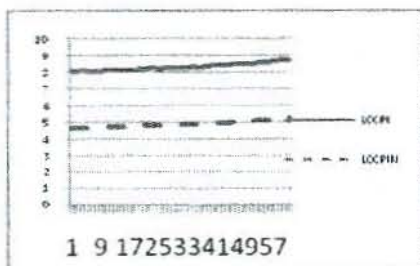
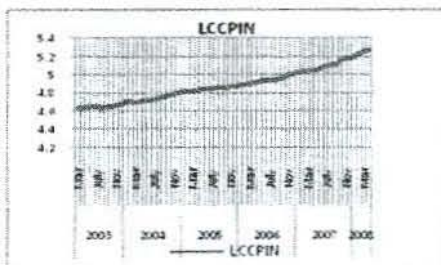


Figure 2. Plots of LCCPI(N) and LCCPI

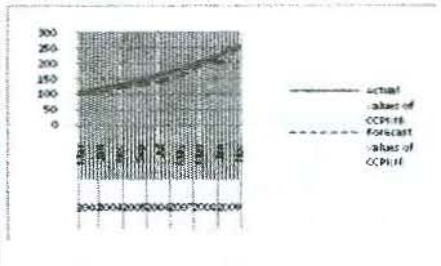


Figure 3. Actual and Forecast values of CCPI(N)

Conclusion

The co-integration analysis with monthly data over the period from March 2003 to April 2008 shows that there is a 1 (1) co integration relationship between CCPI (N) and CCPI. However the change of increase in LCCPI(N) is less with compared to LCCPI. This also indicates from the predicted values obtained by the error correction model.

References

Benbouziane, M. and Benamar, A. (2004). The relationship between Money and Prices in the Maghreb countries: A Cointegration Analysis. The 11th Annual Conference of the Economic Research Forum (ERF).
 Department of Census and Statistics web. <http://www.statistics.gov.lk>.