# AGE STRUCTURAL TRANSITIONS AND INFLATION DYNAMICS IN SELECTED SOUTH ASIAN COUNTRIES

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(178102T)

Degree of Master of Science

Department of Mathematics

University of Moratuwa

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Dissertation submitted in partial fulfillment of the requirement for the degree Master of Science in Financial Mathematics

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# DECLARATION OF THE CANDIDATE & SUPERVISOR

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The above candidate has carried out research for the Masters Dissertation under my supervision.

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Finally I would like to express my sincere gratitude to my mother and my friend giving me support to fulfill this dissertation.

# ABSTRACT

The aim of this study is to find out whether there is significant effect from age structural transitions on inflation dynamics in some selected South Asian countries such as Sri Lanka, India and Bangladesh. It has been shown that the age structural transitions can disrupt macroeconomic equilibriums of countries, if unattended. Sri Lanka is facing a decreasing youth dependency ratio growth and increasing elderly dependency ratio growth phase as a result of age structural transitions. This poses serious concerns in terms of obvious factors such as health budget and social security payments to elders in future. In this thesis, I endeavor to study whether age structural transition has an implication on an important macroeconomic indicator which is inflation. A structural VAR model has been constructed to answer this issue. Elderly dependency ratio growth, youth dependency ratio growth, real interest rate and output gap growth are the selected variables from 2003 to 2018 for these models. Cholesky decomposition and structural decomposition used to check the robustness of the models. The empirical results showed that the growth of youth dependency ratio is inflationary for Sri Lanka. But for India and Bangladesh growth of youth dependency ratio does not have any significant effect on inflation. Growth of elderly dependency ratio does not have any significant effect on inflation for Sri Lanka, India and Bangladesh. But the magnitude of the impact from elderly and youth dependency ratio growth on inflation is around 5% over the period of 10 months as the variance decomposition reveals for Sri Lanka and for India and Bangladesh it is around 2%.

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| | |
|---|---|
| ADF | - Augmented Dickey Fuller |
| AR | - Autoregression |
| CPI | - Consumer Price Index |
| DEP1 | - Youth Dependency ratio |
| DEP2 | - Elderly Dependency Ratio |
| GDP | - Gross Domestic Product |
| GMM | - Generalized Method of Moments |
| IS | - Investment and Saving Equilibrium |
| KPSS | - Kwiatkowski Phillip Schmidt Shin |
| LCH | - Life Cycle Hypothesis |
| MA | - Moving Average |
| OECD | - Organization for Economic Co-operation and Development |
| OLS | - Ordinary Least Square |
| RR | - Real Interest Rate |
| SVAR | - Structural Vector Auto Regression |
| VAR | - Vector Auto Regression |
| VMA | - Vector Moving Average |
| WPI | - Wholesale Price Index |
| YGAP | - Output Gap |

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# CHAPTER 01

# INTRODUCTION

## 1.1 Introduction

Sri Lanka is a lower middle income country and the GDP per capita estimated to be USD 3,853 as at 2019 (World Bank, 2020). Even economy of Sri Lanka is growing at 5.3% average during the period 2010-2019, economic growth can be affected by shocks catastrophically. Other than the major reasons affect for the economy, such as political situations, policy changes and terrorist attacks; this study focused on the effect of demographic changes on economy.

### 1.1.1 Demographic Variables

Demographic variables are type of variables that describes the nature and the distribution of the sample drawn from a population used to analyze the data. Age, gender, educational level, ethnicity and income level are several examples for demographic variables (Scalestatistics, 2020). Age as a demographic variable is a key factor which has huge impact on economic growth (National Bureau of Economic Research, 2020). According to the United Nations Population Funds, aging population is increasing in Asia-Pacific region rapidly (United Nations Population Funds, 2020). Therefore this study focused on finding the relationship between inflation dynamics and population growth of elderly population and youth population.

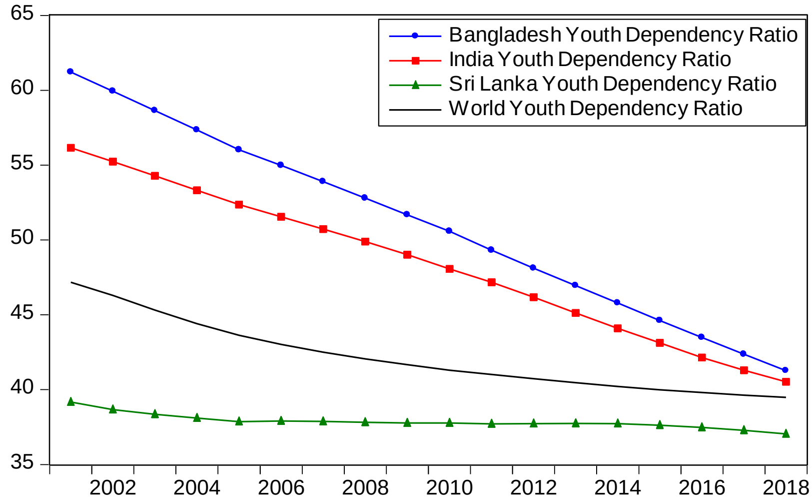


Figure 1.1: Youth population growth

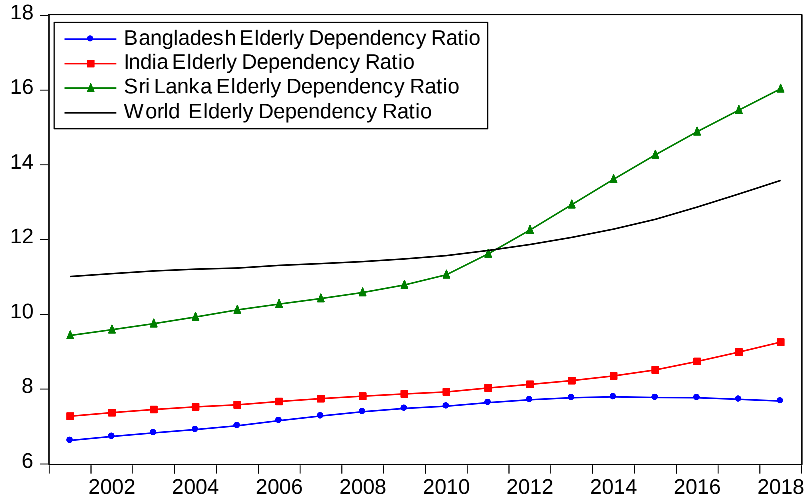


Figure 1.2: Elderly population growth

### 1.1.2 Inflation

Inflation is a key economic indicator which used to measure the change in average price level of selected goods and services over a selected period of time. Usually inflation rate denoted as a percentage. This value indicates the purchasing power of a country; a high inflation rate indicates a less buying power. There are three main factors affecting to the inflation, which are Demand-Pull inflation, Cost-Push inflation and Built-In inflation.

Demand-Pull inflation occurs when there is a rapid growth in demand for goods and services with compared to growth of supply of goods and services. Consequently this creates a gap between demand and supply, which leads to a growth of inflation. Cost-Push inflation occurs when the price of production input increases. As a result of this price of the products increases and which leads to a growth of inflation. Built-In inflation occurs when labors demand more wages as the price of goods and services increases. This leads to Cost-Push inflation and follows a circular flow.

Deflation is the opposite of inflation, which is the price level of good and services decrease over time. Disinflation indicates the decrease in the rate of inflation temporarily. Inflation rate calculated by the ratio of current CPI and base CPI. (Investopedia, 2019)

$$Inflation = \left[\frac{CPI_{Current}}{CPI_{Base}} - 1\right] * 100\%$$

### 1.1.3 Consumer Price Index

Usually Consumer Price Index (CPI) & Wholesale Price Index (WPI) are the indexes used to calculate the inflation. Consumer Price Index (CPI) measured by the weighted average of the prices of selected goods and services. The selected goods and services consist of 10 major components, which are;

1. Food and non-alcoholic beverages
2. Clothing and footwear
3. Housing, Water, electricity and fuel
4. Furnishing, Household equipment & Routine Household maintenance
5. Health
6. Transport
7. Communication
8. Recreation and culture
9. Education
10. Miscellaneous goods and services (Department of Census & Statistics, 2019)

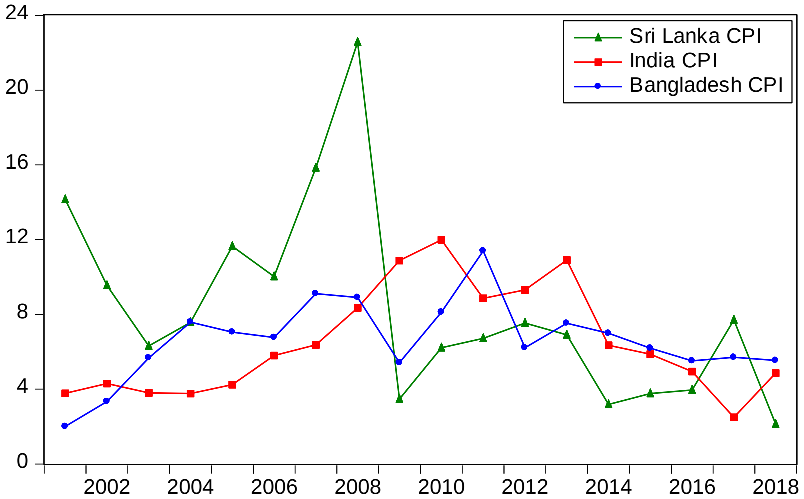


Figure 1.3: Consumer Price Indexes

### 1.1.4 Gross Domestic Product

Gross domestic product (GDP) is the total value of the goods and services of a country in a specific period of a time. Usually GDP measured in annually, quarterly and monthly. GDP value indicates the economy of the country. There are several GDP measurements namely Nominal GDP, Real GDP, GDP growth and GDP per capita. Nominal GDP indicates the raw value of GDP and after adjusting it with inflation it becomes real GDP. GDP growth can be measured by the increase of the GDP relative to the previous GDP. GDP per capita can be measured by dividing the GDP by the total population. Therefore GDP per capita can be used to compare the GDP between countries.

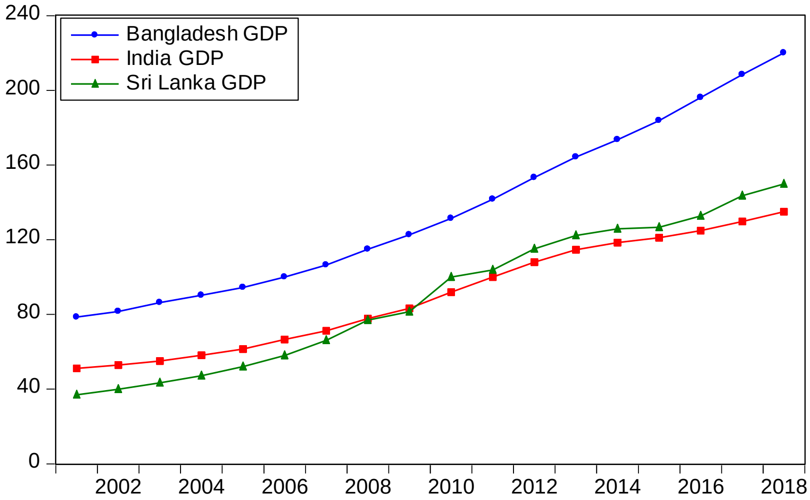


Figure 1.4: GDP Growth

### 1.1.5 Real Interest Rate

Real Interest rate is created by deducting inflation rate from nominal interest rate (declared interest rate). Real interest rate reflect the interest without any effect from inflation (Investopedia, 2019). Real interest rate is a key economic factor for this study because it indicates the economic growth as the increase of real GDP causes an increase in average real interest rate.

$$Real\ Interest\ Rate = Nominal\ Interest\ Rate - Inflation$$

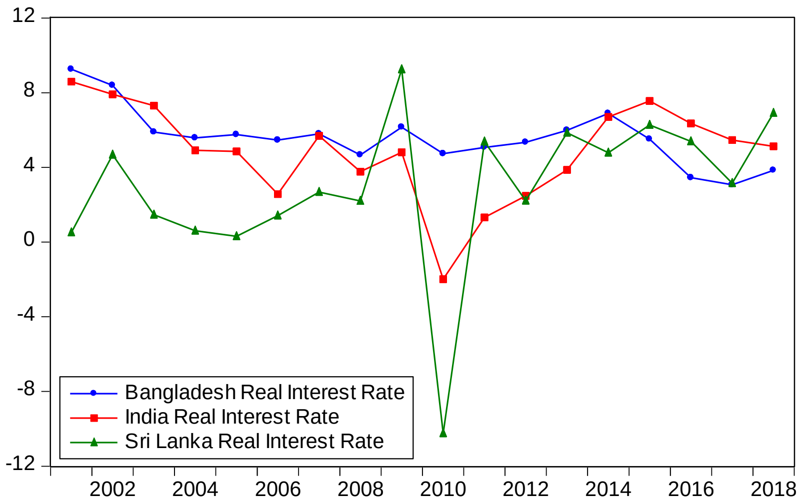


Figure 1.5: Real Interest Rate

### 1.1.6 Output Gap

Output gap or GDP gap indicates the difference between the real GDP and potential GDP (Maximum efficient) as a percentage of GDP. If the output gap is a positive value that means that country performing outstanding GDP than its maximum potential GDP (Investopedia, 2019). Since this study focusing on the change of inflation and output gap from dependency ratios, output gap is a key variable for this study as this indicates the economic growth of the country.

## 1.2 Research Problem

According to the United Nations Population Funds (United Nations Population Funds, 2020) it indicates that elderly population is increasing and youth population is decreasing in South Asian countries. This can be seen in Figure1.1 and Figure 1.2 also. Therefore we need to find out whether there is any significant effect on inflation dynamics from age structural transitions since there is a lack of studies done in Sri Lanka on this matter. Therefore these two hypotheses used as the research problems in this study.

Hypothesis 1; There is a significant effect on inflation from age structural transitions (elderly and youth population growth).

Hypothesis 2; There is a significant effect on output gap from age structural transitions (elderly and youth population growth).

### 1.3 Objective of the research

The objective of this research is to identify the impact of age structural transition (elderly and young population growth) on inflation dynamics of Sri Lanka, India and Bangladesh.

### 1.4 Significance of the study

As it described in the research problem, aging population is increasing and youth population is decreasing in Asian countries in an unprecedented rate. This might have a significant effect on macroeconomic variables of Asian countries. The studies conducted by Gaofeng Han (2018) and Atri Mukherjee et al (2019) indicated that elderly and young population growths have a significant impact on macroeconomic variables in China, Hong Kong, Singapore and India respectively. Therefore Asian countries need to investigate whether there is any impact from age structural transitions on inflation dynamics as there is a lack of studies on this matter to fulfil the gap.

According to the results of this study it can be used to take policy decisions in short term and long term to face the economical changes which are affected from increasing elderly population growth and decreasing youth population growth.

### 1.5 Organization of the study

This dissertation shows the impact of elderly and youth population growth on inflation dynamics. Dissertation has been divided in to five chapters which are Introduction, Literature review, Methodology, Results and discussion, and Conclusion.

First chapter; Introduction gives the basic idea and the background of the study and objectives of this study.

Second chapter; Literature review focused on previous studies conducted related to this study. This will help us to find out the gap that should be answered.

Third chapter; Methodology gives the theoretical background of the study. All the formulas and equations used in the study have been described in this chapter.

Fourth chapter; Results and discussion is the core of the research which gives the results of the study.

Fifth and final chapter; Conclusion gives the final conclusion of the study, suggestion for the new studies and policy recommendations.

# CHAPTER 02

# LITERATURE REVIEW

## 2.1 Introduction

In this chapter it describes several literature reviews related to this study. Most of the literatures conducted to identify the relationship between demographic variables and macroeconomic economic variables by using structural VAR models.

## 2.2 Related researches

Gaofeng Han (2018) develop a structural VAR model to investigate the impact of demographic changes on inflation for China, Hong Kong and Singapore. CPI, Real interest rate, Output gap used as the dependent variables and youth dependency ratio and elderly dependency ratio used as the explanatory variables. For the analysis the data set used obtained from 1991 to 2016 annual data. VAR model developed separately for each demographic variable to remove the interdependency between explanatory variables. Results indicate that the increase in young population is inflationary and increase in old population is disinflationary. But the marginal impact of change in demographic variables on inflation is very small and when it comes to Singapore it is negligible. Global Economic Activity and US federal rates used to examine the robustness of the model by using Phillips Curve and IS Curve.

Mikael Juselius and Előd Takáts (2018) modeled a panel regression to investigate the relationship between inflation and demographic changes. Data selected for this analysis rages from 1870-2016 over 22 countries. Inflation, real interest rate, output gap, young population share, working population share and elderly population share are the variables interested in this analysis. Results of this modeled revealed that there is a robust relationship between inflation and age structure of the population such young and elderly population are associated with higher inflation and working age population associated with lower inflation. Even the elderly population growth tends to increase with compared to young population share, it is not enough to set off the disinflation occurred by young population share.

Atri Mukherjee et al. (2019) conducted a research to investigate the relationship between demographic changes and macroeconomic variables in India using generalized methods of moments (GMM). The data set obtained for the analysis ranges from 1975 to 2017. Population growth rate, Age dependency ratio, Share of working age population in total population, Growth in aging population used as explanatory variables. Real GDP growth, Per capita income growth, Inflation, Fiscal balance and the external current account balance used as the macroeconomic variables. GMM conducted for each demographic variables separately to avoid the multicollinearity. The results concluded that population growth and age dependency ratio have inverse relationship with growth in real GDP and per capita income, and direct relationship with inflation. Also share of working age population has a direct relationship with economic growth. Increase in aging population is disinflationary.

K. Navaneetham (2002) fitted an Ordinary Least Square (OLS) model in order to find the relationship of age structural transition and economic growth. Data obtained from United Nations and Penn World Tables from 1950 to 1992 annual data. Variables selected for this analysis were; age structure of the population, investment share of GDP, net foreign balance, share of public consumption expenditure, inflation rate, openness, institutional quality and tropical conditions. This study covers Indonesia, Malaysia, Thailand, Singapore Bangladesh, India and Sri Lanka. The results conclude that the demographic bonus had a positive impact on economic growth in Southeast Asian countries except Philippine.

Rafael Ravnik and Ivan Žilić (2010) conducted a study on determining the effect of fiscal shocks in Croatia by using a Structured VAR model. The variables used on this study are economic activity, inflation and short term interest rate. The results confirm that there is a large effect on interest rate from government expenditure shocks and low effect on inflation from shocks of government revenue. Shocks on short term tax increases the inflation rate and decreases the short term interest rate. Empirical results reveals that the tax shock has a permanent effect on future taxes and future government expenditure not related to current shocks. Finally it concluded that government revenue does not reflect the expenditure shocks.

Yihan Liu and Niklas Westelius (2016) conducted a study to investigate the Impact of demographics on productivity and inflation in Japan. For the study they have selected annual data from 1990 to 2007 and the variables selected for the regression model are labor force productivity, share of 10 year age groups of working age population, old age dependency ratio and density of working age population. The results indicated that the age distribution of the working age population had an impact on total factor productivity. Highest productivity gained from age group 40-49 and 1% of the shift from 30 years aged group to 40 years aged group increases the total factor productivity by 4.4%. Same change effect for the age group 40 to 50 decreases productivity by 1.3%. In the sense of inflation, 1% increase in elderly population reduce the inflation by 0.1%. Therefore finally this study have concluded that the aging population growth have a significant impact on inflation.

Jong-Won Yoon et al. (2014) studied on the impact of demographic changes on inflation and the macro-economy. They have selected 30 OECD countries over the period of 1960-2013. Real GDP growth per capita, current account balance/GDP, savings/GDP, investment/GDP, Government budget balance/GDP and inflation rate selected as the dependent variables; and Population growth, share of age groups, life expectancy and dependency ratios selected as the explanatory variables for thee cross country panel data analysis. Finally the results concluded that population growth affect positively on inflation, Real interest rate depends on both population growth and age categories and output gap depends on population dynamics.

Yunus Aksoy et al. (2015) studied on the behavior of demographic structure and macroeconomic trends using panel VAR model. The data set covers 21 OECD countries over the period of 1970 to 2007, annual data. Savings rates, investment rates, policy rates, CPI, per capita GDP growth were the selected as the variables for the analysis. Results of this analysis indicated that there is a long run relationship between demographic variables and economic variables. More simply age categories of the population have significant impact on output growth, investment, savings hours worked per capita, real interest rates and inflation. And also the predicted annual long term GDP growth depressed due to the demographic factors over the period from 2010-2019 by 0.75%.

Doug Andrews et al. (2018) studied on the relationship between demography and inflation by using panel regression model and VAR model. 22 OECD counties selected for this analysis and the panel data set covers the period of 1955 to 2010. Growth rate of real GDP, share of investment on GDP, share of personal savings in GDP, logarithm of hours of worked, nominal short interest rate and inflation selected as endogenous variables and age categories of the population selected as the demographic variables for this study. The overall results conclude that there is an impact on inflation and output gap from aging, and also the older population make disinflation than younger population.

Atif Ali Jaffri et al. (2016) studied on the impact of demographic changes on inflation in Pakistan. They have used Autoregressive Distributed Lag (ARDL) model for this study. Variables selected for this study are population growth, middle age working population portion, consumer price index, inflation, real GDP, change in terms of trade and money supply growth. The results of the study indicated that population growth has positive impact of inflation and middle age working population portion has negative effect on inflation. And also negative coefficients of Error Correction Model (ECM) confirms that there is a long term relationship between variables.

Paulina Broniatowka (2017) studied on population aging and inflation. 32 OECD countries selected over the period of 1971 to 2015. CPI inflation, overall dependency ratio, youth dependency ratio, elderly dependency ratio, base money growth rate, GDP growth rate, change in the term of trade index and change in general government deficit used as the variables for this analysis. The graphical representation indicates that there may be some relationship between inflation and dependency ratios. Then a panel regression model used to check the relationship between demographic variables and the inflation and results concluded that there is a positive relationship between these two variables at 1% significance level. Then the dependency ratio split in to younger dependency ratio and elderly dependency ratio; and the results indicated that the elderly dependency ratio is disinflationary and youth dependency ratio is inflationary. Therefore finally it can be concluded that the demographic changes are one of the most important long term challenge for economy.

Hassan B. Ghassan et al. (2018) fitted a structural VAR model to find the relationship between demographic changes and current account savings. The factors selected for this analysis are population structure, current account to GDP (CA to GDP) and real economic growth over 1974 to 2016. KPSS test conducted to find out the stationary conditions of the series. The results concluded that a positive shock on population growth decrease the CA to GDP ratio. But if a positive shock applied to growth of demand labor affect positively on CA to GDP. In addition, shocks of working age population lead to unsteady economic growth in short term and in long term it has a positive effect. Overall it can be concluded that there is a long run impact on economy from the working age population.

Thomas Lindh (2004) studied on forecasting the potential GDP and inflation using age structure information. Annual estimates of old dependency ratio, youth dependency ratio, total dependency ratio selected as dependent variables and GDP growth, CPI inflation rate, saving rate, investment rate selected as independent variables for this study. Finally this study conclude that there is a strong correlation between age growth and inflation.

Elena Bobeica et al. (2017) studied about the relationship between demography and inflation using VAR model. The sample data set ranges through 1975 to 2016. Share of working age population, real interest rate and inflation selected as variables for the analysis. The results indicated that there is a positive long run relationship between inflation and the working age population growth rate. And also this relationship can be reduced by monetary policy which is selected as interest rate.

Weera Prasertnukul et al. (2010) modeled an Autoregressive Distribution lag model to investigate the relationship between exchange rates, price levels and inflation. This study covers the countries; Indonesia, South Korea, Philippines and Thailand over the period of January 1990 to June 2007. This study verify that there is an impact of inflation on exchange rate.

Since above literature reviews focusing on the relationship between demographic changes and macroeconomic variables, Sri Lanka needs to fill such gap of studies to identify the relationship and to take necessary policy actions.

# CHAPTER 03

# METHODOLOGY

## 3.1 Introduction

This chapter describes the methodology used in the structured VAR analysis.

## 3.2 Data

Three South Asian economies Sri Lanka, India and Bangladesh were selected for this analysis. The structured VAR model used five variables which are denoted in the results; inflation as CPI, real interest rate as RR, output gap as YGAP, youth dependency ratio as DEP1 and elderly dependency ratio as DEP2.

Monthly Consumer Price Index (CPI) Inflation used as the indicator of inflation which are obtained from International Monetary Fund (IMF). Monthly Average Weighted Prime Lending Rate (AWPLR) used as the indicator of real interest rate of Sri Lanka and real interest rate for other two countries were obtained from World Bank as annual data and interpolated monthly using regression models. Annual elderly dependency ratio (% of working-age population) and youth dependency ratio (% of working-age population) obtained from World Bank and interpolated monthly using regression models and took the growth rate. Seasonally adjusted annual Gross Domestic Product deflator (GDP) obtained from World Bank and interpolated monthly using regression models. Bases of GDP deflator for each country have used different bases; such Sri Lanka 2010=100 basis, India 2011=100 basis and Bangladesh 2006=100 basis. Then the output gap obtained from removing the cyclical component from the GDP by using the Hodrick–Prescott filtering method.

As a summary, this data set contains five variables (inflation, real interest rate, GDP, elderly and youth dependency ratios) which span through January 2003 to December 2018 for Sri Lanka, India and Bangladesh. Theoretical background section explains several financial and statistical theories which are used to build the VAR model for this study.

## 3.3 Theoretical background

### 3.3.1 Phillips curve

Philips curve is an economical theory which explains that there is an inverse and stable relationship between inflation and unemployment. But Philips curve cannot be applied under such situation of hyperinflation due to stagflation. Therefore Phillips theory can be applied to this study since Sri Lanka, India and Bangladesh have not gone through a stagflation economy from 2003 to 2018. Unemployment is a key factor for this study since it discuss the effect of youth and elderly population growth on inflation; because of youth and elderly dependency ratio growth obtained from as a percentage of working age population.

$$\pi = -h(u - u_n) \quad (3.1)$$

Where, $\pi$ stands for inflation, $u$ stands for unemployment rate, $u_n$ stands for natural unemployment rate and h stands for the constant.

### 3.3.2 IS curve

IS curve is an economical theory that explains that there is an inverse relationship between real interest rate and output gap. Since the second hypothesis of this study is to find out the relationship between output gap and dependency ratios this theory have been used to build the VAR model.

$$Y = \alpha - \beta r \quad (3.2)$$

Where, $Y$ stands for GDP, $\alpha$ & $\beta$ stands for constant, $r$ stands for real interest rate.

### 3.3.3 Interest response function

Interest response function is a variant of Taylor rule which explains there is a relationship real interest rate with inflation expectations and output gap. This formula used to identify the relationship between inflation and output gap.

$$i = \pi + r + a\tilde{\pi} + b\tilde{Y} \quad (3.3)$$

Where, $i$ stands for nominal interest rate, $r$ stands for real interest rate, $\pi$ stands for inflation, $\tilde{\pi}$ stands for inflation gap and $\tilde{Y}$ stands for output gap.

### 3.3.4 Life cycle hypothesis

Life cycle hypothesis assumes that an individual spend money from their saving when their income is low and save money when income is high over their life time.

$$C = \alpha W + \beta In \tag{3.4}$$

Where, $C$ stands for consumption, $W$ stands for wealth, $In$ stands for income, $\alpha$ stands for marginal tendency to consume out of wealth, $\beta$ stands for marginal tendency to consume out of income.

### 3.3.5 Hodrick-Prescott filtering

Hodrick–Prescott (HP) filter is a smoothing technique which used to remove the cyclical component $(C_t)$ from a given time series. In this process the series assumed to be a seasonally adjusted time series $(y_t = T + C)$.

$$\min_{\{g_t\}_{t=-1}^{m}} \left\{ \sum_{t=1}^{m} C_t^2 + \lambda \sum_{t=1}^{m} \left( (T_t - T_{t-1}) - (T_{t-1} - T_{t-2}) \right)^2 \right\} \tag{3.5}$$

Where, $m$ stands for sample size, $C_t$ stands for cyclical component, $T_t$ stands for trend component and $\lambda$ stands for smoothing constant (higher the value of $\lambda$ takes the series tends to more smooth)

This filtering used to remove the cyclical component from the GDP and to obtain the output gap which used as a variable in the VAR model.

### 3.3.6 Unit root test

Unit root test used check whether a given time series has a unit root or not, in other words to test the series is stationary or not. Augmented Dickey Fuller (ADF) test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test are the unit root tests used in this analysis.

#### 3.3.6.1 Augmented Dickey Fuller unit root test

$$\triangle y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \triangle y_{t-1} + \delta_2 \triangle y_{t-2} + \cdots \tag{3.6}$$

Where, $\triangle$ indicates the differenced series, $y_{t-i}$ indicates lagged $y_t$ series.

Test check whether the series is stationary or not by using the existence of the lagged $y_t$ value. Hypothesis for the ADF test are,

$H_0$ : Model has a unit-root

$H_1$ : Model does not have a unit-root

#### 3.3.6.2 Kwiatkowski-Phillips-Schmidt-Shin unit root test

Kwiatkowski-Phillips-Schmidt-Shin test has different hypothesis than ADF test which are,

$H_0$ : Model is stationary

$H_1$ : Model is non stationary

### 3.3.7 Polynomial regression model

Polynomial regression model is a type of regression analysis which used to find the relationship between dependent variable, and independent variable which is modeled up to the $n^{th}$ power. This polynomial regression method used in this study to interpolate monthly data from yearly data. Polynomial regression model indicated by formula 3.7.

$$y = \beta_0 + \beta_1 \cdot x + \beta_2 \cdot x^2 + \cdots + \beta_n \cdot x^n + \varepsilon \tag{3.7}$$

Where, $y$ is the dependent variable $x$ is the independent variable

### 3.3.8 VAR model

A vector autoregression (VAR) model is an extension of univariate autoregression model, which can be used to explain the behavior of multiple time series models. The basic VAR model indicates by formula 3.8.

$$y_{it} = -\alpha_{ij} \cdot y_{jt} + \gamma_{ii} \cdot y_{it-1} + \gamma_{ij} \cdot y_{jt-1} + u_{it} \tag{3.8}$$

Where, $u_{it}$ is a random error, and $i$=1, 2, 3…, $j$=1, 2, 3…, $(i \neq j)$

The matrix form of the formula 3.8 stated by formula 3.9.

$$\begin{bmatrix} 1 & \alpha_{12} & \cdots \\ \alpha_{21} & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} y_{1t} \\ y_{2t} \\ \cdots \end{bmatrix} = \begin{bmatrix} \gamma_{11} & \gamma_{12} & \cdots \\ \gamma_{21} & \gamma_{22} & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} y_{1t-1} \\ y_{2t-1} \\ \cdots \end{bmatrix} + \begin{bmatrix} 1 & 0 & \cdots \\ 0 & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} u_{1t} \\ u_{2t} \\ \cdots \end{bmatrix} \tag{3.9}$$

Multiplying the formula 3.9 by the inverse of $\alpha$, obtain,

$$\begin{bmatrix} y_{1t} \\ y_{2t} \\ \cdots \end{bmatrix} = \begin{bmatrix} 1 & \alpha_{12} & \cdots \\ \alpha_{21} & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}^{-1} \begin{bmatrix} \gamma_{11} & \gamma_{12} & \cdots \\ \gamma_{21} & \gamma_{22} & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} y_{1t-1} \\ y_{2t-1} \\ \cdots \end{bmatrix} + \begin{bmatrix} 1 & \alpha_{12} & \cdots \\ \alpha_{21} & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}^{-1} \begin{bmatrix} 1 & 0 & \cdots \\ 0 & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} u_{1t} \\ u_{2t} \\ \cdots \end{bmatrix} \quad (3.10)$$

Reduced form of VAR obtained from formula 3.10,

$$\begin{bmatrix} y_{1t} \\ y_{2t} \\ \cdots \end{bmatrix} = \begin{bmatrix} \delta_{11} & \delta_{12} & \cdots \\ \delta_{21} & \delta_{22} & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} y_{1t-1} \\ y_{2t-1} \\ \cdots \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \cdots \end{bmatrix} \quad (3.11)$$

Where, $$\begin{bmatrix} \delta_{11} & \delta_{12} & \cdots \\ \delta_{21} & \delta_{22} & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} = \begin{bmatrix} 1 & \alpha_{12} & \cdots \\ \alpha_{21} & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}^{-1} \begin{bmatrix} \gamma_{11} & \gamma_{12} & \cdots \\ \gamma_{21} & \gamma_{22} & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}$$

$$\begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \cdots \end{bmatrix} = \begin{bmatrix} 1 & \alpha_{12} & \cdots \\ \alpha_{21} & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}^{-1} \begin{bmatrix} 1 & 0 & \cdots \\ 0 & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} u_{1t} \\ u_{2t} \\ \cdots \end{bmatrix} \quad (3.12)$$

Simply, $A\varepsilon_t = Bu_t$

Where, $$A = \begin{bmatrix} 1 & \alpha_{12} & \cdots \\ \alpha_{21} & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & \cdots \\ 0 & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix}$$

### 3.3.9 VMA model

A vector moving average (VMA) model is an extension of univariate moving average model, which can be used to explain the variance decomposition of the VAR model. The basic VMA model indicates by formula 3.13.

$$y_{jt} = \theta_{j0} + \sum_{i=1}^{n} \theta_{j1}\varepsilon_{y1t-i} + \sum_{i=1}^{m} \theta_{j2}\varepsilon_{y2t-i} + \cdots + \varepsilon_j \quad (3.13)$$

The matrix form of the formula 3.13 stated by formula 3.14.

$$\begin{bmatrix} y_{1t} \\ y_{2t} \\ \cdots \end{bmatrix} = \begin{bmatrix} \theta_{10} \\ \theta_{20} \\ \cdots \end{bmatrix} + \begin{bmatrix} \theta_{11} & \theta_{12} & \cdots \\ \theta_{21} & \theta_{22} & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} \varepsilon_{1t-1} \\ \varepsilon_{2t-2} \\ \cdots \end{bmatrix} + \begin{bmatrix} 1 & 0 & \cdots \\ 0 & 1 & \cdots \\ \cdots & \cdots & \cdots \end{bmatrix} \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \cdots \end{bmatrix} \quad (3.14)$$

Variance decomposition of $k^{th}$ component given by,

$$\frac{\sum_{i=1}^{n} \theta_{jk} \varepsilon_{ykt-i}}{\sum_{i=1}^{n} \theta_{jk} \varepsilon_{ykt-i} + \sum_{i=1}^{m} \theta_{jk} \varepsilon_{ykt-i} + \cdots} \quad (3.15)$$

### 3.3.10 Cholesky decomposition

Cholesky decomposition is a matrix decomposition method, which a Hermitian (transpose of the conjugate) matrix can be written as a multiplication of lower triangular matrix and its conjugate transpose; which similar to LU decomposition method.

### 3.3.11 Model selection criteria

#### 3.3.11.1 Akaike information criteria

Akaike information criteria (AIC) used to measure the relative quality of statistical models. For given data set. It does not provide an absolute evaluation of the quality, it has to be used to select the best model among tentative models. Less AIC values indicates the high quality model.

$$AIC = n \cdot \ln(SSE) - n \cdot \ln(n) + 2P \quad (3.16)$$

Where, $n$ indicates number of observations, $p$ indicates number of parameters

#### 3.3.11.2 Schwarz information criteria

Schwarz Information Criterion (SIC) or Schwarz Bayesian Criterion is also a measure of the relative quality of the statistical models like AIC.

$$SIC = n \cdot \ln(SSE) - n \cdot \ln(n) + p \cdot \ln(n) \quad (3.17)$$

Where, $n$ indicates number of observations, $p$ indicates number of parameters

# CHAPTER 04

# RESULTS AND DISCUSSION

## 4.1 Introduction

Descriptive statistics and VAR model results obtained from the analysis for Sri Lanka, India and Bangladesh describes in this chapter.

## 4.2 Descriptive statistics

Descriptive statistics of variables for Sri Lanka, India and Bangladesh are shown in table 4.1, table 4.2 and table 4.3 respectively.

Table 4.1: Descriptive statistics of Sri Lanka

| Sri Lanka | Mean | Maximum | Minimum | Std. Dev. |
|---|---|---|---|---|
| CPI | 0.595666 | 4.140625 | -3.457447 | 1.191043 |
| RR | 11.804900 | 20.790000 | 6.350000 | 3.327363 |
| YGAP | 0.126555 | 28.533530 | -3.457909 | 2.123971 |
| DEP1 | -0.000192 | 0.000265 | -0.000781 | 0.000213 |
| DEP2 | 0.002658 | 0.004673 | 0.000000 | 0.001378 |

Table 4.2: Descriptive statistics of India

| India | Mean | Maximum | Minimum | Std. Dev. |
|---|---|---|---|---|
| CPI | 0.557530 | 4.575163 | -1.646091 | 0.791034 |
| RR | 4.770823 | 8.866443 | -2.546079 | 2.716685 |
| YGAP | 0.027981 | 8.953870 | -6.366126 | 0.945366 |
| DEP1 | -0.001625 | -0.001269 | -0.001969 | 0.000174 |
| DEP2 | 0.001021 | 0.002466 | 0.000000 | 0.000771 |

Table 4.3: Descriptive statistics of Bangladesh

| Bangladesh | Mean | Maximum | Minimum | Std. Dev. |
|---|---|---|---|---|
| CPI | 0.585687 | 4.199744 | -1.441554 | 0.897399 |
| RR | 5.852839 | 9.325320 | 2.996300 | 1.350823 |
| YGAP | 0.168239 | 16.823330 | -2.464185 | 1.673604 |
| DEP1 | -0.001928 | -0.001516 | -0.002421 | 0.000228 |
| DEP2 | 0.000813 | 0.003021 | -0.001294 | 0.000895 |

According to the table 4.1, table 4.2 and table 4.3 it can be observed that the Sri Lanka has the highest statistics for CPI, real interest rate, youth dependency ratio growth rate and elderly dependency ratio rate. Bangladesh has the highest YGAP growth rate.

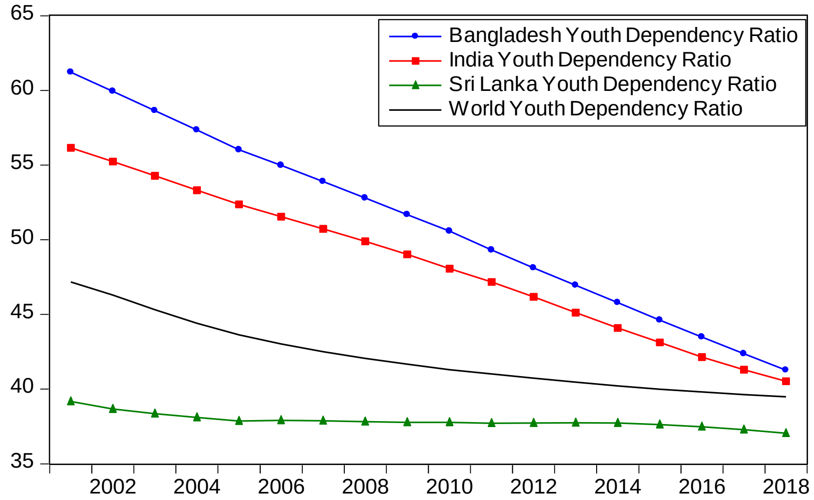


Figure 4.1: Youth population growth

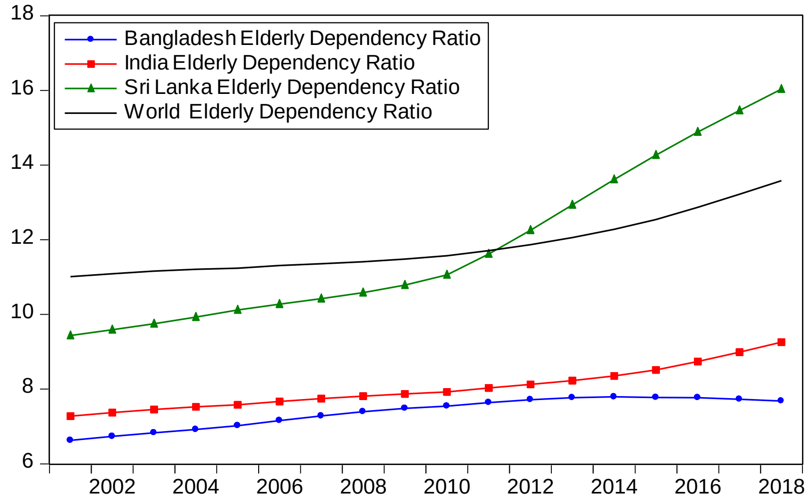


Figure 4.2: Elderly population growth

Figure 4.1 indicates that the youth population growth has a decreasing pattern and among those countries Sri Lanka has the lowest gradient and Bangladesh has the highest. Figure 4.2 indicates that the elderly population growth has an increasing pattern and 2009 onwards Sri Lanka shows a sudden increase in the gradient which is also higher than India and Bangladesh. Figure 4.3 shows a random behavior for CPI for all countries. Figure 4.4 indicates the GDP growth for Sri Lanka, India and Bangladesh which are following an increasing pattern. Figure 4.5 indicates a random pattern for real interest rate for Sri Lanka, India and Bangladesh.

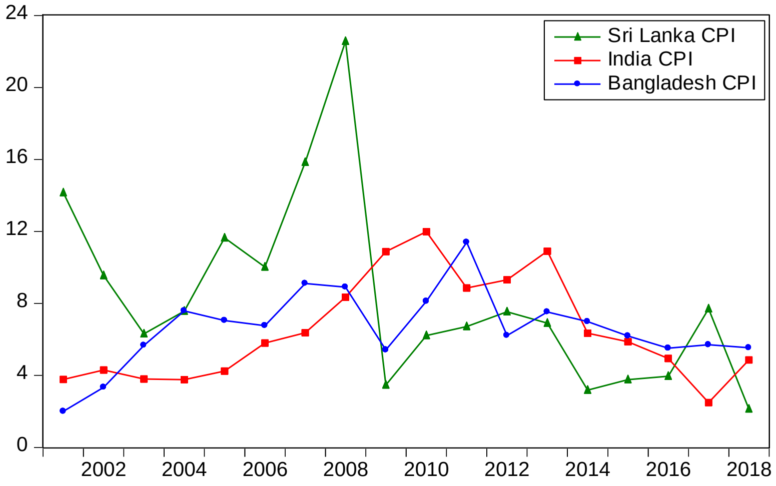


Figure 4.3: Consumer Price Indexes

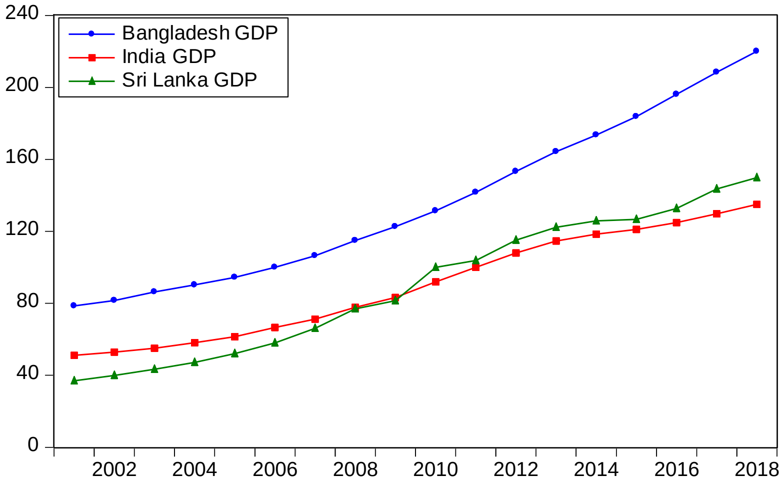


Figure 4.4: GDP Growth

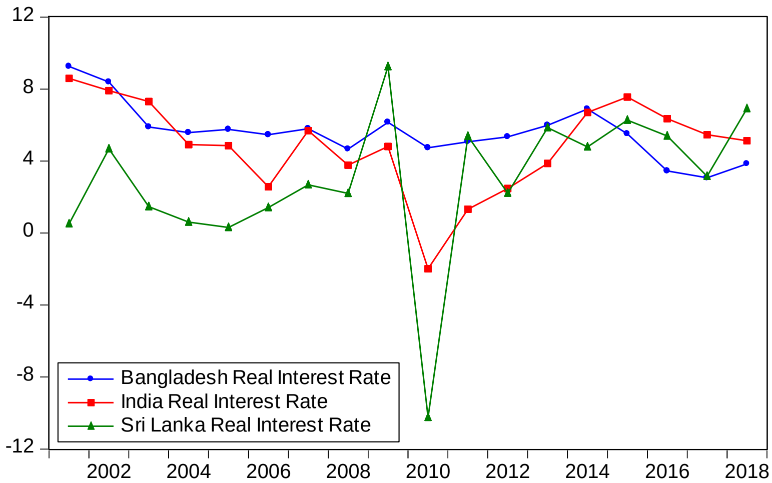


Figure 4.5: Real Interest Rate

## 4.3 Unit root test

Then the ADF unit-root test conducted to check the stationarity of the variables.

Table 4.4: Unit root test for Sri Lanka

| Variable | Level | | | First Difference | | | Second Difference | | | Integration |
|---|---|---|---|---|---|---|---|---|---|---|
| | None | Intercept | Int. + Trn. | None | Intercept | Int. + Trn. | None | Intercept | Int. + Trn. | |
| CPI | **0.017** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |
| RR | 0.456 | **0.020** | 0.051 | **0.004** | 0.053 | 0.182 | **0.000** | **0.000** | **0.000** | *I*(0) |
| YGAP | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |
| DEP1 | 0.273 | 0.642 | 0.989 | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(1) |
| DEP2 | 1.000 | **0.000** | 0.973 | **0.048** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |

Bold numbers denotes statistical significance at 5% level

Table 4.5: Unit root test for India

| Variable | Level | | | First Difference | | | Second Difference | | | Integration |
|---|---|---|---|---|---|---|---|---|---|---|
| | None | Intercept | Int. + Trn. | None | Intercept | Int. + Trn. | None | Intercept | Int. + Trn. | |
| CPI | 0.354 | 0.148 | 0.362 | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(1) |
| RR | 0.274 | 0.390 | 0.838 | **0.000** | **0.008** | **0.018** | **0.000** | **0.000** | **0.000** | *I*(1) |
| YGAP | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |
| DEP1 | 1.000 | 1.000 | 0.995 | 0.199 | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(1) |
| DEP2 | 0.981 | 0.741 | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |

Bold numbers denotes statistical significance at 5% level

Table 4.6: Unit root test for Bangladesh

| Variable | Level | | | First Difference | | | Second Difference | | | Integration |
|---|---|---|---|---|---|---|---|---|---|---|
| | None | Intercept | Int. + Trn. | None | Intercept | Int. + Trn. | None | Intercept | Int. + Trn. | |
| CPI | 0.270 | **0.017** | **0.037** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |
| RR | 0.093 | 0.062 | 0.137 | **0.002** | **0.014** | 0.060 | **0.000** | **0.000** | **0.000** | *I*(1) |
| YGAP | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |
| DEP1 | 1.000 | 1.000 | 0.999 | 0.350 | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(1) |
| DEP2 | **0.000** | 0.419 | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | *I*(0) |

Bold numbers denotes statistical significance at 5% level

Therefore the youth dependency ratio growth rate for Sri Lanka, India and Bangladesh; real interest rate for India and Bangladesh; CPI for India become stationary at the first difference and all other variables become stationary at the level.

### 4.4 VAR model

Then the VAR model fitted and structured VAR model constructed according to the below theories and restrictions and thereafter obtained the results.

$$CPI_t = f\{CPI_{t-1}, E(CPI)_t, YGAP_t\} \quad (4.1)$$

Where, $CPI_t$ represents the CPI inflation, $E(CPI)_t$ represent the inflation expectation and $YGAP_t$ represent the output gap.

$$YGAP_t = f\{E(YGAP)_t, RR_{t-1}\} \quad (4.2)$$

Where, $YGAP_t$ represent the output gap, $E(YGAP)_t$ represent expected value of output gap and $RR_{t-1}$ represent the lagged real interest rate.

$$RR_t = f\{E(CPI)_t, YGAP_t\} \quad (4.3)$$

Where, $RR_t$ represent the real interest rate, $E(CPI)_t$ represent the inflation expectation and $YGAP_t$ represent the output gap.

$$E(CPI)_t = f(CPI_{t-1}, RR_{t-1}, DEP_t) \quad (4.4)$$

Where, $E(CPI)_t$ represent the inflation expectation, $CPI_{t-1}$ represent the lagged CPI inflation, $RR_{t-1}$ indicates lagged real interest rate and $DEP_t$ represents age dependency ratio.

Expected value of output gap assumed to be a function of lagged output gap and lagged real interest rate.

$$E(YGAP)_t = f(YGAP_{t-1}, RR_{t-1}) \quad (4.5)$$

Where, $YGAP_{t-1}$ represent the lagged output gap

By substituting the 4.4 and 4.5 formulas to 4.1, 4.2 and 4.3 formulas, then obtain 4.6, 4.7 and 4.8 formulas; which will be the reduced VAR model formulas.

$$CPI_t = \alpha_0 + \alpha_1 \cdot CPI_{t-1} + \alpha_2 \cdot RR_{t-1} + \alpha_3 \cdot YGAP_t + \alpha_4 \cdot DEP_t + \mu_{1t} \quad (4.6)$$

$$YGAP_t = \beta_0 + \beta_1 \cdot YGAP_{t-1} + \beta_2 \cdot RR_{t-1} + \mu_{2t} \quad (4.7)$$

$$RR_t = \gamma_0 + \gamma_1 \cdot RR_{t-1} + \gamma_2 \cdot CPI_{t-1} + \gamma_3 \cdot YGAP_t + \gamma_4 \cdot DEP_t + \mu_{3t} \quad (4.8)$$

Where, $\mu_{1t}, \mu_{2t}, \mu_{3t}$ represent error terms.

Excluded variables for formula number 4.6, 4.7 & 4.8.

$$\{RR_t, YGAP_{t-1}\} \tag{4.9}$$

$$\{CPI_t, RR_t, CPI_{t-1}, DEP_t\} \tag{4.10}$$

$$\{CPI_t, YGAP_{t-1}\} \tag{4.11}$$

By using 4.7 and 4.8 formula,

$$\begin{bmatrix} & RR_t & YGAP_{t-1} \\ YGAP_t & 0 & \beta_1 \\ RR_t & -1 & 0 \end{bmatrix} \tag{4.12}$$

By using 4.6 and 4.8 formula,

$$\begin{bmatrix} & CPI_t & RR_t & CPI_{t-1} & DEP_t \\ CPI_t & -1 & 0 & \alpha_1 & \alpha_4 \\ RR_t & 0 & -1 & \gamma_2 & \gamma_4 \end{bmatrix} \tag{4.13}$$

By using 4.6 and 4.7 formula,

$$\begin{bmatrix} & CPI_t & YGAP_{t-1} \\ CPI_t & -1 & 0 \\ YGAP_t & 0 & \beta_1 \end{bmatrix} \tag{4.14}$$

By using the 4.6, 4.7 and 4.8 formula including population growth parameter, it can be obtained the matrix 4.15,

$$A = \begin{bmatrix} & CPI & YGAP & RR & DEP \\ CPI & 1 & -\alpha_3 & 0 & -\alpha_4 \\ YGAP & 0 & 1 & 0 & 0 \\ RR & 0 & -\gamma_3 & 1 & -\gamma_4 \\ DEP & 0 & 0 & 0 & 1 \end{bmatrix} \tag{4.15}$$

Two VAR models have to be fitted for each country to avoid multicollinearity as youth dependency ratio growth rate and elderly dependency ratio growth rate highly correlated variables. Therefore the first model contains CPI, real interest rate, growth of output gap and growth of youth dependency ratio variables; and the second model contains CPI, real interest rate, growth of output gap and growth of elderly dependency ratio variables.

## 4.5 VAR model for Sri Lanka

The first VAR model (Table A1) fitted for Sri Lanka with variables CPI, real interest rate, growth of YGAP and growth of youth dependency ratio and the second VAR model (Table A4) with above variables with replacing the growth of youth dependency ratio from growth of elderly dependency ratio. Then the lag length criteria was conducted to identify the best lag length for these models (Table A2 and Table A5). The optimum lag value selected for both models is 14. Even there are some lower lag values shown in Table A2 and Table A5 which seems to be best values, 14 selected to remove the serial correlation and heteroscedasticity.

Then the roots of characteristic polynomial (Table A3 and Table A6) obtained to identify the stability of these models. As shown in the figure 4.6 and figure 4.7 all roots lies within the circle. Therefore it can be concluded that these two VAR models are stable.

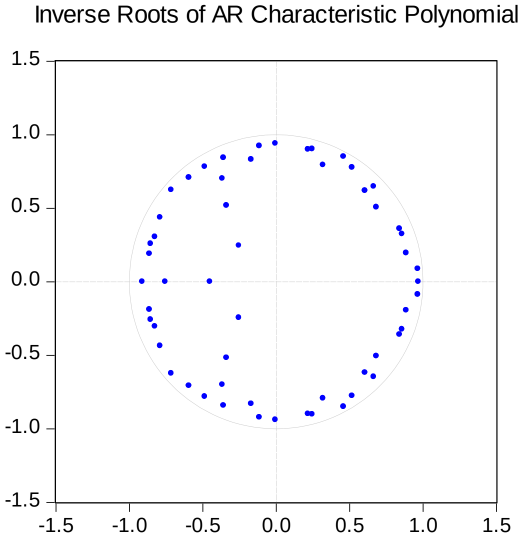


Figure 4.6: Root circle for VAR model 1 (youth dependency ratio model)

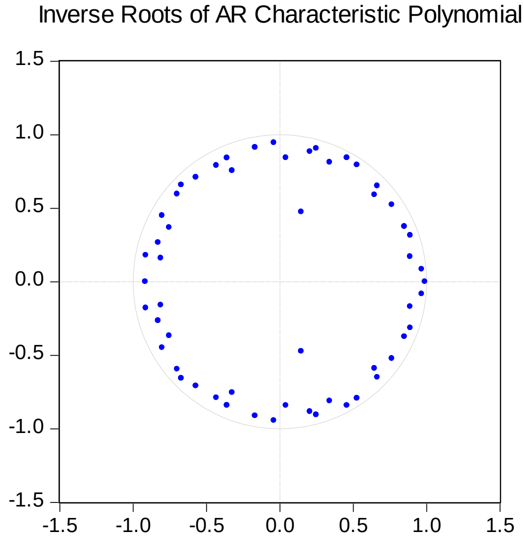


Figure 4.7: Root circle for VAR model 2 (elderly dependency ratio model)

Then the correlogram obtained to identify the residual correlation of these models. There are no significant spikes lying outside of the confidence level as the lag selected 14 for these models.

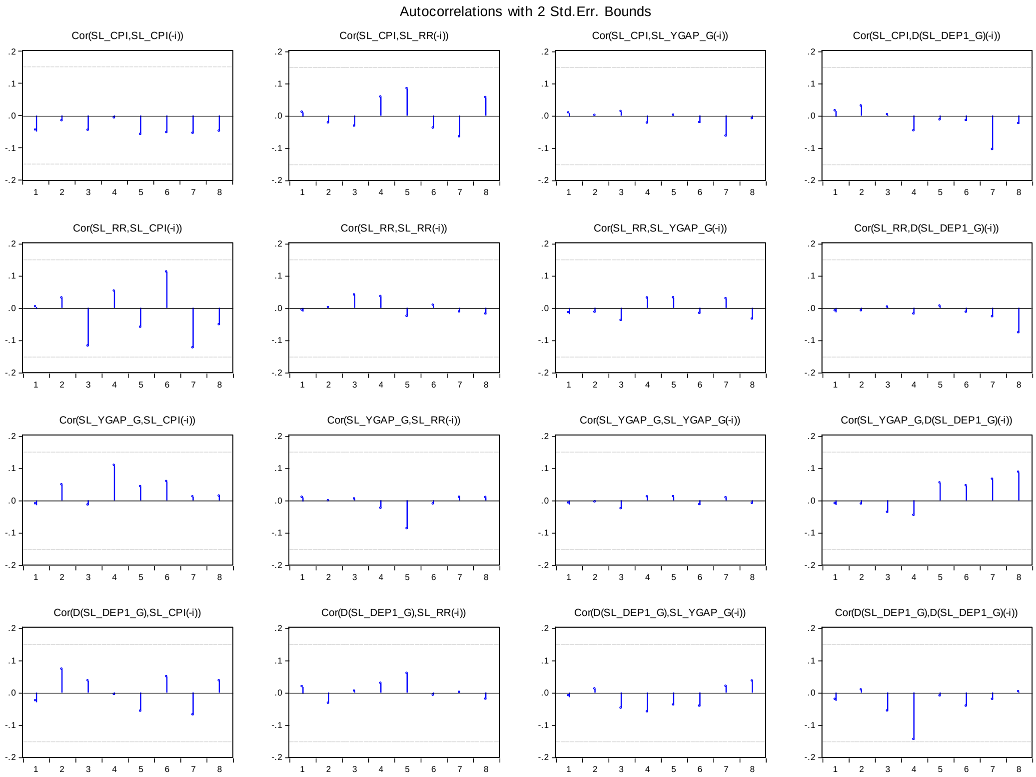


Figure 4.8: Correlogram for the VAR model 1 (youth dependency ratio model)

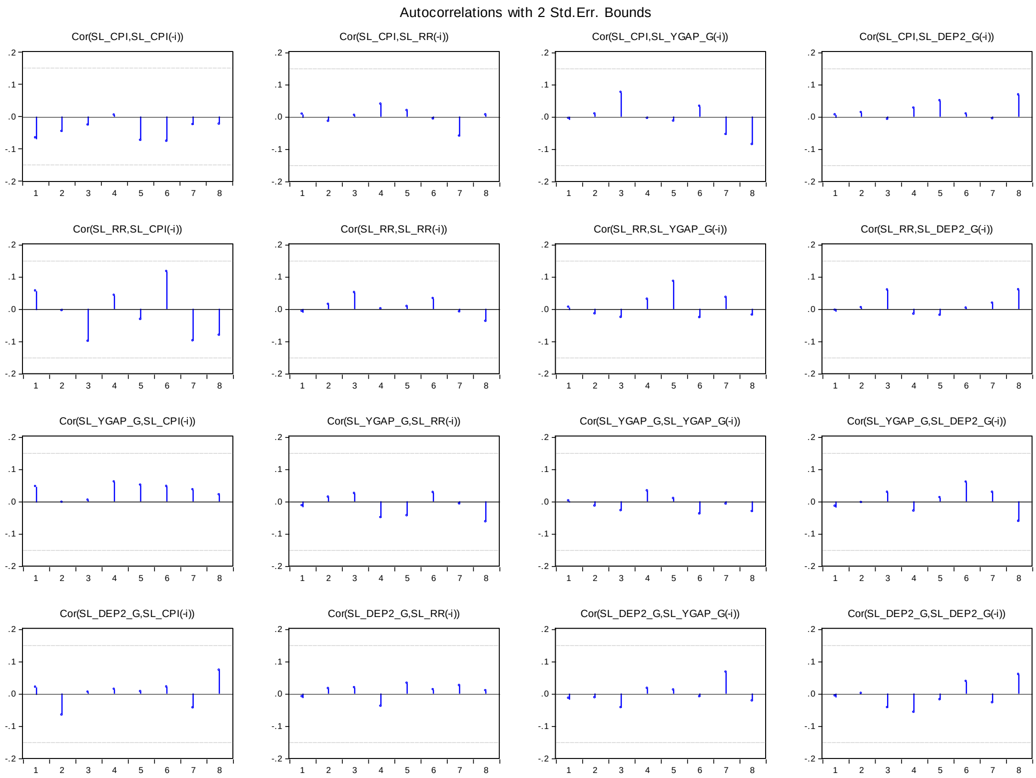


Figure 4.9: Correlogram for the VAR model 2 (elderly dependency ratio model)

Then the model diagnostics tests conducted to identify the appropriateness of these models. First serial correlation LM test (Table 4.7 & Table 4.8) was conducted and identified there are no serial correlation in these models.

Table 4.7: Serial Correlation test for VAR model 1 (youth dep. ratio model)

| Lags | LM-Stat | Prob. |
|---|---|---|
| 1 | 14.40441 | 0.5686 |
| 2 | 9.663252 | 0.8836 |
| 3 | 22.07857 | 0.1407 |
| 4 | 30.799 | 0.0143 |
| 5 | 25.19578 | 0.0664 |
| 6 | 15.21409 | 0.5090 |
| 7 | 26.24203 | 0.0507 |
| 8 | 16.54087 | 0.4159 |
| 9 | 21.02489 | 0.1776 |
| 10 | 24.1684 | 0.0859 |
| 11 | 10.66992 | 0.8294 |
| 12 | 18.93116 | 0.2722 |
| 13 | 15.13791 | 0.5146 |
| 14 | 9.321687 | 0.8996 |
| 15 | 18.19079 | 0.3128 |

Table 4.8: Serial Correlation test for VAR model 2 (elderly dep. ratio model)

| Lags | LM-Stat | Prob. |
|---|---|---|
| 1 | 13.49651 | 0.6362 |
| 2 | 10.54082 | 0.8369 |
| 3 | 26.38681 | 0.0488 |
| 4 | 11.02018 | 0.8082 |
| 5 | 19.71765 | 0.2332 |
| 6 | 16.86588 | 0.3943 |
| 7 | 17.25421 | 0.3693 |
| 8 | 23.38081 | 0.1039 |
| 9 | 9.080983 | 0.9100 |
| 10 | 18.33516 | 0.3046 |
| 11 | 11.32485 | 0.7890 |
| 12 | 16.33305 | 0.4300 |
| 13 | 16.25355 | 0.4354 |
| 14 | 8.400382 | 0.9360 |
| 15 | 19.05065 | 0.2660 |

Table 4.9: Heteroscedasticity test for VAR model 1 (youth dep. ratio model)

Joint test:

| Chi-sq | df | Prob. |
|---|---|---|
| 1153.525 | 1120 | 0.2372 |

Individual components:

| Dependent | R-squared | F(112,63) | Prob. | Chi-sq(112) | Prob. |
|---|---|---|---|---|---|
| res1*res1 | 0.601310 | 0.848372 | 0.7770 | 105.8306 | 0.6463 |
| res2*res2 | 0.700598 | 1.316245 | 0.1166 | 123.3052 | 0.2190 |
| res3*res3 | 0.766606 | 1.847590 | 0.0042 | 134.9227 | 0.0692 |
| res4*res4 | 0.503102 | 0.569523 | 0.9952 | 88.54592 | 0.9502 |
| res2*res1 | 0.670633 | 1.145322 | 0.2801 | 118.0314 | 0.3298 |
| res3*res1 | 0.630293 | 0.958977 | 0.5827 | 110.9316 | 0.5108 |
| res3*res2 | 0.710492 | 1.380454 | 0.0810 | 125.0467 | 0.1883 |
| res4*res1 | 0.526071 | 0.624387 | 0.9849 | 92.58855 | 0.9091 |
| res4*res2 | 0.699654 | 1.310338 | 0.1205 | 123.1391 | 0.2221 |
| res4*res3 | 0.725590 | 1.487356 | 0.0428 | 127.7039 | 0.1473 |

Table 4.10: Heteroscedasticity test for VAR model 2 (elderly dep. ratio model)

Joint test:

| Chi-sq | df | Prob. |
|---|---|---|
| 1102.113 | 1120 | 0.6428 |

Individual components:

| Dependent | R-squared | F(112,63) | Prob. | Chi-sq(112) | Prob. |
|---|---|---|---|---|---|
| res1*res1 | 0.605302 | 0.876333 | 0.7316 | 107.1385 | 0.6121 |
| res2*res2 | 0.734889 | 1.584001 | 0.0228 | 130.0753 | 0.1166 |
| res3*res3 | 0.727738 | 1.527388 | 0.0326 | 128.8096 | 0.1323 |
| res4*res4 | 0.494480 | 0.558948 | 0.9964 | 87.52289 | 0.9579 |
| res2*res1 | 0.722157 | 1.485232 | 0.0424 | 127.8218 | 0.1457 |
| res3*res1 | 0.665593 | 1.137355 | 0.2893 | 117.8100 | 0.3350 |
| res3*res2 | 0.672881 | 1.175425 | 0.2415 | 119.1000 | 0.3054 |
| res4*res1 | 0.572864 | 0.766387 | 0.8907 | 101.3970 | 0.7540 |
| res4*res2 | 0.473176 | 0.513239 | 0.9990 | 83.75219 | 0.9788 |
| res4*res3 | 0.538267 | 0.666146 | 0.9697 | 95.27332 | 0.8715 |

Then heteroscedasticity test (Table 4.9 & 4.10) was conducted to identify the constant residual variance. According to the results residuals of these two models does not have heteroscedasticity in 95% confidence level.

### 4.6 VAR model for India

The third VAR model (Table A7) fitted for India with variables CPI, real interest rate, growth of y gap and growth of youth dependency ratio and the fourth VAR model (Table A10) with above variables with replacing the growth of youth dependency ratio from growth of elderly dependency ratio. Then the lag length criteria was conducted to identify the best lag length for these models (Table A8 and Table A11). The optimum lag value selected for both models is 14. Even there are some lower lag values shown in Table A8 and Table A11 which seems to be best values, 14 selected to remove the serial correlation and heteroscedasticity.

Then the roots of characteristic polynomial (Table A9 and Table A12) obtained to identify the stability of these models. As shown in the figure 4.10 and figure 4.11 all roots lies within the circle. Therefore it can be concluded that these two VAR models are stable.

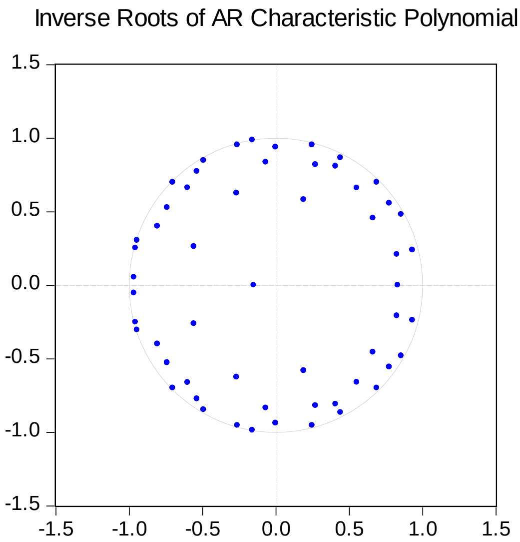


Figure 4.10: Root circle for VAR model 3 (youth dependency ratio model)

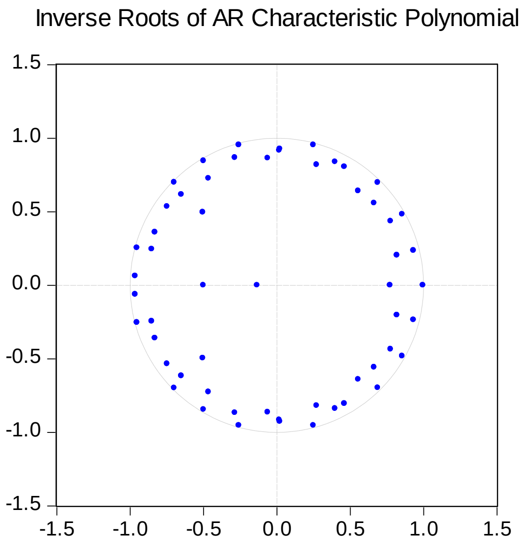


Figure 4.11: Root circle for VAR model 4 (elderly dependency ratio model)

Then the correlogram obtained to identify the residual correlation of these models. There are no significant spikes lying outside of the confidence level as the lag selected 14 for these models.

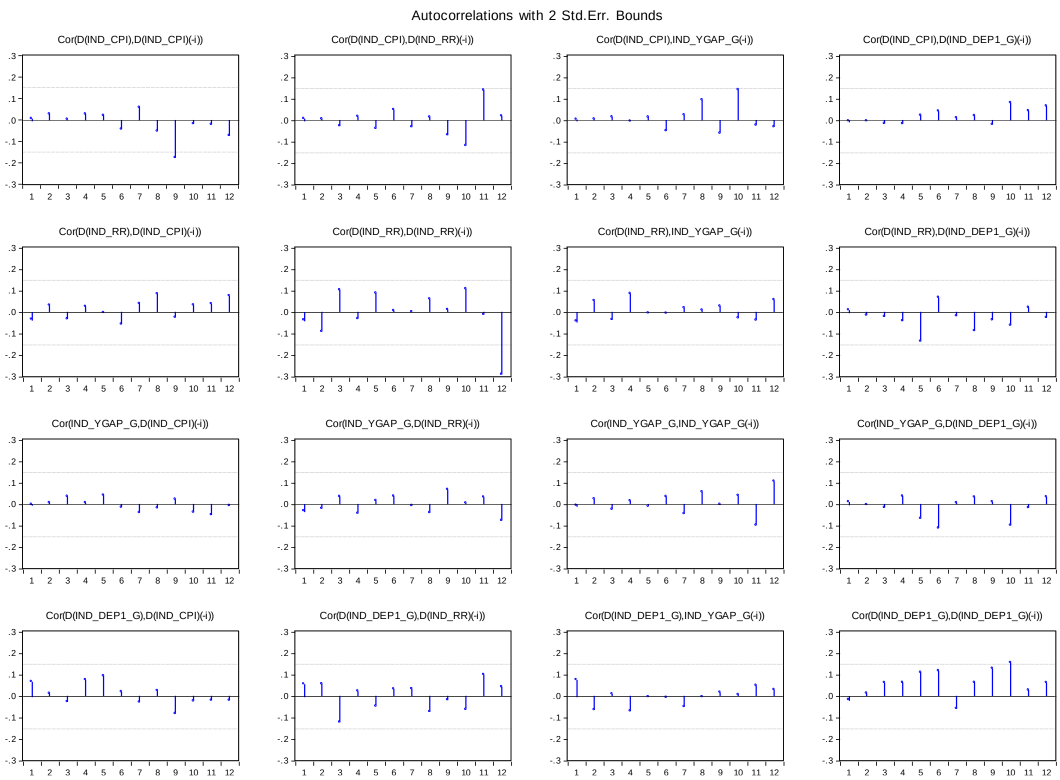


Figure 4.12: Correlogram for the VAR model 3 (youth dependency ratio model)

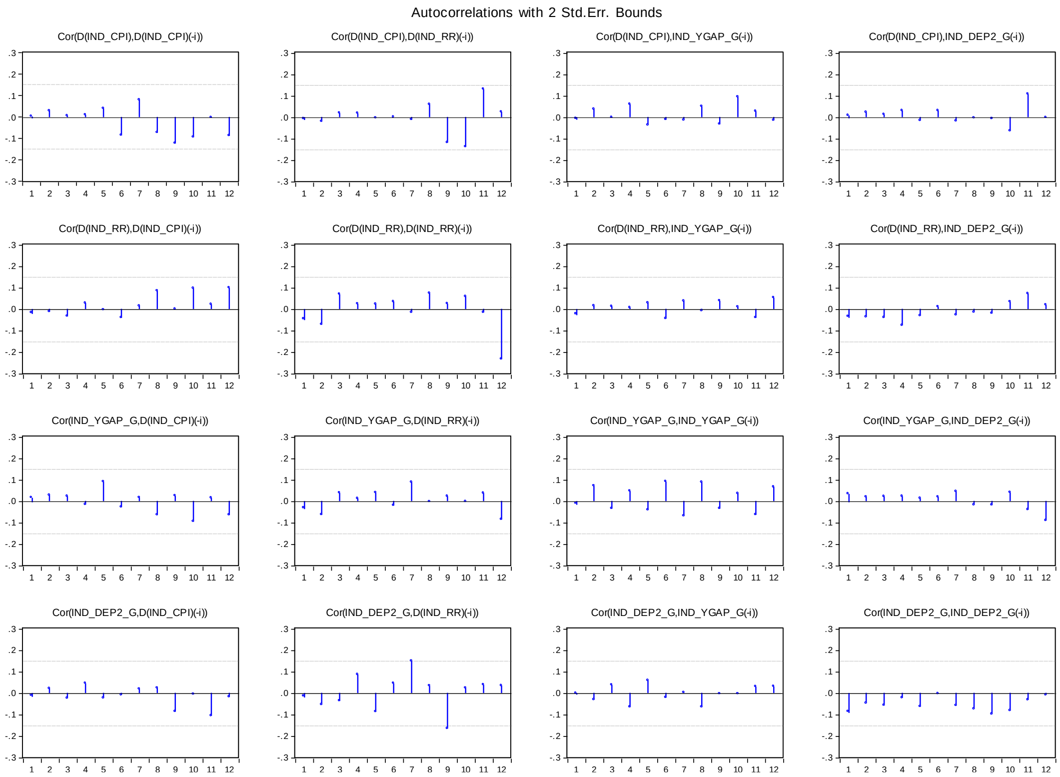


Figure 4.13: Correlogram for the VAR model 4 (elderly dependency ratio model)

Table 4.11: Serial Correlation test for VAR model 3 (youth dep. ratio model)

| Lags | LM-Stat | Prob. |
|---|---|---|
| 1 | 19.68857 | 0.2346 |
| 2 | 13.33484 | 0.6481 |
| 3 | 14.47701 | 0.5632 |
| 4 | 15.7917 | 0.4676 |
| 5 | 17.65385 | 0.3446 |
| 6 | 11.76948 | 0.7597 |
| 7 | 6.248365 | 0.9852 |
| 8 | 15.43965 | 0.4927 |
| 9 | 21.08334 | 0.1753 |
| 10 | 30.10703 | 0.0175 |
| 11 | 18.79113 | 0.2796 |
| 12 | 39.86938 | 0.0008 |
| 13 | 30.45974 | 0.0158 |
| 14 | 15.97311 | 0.4548 |
| 15 | 8.475442 | 0.9334 |

Table 4.12: Serial Correlation test for VAR model 4 (elderly dep. ratio model)

| Lags | LM-Stat | Prob. |
|---|---|---|
| 1 | 23.61297 | 0.0983 |
| 2 | 17.03923 | 0.3831 |
| 3 | 13.55146 | 0.6321 |
| 4 | 15.42382 | 0.4938 |
| 5 | 13.00954 | 0.6721 |
| 6 | 10.87693 | 0.8170 |
| 7 | 15.98891 | 0.4537 |
| 8 | 20.62327 | 0.1935 |
| 9 | 23.95114 | 0.0906 |
| 10 | 23.76635 | 0.0947 |
| 11 | 22.11753 | 0.1394 |
| 12 | 31.43807 | 0.0118 |
| 13 | 24.71496 | 0.0750 |
| 14 | 30.33706 | 0.0163 |
| 15 | 16.64343 | 0.4090 |

Then the model diagnostics tests conducted to identify the appropriateness of these models. First serial correlation LM test (Table 4.11 & Table 4.12) was conducted and identified there are no serial correlation in these models.

Table 4.13: Heteroscedasticity test for VAR model 3 (youth dep. ratio model)

Joint test:

| Chi-sq | df | Prob. |
|---|---|---|
| 1104.493 | 1120 | 0.6236 |

Individual components:

| Dependent | R-squared | F(112,63) | Prob. | Chi-sq(112) | Prob. |
|---|---|---|---|---|---|
| res1*res1 | 0.624131 | 0.934032 | 0.6283 | 109.8471 | 0.5399 |
| res2*res2 | 0.844870 | 3.063483 | 0.0000 | 148.6971 | 0.0116 |
| res3*res3 | 0.486250 | 0.532391 | 0.9982 | 85.58007 | 0.9700 |
| res4*res4 | 0.684368 | 1.219639 | 0.1951 | 120.4488 | 0.2759 |
| res2*res1 | 0.622558 | 0.927796 | 0.6396 | 109.5702 | 0.5473 |
| res3*res1 | 0.497725 | 0.557404 | 0.9964 | 87.59958 | 0.9574 |
| res3*res2 | 0.549070 | 0.684921 | 0.9591 | 96.63627 | 0.8491 |
| res4*res1 | 0.641220 | 1.005314 | 0.4988 | 112.8548 | 0.4596 |
| res4*res2 | 0.554693 | 0.700673 | 0.9491 | 97.62592 | 0.8314 |
| res4*res3 | 0.601879 | 0.850386 | 0.7738 | 105.9307 | 0.6437 |

Table 4.14: Heteroscedasticity test for VAR model 4 (elderly dep. ratio model)

Joint test:

| Chi-sq | df | Prob. |
|---|---|---|
| 1162.555 | 1120 | 0.1835 |

Individual components:

| Dependent | R-squared | F(112,63) | Prob. | Chi-sq(112) | Prob. |
|---|---|---|---|---|---|
| res1*res1 | 0.661762 | 1.100532 | 0.3424 | 116.4702 | 0.3672 |
| res2*res2 | 0.892788 | 4.684097 | 0.0000 | 157.1306 | 0.0032 |
| res3*res3 | 0.481649 | 0.522672 | 0.9986 | 84.77023 | 0.9742 |
| res4*res4 | 0.713835 | 1.403148 | 0.0709 | 125.6349 | 0.1786 |
| res2*res1 | 0.659126 | 1.087668 | 0.3617 | 116.0061 | 0.3787 |
| res3*res1 | 0.675774 | 1.172398 | 0.2465 | 118.9361 | 0.3091 |
| res3*res2 | 0.492190 | 0.545198 | 0.9974 | 86.62547 | 0.9639 |
| res4*res1 | 0.588852 | 0.805620 | 0.8407 | 103.6379 | 0.7014 |
| res4*res2 | 0.661065 | 1.097111 | 0.3474 | 116.3475 | 0.3702 |
| res4*res3 | 0.691990 | 1.263741 | 0.1551 | 121.7903 | 0.2482 |

Then heteroscedasticity test (Table 4.13 & 4.14) was conducted to identify the constant residual variance. According to the results residuals of these two models does not have heteroscedasticity in 95% confidence level.

## 4.7 VAR model for Bangladesh

The fifth VAR model (Table A13) fitted for Bangladesh with variables CPI, real interest rate, growth of y gap and growth of youth dependency ratio and the sixth VAR model (Table A16) with above variables with replacing the growth of youth dependency ratio from growth of elderly dependency ratio. Then the lag length criteria was conducted to identify the best lag length for these models (Table A14 and Table A17). The optimum lag value selected for model five and six are lag 5 and lag 14 respectively. Fifth model does not become stable when the lag value exceed 11, therefore lag five selected to be the best as it satisfy the maximum of model diagnostics.

Then the roots of characteristic polynomial (Table A15 and Table A18) obtained to identify the stability of these models. As shown in the figure 4.14 and figure 4.15 all roots lies within the circle. Therefore it can be concluded that these two VAR models are stable.

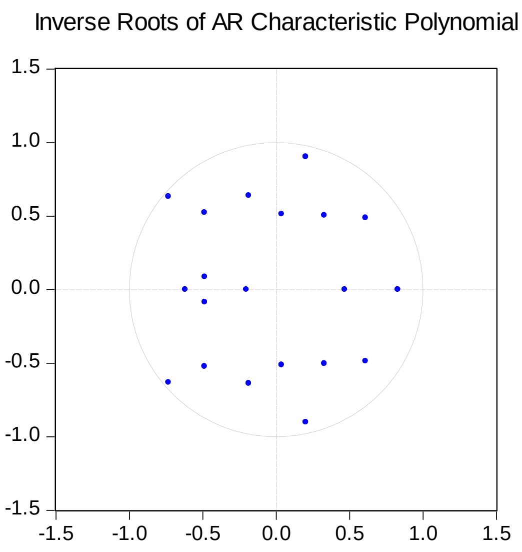


Figure 4.14: Root circle for VAR model 5 (youth dependency ratio model)

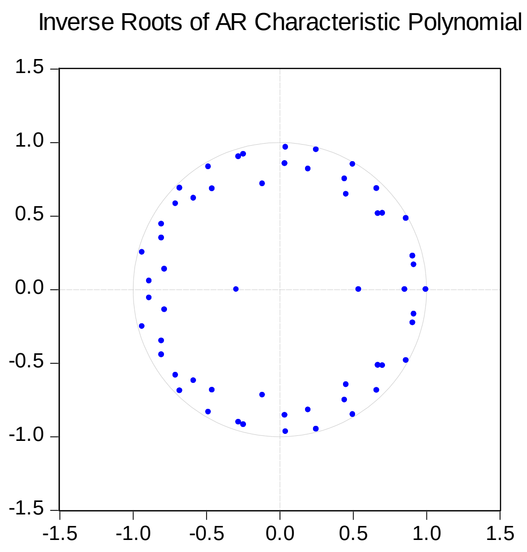


Figure 4.15: Root circle for VAR model 6 (elderly dependency ratio model)

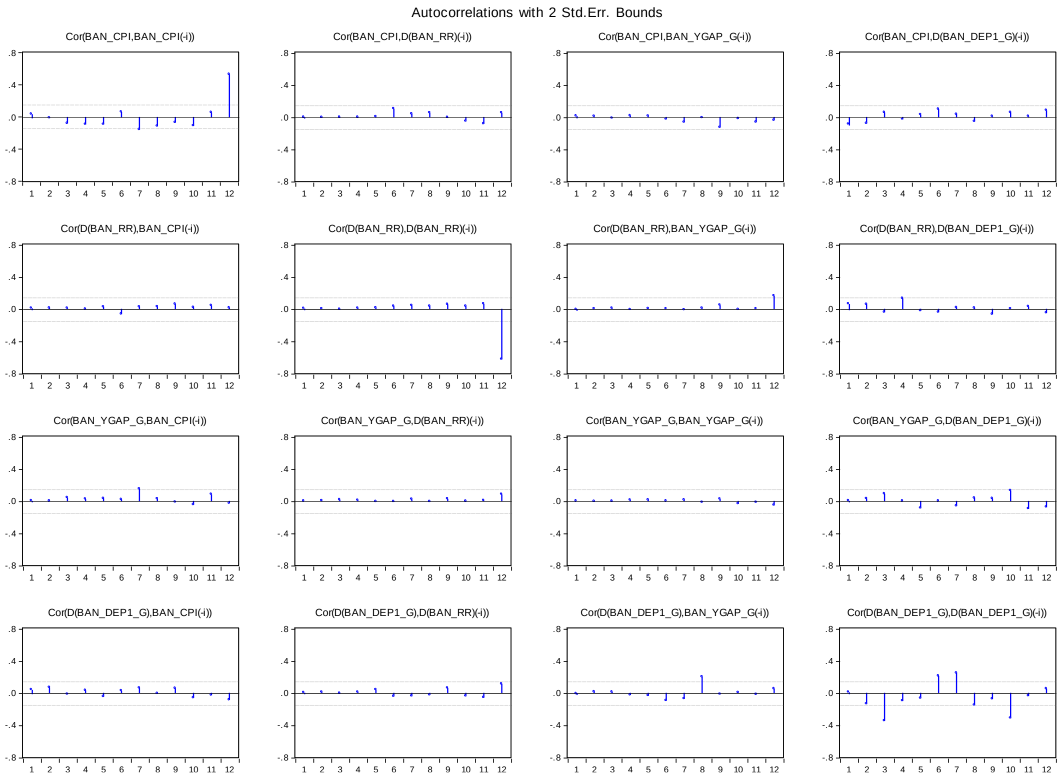


Figure 4.16: Correlogram for the VAR model 5 (youth dependency ratio model)

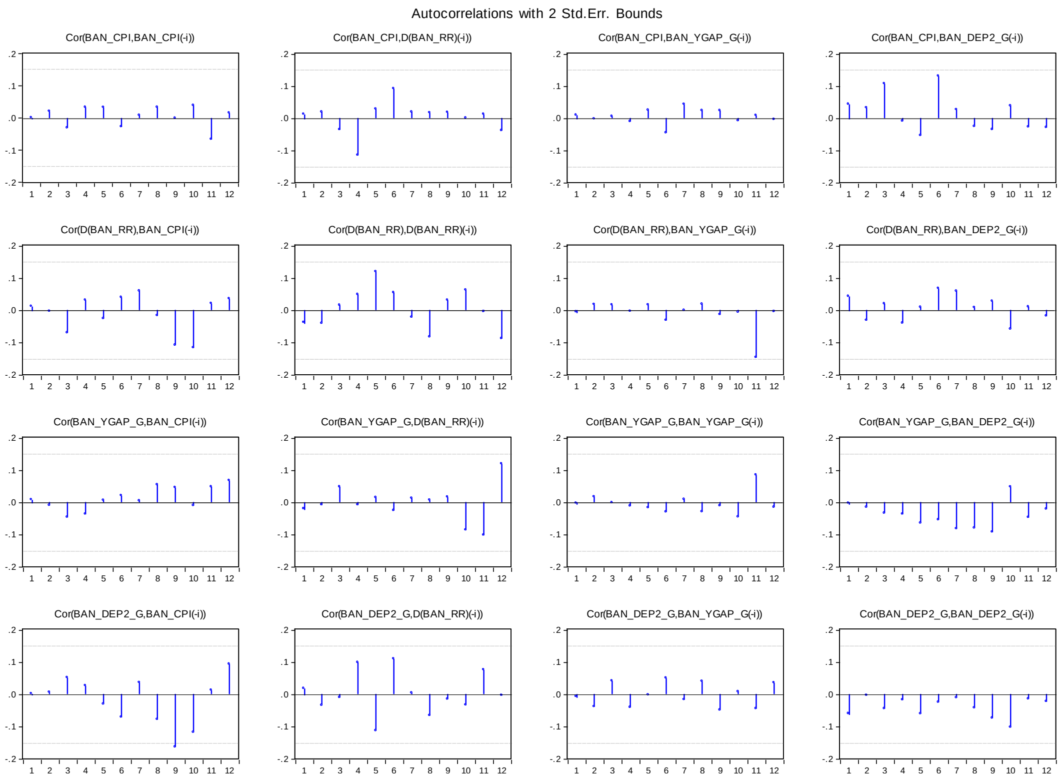


Figure 4.17: Correlogram for the VAR model 6 (elderly dependency ratio model)

Then the correlogram obtained to identify the residual correlation of these models. 5th model shows some significant spikes lying outside of the 95% of confidence level. But for the 6th model there are no significant spikes lying outside of the confidence level as the lag selected 14 for these models.

Then the model diagnostics tests conducted to identify the appropriateness of these models. First serial correlation LM test (Table 4.7 & Table 4.8) was conducted and identified there are no serial correlation in the sixth model but there are some serial correlation in the 5th model.

Table 4.15: Serial Correlation test for VAR model 5 (youth dep. ratio model)

| Lags | LM-Stat | Prob. |
|---|---|---|
| 1 | 17.48456 | 0.3549 |
| 2 | 20.75568 | 0.1881 |
| 3 | 58.41169 | 0.0000 |
| 4 | 28.63166 | 0.0265 |
| 5 | 17.30556 | 0.3661 |
| 6 | 23.25218 | 0.1072 |

Table 4.16: Serial Correlation test for VAR model 6 (elderly dep. ratio model)

| Lags | LM-Stat | Prob. |
|---|---|---|
| 1 | 17.84992 | 0.3328 |
| 2 | 9.536954 | 0.8897 |
| 3 | 16.75164 | 0.4018 |
| 4 | 12.54107 | 0.706 |
| 5 | 17.83942 | 0.3334 |
| 6 | 28.34305 | 0.0288 |
| 7 | 10.02603 | 0.8653 |
| 8 | 13.14688 | 0.662 |
| 9 | 27.67397 | 0.0346 |
| 10 | 24.12904 | 0.0867 |
| 11 | 38.24288 | 0.0014 |
| 12 | 15.06324 | 0.52 |
| 13 | 7.746342 | 0.9561 |
| 14 | 13.84192 | 0.6105 |
| 15 | 8.393499 | 0.9363 |

Then heteroscedasticity test (Table 4.17 & 4.18) was conducted to identify the constant residual variance. According to the results residuals of these two models does not have heteroscedasticity in 95% confidence level.

Table 4.17: Heteroscedasticity test for VAR model 5 (youth dep. ratio model)

Joint test:

| Chi-sq | df | Prob. |
|---|---|---|
| 363.3949 | 400 | 0.9053 |

Individual components:

| Dependent | R-squared | F(112,63) | Prob. | Chi-sq(112) | Prob. |
|---|---|---|---|---|---|
| res1*res1 | 0.168257 | 0.728258 | 0.878 | 31.12747 | 0.8415 |
| res2*res2 | 0.139119 | 0.581761 | 0.976 | 25.73694 | 0.9608 |
| res3*res3 | 0.244554 | 1.165398 | 0.2547 | 45.24253 | 0.2623 |
| res4*res4 | 0.499701 | 3.595698 | 0.0000 | 92.44470 | 0.0000 |
| res2*res1 | 0.089909 | 0.355648 | 0.9999 | 16.63316 | 0.9996 |
| res3*res1 | 0.212942 | 0.973994 | 0.5223 | 39.39420 | 0.4974 |
| res3*res2 | 0.175245 | 0.764931 | 0.8370 | 32.42027 | 0.7973 |
| res4*res1 | 0.142717 | 0.599312 | 0.9694 | 26.40259 | 0.9516 |
| res4*res2 | 0.110216 | 0.445924 | 0.9981 | 20.38989 | 0.9958 |
| res4*res3 | 0.270239 | 1.333125 | 0.1128 | 49.99429 | 0.1337 |

Table 4.18: Heteroscedasticity test for VAR model 6 (elderly dep. ratio model)

Joint test:

| Chi-sq | df | Prob. |
|---|---|---|
| 1157.538 | 1120 | 0.2123 |

Individual components:

| Dependent | R-squared | F(112,63) | Prob. | Chi-sq(112) | Prob. |
|---|---|---|---|---|---|
| res1*res1 | 0.742683 | 1.623521 | 0.0182 | 130.7122 | 0.1092 |
| res2*res2 | 0.610474 | 0.881564 | 0.7218 | 107.4435 | 0.6041 |
| res3*res3 | 0.569791 | 0.745005 | 0.9122 | 100.2833 | 0.7785 |
| res4*res4 | 0.607265 | 0.869762 | 0.7419 | 106.8786 | 0.6190 |
| res2*res1 | 0.591641 | 0.814964 | 0.8276 | 104.1288 | 0.6893 |
| res3*res1 | 0.835417 | 2.855231 | 0.0000 | 147.0334 | 0.0147 |
| res3*res2 | 0.658357 | 1.083955 | 0.3674 | 115.8708 | 0.3820 |
| res4*res1 | 0.652615 | 1.056743 | 0.4108 | 114.8603 | 0.4075 |
| res4*res2 | 0.658924 | 1.086693 | 0.3632 | 115.9706 | 0.3796 |
| res4*res3 | 0.566143 | 0.734011 | 0.9226 | 99.64125 | 0.7920 |

### 4.8 Impulse response & variance decomposition (Cholesky decomposition)

In order to obtain the impulse response using Cholesky decomposition, the order of Cholesky variables should be identified. According to the fishers effect the real interest rate depends on the inflation. Therefore the inflation should be prior to the real interest rate in Cholesky ordering. And also according to the Taylor rule, interest rate depends on the output gap, which means in the Cholesky ordering output gap should prior to interest rate. Considering there is no immediate effect from demographic variable to other variables it kept in the last position in Cholesky ordering. Therefore CPI, Output gap, real interest rate and demographic variable is the suitable Cholesky ordering for these models which is same as Gaofeng Han (2018) used in his model where it described in the literature review.

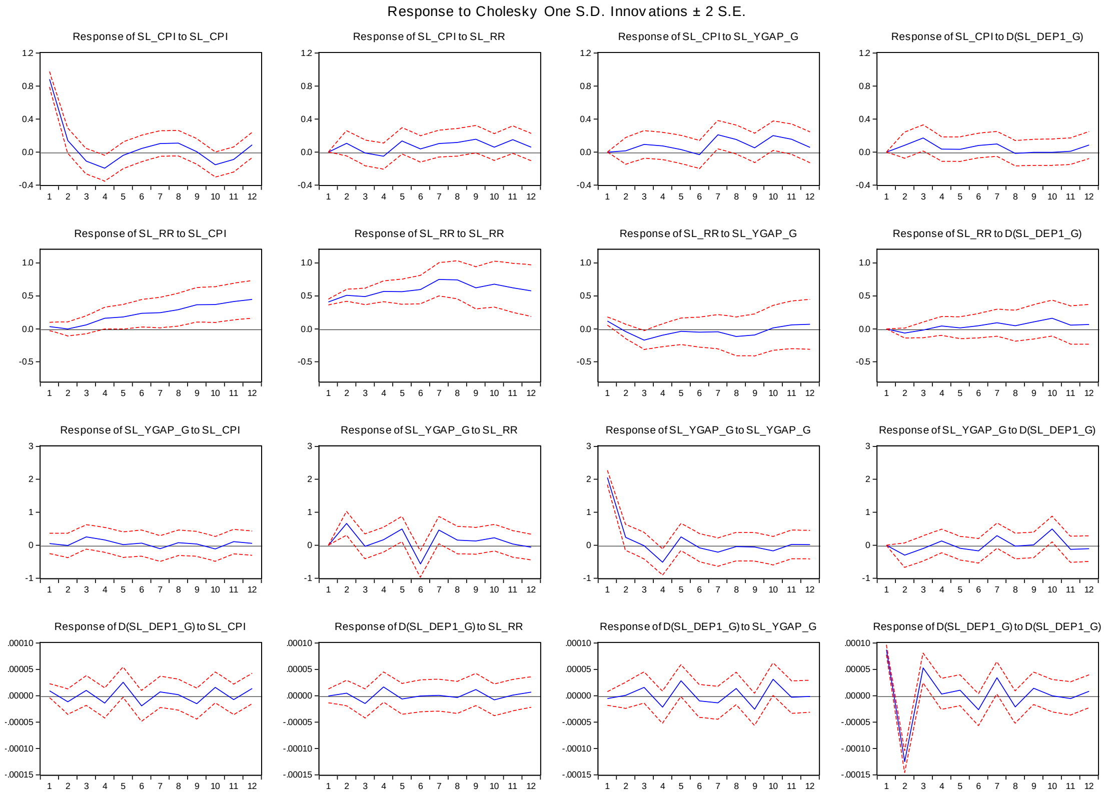


Figure 4.18: Impulse response of VAR model 1 (SL youth dep.)

1st row of Figure 4.18 shows that the there is no immediate shock from other variables to CPI but CPI itself. In the second and third month it shows there is a positive but statistically insignificant effect from real interest rate, output gap growth and youth dependency ratio growth. In the 9th and 10th month there is no effect from youth dependency ratio to CPI as the shock line goes through zero. 2nd row shows real interest rate has a gradually increasing significant effect from CPI with the time and real interest rate itself has a significant impact through the time. 3rd row shows the immediate effect for output gap has a positive but statistically insignificant effect from the real interest rate and then it shows a negative effect until the 10th month. Last row shows the youth dependency ratio growth shows almost no effect until 5th month and then it shows a positive insignificant effect. Output gap shows both positive and negative insignificant effects for the shock of real interest rate. The shocks of youth dependency ratios affect insignificantly negative to output gap in first month and then it shows a positive effect until fourth month. Then it again shows a negative effect and at the $10^{th}$ month it shows highest shock.

The variance decomposition of CPI (Table A19) shows that the 100% of first month variance explained by itself and then it gradually decrease with the time until it become 74% at the $12^{th}$ month. Real interest rate and output gap explain 9% and 12% of total variance respectively at the $12^{th}$ month. Youth dependency ratio growth explain up to 5% of total variance. 91% of total variance of real interest rate explained by itself and 8% explained by output gap at the $1^{st}$ month. At the $12^{th}$ month that changes in to 80% and 1% respectively and CPI and youth dependency growth rate goes as 16% and 1% respectively. Then the total variance of output gap explained by itself from 100% to 70% with the time. Real interest rate explain 20% of total variance at the $12^{th}$ month and the youth dependency growth rate explains 7% of the total variance at the $10^{th}$, $11^{th}$ and $12^{th}$ months. Variance decomposition of youth dependency growth rate explained 98% itself at the $1^{st}$ month. At the month 12 10% of total variance explained by output gap.

Figure 4.19 shows the shocks of elderly dependency ratio does not effect on CPI until $9^{th}$ month. After that at $10^{th}$ month it shows a negative but statistically insignificant effect and then in $11^{th}$ and $12^{th}$ month the effect starting to turns into positive. The shocks of elderly dependency ratio affect real interest rate slightly, but with the time it increases. Responses for the real interest rate from itself and CPI have a statistically significant and increasing effect.

Table A20 shows the variance decomposition of the $2^{nd}$ VAR model. Total variance of CPI explained it self from 100% to 75% throughout the time. Real interest rate and output gap explain 9% and 11% of total variance at the month 12. Elderly dependency ratio growth does not shows a significant impact on total variance until the month 6. Then it goes to 4% at the $12^{th}$ month. Total variance of real interest rate explained 91% and 7% respectively by itself and output gap at the $1^{st}$ month. Then it decrease to 81% and 2% respectively with the time. Elderly dependency ratio growth rate explain maximum of 2% of total variance. Elderly dependency ratio growth rate explain up to 7% of total variance of output gap. The variable output gap itself explain 100% to 71% by the time. Real interest rate explain 18% of total variance from the month 6 onwards. Total variance of elderly dependency ratio does not explained 100% by itself at the 1st month but 4% by CPI and then it increase to 17% at the month 12.

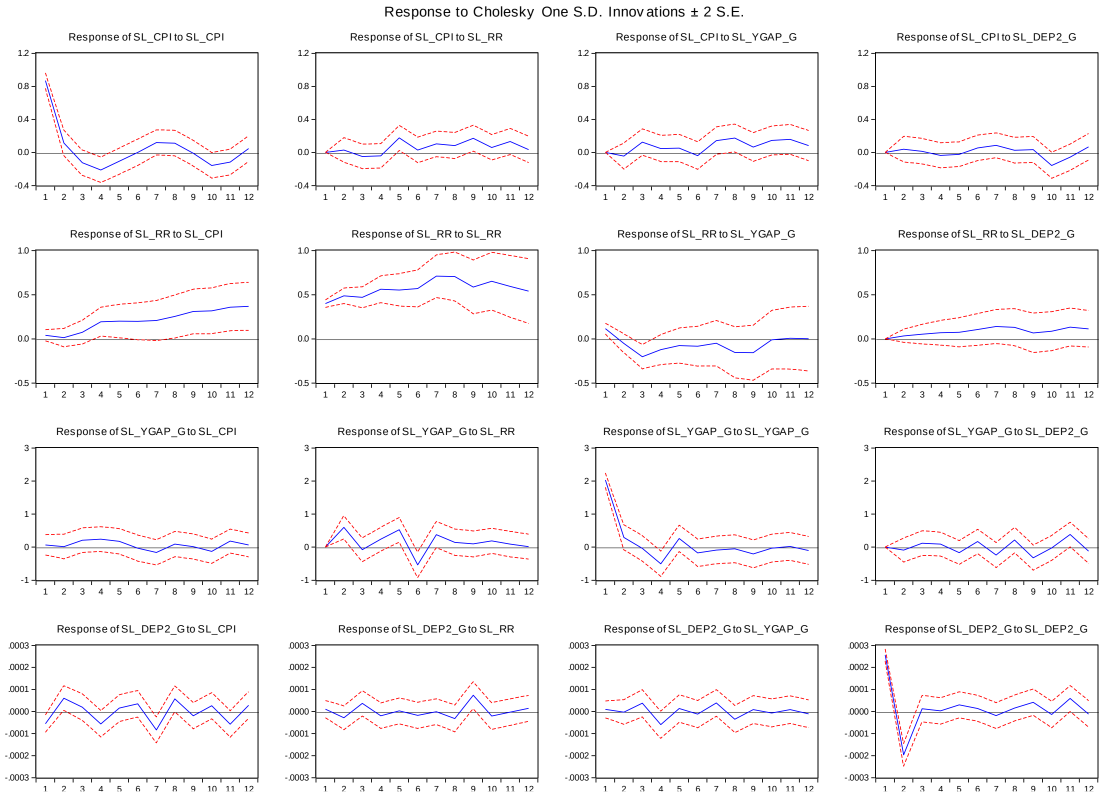


Figure 4.19: Impulse response of VAR model 2 (SL elderly dep.)

1st row of figure 4.20 shows that there is no immediate effect on CPI from other variables but CPI itself. Shocks of youth dependency ratio has almost zero effect on CPI. The shocks of output gap on real interest rate has negative insignificant immediate effect and then it turns in to zero with the time in the 2nd row. In the 3rd row it shows that the shocks of CPI shows negative effect on output gap.

Table A21 shows the variance decomposition of 3rd VAR model. It shows that the total variance of CPI explained by itself at the month 1 and it decreases to 84% during the period. Real interest rate and output gap explain 7% and 5% respectively at the month 12. Youth dependency ratio CPI, and output gap explains up to 2% of total variance of real interest rate and real interest rate itself explain 96% to 93% of total variance during the period. 97% - 82% of total variance of output gap explained by itself and 4% of youth dependency ratio explains at the month 12. CPI explains 2% to 9% of total variance of output gap and real interest takes that value as 5%. 100% to 80% of total variance of youth dependency ratio explained by itself and output gap explains 14% of total variance at the month 12. Impact of real interest rate and CPI is negligible until the month 6, then it increase to 2% & 4% respectively.

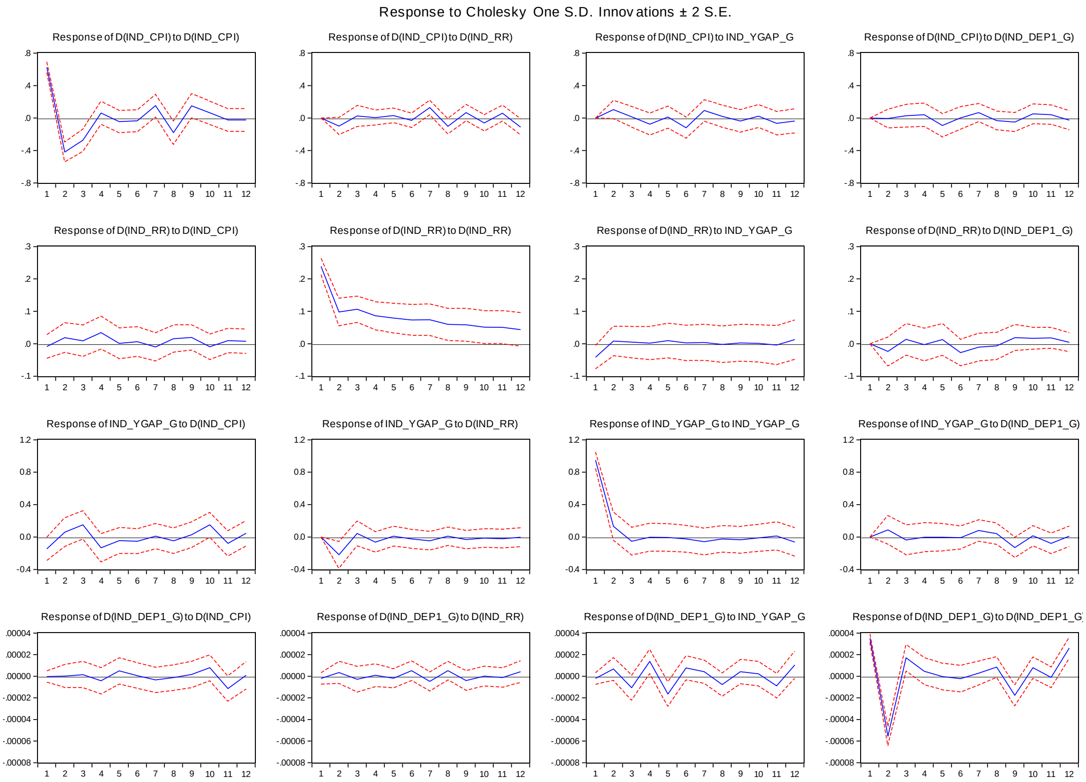


Figure 4.20: Impulse response of VAR model 3 (India youth dep.)

Figure 4.21 shows that the shocks from elderly dependency ratio does not have a significant effect on CPI. And the shocks for output gap has an immediate negative effect on real interest rate.

Table A22 shows the variance decomposition of the 4$^{th}$ model. Total variance of CPI at the 12$^{th}$ month explained 84%, 6%, 6% and 4% by variable itself, real interest rate, output gap and elderly dependency ratio growth. Total variance of real interest rate explained 94% and 5% respectively by itself and output gap at the 1$^{st}$ month and then it decreased to 91% and 2% respectively. Elderly dependency ratio does not show a significant impact until the month 6 and then it increase to 3% by the time. Total variance of output gap at the month 12 explained 84%, 7%, 5% and 3% by itself, CPI, real interest rate and elderly dependency ratio respectively. Except in 1st month real interest rate explains 5% of total variance all the time. Total variance of elderly dependency ratio explained by itself from 99% to 86% by the time. Output gap explains 7% of total variance at the month of 12 and CPI, real interest rate takes that value 3% & 2% respectively.

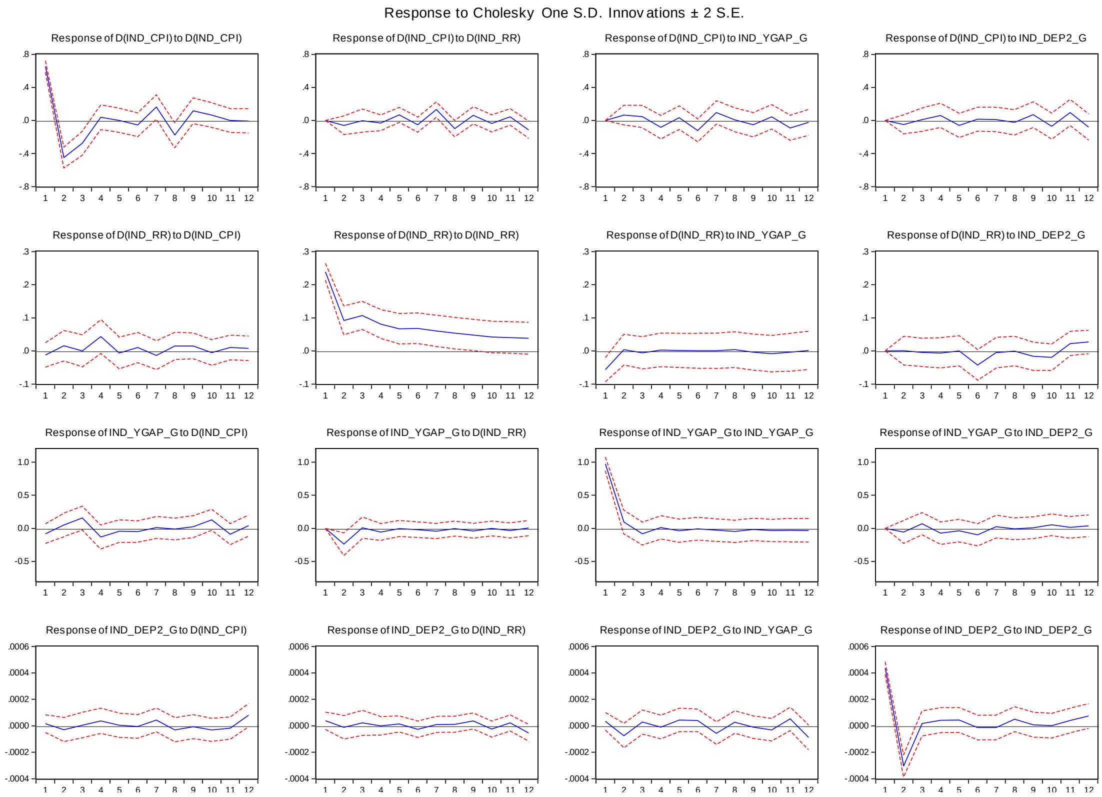


Figure 4.21: Impulse response of VAR model 4 (India elderly dep.)

Figure 4.22 shows that there is no significant effect on CPI from the shocks of youth dependency ratio, but from output gap there is a significant effect for the 4th and 6th month.

Table A23 shows the variance decomposition of 5th VAR model. That indicates the total variance of CPI explained by youth dependency ratio growth is less than 1% for period 1 to 12. Real interest rate also shows nearly 1% of total variance of CPI. Until the 5th month output gap does not show a significant impact on CPI, but from 6th month onwards it explains 10% of total variance of CPI. Total variance of real interest rate almost explained by itself for all the time as the other variables explains only 1%. Total variance of output gap explained by itself from 99% to 94% throughout the time. Youth dependency ratio contribute 2% of total variance by explaining output gap. Real interest rate ranges through 1% to 2% of total variance and CPI goes up to 2% at the period 12. Even though other models shows that the dependency ratio has a significant impact from output gap this model indicates it is less than 1% of total variance. CPI explains up to 5% and real interest rate explains up to 3% of total variance.

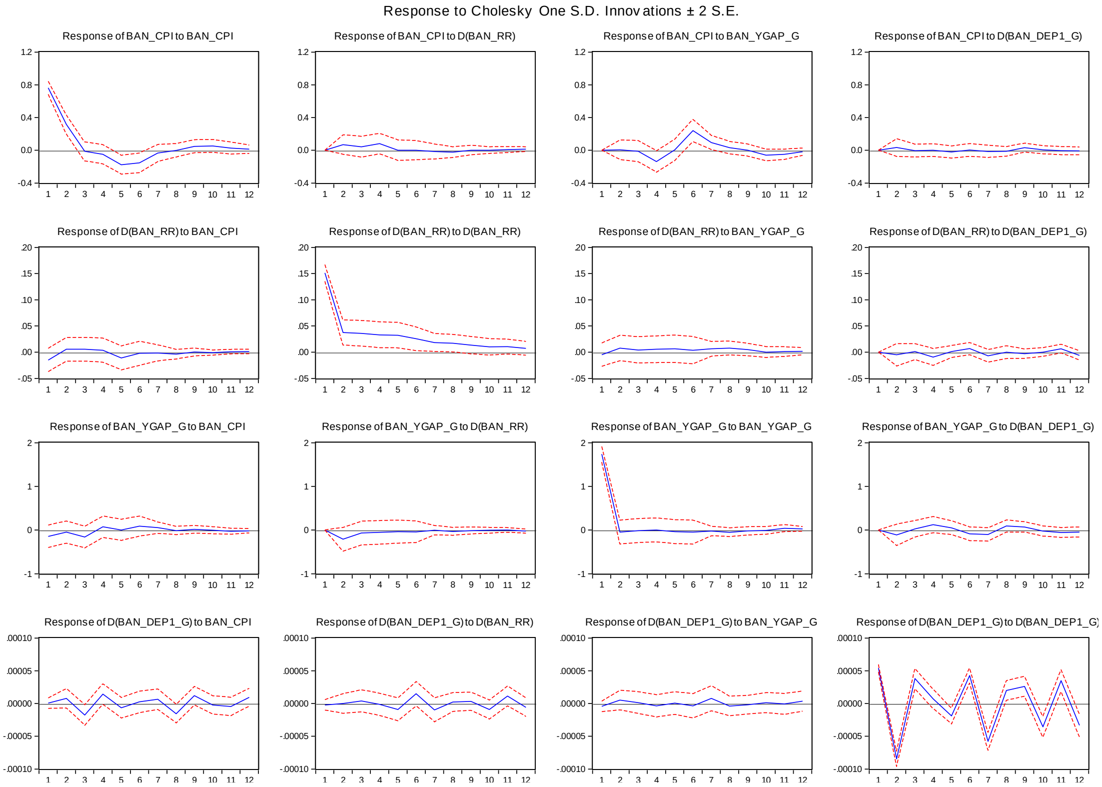


Figure 4.22: Impulse response of VAR model 5 (Bangladesh youth dep.)

Figure 4.23 shows that the shocks on output gap has a significant effect on CPI on 4$^{th}$ month onwards.

Table A24 indicates the variance decomposition of 6$^{th}$ VAR model. 1$^{st}$ month total variance of CPI explained by itself and then it decreased to 71% with the time. Then the output gap shows a significant change in 6$^{th}$ month onwards by explaining 16% to 20% of total variance of CPI. Elderly dependency ratio explains 3% of total variance while real interest rate explains only 3%. Total variance of real interest rate explained by itself from 99% to 83% throughout the period. CPI and output gap explain 5% and 4% in the 12$^{th}$ month respectively. Elderly dependency ratio explain 2% to 7% from the total variance of real interest rate. Total variance of output gap explained 4% by elderly dependency ratio and CPI. Real interest rate explains 7% of total output gap variance through all the periods except 1st month. Output gap explains 5% of total variance of elderly dependency ratio and CPI explains 10% of it. Dependency ratio itself explains from 95% to 78% through the periods.

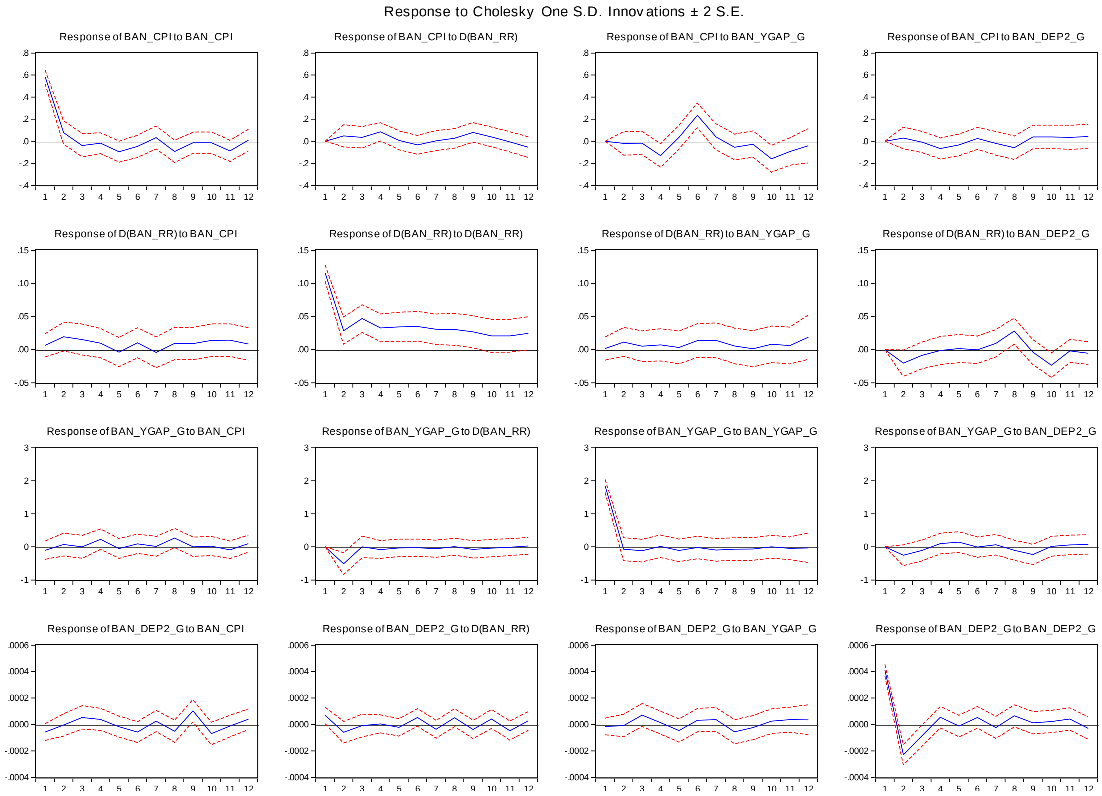


Figure 4.23: Impulse response of VAR model 6 (Bangladesh elderly dep.)

# CHAPTER 05

# CONCLUSION

## 5.1 Conclusion

According to the results, it can be seen that the youth dependency ratio growth for Sri Lanka has a negative insignificant effect on interest rate channel, positive significant effect on inflation and mixed insignificant effects on output gap. That mixed results tends to be negative in short term and tends to be positive in long term. Elderly dependency ratio growth has a positive insignificant effect in short term and negative insignificant effect in long term on both interest rate channel and inflation. For output gap it has negative insignificant effect in short term and positive insignificant effect in long term from elderly dependency ratio growth. Therefore it can be concluded that youth dependency ratio growth is inflationary for Sri Lanka and elderly dependency ratio rate has no any significant effect on inflation for Sri Lanka. The variance decomposition of youth dependency ratio reveals that the contemporaneous effect of youth dependency ratio growth on inflation is around 1.1% and with the time it increases up to 5.7% at the month 7 and then it decreases to 5.1% at the month 10. The elderly dependency ratio growth has an insignificant contemporaneous effect on inflation which is 4.5% and it decreases with the time up to 4% and then increases up to 5.1%. Summarizing the above statements, it can be concluded that the youth dependency ratio growth rate explains 5% of total variance of CPI over the period of 10 months.

When it comes to India, results indicated that India also have a positive but insignificant effect on inflation from youth dependency ratio growth; and negative insignificant effect on inflation from elderly dependency ratio growth. From youth dependency ratio growth it has a positive insignificant effect on output gap in short term and negative insignificant effect in long term. Therefore it can be concluded that youth dependency ratio growth and elderly dependency ratio growth have no significant effect on inflation for India. Variance decomposition of youth and elderly dependency ratio growth indicates that the contemporaneous effect of both dependency ratios on inflation is insignificant and in long term it reaches around 2%. The impact of dependency ratio on inflation is count to be less than Sri Lanka but to be around 2% of total variance over the period of 10 months.

Bangladesh also have similar results to India which can be concluded that there is a positive but insignificant effect on inflation from youth dependency ratio growth and negative insignificant effect from elderly dependency ratio growth. Both youth and elderly dependency ratio have a negative insignificant effect on output gap in short term and positive insignificant effect in long term. The variance decomposition reveals that there is a very small effect from youth dependency ratio to inflation as it varies around 0.006% to 0.5%. The elderly dependency ratio growth has a contemporaneous effect which is 2.1% and with the time it increases to 3.6% at the month 10. Overall it can be concluded that 2% of total CPI variance explained by dependency ratio growth over the period of 10 months.

Finally it can be concluded that the youth dependency ratio growth for Sri Lanka is inflationary and elderly dependency ratio growth has no significant effect on inflation for Sri Lanka. For India and Bangladesh it can be concluded that there is no significant effect from youth and elderly dependency ratios on inflation or output gap.

With comparing the findings of the study of Gaofeg Han (2018) it indicated that both youth and elderly dependency ratios are significantly affect for inflation for China, Hong Kong and Singapore. Youth dependency ratios are inflationary and elderly dependency ratios are disinflationary for those countries. Findings of the study of Mikael Juselius and Előd Takáts (2018) indicated that both youth and elderly dependency ratios are associated with inflation and working age population associated with lower inflation.

According to the findings of the literatures and the finding of this study, youth dependency ratio for Sri Lanka has the same effect on inflation as above studies. But the elderly dependency ratio for Sri Lanka and both youth and elderly dependency ratios for India and Bangladesh do not behave as above studies. This study indicated that there is no significant effect on inflation from above mentioned variables.

## 5.2 Policy implications

The policy goal is to reduce the inflation which will affect the economical growth of the country and for that there are several options suggested here to be execute to answer this issue.

Increasing working age population is the first option in short term and to do that retirement can be extended or encouraging labor immigration can be done. Second option is to increase the healthcare services for elderly population. Which will create expansionary effects in the upstream industries. Third option is reducing short term interest rates will reduce the inflation in an aging environment as interest rate response function shows.

## 5.3 Limitations of the research

The main limitation of this research to be discussed is the impact of both youth and elderly dependency ratios on inflation cannot be examine at once as both variables are highly correlated, therefore it may lead to multicollinearity if it modelled in a single VAR model. This issue needs to be answered future researchers as it is important to have both variables in a single model.

Second limitation of this study is the lack of monthly observations. Some of the observations obtained yearly and interpolated monthly to avoid the over parameterization.

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# APPENDIX

## Table A1: VAR model for Sri Lanka (youth dependency ratio)

Vector Autoregression Estimates
Date: 08/10/20 Time: 21:34
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | SL_CPI | SL_RR | SL_YGAP_G | D(SL_DEP1_G) |
|---|---|---|---|---|
| SL_CPI(-1) | 0.138055 | -0.03831 | -0.03749 | 1.93E-06 |
| | -0.0863 | -0.04166 | -0.20137 | -8.60E-06 |
| | [ 1.59962] | [-0.91940] | [-0.18619] | [ 0.22399] |
| SL_CPI(-2) | -0.15982 | 0.08144 | 0.37456 | 8.36E-06 |
| | -0.08662 | -0.04181 | -0.2021 | -8.60E-06 |
| | [-1.84519] | [ 1.94769] | [ 1.85333] | [ 0.96888] |
| SL_CPI(-3) | -0.21198 | 0.099323 | 0.007214 | -7.17E-06 |
| | -0.08761 | -0.04229 | -0.20443 | -8.70E-06 |
| | [-2.41948] | [ 2.34834] | [ 0.03529] | [-0.82210] |
| SL_CPI(-4) | -0.08349 | 0.011935 | -0.17233 | 1.45E-05 |
| | -0.08993 | -0.04341 | -0.20983 | -9.00E-06 |
| | [-0.92839] | [ 0.27493] | [-0.82128] | [ 1.62132] |
| SL_CPI(-5) | -0.00961 | 0.050504 | 0.376192 | 5.25E-06 |
| | -0.08969 | -0.0433 | -0.20927 | -8.90E-06 |
| | [-0.10715] | [ 1.16644] | [ 1.79763] | [ 0.58819] |
| SL_CPI(-6) | -0.03327 | 0.002041 | -0.39544 | 1.46E-06 |
| | -0.08448 | -0.04078 | -0.19712 | -8.40E-06 |
| | [-0.39378] | [ 0.05005] | [-2.00612] | [ 0.17345] |
| SL_CPI(-7) | 0.016158 | 0.067579 | 0.10034 | 3.22E-06 |
| | -0.08292 | -0.04003 | -0.19349 | -8.30E-06 |
| | [ 0.19485] | [ 1.68814] | [ 0.51859] | [ 0.38958] |
| SL_CPI(-8) | -0.09543 | 0.015609 | 0.08822 | -1.19E-05 |
| | -0.0821 | -0.03963 | -0.19156 | -8.20E-06 |

| | | | | |
|---|---|---|---|---|
| | [-1.16238] | [ 0.39383] | [ 0.46053] | [-1.46096] |
| | | | | |
| SL_CPI(-9) | -0.20198 | -0.04195 | -0.50748 | -1.46E-06 |
| | -0.08013 | -0.03868 | -0.18695 | -8.00E-06 |
| | [-2.52079] | [-1.08464] | [-2.71445] | [-0.18281] |
| | | | | |
| SL_CPI(-10) | -0.08139 | 0.056624 | 0.192268 | -5.32E-06 |
| | -0.0833 | -0.04021 | -0.19436 | -8.30E-06 |
| | [-0.97712] | [ 1.40814] | [ 0.98925] | [-0.64114] |
| | | | | |
| SL_CPI(-11) | -0.08119 | 0.025215 | -0.13153 | 7.63E-06 |
| | -0.08476 | -0.04092 | -0.19776 | -8.40E-06 |
| | [-0.95790] | [ 0.61627] | [-0.66509] | [ 0.90345] |
| | | | | |
| SL_CPI(-12) | 0.062355 | 0.012469 | -0.00299 | 1.63E-06 |
| | -0.08392 | -0.04051 | -0.19582 | -8.40E-06 |
| | [ 0.74299] | [ 0.30777] | [-0.01527] | [ 0.19507] |
| | | | | |
| SL_CPI(-13) | -0.1206 | 2.57E-03 | -0.18771 | 9.52E-06 |
| | -0.08179 | -0.03948 | -0.19083 | -8.10E-06 |
| | [-1.47457] | [ 0.06500] | [-0.98361] | [ 1.16839] |
| | | | | |
| SL_CPI(-14) | -0.14444 | -0.02079 | 0.011704 | 9.01E-06 |
| | -0.08125 | -0.03922 | -0.18958 | -8.10E-06 |
| | [-1.77766] | [-0.53001] | [ 0.06174] | [ 1.11364] |
| | | | | |
| SL_RR(-1) | 0.259778 | 1.250031 | 1.630936 | 1.02E-05 |
| | -0.18599 | -0.08979 | -0.43397 | -1.90E-05 |
| | [ 1.39673] | [ 13.9224] | [ 3.75822] | [ 0.55193] |
| | | | | |
| SL_RR(-2) | -0.38986 | -0.18812 | -2.09838 | -2.74E-05 |
| | -0.29583 | -0.14281 | -0.69026 | -2.90E-05 |
| | [-1.31784] | [-1.31728] | [-3.03998] | [-0.93070] |
| | | | | |
| SL_RR(-3) | -0.03693 | 0.13935 | 0.688063 | 1.33E-05 |
| | -0.30833 | -0.14884 | -0.71942 | -3.10E-05 |
| | [-0.11976] | [ 0.93621] | [ 0.95642] | [ 0.43197] |
| | | | | |
| SL_RR(-4) | 0.528442 | -0.38453 | 0.939117 | 1.58E-05 |
| | -0.31459 | -0.15187 | -0.73402 | -3.10E-05 |
| | [ 1.67979] | [-2.53204] | [ 1.27942] | [ 0.50279] |
| | | | | |
| SL_RR(-5) | -0.35808 | 0.456192 | -2.62845 | -2.14E-05 |

| | | | | |
|---|---|---|---|---|
| | -0.319 | -0.15399 | -0.7443 | -3.20E-05 |
| | [-1.12253] | [ 2.96241] | [-3.53142] | [-0.67320] |
| SL_RR(-6) | 0.085472 | -0.11194 | 2.237676 | -1.69E-05 |
| | -0.3416 | -0.1649 | -0.79704 | -3.40E-05 |
| | [ 0.25021] | [-0.67885] | [ 2.80750] | [-0.49624] |
| SL_RR(-7) | -0.03686 | -0.34274 | -0.61445 | 3.99E-05 |
| | -0.35854 | -0.17309 | -0.83658 | -3.60E-05 |
| | [-0.10280] | [-1.98018] | [-0.73448] | [ 1.11850] |
| SL_RR(-8) | 0.436092 | -0.00241 | 0.300477 | -1.71E-05 |
| | -0.34191 | -0.16505 | -0.79776 | -3.40E-05 |
| | [ 1.27547] | [-0.01458] | [ 0.37665] | [-0.50341] |
| SL_RR(-9) | -0.57626 | 0.330469 | -0.30993 | 3.60E-05 |
| | -0.33575 | -0.16208 | -0.78339 | -3.30E-05 |
| | [-1.71635] | [ 2.03892] | [-0.39562] | [ 1.07731] |
| SL_RR(-10) | 0.039823 | -0.3029 | 0.243641 | -3.92E-05 |
| | -0.33343 | -0.16096 | -0.77799 | -3.30E-05 |
| | [ 0.11943] | [-1.88180] | [ 0.31317] | [-1.18096] |
| SL_RR(-11) | 0.119511 | 0.070223 | -0.27497 | 1.12E-05 |
| | -0.32228 | -0.15558 | -0.75197 | -3.20E-05 |
| | [ 0.37083] | [ 0.45136] | [-0.36566] | [ 0.34769] |
| SL_RR(-12) | -0.07097 | -0.01657 | -0.09068 | 1.54E-06 |
| | -0.30278 | -0.14617 | -0.70647 | -3.00E-05 |
| | [-0.23440] | [-0.11336] | [-0.12835] | [ 0.05123] |
| SL_RR(-13) | -0.15284 | 0.276497 | -0.25851 | -3.78E-05 |
| | -0.28299 | -0.13661 | -0.66029 | -2.80E-05 |
| | [-0.54010] | [ 2.02397] | [-0.39151] | [-1.33969] |
| SL_RR(-14) | 0.157851 | -0.20564 | 0.426477 | 3.15E-05 |
| | -0.17595 | -0.08494 | -0.41055 | -1.80E-05 |
| | [ 0.89711] | [-2.42093] | [ 1.03880] | [ 1.79764] |
| SL_YGAP_G(-1) | -0.0058 | -0.09366 | 0.011757 | -4.22E-06 |
| | -0.04045 | -0.01952 | -0.09437 | -4.00E-06 |
| | [-0.14333] | [-4.79712] | [ 0.12459] | [-1.04869] |

| | | | | |
|---|---|---|---|---|
| SL_YGAP_G(-2) | 0.080537 | -0.03779 | 0.132602 | 6.26E-06 |
| | -0.04442 | -0.02145 | -0.10365 | -4.40E-06 |
| | [ 1.81291] | [-1.76225] | [ 1.27927] | [ 1.41400] |
| SL_YGAP_G(-3) | 0.041677 | 0.054918 | -0.19621 | -3.95E-06 |
| | -0.04383 | -0.02116 | -0.10226 | -4.40E-06 |
| | [ 0.95096] | [ 2.59577] | [-1.91876] | [-0.90510] |
| SL_YGAP_G(-4) | -0.04114 | 0.01301 | -0.02038 | 4.72E-06 |
| | -0.04666 | -0.02253 | -0.10888 | -4.60E-06 |
| | [-0.88162] | [ 0.57754] | [-0.18715] | [ 1.01615] |
| SL_YGAP_G(-5) | 0.042625 | -0.03397 | 0.155953 | 1.08E-05 |
| | -0.04704 | -0.02271 | -0.10975 | -4.70E-06 |
| | [ 0.90623] | [-1.49588] | [ 1.42102] | [ 2.29901] |
| SL_YGAP_G(-6) | 0.125014 | 0.013824 | -0.2147 | -2.10E-06 |
| | -0.04502 | -0.02173 | -0.10504 | -4.50E-06 |
| | [ 2.77702] | [ 0.63612] | [-2.04401] | [-0.46835] |
| SL_YGAP_G(-7) | 0.013938 | -0.01827 | -0.07676 | -8.28E-08 |
| | -0.04926 | -0.02378 | -0.11493 | -4.90E-06 |
| | [ 0.28298] | [-0.76824] | [-0.66787] | [-0.01687] |
| SL_YGAP_G(-8) | 0.026377 | 0.005094 | 0.134771 | -1.10E-05 |
| | -0.04972 | -0.024 | -0.116 | -5.00E-06 |
| | [ 0.53054] | [ 0.21225] | [ 1.16177] | [-2.23000] |
| SL_YGAP_G(-9) | 0.181359 | -0.01081 | -0.17856 | -1.24E-06 |
| | -0.04781 | -0.02308 | -0.11154 | -4.80E-06 |
| | [ 3.79372] | [-0.46819] | [-1.60084] | [-0.26076] |
| SL_YGAP_G(-10) | 0.0664 | 0.006619 | -0.03606 | 5.99E-06 |
| | -0.05019 | -0.02423 | -0.1171 | -5.00E-06 |
| | [ 1.32310] | [ 0.27323] | [-0.30795] | [ 1.19952] |
| SL_YGAP_G(-11) | 0.051211 | -0.00358 | 0.071085 | 2.64E-06 |
| | -0.04994 | -0.02411 | -0.11653 | -5.00E-06 |
| | [ 1.02538] | [-0.14859] | [ 0.61001] | [ 0.53023] |
| SL_YGAP_G(-12) | 0.108824 | 0.002941 | -0.16485 | -3.95E-06 |
| | -0.04784 | -0.0231 | -0.11163 | -4.80E-06 |
| | [ 2.27451] | [ 0.12732] | [-1.47665] | [-0.82854] |

| | | | | |
|---|---|---|---|---|
| SL_YGAP_G(-13) | 0.017272 | -0.02414 | -0.08412 | -1.51E-06 |
| | -0.04633 | -0.02237 | -0.10811 | -4.60E-06 |
| | [ 0.37279] | [-1.07912] | [-0.77810] | [-0.32753] |
| | | | | |
| SL_YGAP_G(-14) | 0.146461 | -0.03257 | -0.02322 | 5.36E-07 |
| | -0.046 | -0.02221 | -0.10733 | -4.60E-06 |
| | [ 3.18385] | [-1.46656] | [-0.21636] | [ 0.11703] |
| | | | | |
| D(SL_DEP1_G(-1)) | 941.1604 | -744.517 | -3481.15 | -1.43498 |
| | -909.996 | -439.295 | -2123.27 | -0.09062 |
| | [ 1.03425] | [-1.69480] | [-1.63952] | [-15.8350] |
| | | | | |
| D(SL_DEP1_G(-2)) | 3347.126 | -616.609 | -4838.33 | -1.46513 |
| | -1588.7 | -766.936 | -3706.87 | -0.15821 |
| | [ 2.10683] | [-0.80399] | [-1.30523] | [-9.26074] |
| | | | | |
| D(SL_DEP1_G(-3)) | 4560.189 | -77.6884 | -4436.78 | -1.21422 |
| | -2010.6 | -970.604 | -4691.27 | -0.20022 |
| | [ 2.26807] | [-0.08004] | [-0.94575] | [-6.06435] |
| | | | | |
| D(SL_DEP1_G(-4)) | 5346.25 | -51.7707 | -6369.11 | -0.69991 |
| | -2128.69 | -1027.61 | -4966.8 | -0.21198 |
| | [ 2.51152] | [-0.05038] | [-1.28234] | [-3.30173] |
| | | | | |
| D(SL_DEP1_G(-5)) | 6414.889 | 74.96414 | -6707.97 | -0.33281 |
| | -2079.95 | -1004.08 | -4853.09 | -0.20713 |
| | [ 3.08415] | [ 0.07466] | [-1.38221] | [-1.60678] |
| | | | | |
| D(SL_DEP1_G(-6)) | 6918.02 | 98.23128 | -4555.13 | 0.104653 |
| | -1993.78 | -962.484 | -4652.03 | -0.19855 |
| | [ 3.46980] | [ 0.10206] | [-0.97917] | [ 0.52709] |
| | | | | |
| D(SL_DEP1_G(-7)) | 6383.101 | -203.94 | -3310.91 | 0.357109 |
| | -1959.15 | -945.768 | -4571.23 | -0.1951 |
| | [ 3.25809] | [-0.21563] | [-0.72429] | [ 1.83039] |
| | | | | |
| D(SL_DEP1_G(-8)) | 5136.575 | -151.554 | -553.226 | 0.540449 |
| | -1975.31 | -953.568 | -4608.93 | -0.19671 |
| | [ 2.60039] | [-0.15893] | [-0.12003] | [ 2.74746] |
| | | | | |
| D(SL_DEP1_G(-9)) | 3143.029 | -202.268 | 5803.818 | 0.70329 |
| | -1986.4 | -958.924 | -4634.82 | -0.19781 |

| | | | | |
|---|---|---|---|---|
| | [ 1.58227] | [-0.21093] | [ 1.25222] | [ 3.55532] |
| D(SL_DEP1_G(-10)) | 1707.732 | -605.8 | 7206.387 | 0.711884 |
| | -2044.61 | -987.023 | -4770.63 | -0.20361 |
| | [ 0.83524] | [-0.61377] | [ 1.51057] | [ 3.49631] |
| D(SL_DEP1_G(-11)) | 1763.605 | -806.842 | 7761.18 | 0.712672 |
| | -2054.13 | -991.617 | -4792.83 | -0.20456 |
| | [ 0.85857] | [-0.81366] | [ 1.61933] | [ 3.48397] |
| D(SL_DEP1_G(-12)) | 1403.464 | -362.941 | 6617.858 | 0.456534 |
| | -1877.9 | -906.543 | -4381.64 | -0.18701 |
| | [ 0.74736] | [-0.40036] | [ 1.51036] | [ 2.44125] |
| D(SL_DEP1_G(-13)) | 1509.875 | -436.032 | 3736.133 | 0.146807 |
| | -1510.32 | -729.097 | -3523.98 | -0.1504 |
| | [ 0.99971] | [-0.59804] | [ 1.06020] | [ 0.97609] |
| D(SL_DEP1_G(-14)) | 1745.784 | -266.392 | 1037.447 | 0.015815 |
| | -896.249 | -432.659 | -2091.19 | -0.08925 |
| | [ 1.94788] | [-0.61571] | [ 0.49610] | [ 0.17720] |
| C | 1.088459 | 0.203221 | -1.91998 | -2.57E-05 |
| | -0.38584 | -0.18626 | -0.90028 | -3.80E-05 |
| | [ 2.82098] | [ 1.09104] | [-2.13265] | [-0.66929] |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.582017 | 0.989409 | 0.403229 | 0.807622 |
| Adj. R-squared | 0.385319 | 0.984425 | 0.122396 | 0.717092 |
| Sum sq. resids | 92.41457 | 21.53641 | 503.1186 | 9.16E-07 |
| S.E. equation | 0.881245 | 0.425415 | 2.056183 | 8.78E-05 |
| F-statistic | 2.95894 | 198.511 | 1.435833 | 8.920984 |
| Log likelihood | -193.044 | -64.8682 | -342.163 | 1428.71 |
| Akaike AIC | 2.841405 | 1.384865 | 4.535946 | -15.5876 |
| Schwarz SC | 3.868209 | 2.41167 | 5.562751 | -14.5608 |
| Mean dependent | 0.643601 | 11.9631 | 0.157532 | -8.55E-08 |
| S.D. dependent | 1.124015 | 3.40873 | 2.194889 | 0.000165 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 4.12E-09 |
| Determinant resid covariance | 8.61E-10 |
| Log likelihood | 837.8917 |
| Akaike information criterion | -6.93059 |
| Schwarz criterion | -2.82337 |

**Table A2: VAR Lag length criteria for Sri Lanka (youth dependency ratio)**

VAR Lag Order Selection Criteria
Endogenous variables: SL_CPI SL_RR SL_YGAP_G D(SL_DEP1_G)
Exogenous variables: C
Date: 08/10/20 Time: 21:35
Sample: 2003M02 2018M12
Included observations: 174

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 168.4823 | NA | 1.77E-06 | -1.8906 | -1.81798 | -1.86114 |
| 1 | 550.9505 | 742.9554 | 2.63E-08 | -6.10288 | -5.73977 | -5.95558 |
| 2 | 600.0771 | 93.17113 | 1.80E-08 | -6.48364 | -5.830047* | -6.21851 |
| 3 | 634.9643 | 64.56148 | 1.45E-08 | -6.70074 | -5.75665 | -6.317760* |
| 4 | 655.1417 | 36.412 | 1.38E-08 | -6.74876 | -5.51418 | -6.24794 |
| 5 | 673.3381 | 32.00064 | 1.35E-08 | -6.774 | -5.24894 | -6.15534 |
| 6 | 696.8961 | 40.34646 | 1.24E-08 | -6.86088 | -5.04533 | -6.12438 |
| 7 | 710.5158 | 22.69946 | 1.28E-08 | -6.83352 | -4.72748 | -5.97918 |
| 8 | 723.6939 | 21.35771 | 1.33E-08 | -6.80108 | -4.40456 | -5.8289 |
| 9 | 747.6856 | 37.78 | 1.22e-08* | -6.89294 | -4.20593 | -5.80292 |
| 10 | 756.0763 | 12.82717 | 1.35E-08 | -6.80548 | -3.82798 | -5.59762 |
| 11 | 766.5142 | 15.47691 | 1.46E-08 | -6.74154 | -3.47356 | -5.41585 |
| 12 | 788.2774 | 31.26886 | 1.38E-08 | -6.80779 | -3.24931 | -5.36425 |
| 13 | 798.68 | 14.46806 | 1.50E-08 | -6.74345 | -2.89449 | -5.18207 |
| 14 | 829.8719 | 41.94767* | 1.29E-08 | -6.918068* | -2.77862 | -5.23885 |
| 15 | 839.8981 | 13.02257 | 1.41E-08 | -6.8494 | -2.41946 | -5.05235 |
| 16 | 855.2004 | 19.17186 | 1.46E-08 | -6.84138 | -2.12096 | -4.92649 |

**Table A3: Inverse roots of AR characteristic polynomial for the VAR model Sri Lanka (youth dependency ratio)**

Roots of Characteristic Polynomial
Endogenous variables: SL_CPI SL_RR
SL_YGAP_G D(SL_DEP1_G)
Exogenous variables: C
Lag specification: 1 14
Date: 08/10/20 Time: 21:34

| Root | Modulus |
|---|---|
| 0.970752 | 0.970752 |
| 0.965194 + 0.086333i | 0.969048 |

| | |
|---|---|
| 0.965194 - 0.086333i | 0.969048 |
| 0.459225 + 0.849842i | 0.965981 |
| 0.459225 - 0.849842i | 0.965981 |
| -0.712161 + 0.623514i | 0.946543 |
| -0.712161 - 0.623514i | 0.946543 |
| -0.003495 + 0.938682i | 0.938688 |
| -0.003495 - 0.938682i | 0.938688 |
| 0.245681 + 0.902477i | 0.93532 |
| 0.245681 - 0.902477i | 0.93532 |
| 0.518166 + 0.776693i | 0.933674 |
| 0.518166 - 0.776693i | 0.933674 |
| -0.113030 - 0.923116i | 0.93001 |
| -0.113030 + 0.923116i | 0.93001 |
| 0.666138 - 0.646662i | 0.928391 |
| 0.666138 + 0.646662i | 0.928391 |
| 0.218402 - 0.900537i | 0.926643 |
| 0.218402 + 0.900537i | 0.926643 |
| -0.593543 - 0.708500i | 0.924265 |
| -0.593543 + 0.708500i | 0.924265 |
| -0.484720 - 0.781036i | 0.919223 |
| -0.484720 + 0.781036i | 0.919223 |
| 0.859512 + 0.324354i | 0.918676 |
| 0.859512 - 0.324354i | 0.918676 |
| -0.358140 + 0.843533i | 0.916413 |
| -0.358140 - 0.843533i | 0.916413 |
| 0.841591 - 0.360690i | 0.915627 |
| 0.841591 + 0.360690i | 0.915627 |
| -0.91047 | 0.910473 |
| 0.886400 - 0.195034i | 0.907603 |
| 0.886400 + 0.195034i | 0.907603 |
| -0.789050 - 0.436719i | 0.901845 |
| -0.789050 + 0.436719i | 0.901845 |
| -0.852543 - 0.258467i | 0.890862 |
| -0.852543 + 0.258467i | 0.890862 |
| -0.862451 + 0.189742i | 0.883076 |
| -0.862451 - 0.189742i | 0.883076 |
| -0.823177 - 0.305361i | 0.87799 |
| -0.823177 + 0.305361i | 0.87799 |
| 0.605838 - 0.619292i | 0.86635 |
| 0.605838 + 0.619292i | 0.86635 |
| 0.320609 + 0.792729i | 0.855108 |
| 0.320609 - 0.792729i | 0.855108 |
| 0.682914 - 0.506020i | 0.849957 |

| | |
|---|---|
| 0.682914 + 0.506020i | 0.849957 |
| -0.169512 + 0.831248i | 0.848356 |
| -0.169512 - 0.831248i | 0.848356 |
| -0.365430 + 0.700322i | 0.789931 |
| -0.365430 - 0.700322i | 0.789931 |
| -0.75317 | 0.753172 |
| -0.336829 + 0.518948i | 0.618677 |
| -0.336829 - 0.518948i | 0.618677 |
| -0.44986 | 0.449864 |
| -0.251779 - 0.245555i | 0.351695 |
| -0.251779 + 0.245555i | 0.351695 |

## Table A4: VAR model for Sri Lanka (elderly dependency ratio)

Vector Autoregression Estimates
Date: 08/10/20 Time: 22:04
Sample (adjusted): 2004M04 2018M12
Included observations: 177 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | SL_CPI | SL_RR | SL_YGAP_G | SL_DEP2_G |
|---|---|---|---|---|
| SL_CPI(-1) | 0.14142 | -0.02485 | -0.07565 | 2.34E-05 |
| | -0.09031 | -0.04335 | -0.2107 | -2.70E-05 |
| | [ 1.56593] | [-0.57320] | [-0.35904] | [ 0.85647] |
| SL_CPI(-2) | -0.16223 | 0.082156 | 0.342338 | 3.39E-05 |
| | -0.0902 | -0.0433 | -0.21045 | -2.70E-05 |
| | [-1.79843] | [ 1.89736] | [ 1.62667] | [ 1.24211] |
| SL_CPI(-3) | -0.20811 | 0.115437 | 0.091923 | -2.83E-05 |
| | -0.09038 | -0.04339 | -0.21087 | -2.70E-05 |
| | [-2.30257] | [ 2.66071] | [ 0.43592] | [-1.03344] |
| SL_CPI(-4) | -0.11954 | 0.017373 | -0.1159 | 7.60E-06 |
| | -0.09443 | -0.04533 | -0.22031 | -2.90E-05 |
| | [-1.26594] | [ 0.38328] | [-0.52609] | [ 0.26595] |
| SL_CPI(-5) | 0.001989 | 0.007972 | 0.261133 | 4.72E-05 |
| | -0.09142 | -0.04389 | -0.2133 | -2.80E-05 |
| | [ 0.02176] | [ 0.18165] | [ 1.22424] | [ 1.70593] |
| SL_CPI(-6) | 0.024579 | 0.012566 | -0.38167 | -8.06E-05 |

| | | | | |
|---|---|---|---|---|
| | -0.08444 | -0.04053 | -0.19699 | -2.60E-05 |
| | [ 0.29110] | [ 0.31003] | [-1.93744] | [-3.15308] |
| SL_CPI(-7) | -0.02875 | 0.059638 | 0.119223 | 3.46E-05 |
| | -0.08597 | -0.04127 | -0.20059 | -2.60E-05 |
| | [-0.33443] | [ 1.44507] | [ 0.59437] | [ 1.32863] |
| SL_CPI(-8) | -0.04667 | -0.01787 | 0.024446 | 7.37E-06 |
| | -0.08377 | -0.04021 | -0.19544 | -2.50E-05 |
| | [-0.55710] | [-0.44430] | [ 0.12508] | [ 0.29049] |
| SL_CPI(-9) | -0.23617 | 0.000586 | -0.37364 | 1.62E-05 |
| | -0.08294 | -0.03981 | -0.19351 | -2.50E-05 |
| | [-2.84737] | [ 0.01471] | [-1.93084] | [ 0.64572] |
| SL_CPI(-10) | -0.14564 | 0.068028 | 0.284561 | -2.22E-05 |
| | -0.08691 | -0.04172 | -0.20277 | -2.60E-05 |
| | [-1.67577] | [ 1.63062] | [ 1.40338] | [-0.84237] |
| SL_CPI(-11) | -0.02624 | 0.006807 | -0.13768 | 2.09E-05 |
| | -0.0894 | -0.04292 | -0.20859 | -2.70E-05 |
| | [-0.29352] | [ 0.15862] | [-0.66007] | [ 0.77027] |
| SL_CPI(-12) | 0.028214 | 0.050634 | -0.00247 | -2.57E-05 |
| | -0.08602 | -0.04129 | -0.2007 | -2.60E-05 |
| | [ 0.32798] | [ 1.22620] | [-0.01229] | [-0.98829] |
| SL_CPI(-13) | -0.17158 | -4.31E-03 | 0.020246 | -4.74E-06 |
| | -0.08461 | -0.04062 | -0.1974 | -2.60E-05 |
| | [-2.02786] | [-0.10617] | [ 0.10256] | [-0.18512] |
| SL_CPI(-14) | -0.11597 | -0.05837 | -0.21376 | -1.27E-05 |
| | -0.08298 | -0.03983 | -0.19361 | -2.50E-05 |
| | [-1.39746] | [-1.46528] | [-1.10408] | [-0.50474] |
| SL_RR(-1) | 0.072141 | 1.215037 | 1.511534 | -5.10E-05 |
| | -0.18491 | -0.08876 | -0.43141 | -5.60E-05 |
| | [ 0.39015] | [ 13.6889] | [ 3.50373] | [-0.91168] |
| SL_RR(-2) | -0.17495 | -0.15244 | -2.1459 | 0.000106 |
| | -0.28911 | -0.13878 | -0.67452 | -8.80E-05 |
| | [-0.60514] | [-1.09842] | [-3.18138] | [ 1.20588] |

| | | | | |
|---|---|---|---|---|
| SL_RR(-3) | -0.07598 | 0.197764 | 1.241594 | -9.05E-05 |
| | -0.3021 | -0.14501 | -0.70482 | -9.10E-05 |
| | [-0.25152] | [ 1.36375] | [ 1.76158] | [-0.98914] |
| SL_RR(-4) | 0.671481 | -0.41313 | 0.575566 | 8.36E-05 |
| | -0.30999 | -0.1488 | -0.72323 | -9.40E-05 |
| | [ 2.16614] | [-2.77637] | [ 0.79583] | [ 0.89041] |
| SL_RR(-5) | -0.57478 | 0.39744 | -2.81976 | -0.00014 |
| | -0.32386 | -0.15546 | -0.7556 | -9.80E-05 |
| | [-1.77477] | [ 2.55650] | [-3.73182] | [-1.37766] |
| SL_RR(-6) | 0.213649 | -0.08766 | 2.536043 | 6.25E-05 |
| | -0.35261 | -0.16926 | -0.82266 | -0.00011 |
| | [ 0.60591] | [-0.51792] | [ 3.08275] | [ 0.58549] |
| SL_RR(-7) | -0.01704 | -0.34984 | -0.91132 | -3.63E-05 |
| | -0.37018 | -0.1777 | -0.86367 | -0.00011 |
| | [-0.04602] | [-1.96872] | [-1.05517] | [-0.32422] |
| SL_RR(-8) | 0.344481 | 0.025735 | 0.473473 | 0.00016 |
| | -0.35303 | -0.16946 | -0.82365 | -0.00011 |
| | [ 0.97578] | [ 0.15186] | [ 0.57485] | [ 1.49297] |
| SL_RR(-9) | -0.54745 | 0.281902 | -0.45598 | -9.36E-05 |
| | -0.34886 | -0.16746 | -0.81392 | -0.00011 |
| | [-1.56925] | [ 1.68338] | [-0.56022] | [-0.88637] |
| SL_RR(-10) | -0.01947 | -0.29004 | 0.361144 | 4.92E-05 |
| | -0.33814 | -0.16231 | -0.7889 | -0.0001 |
| | [-0.05758] | [-1.78692] | [ 0.45778] | [ 0.48032] |
| SL_RR(-11) | 0.141995 | 0.137192 | -0.11465 | 9.30E-06 |
| | -0.314 | -0.15073 | -0.73259 | -9.50E-05 |
| | [ 0.45221] | [ 0.91020] | [-0.15649] | [ 0.09781] |
| SL_RR(-12) | -0.02822 | -0.07512 | -0.30327 | -9.10E-05 |
| | -0.2991 | -0.14358 | -0.69783 | -9.10E-05 |
| | [-0.09434] | [-0.52318] | [-0.43459] | [-1.00463] |
| SL_RR(-13) | -0.02328 | 0.299687 | -0.19065 | -4.87E-06 |
| | -0.29038 | -0.13939 | -0.67747 | -8.80E-05 |
| | [-0.08015] | [ 2.15003] | [-0.28141] | [-0.05534] |

| | | | | |
|---|---|---|---|---|
| SL_RR(-14) | 0.022424 | -0.21879 | 0.434457 | 4.21E-05 |
| | -0.17863 | -0.08575 | -0.41676 | -5.40E-05 |
| | [ 0.12554] | [-2.55156] | [ 1.04246] | [ 0.77795] |
| SL_YGAP_G(-1) | -0.02622 | -0.09507 | 0.060662 | 5.19E-06 |
| | -0.04023 | -0.01931 | -0.09385 | -1.20E-05 |
| | [-0.65192] | [-4.92345] | [ 0.64638] | [ 0.42589] |
| SL_YGAP_G(-2) | 0.080317 | -0.04829 | 0.130358 | 1.24E-05 |
| | -0.04486 | -0.02153 | -0.10466 | -1.40E-05 |
| | [ 1.79041] | [-2.24271] | [ 1.24553] | [ 0.91653] |
| SL_YGAP_G(-3) | 0.003419 | 0.051946 | -0.22265 | -1.41E-05 |
| | -0.04416 | -0.0212 | -0.10302 | -1.30E-05 |
| | [ 0.07742] | [ 2.45069] | [-2.16121] | [-1.05276] |
| SL_YGAP_G(-4) | -0.028 | 0.016628 | 0.029809 | -4.91E-06 |
| | -0.04647 | -0.02231 | -0.10843 | -1.40E-05 |
| | [-0.60242] | [ 0.74536] | [ 0.27492] | [-0.34877] |
| SL_YGAP_G(-5) | 0.054856 | -0.02812 | 0.138971 | -1.46E-06 |
| | -0.04534 | -0.02176 | -0.10578 | -1.40E-05 |
| | [ 1.20988] | [-1.29220] | [ 1.31376] | [-0.10664] |
| SL_YGAP_G(-6) | 0.101586 | 0.016155 | -0.20518 | 3.46E-06 |
| | -0.04344 | -0.02085 | -0.10134 | -1.30E-05 |
| | [ 2.33873] | [ 0.77482] | [-2.02468] | [ 0.26322] |
| SL_YGAP_G(-7) | 0.04154 | -0.02746 | -0.10933 | -1.77E-05 |
| | -0.04661 | -0.02237 | -0.10874 | -1.40E-05 |
| | [ 0.89129] | [-1.22731] | [-1.00549] | [-1.25473] |
| SL_YGAP_G(-8) | 0.028818 | 0.004824 | 0.126467 | -1.30E-05 |
| | -0.04714 | -0.02263 | -0.10997 | -1.40E-05 |
| | [ 0.61138] | [ 0.21321] | [ 1.14998] | [-0.91248] |
| SL_YGAP_G(-9) | 0.163045 | 0.009111 | -0.16089 | 5.40E-06 |
| | -0.04515 | -0.02167 | -0.10534 | -1.40E-05 |
| | [ 3.61113] | [ 0.42037] | [-1.52731] | [ 0.39526] |
| SL_YGAP_G(-10) | 0.084901 | -0.0021 | -0.02576 | 7.34E-07 |
| | -0.04752 | -0.02281 | -0.11086 | -1.40E-05 |

| | | | | |
|---|---|---|---|---|
| | [ 1.78676] | [-0.09195] | [-0.23232] | [ 0.05099] |
| | | | | |
| SL_YGAP_G(-11) | 0.090842 | -0.01622 | 0.041043 | -1.82E-05 |
| | -0.04742 | -0.02276 | -0.11063 | -1.40E-05 |
| | [ 1.91572] | [-0.71248] | [ 0.37098] | [-1.26833] |
| | | | | |
| SL_YGAP_G(-12) | 0.057455 | 0.005348 | -0.18063 | 3.64E-05 |
| | -0.04553 | -0.02186 | -0.10623 | -1.40E-05 |
| | [ 1.26183] | [ 0.24466] | [-1.70038] | [ 2.64142] |
| | | | | |
| SL_YGAP_G(-13) | 0.015134 | -0.02953 | -0.01122 | 1.57E-05 |
| | -0.04656 | -0.02235 | -0.10863 | -1.40E-05 |
| | [ 0.32503] | [-1.32116] | [-0.10329] | [ 1.11568] |
| | | | | |
| SL_YGAP_G(-14) | 0.159021 | -0.03184 | -0.04542 | -1.15E-05 |
| | -0.04579 | -0.02198 | -0.10682 | -1.40E-05 |
| | [ 3.47317] | [-1.44888] | [-0.42518] | [-0.83165] |
| | | | | |
| SL_DEP2_G(-1) | 155.2455 | 131.9175 | -348.069 | -0.76308 |
| | -302.372 | -145.146 | -705.457 | -0.09155 |
| | [ 0.51343] | [ 0.90886] | [-0.49340] | [-8.33511] |
| | | | | |
| SL_DEP2_G(-2) | 135.2035 | 112.1764 | 30.2076 | -0.52818 |
| | -367.618 | -176.466 | -857.681 | -0.1113 |
| | [ 0.36778] | [ 0.63568] | [ 0.03522] | [-4.74540] |
| | | | | |
| SL_DEP2_G(-3) | 25.71791 | 137.337 | 340.8165 | -0.36334 |
| | -378.092 | -181.493 | -882.118 | -0.11448 |
| | [ 0.06802] | [ 0.75670] | [ 0.38636] | [-3.17391] |
| | | | | |
| SL_DEP2_G(-4) | -14.1266 | 110.6004 | -715.228 | -0.12814 |
| | -359.945 | -172.782 | -839.779 | -0.10898 |
| | [-0.03925] | [ 0.64011] | [-0.85169] | [-1.17580] |
| | | | | |
| SL_DEP2_G(-5) | 100.272 | 121.1094 | 113.5018 | 0.073295 |
| | -331.556 | -159.155 | -773.547 | -0.10039 |
| | [ 0.30243] | [ 0.76095] | [ 0.14673] | [ 0.73014] |
| | | | | |
| SL_DEP2_G(-6) | 404.4473 | 146.0254 | -712.037 | 0.109102 |
| | -313.392 | -150.436 | -731.168 | -0.09489 |
| | [ 1.29055] | [ 0.97068] | [-0.97384] | [ 1.14981] |
| | | | | |
| SL_DEP2_G(-7) | 267.2284 | -15.905 | -311.787 | 0.147633 |

| | | | | |
|---|---|---|---|---|
| | -306.433 | -147.096 | -714.933 | -0.09278 |
| | [ 0.87206] | [-0.10813] | [-0.43611] | [ 1.59123] |
| | | | | |
| SL_DEP2_G(-8) | 433.5405 | -379.473 | -1137.72 | 0.327708 |
| | -306.362 | -147.061 | -714.767 | -0.09276 |
| | [ 1.41512] | [-2.58037] | [-1.59174] | [ 3.53295] |
| | | | | |
| SL_DEP2_G(-9) | -421.294 | -284.385 | -868.977 | 0.276959 |
| | -330.929 | -158.854 | -772.084 | -0.1002 |
| | [-1.27306] | [-1.79023] | [-1.12550] | [ 2.76417] |
| | | | | |
| SL_DEP2_G(-10) | -423.136 | -141.586 | 620.1489 | 0.51825 |
| | -339.928 | -163.174 | -793.078 | -0.10292 |
| | [-1.24478] | [-0.86770] | [ 0.78195] | [ 5.03544] |
| | | | | |
| SL_DEP2_G(-11) | -144.625 | -87.7181 | 186.1044 | 0.53127 |
| | -368.151 | -176.721 | -858.924 | -0.11147 |
| | [-0.39284] | [-0.49636] | [ 0.21667] | [ 4.76622] |
| | | | | |
| SL_DEP2_G(-12) | -167.817 | 142.8082 | 918.9827 | 0.259256 |
| | -371.934 | -178.537 | -867.751 | -0.11261 |
| | [-0.45120] | [ 0.79988] | [ 1.05904] | [ 2.30222] |
| | | | | |
| SL_DEP2_G(-13) | -296.508 | 159.258 | 1298.251 | 0.178433 |
| | -346.545 | -166.35 | -808.516 | -0.10492 |
| | [-0.85561] | [ 0.95737] | [ 1.60572] | [ 1.70059] |
| | | | | |
| SL_DEP2_G(-14) | -297.512 | -104.02 | 478.7322 | 0.163096 |
| | -280.687 | -134.736 | -654.864 | -0.08498 |
| | [-1.05994] | [-0.77202] | [ 0.73104] | [ 1.91914] |
| | | | | |
| C | 1.588982 | -0.0016 | -1.26272 | 0.000973 |
| | -0.63828 | -0.30639 | -1.48916 | -0.00019 |
| | [ 2.48946] | [-0.00523] | [-0.84794] | [ 5.03399] |
| | | | | |
| R-squared | 0.59043 | 0.989755 | 0.414158 | 0.967857 |
| Adj. R-squared | 0.399297 | 0.984974 | 0.140765 | 0.952857 |
| Sum sq. resids | 90.73723 | 20.90801 | 493.9055 | 8.32E-06 |
| S.E. equation | 0.869565 | 0.417413 | 2.028763 | 0.000263 |
| F-statistic | 3.089109 | 207.0158 | 1.514883 | 64.52413 |
| Log likelihood | -192.018 | -62.1146 | -341.97 | 1242.13 |
| Akaike AIC | 2.813763 | 1.345927 | 4.508139 | -13.3913 |
| Schwarz SC | 3.836591 | 2.368755 | 5.530967 | -12.3685 |

| | | | | |
|---|---|---|---|---|
| Mean dependent | 0.647385 | 11.94771 | 0.157353 | 0.002862 |
| S.D. dependent | 1.121947 | 3.40519 | 2.188645 | 0.001213 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 3.27E-08 |
| Determinant resid covariance | 6.91E-09 |
| Log likelihood | 658.2792 |
| Akaike information criterion | -4.86191 |
| Schwarz criterion | -0.7706 |

## Table A5: VAR Lag length criteria for Sri Lanka (elderly dependency ratio)

VAR Lag Order Selection Criteria
Endogenous variables: SL_CPI SL_RR SL_YGAP_G SL_DEP2_G
Exogenous variables: C
Date: 08/10/20 Time: 22:05
Sample: 2003M02 2018M12
Included observations: 175

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -164.141 | NA | 8.03E-05 | 1.921605 | 1.993943 | 1.950948 |
| 1 | 284.4858 | 871.6167 | 5.72E-07 | -3.0227 | -2.66101 | -2.87598 |
| 2 | 356.3863 | 136.4056 | 3.02E-07 | -3.66156 | -3.01052 | -3.39748 |
| 3 | 399.8185 | 80.41158 | 2.21E-07 | -3.97507 | -3.034675* | -3.59362 |
| 4 | 433.4348 | 60.70137 | 1.81E-07 | -4.1764 | -2.94665 | -3.67758 |
| 5 | 454.9026 | 37.78332 | 1.70E-07 | -4.23889 | -2.71979 | -3.6227 |
| 6 | 492.4519 | 64.37026 | 1.34E-07 | -4.48516 | -2.67672 | -3.751606* |
| 7 | 509.0046 | 27.61947 | 1.33E-07 | -4.49148 | -2.39368 | -3.64055 |
| 8 | 532.3752 | 37.92712 | 1.23E-07 | -4.57572 | -2.18856 | -3.60742 |
| 9 | 563.3219 | 48.80739 | 1.05E-07 | -4.74654 | -2.07003 | -3.66087 |
| 10 | 576.3481 | 19.94856 | 1.09E-07 | -4.71255 | -1.74669 | -3.50951 |
| 11 | 592.5232 | 24.03167 | 1.10E-07 | -4.71455 | -1.45934 | -3.39415 |
| 12 | 610.3365 | 25.65119 | 1.10E-07 | -4.73528 | -1.19072 | -3.2975 |
| 13 | 621.1774 | 15.11531 | 1.18E-07 | -4.67631 | -0.8424 | -3.12117 |
| 14 | 649.8055 | 38.60696* | 1.05e-07* | -4.820634* | -0.69737 | -3.14812 |
| 15 | 660.233 | 13.58562 | 1.14E-07 | -4.75695 | -0.34433 | -2.96707 |
| 16 | 668.6577 | 10.59105 | 1.28E-07 | -4.67037 | 0.031593 | -2.76312 |

**Table A6: Inverse roots of AR characteristic polynomial for the VAR model Sri Lanka (elderly dependency ratio)**

Roots of Characteristic Polynomial
Endogenous variables: SL_CPI SL_RR SL_YGAP_G SL_DEP2_G
Exogenous variables: C
Lag specification: 1 14
Date: 08/10/20 Time: 22:04

| Root | Modulus |
|---|---|
| 0.991149 | 0.991149 |
| 0.968882 - 0.083386i | 0.972464 |
| 0.968882 + 0.083386i | 0.972464 |
| 0.457834 - 0.843504i | 0.959746 |
| 0.457834 + 0.843504i | 0.959746 |
| 0.526861 - 0.792843i | 0.951936 |
| 0.526861 + 0.792843i | 0.951936 |
| -0.039170 + 0.944506i | 0.945318 |
| -0.039170 - 0.944506i | 0.945318 |
| 0.891029 + 0.314727i | 0.94498 |
| 0.891029 - 0.314727i | 0.94498 |
| 0.249324 - 0.905595i | 0.939289 |
| 0.249324 + 0.905595i | 0.939289 |
| -0.670705 + 0.656986i | 0.938869 |
| -0.670705 - 0.656986i | 0.938869 |
| 0.665606 - 0.650706i | 0.930833 |
| 0.665606 + 0.650706i | 0.930833 |
| -0.911876 + 0.179535i | 0.929382 |
| -0.911876 - 0.179535i | 0.929382 |
| 0.849847 - 0.375355i | 0.929049 |
| 0.849847 + 0.375355i | 0.929049 |
| -0.166721 + 0.913203i | 0.928297 |
| -0.166721 - 0.913203i | 0.928297 |
| 0.764873 + 0.522877i | 0.926515 |
| 0.764873 - 0.522877i | 0.926515 |
| -0.800527 + 0.450156i | 0.918413 |
| -0.800527 - 0.450156i | 0.918413 |
| -0.698347 + 0.596353i | 0.918328 |
| -0.698347 - 0.596353i | 0.918328 |
| -0.91627 | 0.91627 |
| -0.359175 - 0.841851i | 0.91527 |

| | |
|---|---|
| -0.359175 + 0.841851i | 0.91527 |
| -0.570728 - 0.709948i | 0.910909 |
| -0.570728 + 0.709948i | 0.910909 |
| 0.206770 + 0.883242i | 0.907122 |
| 0.206770 - 0.883242i | 0.907122 |
| 0.890022 - 0.169646i | 0.906046 |
| 0.890022 + 0.169646i | 0.906046 |
| -0.429932 + 0.790592i | 0.899932 |
| -0.429932 - 0.790592i | 0.899932 |
| 0.340778 + 0.811418i | 0.880073 |
| 0.340778 - 0.811418i | 0.880073 |
| 0.646462 - 0.590078i | 0.875274 |
| 0.646462 + 0.590078i | 0.875274 |
| -0.827621 - 0.265699i | 0.869226 |
| -0.827621 + 0.265699i | 0.869226 |
| 0.043736 - 0.842473i | 0.843607 |
| 0.043736 + 0.842473i | 0.843607 |
| -0.751500 - 0.366970i | 0.836313 |
| -0.751500 + 0.366970i | 0.836313 |
| -0.808621 - 0.159614i | 0.824223 |
| -0.808621 + 0.159614i | 0.824223 |
| -0.323790 + 0.755723i | 0.822166 |
| -0.323790 - 0.755723i | 0.822166 |
| 0.146271 - 0.474917i | 0.496932 |
| 0.146271 + 0.474917i | 0.496932 |

## Table A7: VAR model for India (youth dependency ratio)

Vector Autoregression Estimates
Date: 08/10/20 Time: 22:10
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | D(IND_DEP1_G) |
|---|---|---|---|---|
| D(IND_CPI(-1)) | -0.65452 | 0.041143 | 0.108089 | 4.52E-07 |
| | -0.08923 | -0.03456 | -0.13707 | -5.10E-06 |
| | [-7.33506] | [ 1.19062] | [ 0.78858] | [ 0.08947] |
| D(IND_CPI(-2)) | -0.85234 | 0.034788 | 0.325256 | 6.87E-07 |
| | -0.10406 | -0.0403 | -0.15985 | -5.90E-06 |
| | [-8.19062] | [ 0.86323] | [ 2.03477] | [ 0.11658] |

| | | | | |
|---|---|---|---|---|
| D(IND_CPI(-3)) | -0.78 | 0.073208 | 0.016072 | -1.73E-06 |
| | -0.12752 | -0.04938 | -0.19588 | -7.20E-06 |
| | [-6.11655] | [ 1.48242] | [ 0.08205] | [-0.23935] |
| D(IND_CPI(-4)) | -0.86979 | 0.036921 | 0.156739 | 4.53E-07 |
| | -0.13366 | -0.05176 | -0.20532 | -7.60E-06 |
| | [-6.50727] | [ 0.71328] | [ 0.76339] | [ 0.05982] |
| D(IND_CPI(-5)) | -0.95706 | 0.050674 | -0.0394 | 2.07E-06 |
| | -0.14221 | -0.05507 | -0.21845 | -8.10E-06 |
| | [-6.72986] | [ 0.92013] | [-0.18034] | [ 0.25735] |
| D(IND_CPI(-6)) | -0.74087 | 0.02663 | 0.084006 | 7.26E-06 |
| | -0.14529 | -0.05626 | -0.22317 | -8.20E-06 |
| | [-5.09939] | [ 0.47330] | [ 0.37642] | [ 0.88193] |
| D(IND_CPI(-7)) | -1.06154 | 0.061206 | -0.07997 | 1.82E-06 |
| | -0.14178 | -0.05491 | -0.21778 | -8.00E-06 |
| | [-7.48730] | [ 1.11475] | [-0.36721] | [ 0.22689] |
| D(IND_CPI(-8)) | -0.80353 | 0.076579 | 0.028152 | 4.41E-07 |
| | -0.14335 | -0.05551 | -0.22019 | -8.10E-06 |
| | [-5.60548] | [ 1.37948] | [ 0.12785] | [ 0.05434] |
| D(IND_CPI(-9)) | -0.82877 | 0.026684 | 0.311891 | 1.09E-05 |
| | -0.14635 | -0.05668 | -0.22481 | -8.30E-06 |
| | [-5.66290] | [ 0.47082] | [ 1.38738] | [ 1.31225] |
| D(IND_CPI(-10)) | -0.72717 | 0.061205 | -0.09479 | 3.48E-06 |
| | -0.14376 | -0.05567 | -0.22083 | -8.10E-06 |
| | [-5.05818] | [ 1.09936] | [-0.42923] | [ 0.42707] |
| D(IND_CPI(-11)) | -0.72513 | 0.043498 | 0.202713 | 4.89E-06 |
| | -0.13466 | -0.05215 | -0.20685 | -7.60E-06 |
| | [-5.38486] | [ 0.83412] | [ 0.98000] | [ 0.64074] |
| D(IND_CPI(-12)) | -0.27636 | 0.069386 | -0.13603 | -8.89E-06 |
| | -0.13413 | -0.05194 | -0.20603 | -7.60E-06 |
| | [-2.06038] | [ 1.33580] | [-0.66022] | [-1.17037] |
| D(IND_CPI(-13)) | -0.2324 | -0.00786 | 0.047059 | 5.50E-06 |
| | -0.10929 | -0.04232 | -0.16788 | -6.20E-06 |

| | | | | |
|---|---|---|---|---|
| | [-2.12643] | [-0.18567] | [ 0.28032] | [ 0.88891] |
| | | | | |
| D(IND_CPI(-14)) | -0.16703 | 0.018137 | -0.27144 | 1.30E-06 |
| | -0.09414 | -0.03646 | -0.14461 | -5.30E-06 |
| | [-1.77421] | [ 0.49749] | [-1.87708] | [ 0.24355] |
| | | | | |
| D(IND_RR(-1)) | -0.41949 | 0.404749 | -0.90264 | 1.11E-06 |
| | -0.22293 | -0.08633 | -0.34244 | -1.30E-05 |
| | [-1.88171] | [ 4.68831] | [-2.63594] | [ 0.08822] |
| | | | | |
| D(IND_RR(-2)) | 0.085992 | 0.326069 | 0.672999 | -2.74E-06 |
| | -0.23249 | -0.09003 | -0.35712 | -1.30E-05 |
| | [ 0.36988] | [ 3.62163] | [ 1.88451] | [-0.20795] |
| | | | | |
| D(IND_RR(-3)) | -0.04553 | 0.058619 | -0.05544 | -9.33E-06 |
| | -0.13631 | -0.05279 | -0.20939 | -7.70E-06 |
| | [-0.33399] | [ 1.11045] | [-0.26476] | [-1.20818] |
| | | | | |
| D(IND_RR(-4)) | 0.046474 | 0.039406 | 0.078298 | -1.92E-06 |
| | -0.13744 | -0.05322 | -0.21112 | -7.80E-06 |
| | [ 0.33814] | [ 0.74036] | [ 0.37088] | [-0.24691] |
| | | | | |
| D(IND_RR(-5)) | -0.12436 | 0.017964 | -0.02289 | -3.74E-07 |
| | -0.13693 | -0.05303 | -0.21033 | -7.80E-06 |
| | [-0.90818] | [ 0.33878] | [-0.10880] | [-0.04823] |
| | | | | |
| D(IND_RR(-6)) | 0.360543 | 0.039319 | -0.18544 | -9.56E-07 |
| | -0.13416 | -0.05195 | -0.20607 | -7.60E-06 |
| | [ 2.68748] | [ 0.75681] | [-0.89987] | [-0.12578] |
| | | | | |
| D(IND_RR(-7)) | -0.10927 | -0.03987 | 0.176922 | 1.72E-05 |
| | -0.13788 | -0.0534 | -0.2118 | -7.80E-06 |
| | [-0.79247] | [-0.74674] | [ 0.83532] | [ 2.20679] |
| | | | | |
| D(IND_RR(-8)) | 0.085801 | 0.025745 | -0.34103 | -8.53E-06 |
| | -0.14104 | -0.05462 | -0.21665 | -8.00E-06 |
| | [ 0.60834] | [ 0.47135] | [-1.57410] | [-1.06757] |
| | | | | |
| D(IND_RR(-9)) | -0.10688 | -0.01731 | 0.236962 | -2.50E-06 |
| | -0.14263 | -0.05524 | -0.21909 | -8.10E-06 |
| | [-0.74931] | [-0.31344] | [ 1.08156] | [-0.30884] |
| | | | | |
| D(IND_RR(-10)) | 0.245284 | 0.020248 | 0.011506 | -6.41E-06 |

| | | | | |
|---|---|---|---|---|
| | -0.13951 | -0.05403 | -0.2143 | -7.90E-06 |
| | [ 1.75816] | [ 0.37477] | [ 0.05369] | [-0.81159] |
| D(IND_RR(-11)) | -0.40563 | -0.03204 | 0.064599 | 5.24E-06 |
| | -0.14049 | -0.05441 | -0.21581 | -8.00E-06 |
| | [-2.88718] | [-0.58885] | [ 0.29933] | [ 0.65894] |
| D(IND_RR(-12)) | -0.02976 | -0.74816 | 0.269674 | -1.22E-05 |
| | -0.14358 | -0.0556 | -0.22055 | -8.10E-06 |
| | [-0.20726] | [-13.4555] | [ 1.22274] | [-1.50357] |
| D(IND_RR(-13)) | -0.38237 | 0.303909 | -1.18623 | 8.40E-06 |
| | -0.21723 | -0.08413 | -0.33369 | -1.20E-05 |
| | [-1.76018] | [ 3.61256] | [-3.55492] | [ 0.68305] |
| D(IND_RR(-14)) | 0.290296 | 0.327222 | 0.512574 | -9.05E-06 |
| | -0.22096 | -0.08557 | -0.33942 | -1.30E-05 |
| | [ 1.31378] | [ 3.82403] | [ 1.51016] | [-0.72329] |
| IND_YGAP_G(-1) | 0.090248 | 0.02515 | 0.103845 | 3.73E-06 |
| | -0.05879 | -0.02277 | -0.0903 | -3.30E-06 |
| | [ 1.53516] | [ 1.10473] | [ 1.14998] | [ 1.12093] |
| IND_YGAP_G(-2) | 0.083044 | 0.01155 | -0.05741 | -5.03E-06 |
| | -0.05767 | -0.02233 | -0.08858 | -3.30E-06 |
| | [ 1.44005] | [ 0.51718] | [-0.64815] | [-1.53895] |
| IND_YGAP_G(-3) | 0.018031 | -0.01023 | -0.01085 | 6.61E-06 |
| | -0.05809 | -0.02249 | -0.08922 | -3.30E-06 |
| | [ 0.31042] | [-0.45494] | [-0.12162] | [ 2.00922] |
| IND_YGAP_G(-4) | 0.055313 | 0.013437 | -0.03318 | -7.33E-06 |
| | -0.05753 | -0.02228 | -0.08837 | -3.30E-06 |
| | [ 0.96150] | [ 0.60313] | [-0.37553] | [-2.24839] |
| IND_YGAP_G(-5) | -0.08007 | -0.01829 | 0.028431 | -2.49E-06 |
| | -0.05659 | -0.02191 | -0.08692 | -3.20E-06 |
| | [-1.41502] | [-0.83455] | [ 0.32708] | [-0.77554] |
| IND_YGAP_G(-6) | 0.098538 | 0.015275 | -0.07083 | -3.38E-07 |
| | -0.05574 | -0.02158 | -0.08562 | -3.20E-06 |
| | [ 1.76792] | [ 0.70768] | [-0.82731] | [-0.10721] |

| | | | | |
|---|---|---|---|---|
| IND_YGAP_G(-7) | 0.008138 | -0.0129 | 0.036472 | -4.38E-06 |
| | -0.05578 | -0.0216 | -0.08568 | -3.20E-06 |
| | [ 0.14591] | [-0.59712] | [ 0.42569] | [-1.38691] |
| IND_YGAP_G(-8) | 0.030803 | 0.013382 | -0.09128 | -4.64E-06 |
| | -0.05588 | -0.02164 | -0.08583 | -3.20E-06 |
| | [ 0.55126] | [ 0.61841] | [-1.06350] | [-1.46458] |
| IND_YGAP_G(-9) | 0.030453 | -0.01678 | 0.051742 | 1.86E-06 |
| | -0.05489 | -0.02126 | -0.08432 | -3.10E-06 |
| | [ 0.55479] | [-0.78945] | [ 0.61365] | [ 0.59893] |
| IND_YGAP_G(-10) | -0.06224 | 0.000147 | -0.07919 | -1.16E-05 |
| | -0.05643 | -0.02185 | -0.08669 | -3.20E-06 |
| | [-1.10285] | [ 0.00674] | [-0.91357] | [-3.61671] |
| IND_YGAP_G(-11) | -0.03941 | 0.004386 | 0.038372 | 4.94E-06 |
| | -0.06026 | -0.02333 | -0.09256 | -3.40E-06 |
| | [-0.65402] | [ 0.18797] | [ 0.41457] | [ 1.44601] |
| IND_YGAP_G(-12) | 0.067433 | 0.089461 | 0.019881 | -4.95E-06 |
| | -0.05976 | -0.02314 | -0.0918 | -3.40E-06 |
| | [ 1.12836] | [ 3.86550] | [ 0.21657] | [-1.46085] |
| IND_YGAP_G(-13) | -0.01459 | -0.03613 | 0.003686 | 2.42E-06 |
| | -0.06273 | -0.02429 | -0.09636 | -3.60E-06 |
| | [-0.23254] | [-1.48732] | [ 0.03825] | [ 0.68168] |
| IND_YGAP_G(-14) | -0.00214 | -0.00158 | -0.08435 | 2.00E-06 |
| | -0.06237 | -0.02415 | -0.09581 | -3.50E-06 |
| | [-0.03422] | [-0.06530] | [-0.88038] | [ 0.56746] |
| D(IND_DEP1_G(-1)) | -220.562 | -671.376 | 2471.905 | -1.5729 |
| | -1623.73 | -628.805 | -2494.17 | -0.09198 |
| | [-0.13584] | [-1.06770] | [ 0.99107] | [-17.1012] |
| D(IND_DEP1_G(-2)) | -230.849 | -455.154 | 2005.438 | -1.99722 |
| | -3056.24 | -1183.56 | -4694.63 | -0.17312 |
| | [-0.07553] | [-0.38456] | [ 0.42718] | [-11.5366] |
| D(IND_DEP1_G(-3)) | 1269.108 | -435.585 | 2908.913 | -2.23371 |
| | -4465.65 | -1729.37 | -6859.6 | -0.25296 |
| | [ 0.28419] | [-0.25187] | [ 0.42406] | [-8.83038] |

| | | | | |
|---|---|---|---|---|
| D(IND_DEP1_G(-4)) | 708.3626 | -73.8389 | 2418.838 | -2.37647 |
| | -5609.11 | -2172.18 | -8616.03 | -0.31773 |
| | [ 0.12629] | [-0.03399] | [ 0.28074] | [-7.47958] |
| D(IND_DEP1_G(-5)) | 304.9389 | -763.811 | 2425.116 | -2.44636 |
| | -6311.32 | -2444.12 | -9694.68 | -0.3575 |
| | [ 0.04832] | [-0.31251] | [ 0.25015] | [-6.84288] |
| D(IND_DEP1_G(-6)) | 763.5106 | -1202.23 | 4320.767 | -2.43968 |
| | -6963.64 | -2696.74 | -10696.7 | -0.39446 |
| | [ 0.10964] | [-0.44581] | [ 0.40393] | [-6.18492] |
| D(IND_DEP1_G(-7)) | 570.1134 | -1384.7 | 6240.688 | -2.13866 |
| | -7452.91 | -2886.21 | -11448.3 | -0.42217 |
| | [ 0.07650] | [-0.47976] | [ 0.54512] | [-5.06588] |
| D(IND_DEP1_G(-8)) | -1160.11 | -626.556 | 3013.876 | -1.97127 |
| | -7536.66 | -2918.65 | -11576.9 | -0.42691 |
| | [-0.15393] | [-0.21467] | [ 0.26034] | [-4.61750] |
| D(IND_DEP1_G(-9)) | -1526.99 | 124.1855 | 3622.81 | -1.82788 |
| | -7107.99 | -2752.64 | -10918.4 | -0.40263 |
| | [-0.21483] | [ 0.04512] | [ 0.33181] | [-4.53984] |
| D(IND_DEP1_G(-10)) | -903.43 | 794.6964 | 1346.964 | -1.7667 |
| | -6493.66 | -2514.74 | -9974.78 | -0.36783 |
| | [-0.13912] | [ 0.31602] | [ 0.13504] | [-4.80300] |
| D(IND_DEP1_G(-11)) | 1007.717 | 967.0592 | 288.1346 | -0.95354 |
| | -5831.97 | -2258.49 | -8958.37 | -0.33035 |
| | [ 0.17279] | [ 0.42819] | [ 0.03216] | [-2.88642] |
| D(IND_DEP1_G(-12)) | 1558.728 | 1463.536 | -1328.83 | -0.48412 |
| | -4618.03 | -1788.38 | -7093.67 | -0.26159 |
| | [ 0.33753] | [ 0.81836] | [-0.18733] | [-1.85071] |
| D(IND_DEP1_G(-13)) | 1741.833 | 1096.632 | -1746.76 | -0.19934 |
| | -3141.49 | -1216.57 | -4825.57 | -0.17795 |
| | [ 0.55446] | [ 0.90141] | [-0.36198] | [-1.12021] |
| D(IND_DEP1_G(-14)) | -997.516 | 1087.093 | -2566.54 | -0.04836 |
| | -1638.16 | -634.392 | -2516.34 | -0.09279 |

| | | | | |
|---|---|---|---|---|
| | [-0.60893] | [ 1.71360] | [-1.01995] | [-0.52118] |
| C | 0.002159 | -0.00587 | 0.113299 | -6.26E-05 |
| | -0.18006 | -0.06973 | -0.27658 | -1.00E-05 |
| | [ 0.01199] | [-0.08423] | [ 0.40964] | [-6.13605] |
| R-squared | 0.740217 | 0.804943 | 0.306635 | 0.966114 |
| Adj. R-squared | 0.617966 | 0.713151 | -0.01966 | 0.950168 |
| Sum sq. resids | 46.50294 | 6.974068 | 109.7255 | 1.49E-07 |
| S.E. equation | 0.625125 | 0.242086 | 0.960241 | 3.54E-05 |
| F-statistic | 6.054892 | 8.769224 | 0.939763 | 60.58584 |
| Log likelihood | -132.608 | 34.35593 | -208.153 | 1588.444 |
| Akaike AIC | 2.154636 | 0.257319 | 3.013102 | -17.4028 |
| Schwarz SC | 3.18144 | 1.284123 | 4.039906 | -16.376 |
| Mean dependent | -0.00188 | -0.01221 | 0.049666 | -1.41E-06 |
| S.D. dependent | 1.011383 | 0.452004 | 0.950941 | 0.000159 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 2.49E-11 |
| Determinant resid covariance | 5.20E-12 |
| Log likelihood | 1287.466 |
| Akaike information criterion | -12.0394 |
| Schwarz criterion | -7.93217 |

### Table A8: VAR Lag length criteria for India (youth dependency ratio)

VAR Lag Order Selection Criteria
Endogenous variables: D(IND_CPI) D(IND_RR) IND_YGAP_G D(IND_DEP1_G)
Exogenous variables: C
Date: 08/10/20 Time: 22:12
Sample: 2003M02 2018M12
Included observations: 174

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 684.2199 | NA | 4.73E-09 | -7.81862 | -7.746 | -7.78916 |
| 1 | 736.1548 | 100.8851 | 3.13E-09 | -8.23167 | -7.86856 | -8.08437 |
| 2 | 787.7242 | 97.80394 | 2.08E-09 | -8.64051 | -7.98691 | -8.37537 |
| 3 | 874.9701 | 161.455 | 9.17E-10 | -9.45943 | -8.515341* | -9.07645 |
| 4 | 894.8258 | 35.83162 | 8.79E-10 | -9.50375 | -8.26917 | -9.00293 |
| 5 | 914.0548 | 33.81649 | 8.48E-10 | -9.54086 | -8.0158 | -8.9222 |
| 6 | 953.1381 | 66.93573 | 6.53E-10 | -9.80619 | -7.99064 | -9.06969 |
| 7 | 984.4858 | 52.24614 | 5.50E-10 | -9.9826 | -7.87656 | -9.12826 |
| 8 | 998.464 | 22.65443 | 5.66E-10 | -9.95936 | -7.56283 | -8.98718 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 9 | 1022.554 | 37.93421 | 5.20E-10 | -10.0523 | -7.36533 | -8.96232 |
| 10 | 1075.345 | 80.70328 | 3.44E-10 | -10.4752 | -7.49772 | -9.26737 |
| 11 | 1119.331 | 65.22118 | 2.52E-10 | -10.7969 | -7.52892 | -9.47121 |
| 12 | 1207.126 | 126.1419 | 1.12E-10 | -11.6221 | -8.06366 | -10.1786 |
| 13 | 1245.241 | 53.01154 | 8.85E-11 | -11.8763 | -8.02737 | -10.31496* |
| 14 | 1270.491 | 33.95698* | 8.12e-11* | -11.9827 | -7.84321 | -10.3034 |
| 15 | 1287.126 | 21.60563 | 8.26E-11 | -11.98995* | -7.56001 | -10.1929 |
| 16 | 1301.621 | 18.16026 | 8.64E-11 | -11.9727 | -7.25223 | -10.0578 |

**Table A9: Inverse roots of AR characteristic polynomial for the VAR model India (youth dependency ratio)**

Roots of Characteristic Polynomial
Endogenous variables:
D(IND_CPI) D(IND_RR)
IND_YGAP_G D(IND_DEP1_G)
Exogenous variables: C
Lag specification: 1 14
Date: 08/10/20 Time: 22:11

| Root | Modulus |
|---|---|
| -0.157986 + 0.986504i | 0.999075 |
| -0.157986 - 0.986504i | 0.999075 |
| -0.945443 + 0.304853i | 0.993377 |
| -0.945443 - 0.304853i | 0.993377 |
| -0.701917 - 0.699747i | 0.991127 |
| -0.701917 + 0.699747i | 0.991127 |
| -0.261627 + 0.954572i | 0.989776 |
| -0.261627 - 0.954572i | 0.989776 |
| -0.954928 + 0.251633i | 0.987526 |
| -0.954928 - 0.251633i | 0.987526 |
| 0.248077 + 0.953234i | 0.984986 |
| 0.248077 - 0.953234i | 0.984986 |
| 0.689517 + 0.699546i | 0.982241 |
| 0.689517 - 0.699546i | 0.982241 |
| 0.855811 - 0.480477i | 0.981464 |
| 0.855811 + 0.480477i | 0.981464 |
| -0.491654 - 0.846542i | 0.978957 |
| -0.491654 + 0.846542i | 0.978957 |
| 0.442215 + 0.866918i | 0.973191 |
| 0.442215 - 0.866918i | 0.973191 |
| -0.965212 - 0.053438i | 0.96669 |

| | |
|---|---|
| -0.965212 + 0.053438i | 0.96669 |
| 0.931550 + 0.239553i | 0.961858 |
| 0.931550 - 0.239553i | 0.961858 |
| 0.774740 + 0.556099i | 0.95366 |
| 0.774740 - 0.556099i | 0.95366 |
| -0.536914 + 0.773353i | 0.941462 |
| -0.536914 - 0.773353i | 0.941462 |
| -0.000235 - 0.937649i | 0.937649 |
| -0.000235 + 0.937649i | 0.937649 |
| -0.740174 + 0.527566i | 0.908946 |
| -0.740174 - 0.527566i | 0.908946 |
| 0.408604 - 0.809519i | 0.906796 |
| 0.408604 + 0.809519i | 0.906796 |
| -0.806168 + 0.399258i | 0.899618 |
| -0.806168 - 0.399258i | 0.899618 |
| -0.600497 + 0.661973i | 0.893759 |
| -0.600497 - 0.661973i | 0.893759 |
| 0.271382 - 0.819995i | 0.863736 |
| 0.271382 + 0.819995i | 0.863736 |
| 0.553928 - 0.660668i | 0.862159 |
| 0.553928 + 0.660668i | 0.862159 |
| 0.826487 - 0.208726i | 0.852436 |
| 0.826487 + 0.208726i | 0.852436 |
| -0.068364 + 0.835835i | 0.838626 |
| -0.068364 - 0.835835i | 0.838626 |
| 0.833221 | 0.833221 |
| 0.662549 - 0.456029i | 0.804322 |
| 0.662549 + 0.456029i | 0.804322 |
| -0.267514 + 0.624304i | 0.679205 |
| -0.267514 - 0.624304i | 0.679205 |
| -0.557590 + 0.262428i | 0.616259 |
| -0.557590 - 0.262428i | 0.616259 |
| 0.190371 + 0.580747i | 0.611153 |
| 0.190371 - 0.580747i | 0.611153 |
| -0.15006 | 0.150056 |

**Table A10: VAR model for India (elderly dependency ratio)**

Vector Autoregression Estimates
Date: 08/10/20 Time: 22:39
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | IND_DEP2_G |
|---|---|---|---|---|
| D(IND_CPI(-1)) | -0.68179 | 0.033986 | 0.066625 | -3.25E-05 |
| | -0.08932 | -0.0336 | -0.13381 | -6.00E-05 |
| | [-7.63295] | [ 1.01145] | [ 0.49792] | [-0.54002] |
| D(IND_CPI(-2)) | -0.87901 | 0.019812 | 0.296369 | -3.16E-05 |
| | -0.1059 | -0.03984 | -0.15865 | -7.10E-05 |
| | [-8.30024] | [ 0.49732] | [ 1.86812] | [-0.44232] |
| D(IND_CPI(-3)) | -0.86031 | 0.081183 | 0.024415 | 1.94E-05 |
| | -0.13077 | -0.04919 | -0.19591 | -8.80E-05 |
| | [-6.57859] | [ 1.65026] | [ 0.12463] | [ 0.21980] |
| D(IND_CPI(-4)) | -0.88397 | 0.027273 | 0.164609 | 3.15E-05 |
| | -0.14063 | -0.0529 | -0.21067 | -9.50E-05 |
| | [-6.28584] | [ 0.51556] | [ 0.78137] | [ 0.33228] |
| D(IND_CPI(-5)) | -0.99944 | 0.054393 | -0.02321 | 5.57E-05 |
| | -0.14579 | -0.05484 | -0.2184 | -9.80E-05 |
| | [-6.85543] | [ 0.99183] | [-0.10629] | [ 0.56614] |
| D(IND_CPI(-6)) | -0.77839 | 0.022115 | 0.086611 | 1.04E-04 |
| | -0.15057 | -0.05664 | -0.22556 | -0.0001 |
| | [-5.16967] | [ 0.39045] | [ 0.38399] | [ 1.02898] |
| D(IND_CPI(-7)) | -1.0528 | 0.050153 | 0.000967 | 8.75E-05 |
| | -0.14516 | -0.05461 | -0.21746 | -9.80E-05 |
| | [-7.25249] | [ 0.91844] | [ 0.00445] | [ 0.89345] |
| D(IND_CPI(-8)) | -0.86552 | 0.077443 | 0.059441 | 1.02E-04 |
| | -0.14642 | -0.05508 | -0.21934 | -9.90E-05 |
| | [-5.91129] | [ 1.40604] | [ 0.27100] | [ 1.03137] |
| D(IND_CPI(-9)) | -0.85192 | 0.027596 | 0.350623 | 1.53E-05 |
| | -0.15016 | -0.05649 | -0.22494 | -0.0001 |
| | [-5.67354] | [ 0.48856] | [ 1.55873] | [ 0.15137] |
| D(IND_CPI(-10)) | -0.78137 | 0.064352 | 0.005689 | -4.28E-06 |
| | -0.14869 | -0.05593 | -0.22274 | -1.00E-04 |
| | [-5.25511] | [ 1.15053] | [ 0.02554] | [-0.04272] |

| | | | | |
|---|---|---|---|---|
| D(IND_CPI(-11)) | -0.70595 | 0.048908 | 0.293963 | 3.66E-05 |
| | -0.14266 | -0.05367 | -0.21371 | -9.60E-05 |
| | [-4.94848] | [ 0.91135] | [ 1.37551] | [ 0.38088] |
| D(IND_CPI(-12)) | -0.26076 | 0.057805 | -0.02483 | 7.42E-05 |
| | -0.13844 | -0.05208 | -0.20739 | -9.30E-05 |
| | [-1.88359] | [ 1.10998] | [-0.11975] | [ 0.79463] |
| D(IND_CPI(-13)) | -0.27419 | 0.013956 | 0.068735 | 2.83E-05 |
| | -0.11114 | -0.04181 | -0.16649 | -7.50E-05 |
| | [-2.46714] | [ 0.33382] | [ 0.41285] | [ 0.37803] |
| D(IND_CPI(-14)) | -0.17113 | 0.015553 | -0.18768 | 5.57E-05 |
| | -0.09408 | -0.03539 | -0.14093 | -6.30E-05 |
| | [-1.81905] | [ 0.43950] | [-1.33172] | [ 0.87726] |
| D(IND_RR(-1)) | -0.23025 | 0.38564 | -0.97962 | 5.99E-05 |
| | -0.2373 | -0.08927 | -0.35549 | -0.00016 |
| | [-0.97027] | [ 4.32005] | [-2.75570] | [ 0.37455] |
| D(IND_RR(-2)) | -0.01884 | 0.334216 | 0.458777 | 4.82E-05 |
| | -0.25128 | -0.09452 | -0.37643 | -0.00017 |
| | [-0.07499] | [ 3.53576] | [ 1.21877] | [ 0.28450] |
| D(IND_RR(-3)) | -0.14947 | 0.051501 | 0.056441 | 1.90E-05 |
| | -0.14196 | -0.0534 | -0.21267 | -9.60E-05 |
| | [-1.05288] | [ 0.96438] | [ 0.26539] | [ 0.19812] |
| D(IND_RR(-4)) | 0.144979 | 0.01241 | 0.143879 | 1.50E-06 |
| | -0.14151 | -0.05323 | -0.21198 | -9.50E-05 |
| | [ 1.02453] | [ 0.23314] | [ 0.67873] | [ 0.01567] |
| D(IND_RR(-5)) | -0.15323 | 0.0511 | 0.001365 | -6.59E-05 |
| | -0.14243 | -0.05358 | -0.21337 | -9.60E-05 |
| | [-1.07577] | [ 0.95371] | [ 0.00640] | [-0.68595] |
| D(IND_RR(-6)) | 0.323544 | 0.038091 | -0.13613 | 3.04E-05 |
| | -0.14055 | -0.05287 | -0.21055 | -9.50E-05 |
| | [ 2.30198] | [ 0.72044] | [-0.64653] | [ 0.32040] |
| D(IND_RR(-7)) | -0.11528 | -0.04424 | 0.139038 | 6.34E-06 |
| | -0.1434 | -0.05394 | -0.21482 | -9.70E-05 |
| | [-0.80393] | [-0.82020] | [ 0.64725] | [ 0.06552] |

| | | | | |
|---|---|---|---|---|
| D(IND_RR(-8)) | 0.132923 | 0.027244 | -0.28171 | 0.000175 |
| | -0.14411 | -0.05421 | -0.21588 | -9.70E-05 |
| | [ 0.92239] | [ 0.50257] | [-1.30493] | [ 1.80520] |
| | | | | |
| D(IND_RR(-9)) | -0.02195 | -0.02541 | 0.222234 | -9.55E-05 |
| | -0.14487 | -0.0545 | -0.21702 | -9.80E-05 |
| | [-0.15153] | [-0.46631] | [ 1.02404] | [-0.97788] |
| | | | | |
| D(IND_RR(-10)) | 0.150467 | 0.008548 | -0.2272 | -4.31E-05 |
| | -0.14257 | -0.05363 | -0.21358 | -9.60E-05 |
| | [ 1.05537] | [ 0.15939] | [-1.06377] | [-0.44857] |
| | | | | |
| D(IND_RR(-11)) | -0.43189 | -0.01215 | 0.185029 | -0.00025 |
| | -0.14355 | -0.054 | -0.21504 | -9.70E-05 |
| | [-3.00869] | [-0.22493] | [ 0.86044] | [-2.54214] |
| | | | | |
| D(IND_RR(-12)) | 0.004313 | -0.7652 | 0.2321 | -0.0001 |
| | -0.14771 | -0.05556 | -0.22128 | -0.0001 |
| | [ 0.02920] | [-13.7712] | [ 1.04891] | [-1.02039] |
| | | | | |
| D(IND_RR(-13)) | -0.24964 | 0.300699 | -1.25277 | -5.05E-06 |
| | -0.22617 | -0.08508 | -0.33881 | -0.00015 |
| | [-1.10378] | [ 3.53436] | [-3.69756] | [-0.03312] |
| | | | | |
| D(IND_RR(-14)) | 0.144827 | 0.310119 | 0.435103 | 0.000247 |
| | -0.23308 | -0.08768 | -0.34917 | -0.00016 |
| | [ 0.62136] | [ 3.53698] | [ 1.24612] | [ 1.57273] |
| | | | | |
| IND_YGAP_G(-1) | 0.05723 | 0.0261 | 0.045118 | -4.92E-05 |
| | -0.06159 | -0.02317 | -0.09226 | -4.20E-05 |
| | [ 0.92923] | [ 1.12653] | [ 0.48902] | [-1.18361] |
| | | | | |
| IND_YGAP_G(-2) | 0.083764 | 0.007427 | -0.07407 | 1.18E-06 |
| | -0.05994 | -0.02255 | -0.0898 | -4.00E-05 |
| | [ 1.39740] | [ 0.32937] | [-0.82489] | [ 0.02918] |
| | | | | |
| IND_YGAP_G(-3) | -0.0116 | 0.005589 | 0.010732 | -1.75E-05 |
| | -0.05961 | -0.02242 | -0.0893 | -4.00E-05 |
| | [-0.19455] | [ 0.24926] | [ 0.12019] | [-0.43443] |
| | | | | |
| IND_YGAP_G(-4) | 0.098846 | -0.00235 | -0.04903 | 3.53E-05 |
| | -0.05802 | -0.02183 | -0.08692 | -3.90E-05 |

| | | | | |
|---|---|---|---|---|
| | [ 1.70354] | [-0.10743] | [-0.56410] | [ 0.90268] |
| IND_YGAP_G(-5) | -0.09786 | 0.002155 | 0.021492 | 5.78E-05 |
| | -0.05674 | -0.02134 | -0.08499 | -3.80E-05 |
| | [-1.72485] | [ 0.10099] | [ 0.25287] | [ 1.50995] |
| IND_YGAP_G(-6) | 0.137042 | 0.0016 | -0.06515 | -1.28E-05 |
| | -0.05748 | -0.02162 | -0.08611 | -3.90E-05 |
| | [ 2.38397] | [ 0.07399] | [-0.75650] | [-0.32920] |
| IND_YGAP_G(-7) | -0.01432 | -0.00312 | -0.00028 | 8.45E-06 |
| | -0.05836 | -0.02195 | -0.08743 | -3.90E-05 |
| | [-0.24534] | [-0.14215] | [-0.00321] | [ 0.21475] |
| IND_YGAP_G(-8) | 0.018462 | 0.007236 | -0.06845 | -2.26E-06 |
| | -0.05813 | -0.02187 | -0.08708 | -3.90E-05 |
| | [ 0.31759] | [ 0.33088] | [-0.78605] | [-0.05766] |
| IND_YGAP_G(-9) | 0.073342 | -0.01864 | 0.01574 | -4.83E-05 |
| | -0.05816 | -0.02188 | -0.08713 | -3.90E-05 |
| | [ 1.26097] | [-0.85204] | [ 0.18065] | [-1.23037] |
| IND_YGAP_G(-10) | -0.10663 | 0.007928 | -0.07999 | 3.17E-05 |
| | -0.06036 | -0.02271 | -0.09042 | -4.10E-05 |
| | [-1.76650] | [ 0.34918] | [-0.88467] | [ 0.77979] |
| IND_YGAP_G(-11) | -0.01221 | 0.003502 | -0.01108 | -7.97E-05 |
| | -0.06145 | -0.02312 | -0.09206 | -4.10E-05 |
| | [-0.19870] | [ 0.15147] | [-0.12039] | [-1.92184] |
| IND_YGAP_G(-12) | 0.056552 | 0.075554 | 0.046853 | 3.29E-06 |
| | -0.06189 | -0.02328 | -0.09271 | -4.20E-05 |
| | [ 0.91375] | [ 3.24525] | [ 0.50536] | [ 0.07892] |
| IND_YGAP_G(-13) | -0.05829 | -0.0176 | -0.03269 | -7.95E-05 |
| | -0.0644 | -0.02422 | -0.09647 | -4.30E-05 |
| | [-0.90518] | [-0.72633] | [-0.33891] | [-1.83036] |
| IND_YGAP_G(-14) | 0.029519 | -0.02008 | -0.04688 | 3.78E-05 |
| | -0.06496 | -0.02444 | -0.09731 | -4.40E-05 |
| | [ 0.45442] | [-0.82162] | [-0.48176] | [ 0.86183] |
| IND_DEP2_G(-1) | -110.254 | 1.404646 | -124.677 | -0.69373 |

| | | | | |
|---|---|---|---|---|
| | -131.193 | -49.3513 | -196.532 | -0.08848 |
| | [-0.84040] | [ 0.02846] | [-0.63438] | [-7.84039] |
| IND_DEP2_G(-2) | -123.224 | -3.28421 | 89.0087 | -0.45293 |
| | -147.324 | -55.4197 | -220.698 | -0.09936 |
| | [-0.83642] | [-0.05926] | [ 0.40330] | [-4.55841] |
| IND_DEP2_G(-3) | -26.7916 | -14.5888 | -98.293 | -0.18589 |
| | -152.07 | -57.205 | -227.808 | -0.10256 |
| | [-0.17618] | [-0.25503] | [-0.43147] | [-1.81248] |
| IND_DEP2_G(-4) | -131.505 | 6.847188 | -142.813 | 0.051073 |
| | -145.799 | -54.846 | -218.414 | -0.09833 |
| | [-0.90196] | [ 0.12484] | [-0.65386] | [ 0.51939] |
| IND_DEP2_G(-5) | -50.7939 | -81.0821 | -341.076 | 0.129861 |
| | -143.439 | -53.9579 | -214.877 | -0.09674 |
| | [-0.35412] | [-1.50269] | [-1.58730] | [ 1.34236] |
| IND_DEP2_G(-6) | -95.6845 | -25.3943 | -224.627 | 0.091925 |
| | -146.261 | -55.0195 | -219.105 | -0.09864 |
| | [-0.65421] | [-0.46155] | [-1.02521] | [ 0.93189] |
| IND_DEP2_G(-7) | -61.1243 | 29.89918 | -163.099 | 0.163307 |
| | -144.088 | -54.202 | -215.849 | -0.09718 |
| | [-0.42422] | [ 0.55162] | [-0.75561] | [ 1.68048] |
| IND_DEP2_G(-8) | 27.08688 | 1.809568 | 23.22822 | 0.183364 |
| | -142.744 | -53.6966 | -213.836 | -0.09627 |
| | [ 0.18976] | [ 0.03370] | [ 0.10863] | [ 1.90463] |
| IND_DEP2_G(-9) | -51.6005 | -12.0375 | 119.2856 | 0.17775 |
| | -142.012 | -53.4213 | -212.74 | -0.09578 |
| | [-0.36335] | [-0.22533] | [ 0.56071] | [ 1.85583] |
| IND_DEP2_G(-10) | 157.4384 | 70.83872 | 142.6483 | 0.227919 |
| | -141.829 | -53.3524 | -212.466 | -0.09566 |
| | [ 1.11006] | [ 1.32775] | [ 0.67139] | [ 2.38270] |
| IND_DEP2_G(-11) | 47.86351 | 94.12226 | 252.6395 | 0.356835 |
| | -145.089 | -54.5787 | -217.349 | -0.09785 |
| | [ 0.32989] | [ 1.72452] | [ 1.16237] | [ 3.64660] |

| | | | | |
|---|---|---|---|---|
| IND_DEP2_G(-12) | 46.38489 | 26.93472 | 195.137 | 0.310581 |
| | -151.27 | -56.9039 | -226.609 | -0.10202 |
| | [ 0.30664] | [ 0.47334] | [ 0.86112] | [ 3.04422] |
| | | | | |
| IND_DEP2_G(-13) | 124.2738 | -38.7108 | 335.9604 | 0.397397 |
| | -147.663 | -55.5469 | -221.205 | -0.09959 |
| | [ 0.84161] | [-0.69690] | [ 1.51877] | [ 3.99032] |
| | | | | |
| IND_DEP2_G(-14) | 168.7004 | -23.6007 | 56.27775 | 0.181258 |
| | -130.082 | -48.9335 | -194.869 | -0.08773 |
| | [ 1.29688] | [-0.48230] | [ 0.28880] | [ 2.06602] |
| | | | | |
| C | 0.125139 | -0.03483 | -0.00484 | 0.000277 |
| | -0.13171 | -0.04955 | -0.19731 | -8.90E-05 |
| | [ 0.95012] | [-0.70299] | [-0.02453] | [ 3.12232] |
| | | | | |
| R-squared | 0.716074 | 0.798845 | 0.27926 | 0.761659 |
| Adj. R-squared | 0.582461 | 0.704184 | -0.05991 | 0.649498 |
| Sum sq. resids | 50.8247 | 7.192063 | 114.0575 | 2.31E-05 |
| S.E. equation | 0.653528 | 0.24584 | 0.979013 | 0.000441 |
| F-statistic | 5.359334 | 8.439014 | 0.823359 | 6.790783 |
| Log likelihood | -140.428 | 31.64734 | -211.56 | 1144.657 |
| Akaike AIC | 2.243503 | 0.288098 | 3.051823 | -12.3597 |
| Schwarz SC | 3.270307 | 1.314903 | 4.078628 | -11.3329 |
| Mean dependent | -0.00188 | -0.01221 | 0.049666 | 1.10E-03 |
| S.D. dependent | 1.011383 | 0.452004 | 0.950941 | 0.000744 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 4.44E-09 |
| Determinant resid covariance | 9.29E-10 |
| Log likelihood | 831.2074 |
| Akaike information criterion | -6.85463 |
| Schwarz criterion | -2.74741 |

### Table A11: VAR Lag length criteria for India (elderly dependency ratio)

VAR Lag Order Selection Criteria
Endogenous variables: D(IND_CPI) D(IND_RR) IND_YGAP_G IND_DEP2_G
Exogenous variables: C
Date: 08/10/20 Time: 22:41
Sample: 2003M02 2018M12
Included observations: 174

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 0 | 418.9837 | NA | 9.97E-08 | -4.76993 | -<br>4.697306* | -4.74047 |
| 1 | 451.2727 | 62.72216 | 8.27E-08 | -4.95716 | -4.59405 | -4.80986 |
| 2 | 489.1295 | 71.79752 | 6.43E-08 | -5.20839 | -4.55479 | -4.94325 |
| 3 | 513.5641 | 45.21803 | 5.84E-08 | -5.30534 | -4.36125 | -4.92236 |
| 4 | 529.1781 | 28.1769 | 5.88E-08 | -5.3009 | -4.06632 | -4.80008 |
| 5 | 562.0847 | 57.87036 | 4.85E-08 | -5.49523 | -3.97017 | -4.87657 |
| 6 | 575.2075 | 22.47468 | 5.03E-08 | -5.46216 | -3.64661 | -4.72566 |
| 7 | 594.669 | 32.43577 | 4.85E-08 | -5.50194 | -3.39591 | -4.64761 |
| 8 | 610.3303 | 25.38209 | 4.90E-08 | -5.49805 | -3.10153 | -4.52587 |
| 9 | 623.1155 | 20.13308 | 5.13E-08 | -5.4611 | -2.77409 | -4.37108 |
| 10 | 639.0597 | 24.37449 | 5.18E-08 | -5.46046 | -2.48296 | -4.2526 |
| 11 | 669.5385 | 45.19266 | 4.44E-08 | -5.62688 | -2.35889 | -4.30118 |
| 12 | 756.9175 | 125.5445 | 1.98E-08 | -6.44733 | -2.88885 | -5.00379 |
| 13 | 794.2915 | 51.97984 | 1.58E-08 | -6.69301 | -2.84404 | -5.131629* |
| 14 | 819.4827 | 33.87783* | 1.45E-08 | -6.79865 | -2.6592 | -5.11944 |
| 15 | 838.209 | 24.3227 | 1.44e-08* | -6.829988* | -2.40005 | -5.03293 |
| 16 | 848.4832 | 12.87234 | 1.58E-08 | -6.76418 | -2.04375 | -4.84928 |

**Table A12: Inverse roots of AR characteristic polynomial for the VAR model India (elderly dependency ratio)**

Roots of Characteristic Polynomial
Endogenous variables: D(IND_CPI) D(IND_RR) IND_YGAP_G IND_DEP2_G
Exogenous variables: C
Lag specification: 1 14
Date: 08/10/20 Time: 22:40

| Root | Modulus |
|---|---|
| 0.996902 | 0.996902 |
| -0.698357 + 0.699949i | 0.988752 |
| -0.698357 - 0.699949i | 0.988752 |
| -0.257796 + 0.953796i | 0.988021 |
| -0.257796 - 0.953796i | 0.988021 |
| -0.953194 - 0.254172i | 0.9865 |
| -0.953194 + 0.254172i | 0.9865 |
| 0.251202 - 0.953531i | 0.986065 |
| 0.251202 + 0.953531i | 0.986065 |
| 0.855981 + 0.481632i | 0.982178 |

| | |
|---|---|
| 0.855981 - 0.481632i | 0.982178 |
| -0.497806 + 0.846315i | 0.981866 |
| -0.497806 - 0.846315i | 0.981866 |
| 0.688879 + 0.698714i | 0.981201 |
| 0.688879 - 0.698714i | 0.981201 |
| -0.963815 + 0.061683i | 0.965786 |
| -0.963815 - 0.061683i | 0.965786 |
| 0.932669 + 0.235507i | 0.961943 |
| 0.932669 - 0.235507i | 0.961943 |
| 0.398750 - 0.839081i | 0.92901 |
| 0.398750 + 0.839081i | 0.92901 |
| 0.021406 + 0.926849i | 0.927096 |
| 0.021406 - 0.926849i | 0.927096 |
| 0.460575 - 0.804098i | 0.926663 |
| 0.460575 + 0.804098i | 0.926663 |
| -0.746098 + 0.534874i | 0.918016 |
| -0.746098 - 0.534874i | 0.918016 |
| 0.018806 + 0.916592i | 0.916785 |
| 0.018806 - 0.916592i | 0.916785 |
| -0.284275 + 0.867720i | 0.913099 |
| -0.284275 - 0.867720i | 0.913099 |
| -0.829060 + 0.360590i | 0.904083 |
| -0.829060 - 0.360590i | 0.904083 |
| -0.649706 - 0.616021i | 0.895321 |
| -0.649706 + 0.616021i | 0.895321 |
| 0.776948 + 0.434428i | 0.890155 |
| 0.776948 - 0.434428i | 0.890155 |
| -0.852108 + 0.244822i | 0.886581 |
| -0.852108 - 0.244822i | 0.886581 |
| 0.664814 - 0.557955i | 0.867924 |
| 0.664814 + 0.557955i | 0.867924 |
| -0.060058 + 0.863067i | 0.865154 |
| -0.060058 - 0.863067i | 0.865154 |
| 0.273169 + 0.819489i | 0.863819 |
| 0.273169 - 0.819489i | 0.863819 |
| -0.464050 - 0.725722i | 0.861403 |
| -0.464050 + 0.725722i | 0.861403 |
| 0.555940 + 0.641656i | 0.848995 |
| 0.555940 - 0.641656i | 0.848995 |
| 0.820106 - 0.204437i | 0.845203 |
| 0.820106 + 0.204437i | 0.845203 |
| 0.772244 | 0.772244 |
| -0.503454 + 0.496565i | 0.707137 |

| | |
|---|---|
| -0.503454 - 0.496565i | 0.707137 |
| -0.49909 | 0.499086 |
| -0.13377 | 0.133766 |

**Table A13: VAR model for Bangladesh (youth dependency ratio)**

Vector Autoregression Estimates
Date: 08/14/20 Time: 19:26
Sample (adjusted): 2003M08 2018M12
Included observations: 185 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | D(BAN_DEP1_G) |
|---|---|---|---|---|
| BAN_CPI(-1) | 0.422718 | 0.013092 | -0.09575 | 1.10E-05 |
| | -0.0729 | -0.01452 | -0.16631 | -5.20E-06 |
| | [ 5.79856] | [ 0.90173] | [-0.57574] | [ 2.13279] |
| BAN_CPI(-2) | -0.20414 | 0.005292 | -0.14465 | -9.60E-06 |
| | -0.07767 | -0.01547 | -0.17719 | -5.50E-06 |
| | [-2.62821] | [ 0.34209] | [-0.81634] | [-1.73923] |
| BAN_CPI(-3) | 0.024936 | 0.002806 | 0.147812 | 7.06E-06 |
| | -0.07905 | -0.01574 | -0.18034 | -5.60E-06 |
| | [ 0.31544] | [ 0.17824] | [ 0.81963] | [ 1.25676] |
| BAN_CPI(-4) | -0.23982 | -0.01347 | -0.07833 | -5.75E-06 |
| | -0.07704 | -0.01534 | -0.17575 | -5.50E-06 |
| | [-3.11306] | [-0.87776] | [-0.44570] | [-1.05096] |
| BAN_CPI(-5) | 0.011232 | 0.006626 | 0.08998 | 6.79E-06 |
| | -0.07322 | -0.01458 | -0.16704 | -5.20E-06 |
| | [ 0.15340] | [ 0.45440] | [ 0.53869] | [ 1.30479] |
| D(BAN_RR(-1)) | 0.465251 | 0.246271 | -1.42754 | -2.33E-05 |
| | -0.39315 | -0.0783 | -0.89688 | -2.80E-05 |
| | [ 1.18341] | [ 3.14535] | [-1.59168] | [-0.83384] |
| D(BAN_RR(-2)) | -0.0041 | 0.175265 | -0.15259 | -8.14E-08 |
| | -0.40585 | -0.08083 | -0.92585 | -2.90E-05 |
| | [-0.01010] | [ 2.16840] | [-0.16481] | [-0.00282] |
| D(BAN_RR(-3)) | 0.386239 | 0.114725 | 0.132133 | 1.94E-05 |

| | | | | |
|---|---|---|---|---|
| | -0.40896 | -0.08145 | -0.93294 | -2.90E-05 |
| | [ 0.94445] | [ 1.40861] | [ 0.14163] | [ 0.66728] |
| D(BAN_RR(-4)) | -0.49021 | 0.083839 | 0.172731 | -4.82E-05 |
| | -0.40821 | -0.0813 | -0.93125 | -2.90E-05 |
| | [-1.20086] | [ 1.03126] | [ 0.18548] | [-1.66098] |
| D(BAN_RR(-5)) | 0.17145 | 0.038677 | -0.07123 | 4.52E-05 |
| | -0.39576 | -0.07882 | -0.90283 | -2.80E-05 |
| | [ 0.43322] | [ 0.49072] | [-0.07890] | [ 1.60843] |
| BAN_YGAP_G(-1) | 0.006035 | 0.004936 | -0.03651 | -1.05E-06 |
| | -0.03443 | -0.00686 | -0.07854 | -2.40E-06 |
| | [ 0.17530] | [ 0.71997] | [-0.46492] | [-0.43119] |
| BAN_YGAP_G(-2) | -0.00986 | 0.001908 | -0.00268 | 1.06E-06 |
| | -0.03439 | -0.00685 | -0.07846 | -2.40E-06 |
| | [-0.28656] | [ 0.27862] | [-0.03420] | [ 0.43213] |
| BAN_YGAP_G(-3) | -0.07657 | 0.001987 | 0.013413 | 9.03E-07 |
| | -0.03431 | -0.00683 | -0.07828 | -2.40E-06 |
| | [-2.23135] | [ 0.29074] | [ 0.17134] | [ 0.37027] |
| BAN_YGAP_G(-4) | 0.027661 | 0.003328 | -0.02073 | 6.26E-07 |
| | -0.03475 | -0.00692 | -0.07928 | -2.50E-06 |
| | [ 0.79595] | [ 0.48086] | [-0.26147] | [ 0.25345] |
| BAN_YGAP_G(-5) | 0.123212 | 0.001297 | -0.0401 | -1.54E-06 |
| | -0.03426 | -0.00682 | -0.07815 | -2.40E-06 |
| | [ 3.59650] | [ 0.19008] | [-0.51306] | [-0.63085] |
| D(BAN_DEP1_G(-1)) | 619.6425 | -93.045 | -2086.15 | ####### |
| | -996.46 | -198.45 | -2273.2 | -7.08E-02 |
| | [ 0.62184] | [-0.46886] | [-0.91771] | [-22.0708] |
| D(BAN_DEP1_G(-2)) | 667.3914 | -101.207 | -2897.34 | ####### |
| | -1480.92 | -294.932 | -3378.39 | -1.05E-01 |
| | [ 0.45066] | [-0.34315] | [-0.85761] | [-16.6180] |
| D(BAN_DEP1_G(-3)) | 775.175 | -252.717 | -712.123 | ####### |
| | -1800.48 | -358.574 | -4107.4 | -1.28E-01 |
| | [ 0.43054] | [-0.70478] | [-0.17338] | [-11.6163] |

| | | | | |
|---|---|---|---|---|
| D(BAN_DEP1_G(-4)) | 163.1716 | -249.59 | 1939.806 | ####### |
| | -1487.14 | -296.171 | -3392.58 | -1.06E-01 |
| | [ 0.10972] | [-0.84272] | [ 0.57178] | [-11.6736] |
| | | | | |
| D(BAN_DEP1_G(-5)) | 266.9297 | -64.7721 | 1653.624 | -3.97E-01 |
| | -1014.61 | -202.065 | -2314.61 | -7.21E-02 |
| | [ 0.26309] | [-0.32055] | [ 0.71443] | [-5.50281] |
| | | | | |
| C | 0.584908 | -0.02591 | 0.187019 | -3.38E-05 |
| | -0.1058 | -0.02107 | -0.24135 | -7.50E-06 |
| | [ 5.52858] | [-1.22955] | [ 0.77488] | [-4.49771] |
| | | | | |
| R-squared | 0.334128 | 0.250276 | 0.063664 | 9.17E-01 |
| Adj. R-squared | 0.252925 | 0.158846 | -0.05052 | 9.07E-01 |
| Sum sq. resids | 95.63606 | 3.793188 | 497.7133 | 4.83E-07 |
| S.E. equation | 0.76364 | 0.152083 | 1.742078 | 5.43E-05 |
| F-statistic | 4.114687 | 2.737353 | 0.557538 | 9.04E+01 |
| Log likelihood | -201.472 | 97.05765 | -354.048 | 1.57E+03 |
| Akaike AIC | 2.405098 | -0.82225 | 4.054573 | -16.6987 |
| Schwarz SC | 2.770652 | -0.45669 | 4.420126 | -16.3331 |
| Mean dependent | 0.57805 | -0.03419 | 0.178534 | -3.94E-06 |
| S.D. dependent | 0.8835 | 0.165822 | 1.699671 | 1.78E-04 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 1.17E-10 |
| Determinant resid covariance | 7.25E-11 |
| Log likelihood | 1109.56 |
| Akaike information criterion | -11.0871 |
| Schwarz criterion | -9.62492 |

**Table A14: VAR Lag length criteria for Bangladesh (youth dependency ratio)**

VAR Lag Order Selection Criteria
Endogenous variables: BAN_CPI D(BAN_RR) BAN_YGAP_G D(BAN_DEP1_G)
Exogenous variables: C
Date: 08/14/20 Time: 19:28
Sample: 2003M02 2018M12
Included observations: 180

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 0 | 779.367 | NA | 2.13E-09 | -8.61519 | -8.54424 | -8.58642 |
| 1 | 877.0186 | 189.8781 | 8.60E-10 | -9.52243 | -9.16766 | -9.37858 |
| 2 | 965.8961 | 168.8671 | 3.83E-10 | -10.3322 | -9.69359 | -10.0733 |
| 3 | 973.3035 | 13.74487 | 4.21E-10 | -10.2367 | -9.3143 | -9.86271 |
| 4 | 1049.327 | 137.6869 | 2.17E-10 | -10.9036 | -9.697404* | -10.41456* |
| 5 | 1075.239 | 45.77717 | 1.94E-10 | -11.0138 | -9.52372 | -10.4096 |
| 6 | 1084.491 | 15.93536 | 2.10E-10 | -10.9388 | -9.16493 | -10.2196 |
| 7 | 1115.924 | 52.73645 | 1.78E-10 | -11.1103 | -9.05258 | -10.276 |
| 8 | 1134.596 | 30.49851* | 1.74e-10* | -11.13996* | -8.79846 | -10.1906 |
| 9 | 1147.906 | 21.14835 | 1.80E-10 | -11.1101 | -8.48475 | -10.0456 |
| 10 | 1156.243 | 12.87539 | 1.98E-10 | -11.0249 | -8.11578 | -9.84539 |

**Table A15: Inverse roots of AR characteristic polynomial for the VAR model Bangladesh (youth dependency ratio)**

Roots of Characteristic Polynomial
Endogenous variables: BAN_CPI D(BAN_RR) BAN_YGAP_G D(BAN_DEP1_G)
Exogenous variables: C
Lag specification: 1 5
Date: 08/14/20 Time: 19:27

| Root | Modulus |
|---|---|
| -0.731159 - 0.632530i | 0.966793 |
| -0.731159 + 0.632530i | 0.966793 |
| 0.203190 + 0.903499i | 0.926065 |
| 0.203190 - 0.903499i | 0.926065 |
| 0.829657 | 0.829657 |
| 0.610121 + 0.487825i | 0.781167 |
| 0.610121 - 0.487825i | 0.781167 |
| -0.485398 + 0.522040i | 0.712838 |
| -0.485398 - 0.522040i | 0.712838 |
| -0.185593 + 0.637803i | 0.664257 |
| -0.185593 - 0.637803i | 0.664257 |
| -0.61702 | 0.617022 |
| 0.329844 - 0.503775i | 0.602152 |
| 0.329844 + 0.503775i | 0.602152 |
| 0.038893 - 0.511782i | 0.513258 |
| 0.038893 + 0.511782i | 0.513258 |
| -0.484256 + 0.085813i | 0.491801 |

| | |
|---|---|
| -0.484256 - 0.085813i | 0.491801 |
| 0.468271 | 0.468271 |
| -0.20267 | 0.202671 |

**Table A16: VAR model for Bangladesh (elderly dependency ratio)**

Vector Autoregression Estimates
Date: 08/10/20 Time: 22:29
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | BAN_DEP2_G |
|---|---|---|---|---|
| BAN_CPI(-1) | 0.134881 | 0.026536 | 0.099884 | -5.97E-05 |
| | -0.09176 | -0.01817 | -0.28991 | -6.60E-05 |
| | [ 1.46992] | [ 1.46008] | [ 0.34453] | [-0.90375] |
| BAN_CPI(-2) | -0.09556 | 0.005174 | 0.022721 | 5.71E-05 |
| | -0.09096 | -0.01802 | -0.28738 | -6.60E-05 |
| | [-1.05052] | [ 0.28720] | [ 0.07906] | [ 0.87164] |
| BAN_CPI(-3) | -0.06091 | 0.002319 | 0.488132 | 7.88E-05 |
| | -0.07952 | -0.01575 | -0.25124 | -5.70E-05 |
| | [-0.76594] | [ 0.14727] | [ 1.94292] | [ 1.37556] |
| BAN_CPI(-4) | -0.18563 | -0.016 | 0.019528 | 2.66E-05 |
| | -0.07982 | -0.01581 | -0.25218 | -5.70E-05 |
| | [-2.32569] | [-1.01228] | [ 0.07743] | [ 0.46189] |
| BAN_CPI(-5) | -0.00588 | 0.020288 | 0.255172 | -7.32E-05 |
| | -0.08034 | -0.01591 | -0.25385 | -5.80E-05 |
| | [-0.07315] | [ 1.27494] | [ 1.00522] | [-1.26447] |
| BAN_CPI(-6) | 0.084034 | -0.02081 | 0.059721 | 2.85E-05 |
| | -0.08301 | -0.01644 | -0.26227 | -6.00E-05 |
| | [ 1.01231] | [-1.26557] | [ 0.22771] | [ 0.47735] |
| BAN_CPI(-7) | -0.22468 | 0.014256 | 0.445874 | -8.69E-05 |
| | -0.08409 | -0.01665 | -0.26568 | -6.10E-05 |
| | [-2.67184] | [ 0.85594] | [ 1.67824] | [-1.43466] |
| BAN_CPI(-8) | -0.06312 | -0.00051 | -0.04181 | 0.000123 |

| | | | | |
|---|---|---|---|---|
| | -0.08312 | -0.01646 | -0.26262 | -6.00E-05 |
| | [-0.75934] | [-0.03079] | [-0.15919] | [ 2.05983] |
| BAN_CPI(-9) | -0.07215 | 0.008301 | 0.189244 | -0.00012 |
| | -0.08314 | -0.01647 | -0.26268 | -6.00E-05 |
| | [-0.86778] | [ 0.50409] | [ 0.72043] | [-1.93889] |
| BAN_CPI(-10) | -0.12201 | -0.00018 | 0.079865 | 1.52E-05 |
| | -0.0778 | -0.01541 | -0.24581 | -5.60E-05 |
| | [-1.56827] | [-0.01134] | [ 0.32491] | [ 0.27165] |
| BAN_CPI(-11) | -0.02956 | 0.006687 | 0.435217 | 3.94E-05 |
| | -0.07501 | -0.01486 | -0.237 | -5.40E-05 |
| | [-0.39410] | [ 0.45009] | [ 1.83637] | [ 0.72962] |
| BAN_CPI(-12) | 0.470074 | 0.005934 | -0.04541 | -2.20E-05 |
| | -0.07634 | -0.01512 | -0.2412 | -5.50E-05 |
| | [ 6.15753] | [ 0.39246] | [-0.18828] | [-0.39930] |
| BAN_CPI(-13) | 0.108759 | -0.01391 | 0.06547 | 0.000117 |
| | -0.08718 | -0.01727 | -0.27543 | -6.30E-05 |
| | [ 1.24756] | [-0.80573] | [ 0.23770] | [ 1.86108] |
| BAN_CPI(-14) | -0.06515 | -0.0026 | -0.1657 | -9.36E-05 |
| | -0.08793 | -0.01741 | -0.2778 | -6.30E-05 |
| | [-0.74090] | [-0.14954] | [-0.59649] | [-1.47843] |
| D(BAN_RR(-1)) | 0.37621 | 0.276751 | -4.04253 | -0.00018 |
| | -0.4403 | -0.08721 | -1.39112 | -0.00032 |
| | [ 0.85443] | [ 3.17354] | [-2.90596] | [-0.55964] |
| D(BAN_RR(-2)) | 0.12341 | 0.345165 | 0.961008 | -1.51E-05 |
| | -0.4688 | -0.09285 | -1.48115 | -0.00034 |
| | [ 0.26325] | [ 3.71747] | [ 0.64883] | [-0.04481] |
| D(BAN_RR(-3)) | 0.590893 | 0.06206 | 0.236161 | 0.000103 |
| | -0.35168 | -0.06965 | -1.11113 | -0.00025 |
| | [ 1.68019] | [ 0.89097] | [ 0.21254] | [ 0.40787] |
| D(BAN_RR(-4)) | -0.61666 | 0.047261 | -0.04352 | -9.12E-05 |
| | -0.35618 | -0.07054 | -1.12533 | -0.00026 |
| | [-1.73133] | [ 0.66994] | [-0.03867] | [-0.35552] |

| | | | | |
|---|---|---|---|---|
| D(BAN_RR(-5)) | -0.33869 | 0.09075 | 0.252224 | 0.000211 |
| | -0.36144 | -0.07159 | -1.14195 | -0.00026 |
| | [-0.93705] | [ 1.26770] | [ 0.22087] | [ 0.80891] |
| D(BAN_RR(-6)) | 0.629474 | 0.045183 | -0.15788 | -9.16E-05 |
| | -0.36447 | -0.07219 | -1.15153 | -0.00026 |
| | [ 1.72709] | [ 0.62592] | [-0.13711] | [-0.34891] |
| D(BAN_RR(-7)) | 0.200852 | -0.00145 | 0.714899 | 0.000503 |
| | -0.35588 | -0.07049 | -1.1244 | -0.00026 |
| | [ 0.56437] | [-0.02058] | [ 0.63581] | [ 1.96266] |
| D(BAN_RR(-8)) | 0.238691 | 0.015009 | -0.0923 | -0.0002 |
| | -0.35805 | -0.07091 | -1.13124 | -0.00026 |
| | [ 0.66664] | [ 0.21165] | [-0.08159] | [-0.78786] |
| D(BAN_RR(-9)) | -0.09772 | -0.02668 | -0.62881 | 0.000109 |
| | -0.35316 | -0.06995 | -1.1158 | -0.00025 |
| | [-0.27670] | [-0.38148] | [-0.56355] | [ 0.42990] |
| D(BAN_RR(-10)) | -0.33259 | -0.0392 | -0.261 | -0.00046 |
| | -0.34619 | -0.06857 | -1.09376 | -0.00025 |
| | [-0.96072] | [-0.57173] | [-0.23862] | [-1.84446] |
| D(BAN_RR(-11)) | -0.61992 | 0.033454 | 0.002043 | 0.000189 |
| | -0.34854 | -0.06903 | -1.10119 | -0.00025 |
| | [-1.77862] | [ 0.48462] | [ 0.00186] | [ 0.75198] |
| D(BAN_RR(-12)) | 0.426529 | -0.6471 | 1.187621 | -0.00013 |
| | -0.35205 | -0.06973 | -1.11228 | -0.00025 |
| | [ 1.21156] | [-9.28052] | [ 1.06773] | [-0.50067] |
| D(BAN_RR(-13)) | -0.11861 | 0.147866 | -4.01246 | 0.000609 |
| | -0.44762 | -0.08865 | -1.41423 | -0.00032 |
| | [-0.26498] | [ 1.66788] | [-2.83721] | [ 1.88852] |
| D(BAN_RR(-14)) | -0.07825 | 0.326158 | 1.575992 | -0.00045 |
| | -0.44276 | -0.08769 | -1.39887 | -0.00032 |
| | [-0.17674] | [ 3.71938] | [ 1.12662] | [-1.42051] |
| BAN_YGAP_G(-1) | -0.01071 | 0.005561 | -0.04107 | -8.67E-06 |
| | -0.02892 | -0.00573 | -0.09138 | -2.10E-05 |
| | [-0.37017] | [ 0.97079] | [-0.44948] | [-0.41610] |

| | | | | |
|---|---|---|---|---|
| BAN_YGAP_G(-2) | -0.01007 | 0.000738 | -0.04764 | 3.22E-05 |
| | -0.02805 | -0.00556 | -0.08863 | -2.00E-05 |
| | [-0.35896] | [ 0.13280] | [-0.53757] | [ 1.59595] |
| BAN_YGAP_G(-3) | -0.07813 | 0.003334 | 0.026921 | 2.58E-05 |
| | -0.02795 | -0.00554 | -0.08831 | -2.00E-05 |
| | [-2.79551] | [ 0.60226] | [ 0.30487] | [ 1.28189] |
| BAN_YGAP_G(-4) | 0.015511 | 0.003142 | 0.00126 | -2.72E-06 |
| | -0.02859 | -0.00566 | -0.09033 | -2.10E-05 |
| | [ 0.54250] | [ 0.55478] | [ 0.01395] | [-0.13184] |
| BAN_YGAP_G(-5) | 0.116964 | 0.004916 | 0.004715 | 2.49E-05 |
| | -0.02846 | -0.00564 | -0.08991 | -2.00E-05 |
| | [ 4.11014] | [ 0.87226] | [ 0.05244] | [ 1.21326] |
| BAN_YGAP_G(-6) | 0.00846 | 0.001128 | -0.00813 | 4.10E-05 |
| | -0.03034 | -0.00601 | -0.09586 | -2.20E-05 |
| | [ 0.27885] | [ 0.18768] | [-0.08484] | [ 1.87559] |
| BAN_YGAP_G(-7) | -0.03717 | -0.00249 | -0.00764 | -1.33E-05 |
| | -0.02999 | -0.00594 | -0.09475 | -2.20E-05 |
| | [-1.23936] | [-0.41885] | [-0.08062] | [-0.61788] |
| BAN_YGAP_G(-8) | -0.00714 | -0.00296 | -0.08379 | -3.68E-05 |
| | -0.02981 | -0.0059 | -0.09419 | -2.10E-05 |
| | [-0.23939] | [-0.50087] | [-0.88953] | [-1.71375] |
| BAN_YGAP_G(-9) | -0.05391 | -0.00248 | -0.04719 | -6.38E-06 |
| | -0.03007 | -0.00596 | -0.09502 | -2.20E-05 |
| | [-1.79254] | [-0.41576] | [-0.49667] | [-0.29438] |
| BAN_YGAP_G(-10) | -0.05717 | 0.000749 | -0.00142 | 8.52E-06 |
| | -0.03034 | -0.00601 | -0.09586 | -2.20E-05 |
| | [-1.88440] | [ 0.12464] | [-0.01484] | [ 0.39007] |
| BAN_YGAP_G(-11) | -0.0563 | 0.014695 | 0.00224 | 3.81E-05 |
| | -0.04149 | -0.00822 | -0.1311 | -3.00E-05 |
| | [-1.35681] | [ 1.78814] | [ 0.01709] | [ 1.27365] |

| | | | | |
|---|---|---|---|---|
| BAN_YGAP_G(-12) | 0.02089 | 0.017517 | 0.015882 | -2.49E-05 |
| | -0.04039 | -0.008 | -0.1276 | -2.90E-05 |
| | [ 0.51726] | [ 2.19000] | [ 0.12447] | [-0.85453] |
| BAN_YGAP_G(-13) | -0.03175 | -0.00589 | 0.033926 | -5.35E-06 |
| | -0.04042 | -0.00801 | -0.12772 | -2.90E-05 |
| | [-0.78533] | [-0.73514] | [ 0.26564] | [-0.18373] |
| BAN_YGAP_G(-14) | -0.06564 | 0.002407 | 0.018096 | 1.76E-05 |
| | -0.04029 | -0.00798 | -0.12728 | -2.90E-05 |
| | [-1.62921] | [ 0.30173] | [ 0.14217] | [ 0.60799] |
| BAN_DEP2_G(-1) | 70.77869 | -49.951 | -618.361 | -0.55821 |
| | -121.375 | -24.0395 | -383.48 | -0.08743 |
| | [ 0.58314] | [-2.07787] | [-1.61250] | [-6.38491] |
| BAN_DEP2_G(-2) | 23.75713 | -34.0357 | -849.208 | -0.53311 |
| | -135.421 | -26.8214 | -427.857 | -0.09754 |
| | [ 0.17543] | [-1.26898] | [-1.98479] | [-5.46531] |
| BAN_DEP2_G(-3) | -119.457 | -7.69419 | -438.259 | -0.27538 |
| | -147.454 | -29.2045 | -465.874 | -0.10621 |
| | [-0.81013] | [-0.26346] | [-0.94072] | [-2.59273] |
| BAN_DEP2_G(-4) | -145.162 | 15.28357 | 16.18092 | -0.20591 |
| | -146.762 | -29.0676 | -463.689 | -0.10571 |
| | [-0.98910] | [ 0.52579] | [ 0.03490] | [-1.94786] |
| BAN_DEP2_G(-5) | -63.2223 | 17.75249 | 67.72179 | 0.012763 |
| | -139.19 | -27.5679 | -439.765 | -0.10026 |
| | [-0.45421] | [ 0.64396] | [ 0.15400] | [ 0.12730] |
| BAN_DEP2_G(-6) | -65.0047 | 47.8636 | 388.2984 | 0.03401 |
| | -131.313 | -26.0077 | -414.878 | -0.09459 |
| | [-0.49504] | [ 1.84036] | [ 0.93593] | [ 0.35957] |
| BAN_DEP2_G(-7) | -134.451 | 96.04812 | 179.467 | 0.268452 |
| | -124.548 | -24.6678 | -393.504 | -0.08971 |
| | [-1.07951] | [ 3.89366] | [ 0.45607] | [ 2.99237] |
| BAN_DEP2_G(-8) | -26.9307 | 36.13677 | -8.06434 | 0.288528 |

| | | | | |
|---|---|---|---|---|
| | -127.197 | -25.1925 | -401.873 | -0.09162 |
| | [-0.21172] | [ 1.43443] | [-0.02007] | [ 3.14917] |
| | | | | |
| BAN_DEP2_G(-9) | 6.89139 | -43.8882 | 19.96416 | 0.336406 |
| | -131.866 | -26.1171 | -416.623 | -0.09498 |
| | [ 0.05226] | [-1.68044] | [ 0.04792] | [ 3.54174] |
| | | | | |
| BAN_DEP2_G(-10) | 5.495109 | -22.4163 | 30.92583 | 0.398625 |
| | -136.972 | -27.1284 | -432.756 | -0.09866 |
| | [ 0.04012] | [-0.82630] | [ 0.07146] | [ 4.04035] |
| | | | | |
| BAN_DEP2_G(-11) | 31.59483 | -22.9138 | 306.6834 | 0.32069 |
| | -142.153 | -28.1545 | -449.124 | -0.10239 |
| | [ 0.22226] | [-0.81386] | [ 0.68285] | [ 3.13196] |
| | | | | |
| BAN_DEP2_G(-12) | 240.6769 | -37.0026 | 248.9182 | 0.326255 |
| | -144.988 | -28.716 | -458.081 | -0.10443 |
| | [ 1.65998] | [-1.28857] | [ 0.54339] | [ 3.12401] |
| | | | | |
| BAN_DEP2_G(-13) | 244.3665 | -2.69653 | 158.5467 | 0.337354 |
| | -139.448 | -27.6188 | -440.578 | -0.10044 |
| | [ 1.75239] | [-0.09763] | [ 0.35986] | [ 3.35862] |
| | | | | |
| BAN_DEP2_G(-14) | -3.64963 | 2.694331 | 66.46304 | 0.188251 |
| | -119.366 | -23.6414 | -377.131 | -0.08598 |
| | [-0.03058] | [ 0.11397] | [ 0.17623] | [ 2.18949] |
| | | | | |
| C | 0.5968 | -0.0313 | -0.8395 | -0.00029 |
| | -0.22522 | -0.04461 | -0.71158 | -0.00016 |
| | [ 2.64981] | [-0.70166] | [-1.17976] | [-1.81270] |
| | | | | |
| R-squared | 0.716256 | 0.684586 | 0.222294 | 0.821271 |
| Adj. R-squared | 0.582729 | 0.536156 | -0.14369 | 0.737164 |
| Sum sq. resids | 40.56477 | 1.591243 | 404.9236 | 2.10E-05 |
| S.E. equation | 0.58385 | 0.115636 | 1.844646 | 0.000421 |
| F-statistic | 5.364142 | 4.612173 | 0.607395 | 9.76454 |
| Log likelihood | -120.586 | 164.392 | -323.056 | 1152.922 |
| Akaike AIC | 2.01802 | -1.22036 | 4.318819 | -12.4537 |
| Schwarz SC | 3.044825 | -0.19356 | 5.345623 | -11.4269 |
| Mean dependent | 0.583192 | -0.03282 | 0.203079 | 0.000705 |
| S.D. dependent | 0.903841 | 0.169789 | 1.724883 | 0.00082 |
| | | | | |
| Determinant resid covariance (dof adj.) | | 2.60E-09 | | |

| | |
|---|---|
| Determinant resid covariance | 5.43E-10 |
| Log likelihood | 878.3746 |
| Akaike information criterion | -7.39062 |
| Schwarz criterion | -3.2834 |

**Table A17: VAR Lag length criteria for Bangladesh (elderly dependency ratio)**

VAR Lag Order Selection Criteria
Endogenous variables: BAN_CPI D(BAN_RR) BAN_YGAP_G BAN_DEP2_G
Exogenous variables: C
Date: 08/10/20 Time: 22:31
Sample: 2003M02 2018M12
Included observations: 174

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 481.1654 | NA | 4.88E-08 | -5.48466 | -5.41204 | -5.4552 |
| 1 | 536.7183 | 107.913 | 3.10E-08 | -5.93929 | -5.576181* | -5.79199 |
| 2 | 568.8244 | 60.89089 | 2.57E-08 | -6.12442 | -5.47082 | -5.859279* |
| 3 | 593.5491 | 45.75489 | 2.33E-08 | -6.2247 | -5.28062 | -5.84172 |
| 4 | 619.6768 | 47.15006 | 2.08E-08 | -6.34111 | -5.10654 | -5.84029 |
| 5 | 647.4781 | 48.89191 | 1.82E-08 | -6.47676 | -4.9517 | -5.8581 |
| 6 | 651.0352 | 6.092117 | 2.10E-08 | -6.33374 | -4.51819 | -5.59724 |
| 7 | 678.4708 | 45.72597 | 1.85E-08 | -6.46518 | -4.35915 | -5.61084 |
| 8 | 701.965 | 38.07687 | 1.71E-08 | -6.55132 | -4.1548 | -5.57915 |
| 9 | 717.0269 | 23.71814 | 1.74E-08 | -6.54054 | -3.85353 | -5.45052 |
| 10 | 732.0488 | 22.96454 | 1.78E-08 | -6.5293 | -3.5518 | -5.32144 |
| 11 | 746.6837 | 21.6999 | 1.83E-08 | -6.51361 | -3.24562 | -5.18791 |
| 12 | 820.8644 | 106.5815 | 9.51E-09 | -7.18235 | -3.62387 | -5.73881 |
| 13 | 845.0861 | 33.68773 | 8.80E-09 | -7.27685 | -3.42789 | -5.71548 |
| 14 | 866.9892 | 29.45589* | 8.39e-09* | -7.344704* | -3.20525 | -5.66549 |
| 15 | 882.7167 | 20.4276 | 8.62E-09 | -7.34157 | -2.91163 | -5.54452 |
| 16 | 893.6302 | 13.67334 | 9.40E-09 | -7.28311 | -2.56268 | -5.36821 |

**Table A18: Inverse roots of AR characteristic polynomial for the VAR model Bangladesh (elderly dependency ratio)**

Roots of Characteristic Polynomial
Endogenous variables: BAN_CPI
D(BAN_RR) BAN_YGAP_G
BAN_DEP2_G
Exogenous variables: C

Lag specification: 1 14
Date: 08/10/20 Time: 22:30

| Root | Modulus |
|---|---|
| 0.996918 | 0.996918 |
| 0.862376 + 0.482853i | 0.988351 |
| 0.862376 - 0.482853i | 0.988351 |
| 0.499784 - 0.849900i | 0.985959 |
| 0.499784 + 0.849900i | 0.985959 |
| 0.249388 + 0.949432i | 0.981639 |
| 0.249388 - 0.949432i | 0.981639 |
| -0.936422 + 0.251520i | 0.969613 |
| -0.936422 - 0.251520i | 0.969613 |
| -0.680324 + 0.689420i | 0.968577 |
| -0.680324 - 0.689420i | 0.968577 |
| 0.041340 + 0.966577i | 0.96746 |
| 0.041340 - 0.966577i | 0.96746 |
| -0.485337 + 0.834148i | 0.965068 |
| -0.485337 - 0.834148i | 0.965068 |
| 0.661032 + 0.686361i | 0.952919 |
| 0.661032 - 0.686361i | 0.952919 |
| -0.246735 - 0.918264i | 0.950835 |
| -0.246735 + 0.918264i | 0.950835 |
| -0.279937 + 0.902523i | 0.94494 |
| -0.279937 - 0.902523i | 0.94494 |
| 0.907827 + 0.228054i | 0.936034 |
| 0.907827 - 0.228054i | 0.936034 |
| 0.916628 + 0.167302i | 0.931771 |
| 0.916628 - 0.167302i | 0.931771 |
| -0.805517 + 0.443941i | 0.91975 |
| -0.805517 - 0.443941i | 0.91975 |
| -0.707966 - 0.582652i | 0.916897 |
| -0.707966 + 0.582652i | 0.916897 |
| -0.887685 - 0.057518i | 0.889547 |
| -0.887685 + 0.057518i | 0.889547 |
| -0.804513 - 0.350009i | 0.877352 |
| -0.804513 + 0.350009i | 0.877352 |
| 0.443757 - 0.752592i | 0.873679 |
| 0.443757 + 0.752592i | 0.873679 |
| 0.701873 + 0.518382i | 0.872551 |
| 0.701873 - 0.518382i | 0.872551 |
| 0.036235 + 0.856283i | 0.85705 |

| | |
|---|---|
| 0.036235 - 0.856283i | 0.85705 |
| 0.853223 | 0.853223 |
| -0.585118 - 0.619968i | 0.852481 |
| -0.585118 + 0.619968i | 0.852481 |
| 0.671022 + 0.514836i | 0.84577 |
| 0.671022 - 0.514836i | 0.84577 |
| 0.194495 + 0.818891i | 0.841671 |
| 0.194495 - 0.818891i | 0.841671 |
| -0.460251 - 0.684910i | 0.825187 |
| -0.460251 + 0.684910i | 0.825187 |
| -0.784632 - 0.138601i | 0.79678 |
| -0.784632 + 0.138601i | 0.79678 |
| 0.453931 + 0.646438i | 0.789895 |
| 0.453931 - 0.646438i | 0.789895 |
| -0.116450 - 0.717997i | 0.727379 |
| -0.116450 + 0.717997i | 0.727379 |
| 0.538626 | 0.538626 |
| -0.29402 | 0.29402 |

### Table A19: Variance decomposition of VAR model 1 (SL youth dep.)

Variance Decomposition of SL_CPI:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | D(SL_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.881245 | 100 | 0 | 0 | 0 |
| 2 | 0.902221 | 97.78894 | 1.362139 | 0.023495 | 0.825426 |
| 3 | 0.92943 | 93.58284 | 1.302044 | 0.987101 | 4.128017 |
| 4 | 0.954822 | 92.90445 | 1.517105 | 1.526365 | 4.052081 |
| 5 | 0.966228 | 90.90484 | 3.432367 | 1.584586 | 4.078209 |
| 6 | 0.971568 | 90.10389 | 3.536203 | 1.67157 | 4.688332 |
| 7 | 1.008896 | 84.58216 | 4.290079 | 5.846164 | 5.281602 |
| 8 | 1.03235 | 81.85472 | 5.358777 | 7.717352 | 5.069146 |
| 9 | 1.044999 | 79.8869 | 7.408853 | 7.754737 | 4.949506 |
| 10 | 1.076179 | 77.36406 | 7.285794 | 10.68266 | 4.66749 |

Variance Decomposition of SL_RR:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | D(SL_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.425415 | 0.704006 | 91.45107 | 7.844928 | 0 |
| 2 | 0.667583 | 0.286054 | 95.23541 | 3.535092 | 0.943439 |
| 3 | 0.847475 | 0.679873 | 92.51886 | 6.178157 | 0.623114 |
| 4 | 1.038742 | 2.884633 | 91.55601 | 4.967636 | 0.591719 |
| 5 | 1.196046 | 4.466673 | 91.22194 | 3.849546 | 0.46184 |
| 6 | 1.358561 | 6.486377 | 89.91592 | 3.123145 | 0.474554 |
| 7 | 1.574677 | 7.248967 | 89.65229 | 2.39929 | 0.699456 |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| 8 | 1.769221 | 8.45681 | 88.59835 | 2.322279 | 0.622558 |
| 9 | 1.915507 | 10.83702 | 86.11261 | 2.221033 | 0.829338 |
| 10 | 2.071936 | 12.42768 | 84.35286 | 1.903623 | 1.31584 |

Variance Decomposition of SL_YGAP_G:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | D(SL_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 2.056183 | 0.0636 | 0 | 99.9364 | 0 |
| 2 | 2.195111 | 0.056644 | 9.175696 | 88.85997 | 1.907689 |
| 3 | 2.211864 | 1.337148 | 9.061481 | 87.52329 | 2.078083 |
| 4 | 2.286089 | 1.735291 | 9.030345 | 86.97722 | 2.257148 |
| 5 | 2.353905 | 1.640638 | 12.89565 | 83.17799 | 2.28572 |
| 6 | 2.429926 | 1.608562 | 17.59159 | 78.15778 | 2.642067 |
| 7 | 2.500851 | 1.702614 | 19.96227 | 74.48049 | 3.854632 |
| 8 | 2.507219 | 1.782574 | 20.24062 | 74.13112 | 3.845687 |
| 9 | 2.511428 | 1.7964 | 20.44593 | 73.92381 | 3.833855 |
| 10 | 2.577521 | 1.899037 | 20.18497 | 70.61169 | 7.304304 |

Variance Decomposition of D(SL_DEP1_G):

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | D(SL_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 8.78E-05 | 1.107191 | 0.002175 | 0.397551 | 98.49308 |
| 2 | 0.000153 | 0.917715 | 0.096674 | 0.131396 | 98.85421 |
| 3 | 0.000164 | 1.165388 | 0.898949 | 1.027477 | 96.90819 |
| 4 | 0.000167 | 1.849885 | 1.831763 | 2.699065 | 93.61929 |
| 5 | 0.000171 | 3.970726 | 1.866394 | 5.277025 | 88.88585 |
| 6 | 0.000175 | 5.034395 | 1.795374 | 5.406834 | 87.7634 |
| 7 | 0.000179 | 4.972601 | 1.719376 | 5.755573 | 87.55245 |
| 8 | 0.00018 | 4.880258 | 1.719607 | 6.215633 | 87.1845 |
| 9 | 0.000184 | 5.382656 | 2.047183 | 7.957304 | 84.61286 |
| 10 | 0.000187 | 5.885357 | 2.157631 | 10.41567 | 81.54134 |

Cholesky Ordering: SL_CPI SL_YGAP_G SL_RR D(SL_DEP1_G)

## Table A20: Variance decomposition of VAR model 2 (SL elderly dep.)

Variance Decomposition of SL_CPI:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | SL_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.869565 | 100 | 0 | 0 | 0 |
| 2 | 0.879703 | 99.43106 | 0.119938 | 0.243175 | 0.205827 |
| 3 | 0.898694 | 97.165 | 0.413868 | 2.197006 | 0.224123 |
| 4 | 0.925942 | 96.72669 | 0.586432 | 2.334119 | 0.352756 |
| 5 | 0.950252 | 93.09253 | 3.98433 | 2.534667 | 0.388471 |
| 6 | 0.953131 | 92.53114 | 4.059763 | 2.686714 | 0.722385 |
| 7 | 0.9807 | 88.92471 | 4.94199 | 4.669697 | 1.463604 |
| 8 | 1.006212 | 85.73096 | 5.385492 | 7.420916 | 1.462632 |

| | | | | | |
|---|---|---|---|---|---|
| 9 | 1.023605 | 82.85106 | 8.035654 | 7.582424 | 1.530864 |
| 10 | 1.059168 | 79.57601 | 7.843037 | 8.963822 | 3.617132 |

Variance Decomposition of SL_RR:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | SL_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.417413 | 0.892227 | 91.42957 | 7.678208 | 0 |
| 2 | 0.64397 | 0.412098 | 95.45753 | 3.853032 | 0.277338 |
| 3 | 0.827728 | 1.05951 | 89.99303 | 8.389756 | 0.557706 |
| 4 | 1.028173 | 4.245225 | 88.08404 | 6.865058 | 0.805675 |
| 5 | 1.189033 | 6.007217 | 87.47083 | 5.542292 | 0.979661 |
| 6 | 1.34022 | 6.917442 | 86.92862 | 4.757738 | 1.3962 |
| 7 | 1.537426 | 7.074561 | 87.33075 | 3.722795 | 1.871893 |
| 8 | 1.722252 | 7.788317 | 86.37947 | 3.76338 | 2.068832 |
| 9 | 1.853567 | 9.523751 | 84.59172 | 3.970019 | 1.914508 |
| 10 | 1.991984 | 10.7895 | 83.92539 | 3.440037 | 1.845077 |

Variance Decomposition of SL_YGAP_G:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | SL_DEP2_G |
|---|---|---|---|---|---|
| 1 | 2.028763 | 0.11778 | 0 | 99.88222 | 0 |
| 2 | 2.137852 | 0.112523 | 7.864722 | 91.84756 | 0.175191 |
| 3 | 2.153196 | 1.066335 | 7.880816 | 90.57542 | 0.47743 |
| 4 | 2.239161 | 2.130442 | 8.430741 | 88.83318 | 0.605641 |
| 5 | 2.327096 | 2.539769 | 12.86919 | 83.53226 | 1.058777 |
| 6 | 2.400211 | 2.405116 | 17.06306 | 79.03749 | 1.494342 |
| 7 | 2.448308 | 2.74466 | 18.76196 | 76.08756 | 2.405819 |
| 8 | 2.464132 | 2.844381 | 18.87977 | 75.15188 | 3.123969 |
| 9 | 2.495267 | 2.777927 | 18.56161 | 73.97309 | 4.687369 |
| 10 | 2.505805 | 3.012276 | 18.96433 | 73.36627 | 4.657129 |

Variance Decomposition of SL_DEP2_G:

| Period | S.E. | SL_CPI | SL_RR | SL_YGAP_G | SL_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.000263 | 4.361802 | 0.167421 | 0.12521 | 95.34557 |
| 2 | 0.000335 | 5.969903 | 0.831271 | 0.082827 | 93.116 |
| 3 | 0.00034 | 6.12424 | 2.007624 | 1.299582 | 90.56855 |
| 4 | 0.00035 | 8.343089 | 2.186993 | 4.134118 | 85.3358 |
| 5 | 0.000352 | 8.439748 | 2.168394 | 4.24598 | 85.14588 |
| 6 | 0.000355 | 9.284275 | 2.380839 | 4.298655 | 84.03623 |
| 7 | 0.000367 | 13.82064 | 2.226107 | 5.134936 | 78.81832 |
| 8 | 0.000375 | 15.5879 | 2.851854 | 5.782694 | 75.77755 |
| 9 | 0.000385 | 15.04171 | 6.399883 | 5.533868 | 73.02454 |
| 10 | 0.000387 | 15.35817 | 6.629716 | 5.515896 | 72.49622 |

Cholesky Ordering: SL_CPI SL_YGAP_G SL_RR SL_DEP2_G

**Table A21: Variance decomposition of VAR model 3 (India youth dep.)**

Variance Decomposition of D(IND_CPI):

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | D(IND_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.625125 | 100 | 0 | 0 | 0 |
| 2 | 0.766041 | 96.47423 | 1.688061 | 1.82739 | 0.010323 |
| 3 | 0.814564 | 96.6493 | 1.582883 | 1.648814 | 0.119007 |
| 4 | 0.821377 | 95.62146 | 1.559921 | 2.476045 | 0.342577 |
| 5 | 0.828278 | 94.32821 | 1.672654 | 2.450867 | 1.548267 |
| 6 | 0.838411 | 92.2368 | 1.755958 | 4.496141 | 1.511097 |
| 7 | 0.869262 | 88.87168 | 3.854652 | 5.295688 | 1.97798 |
| 8 | 0.894575 | 88.02692 | 4.929334 | 5.050968 | 1.992774 |
| 9 | 0.911667 | 87.47741 | 5.275165 | 5.023101 | 2.224319 |
| 10 | 0.917526 | 86.82583 | 5.645313 | 5.019606 | 2.509253 |

Variance Decomposition of D(IND_RR):

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | D(IND_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.242086 | 0.123011 | 96.92513 | 2.951854 | 0 |
| 2 | 0.26299 | 0.615236 | 95.96911 | 2.604106 | 0.811548 |
| 3 | 0.28416 | 0.630973 | 96.18994 | 2.258669 | 0.920418 |
| 4 | 0.29892 | 1.881091 | 95.2324 | 2.04502 | 0.841485 |
| 5 | 0.309596 | 1.754541 | 95.27772 | 2.00477 | 0.96297 |
| 6 | 0.319448 | 1.691334 | 94.78682 | 1.888805 | 1.633039 |
| 7 | 0.328198 | 1.698881 | 94.8504 | 1.80317 | 1.647553 |
| 8 | 0.333964 | 1.857605 | 94.76384 | 1.745389 | 1.633164 |
| 9 | 0.340062 | 2.111587 | 94.31068 | 1.6898 | 1.887935 |
| 10 | 0.344413 | 2.131971 | 94.13938 | 1.648069 | 2.080579 |

Variance Decomposition of IND_YGAP_G:

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | D(IND_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.960241 | 2.325638 | 0 | 97.67436 | 0 |
| 2 | 0.999405 | 2.498901 | 4.853802 | 91.8855 | 0.761799 |
| 3 | 1.01353 | 4.615066 | 4.899178 | 89.61298 | 0.872776 |
| 4 | 1.02421 | 6.228012 | 5.161828 | 87.75469 | 0.855473 |
| 5 | 1.025209 | 6.397037 | 5.15953 | 87.58841 | 0.855022 |
| 6 | 1.027151 | 6.638925 | 5.193609 | 87.3103 | 0.857168 |
| 7 | 1.032993 | 6.574161 | 5.345938 | 86.63071 | 1.449195 |
| 8 | 1.035142 | 6.747095 | 5.33065 | 86.32543 | 1.596825 |
| 9 | 1.044729 | 6.695264 | 5.331324 | 84.85908 | 3.11433 |
| 10 | 1.055705 | 8.578995 | 5.238187 | 83.11433 | 3.068487 |

Variance Decomposition of D(IND_DEP1_G):

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | D(IND_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 3.54E-05 | 0.007053 | 0.332966 | 0.347507 | 99.31247 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 6.63E-05 | 0.002873 | 0.370635 | 1.145445 | 98.48105 |
| 3 | 6.93E-05 | 0.051312 | 0.50191 | 3.38572 | 96.06106 |
| 4 | 7.10E-05 | 0.414804 | 0.493931 | 6.944554 | 92.14671 |
| 5 | 7.31E-05 | 0.837573 | 0.537172 | 11.68415 | 86.9411 |
| 6 | 7.37E-05 | 0.829496 | 1.00599 | 12.57316 | 85.59135 |
| 7 | 7.41E-05 | 1.035272 | 1.417834 | 12.74436 | 84.80253 |
| 8 | 7.52E-05 | 1.038064 | 1.845837 | 13.45056 | 83.66554 |
| 9 | 7.75E-05 | 1.019345 | 2.016466 | 12.9704 | 83.99379 |
| 10 | 7.83E-05 | 2.013875 | 1.973598 | 12.77859 | 83.23394 |

Cholesky Ordering: D(IND_CPI) IND_YGAP_G D(IND_RR) D(IND_DEP1_G)

### Table A22: Variance decomposition of VAR model 4 (India elderly dep.)

Variance Decomposition of D(IND_CPI):

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | IND_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.653528 | 100 | 0 | 0 | 0 |
| 2 | 0.799307 | 98.42366 | 0.548091 | 0.663978 | 0.36427 |
| 3 | 0.846394 | 98.27247 | 0.489603 | 0.901305 | 0.336623 |
| 4 | 0.853913 | 96.74544 | 0.60339 | 1.818072 | 0.833099 |
| 5 | 0.859289 | 95.53873 | 1.196145 | 1.951841 | 1.313281 |
| 6 | 0.871198 | 93.32463 | 1.517649 | 3.844894 | 1.312826 |
| 7 | 0.901596 | 90.4463 | 3.567928 | 4.745969 | 1.239804 |
| 8 | 0.92447 | 89.71447 | 4.52448 | 4.519519 | 1.241531 |
| 9 | 0.937865 | 88.6998 | 4.839566 | 4.712082 | 1.748556 |
| 10 | 0.944361 | 87.93861 | 4.923937 | 4.86757 | 2.26988 |

Variance Decomposition of D(IND_RR):

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | IND_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.24584 | 0.254238 | 94.47032 | 5.275442 | 0 |
| 2 | 0.263037 | 0.562726 | 94.80833 | 4.628393 | 0.000546 |
| 3 | 0.284075 | 0.482469 | 95.48128 | 4.008526 | 0.027722 |
| 4 | 0.298658 | 2.531254 | 93.76502 | 3.635901 | 0.067827 |
| 5 | 0.306056 | 2.457989 | 94.01334 | 3.464069 | 0.064605 |
| 6 | 0.316586 | 2.397744 | 92.50143 | 3.237637 | 1.863187 |
| 7 | 0.322606 | 2.479156 | 92.57947 | 3.118104 | 1.823274 |
| 8 | 0.327385 | 2.614869 | 92.57352 | 3.040793 | 1.770815 |
| 9 | 0.331615 | 2.745237 | 92.30432 | 2.978162 | 1.972285 |
| 10 | 0.334973 | 2.715307 | 92.03223 | 2.9789 | 2.273566 |

Variance Decomposition of IND_YGAP_G:

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | IND_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.979013 | 0.676235 | 0 | 99.32377 | 0 |
| 2 | 1.014894 | 0.872024 | 5.53546 | 93.30359 | 0.288928 |

| | | | | | |
|---|---|---|---|---|---|
| 3 | 1.032508 | 3.136648 | 5.356531 | 90.76127 | 0.745553 |
| 4 | 1.04504 | 4.644903 | 5.517373 | 88.61266 | 1.225061 |
| 5 | 1.047173 | 4.78726 | 5.49573 | 88.37854 | 1.338471 |
| 6 | 1.053243 | 4.954314 | 5.475057 | 87.36752 | 2.203107 |
| 7 | 1.054822 | 4.952134 | 5.618651 | 87.17608 | 2.253139 |
| 8 | 1.055925 | 4.950557 | 5.608412 | 87.18773 | 2.253299 |
| 9 | 1.05711 | 4.999154 | 5.727538 | 87.0167 | 2.256606 |
| 10 | 1.066781 | 6.366991 | 5.624327 | 85.54674 | 2.461945 |

Variance Decomposition of IND_DEP2_G:

| Period | S.E. | D(IND_CPI) | D(IND_RR) | IND_YGAP_G | IND_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.000441 | 0.13886 | 0.732125 | 0.582569 | 98.54645 |
| 2 | 0.000541 | 0.387876 | 0.533281 | 2.290414 | 96.78843 |
| 3 | 0.000543 | 0.393343 | 0.692389 | 2.552564 | 96.3617 |
| 4 | 0.000546 | 0.850558 | 0.684875 | 2.557869 | 95.9067 |
| 5 | 0.000549 | 0.843597 | 0.734891 | 3.166515 | 95.255 |
| 6 | 0.000552 | 0.844806 | 0.955391 | 3.679278 | 94.52053 |
| 7 | 0.000557 | 1.450427 | 0.968849 | 4.64658 | 92.93414 |
| 8 | 0.00056 | 1.728665 | 0.995757 | 4.82666 | 92.44892 |
| 9 | 0.000562 | 1.737329 | 1.409542 | 4.839399 | 92.01373 |
| 10 | 0.000564 | 2.03661 | 1.601893 | 5.094004 | 91.26749 |

Cholesky Ordering: D(IND_CPI) IND_YGAP_G D(IND_RR) IND_DEP2_G

## Table A23: Variance decomposition of VAR model 5 (Bangladesh youth dep.)

Variance Decomposition of BAN_CPI:

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | D(BAN_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.76364 | 100 | 0 | 0 | 0 |
| 2 | 0.829765 | 99.14103 | 0.691605 | 0.004484 | 0.162885 |
| 3 | 0.831087 | 98.85193 | 0.959416 | 0.022469 | 0.166185 |
| 4 | 0.847716 | 95.3439 | 1.847375 | 2.648492 | 0.160235 |
| 5 | 0.866227 | 95.47598 | 1.769409 | 2.541363 | 0.213247 |
| 6 | 0.912303 | 88.93911 | 1.59523 | 9.272232 | 0.193427 |
| 7 | 0.917948 | 87.97787 | 1.60164 | 10.20371 | 0.216778 |
| 8 | 0.918888 | 87.79814 | 1.663204 | 10.30051 | 0.238142 |
| 9 | 0.920787 | 87.71858 | 1.656516 | 10.25848 | 0.366417 |
| 10 | 0.924239 | 87.4011 | 1.644493 | 10.58643 | 0.367973 |

Variance Decomposition of D(BAN_RR):

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | D(BAN_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 0.152083 | 0.96994 | 98.93203 | 0.098029 | 0 |
| 2 | 0.157001 | 1.034671 | 98.52369 | 0.339056 | 0.102586 |
| 3 | 0.161192 | 1.102021 | 98.40681 | 0.389737 | 0.10143 |

| | | | | | |
|---|---|---|---|---|---|
| 4 | 0.164953 | 1.104344 | 98.00117 | 0.483165 | 0.411317 |
| 5 | 0.168585 | 1.488229 | 97.50673 | 0.606466 | 0.398575 |
| 6 | 0.170683 | 1.469662 | 97.349 | 0.635144 | 0.546196 |
| 7 | 0.171927 | 1.456655 | 97.07001 | 0.761878 | 0.711452 |
| 8 | 0.172992 | 1.489174 | 96.85333 | 0.954773 | 0.702726 |
| 9 | 0.173594 | 1.479232 | 96.77158 | 1.024754 | 0.724439 |
| 10 | 0.173889 | 1.476971 | 96.77974 | 1.021297 | 0.721992 |

Variance Decomposition of BAN_YGAP_G:

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | D(BAN_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 1.742078 | 0.681596 | 0 | 99.3184 | 0 |
| 2 | 1.759757 | 0.74171 | 1.442054 | 97.40575 | 0.410482 |
| 3 | 1.76885 | 1.578792 | 1.578989 | 96.41139 | 0.43083 |
| 4 | 1.775414 | 1.746072 | 1.662058 | 95.69986 | 0.892012 |
| 5 | 1.777011 | 1.743037 | 1.709018 | 95.57434 | 0.973603 |
| 6 | 1.782404 | 1.983228 | 1.751925 | 95.06793 | 1.196916 |
| 7 | 1.786253 | 2.066985 | 1.745002 | 94.67779 | 1.510227 |
| 8 | 1.789724 | 2.063048 | 1.769937 | 94.3927 | 1.774311 |
| 9 | 1.79127 | 2.067078 | 1.771108 | 94.24155 | 1.920265 |
| 10 | 1.791491 | 2.067503 | 1.771722 | 94.22122 | 1.939551 |

Variance Decomposition of D(BAN_DEP1_G):

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | D(BAN_DEP1_G) |
|---|---|---|---|---|---|
| 1 | 5.43E-05 | 0.013217 | 0.166534 | 0.647615 | 99.17263 |
| 2 | 0.000101 | 0.627403 | 0.048267 | 0.443839 | 98.88049 |
| 3 | 0.000109 | 3.129933 | 0.179802 | 0.394632 | 96.29563 |
| 4 | 0.000111 | 4.769381 | 0.187569 | 0.485837 | 94.55721 |
| 5 | 0.000113 | 4.932732 | 0.815658 | 0.471081 | 93.78053 |
| 6 | 0.000122 | 4.283536 | 2.213962 | 0.497086 | 93.00542 |
| 7 | 0.000135 | 3.699685 | 2.314014 | 0.747564 | 93.23874 |
| 8 | 0.000138 | 4.841388 | 2.262415 | 0.803157 | 92.09304 |
| 9 | 0.000141 | 5.359745 | 2.224978 | 0.785243 | 91.63003 |
| 10 | 0.000145 | 5.043392 | 2.487654 | 0.742727 | 91.72623 |

Cholesky Ordering: BAN_CPI BAN_YGAP_G D(BAN_RR) D(BAN_DEP1_G)

**Table A24: Variance decomposition of VAR model 6 (Bangladesh elderly dep.)**

Variance Decomposition of BAN_CPI:

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | BAN_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.58385 | 100 | 0 | 0 | 0 |
| 2 | 0.592096 | 98.97788 | 0.664841 | 0.116218 | 0.241061 |
| 3 | 0.594628 | 98.55455 | 0.994132 | 0.196195 | 0.255126 |
| 4 | 0.618669 | 91.13583 | 2.774757 | 4.695827 | 1.393588 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 0.628018 | 90.77311 | 2.704206 | 4.871273 | 1.65141 |
| 6 | 0.67325 | 79.47723 | 2.595485 | 16.35367 | 1.57361 |
| 7 | 0.67551 | 79.18634 | 2.582401 | 16.58264 | 1.648618 |
| 8 | 0.687232 | 78.37525 | 2.641133 | 16.63947 | 2.344149 |
| 9 | 0.693513 | 76.99777 | 3.905978 | 16.4902 | 2.606054 |
| 10 | 0.714085 | 72.66507 | 3.974109 | 20.61003 | 2.75079 |

Variance Decomposition of D(BAN_RR):

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | BAN_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.115636 | 0.307763 | 99.67407 | 0.018168 | 0 |
| 2 | 0.122963 | 2.804091 | 93.53401 | 0.878049 | 2.783852 |
| 3 | 0.132827 | 3.705268 | 92.57024 | 0.895256 | 2.829232 |
| 4 | 0.137321 | 3.964223 | 92.27048 | 1.107813 | 2.657479 |
| 5 | 0.141647 | 3.796778 | 92.60467 | 1.09026 | 2.508293 |
| 6 | 0.146885 | 4.02439 | 91.76553 | 1.876657 | 2.333426 |
| 7 | 0.151032 | 3.880944 | 90.89463 | 2.624328 | 2.600101 |
| 8 | 0.156992 | 3.938551 | 87.89759 | 2.554583 | 5.609275 |
| 9 | 0.159592 | 4.141702 | 87.89615 | 2.477099 | 5.485053 |
| 10 | 0.163451 | 4.67869 | 85.39392 | 2.604877 | 7.322512 |

Variance Decomposition of BAN_YGAP_G:

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | BAN_DEP2_G |
|---|---|---|---|---|---|
| 1 | 1.844646 | 0.290587 | 0 | 99.70941 | 0 |
| 2 | 1.933077 | 0.402404 | 6.934211 | 90.93718 | 1.726204 |
| 3 | 1.939594 | 0.399709 | 6.887695 | 90.67196 | 2.040638 |
| 4 | 1.957569 | 1.779658 | 6.929919 | 89.02082 | 2.269604 |
| 5 | 1.966366 | 1.826905 | 6.893836 | 88.51393 | 2.765325 |
| 6 | 1.968818 | 2.041823 | 6.895399 | 88.30315 | 2.759627 |
| 7 | 1.973105 | 2.039548 | 6.952003 | 88.15005 | 2.858398 |
| 8 | 1.994843 | 3.797905 | 6.802346 | 86.35201 | 3.047744 |
| 9 | 2.010784 | 3.73799 | 6.843794 | 85.08019 | 4.338029 |
| 10 | 2.011378 | 3.748032 | 6.879091 | 85.03009 | 4.342784 |

Variance Decomposition of BAN_DEP2_G:

| Period | S.E. | BAN_CPI | D(BAN_RR) | BAN_YGAP_G | BAN_DEP2_G |
|---|---|---|---|---|---|
| 1 | 0.000421 | 1.84148 | 2.649986 | 0.124736 | 95.3838 |
| 2 | 0.000483 | 1.40277 | 3.491441 | 0.121851 | 94.98394 |
| 3 | 0.000499 | 2.467803 | 3.304783 | 2.173396 | 92.05402 |
| 4 | 0.000503 | 2.986583 | 3.254545 | 2.206247 | 91.55263 |
| 5 | 0.000506 | 3.060758 | 3.399903 | 3.011123 | 90.52822 |
| 6 | 0.000516 | 4.198577 | 4.301531 | 3.293749 | 88.20614 |
| 7 | 0.00052 | 4.390931 | 4.741968 | 3.762079 | 87.10502 |
| 8 | 0.000532 | 5.115433 | 5.467493 | 4.693659 | 84.72341 |
| 9 | 0.000544 | 8.530963 | 5.71885 | 4.677803 | 81.07238 |

| | | | | | |
|---|---|---|---|---|---|
| 10 | 0.000551 | 9.836506 | 6.142192 | 4.769102 | 79.2522 |

Cholesky Ordering: BAN_CPI BAN_YGAP_G D(BAN_RR) BAN_DEP2_G

## Table A25: Structural decomposition matrix Sri Lanka (youth dep.)

Structural VAR Estimates
Date: 08/15/20 Time: 11:30
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Estimation method: method of scoring (analytic derivatives)
Convergence achieved after 1 iterations
Structural VAR is over-identified (2 degrees of freedom)

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run pattern matrix

A =

| | | | |
|---|---|---|---|
| 1 | C(1) | 0 | C(3) |
| 0 | 1 | 0 | 0 |
| 0 | C(2) | 1 | C(4) |
| 0 | 0 | 0 | 1 |

B =

| | | | |
|---|---|---|---|
| C(5) | 0 | 0 | 0 |
| 0 | C(6) | 0 | 0 |
| 0 | 0 | C(7) | 0 |
| 0 | 0 | 0 | C(8) |

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.17674 | 0.154705 | -1.14241 | 0.2533 |
| C(2) | -1.35992 | 0.348919 | -3.89753 | 0.0001 |
| C(3) | -1068.02 | 749.9521 | -1.42411 | 0.1544 |
| C(4) | 1327.05 | 1691.426 | 0.784575 | 0.4327 |
| C(5) | 0.873122 | 0.046538 | 18.76166 | 0 |
| C(6) | 0.425415 | 0.022675 | 18.76166 | 0 |
| C(7) | 1.969222 | 0.10496 | 18.76166 | 0 |
| C(8) | 8.78E-05 | 4.68E-06 | 18.76166 | 0 |

| | | | | |
|---|---|---|---|---|
| Log likelihood | 700.1117 | | | |
| LR test for over-identification: | | | | |
| Chi-square(2) | 0.042298 | | Probability | 0.9791 |

Estimated A matrix:

| | | | |
|---|---|---|---|
| 1 | -0.17674 | 0 | -1068.02 |
| 0 | 1 | 0 | 0 |
| 0 | -1.35992 | 1 | 1327.05 |
| 0 | 0 | 0 | 1 |

Estimated B matrix:

| | | | |
|---|---|---|---|
| 0.873122 | 0 | 0 | 0 |
| 0 | 0.425415 | 0 | 0 |
| 0 | 0 | 1.969222 | 0 |
| 0 | 0 | 0 | 8.78E-05 |

## Table A26: Structural decomposition matrix Sri Lanka (elderly dep.)

Structural VAR Estimates
Date: 08/15/20 Time: 11:37
Sample (adjusted): 2004M04 2018M12
Included observations: 177 after adjustments
Estimation method: method of scoring (analytic derivatives)
Convergence achieved after 1 iterations
Structural VAR is over-identified (2 degrees of freedom)

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run pattern matrix
A =

| | | | |
|---|---|---|---|
| 1 | C(1) | 0 | C(3) |
| 0 | 1 | 0 | 0 |
| 0 | C(2) | 1 | C(4) |
| 0 | 0 | 0 | 1 |

B =

| | | | |
|---|---|---|---|
| C(5) | 0 | 0 | 0 |
| 0 | C(6) | 0 | 0 |
| 0 | 0 | C(7) | 0 |
| 0 | 0 | 0 | C(8) |

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.20966 | 0.152319 | -1.37646 | 0.1687 |
| C(2) | -1.3589 | 0.350617 | -3.87573 | 0.0001 |
| C(3) | 699.4979 | 241.4925 | 2.896562 | 0.0038 |
| C(4) | -154.362 | 555.8797 | -0.27769 | 0.7813 |
| C(5) | 0.845878 | 0.044958 | 18.81489 | 0 |
| C(6) | 0.417413 | 0.022185 | 18.81489 | 0 |
| C(7) | 1.947086 | 0.103486 | 18.81489 | 0 |

| | | | | |
|---|---|---|---|---|
| C(8) | 0.000263 | 1.40E-05 | 18.81489 | 0 |

Log likelihood 520.6039

LR test for over-identification:

Chi-square(2) 0.180705 Probability 0.9136

Estimated A matrix:

| | | | |
|---|---|---|---|
| 1 | -0.20966 | 0 | 699.4979 |
| 0 | 1 | 0 | 0 |
| 0 | -1.3589 | 1 | -154.362 |
| 0 | 0 | 0 | 1 |

Estimated B matrix:

| | | | |
|---|---|---|---|
| 0.845878 | 0 | 0 | 0 |
| 0 | 0.417413 | 0 | 0 |
| 0 | 0 | 1.947086 | 0 |
| 0 | 0 | 0 | 0.000263 |

## Table A27: Structural decomposition matrix India (youth dep.)

Structural VAR Estimates
Date: 08/15/20 Time: 19:13
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Estimation method: method of scoring (analytic derivatives)
Convergence achieved after 1 iterations
Structural VAR is over-identified (2 degrees of freedom)

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run pattern matrix

A =

| | | | |
|---|---|---|---|
| 1 | C(1) | 0 | C(3) |
| 0 | 1 | 0 | 0 |
| 0 | C(2) | 1 | C(4) |
| 0 | 0 | 0 | 1 |

B =

| | | | |
|---|---|---|---|
| C(5) | 0 | 0 | 0 |
| 0 | C(6) | 0 | 0 |
| 0 | 0 | C(7) | 0 |
| 0 | 0 | 0 | C(8) |

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| C(1) | 0.091771 | 0.194514 | 0.471793 | 0.6371 |
| C(2) | 0.664214 | 0.294283 | 2.257057 | 2.40E-02 |
| C(3) | 177.3624 | 1329.821 | 0.133373 | 8.94E-01 |
| C(4) | 1755.794 | 2011.901 | 0.872704 | 0.3828 |
| C(5) | 0.624709 | 0.033297 | 18.76166 | 0 |
| C(6) | 0.242086 | 0.012903 | 18.76166 | 0.00E+00 |
| C(7) | 0.945129 | 0.050376 | 18.76166 | 0.00E+00 |
| C(8) | 3.54E-05 | 1.89E-06 | 18.76166 | 0 |

Log likelihood 1147.19

LR test for over-identification:

Chi-square(2) 5.034352 Probability 0.0807

Estimated A matrix:

| | | | |
|---|---|---|---|
| 1 | 0.091771 | 0 | 177.3624 |
| 0 | 1 | 0 | 0 |
| 0 | 0.664214 | 1 | 1755.794 |
| 0 | 0 | 0 | 1 |

Estimated B matrix:

| | | | |
|---|---|---|---|
| 0.624709 | 0 | 0 | 0 |
| 0 | 0.242086 | 0 | 0 |
| 0 | 0 | 0.945129 | 0 |
| 0 | 0 | 0 | 3.54E-05 |

## Table A28: Structural decomposition matrix India (elderly dep.)

Structural VAR Estimates
Date: 08/15/20 Time: 19:35
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Estimation method: method of scoring (analytic derivatives)
Convergence achieved after 1 iterations
Structural VAR is over-identified (2 degrees of freedom)

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run pattern matrix
A =

| | | | |
|---|---|---|---|
| 1 | C(1) | 0 | C(3) |
| 0 | 1 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| | 0 | C(2) | | 1 | C(4) |
| | 0 | 0 | | 0 | 1 |
| B = | | | | | |
| C(5) | | 0 | | 0 | 0 |
| | 0 | C(6) | | 0 | 0 |
| | 0 | 0 | C(7) | | 0 |
| | 0 | 0 | | 0 | C(8) |

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | 0.140927 | 0.19996 | 0.704777 | 0.4809 |
| C(2) | 0.917324 | 0.291316 | 3.148899 | 1.60E-03 |
| C(3) | -60.2627 | 111.5287 | -0.54033 | 5.89E-01 |
| C(4) | -194.771 | 162.4829 | -1.19872 | 0.2306 |
| C(5) | 0.652158 | 0.03476 | 18.76166 | 0 |
| C(6) | 0.24584 | 0.013103 | 18.76166 | 0.00E+00 |
| C(7) | 0.950109 | 0.050641 | 18.76166 | 0 |
| C(8) | 4.41E-04 | 2.35E-05 | 18.76166 | 0 |
| Log likelihood | 692.2006 | | | |
| LR test for over-identification: | | | | |
| Chi-square(2) | 2.495692 | | Probability | 0.2871 |

Estimated A matrix:

| | | | |
|---|---|---|---|
| 1 | 0.140927 | 0 | -60.2627 |
| 0 | 1 | 0 | 0 |
| 0 | 0.917324 | 1 | -194.771 |
| 0 | 0 | 0 | 1 |

Estimated B matrix:

| | | | |
|---|---|---|---|
| 0.652158 | 0 | 0 | 0 |
| 0 | 0.24584 | 0 | 0 |
| 0 | 0 | 0.950109 | 0 |
| 0 | 0 | 0 | 4.41E-04 |

## Table A29: Structural decomposition matrix Bangladesh (youth dep.)

Structural VAR Estimates
Date: 08/15/20 Time: 19:54
Sample (adjusted): 2003M08 2018M12
Included observations: 185 after adjustments
Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 1 iterations
Structural VAR is over-identified (2 degrees of freedom)

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run pattern matrix
A =

| | | | | |
|---|---|---|---|---|
| | 1 | C(1) | 0 | C(3) |
| | 0 | 1 | 0 | 0 |
| | 0 | C(2) | 1 | C(4) |
| | 0 | 0 | 0 | 1 |

B =

| | | | | |
|---|---|---|---|---|
| C(5) | | 0 | 0 | 0 |
| | 0 | C(6) | 0 | 0 |
| | 0 | 0 | C(7) | 0 |
| | 0 | 0 | 0 | C(8) |

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | 0.493012 | 0.367361 | 1.342034 | 0.1796 |
| C(2) | 0.301189 | 0.839104 | 0.358941 | 7.20E-01 |
| C(3) | -107.607 | 1029.475 | -0.10453 | 9.17E-01 |
| C(4) | 2638 | 2351.464 | 1.121854 | 0.2619 |
| C(5) | 0.759906 | 0.039506 | 19.23538 | 0 |
| C(6) | 0.152083 | 0.007906 | 19.23538 | 0.00E+00 |
| C(7) | 1.73573 | 0.090236 | 19.23538 | 0.00E+00 |
| C(8) | 5.43E-05 | 2.82E-06 | 19.23538 | 0 |

| | | | | |
|---|---|---|---|---|
| Log likelihood | 1064.167 | | | |
| LR test for over-identification: | | | | |
| Chi-square(2) | 1.623699 | | Probability | 0.444 |

Estimated A matrix:

| | | | |
|---|---|---|---|
| 1 | 0.493012 | 0 | -107.607 |
| 0 | 1 | 0 | 0 |
| 0 | 0.301189 | 1 | 2638 |
| 0 | 0 | 0 | 1 |

Estimated B matrix:

| | | | |
|---|---|---|---|
| 0.759906 | 0 | 0 | 0 |
| 0 | 0.152083 | 0 | 0 |
| 0 | 0 | 1.73573 | 0 |
| 0 | 0 | 0 | 5.43E-05 |

**Table A30: Structural decomposition matrix Bangladesh (elderly dep.)**

Structural VAR Estimates
Date: 08/15/20 Time: 19:40
Sample (adjusted): 2004M05 2018M12
Included observations: 176 after adjustments
Estimation method: method of scoring (analytic derivatives)
Convergence achieved after 1 iterations
Structural VAR is over-identified (2 degrees of freedom)

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run pattern matrix

A =

| | | | | |
|---|---|---|---|---|
| | 1 | C(1) | 0 | C(3) |
| | 0 | 1 | 0 | 0 |
| | 0 | C(2) | 1 | C(4) |
| | 0 | 0 | 0 | 1 |

B =

| | | | | |
|---|---|---|---|---|
| C(5) | | 0 | 0 | 0 |
| | 0 | C(6) | 0 | 0 |
| | 0 | 0 | C(7) | 0 |
| | 0 | 0 | 0 | C(8) |

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.39541 | 0.375911 | -1.05187 | 0.2929 |
| C(2) | -0.24166 | 1.201831 | -0.20108 | 8.41E-01 |
| C(3) | 205.1948 | 103.3629 | 1.985189 | 4.71E-02 |
| C(4) | 132.8718 | 330.4628 | 0.402078 | 0.6876 |
| C(5) | 0.576682 | 0.030737 | 18.76166 | 0 |
| C(6) | 0.115636 | 0.006163 | 18.76166 | 0.00E+00 |
| C(7) | 1.843719 | 0.098271 | 18.76166 | 0.00E+00 |
| C(8) | 0.000421 | 2.24E-05 | 18.76166 | 0 |

| | | | | |
|---|---|---|---|---|
| Log likelihood | 738.1758 | | | |
| LR test for over-identification: | | | | |
| Chi-square(2) | 4.879811 | | Probability | 0.0872 |

Estimated A matrix:

| | | | | |
|---|---|---|---|---|
| | 1 | -0.39541 | 0 | 205.1948 |
| | 0 | 1 | 0 | 0 |
| | 0 | -0.24166 | 1 | 132.8718 |

| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 1 |

Estimated B matrix:

| | | | |
|---|---|---|---|
| 0.576682 | 0 | 0 | 0 |
| 0 | 0.115636 | 0 | 0 |
| 0 | 0 | 1.843719 | 0 |
| 0 | 0 | 0 | 0.000421 |

**Table A31: Variance decomposition of VAR model 1 (Sri Lanka youth dep.)**

Variance Decomposition of SL_CPI:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.881351 | 98.14134 | 0.727751 | 0 | 1.130911 |
| 2 | 0.902503 | 95.37887 | 2.390209 | 0.016 | 2.214922 |
| 3 | 0.929831 | 91.80426 | 2.256159 | 1.198291 | 4.741288 |
| 4 | 0.955348 | 91.18554 | 2.353227 | 1.959116 | 4.502114 |
| 5 | 0.966797 | 89.3718 | 4.227116 | 1.918972 | 4.482112 |
| 6 | 0.972178 | 88.49361 | 4.281373 | 2.032173 | 5.192842 |
| 7 | 1.009585 | 82.64437 | 6.654073 | 4.981637 | 5.719915 |
| 8 | 1.032915 | 79.79281 | 8.81413 | 5.913299 | 5.479761 |
| 9 | 1.045544 | 77.88383 | 10.99186 | 5.772563 | 5.351741 |
| 10 | 1.076879 | 75.66937 | 11.19671 | 8.009961 | 5.123955 |

Variance Decomposition of SL_RR:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.425415 | 0 | 100 | 0 | 0 |
| 2 | 0.666961 | 0.251452 | 91.34429 | 7.647521 | 0.756738 |
| 3 | 0.847087 | 0.253734 | 81.94793 | 17.32694 | 0.4714 |
| 4 | 1.039123 | 1.350193 | 80.61528 | 17.256 | 0.778523 |
| 5 | 1.196797 | 2.269563 | 81.3954 | 15.6316 | 0.703436 |
| 6 | 1.359896 | 3.568389 | 80.99071 | 14.55878 | 0.882123 |
| 7 | 1.576823 | 3.873862 | 81.55672 | 13.26847 | 1.300945 |
| 8 | 1.771928 | 4.71855 | 80.3183 | 13.67642 | 1.286728 |
| 9 | 1.91897 | 6.514407 | 78.28202 | 13.46928 | 1.734286 |
| 10 | 2.076224 | 7.563108 | 77.84 | 12.14985 | 2.447039 |

Variance Decomposition of SL_YGAP_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 2.055747 | 0 | 7.91982 | 91.75925 | 0.320927 |
| 2 | 2.193394 | 0.022275 | 17.07835 | 80.61504 | 2.284336 |
| 3 | 2.210176 | 1.424331 | 16.82584 | 79.3975 | 2.352327 |
| 4 | 2.284757 | 1.725753 | 15.76697 | 79.7163 | 2.790976 |
| 5 | 2.352307 | 1.636005 | 20.16945 | 75.37391 | 2.820629 |
| 6 | 2.428849 | 1.815888 | 24.29356 | 70.79324 | 3.097315 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | 2.500223 | 2.169275 | 25.17125 | 68.35229 | 4.307185 |
| 8 | 2.5066 | 2.226459 | 25.36403 | 68.12112 | 4.288392 |
| 9 | 2.510827 | 2.228853 | 25.48647 | 68.0067 | 4.277977 |
| 10 | 2.577246 | 2.597774 | 24.60714 | 65.12639 | 7.668696 |

Variance Decomposition of D(SL_DEP1_G):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 8.78E-05 | 0 | 0 | 0 | 100 |
| 2 | 0.000153 | 0.012039 | 0.017908 | 0.294807 | 99.67525 |
| 3 | 0.000164 | 0.100729 | 0.268523 | 2.107472 | 97.52328 |
| 4 | 0.000166 | 0.924365 | 0.513444 | 4.335256 | 94.22693 |
| 5 | 0.000171 | 2.83716 | 0.546027 | 7.062907 | 89.55391 |
| 6 | 0.000175 | 3.563537 | 0.617092 | 7.193956 | 88.62542 |
| 7 | 0.000178 | 3.451408 | 0.604111 | 7.279769 | 88.66471 |
| 8 | 0.00018 | 3.4283 | 0.592436 | 7.635839 | 88.34343 |
| 9 | 0.000184 | 4.136784 | 0.592236 | 9.535301 | 85.73568 |
| 10 | 0.000187 | 4.665327 | 0.585948 | 12.1098 | 82.63892 |

### Table A32: Variance decomposition of VAR model 2 (Sri Lanka elderly dep.)

Variance Decomposition of SL_CPI:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.870106 | 94.50852 | 1.01163 | 0 | 4.479848 |
| 2 | 0.880315 | 94.17587 | 1.086704 | 0.336428 | 4.400993 |
| 3 | 0.899555 | 91.88406 | 1.118127 | 2.550439 | 4.447374 |
| 4 | 0.926965 | 91.701 | 1.302763 | 2.792828 | 4.203407 |
| 5 | 0.951229 | 88.81176 | 4.540817 | 2.653192 | 3.994229 |
| 6 | 0.954085 | 88.29513 | 4.543507 | 2.880892 | 4.280474 |
| 7 | 0.981172 | 85.04564 | 6.568478 | 3.908511 | 4.477368 |
| 8 | 1.006449 | 81.86504 | 8.138117 | 5.734634 | 4.262213 |
| 9 | 1.023633 | 79.17381 | 10.98711 | 5.563263 | 4.27581 |
| 10 | 1.059776 | 77.29233 | 10.93491 | 6.604416 | 5.168348 |

Variance Decomposition of SL_RR:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.417413 | 0 | 100 | 0 | 0 |
| 2 | 0.643166 | 0.106803 | 91.30627 | 8.283232 | 0.303694 |
| 3 | 0.826861 | 0.425605 | 78.5025 | 20.70616 | 0.365734 |
| 4 | 1.027586 | 2.666626 | 76.40963 | 20.60265 | 0.32109 |
| 5 | 1.188497 | 3.920929 | 76.65769 | 19.09905 | 0.322335 |
| 6 | 1.339358 | 4.67993 | 76.51603 | 18.30246 | 0.501578 |
| 7 | 1.53575 | 4.806934 | 77.84643 | 16.54752 | 0.799112 |
| 8 | 1.720444 | 5.431506 | 76.46504 | 17.25397 | 0.84949 |

| | | | | | |
|---|---|---|---|---|---|
| 9 | 1.852463 | 6.815691 | 74.66027 | 17.79112 | 0.732916 |
| 10 | 1.991058 | 7.758717 | 75.25189 | 16.33897 | 0.650428 |

Variance Decomposition of SL_YGAP_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 2.028431 | 0 | 7.819579 | 92.14028 | 0.040142 |
| 2 | 2.13826 | 0.089558 | 16.5273 | 83.22319 | 0.159948 |
| 3 | 2.15369 | 1.309265 | 16.38656 | 82.04228 | 0.261889 |
| 4 | 2.240392 | 2.440118 | 15.38803 | 81.91503 | 0.256818 |
| 5 | 2.329602 | 2.379119 | 20.77178 | 75.99044 | 0.858655 |
| 6 | 2.403754 | 2.290833 | 25.07327 | 71.38184 | 1.254056 |
| 7 | 2.452326 | 3.140426 | 25.86196 | 69.13458 | 1.863036 |
| 8 | 2.467891 | 3.346516 | 25.8168 | 68.40535 | 2.431337 |
| 9 | 2.49909 | 3.310149 | 25.21018 | 67.46768 | 4.011997 |
| 10 | 2.509543 | 3.611942 | 25.40038 | 67.0086 | 3.979075 |

Variance Decomposition of SL_DEP2_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.000263 | 0 | 0 | 0 | 100 |
| 2 | 0.000335 | 0.35005 | 0.237393 | 0.090988 | 99.32157 |
| 3 | 0.00034 | 0.594073 | 2.192279 | 0.647286 | 96.56636 |
| 4 | 0.00035 | 2.638183 | 3.401795 | 2.83086 | 91.12916 |
| 5 | 0.000352 | 2.952116 | 3.404174 | 2.916553 | 90.72716 |
| 6 | 0.000354 | 4.108657 | 3.582859 | 2.912192 | 89.39629 |
| 7 | 0.000367 | 9.362812 | 3.349386 | 3.790434 | 83.49737 |
| 8 | 0.000375 | 11.79747 | 4.064748 | 4.074789 | 80.06299 |
| 9 | 0.000384 | 11.39377 | 7.170166 | 3.984316 | 77.45175 |
| 10 | 0.000386 | 11.69086 | 7.341198 | 3.949234 | 77.01871 |

**Table A33: Variance decomposition of VAR model 3 (India youth dep.)**

Variance Decomposition of D(IND_CPI):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.625135 | 99.86361 | 0.126299 | 0 | 0.010093 |
| 2 | 0.758716 | 96.83801 | 1.87622 | 1.263858 | 0.021911 |
| 3 | 0.806611 | 96.84988 | 1.821928 | 1.184508 | 0.143689 |
| 4 | 0.812799 | 95.77955 | 1.840385 | 1.95383 | 0.426235 |
| 5 | 0.819557 | 94.48472 | 1.909929 | 1.935108 | 1.67024 |
| 6 | 0.831159 | 92.31326 | 1.863001 | 4.187237 | 1.6365 |
| 7 | 0.866489 | 89.05221 | 3.298522 | 5.719375 | 1.929888 |
| 8 | 0.892025 | 88.33819 | 4.331813 | 5.396604 | 1.933391 |
| 9 | 0.908261 | 87.85373 | 4.673848 | 5.302091 | 2.170335 |
| 10 | 0.914153 | 87.20121 | 5.096057 | 5.262575 | 2.440156 |

Variance Decomposition of D(IND_RR):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.242086 | 0 | 100 | 0 | 0 |
| 2 | 0.262945 | 0.955473 | 97.27976 | 0.817217 | 0.947547 |
| 3 | 0.284549 | 1.16535 | 96.43631 | 1.417922 | 0.980414 |
| 4 | 0.29959 | 2.817306 | 94.68891 | 1.587262 | 0.906519 |
| 5 | 0.310471 | 2.684221 | 94.24555 | 2.090101 | 0.980128 |
| 6 | 0.320081 | 2.644401 | 93.5096 | 2.139493 | 1.706508 |
| 7 | 0.328658 | 2.533274 | 93.46281 | 2.264313 | 1.739608 |
| 8 | 0.334425 | 2.762185 | 93.26577 | 2.240709 | 1.731332 |
| 9 | 0.340812 | 3.142271 | 92.58506 | 2.329206 | 1.943466 |
| 10 | 0.345237 | 3.088901 | 92.42475 | 2.370297 | 2.116055 |

Variance Decomposition of IND_YGAP_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.960724 | 0 | 2.801287 | 96.77991 | 0.4188 |
| 2 | 1.000054 | 0.455902 | 8.230846 | 90.28047 | 1.032779 |
| 3 | 1.013009 | 2.45111 | 8.214374 | 88.20675 | 1.127765 |
| 4 | 1.024001 | 4.219839 | 8.334551 | 86.34189 | 1.103719 |
| 5 | 1.025037 | 4.397168 | 8.330258 | 86.17035 | 1.10222 |
| 6 | 1.027242 | 4.699666 | 8.324326 | 85.87603 | 1.099978 |
| 7 | 1.032954 | 4.647838 | 8.336768 | 85.26121 | 1.754182 |
| 8 | 1.035283 | 4.847284 | 8.323729 | 84.9142 | 1.914787 |
| 9 | 1.044921 | 4.78712 | 8.271337 | 83.57741 | 3.364133 |
| 10 | 1.055608 | 6.650782 | 8.128743 | 81.90713 | 3.31335 |

Variance Decomposition of D(IND_DEP1_G):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 3.54E-05 | 0 | 0 | 0 | 100 |
| 2 | 6.63E-05 | 0.001816 | 0.002639 | 0.283195 | 99.71235 |
| 3 | 6.94E-05 | 0.001795 | 0.002967 | 2.283509 | 97.71173 |
| 4 | 7.09E-05 | 0.083646 | 0.030493 | 6.129587 | 93.75627 |
| 5 | 7.29E-05 | 0.169745 | 0.040506 | 11.13227 | 88.65748 |
| 6 | 7.36E-05 | 0.241923 | 0.271438 | 12.22903 | 87.25761 |
| 7 | 7.39E-05 | 0.40804 | 0.764129 | 12.32442 | 86.50341 |
| 8 | 7.51E-05 | 0.470123 | 1.577033 | 12.64514 | 85.3077 |
| 9 | 7.75E-05 | 0.485018 | 2.012139 | 11.97665 | 85.5262 |
| 10 | 7.83E-05 | 1.626294 | 1.967975 | 11.83707 | 84.56866 |

**Table A34: Variance decomposition of VAR model 4 (India elderly dep.)**

Variance Decomposition of D(IND_CPI):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.653617 | 99.55389 | 0.280963 | 0 | 0.165147 |
| 2 | 0.796114 | 98.29808 | 0.521645 | 0.466498 | 0.713777 |
| 3 | 0.841951 | 98.19942 | 0.466435 | 0.695262 | 0.638885 |
| 4 | 0.849288 | 96.60212 | 0.491366 | 1.879955 | 1.02656 |
| 5 | 0.855015 | 95.33029 | 0.983514 | 2.255454 | 1.430737 |
| 6 | 0.868024 | 93.11012 | 1.006663 | 4.494618 | 1.388597 |
| 7 | 0.90082 | 90.46942 | 2.073211 | 6.06232 | 1.395045 |
| 8 | 0.923797 | 89.92646 | 2.840927 | 5.78668 | 1.445929 |
| 9 | 0.936374 | 88.96722 | 3.211723 | 5.851987 | 1.969073 |
| 10 | 0.942986 | 88.24524 | 3.39415 | 5.96212 | 2.398488 |

Variance Decomposition of D(IND_RR):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.24584 | 0 | 100 | 0 | 0 |
| 2 | 0.263166 | 0.709307 | 98.38237 | 0.887879 | 0.02044 |
| 3 | 0.28431 | 0.676596 | 98.06502 | 1.232138 | 0.026243 |
| 4 | 0.299282 | 3.341611 | 94.97428 | 1.654959 | 0.029151 |
| 5 | 0.306634 | 3.186836 | 94.91437 | 1.868454 | 0.030335 |
| 6 | 0.317807 | 3.253971 | 92.96815 | 2.141155 | 1.636719 |
| 7 | 0.323817 | 3.205989 | 92.92634 | 2.271431 | 1.596239 |
| 8 | 0.328656 | 3.44789 | 92.55727 | 2.442968 | 1.551874 |
| 9 | 0.333055 | 3.668371 | 92.16984 | 2.446717 | 1.71507 |
| 10 | 0.33656 | 3.595836 | 91.9835 | 2.406893 | 2.01377 |

Variance Decomposition of IND_YGAP_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.980273 | 0 | 5.292466 | 93.94057 | 0.766964 |
| 2 | 1.01551 | 0.18307 | 11.15386 | 87.71263 | 0.950444 |
| 3 | 1.031862 | 2.19438 | 10.82549 | 85.60625 | 1.373885 |
| 4 | 1.044098 | 3.704795 | 10.76602 | 83.61543 | 1.913756 |
| 5 | 1.046398 | 3.860891 | 10.7286 | 83.35091 | 2.0596 |
| 6 | 1.052421 | 4.014102 | 10.616 | 82.40033 | 2.969573 |
| 7 | 1.05403 | 4.004366 | 10.70418 | 82.28755 | 3.003897 |
| 8 | 1.055198 | 4.012141 | 10.68622 | 82.29128 | 3.010359 |
| 9 | 1.05635 | 4.043662 | 10.77471 | 82.17172 | 3.009915 |
| 10 | 1.065597 | 5.306585 | 10.58964 | 80.88083 | 3.222952 |

Variance Decomposition of IND_DEP2_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.000441 | 0 | 0 | 0 | 100 |
| 2 | 0.000542 | 0.152963 | 0.246847 | 0.741509 | 98.85868 |
| 3 | 0.000544 | 0.172552 | 0.304325 | 1.065169 | 98.45795 |
| 4 | 0.000547 | 0.558826 | 0.303198 | 1.116581 | 98.02139 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 0.000551 | 0.563284 | 0.299206 | 1.680448 | 97.45706 |
| 6 | 0.000553 | 0.561378 | 0.67265 | 2.061097 | 96.70488 |
| 7 | 0.000557 | 1.078744 | 0.806362 | 2.884083 | 95.23081 |
| 8 | 0.000561 | 1.349611 | 0.798258 | 3.04164 | 94.81049 |
| 9 | 0.000562 | 1.354441 | 1.244812 | 3.029449 | 94.3713 |
| 10 | 0.000565 | 1.745587 | 1.31266 | 3.401557 | 93.5402 |

### Table A35: Variance decomposition of VAR model 5 (Bangladesh youth dep.)

Variance Decomposition of BAN_CPI:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.763618 | 99.03005 | 0.964101 | 0 | 0.005848 |
| 2 | 0.830153 | 98.76497 | 1.034037 | 0.015923 | 0.185071 |
| 3 | 0.831476 | 98.46515 | 1.316627 | 0.03095 | 0.187272 |
| 4 | 0.848846 | 94.84731 | 2.405288 | 2.545612 | 0.201794 |
| 5 | 0.867241 | 94.95087 | 2.34438 | 2.441262 | 0.263492 |
| 6 | 0.910255 | 88.34652 | 2.134869 | 9.241257 | 0.277351 |
| 7 | 0.915701 | 87.38329 | 2.137426 | 10.14437 | 0.334913 |
| 8 | 0.916657 | 87.20122 | 2.205845 | 10.22794 | 0.364995 |
| 9 | 0.918578 | 87.12057 | 2.197308 | 10.18774 | 0.494383 |
| 10 | 0.921776 | 86.79583 | 2.1823 | 10.51601 | 0.50586 |

Variance Decomposition of D(BAN_RR):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.152083 | 0 | 100 | 0 | 0 |
| 2 | 0.156996 | 0.401549 | 99.16971 | 0.297858 | 0.130885 |
| 3 | 0.16122 | 0.73066 | 98.74816 | 0.395364 | 0.125812 |
| 4 | 0.164929 | 0.907813 | 98.12508 | 0.500487 | 0.466618 |
| 5 | 0.168538 | 1.052616 | 97.82196 | 0.677704 | 0.447717 |
| 6 | 0.170676 | 1.027639 | 97.65148 | 0.743787 | 0.577097 |
| 7 | 0.17189 | 1.015461 | 97.34636 | 0.868614 | 0.769563 |
| 8 | 0.172947 | 1.010575 | 97.13837 | 1.088986 | 0.762065 |
| 9 | 0.173545 | 1.018011 | 97.02618 | 1.16418 | 0.791625 |
| 10 | 0.173839 | 1.014613 | 97.03575 | 1.160683 | 0.788949 |

Variance Decomposition of BAN_YGAP_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 1.742226 | 0 | 0.069124 | 99.25564 | 0.675237 |
| 2 | 1.760629 | 0.170786 | 1.466771 | 97.32115 | 1.041294 |
| 3 | 1.769782 | 1.088892 | 1.53491 | 96.3215 | 1.054697 |
| 4 | 1.776223 | 1.233054 | 1.626943 | 95.62728 | 1.512717 |
| 5 | 1.777784 | 1.231822 | 1.665889 | 95.4988 | 1.603485 |
| 6 | 1.783052 | 1.429869 | 1.739032 | 95.03344 | 1.797656 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | 1.786845 | 1.507159 | 1.736815 | 94.66458 | 2.091442 |
| 8 | 1.790302 | 1.512457 | 1.749875 | 94.36132 | 2.376342 |
| 9 | 1.791824 | 1.514919 | 1.749859 | 94.20727 | 2.527957 |
| 10 | 1.792052 | 1.515985 | 1.750492 | 94.18775 | 2.545776 |

Variance Decomposition of D(BAN_DEP1_G):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 5.43E-05 | 0 | 0 | 0 | 100 |
| 2 | 0.000101 | 0.691493 | 0.183314 | 0.032888 | 99.09231 |
| 3 | 0.000109 | 3.006677 | 0.590906 | 0.210607 | 96.19181 |
| 4 | 0.000111 | 4.534794 | 0.617852 | 0.276411 | 94.57094 |
| 5 | 0.000113 | 4.790086 | 1.23618 | 0.275934 | 93.6978 |
| 6 | 0.000122 | 4.195472 | 2.872875 | 0.237047 | 92.69461 |
| 7 | 0.000136 | 3.596081 | 3.222734 | 0.236977 | 92.94421 |
| 8 | 0.000138 | 4.733038 | 3.227528 | 0.254643 | 91.78479 |
| 9 | 0.000141 | 5.26409 | 3.144686 | 0.244822 | 91.3464 |
| 10 | 0.000146 | 4.969671 | 3.448329 | 0.246613 | 91.33539 |

**Table A36: Variance decomposition of VAR model 6 (Bangladesh elderly dep.)**

Variance Decomposition of BAN_CPI:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.584893 | 97.21211 | 0.611127 | 0 | 2.176764 |
| 2 | 0.592729 | 96.38082 | 1.28889 | 0.110901 | 2.219385 |
| 3 | 0.595341 | 96.03254 | 1.569032 | 0.198234 | 2.200192 |
| 4 | 0.621181 | 88.62556 | 3.555166 | 4.924549 | 2.89473 |
| 5 | 0.630207 | 88.53799 | 3.460835 | 5.072609 | 2.92857 |
| 6 | 0.674883 | 77.38325 | 3.303099 | 16.64776 | 2.665886 |
| 7 | 0.677308 | 77.04765 | 3.304901 | 16.85188 | 2.795566 |
| 8 | 0.689782 | 76.64497 | 3.339609 | 16.9238 | 3.09162 |
| 9 | 0.695402 | 75.44685 | 4.35046 | 16.79723 | 3.405464 |
| 10 | 0.715887 | 71.26174 | 4.259457 | 20.82975 | 3.649058 |

Variance Decomposition of D(BAN_RR):

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.115636 | 0 | 100 | 0 | 0 |
| 2 | 0.124024 | 1.522351 | 94.17115 | 0.683384 | 3.623117 |
| 3 | 0.134448 | 2.004804 | 93.5856 | 0.672319 | 3.73728 |
| 4 | 0.139018 | 2.19999 | 93.40559 | 0.857631 | 3.536786 |
| 5 | 0.143207 | 2.207799 | 93.59104 | 0.844617 | 3.35654 |
| 6 | 0.148517 | 2.413203 | 92.87332 | 1.571477 | 3.142004 |
| 7 | 0.152313 | 2.351115 | 91.92113 | 2.32494 | 3.402819 |
| 8 | 0.157547 | 2.76817 | 88.82827 | 2.329894 | 6.073666 |

| | | | | | |
|---|---|---|---|---|---|
| 9 | 0.160275 | 2.86883 | 88.91319 | 2.252801 | 5.965182 |
| 10 | 0.164762 | 3.051818 | 86.53476 | 2.306262 | 8.107165 |

Variance Decomposition of BAN_YGAP_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 1.844777 | 0 | 0.022947 | 99.8853 | 0.091751 |
| 2 | 1.923161 | 0.089708 | 5.843339 | 92.06406 | 2.002896 |
| 3 | 1.929916 | 0.10214 | 5.808114 | 91.79626 | 2.293482 |
| 4 | 1.94854 | 1.72045 | 5.854938 | 90.06111 | 2.363497 |
| 5 | 1.958186 | 1.729756 | 5.888898 | 89.43543 | 2.945917 |
| 6 | 1.960565 | 1.938964 | 5.883964 | 89.22799 | 2.949084 |
| 7 | 1.965163 | 1.944502 | 5.978332 | 89.02752 | 3.049645 |
| 8 | 1.986907 | 3.432202 | 5.891867 | 87.21711 | 3.458825 |
| 9 | 2.002219 | 3.405203 | 5.847031 | 86.0067 | 4.741063 |
| 10 | 2.002861 | 3.421041 | 5.884469 | 85.95193 | 4.74256 |

Variance Decomposition of BAN_DEP2_G:

| Period | S.E. | Shock1 | Shock2 | Shock3 | Shock4 |
|---|---|---|---|---|---|
| 1 | 0.000421 | 0 | 0 | 0 | 100 |
| 2 | 0.000481 | 0.512915 | 0.238668 | 0.110407 | 99.13801 |
| 3 | 0.000498 | 1.271752 | 0.263604 | 1.992091 | 96.47255 |
| 4 | 0.000502 | 2.080423 | 0.258739 | 2.051131 | 95.60971 |
| 5 | 0.000505 | 2.206287 | 0.443982 | 2.868145 | 94.48159 |
| 6 | 0.000514 | 3.087804 | 1.035252 | 3.202846 | 92.6741 |
| 7 | 0.000518 | 3.306736 | 1.367215 | 3.668301 | 91.65775 |
| 8 | 0.000529 | 3.936651 | 1.774506 | 4.550318 | 89.73852 |
| 9 | 0.000541 | 7.542368 | 2.052538 | 4.530057 | 85.87504 |
| 10 | 0.000548 | 8.75797 | 2.366217 | 4.639445 | 84.23637 |

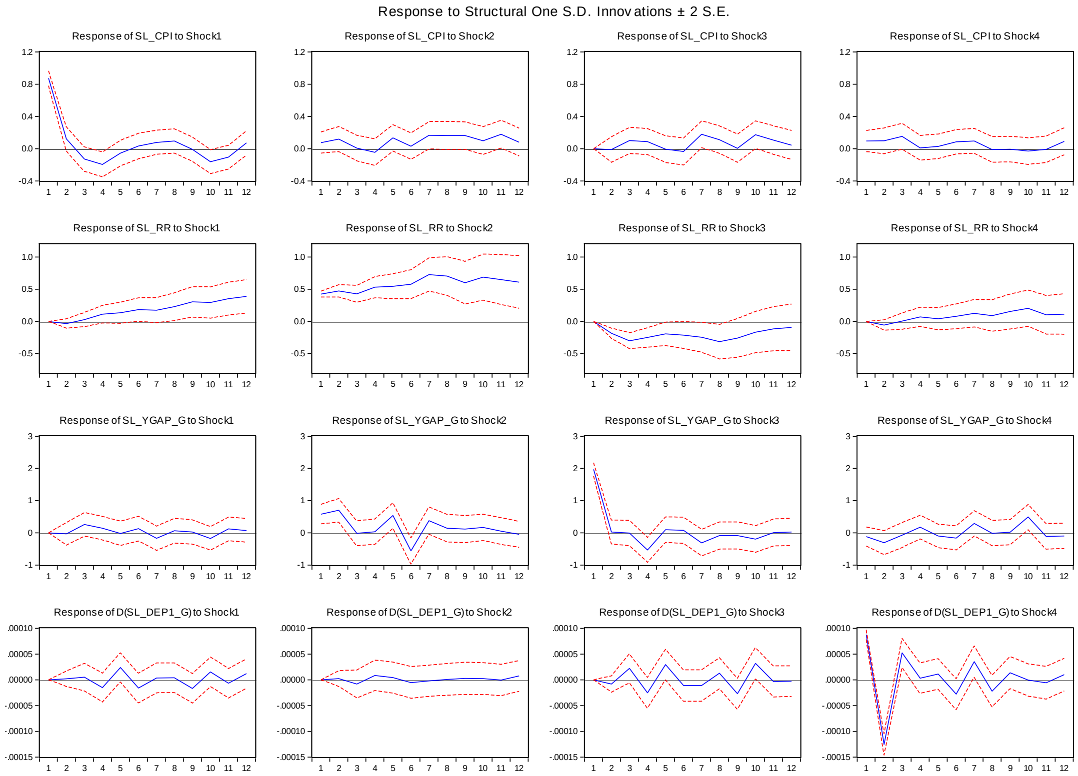


**Figure A1: Impulse response of VAR model 1 (Sri Lanka youth dep.)**

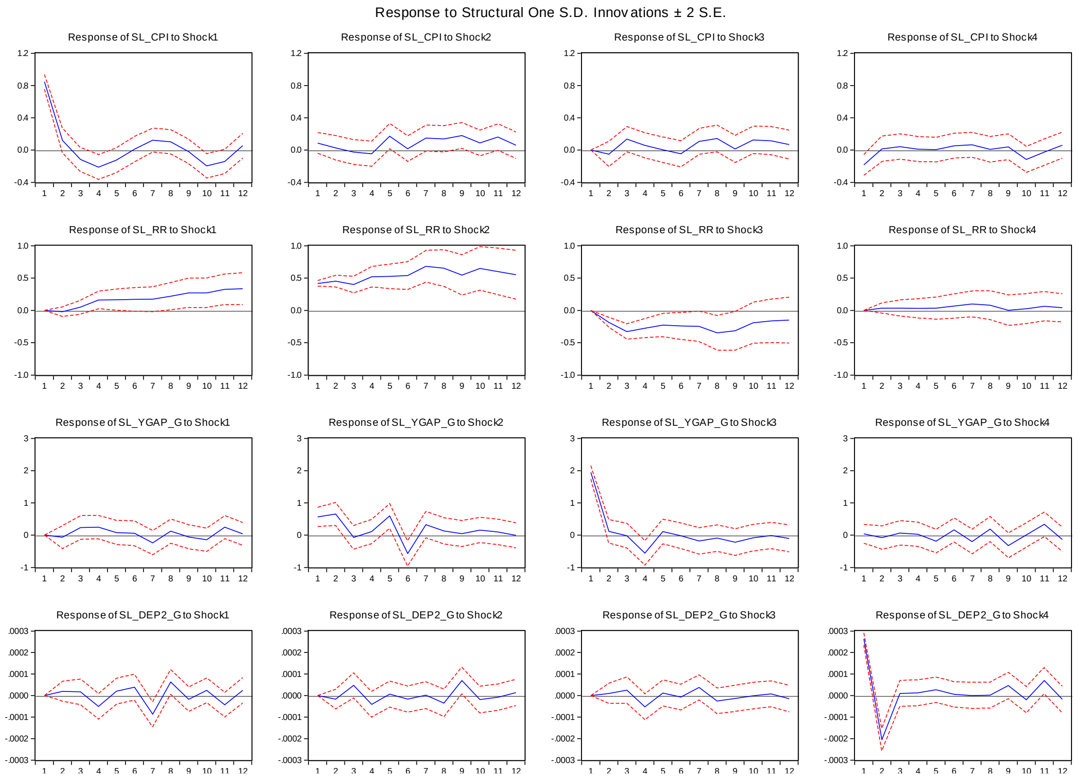


**Figure A2: Impulse response of VAR model 2 (Sri Lanka elderly dep.)**

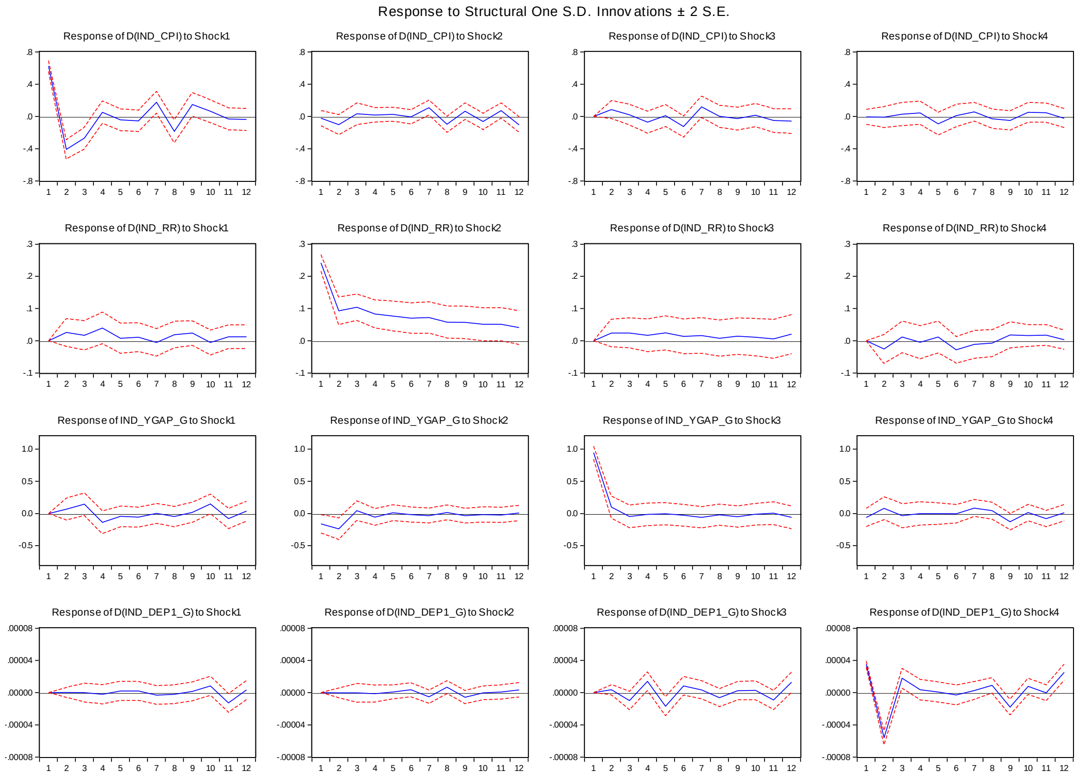


**Figure A3: Impulse response of VAR model 3 (India youth dep.)**

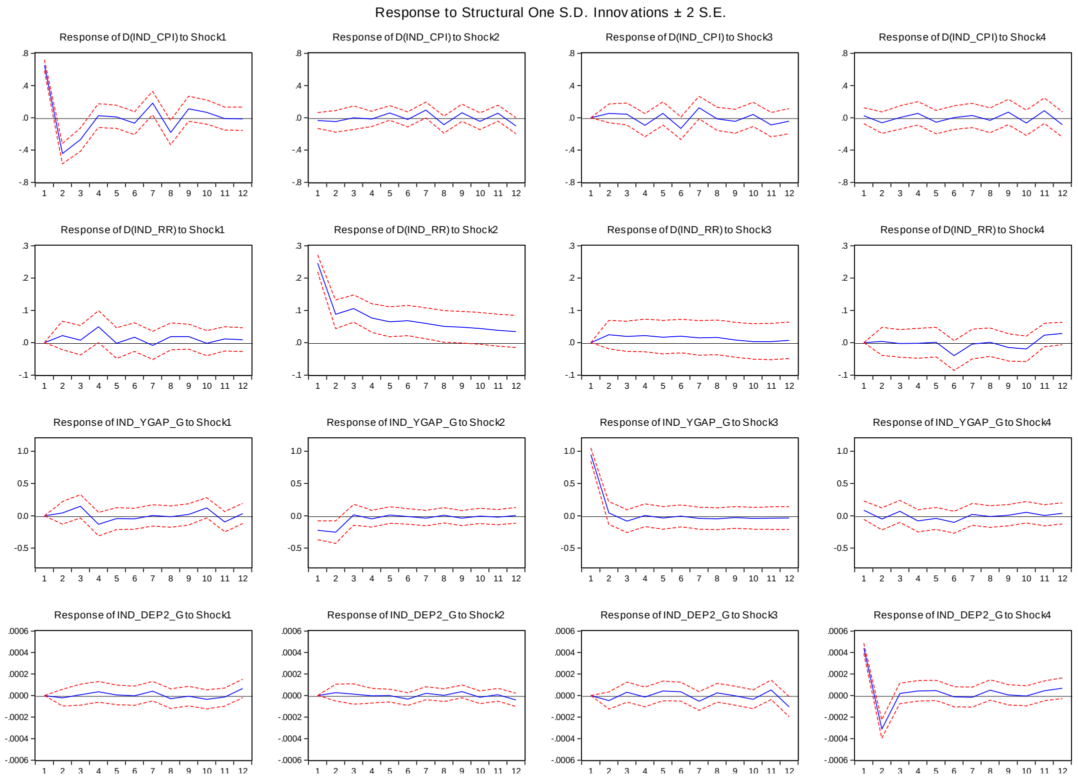


**Figure A4: Impulse response of VAR model 4 (India elderly dep.)**

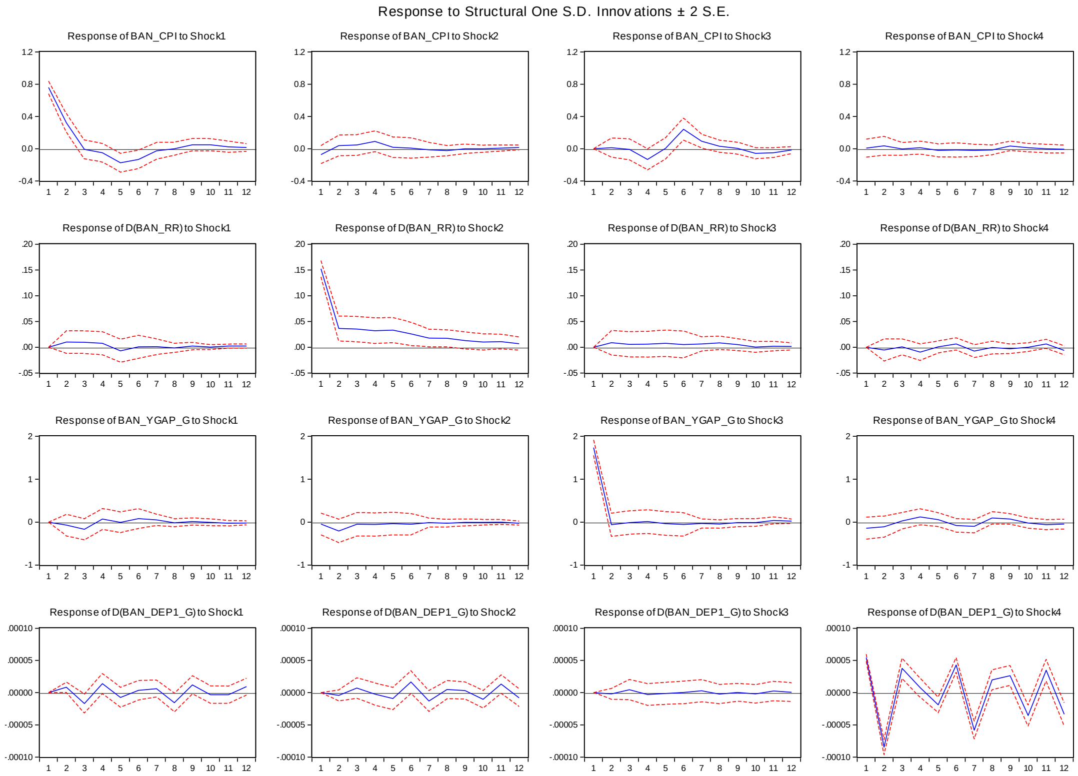


**Figure A5: Impulse response of VAR model 5 (Bangladesh youth dep.)**

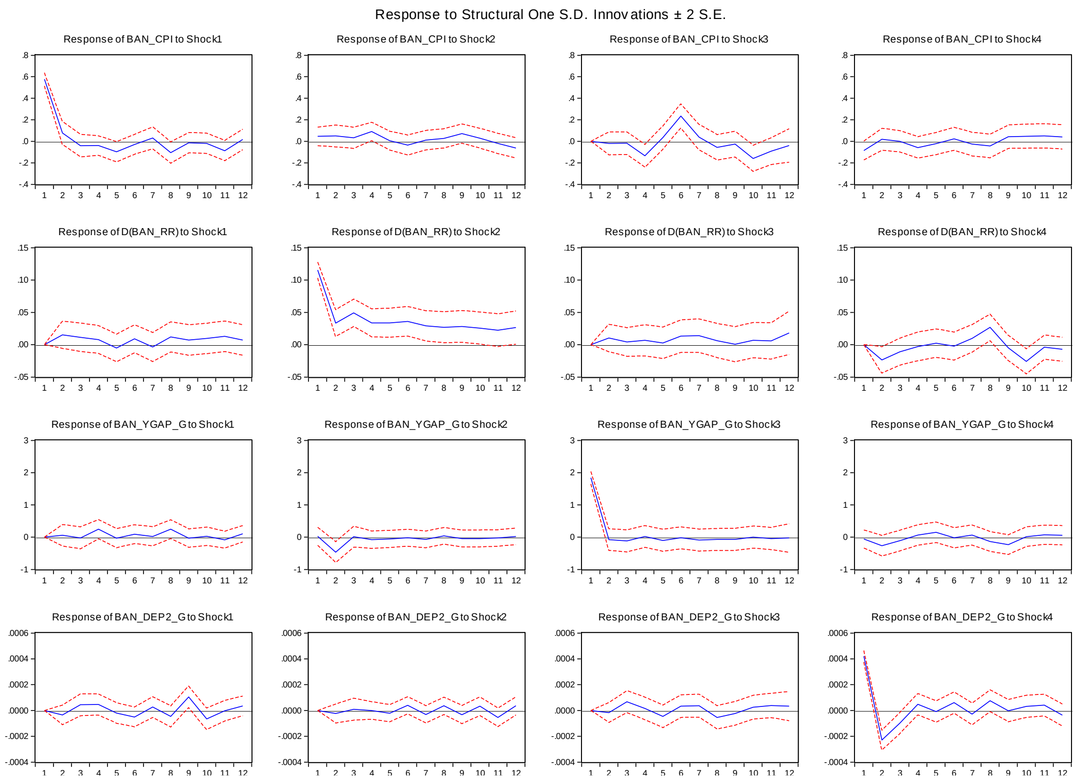


**Figure A6: Impulse response of VAR model 6 (Bangladesh elderly dep.)**