Dynamic Effects of Fiscal Policy on Output and Unemployment in India & Romania: An Econometric Study

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Abstract

This study investigates the effect of fiscal policy shocks on output and unemployment in India and Romania by utilizing SVAR (Structural Vector Auto Regression) approach over a period from 1990 to 2024. The variables are stationary after first difference with order of integration I(1). The study shows absence of long-run equilibrium association among the selected macro-economic variables. For India GDP and Unemployment dynamics are virtually explained entirely by its own shocks at all horizons. For Romania own shocks play by far the crucial role but gradually shrink over time. The finding suggests that output and unemployment of Romania react to fiscal policy interventions more vigorously than India, perhaps owing to the relevant structural and institutional qualities. Very few cases uni-directional casualty has been observed in both the countries. Finally, the study calls for a differentiated approach to fiscal strategies, considering the country-specific transmission mechanism and economic structure.

Keywords: GDP, Unemployment, Total Expenditure, Revenue

JEL Classification: C5, E5, J5

Introduction:

Government may use fiscal policy tools like taxes and spending that affects macroeconomic stability, growth and employment. The dynamic effects of it on output and unemployment have been for long a discussion topic in economic theory and policy discourse (Budget Lab, 2024). Keynesian theory is opposed to those of classical economics that fiscal measures are necessary to save the world from a global slump in output and jobs as result of a downturn. Data shows that the effect of fiscal policy on volume and sign is not consistent among countries due to institutional contexts, credit structural characteristics and the character of individual fiscal measure components. Romania and India will be an interesting comparative case to review. A key emerging economy, India adopted a fiscal policy heavily focused on infrastructure development, welfare spending and subsidies. By comparison, Romania was subject to rigorous fiscal reform as an EU member, codified in its budget the values of stabilization, integration and growth as it was emerging from a command economy (Taylor 2000). These developing market economies could not be more different, yet both struggled to expand fiscal policy while maintaining growth and job creation. However, very limited research has been done in terms of exploring dynamic relationships between fiscal policy, output and unemployment in these economies especially for cross-country experiences over a period. The period 1990–2024 is of interest as it covers a time when both nations were globalizing, reforming structure and building new macroeconomic frameworks.

This study follows the impact of fiscal policy shocks on output and unemployment in the short term and long term so as to measure differentials across effectiveness of policies and effects. With this view econometric approach has been developed that that looks at the relationships between theoretical viewpoints and empirical data by illuminating how fiscal policy influences economic outcomes in various macroeconomic contexts.

The paper has been designed as follows: Section 2 has explained literature review. Section 3 has explained its objectives. Section 4 provides data and study period. Section 5 has explained Methodology. Section 6 has described result and analysis portion. Finally, conclusion and recommendation is mentioned in Section 7

Literature Review:

In theoretical terms, classical Keynesian and state-of-the-art new Keynesian considerations are employed to assess both the dynamic impact of fiscal policy on output and unemployment. This theory, which dates back to (Keynes 1936), can be expressed in a simple form that the government spending stimulates aggregate demand such that fiscal expansion reduces unemployment and especially so during periods of economic weakness. (Blinder and Solow 1973) further developed this idea by illustrating that fiscal multipliers are affected by the extant rigidities in prices and wages, exerting an effect on both short-term output and employment. In a famous article (Barro 1974) tested the Ricardian equivalence hypothesis which asserted that debt-financed fiscal policy would have no impact on output because rational agents would anticipate future taxes. Among developing economies (Tanzi and Zee 1997) found that sluggish growth in these countries owes to a range of factors including structural bottlenecks, weak institutions, and inflationary pressures which inhibit the efficacy of fiscal adjustment policies. (Romer and Romer 2010) argue that changes in taxes that are exogenous minimally have very large and long-lived effects on real GDP, with primary contractionary tax policies hindering recovery for up to the whole time during which output is low and unemployment is high. In particular (Perotti 2005) documented differences in fiscal policy effects on output between advanced and emerging markets mainly attributable to financial market depth and automatic stabilizers. A further development due to Blanchard and (Perotti 2002) is a structural VAR framework that helps distinguish the effects of contemporaneous government spending and taxation, which provided an appropriate econometric footing for studying the dynamics of fiscal policy. More recently (Alesina et al, 2015) highlighted that spending-based adjustments are less harmful to growth and the labor market than tax-based ones.

Several empirical studies on the dynamic effects of fiscal policy on macroeconomic outcomes showed widely varying results across economies. One early article trying to introduce SVAR for identification of the short and long run effect of government spending and taxation (Blanchard and Perotti 2002) that showed expansionary spending did raise output in the short-run. The EU work covers a similar range of EU countries (including Romania) and found that fiscal shocks do impact on GDP, though with less uniform effects on employment-related outcomes (Afonso and Sousa 2012). Perotti 2005 demonstrated that in developing and emerging markets the fiscal multipliers are generally lower due to structural limitations. (Bose et al., 2007) emphasize that in the Indian perspective, productive capital, mainly infrastructural expenditure has a significant positive effect on output growth but unproductive does not. In India, Jha and Sharma (2014) find fiscal consolidation resulted in short-run growth slowdowns but with longer-term stability. Similarly, Dăianu and Lungu (2014) show that pro-cyclical fiscal policy aggravated output instability in Romania increasing during booms inflation due to the rise in spending. More recent evidence (Auerbach and Gorodnichenko 2012) indicates that fiscal multipliers are state dependent, with larger multipliers in recessions than in expansions. This is abundantly evident from empirical comparisons across emerging economies, as the authors found in (Batini, Eyraud and Weber 2014), which show that capital expenditure leads to much larger output gains and helps lower unemployment persistently relative to current expenditure. Their descriptive content is important; but, as indicated by the heterogeneity of fiscal policy effects across countries and time they highlight, a comparative econometric study such as the one proposed for India and Romania during 1990 to 2024 is essential.

Although earlier studies have examined the effect of fiscal policy on the output or unemployment but the dynamics interactions between India and Romania have been less investigated. Most of the existing works are country-specific and have narrower time-window, while they rarely use advanced econometric techniques such as SVAR to identify exogenous fiscal shocks. There is still very little comparative evidence across structurally dissimilar economies, leaving room for a unified analysis of how fiscal policy affects both output and unemployment over time.

Objective of the Study:

The study has been designed to achieve the following objective:

- To observe dynamic interaction among the selected macroeconomic indicators
- To inspect the direction of causality
- To analyze the impact of shock

Data & Study Period:

The study has employed quarterly data and converted into log of the selected macro-economic variables for the period from 1990 to 2024. Data on total expenditure and total Revenue have been used as fiscal policy variables, while on the other hand Gross Domestic Product (GDP) and Unemployment Rate are the variables of interest. Data on GDP, Unemployment Rate, total Expenditure and total revenue have been collected from World Bank database.

Methodology:

SVAR is a natural extension of Sims (1980) reduced-form VAR (Cooley & LeRoy, 1984), in which all variables are treated as endogenous to avoid the simultaneity bias. Blanchard and Quah (1989) further formalized the approach by the introduction of long-run restrictions to identify structural shocks, alternatively short-run recursive (Cholesky) schemes are frequently used. SVAR gained popularity in the 1980s and 1990s with applications such as Christiano, Eichenbaum, and Evans (2005) and Romer and Romer (2017) for monetary and fiscal policy analysis. These later innovations, including Uhlig (2005) sign restrictions and Hyvärinen et al. (2010) non-Gaussian identification, extended methodological adaptability. A more recent treatment of these identification strategies is offered in Kilian and Lutkepohl (2017), who provides a unifying approach that incorporates a broad range of extensions, including Bayesian, data-rich modeling. SVARs are therefore suited for both theoretical investigation and empirical application in macroeconomics. Sims (1980) criticized the single system of equation approach used in economic analysis and he further noted that there are no variables which should be treated as dependent or independent or be dichotomized, and instead termed that all of these variables should actually be referred to as endogenous variables. Instead, Sims suggested using the Vector Autoregressive (VAR) analysis, in which each endogenous variable is modeled as a function of lagged values of the other endogenous variables. Consider a simple bi-variate model to illustrate this:

$y_t = b_{10} - b_{12}z_t + \gamma_{11}y_{t-1} + \gamma_{12}z_{t-1} + \varepsilon_{yt}$ (1)

$z_t = b_{20} - b_{21}y_t + \gamma_{21}y_{t-1} + \gamma_{22}z_{t-1} + \varepsilon_{zt}$ (2)

The endogenous variables y_t and z_t can be found from equations (1) and (2), while b_{12} and b_{21} captures the contemporaneous effect of z_t on y_t and y_t on z_t respectively. The coefficients γ_i are capturing lagged relationship between the variables and ε_{yt} and ε_{zt} are structural errors. The equations (1) and (2) combined forming matrix form results, if we construct the matrix and gather items in similar manner, matrices arranged as:

$$\begin{bmatrix} 1 & b_{21} \\ b_{21} & 1 \end{bmatrix}\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix}\begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix} \quad (3)$$

The equation (3) can be illustrated as below:

$Ax_t = \Pi_0 + \Pi_1 x_{t-1} + \varepsilon_t$ (4)

Where $A = \begin{bmatrix} 1 & b_{21} \\ b_{21} & 1 \end{bmatrix}$,

$x_t = \begin{bmatrix} y_t \\ z_t \end{bmatrix}$,

$\Pi_0 = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix}$,

$\Pi_1 = \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix}$,

and $\varepsilon_t = \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix}$

Here in equation (4) is the VAR model in the structural form, where no direct estimation of the structural parameters can be achieved as z_t is correlated with ε_{yt} and y_t is correlated with ε_{zt}. So, to estimate we will have to transform the structural model to its reduced form (where endogenous variables i.e. left-hand side of the equation) will be a function of predetermined variables (i.e., right hand side of the equation contains only pre determinable), this is commonly called standard VAR or Reduced form VAR.

Multiply equation (4) by A^{-1} to obtain the standard VAR from the structural equation. If done, the equation becomes:

$x_t = A_0 + A_1 x_{t-1} + \varepsilon_t$ (5)

Where, $A_0 = A^{-1}\Pi_0$,

$A_1 = A^{-1}\Pi_1$, and

$A^{-1}\varepsilon_t$

As we saw in equation (5) is the standard VAR model, hence using that equation and estimate it and with from the reduced form coefficients, we can obtain structural parameters, which is used by all typical estimation techniques need either regressors to be assume uncorrelated with error term. However, only if the equation is identified can the structural parameters be inferred from the coefficients of the reduced form. The structural system is said to be identified if it is possible to fully recover any of the primitive/structural systems from the estimated reduced form model. The reduced-form model has fewer parameters than the structural model, and in return it only identifies the structural model under assumptions on the parameters of the structural model.

So, it is important to also mention that, within the SVAR methodology, the focus remains more on structural errors than coefficient estimates. The identification scheme used in the study introduces a further difference from other SVAR methodologies, by employing the "recursive system" discussed by Sims (1980). In the recursive system, the structural model is determined by imposing restrictions on matrix A (matrix of contemporaneous relationship among variables) such that this matrix either is lower triangular or upper triangular. If A-matrix is lower triangular, it implies that we are in presence of a type-1 pair of orthogonal shocks; i.e., the structural shock of the preceding variable affects the succeeding variable but not vice versa and for upper triangular, instead. From Enders (2014), exact identification imposes $(n^2 - n)/2$ restrictions on the relationship between the regression residuals and structural innovations. The residues also belong to the A-matrix with restrictions but in a triangular way (the "Choleski decomposition"). For example, if we model whether there is identification using equations (1) and (2), these with $b_{21}=0$ based on economic theory would now be:

$$y_t = b_{10} - b_{12}z_t + \gamma_{11}y_{t-1} + \gamma_{12}z_{t-1} + \varepsilon_{yt} \qquad (6)$$

$$z_t = b_{20} + \gamma_{21}y_{t-1} + \gamma_{22}z_{t-1} + \varepsilon_{yt} \qquad (7)$$

From Equations (6) and (7), it can be seen that, the contemporaneous effect of z_t on y_t exists but $b_{21} = 0$ implies y_t affects z_t, but not in the opposite manner. Similarly, it is important to stress here that shocks to ε_{yt} and z_t affects y_t, yet only shocks to ε_{zt} influences z_t. As an example of this, you will remember from the expression (5) that;

$$e_t = A^{-1}\varepsilon_t \qquad (8)$$

Now the reduced form errors are combination of two shocks and hence after imposition of restriction on A-matrix they will exhibit the following relationship:

$$e_{1t} = \varepsilon_{yt} - b_{12}\varepsilon_{zt} \qquad (9)$$

$$e_{2t} = \varepsilon_{zt} \qquad (10)$$

Equation (9) and (10) show that the residual equation is factored into a triangular shape, a Choleski decomposition. We assume that the covariance between the structural shocks ε_{yt} and ε_{zt} is zero since each is a pure structural shock, and that these shocks have time invariant variances, such that the variance covariance matrix of the structural shocks can be assumed to equal a diagonal matrix. Because what we are interested in is the ability to recover the structural shocks from the reduced form errors and use economic theory to impose restrictions on A-Matrix, equation (8), pre multiplied by matrix A would be:

$$\varepsilon_t = Ae_t \qquad (11)$$

Adopting from equation 11 and using the previous equation 6 and 7, it may be specified as:

$$\varepsilon_{1t} = e_{it} + b_{21}e_t \qquad (12)$$

$$\varepsilon_{2t} = e_{2t} \qquad (13)$$

Using equations (12) and (13), we can recover the same structural shocks after estimating e_{1t}, e_{2t}, b_{21}.

Another essential component of the SVAR analysis is that the subject of "ordering. For instance, the as points out are that ordering is crucial if the error of reduced form model highly correlated (Enders (2014)). The ordering of the variables is immaterial if the correlation coefficient between the errors is equal to zero and significant otherwise since incorrect ordering can significantly influence results. The "Wold Causal Ordering" was used in the study. In this ordering, variables in the model are classified into fast moving, slow moving and policy variables. With this ordering, we enter slow-moving variables at one step, and the fast-moving ones at the next step and policy variables are entered after that.

According to Enders (2014), the SVAR model provides two main analytical tools, namely Impulse Response Function (IRF) that is used to draw the time path of the different shocks on the variables inbuilt into the VAR system, shows the time path response of variable to shock in itself and shock to other variables in the model and the another is Forecast Error Variance Decomposition (FEVD) that shares variability at each forecast origin in a given endogenous variable, with respect to their own innovations. Simply put, it reflects how a prediction error of a variable breaks down to itself and other variables in the system.

Designating the endogenous variables to consider in Wold causal ordering for examining the effect of fiscal policy shocks on output and unemployment in India and Romania as ordered by strength:

[GDP, UNEMP, EXP, REV]

Here, GDP means Real Gross Domestic Product, UNEMP means Unemployment rate, EXP means Total Expenditure and REV means Total Revenue

In this A contraption, the SVAR model is identified to recover the structural shocks via Sims (1980) recursive identification scheme; A matrix is then set to lower triangular:

$$\begin{bmatrix} \varepsilon_{gdp} \\ \varepsilon_{unemp} \\ \varepsilon_{exp} \\ \varepsilon_{rev} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 \\ b_{41} & b_{42} & b_{43} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{gdp} \\ \varepsilon_{unemp} \\ \varepsilon_{exp} \\ \varepsilon_{rev} \end{bmatrix} \quad (14)$$

Thereafter, the study has developed the SVAR equations as below:

$$\ln\Delta GDP_t = \alpha_0 + \sum_{i=1}^{1} \beta_1 \ln\Delta GDP_{t-i} + \sum_{i=1}^{1} \beta_2 \ln\Delta UNEMP_{t-i} + \sum_{i=1}^{1} \beta_3 \ln\Delta EXP_{t-i} + \sum_{i=1}^{1} \beta_4 \ln\Delta REV_{t-i} + e_{it} \quad (15)$$

$$\ln\Delta UNEMP_t = \alpha_0 + \sum_{i=6}^{1} \beta_1 \ln\Delta GDP_{t-i} + \sum_{i=1}^{1} \beta_7 \ln\Delta UNEMP_{t-i} + \sum_{i=1}^{1} \beta_8 \ln\Delta EXP_{t-i} + \sum_{i=1}^{1} \beta_9 \ln\Delta REV_{t-i} + e_{it} \quad (16)$$

$$\ln\Delta EXP_t = \alpha_0 + \sum_{i=1}^{1} \beta_{11} \ln\Delta GDP_{t-i} + \sum_{i=1}^{1} \beta_{12} \ln\Delta UNEMP_{t-i} + \sum_{i=1}^{1} \beta_{13} \ln\Delta EXP_{t-i} + \sum_{i=1}^{1} \beta_{14} \ln\Delta REV_{t-i} + e_{it} \quad (17)$$

$$\ln\Delta REV_t = \alpha_0 + \sum_{i=1}^{1} \beta_{16} \ln\Delta GDP_{t-i} + \sum_{i=1}^{1} \beta_{17} \ln\Delta UNEMP_{t-i} + \sum_{i=1}^{1} \beta_{18} \ln\Delta EXP_{t-i} + \sum_{i=1}^{1} \beta_{19} \ln\Delta REV_{t-i} + e_{it} \quad (18)$$

α is the constant; β's are the coefficient of the lagged short run associations to be estimated through maximum likelihood estimator; e is the white noise and Δ is the difference operator.

The direction of causality between the variables in SVAR framework has been computed by applying the Granger Causality test by considering one lag:

$$\ln\Delta GDP_t = \alpha_0 + \alpha_1 \ln\Delta GDP_{t-1} + \alpha_2 \ln\Delta UNEMP_{t-1} + \alpha_3 \ln\Delta EXP_{t-1} + \alpha_4 \ln\Delta REV_{t-1} + e_{1t} \quad (19)$$

$$\ln\Delta UNEMP_t = \alpha_0 + \alpha_1 \ln\Delta GDP_{t-1} + \alpha_2 \ln\Delta UNEMP_{t-1} + \alpha_3 \ln\Delta EXP_{t-1} + \alpha_4 \ln\Delta REV_{t-1} + e_{1t} \quad (20)$$

$$\ln\Delta EXP_t = \alpha_0 + \alpha_1 \ln\Delta GDP_{t-1} + \alpha_2 \ln\Delta UNEMP_{t-1} + \alpha_3 \ln\Delta EXP_{t-1} + \alpha_4 \ln\Delta REV_{t-1} + e_{1t} \quad (21)$$

$$\ln\Delta REV_t = \alpha_0 + \alpha_1 \ln\Delta GDP_{t-1} + \alpha_2 \ln\Delta UNEMP_{t-1} + \alpha_3 \ln\Delta EXP_{t-1} + \alpha_4 \ln\Delta REV_{t-1} + e_{1t} \quad (22)$$

The robustness of SVAR models have been tested by using some residual tests like serial correlation, heteroskedasticity and normality.

CUSUM test has been used to detect whether parameter in regression model become time variant or not. It assesses the structural shifts, in case the regression coefficient stays stable through the whole period of a sample or they change over time, implies instability and provides information when there is a structural break in the model. Although primarily employed with reduced-form VAR models, the tracking of parameter constancy could be readily transposed to SVAR frameworks using the CUSUM test. Sangjo Lee & Sangyeol Lee (2022) has developed the residual-based CUSUM control chart with Independent Component Analysis (ICA) for both VAR and SVAR to monitor the change of mode level. Following this, Sangyeol Lee (2020) has developed an improved version that similarly applies to vector autoregressive models but has both structural and mean components that is the location and scale-based overtime in which the CUSUM test is based on following recursive residuals:

$$w_t = \sum_{j=k+1}^{T} \frac{w_t}{\hat{\sigma}'} \text{j= k+1,……., T}$$

With, $\hat{\sigma}' = \frac{\sum_{j=k+1}^{T}(w_t - \overline{w})^2}{T-k-1}$ and, $\overline{w} = \frac{\sum_{j=k+1}^{T} wt}{T-k}$

Where, w denotes the recursive residuals; ' is the standard error of the regression fitted to all 'T' sample point; 'k' is the number of coefficients to be estimated.

Result and Discussion:

The outcome of descriptive statistic has been presented in Table 1. It has been found that the probability value of all the variables in both the countries (India and Romania) are less than 5% significance level that means the variables don't follow normal distribution except total expenditure in Romania.

Table 1: Test of Normality

	INDIA					ROMANIA				
Variable	**Obs.**	**Skew.**	**Kurt.**	**J-B**	**p-value**	**Obs.**	**Skew.**	**Kurt.**	**J-B**	**p-value**
LnGDP	105	-0.0076	1.7140	28.9427**	0.0000	105	-0.3219	1.6553	38.8959**	0.0000
LnUNEMP	105	0.0681	1.9274	20.4564**	0.0000	105	-0.7650	3.1494	41.3595**	0.0000
LnEXP	105	-1.8655	4.9735	311.7670**	0.0000	105	0.0030	3.4089	2.9269	0.2314
LnREV	105	-1.3925	4.9827	204.5363**	0.0000	105	0.1778	4.2382	29.0470**	0.0000

*** significant at 5% level Source: Author's own*

Table 2 and 3 shows the outcome of stationarity along with order of integration. It has been observed that the variables are stationary at their first difference with order of integration I(1) in both the countries.

Table 2: Unit Root Test (India)

Variable	**ADF**				**Phillips-Perron**				**Order of Integration**
	Level		**1st difference**		**Level**		**1st difference**		
	t-stat	**Prob.**	**t-stat**	**Prob.**	**t-stat**	**Prob.**	**t-stat**	**Prob.**	
LnGDP	-1.194	0.6782	-3.998**	0.0016	-1.170	0.688	-21.752**	0.000	I(1)
LnUNEMP	-1.759	0.3958	-20.417**	0.0000	-1.777	0.391	-20.417**	0.000	I(1)
LnEXP	-2.629	0.0877	-20.399**	0.0000	-2.722	0.071	-20.399**	0.000	I(1)
LnREV	-2.480	0.1210	-20.400**	0.0000	-2.506	0.114	-20.400**	0.000	I(1)

*Note: **indicates significance at 5% level ; Source: Author's own calculation*

Table 3: Unit Root Test (Romania)

Variable	**ADF**				**Phillips-Perron**				**Order of Integration**
	Level		**1st difference**		**Level**		**1st difference**		
	t-stat	**Prob.**	**t-stat**	**Prob.**	**t-stat**	**Prob.**	**t-stat**	**Prob.**	
LnGDP	-1.194	0.678	-3.998**	0.0016	-1.170	0.688	-21.750**	0.000	I(1)
LnUNEMP	-1.769	0.395	-20.417**	0.0000	-1.777	0.391	-20.417**	0.000	I(1)
LnEXP	-2.269	0.087	-20.399**	0.0000	-2.722	0.071	-20.399**	0.000	I(1)
LnREV	-2.480	0.121	-20.400**	0.0000	-2.506	0.114	-20.400**	0.000	I(1)

*Note: **indicates significance at 5% level ; Source: Author's own calculation*

To determine the appropriate lag order, the study has been applied AIC, SBIC and HQIC information criterions and the result has been presented in table 3 that confirms 1 as optimum lag length.

Table 4: Optimum lags Order Selection

	INDIA			ROMANIA		
Lag Order	**AIC**	**SBIC**	**HQIC**	**AIC**	**SBIC**	**HQIC**
0	-0.2973	-0.2586	-0.2820	-6.4288	-6.3901	-6.4135
1	-16.1599*	-15.9669*	-16.0836*	-21.7079*	-21.5148*	-21.6316*
2	-16.0905	-15.7430	-15.9531	-21.6361	-21.2885	-21.4987

AIC: Akaike Information criterion ; SBIC: Schwarz information criterion ; HQIC: Hannan queen information criterion

Source: Author's own

Thereafter, the study proceeds to identify the number of cointegrating equation among the selected variables (scaling), after ascertaining stationarity, order of integration and optimum lag length selection and thus, Johansen-Juselios (1990) test of cointegration has been applied which provides outcome of two test statistics particularly Trace test and Maximum-Eigen value and the outcome has been presented in table 5 and 6. The result shows absence of cointegrating equation long-run equilibrium association among the selected indicators in both the countries.

Table 5: Johansen-Juselius Test of Co-integration (India)

Hypothesized No. of CEs	Eigen Value	Rank Test (Trace)			Rank Test (Max-Eigen Value)		
		Trace Stat.	Critical Value (0.05)	p-Value*	Max.-Eigen Stat.	Critical Value (0.05)	p-Value*
None	0.0395	22.4507	47.8561	0.9691	0.0396	27.5843	0.5914
At most 1	0.0070	5.5840	29.7970	0.9999	0.0070	21.1316	1.0000
At most 2	0.0060	2.6545	15.4947	0.9803	0.0060	14.2646	0.9728
At most 3	0.0002	0.1204	3.8414	0.7286	0.0003	3.8414	0.7286

Source: Authors' own

Table 6: Johansen-Juselius Test of Co-integration (Romania)

Hypothesized No. of CEs	Eigen Value	Rank Test (Trace)			Rank Test (Max-Eigen Value)		
		Trace Stat.	Critical Value (0.05)	p-Value*	Max.-Eigen Stat.	Critical Value (0.05)	p-Value*
None	0.0369	34.8774	47.8561	0.4545	15.7112	27.5843	0.6901
At most 1	0.0199	19.1662	29.7970	0.4810	8.8450	21.1316	0.8752
At most 2	0.0185	10.7312	15.4947	0.2286	7.8395	14.2646	0.3952
At most 3	0.0069	2.8917	3.8414	0.0890	2.8917	3.8414	0.0890

Source:Authors'own

The output of short run association among the financial indicators has been shown in table 7, 8, 9 and 10. It has been seen from the Wald test that absence of short run association when GDP, unemployment and revenue has been considered as the regressor in both the countries. However, there exists a short run relationship that runs from unemployment to total expenditure when total expenditure acts as a Regressor in Romania. Likewise, there exists a short run association running from revenue on total expenditure when total expenditure has been considered as regressor in India. Lastly, there is a short run association from GDP on Return on Total Expenditure when Total Expenditure is taken as the regressor (equation 6).

Table 7: Short Run Dynamics (VAR)

	INDIA				ROMANIA			
	Regressor: lnΔGDP			Wald-Test	Regressor: lnΔGDP			Wald-Test
Var. with lag	Coefficient	t-stat.	Prob.		Coefficient	t-stat.	Prob.	
lnΔUNEMP(-1)	0.000458	0.099411	0.9209	H_0:C(2)=0 χ^2=0.009883 Prob.=0.9208	0.005139	1.474814	0.1410	H_0:C(2)=0 χ^2=2.175076 Prob.=0.1403
lnΔEXP(-1)	0.003441	0.942754	0.3464	H_0:C(3)=0 χ^2=0.889785 Prob.=0.3458	0.011788	1.549054	0.1221	H_0:C(3)=0 χ^2=2.399567 Prob.=0.1214
lnΔREV(-1)	-0.003960	-0.421419	0.6737	H_0:C(4)=0 χ^2=177594 Prob.=0.6734	-0.015692	-1.590973	0.1124	H_0:C(4)=0 χ^2=2.531194 Prob.=0.1116

Table 8: Short Run Dynamics (VAR)

	INDIA				ROMANIA			
	Regressor: lnΔUNEMP			Wald-Test	Regressor: lnΔUNEMP			Wald-Test
Var. with lag	Coefficient	t-stat.	Prob.		Coefficient	t-stat.	Prob.	
lnΔGDP(-1)	-0.000223	-0.064226	0.9488	H_0:C(6)=0 χ^2=0.004125 Prob.=0.9488	-0.012920	-1.692726	0.0913	H_0:C(6)=0 χ^2=2.865323 Prob.=0.0905
lnΔEXP(-1)	0.000260	0.036213	0.9711	H_0:C(8)=0 χ^2=0.001311 Prob.=0.9711	0.042485	1.761975	0.0788	H_0:C(8)=0 χ^2=3.104556 Prob.=0.0781
lnΔREV(-1)	0.003004	0.162719	0.8708	H_0:C(9)=0 χ^2=0.026478 Prob.=0.8707	0.006653	0.212873	0.8315	H_0:C(9)=0 χ^2=0.045315 Prob.=0.8314

Table 9: Short Run Dynamics (VAR)

	INDIA				ROMANIA			
	Regressor: lnΔEXP			Wald-Test	Regressor: lnΔEXP			Wald-Test
Var. with lag	Coefficient	t-stat.	Prob.		Coefficient	t-stat.	Prob.	
lnΔGDP(-1)	-0.012797	-1.721167	0.0860	H_0:C(11)=0 χ^2=2.962416 Prob.=0.0852	-0.003730	-0.736289	0.4620	H_0:C(11)=0 χ^2=0.542121 Prob.=0.4616
lnΔUNEMP(-1)	-0.001318	-0.068169	0.9457	H_0:C(12)=0 χ^2=0.004647 Prob.=0.9457	-0.014738	-2.011092	0.0450**	H_0:C(12)=0 χ^2=4.044492 Prob.=0.0443**
lnΔREV(-1)	0.087503	2.218040	0.0271**	H_0:C(14)=0 χ^2=4.919699 Prob.=0.0266**	0.001472	0.070950	0.9435	H_0:C(14)=0 χ^2=0.005034 Prob.=0.9434

Table 10: Short Run Dynamics (VAR)

	INDIA				ROMANIA			
	Regressor: lnΔREV			Wald-Test	Regressor: lnΔREV			Wald-Test
Var. with lag	Coefficient	t-stat.	Prob.		Coefficient	t-stat.	Prob.	
lnΔGDP(-1)	-0.000572	-0.228639	0.8193	H_0:C(16)=0 χ^2=0.052276 Prob.=0.8191	-0.000652	-0.201095	0.8407	H_0:C(16)=0 χ^2=0.040439 Prob.=0.8406
lnΔUNEMP(-1)	0.001379	0.212103	0.8321	H_0:C(17)=0 χ^2=0.044988 Prob.=0.8320	-0.002336	-0.498507	0.6184	H_0:C(17)=0 χ^2=0.248509 Prob.=0.6181
lnΔEXP(-1)	0.008639	1.676090	0.0945	H_0:C(18)=0 χ^2=2.809277 Prob.=0.0937	0.007139	0.697460	0.4859	H_0:C(18)=0 χ^2=0.486450 Prob.=0.4855

The outcome of the direction of Granger Causality has been displayed in Table 11. It has been revealed that there exist uni-directional causality runs from total expenditure to GDP in India. Similarly, uni-directional causality runs from total expenditure to unemployment in Romania. Likewise, uni-directional causality also runs from total revenue to total expenditure in India.

Table 11: Test of Granger Casuality

	INDIA			ROMANIA		
Null Hypothesis (H_0)	**F-Stat.**	**Prob.**	**Decision**	**F-Stat.**	**Prob.**	**Decision**
UNEMP does not Granger Cause GDP	0.00212	0.9633	Don't Reject H_0	0.72973	0.3935	Don't Reject H_0
GDP does not Granger Cause UNEMP	0.02055	0.8861	Don't Reject H_0	1.73944	0.1879	Don't Reject H_0
EXP does not Granger Cause GDP	0.77662	0.3787	Don't Reject H_0	0.61021	0.4352	Don't Reject H_0
GDP does not Granger Cause EXP	4.1559**	0.0421	Reject H_0	0.44167	0.5067	Don't Reject H_0
REV does not Granger Cause GDP	0.06252	0.8027	Don't Reject H_0	0.28080	0.5965	Don't Reject H_0
GDP does not Granger Cause EXP	1.15296	0.2836	Don't Reject H_0	0.17302	0.6777	Don't Reject H_0
EXP does not Granger Cause UNEMP	0.01608	0.8991	Don't Reject H_0	3.83864	0.0508	Don't Reject H_0
UNEMP does not Granger Cause EXP	0.00141	0.9701	Don't Reject H_0	4.6984**	0.0308	Reject H_0
REV does not Granger Cause UNEMP	0.04292	0.8360	Don't Reject H_0	1.82254	0.1777	Don't Reject H_0
UNEMP does not Granger Cause REV	0.14659	0.7020	Don't Reject H_0	0.66329	0.4159	Don't Reject H_0
REV does not Granger Cause EXP	6.02024	0.0146	Don't Reject H_0	1.09869	0.2952	Don't Reject H_0
EXP does not Granger Cause REV	3.9213**	0.0483	Reject H_0	0.90411	0.3422	Don't Reject H_0

***significant at 5% level; Source: Author's own*

The outcome of impulse response functions (IRF) has been generated from the estimated SVAR model and presented in figure 1 and 2. It exhibits many commonalities as well as country-specific differences in their macroeconomic reactions to structural shocks. In case of India, the first shock holds a substantial and persistent expansionary impact on GDP, total expenditure and revenue while in Romania not withstanding experiencing more modest effects on both GDP and expenditure, still it is coupled with sustainably mild unemployment decrease as well as quite stable expenditure and revenue. Both economies demonstrate that the second shock is supportive of growth and, while not unambiguous by any means, it appears that India suffers substantially more in terms of government revenue collapse than Romania, highlighting differences between fiscal contractions tend to play out across countries.

The total expenditure dynamics also differ widely. In India total expenditure collapses for both negative trade-related shocks (Shock 3 and Shock 4), which shows steep declines as well as long-lasting thereafter, while Romanian expenditure succumb to both these shocks but with smaller magnitudes that means it is either less fragile or has more diversified trade flows. Unemployment in Romania is well known for its high job separation elasticities and displays smaller fluctuations and faster adjustment than that of India, where unemployment reacts more strongly to adverse shocks, notably under trade and supply disturbances.

Indian government revenue demonstrates strong positive responses to expansionary shocks and large reductions in contractionary ones, with a tax base that grows more when the economy is growing. In Romania, the crosses and up move are less pronounced overall, which may be due to a more efficient governmental structure or revenue, less responsive to economic fluctuations. In terms of the impact on macroeconomic variables, both countries are less responsive to growth-oriented shocks and more reactive to contractionary ones yet India exhibits significantly larger and more persistent effects than that of Romania suggesting a higher susceptibility to structural disturbances, whereas responses in Romania are smaller in magnitude but tend to stabilize quicker illustrating greater ability for even shock absorption throughout this span.

Figure 1: Structural Impulse Response Function of INDIA

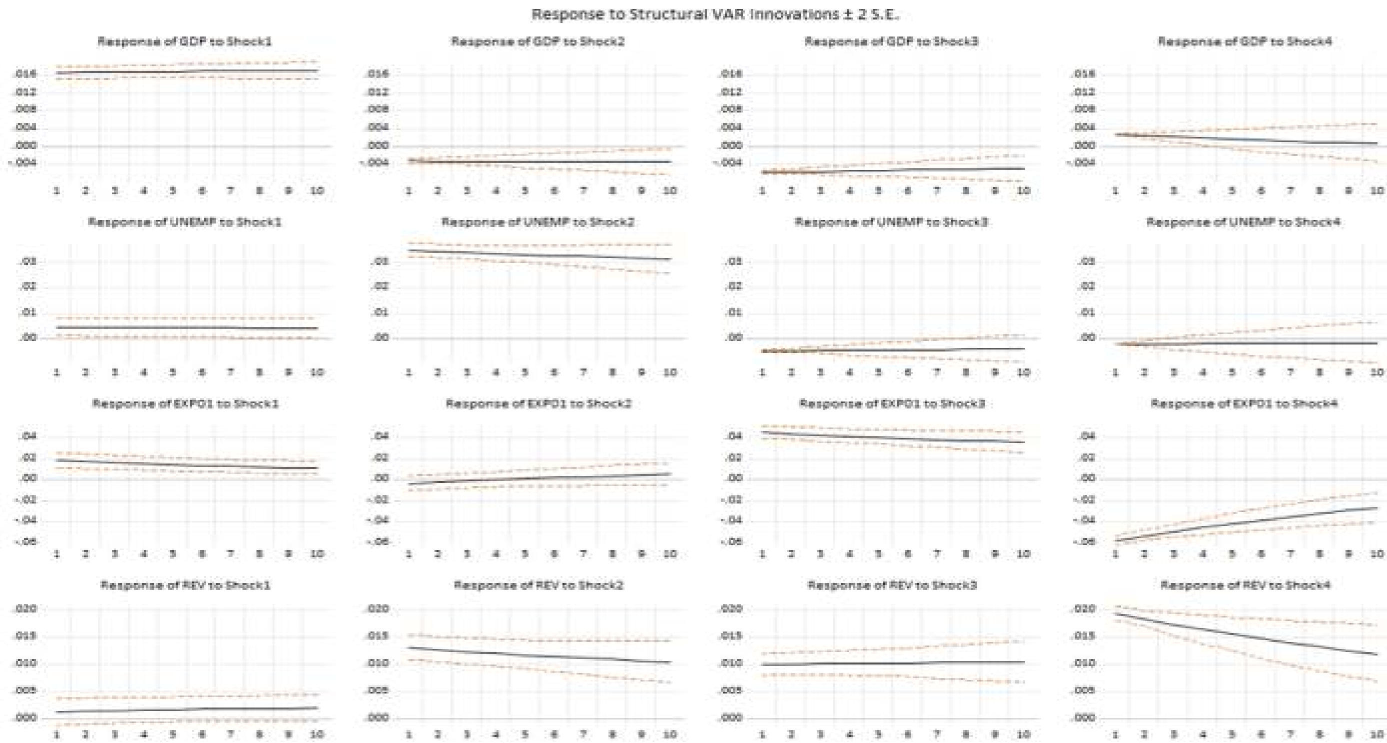
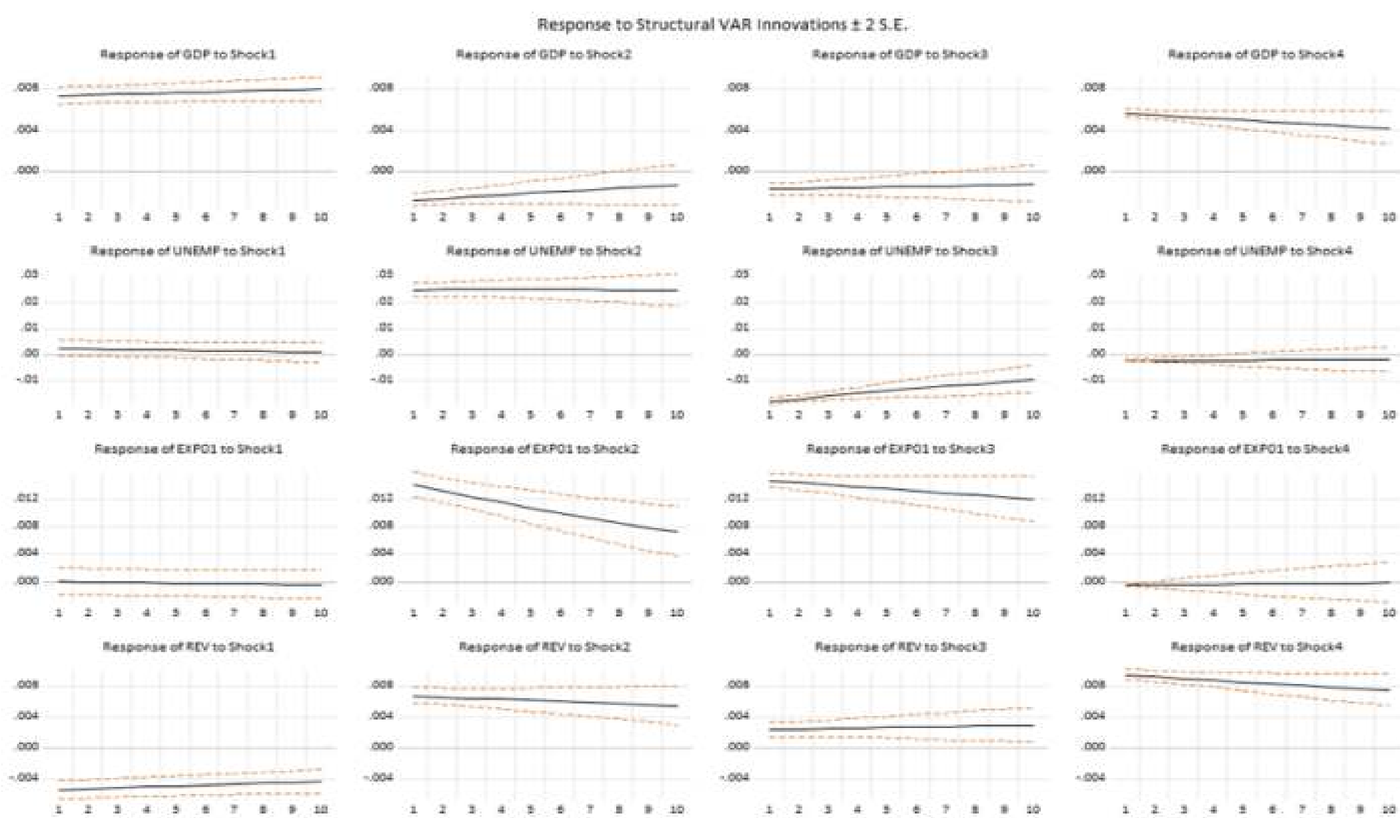


Figure 2: Structural Impulse Response Function of Romania



Forecast Error Variance Decomposition

The result of Forecast Error Variance Decomposition (FEVD) from the estimated SVAR model is presented in Table 12 and Table 13. Table 12, presents the FEVD of Output in India and Romania when GDP is the regressor. Fiscal Policy and Unemployment drive only a fraction of the Forecast Error Variance in India, shocks to GDP itself explain practically all of the forecast error variance over 99.95% across all horizons while those from fiscal policy variables (total expenditure and revenue) including unemployment are almost nil. This is consistent with the idea that short- and medium-term output dynamics in India are largely insulated, with very modest impact of fiscal measures in the estimated model. Thus, the fiscal transmission mechanism seems to be weak in view of lags like structural delays possibility small scale of discretionary fiscal impulses size relative to GDP or effects from other non-fiscal macroeconomic factors which is not included into the model.

Thereby, in Romania the own shocks of GDP remain dominant but with a declining one from 100% in the first period to about 98.25%, by the tenth. The relevance of fiscal policy shocks increases with time in the long run, revenue and total expenditure shocks together explain about 0.84% and 0.48%, respectively the variance in GDP, while unemployment shocks contribute about 0.43%. This incrementing trend indicates a stronger fiscal-output link and, hence, more effective fiscal transmission relative to India in response to fiscal disturbances.

The difference between the two countries is striking: in India, internal GDP dynamics are almost entirely dominant and fiscal policy barely accounts for short to medium run variability; by contrast, in Romania dynamic multipliers are more modest but they matter at longer horizons. This difference could have its roots in various fiscal policy frameworks, economic structure and inefficiency of institutions, limited openness to the economy.

Table 12: Output of Forecast Error Variance Decomposition (GDP)

Period	INDIA					ROMANIA				
	S.E.	GDP	UNEMP	EXP	REV	S.E.	GDP	UNEMP	EXP	REV
1	0.0354	0.0329	99.9670	0.000000	0.0000	0.0097	100.000	0.0000	0.0000	0.0000
2	0.0498	0.0334	99.9663	1.92E-06	0.0001	0.0136	99.9637	0.0099	0.0095	0.0167
3	0.0606	0.0339	99.9654	5.35E-06	0.0005	0.0166	99.8815	0.0319	0.0315	0.0550
4	0.0696	0.0334	99.9644	9.39E-06	0.0011	0.0191	99.7560	0.0649	0.0652	0.1137
5	0.0774	0.0349	99.9631	1.34E-05	0.0019	0.0213	99.5901	0.1077	0.1100	0.1920
6	0.0842	0.0355	99.9616	1.69E-05	0.0028	0.0232	99.3863	0.1592	0.1655	0.2887
7	0.0908	0.0360	99.9599	1.96E-05	0.0040	0.0250	99.1475	0.2184	0.2310	0.4029
8	0.0961	0.0365	99.9580	2.14E-05	0.0053	0.0267	98.8762	0.2843	0.3057	0.5335
9	0.1014	0.0371	99.9560	2.23E-05	0.0068	0.0282	98.5751	0.3560	0.3892	0.6796
10	0.1062	0.0376	99.9538	2.24E-05	0.0084	0.0296	98.2466	0.4325	0.4807	0.8401

Source: Author's own

Table 13 represents that the FEVD confirms that both at short-term and long-term horizons, Indian Unemployment movements are primarily self-determined. During the first four periods, shocks to Unemployment explain 99.95% of its FEVD and only 0.03–0.038% by an GDP shock and less than 0.01 from Total Expenditure and revenue together even in the long run. This implies that in the model context, there are almost zero quantifiable benefits with respect to short-term and long-term changes in unemployment in Indian dynamics from fiscal measures or outputs.

In Romania, Unemployment changes are more synchronous with other macroeconomic aggregates. They account for almost all the shocks at period 1, and that share finally falls to about 95.26% in the end of period 10. Similarly, GDP shocks increase their portion of the total variation in unemployment from 1.36% to approximately 2.96% over the same horizon which shows that shocks to output take time to trickle down into the labor market. The fiscal policy variables likewise become modestly more important over time and the Total Expenditure shocks account for around 1.75% and revenue shocks 0.018% of the Unemployment Rate variance by period 10 by implying some limited role for fiscal policies in labor market outcomes, relative to GDP dynamics.

The difference between the two countries can be seen as India has almost entirely autonomous unemployment dynamics, with virtually no long-run sensitivity of unemployment to fiscal or output shocks, while Romania has a very well-integrated labor market in which GDP and even less so fiscal policy would increasingly influence the unemployment rate over longer horizons. This could be an indication of varying degrees of labor market flexibility, the effectiveness of fiscal interventions as well as structural linkages between economic growth and employment in the two economies.

Table 13: Forecast Variance Decomposition of Unemployment

Period	INDIA					ROMANIA				
	S.E.	GDP	UNEMP	EXP	REV	S.E.	GDP	UNEMP	EXP	REV
1	0.0354	0.0329	99.9670	0.00000	0.0000	0.0307	1.3579	98.6420	0.0000	0.0000
2	0.0498	0.0334	99.9663	1.92E-06	0.0001	0.0431	1.5157	98.4446	0.0392	0.0003
3	0.0606	0.0339	99.9654	5.35E-06	0.0005	0.0524	1.6803	98.1918	0.1268	0.0010
4	0.0696	0.0344	99.9644	9.39E-06	0.0011	0.0600	1.8507	97.8886	0.2584	0.0021
5	0.0774	0.0349	99.9631	1.34E-05	0.0019	0.0665	2.0264	97.5399	0.4298	0.0037
6	0.0842	0.0355	99.9616	1.69E-05	0.0028	0.0723	2.2067	97.1502	0.6371	0.0057
7	0.0905	0.0360	99.9599	1.96E-05	0.0040	0.0774	2.3911	96.7239	0.8767	0.0082
8	0.0901	0.0365	99.9580	2.14E-05	0.0053	0.0821	2.5789	96.2649	1.1449	0.0111
9	0.1014	0.0371	99.9560	2.23E-05	0.0068	0.0864	2.7697	95.7776	1.4384	0.0145
10	0.1062	0.0372	99.9538	2.24E-05	0.0084	0.0903	2.9630	95.2644	1.7540	0.0184

Source: Author's own calculation

The result of validity of the SVAR has been presented in Table 14. For validity or robustness check, the residuals of the VAR have been taken into consideration. It has been revealed from the residual test which has been conducted through B-G LM test, B-P-G Heteroskedasticity test and normality test that the VAR models are valid and robust.

Table 14: Validity/Robustness Check of VAR

Dependent Var.	INDIA						ROMANIA					
	B-G LM Test		B-P-G Het. Test		Normality Test		B-G LM Test		B-P-G Het. Test		Normality Test	
	Obs* R^2	Prob.	Obs* R^2	Prob.	J-B Stat.	Prob.	Obs* R^2	Prob.	Obs* R^2	Prob.	J-B Stat.	Prob.
Resid. of ln? GDP	2.28161	0.1334	0.6248	0.9609	2684.164	0.0000	0.70389	0.4050	2.5559	0.6376	7686.375**	0.0000
Resid. of ln? UNEMP	0.01297	0.9100	3.1703	0.5327	36175.56	0.0000	0.02618	0.8724	5.5382	0.2378	13822.98**	0.0000
Resid. of ln? EXP	0.29326	0.5910	7.5576	0.1094	258380.9	0.0000	0.04724	0.8292	3.0535	0.0591	75076.01**	0.0000
Resid. of ln? REV	0.16871	0.6836	5.9184	0.2065	202904.7	0.0000	0.00942	0.9233	4.3544	0.3625	23881.35**	0.0000

*****significant at 5% level; Source: Author's own calculation***

Lastly, the investigation provides a CUSUM test for parameter stability. This means parameters are stable, as cumulative sums of scaled recursive residuals all lie in 5 percent critical lines.

Figure 3: CUSUM Test OF GDP (INDIA)

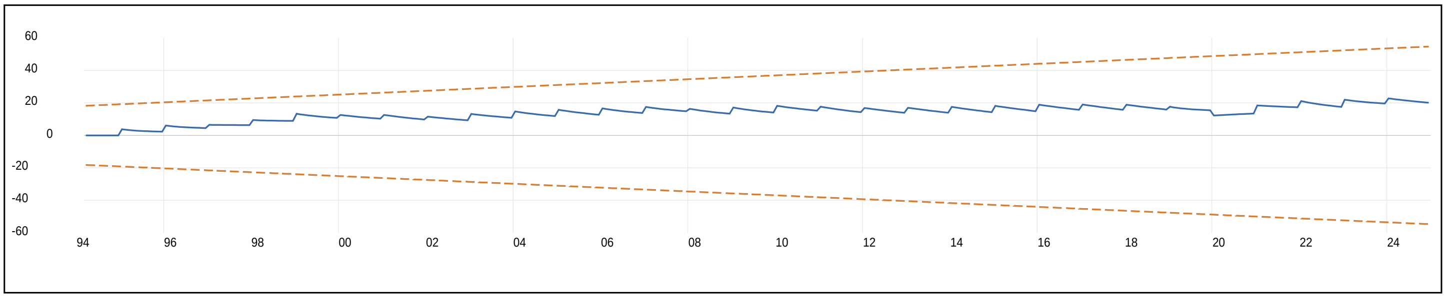


Figure 4: CUSUM Test OF UNEMPLOYMENT (INDIA)

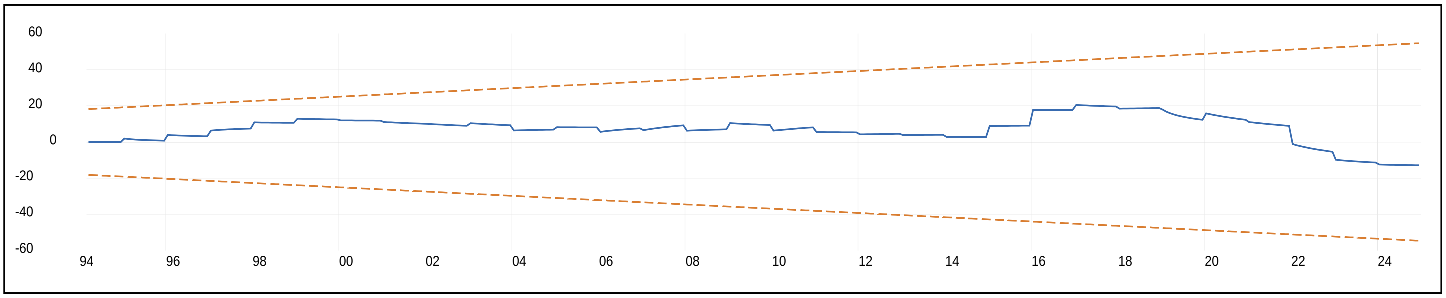


Figure 5: CUSUM Test OF EXPENDITURE (INDIA)

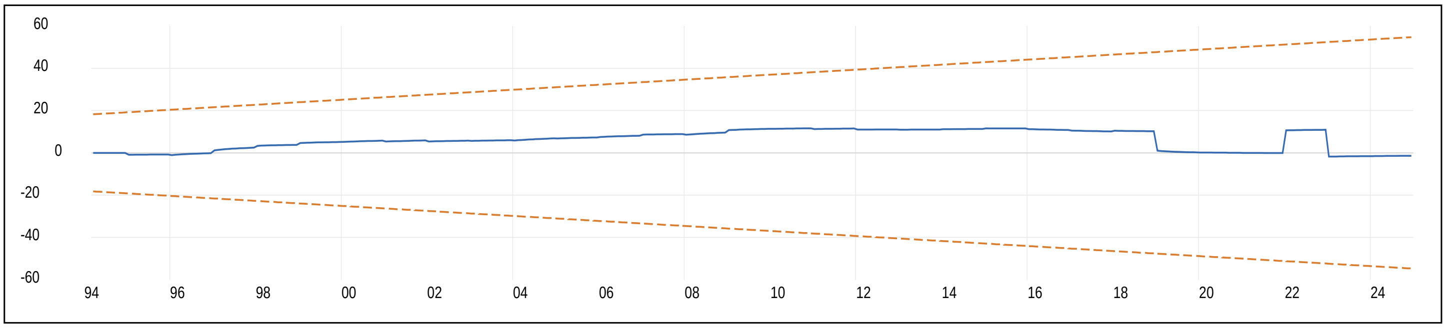


Figure 6: CUSUM Test OF TOTAL REVENUE (INDIA)

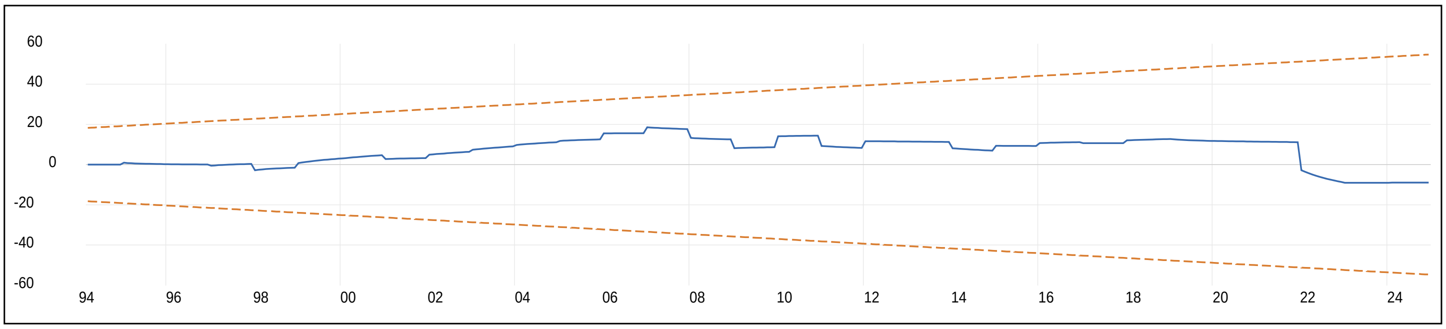


Figure 7: CUSUM Test OF GDP (ROMANIA)

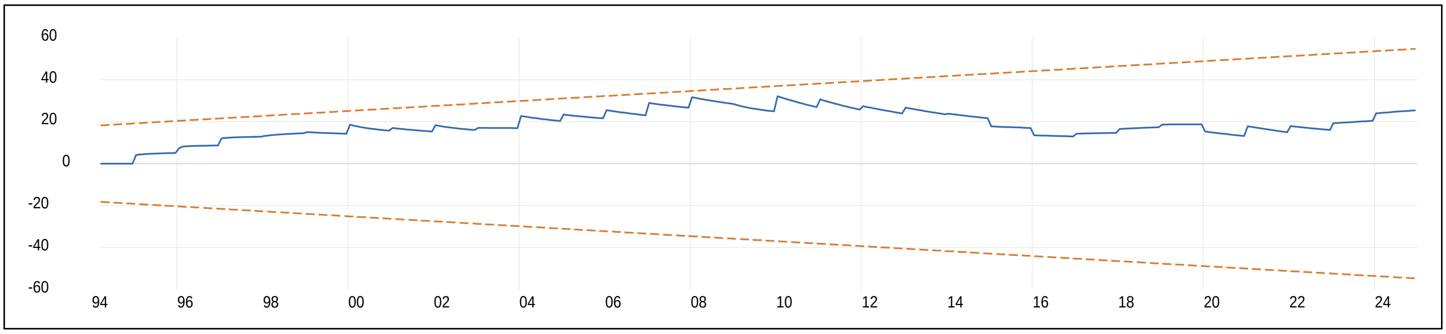


Figure 8: CUSUM Test OF UNEMPLOYMENT (ROMANIA)

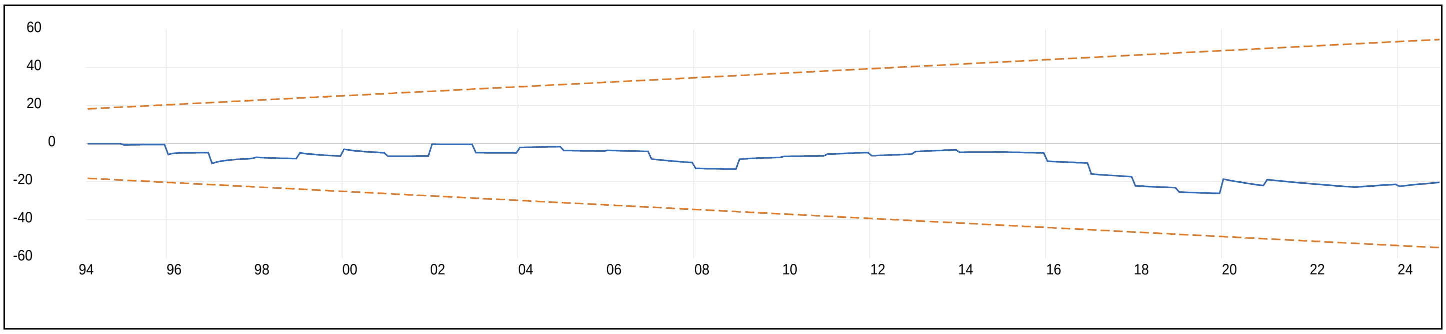


Figure 9: CUSUM Test OF EXPENDITURE (ROMANIA)

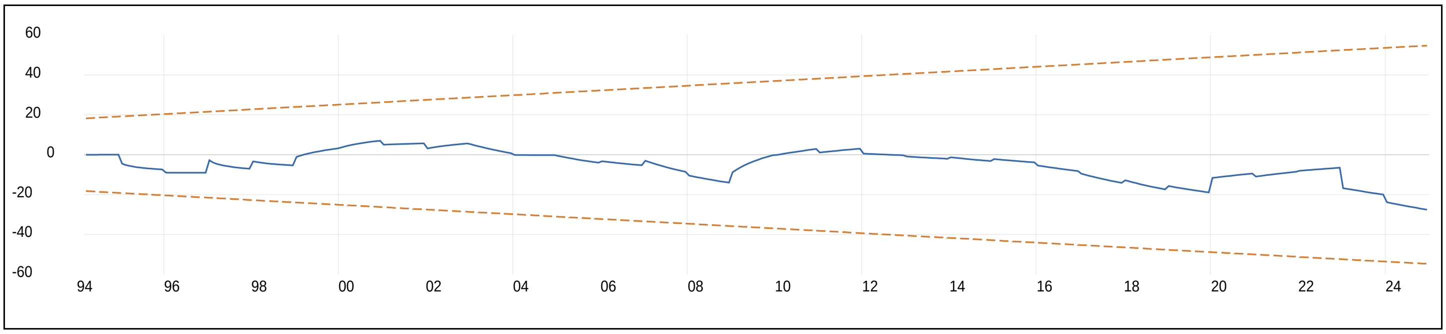
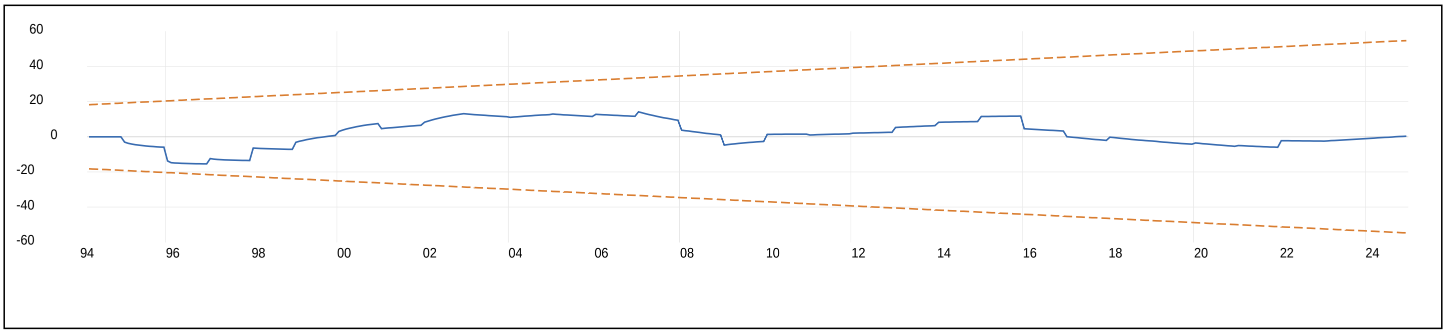


Figure 10: CUSUM Test OF TOTAL REVENUE (ROMANIA)



Conclusion and Recommendation

The study has examined the dynamic effects of fiscal policy on economic output and Unemployment in India and Romania. The study reveals that GDP and unemployment are driven primarily by their own past values in both countries, while fiscal policy variables have short-run effects (Perotti 2002). With no causal relationship of shocks with GDP and unemployment, there shocks to total expenditure and revenue only react for a short time basically for less than four years. In Romania, total expenditure has a closer correlation with unemployment and revenue is more responsive to GDP fluctuations, which can be seen as supportive of the channeled effect functioning well. This is how the Romanian case fundamentally differs from that of India-where the impact of fiscal policy is realized faster, measured better and therefore offers long-lasting benefits.

In India, the effectiveness of fiscal policy could be enhanced by rebalancing total expenditure towards sectors with higher output and employment multipliers, improving the quality and targeting of public investment, as well as widening the revenue base through efficient and equitable taxation (Fatás et al., 2001). Strengthening automatic stabilizers and reinforcing the compatibility with monetary policy also raise the response to economic shocks. In Romania, maintaining the fiscal space requires continued balancing of social and capital spending needs, from revenues that are increasingly mobilized to preserve prudence in the fiscal discipline, while ensuring its composition remains targeted and efficient. This will be result in critically ensuring that fiscal policy interventions lead to positive macroeconomic outcomes while preserving long term stability in both countries, the study suggests.

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