THE LONG-RUN CAUSAL NEXUS BETWEEN EXPENDITURE IN SOCIAL SERVICES SECTOR AND ECONOMIC SERVICES SECTOR: A COMPARATIVE ANALYSIS BETWEEN NATIONAL AND SUB-NATIONAL GOVERNMENT

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ABSTRACT

Every welfare state allocates resources to numerous socio-economic and general welfare services sectorsto have higher growth in Output, to generate more employment opportunities, to reduce poverty and to achieve social and economic equality. By generating resources through tax and non-tax measures, the government executes a number of activities to provide basic necessities of people like roads and bridges, irrigation for agriculture, drinking water facilities, electricity, housing, medical and public health facilities, protection to citizens etc. These services are part of general services, social services and economic services sectors.There are dearth of studies in analyzing the relationship between the expenditure in social service sector and the expenditure in the economic service sector. Hence, the study attempts toanalyze the long run association, and to examine the causal nexus between the expenditure in social services and the expenditure in economic services both in Indian context as well as for Odisha. The Johansen-Juselius cointegration approach established the long-run relationship between the expenditure in social service sector and economic service sector both for India and Odisha. The VECM based causality estimates concluded that in Indian context, expenditure in social service sector causes economic service sector expenditure but not vice versa while for Odisha, economic service sector expenditure causes social service sector expenditure but not vice versa. As regards to policy

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implication, raising the quality of expenditure of both the social and the economic service sector will be relevant to sustain higherinclusive economic growth rate.

JEL Codes: H5, H7, C31.

Keywords: Expenditure, Social Service Sector, Economic Service Sector, cointegration, VECM.

1. Introduction

The prime objective of every economy is to accelerate economic growth through the expansion of economic activities, infrastructural facilities and also to raise the standard of living of the individuals. Every welfare state undertakes numerous socio-economic and general welfare services for the benefit of the people to generate employment opportunities, to reduce poverty and, to achieve social and economic equality. By raising resources through both tax and non-tax measures, the government executes a number of activities to provide basic necessities of people like roads and bridges, irrigation facilities for agriculture, drinking water facilities, electricity, housing, medical and public health facilities, etc. Broadly, both the union and state governments mainly spend their revenue to deliver social services, economic services and general services. The inter-linkages between the expenditure in social services sector[1] and economic services sector[2] has gained due importance in the public finance literature as these two sectors constitute development sector, whereas, general services sector is considered as non-development sector. However, there are dearth of studies analyzing the relationship between social services and economic services sectors. Hence, identifying the long run relationship and examining the causal nexus between the expenditure in social services and the expenditure in economic services will be relevant in view of policy implications.

Many policy practitioners are of the view that expenditure in social sector may influence economic sector expenditure by providing economic infrastructure, enhancing labour productivity through better healthcare and education, maintaining law and order, harmonizing conflicts between private and social interests and enhancing export industries (Khalifa, 2001;

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[1] The expenditure in the social service sector include Education, expenditure on Sports, Art and Culture; Medical and Public Health expenditure; expenditure for Family Welfare, Water Supply and Sanitation, Housing, Urban Development, Welfare of Scheduled Castes, Scheduled Tribes and Other Backward Classes, Labour and Labour Welfare, Social Security and Welfare; Nutrition, Relief on account of Natural Calamities and Others.

[2] The expenditure in the economic service sector include Agriculture and Allied Activities, Rural Development, Special Area Programmes, Irrigation and Flood Control, Power, Industry and Minerals, Transport and Communications, Roads and Bridges, Road and Water Transport Services, Science, Technology and Environment.

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Jaman, 2016).On the contrary, the expenditure in economic service sector may also influence the expenditure in social services. Better agriculture facilities, irrigation and flood control measures, improved transportation and communication facilities, etc. will lead the economic prosperity of the individuals which has spillover effect on social services sector.

The provision of social and physical infrastructure through public expenditure on some goods and services can indirectly improve productivity in the private sector through a more efficient allocation of resources (Chenery and Syrquin, 1975).

Expenditure in economic service sector facilitates road and transport services, agriculture developmental initiatives, improvement in technological know-how, etc. The expenditure on these heads improve the labour efficiency and result in output growth. A large government size in terms of more government expenditure accelerates economic growth by injecting purchasing power into the economy. This in turn further raises the revenue receipts of the state. Furthermore, Revenue Receipts (RR) finances the essential expenditures of the government and reduces the dependency on borrowing, thereby, fiscal deficit of the government. A higher level of revenue receipts with revenue surplus is instrumental for the capital outlay of the government in development sector as it provides fiscal space to the government to keep fiscal deficit at prudent level. (Mohanty et. al, 2016).

Expenditure in social service sector provides a safety net to the citizens and mitigates risk. Facilities provided through social expenditure by the government avoid the excludability criterion and alleviate the cost of failures.Besides, social expenditures also favorably improves the quality of human capital. Social security measures improve the quality of living standard of the workers and thus strengthen their productivity. In turn, this encourages the risk-takers to engage in the economic activity that leads to new ideas and new techniques of production. This technological advancement otherwise known as growth in total factor productivity would increase the real GDP growth (Atkinson, 1999). Contrary to this view, some of the researchers were of the view that social expenditure is detrimental to economic growth since it discourages employment and savings (Lindbeck andSnower; 1986, Feldstein, 1974).Social expenditures such as unemployment benefits may increase the reservation wage for the outsiders of labour markets and therefore reduce labour supply and subsequently economic growth. High social expenditure puts more burden for the state budget and thereby deepens the fiscal deficit. High fiscal deficit again forces the government to borrow more which in turn will raise the rate of interest and

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crowd out the private investment. The economic activity will be affected and the economy slows down.

In a recent study on State Finances: A Study of Budgets (2016), Reserve Bank of India has empirically established that the quality of expenditure is the key to fiscal consolidation to reap efficiency and welfare gains while smoothing the effects of fiscal adjustment.

The empirical analysis indicates that expenditure on social and physical infrastructure can have growth augmenting effects and recommends to prioritise expenditures on physical and social infrastructure and to economise on non-developmental expnditures. Reserve Bank of India refers the quality of expenditure as expenditures on both social and economic services sector. However, RBI has implicitly given equal weightage to both social and economic services sector. Hence, the debate still continues on allocation of resources between social and economic services sector

However, for achieving sustained high economic growth rate, both the social service sector expenditure and economic service sector expenditure are important. Thus, realizing the importance of both the social service sector expenditure and economic service sector expenditure in achieving the growth target, it will be very pertinent to examine the long run association and causality between them. The causality would indicate the relative importance of either of these two sectors. In our study, we have tried to see these relations for India in general and for Odisha in particular. At sub-national government level, the State of Odisha is selected as a sample state to compare with the national level.

The remaining of the paper is organized as follows: Section 2 explains the trends in Social expenditure Ratio and Economic Expenditure Ratio for the period 1980-81 to 2015-16both in case of India and Odisha. The detailed methodology in terms of analytical framework and data sources is presented in section 3. The section 4 presents the empirical results; and section 5 concludes and suggests policy implications.

2. Trends in Social Expenditure Ratio and Economic Expenditure Ratio

At national level, the share of economic expenditure as percentage of total expenditure (ECOEXP/TE) was much higher as compared to the share of social expenditure as percentage of total expenditure at national level since the 1980s. Economic expenditure as percentage of developmental expenditure and of GDP has been more than social expenditure as percentage of

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developmental expenditure and of GDP since the 1980s. Both the economic expenditure and social expenditure ratios in 1990s have been lower as compared to the other periods because of compression of expenditures during economic reforms. Also, it is very interesting to observe that the gap between economic expenditures ratios and social expenditure ratios has widened since the 1990s. This is attributed to the higher growth in outlay in economic services sector as compared to social services sector (Table 1).

Table 1: Trends in Social Expenditure Ratio and Economic Expenditure Ratio: India and Odisha

PERIODS	1980S	1990S	2000S	2011-16
	India			
ECOEXP/TE	24.62%	19.81%	24.88%	30.11%
SOCEXP/TE	3.90%	4.07%	6.91%	7.15%
ECOEXP/DE	86.34%	82.93%	78.42%	81.33%
SOCEXP/DE	13.66%	17.07%	21.58%	18.67%
ECOEXP/GDP	4.35%	3.18%	3.81%	4.42%
SOCEXP/GDP	0.68%	0.64%	1.06%	1.06%
ECOEXP/SOCEXP	6.31	4.87	3.60	4.21
	Odisha			
ECOEXP/TE	39.56%	33.50%	24.02%	33.75%
SOCEXP/TE	36.18%	35.44%	33.23%	37.39%
ECOEXP/DE	52.25%	48.41%	41.65%	47.38%
SOCEXP/DE	47.75%	51.59%	58.35%	52.62%
ECOEXP/GSDP	6.07%	6.13%	4.31%	6.75%
SOCEXP/GSDP	5.58%	6.47%	5.99%	7.38%
ECOEXP/SOCEXP	1.09	0.95	0.72	0.90

*   **ECOEXP: Economic Services Expenditures, SOCEXP: Social Services Expenditures**

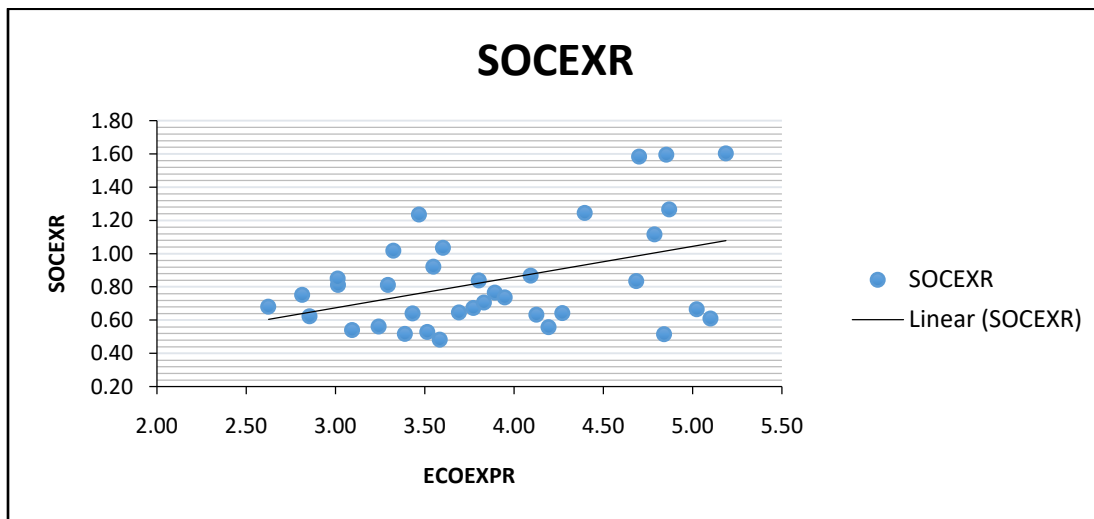Source: Reserve Bank of India and Finance Accounts, Govt. of Odisha

Economic expenditures ratios in terms of total expenditure, developmental expenditure and Gross State Domestic Product as compared to social expenditure ratios were higher during the 1980s in case of Odisha. After 1980s, the social expenditure ratios have exceeded the economic expenditure ratios in Odisha.

Though the share of economic expenditure as percentage of total expenditure, developmental expenditure and GSDP has been higher in case of Odisha as compared to social expenditure ratios, however, the difference is not as high as national level (Table 1).

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The scatter plot presented in chart 1 explains the close association between social expenditure as percentage of GDP ratio (SOCEXPI) and economic expenditure as percentage of GDP (ECOEXPI) at national level. Similarly, the scatter plot of presented in chart 2 also depicts the close relationship between social expenditure as percentage of GSDP ratio (SOCEXPO) and economic expenditure as percentage of GSDP (ECOEXPO) in case of Odisha.
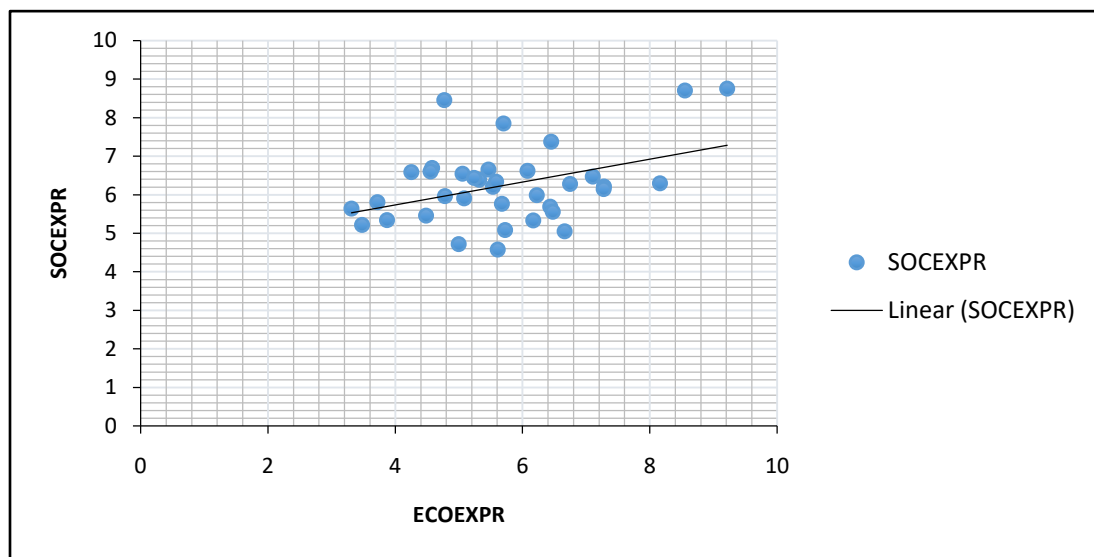
The correlation coefficient between economic services expenditure and social services expenditure from 1980-81 to 2015-16 is worked out at 94% for India and 99% in case of Odisha.

Chart.1: Social Expenditure (%GDP) and Economic Expenditure (%GDP): India
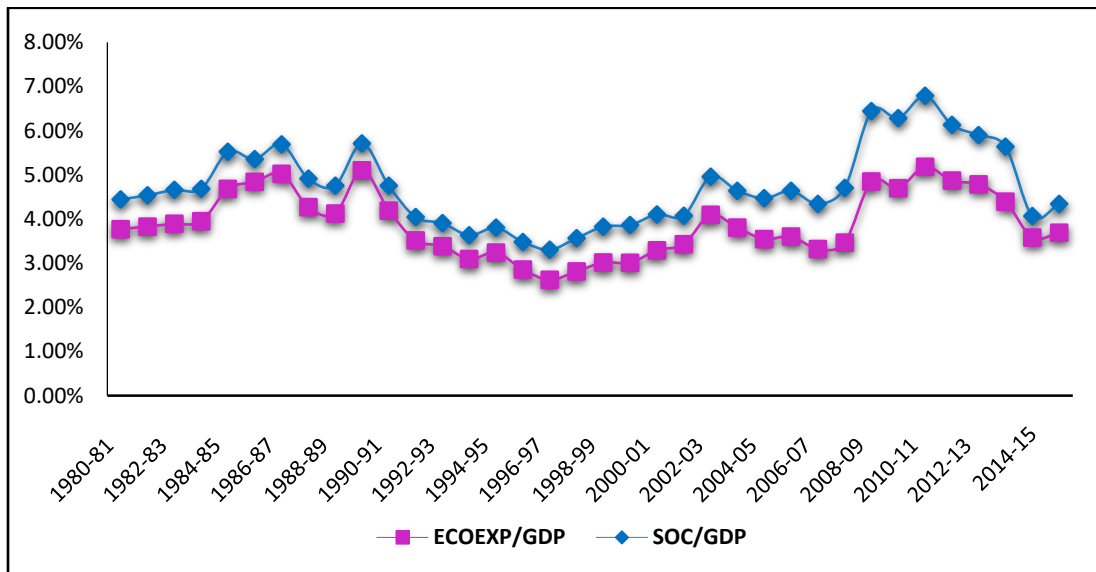

Source: Reserve Bank of India

Chart. 2: Social Expenditure (%GSDP) and Economic Expenditure (%GSDP): Odisha

Source: Finance Accounts, Govt. of Odisha

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The economic expenditure as percentage of GDP hovered around 3-5 percent in case of India (chart 3). The social expenditure as percentage of GDP has been in the range of 1-2 percent.
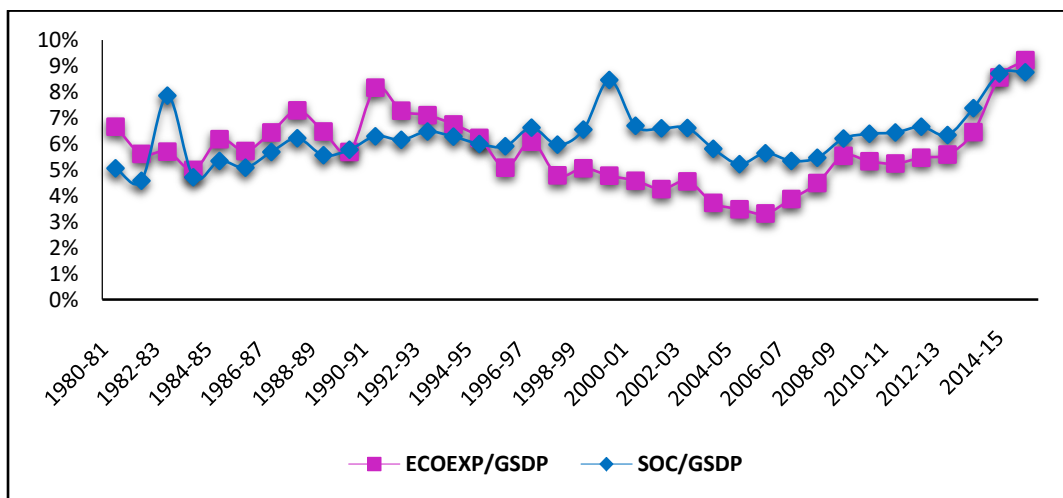
Chart. 3: Trends in Economic Expenditure and Social Expenditure: (as % of GDP)

Source: Reserve Bank of India

In case of Odisha, economic services expenditures rangebetween 3% to 9%, whereas, social services expenditures have witnessed a 4.5% to 9%. The gap between economic services and social services expenditures is very less as compared to India (chart 4).

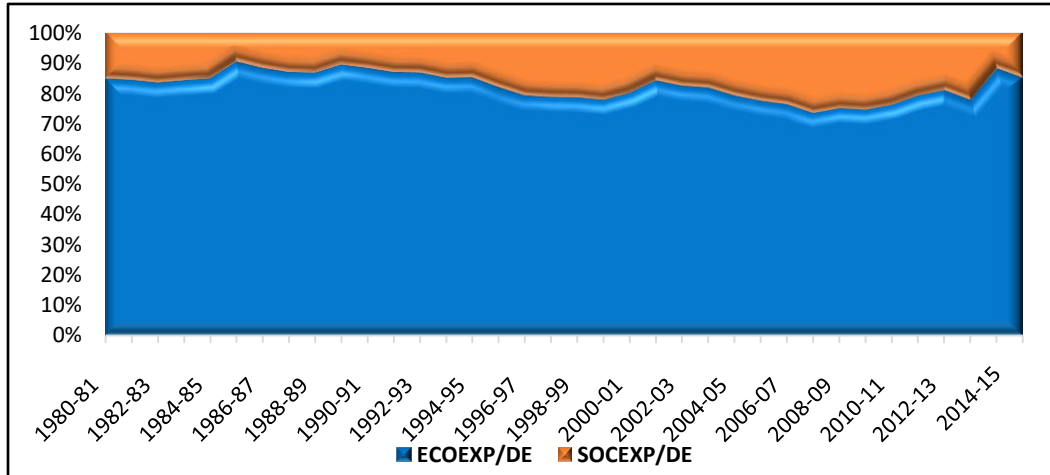**Chart. 4: Trends in Economic Expenditure and Social Expenditure: (as % of GSDP)**

Source: Finance Accounts, Govt. of Odisha

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The economic expenditure has registered a larger share as compared to social expenditure in the developmental expenditure in case of India over the years (chart 5). Expenditure on economic services constitutes five times of expenditure on social services during 1980-81 to 2015-16.
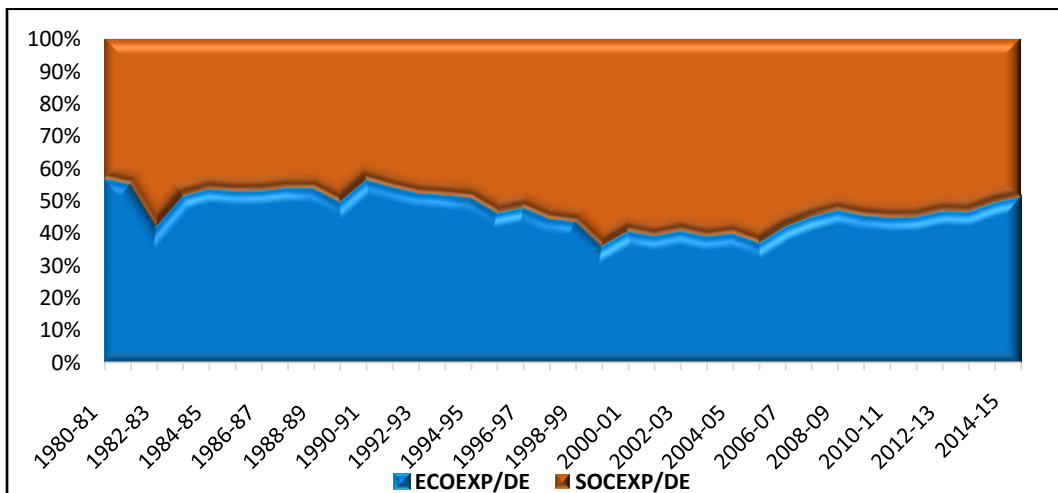
Chart. 5: Components of Developmental Expenditure: India

Source: Reserve Bank of India

However, in case of Odisha, both the economic expenditure and social expenditure have approximately same share in the developmental expenditure (chart 6).Expenditure on economic services constitutes 0.99 times of expenditure on social services during 1980-81 to 2015-16.

Chart. 6: Components of Developmental Expenditure: Odisha

Source: Finance Accounts, Govt. of Odisha

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Since, there is close association between economic expenditure ratio and social expenditure ratios;the next step is to examine the long run relationship and the direction of causality between these two variables.

3. Data Sources and Methodology

a. Data Sources

All relevant data for India are obtained from the various issues of Handbook of Statistics on Indian Economy published by Reserve Bank of India (RBI). All data for Odisha has been compiled from Finance Account, Government of Odisha. For the empirical analysis, all data are transformed into logarithmic form. Annual time series data for the period 1980-81 to 2015-16 are taken for the analysis.

b. Johansen and Juselius cointegration Approach

This paper used Johansen and Juselius (1990) cointegration method in order to show the existence of a long-run relationship between the expenditure in social services and the expenditure in economic services over the period of 1980-81 to 2015-16. The approach of Johansen and Juselius (1990) model stated that, if $Y_t$is a vector of n stochastic variables, then there exists a p-lag vector auto regression with Gaussian error of the following form:

$$Y_t = k + \Pi_1 Y_{t-1} + \cdots + \Pi_p Y_{t-p} + \Pi_p Y_{t-1} + \upsilon_t \quad (1)$$

Where Y_t is an n×1 vector of variables that are stationary in first difference or integrated of order one. ν_t is an n×1 vector of innovations. This VAR can be re-written as:

$$\Delta Y_t = k + \lambda_1 Y_{t-1} + \sum_{i-1}^{p-1} \psi_i \Delta Y_{t-i} + \upsilon_t \quad (2)$$

Where

$$\lambda = \sum_{i-1}^{p} \Pi_i - I \text{ and } \Psi_i = -\sum_{j=i+1}^{p} \Pi_i \quad (3)$$

If the coefficient matrix λ has reduced rank r<n, then there exist n×r matrices, µ and γ each with rank r such that $\lambda = \mu\gamma'$ and $\gamma' Y_t$ is stationary. 'r' represents the number of cointegrating relationships, the elements of µ denote the adjustment parameters in the VECM framework and each column in γ is a cointegrating vector. The maximum likelihood estimator

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of γ for a given r can be defined as the combination of Y_{t-1} that yields the largest canonical correlations of ΔY_t with Y_{t-1} after correcting for lagged differences and deterministic variables. Two likelihood ratios tests such as the trace test and the maximum eigenvalue test were proposed by Johansen for the statistical significance of these canonical correlations. These tests are given below:

$$J_{trace} = -N \sum_{i=r+1}^{n} \ln(1 - \hat{\delta}_t) \quad (4)$$

$$J_{max} = -N \ln(1 - \hat{\delta}_t) \quad (5)$$

Where, N is the sample size and $\hat{\delta}_t$ is the ith largest canonical correlation.

The reason behind conducting Johansen's cointegration tests is to determine the rank(r) of matrix Π_k. In the present application, there are three possible outcomes. First, it can be of full rank, (r = n), which would imply that the variables are stationary processes. Second, the rank of k can be zero(r=0), indicating that there is no long-run relationship among the variables. In instances when Π_k is of either full rank or zero rank, it will be appropriate to estimate the model in either levels or first differences, respectively. Finally, in the intermediate case when there are at most 'r' cointegrating vectors $0 \le r \le n$ (i.e.,reduced rank),it suggests that there are (n-r) common stochastic trends. The number of lags used in the vector auto-regression is chosen based on the evidence provided by Akaike's Information Criterion (AIC). The cointegration procedure yields two likelihood ratio test statistics, referred to as the maximum eigen value (λ-max) test and the trace test, which will help to determine which of the three possibilities is supported by the data.

c. Vector Error Correction Model (VECM)

Once the study finds existence of long run relationship between public expenditures (economic & social services), the next step is to investigate causality, since the variables are cointegrated: there is causality in at least one direction (Engel and Granger, 1987). This study will proceed to determine the speed of adjustment coefficient by using Vector Error Correction Model (VECM). Vector error correction model (VECM) is given in the following form.

$$\Delta z_t = \mu + \alpha t + \lambda z_{t-1} + \sum_{i=1}^{p-i} \gamma_t \Delta y_{t-i} + \sum_{i=1}^{p-1} \gamma_t \Delta x_{t-i} + \varepsilon_t \qquad (6)$$

Where, Δ is the first-difference operator. The long-run multiplier matrix λ is defined as:

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$$\lambda = \begin{bmatrix} \lambda_{YY} \lambda_{YX} \\ \lambda_{XY} \lambda_{XX} \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either I(0) or I(1). If $\lambda_{YY} = 0$, then Y is I(1). In contrast, if $\lambda_{YY} < 0$, then Y is I(0). The VECM procedures described above are imperative in the testing of at most one cointegrating vector between dependent variable y_t and a set of regressors x_t.

4. Main Results

The empirical analysis of the present study began with assessing the stationarity conditions of the variables used in our study by applying augmented Dicky-Fuller (ADF) and Phillips-Perron (PP) unit root test. The results of the unit root test are reported in the Table 2. The unit root test results conclude that both the variables such expenditure in social service sector (LSOEXPI)[3] and expenditure in economic service sector (LECEXPI)[4] are stationary at first order difference in Indian context. Similarly, for Odisha, the unit root test results conclude that both the variables such as LSOEXPO and LECEXPO are stationary at first order.

Table 2: Results of Unit Root Tests (1980-81 to 2015-16)

Variables	ADF Test		PP Test	
	Level	First Diff.	Level	First Diff.
INDIA				
LSOEXPI	-2.84	-7.38*	-2.37	-7.24*
LECEXPI	-2.03	-5.50*	-2.18	-5.50*
ODISHA				
LSOEXPO	-2.78	-8.58*	-2.73	-8.51
LECEXPO	-0.27	-4.71*	-0.59	-4.69*

Notes: * denotes the statistical significance and the rejection of null at 1% level.

Once the stationarity of the variables is determined, this study used the Johansen and Juselius (1990) Cointegration technique to trace the existence of long-run relationship between them. The results are presented in Table 3. Before conducting theJohansen and Juselius (1990)

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[3]Expenditure in Social Service Sector is transformed into logarithmic form.
[4]Expenditure in Economic Service Sector is transformed into logarithmic form.

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test, this study chose the optimal lag 2 through VAR model by following AIC and HQ criteria.It is observed from the Table 3 that there is at mostone cointegrtaing vector exist between LSOEXPI and LECEXPI. Similarly, one cointegrating vector is also identified between LSOEXPO and LECEXPO.

Table 3: Results of Johansen and Juselius Cointegration Test

Null Hyp.	Alternative Hyp.		95% Critical Value
		INDIA	
λ_{trace} test		λ_{trace} value	
r = 0	r > 0	21.47	20.26
r ≤ 1	r > 1	2.07	9.16
λ_{max} test		λ_{max} value	
r = 0	r =1	19.40	15.89
r = 1	r = 2	2.07	9.16
		ODISHA	
λ_{trace} test		λ_{trace} value	
r = 0	r > 0	17.97	15.49
r ≤ 1	r > 1	1.16	3.84
λ_{max} test		λ_{max} value	
r = 0	r =1	16.81	14.26
r = 1	r = 2	1.16	3.84

Note: Figure in Parentheses is P-Value and *** indicates significant at 1 percent Level.

From the above Table 3, it is concluded that the null hypothesis of no co-integrationis rejected but the null of at most one co-integration relationship between the variables cannot be rejected. Both the trace test as well as max eigen test confirm one co-integrating vector between two variables. This implies the existence of long-run association between expenditures on economic services and social servicesboth in case of India and Odisha.

Further, in order to examine the equilibrium relationship between LSOEXPI and LECEXPI through the speed of adjustment, vector auto regressive model (VECM) is applied. The error correction term of the one period lag (ECM_{t-1}) shows the speed of adjustment for any deviation during a year from the equilibrium.The result is presented in the Table 3. The ECM_{t-1} term is negative and significant when the LECEXPI is the dependent variable whereas it is not

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significant when the LSOEXPI is the dependent variable. If there is any short run deviation between these variables, it is corrected by 45% annually to get back to equilibrium.

Hence, it is concluded LSOEXPI in the long run causes LECEXPI but not vice versa in case of India.

Similar analysis has been also carried out for Odisha. The ECT_{t-1} term is negative and significant when the dependent variable is LSOEXPO where as it is not significant when the LECEXPO is the dependent variable.Hence, it is concluded that LECEXPI in the long run causes LSOEXPO but not the other way in case of Odisha. If there is any short run deviation between these variables, it is corrected by 29% annually to get back to equilibrium.

Table 4: Vector error correction mechanism (VECM)

INDIA		
Error Correction:	D(LSOEXPI)	D(LECEXPI)
D(LSOEXPI (-1))	-0.47*** (-1.82)	0.06 (0.40)
D(LECEXPI (-1))	0.01 (0.02)	-0.33* (-3.04)
C	0.18 (2.92)	0.16* (6.15)
e_{t-1}	0.24 (1.15)	-0.45* (-4.32)
ODISHA		
Error Correction:	D(LSOEXPO)	D(LECEXPO)
D(LSOEXPO (-1))	-0.36** (-2.28)	0.003 (0.02)
D(LECEXPO (-1))	-0.001 (-0.004)	0.22 (1.07)
C	0.19* (5.33)	0.11* (3.04)
e_{t-1}	-0.29** (-2.44)	-0.008 (-0.06)

Notes: * and ** denote t-values(given in the parentheses) whichindicatesignificance at 1 per cent and 10 per cent level respectively.

The causation from social services expenditure to economic services expenditure at national level may be because of lower social services expenditure as compared to economic services economic expenditure. The expenditure on social services creates more positive externalities to accommodate and absorb expenditures on economic services sector.

On the contrary, the rising expenditures on economic services as compared to social services expenditures create externalities that help in absorbing more social services expenditure.

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Therefore, causation from economic services expenditure to social services expenditure is empirically established in Odisha (at sub-national level) economic services sector.

5. Conclusion

The study begins with analyzing the trends in expenditure in social service sector and economic service sector both in case of Indian (national government) and Odisha (sub-national government) for the period 1980-81 to 2015-16. Realizing the close association between them, we move ahead to examine the long-run association between social service sector expenditure and economic service sector expenditure both for India and Odisha. Prior to estimation, it is required to identify the time series properties of the variables. Both the conventional Augmented Dicky-Fuller test and Phillips-Perron tests concluded that all variables are stationary in first difference both for India and Odisha. After that we applied Johansen-Juselius cointegration test to examine the long run association between the variables under consideration. The Johansen-Juselius cointegration approach suggested the long run relationship between expenditure in social service sector and the expenditure in economic service sector both for India and Odisha. The cointegration does not explain the direction of causality. Thus, we employed VECM causality test both for India and Odisha. The VECM estimates suggest the unidirectional causality running from social service sector expenditure to economic service sector expenditure but not the vice versa for Indian context. However, the reverse unidirectional causality was observed in case of Odisha. In more detail, the long run causality runs from economic service sector expenditure to social service sector expenditure for Odisha.

The contradictory results suggests that expenditure on social services sector generates more positive externalities at India(national) level which help in absorbing more expenditure in economic services sector. Therefore, the policy intervention is to augment more expenditure in social services sector with more emphasis on capital outlay in social services sector in order to optimize the quality of developmental expenditure.

In case of Odisha(at sub-national level), expenditure in economic services sector generates more positive externalities, as a result, more social expenditure is accommodated for optimization of quality of developmental expenditure.Therefore, policy intervention should be to augment expenditure on capital outlay in economic services sector.

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