An Empirical Evaluation Of Growth In The Services Sector And Employment Outcomes In India

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Abstract

With a focus on the roles of foreign direct investment (FDI) inflows, services sector output, and services exports, this study empirically examines the factors that influence employment in India's services industry. The analysis looks at the long-term and short-term dynamics between the variables using annual time-series data and the Autoregressive Distributed Lag (ARDL) framework. The KPSS unit root test is used to evaluate the series' stationarity, while the ARDL bounds test and the Johansen cointegration process are used to evaluate cointegration. The findings show that employment in the services sector, services value added, foreign direct investment inflows, and services exports all have a consistent long-term association. According to long-term estimates, employment is positively impacted by services sector output and FDI inflows, but exports of services show a negative correlation, indicating that export-oriented service expansion is comparatively employment-inelastic. The significance of sectoral expansion and foreign investment in creating jobs is further supported by short-term dynamics. The results demonstrate the unique character of services-led growth in India and emphasize the necessity of policies that support employment-intensive service activities in addition to focused skill development and investment plans to maximize the services sector's capacity to create jobs.

Keywords: Services sector employment; Foreign direct investment; Services exports; ARDL–ECM; Cointegration; India.

Introduction

In many emerging nations, especially India, where it contributes significantly to both foreign exchange profits and gross domestic product, the services industry has been a key driver of economic expansion in recent decades. Globalization, technical advancement, and greater integration into foreign markets have all been strongly linked to the growth of services. However, India's growth trajectory has been marked by a rapid shift

toward services, in contrast to the manufacturing-led development experience of previous industrializers. This raises significant questions about the sector's ability to create jobs and absorb surplus labor from low-productivity activities and agriculture.

Given its sizable and expanding labor pool, creating jobs continues to be a major concern for the Indian economy. Despite being a significant driver of output development, the services sector's employment performance has varied among its subsectors. While traditional and domestic-oriented services like trade, transportation, tourism, and personal services tend to be more employment intensive, high-skill, technology-intensive industries like information technology and business services have grown quickly but have a relatively limited capacity to absorb labor. A closer look at the factors influencing employment in the services sector is necessary because of the structural heterogeneity within the sector, which suggests that output growth alone may not be enough to ensure the development of widespread jobs.

The development of India's services sector has been significantly influenced by both foreign direct investment (FDI) and service exports. Since the 1990s, liberalization laws have made it easier for foreign capital to enter industries including business, finance, and telecommunications. At the same time, exports of software and other contemporary services have improved India's standing in international markets. Theoretically, whereas export growth may raise labor demand by expanding market size, foreign direct investment (FDI) might boost employment through capital accumulation, technology transfer, and productivity spillovers. However, there is still conflicting empirical data about the employment benefits of foreign direct investment (FDI) and exports from the services sector, especially in developing nations where export development is frequently fueled by technology-based and skill-intensive services.

The majority of empirical research to date has been on how exports and foreign direct investment affect overall employment or employment in the manufacturing sector, paying little attention to the services sector as a separate source of labor absorption. Furthermore, a lot of research uses panel data or cross-sectional methods, which might mask the long-term dynamics unique to different economies. Therefore, in order to capture the short-term and long-term links between employment in the services sector and its primary causes within a cohesive econometric framework, country-specific time-series analysis is required.

In light of this, the current study looks at how employment in India's services industry is affected by FDI inflows, services value added, and services exports. The study examines the short-term adjustment dynamics among the variables as well as the presence of a long-term equilibrium relationship using annual time-series data and the Autoregressive Distributed Lag (ARDL) technique to cointegration. The KPSS unit root test is used to evaluate the series' stationarity, while the ARDL bounds test and the Johansen cointegration process are used to check cointegration and guarantee robustness.

This study makes two contributions. First, by specifically combining export performance, foreign investment inflows, and services sector output into a single framework, it offers empirical information on the employment consequences of services-led growth in India. Second, the study provides insights into the dynamic nature of employment adjustment in the services industry by differentiating between short-term and long-term effects. Policy discussions about how the rise of the services sector might help with employment issues and encourage inclusive growth in emerging economies are anticipated to be influenced by the findings.

This is how the rest of the paper is structured. The pertinent literature on employment, FDI, exports, and the expansion of the services sector is reviewed in Section 2. The methodology and data sources are described in Section 3. The empirical findings and discussion are presented in Section 4. Policy implications are discussed at the end of Section 5.

Literature Review

Although early research on India's services sector highlighted its increasing significance in terms of output and trade, it also raised questions about the employment potential of this sector. One of the earliest comprehensive analyses of India's services-led growth strategy was presented by Banga (2005), who demonstrated that while the services industry grew quickly following economic liberalization, employment growth in the sector remained unequal across subsectors. The study raised doubts about the viability of services-led development as a source of mass employment by pointing out that contemporary services, including finance and information technology, required more skills and required less labor than traditional services.

The employment structure in India's services sector was further investigated by Nayyar (2009), who again highlighted its heterogeneity. According to the study, low-productivity informal services accounted for the majority of job growth, whereas high-productivity services made up a disproportionate share of output but just a small fraction of employment. The idea that the type of services expansion matters for labor absorption was reinforced by this dualistic pattern, which implied that weak employment generation could coexist with aggregate services development.

Building on these discoveries, Eichengreen and Gupta (2011, 2012) examined the factors that contributed to India's explosive growth in contemporary services, especially in export-focused markets. According to their findings, legislative liberalization, technical advancement, and globalization all influenced India's comparative advantage in skill-intensive services. Although the expansion of services exports improved the performance of the external sector, the authors pointed out that this expansion was mostly dependent on skilled labor and productivity increases, suggesting that there would be little impact on the creation of jobs on a wider scale.

The focus was moved to the function of services in structural transformation by Ghani, Goswami, and Kharas (2012). They provided cross-national evidence to support their claim that, in the absence of manufacturing-led modernization, services may serve as a substitute economic engine for developing nations. They did, however, issue a warning that the labor intensity and tradability of service activities determine employment results. Their findings highlighted the necessity for disaggregated analysis by indicating that only specific sectors of the services sector had strong employment links.

The impact of foreign direct investment on employment outcomes was examined in later research. Due to the capital- and skill-intensive character of many foreign-invested service activities, Sen (2014), who studied sectoral FDI inflows in India, concluded that FDI had equivocal effects on employment but positively contributed to production and productivity in services. This supported the claim that, especially when concentrated in high-end services, FDI-led expansion may not always result in the creation of jobs.

Time-series and econometric methods were used in more recent empirical research to investigate the dynamic linkages between trade, employment, investment, and services production. While emphasizing short-term adjustment dynamics influenced by investment and sectoral production fluctuations, studies using cointegration and error correction models revealed evidence of long-term links between employment and services sector growth. These results demonstrated that employment is sensitive to both internal and external factors and reacts gradually to structural changes in the services industry.

The effects of services exports on employment have also been the subject of recent contributions. According to empirical data, traditional services like trade, transportation, and tourism provide more jobs per unit of production than export-oriented services, especially information technology and business process outsourcing. Rapid productivity increase, automation, and a growing need for trained labor have all been blamed for this trend. As a result, compared to the expansion of domestic services, export-led services growth has been described as comparatively employment-inelastic.

In the post-pandemic era, policy-focused research has brought services' contribution to inclusive growth and job recovery back into the spotlight. While services continue to contribute significantly to GDP and foreign exchange earnings, official data and recent research show that employment growth has trailed output growth, indicating enduring structural imbalances in the industry. These studies emphasize how crucial it is to support labor-intensive service activities in addition to investment and skill-development plans in order to increase the sector's ability to create jobs.

Despite this expanding literature, the majority of studies that are now available either concentrate on the overall effects on employment or look at FDI and exports separately. Furthermore, only a small number of research use a single time-series approach to examine how exports, foreign investment, and services sector output all affect services employment in India. This creates a void in our knowledge of the short- and long-term dynamics that connect these factors. By using the ARDL approach to cointegration to examine the factors that influence employment in India's services sector, the current study aims to close this gap and add to the body of knowledge on services-led growth and job creation.

Data Sources

Based on data availability and consistency across variables, the study uses annual time-series data for India encompassing the period e.g., 2000–2022. To guarantee accuracy and comparability, all variables are sourced from reputable national and international sources.

The percentage of employment in the services industry relative to all employment is known as employment in the services sector (EMP). The World Bank's World Development Indicators (WDI), which are based on estimates from the International Labour Organization (ILOSTAT) database, are the source of the data. This statistic measures how much of the economy's labor is absorbed by the services sector.

Services value added as a percentage of GDP (SERGDP) serves as a proxy for the expansion of the services sector. The World Bank's World Development Indicators (WDI) are the source of this measure. It is the primary explanatory variable in the model and represents the services sector's proportionate contribution to total production. Services exports (SEREXP) are included and measured in current US dollars to account for

the influence of foreign demand. The information is obtained from the World Bank (WDI) and cross-checked with Reserve Bank of India (RBI) publications. The export-oriented aspect of India's services industry, especially in IT, business, and financial services, is captured by this variable.

FDI equity inflows into the services sector (measured in current US dollars) constitute foreign investment in the services sector (FDISER). The Department for Promotion of Industry and Internal Trade (DPIIT), Government of India, provides these statistics via its yearly FDI fact sheets. This variable illustrates how foreign capital contributes to the growth of job possibilities in the services industry. In order to maintain a balanced sample period, the data are examined for consistency and missing observations, and series are aligned as needed.

<div align="center">Table1: Data and Sources</div>

Data	Source
Employment in Service Sector	World Bank
Service Value Added (% of GDP)	World Bank
FDI equity inflow	Fact-Sheet DPIIT
Service Export	World Bank

<div align="center">Source: Author's own compilation</div>

Methodology

This study examines the effects of foreign direct investment (FDI) on employment in India's services sector while accounting for external demand and sectoral output growth. Employment in the services sector is thought to be dependent on foreign capital inflows, sectoral output growth, and export performance, based on labor demand theory and the services-led growth paradigm. Consequently, the regression model defined as follows:

$$EMP_t = \alpha_0 + \alpha_1 SERGDP_t + \alpha_2 FDISER_t + \alpha_3 SEREXP_t + \varepsilon_t$$

Where:

EMP_t = Employment in Services sector

$SERGDP_t$ = Services value added

$FDISER_t$ = FDI inflows in Services sector

$SEREXP_t$ = Services Export

α_1, α_2, α_3 = Long run elasticities of services sector employment in respect to the above stated variables respectively

ε_t = Error term

To examine the long-term and short-term correlations between the variables, the study uses the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration, which was created by Pesaran, Shin, and Smith (2001). Because it can handle regressors that are integrated of different orders, such as I(0) and I(1), as long as none of the variables are integrated of order I(2), the ARDL technique is especially appropriate for

the current investigation. Additionally, the ARDL method enables the simultaneous estimation of long-run and short-run dynamics and produces accurate and impartial estimates even in small samples.

Unit Root Test

The variables' stationarity properties are analyzed to ascertain their sequence of integration before estimating the ARDL model. This study uses the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test, which is predicated on the null hypothesis that a time series is stationary, in contrast to traditional unit root tests like the Augmented Dickey–Fuller (ADF) test.

Every variable is subjected to the KPSS test in both level and first-difference form. The series is categorized as integrated of order one, or I(1), if the null hypothesis of stationarity is rejected at levels but not after first differencing. On the other hand, the series is regarded as stationary at level I(0) if the null hypothesis cannot be disproved at levels. This process satisfies the prerequisite for applying the ARDL bounds testing approach by guaranteeing that none of the variables are integrated of order two, I(2).

ARDL Bounds Test for Cointegration

A long-run equilibrium relationship between employment in the services sector, FDI inflows into the services sector, services value added, and services exports is examined using the ARDL limits testing approach once the order of integration of the variables has been established. The ARDL model's unrestricted error correcting representation is defined as follows:

$$\Delta EMP_t = \beta_0 + \sum_{i=1}^{p} \beta_{1\,i}\Delta EMP_{t-i} + \sum_{j=0}^{q1} \beta_2 \Delta SERGDP_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta FDISER_{t-i} + \sum_{i=0}^{q3} \beta_4 \Delta SEREXP_{t-i} + \delta_1 EXP_{t-1} + \delta_2 FDISER_{t-1} + \delta_3 SERGDPg_{t-1} + \delta_4 SEREXP_{t-1} + \varepsilon_t$$

Where:

EMP_t = Employment in services sector

$SERGDP_t$ = Services value added

$FDISER_t$ = FDI inflows in services sector

$SEREXP_t$ = Services Exports

Δ = first difference operator

p,q,q2,q3 = optimal lag length

ε_t = error term

The condition for Null Hypothesis (H0) rejection of the bounda test is $\delta1 = \delta2 = \delta3 = \delta4 = 0$ (no Cointegration in the long run between the variables). The null hypothesis is rejected if the F-statistic derived from the limits testing is higher than the critical value of the chosen significance level. This indicates that the variables in the model that have a long run link (Cointegration). If the long run equilibrium relationship is confirmed, the

short run and long run effects of independent variables on the dependent variable is estimated using short run and long run equations:

Short run equation:

$$\Delta EMP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\Delta EMP_{t-1} + \sum_{J=0}^{q1} \alpha_{2j}\ \Delta SERGDP_{t-j} + \sum_{k=0}^{q2} \alpha_3\ k\Delta FDISER_{t-k} +$$
$$\sum_{m=0}^{q3} \alpha_{4m}\Delta SEREXP_{t-m} + \delta_1 ECT_{t-1} + \varepsilon_t$$

Long run equation:

$$EMP_t = \beta_0 + \beta_1 SERGDP_t + \beta_2 FDISER_t + \beta_3 SEREXP_t + \varepsilon_t$$

Empirical Results

Trend analysis of of all the variables taken in this study from the period of 2000-2022.

The services industry has emerged as a vital job source, particularly in urban regions. As of 2025, about 30.7% of all workers are employed in the services industry. These are some factors that should be taken into consideration since qualified workers can find employment, which lowers unemployment rates among the employable population.
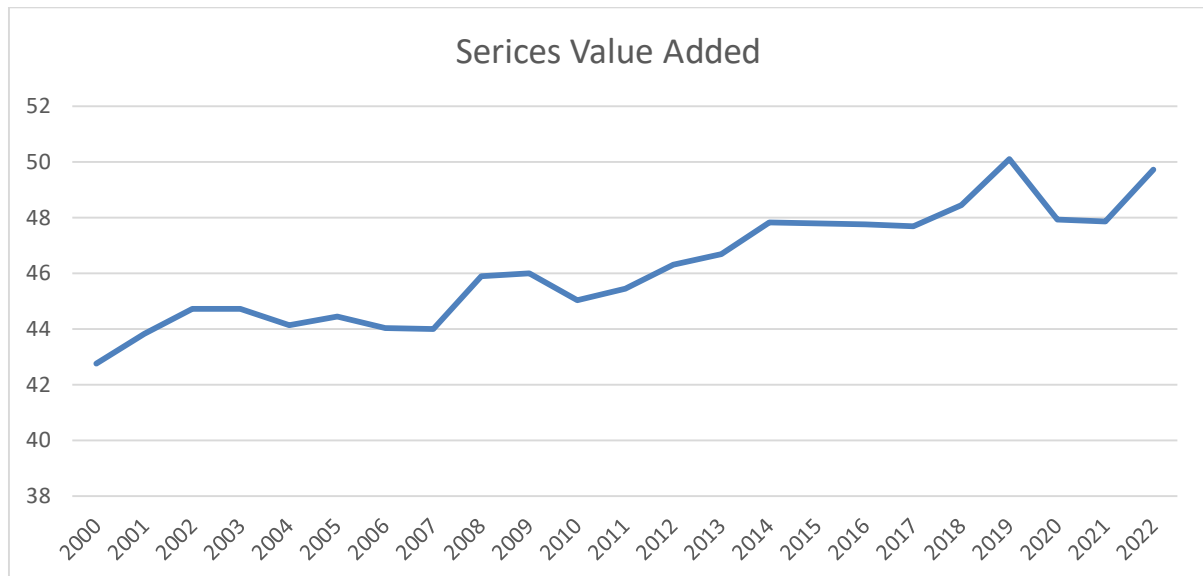
Graph 1: Employment in Service Sector

Source: Author's own compilation based on data obtained from World Bank

The services sector has grown significantly over the past few decades, accounting for 50% of India's GDP, with growth rates frequently outpacing those of the manufacturing and agricultural sectors. Information technology (IT) and business process outsourcing (BPO) are two significant subsectors that mostly service international clients and ultimately contribute to foreign exchange reserves.
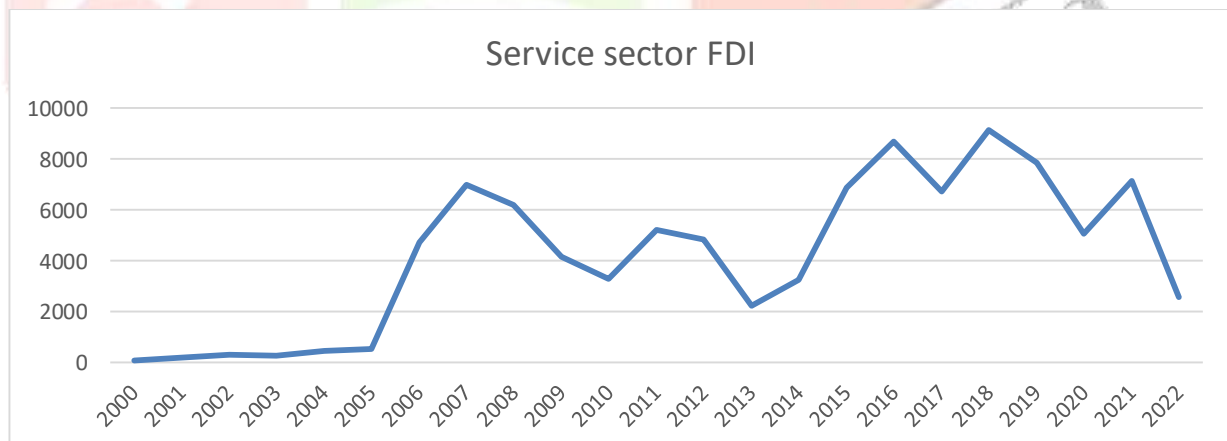
Graph 2: Service Value Added

Source: Author's own compilation based on data obtained from World Bank

However, as we can see from the graph above, the industry has occasionally witnessed an increasing trend, but in recent years it has experienced a decline. This can be linked to poor performance in important subsectors like BPO and IT. However, these are not the only factors impeding the influx of FDI equity; other factors include bureaucratic red tape, regulatory obstacles, and improper policy implementation. These discrepancies are turning into a problem that our nation must resolve in order to win back the trust of investors and draw in steady foreign direct investment.
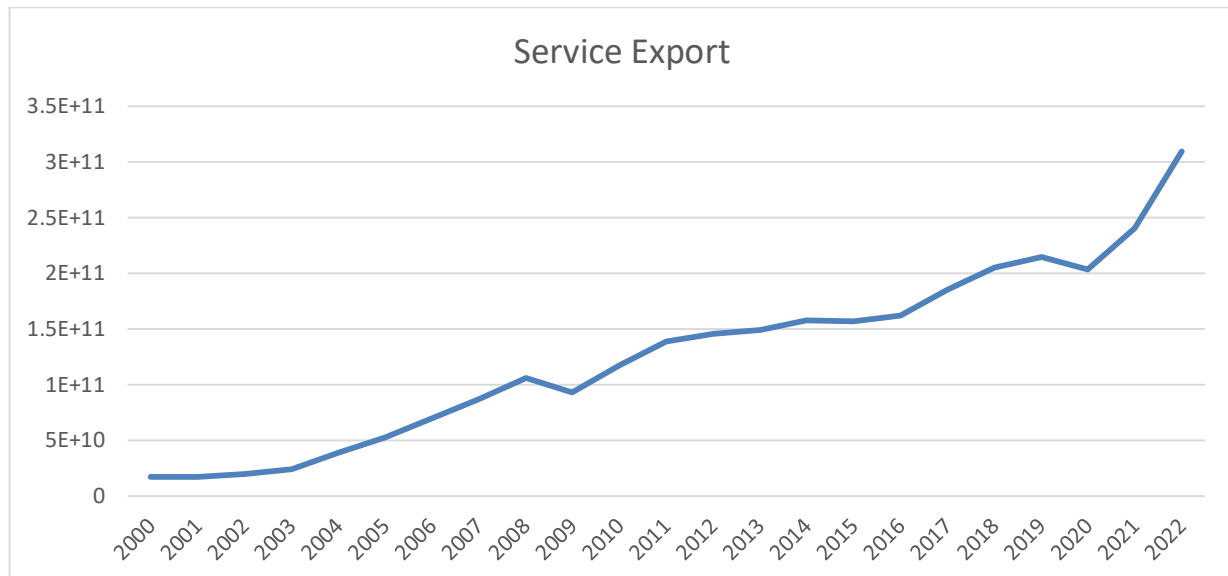
Graph 3: FDI in Service Sector

Source: Author's own compilation based on data obtained from Fact Sheet DPIIT

India has been a significant exporter of services and a vital force behind economic expansion, especially in subsectors like the global software and IT industries. With $387.5 billion in services exports in 2024–2025, India is ranked sixth in the world. The services industry has performed exceptionally well in both investment and exports. Foreign direct investment ensures that the economy grows and creates significant opportunity for the host nations.

Graph 4: Service Export

Source: Author's own compilation based on data obtained from World Bank

The Unit Root Test

The Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test, which is predicated on the stationarity null hypothesis, was used to assess the stationarity characteristics of the variables. All of the model's variables—employment in the services sector, FDI inflows into the services sector, services value added, and services exports—were tested at both levels and first differences.

The null hypothesis of stationarity is rejected since the KPSS test statistics at level surpass the critical values at the 1% significance level, indicating that all variables are non-stationary at levels. The KPSS test results, however, drop below the crucial values when the variables are converted into first differences, suggesting that the null hypothesis of stationarity cannot be rejected at standard significance levels.

As a result, it is determined that employment in the services sector, FDI inflows into the services sector, services value added, and services exports are all integrated of order one, I(1). Crucially, none of the variables is integrated of order two, or I(2), meeting the prerequisite for using the ARDL bounds testing method for cointegration. The application of the ARDL methodology to investigate the long-term and short-term correlations among the variables is justified by the mixed order of integration, where all variables are I(1).

Table 2:Stationarity Test KPSS

Variable	At Level	At First Difference	Result
Employment in Sevice Sector	0.01	0.1	I(1)
Service Sector FDI	0.0300	0.1	I(1)
Service Value Added	0.01	0.1	(1)
Service Export	0.01	0.1	I(1)

Source: Author's own calculation

ARDL Bounds Test for Cointegration

The study uses the ARDL limits testing approach to cointegration suggested by Pesaran, Shin, and Smith (2001) to investigate the presence of a long-term link between employment in the services sector, services sector FDI inflows, services value added, and services exports. The limits test yielded an F-statistic of 3.0096.

At standard significance levels, this value is contrasted with the critical limits values. The lower and upper bound critical values at the 10% significance level are 3.008 and 4.15, respectively. At the 10% significance level, the test result is equivocal because the computed F-statistic is over the lower bound (I(0)) but below the higher bound (I(1)). Likewise, the computed F-statistic is below the relevant lower bound critical values at the 5% and 1% levels.

These findings suggest that, at standard levels of significance, the ARDL limits test does not offer convincing proof of cointegration. Nonetheless, the F-statistic's slight elevation over the lower bound at the 10% level raises the likelihood of a weak long-term link between the variables, necessitating additional research using different cointegration methods.

Table 3: Pesaran, Shin and Smith (2001) Cointegration Test

	F-test	
	I(0)	I(1)
10% critical value	3.008	4.15
5% critical value	3.71	5.018
1% critical value	5.333	7.063
F-statistic: 3.00960517620603		

Source: Author's own calculation

Johansen Cointegration Table

This work uses the Johansen cointegration test as a robustness metric to support the ARDL limits testing methodology. The results of the limits test in this study fall into the inconclusive region, even though the ARDL framework is appropriate for small sample sizes and variables integrated of mixed orders I(0) and I(1). In these situations, using a different cointegration method offers more empirical support for the long-term link.

Furthermore, when the KPSS unit root test confirms that all variables are integrated of order one, I(1), the Johansen approach is very suitable. The Johansen procedure offers a more thorough depiction of the long-run dynamics among the variables than the Engle–Granger two-step method because it is based on a system of equations rather than a single-equation framework and permits the possibility of multiple cointegrating vectors.

As a result, using the Johansen cointegration test in conjunction with the ARDL bounds test strengthens the conclusion that there is a long-term equilibrium relationship between FDI inflows and employment in the services sector, contingent on services value added and services exports, and improves the robustness of the empirical findings.

Table 4: Johansen Cointegration Test

	test	10pct	5pct	1pct
r<=3	3.07	7.52	9.24	12.97
r<=2	9.67	17.85	19.96	24.6
r<=1	26.07	32	34.91	41.07
r=0	51.5	49.65	53.12	60.16

Source: Author's own calculation

Because the trace statistic (51.5) is greater than the equivalent critical value (49.65), the Johansen trace statistics show that the null hypothesis of no cointegration (r = 0) is rejected at the 10% significance level. However, because the trace statistics are below their respective critical values, the null hypotheses of at most one cointegrating vector (r < 1), at most two cointegrating vectors (r ≤ 2), and at most three cointegrating vectors (r ≤ 3) cannot be rejected at conventional significance levels.

These findings imply that employment in the services sector, FDI inflows into the services sector, services value added, and services exports have at most one cointegrating link. Despite short-term volatility, the presence of a single cointegrating vector suggests that the variables have a shared long-term equilibrium relationship.

The calculation of long-run coefficients and the associated error correction model are justified when the findings of the ARDL limits test and the Johansen cointegration test are combined because they offer convincing proof of a long-term link between the variables.

Short Run and Long Run Results

The Error Correction Model (ECM), which is derived from the ARDL framework, is used to analyze the short-run dynamics of the link between employment in the services sector, services sector FDI inflows, services value added, and services exports. The findings show a statistically significant mistake correcting mechanism and considerable short-term modifications.

The existence of a stable long-run equilibrium relationship between the variables is confirmed by the negative and statistically significant coefficient of the error correction term (ECT $t-1$ $t-1$) at the 1 percent level (−0.922, p < 0.01). According to the coefficient's size, 92 percent of any short-term employment disequilibrium in the services sector is resolved within a year, suggesting a comparatively quick rate of adjustment toward long-term equilibrium.

Employment in the services sector is significantly impacted in the short term by shifts in the value added of services. Employment is positively and statistically significantly impacted by the contemporaneous change in services value added (coefficient = 0.734, p < 0.01), indicating that temporary increases in services output result in the creation of jobs right away. The first lag of services value added, however, has a negative and significant coefficient (-0.721, p < 0.01), suggesting the existence of short-run labor productivity increases or partial adjustment effects that could momentarily slow employment development. Its short-term impact fades after the first lag, as evidenced by the statistical insignificance of the second lag of services value added.

The idea that foreign capital inflows into services-related activities contribute to job creation in the short term through business expansion, technology transfer, and increased demand for skilled labor is supported by the fact that FDI inflows into the services sector have a positive and statistically significant short-run effect on employment (coefficient = 1.22×10^{-1}, $p < 0.05$). On the other hand, services exports do not exhibit a statistically significant short-run impact on employment (coefficient = 0.922, $p > 0.10$). This suggests that export growth in the services sector does not immediately translate into higher employment, perhaps because export-oriented services like business process outsourcing and information technology are capital- or skill-intensive.

Persistence in employment dynamics is indicated by the fact that the lag dependent variables are positive and statistically significant at the 5% level. This suggests that historical employment levels, which represent adjustment costs and institutional labor market rigidities, have a significant impact on current employment outcomes in the services sector.

Table 5: Short run results

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-3.69E+01	8.78E+00	-4.2	0.00149**
ec.1	-9.22E-01	2.20E-01	-4.193	0.0015**
dSerValueAdded.t	7.34E-01	1.31E-01	5.603	0.00016***
dSerValueAdded.1	-7.21E-01	2.24E-01	-3.218	0.00819**
dSerValueAdded.2	-4.10E-01	2.30E-01	-1.783	0.10212
dServicesectorFDI.t	1.22E-04	4.84E-05	2.524	0.02829*
dlogSExp.t	9.22E-01	9.09E-01	1.014	0.33253
dEmpSer.1	5.30E-01	1.87E-01	2.835	0.01622*
dEmpSer.2	7.82E-01	2.78E-01	2.81	0.01698*

Source: Author's own calculation

Overall, the short-term results show that FDI inflows and the expansion of the services sector's output are significant factors in the creation of jobs in the sector, whereas the short-term employment benefits of services exports seem to be minimal. The stability of the calculated model and the presence of a long-term relationship between the variables are further supported by the statistically significant and appropriately signed error correction term.

Table 6:Long run results

EmpSer.1	SerValueAdded.1	ServicesectorFDI.1	logSExp.1
-0.921623	1.44711736	0.00013009	-0.182396

Source: Author's own calculation

The long-term projections show a steady correlation between employment in the services industry and its primary variables, which are services value added, services sector FDI inflows, and services exports. An increase in the output of the services sector is linked to a significant increase in employment over time, according to the positive coefficient of services value added (1.447). This supports the services-led

employment hypothesis by indicating that the services sector's capacity to absorb labor is improved over time by steady growth.

With a coefficient of 0.00013, FDI inflows into the services sector also show a favorable long-term impact on employment. The positive sign suggests that foreign capital inflows into the services sector help create jobs through firm expansion, knowledge transfer, and higher demand for labor-intensive service activities, even when their amount is minor due to the variable's scale.

The long-run coefficient for services exports, on the other hand, is negative (-0.182), indicating that development in export-oriented services does not eventually result in a proportionate increase in employment. The skill-intensive and technologically advanced nature of India's services exports, especially in information technology and business services, where output growth is frequently attained through productivity gains rather than significant employment creation, may be reflected in this conclusion.

Overall, the long-term findings show that foreign investment and the growth of the domestic services sector are more important in creating jobs than services exports. These results underline the significance of measures meant to boost domestic services sector expansion and draw in employment-intensive foreign investment in order to increase the services sector's capacity to generate jobs in India.

Table 7: Diagnostic Tests

Diagnostic Tests	Test Statistics	P Value
Breusch-Godfrey Test	2.8708	0.134
Ljung-Box Test	1.212	0.2709
Breusch-Pagan Test	9.3037	0.5939
Shapiro-Wilk test	0.94945	0.3589

Source: Author's own calculation

A series of common diagnostic tests were carried out to evaluate the estimated ARDL–ECM model's suitability and dependability. The model satisfies the fundamental principles of classical regression, according to the results. The null hypothesis that there is no serial correlation cannot be rejected at standard significance levels, according to the Breusch–Godfrey LM test for serial correlation, which provides a test statistic of 2.8708 with a p-value of 0.134. This implies that there is no autocorrelation in the residuals, hence validating the model's dynamic stability. This conclusion is further supported by the Ljung-Box Q-statistic, whose p-value of 0.2709 shows that the residuals do not exhibit serial dependence.

The null hypothesis of homoskedasticity cannot be rejected, according to the Breusch–Pagan test for heteroskedasticity, which yields a p-value of 0.5939. This shows that the residuals' variance remains constant throughout time, guaranteeing the effectiveness and objectivity of the computed coefficients. The residuals appear to be regularly distributed based on the p-value of 0.3589 obtained from the Shapiro-Wilk test for normality. The application of traditional statistical reasoning based on the t- and F-statistics is therefore validated.
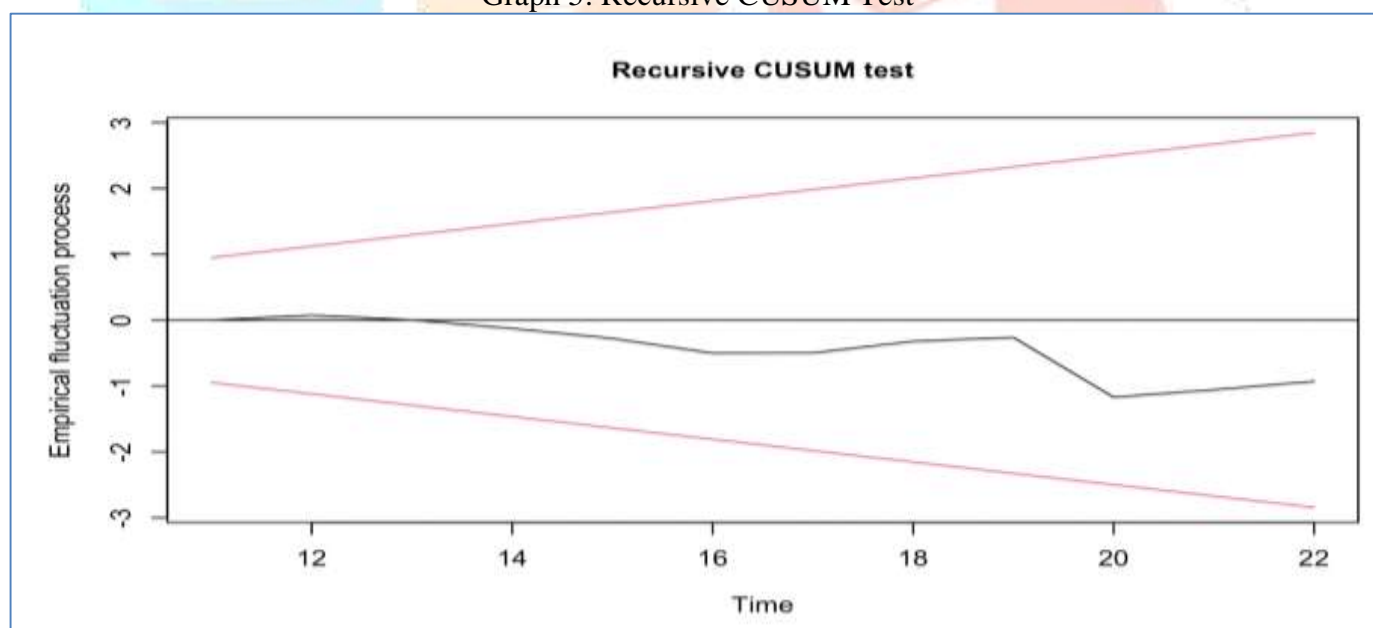
All things considered, the diagnostic test findings verify that the residuals have a normal distribution and that the estimated model is devoid of serial correlation and heteroskedasticity. These results show that the estimated short-run and long-run coefficients are statistically credible for inference and policy interpretation, and that the model is well-specified.

Stability test Results

The cumulative sum (CUSUM) test, which is based on recursive residuals, is used to assess the stability of the estimated ARDL model. The cumulative sum of residuals stays under the 5% critical boundaries for the course of the sample period, according to the CUSUM plot. This implies that there is no indication of substantial parameter instability or structural breaks influencing the relationship between the variables, and that the estimated coefficients of the model are structurally stable over time.

The long-run and short-run coefficients appear to be constant throughout the study period if there are no regular deviations of the CUSUM statistic from the critical limits. The inferred correlations between services sector employment, services sector FDI inflows, services value added, and services exports can therefore be regarded as trustworthy for econometric inference and policy interpretation, and the estimated model does not suffer from structural instability. Overall, the CUSUM test validates the estimated long-run equilibrium connection and short-run adjustment dynamics, as well as the resilience and sufficiency of the given ARDL–ECM framework.

Graph 5: Recursive CUSUM Test

Souce: Author's own calculation

Discussion

Using the ARDL–ECM paradigm, this study empirically investigated the link between employment in the services sector and its primary variables, namely services sector FDI inflows, services value added, and services exports. The findings shed significant light on the nature of employment creation in India that is driven by services, both in the short and long term.

While the ARDL limits test produces modest but encouraging evidence of cointegration, the Johansen procedure's cointegration results show that there is a long-run equilibrium link between the variables. When

combined, these results imply that, despite short-term volatility, there is a steady long-term correlation between services sector employment, services production, foreign investment, and exports. This validates the structural transformation theory, which holds that labor absorption is shaped over time by sectors expansion and capital inflows.

Employment in the services industry is strongly and favorably impacted by services value added, according to long-term estimates. This suggests that consistent expansion in the output of domestic services improves the sector's long-term labor absorption capacity. The outcome supports the services-led growth theory and is in line with other research that highlights how the expansion of the tertiary sector contributes to the creation of jobs in emerging nations. It implies that long-term labor absorption has also been aided by the structural shift toward services, which has not only been driven by output.

FDI inflows into the services sector also show a positive long-term correlation with employment, suggesting that foreign capital helps create jobs through business expansion, technology advancement, and the incorporation of Indian services into international production networks. The coefficient's positive sign highlights the role of foreign investment as a complementary driver of job development in the services sector, notwithstanding its minor magnitude due to scale differences. This result supports the idea that when foreign direct investment (FDI) is focused on service industries with comparatively high labor intensity, it can serve as a catalyst for the creation of jobs.

On the other hand, there is a long-term negative correlation between services exports and employment. This implies that the expansion of export-oriented services does not always result in the long-term creation of jobs in proportion. The skill-intensive and technologically advanced nature of India's services exports, especially in information technology, banking, and business services, where output growth is frequently attained through productivity gains rather than significant labor absorption, provides a tenable explanation. This finding raises concerns about "jobless growth" in some service sector segments by highlighting the potential for export-led services growth to be relatively employment-inelastic over time.

These linkages are further illuminated by the short-run dynamics. Employment is significantly positively impacted by changes in services value added, suggesting that short-term increases in sectoral output result in the creation of jobs right away. Its lagged term's negative coefficient, however, points to adjustment effects, in which businesses first raise production through capital deepening or productivity gains before converting growth into long-term job gains. FDI inflows into the services sector are found to have a positive and statistically significant short-term impact on employment, demonstrating that foreign capital helps to job creation even in the near term, potentially through project implementation and business start-ups.

The idea that export growth in services is not immediately labor-absorbing is further supported by the fact that services exports do not have a statistically significant short-run impact on employment. The fast rate of adjustment toward long-run equilibrium is indicated by the error correction term, which is negative and highly significant. This suggests that employment in the services sector reacts effectively to changes in output, investment, and external demand since deviations from the long-run connection are promptly remedied. The dynamic character of India's services sector and its susceptibility to both sector-specific and macroeconomic trends are reflected in the rapid rate of adjustment.

The calculated model is confirmed to be well-specified, free from heteroskedasticity and serial correlation, and stable over the sample period by diagnostic and stability tests. The estimated long-run and short-run coefficients are given credibility by the CUSUM results, which also support the validity of the empirical data. In summary, the results indicate that while services exports have a limited ability to create jobs, the growth of the services sector and FDI inflows are important factors in long-term employment promotion. This suggests that India's services-led growth trajectory is defined by a dual structure: export-oriented services are typically more capital- and skill-intensive, creating comparatively fewer jobs, while domestically driven services growth and foreign investment positively contribute to labor absorption. In addition to export-oriented high-skill services, these findings highlight the significance of policies that support employment-intensive service industries including tourism, logistics, healthcare, and retail.

Conclusion

By investigating the employment effects of services sector expansion, foreign investment inflows, and export performance in India within a single time-series framework, this study adds to the empirical literature on services-led growth. The analysis emphasizes that the relationship between employment and the development of the services sector is not predictable nor consistent, but rather heavily relies on the type of growth occurring within the sector. Although the services sector has become a major force behind India's structural change, its ability to create jobs seems to be influenced more by investment trends and domestic sectoral growth than by export results alone.

The results indicate the existence of a distinct services sector where more labor-intensive domestic service activities coexist with high-skill, technology-intensive export services. This dual structure aids in explaining why the fast expansion of the services sector has not resulted in an increase in employment that is proportionate. Therefore, policies that only increase exports of services might not be enough to solve the problem of unemployment unless they are combined with measures that support labor-intensive service sectors and increase access to skill development.

The findings highlight the necessity of a balanced strategy for the growth of the services sector from a policy standpoint. The sector's capacity to create jobs can be increased by bolstering employment-intensive service sectors like travel, transportation, retail, healthcare, and personal services. However, rather than concentrating solely on high-productivity businesses with little labor absorption, foreign direct investment policies should give preference to sectors with strong employment ties. In order to lower the risk of employment polarization, targeted skill development programs are also necessary to guarantee that the workforce can engage in both conventional and contemporary service industries.

Thus, the analysis indicates that sectoral, labor market, and investment policies must be in place for services-led growth to have a significant impact on job creation. Policymakers may better utilize the services sector's potential to support inclusive and sustainable economic development in India by coordinating its growth with employment goals.

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