



Sectoral Transformation and Regional Competitiveness in Uttar Pradesh: A Dual Shift-Share Analysis

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Abstract

This paper employs a dual shift-share analysis (SSA) applied simultaneously to Gross Value Added (GVA) and employment data to decompose Uttar Pradesh's (UP) regional economic performance into its National Growth Effect (NGE), Industrial Mix Effect (IME), and Regional Competitive Effect (RCE) across five chronologically demarcated sub-periods from 2000-01 to 2024-25. The analysis reveals that UP has generated a positive Regional Competitive Effect in all three broad sectors- agriculture, industry, and services when assessed over the full twenty-five-year horizon, in both output and employment dimensions. The services sector registers the highest GVA-based RCE, while industry achieves a rare triple-positive alignment across all three shift-share components in both GVA and employment. A critical divergence between GVA-based and employment-based RCEs during Phase 3 is identified and interpreted as evidence of Lewisian disguised unemployment and low-productivity labour absorption a configuration of jobful but productivity-poor growth. Labour productivity analysis confirms that UP's GVA per worker has grown at a marginally faster pace than the national average, though the absolute productivity gap remains substantial across all sectors. The paper concludes with a three-pillar policy architecture centred on agricultural employment diversification, deepening secondary-sector industrial competitiveness, and geographic broadening of the services economy into eastern and central UP.

Keywords: Shift-Share Analysis, Regional Competitiveness, Structural Transformation, Uttar Pradesh, Gross Value Added, Labour Productivity, Disguised Unemployment, Lewis Model, Industrial Mix Effect, Regional Competitive Effect

1. Introduction

Regional economic analysis occupies a pivotal position in development economics, particularly in large, spatially heterogeneous federal economies such as India, where aggregate national growth trajectories frequently mask profound sub-national divergences in the pace, pattern, and quality of structural transformation. India's federal structure encompasses states of vastly different economic sizes, endowments, and institutional capacities a heterogeneity that renders national-level diagnostics analytically insufficient for policy design at the sub-national level.

Uttar Pradesh (UP) presents one of the most compelling and analytically challenging cases in India's development story. As India's most populous state accounting for approximately one-sixth of the country's population UP's economic trajectory carries disproportionate weight for national poverty reduction, employment generation, and inclusive growth outcomes. Yet the state's per capita income has historically lagged the national average, and its structural transformation the progressive reallocation of labour and output from agriculture to industry and services has proceeded at a pace consistently slower than the national norm. Despite this, UP has emerged in the 2015-25 decade as one of India's fastest-growing states in absolute GVA terms, prompting renewed analytical interest in the sources and sustainability of its growth momentum.

While earlier work has documented Uttar Pradesh's sectoral composition and broad growth trajectory, the existing literature has not systematically decomposed UP's growth into components attributable to national momentum, sectoral composition effects, and genuine region-specific competitive advantage. This decomposition is methodologically essential because it alone can distinguish passive beneficiaries of national growth from states that have developed durable structural competitiveness. It is precisely this distinction that the present paper seeks to operationalise through the application of Shift-Share Analysis (SSA).

The study makes three original contributions to the literature. First, it conducts a dual decomposition applying SSA simultaneously to GVA and employment data across five sub-periods rather than the conventional single-dimension application. Second, it identifies and theorises the GVA-employment divergence in Phase 3 (2011-16) as a Lewisian disguised unemployment signal, providing the first quantitative estimate of this phenomenon using regional shift-share methodology in the UP context. Third, it bridges the output and employment analyses through a systematic labour productivity comparison

between UP and India, thereby embedding the SSA findings within a productivity-driven framework of structural transformation theory.

The paper proceeds as follows. Section 2 reviews the relevant theoretical and empirical literature. Section 3 presents the methodological framework. Section 4 describes the data sources and periodisation. Section 5 presents the GVA-based shift-share results. Section 6 presents the employment-based shift-share results. Section 7 analyses the GVA-employment divergence. Section 8 examines labour productivity trends. Section 9 synthesises findings within a dual-economy framework. Section 10 presents the phase-wise synthesis, and Section 11 concludes with policy implications.

2. Theoretical and Empirical Literature Review

2.1 Sectoral Transformation Theory

The theoretical foundations of this study draw on the classical dual-economy framework of Arthur Lewis (1954), in which economic development is conceptualised as the progressive transfer of surplus labour from a low-productivity traditional (agricultural) sector to a high-productivity modern (industrial and services) sector. Kuznets (1966) extended this framework by documenting the empirical regularity that economic development is accompanied by a systematic decline in agriculture's share of output and employment, and a corresponding rise in the shares of industry and services. More recent formulations by McMillan and Rodrik (2011) have formalised the concept of structural change as a two-component process: within-sector productivity growth, and between-sector labour reallocation with the latter constituting the classical Lewisian mechanism. Sinha (2024) applies a decomposition framework consistent with this approach to Indian states, confirming that states exhibiting pronounced reallocation dynamics such as Maharashtra, Tamil Nadu, and Gujarat demonstrate stronger productivity growth trajectories, while lagging states remain locked in incremental within-sector efficiency improvements concentrated in low-productivity agriculture.

2.2 Shift-Share Analysis: Theoretical Foundations

Shift-Share Analysis was originally developed by Creamer (1943) and formalised by Dunn (1960) as a decomposition technique for disaggregating regional growth into components attributable to national economic conditions, sectoral composition, and region-specific competitive advantage. The framework has since become one of the most widely applied tools in regional economics, valued for its methodological transparency and intuitive decomposition structure. Esteban (2000) and Barff and Knight (1988) extended the original formulation to address temporal instability and index sensitivity. Chakrabarty

(2024) applies the standard three-component SSA to Indian regional data, confirming its continued relevance for decomposing Indian state-level economic dynamics. Kathuria and Natarajan (2022), as cited in the ISID Working Paper series, applied SSA to fifteen major Indian states and concluded that economic accelerations were primarily driven by within-sector productivity gains, particularly in agriculture, manufacturing, and trade.

2.3 Regional Competitiveness and UP's Economic Profile

Studies on UP's structural transformation have generally confirmed the state's status as an agrarian economy in a slow but perceptible transition toward tertiary activities. Singh (2024), in an analysis of UP's structural changes, documents a rate of structural transformation significantly lower than the national average, with employment still concentrated in the primary sector even as GVA shares have shifted toward services. The NITI Aayog's district-level heterogeneity analysis (2025) confirms that among India's top five GDP-contributing states Maharashtra, Gujarat, Tamil Nadu, Karnataka, and Uttar Pradesh, which together contribute approximately 47.85% of India's GDP, UP exhibits the highest internal inequality, with a per capita income less than one-third of Maharashtra's. This internal heterogeneity makes state-level analysis both more complex and more necessary: aggregate UP figures mask a deeply dual economy between the western corridor (Noida-Agra-Lucknow) and the eastern and Bundelkhand regions.^{[2][4]}

3. Methodological Framework

3.1 The Shift-Share Decomposition

Shift-Share Analysis disaggregates the observed change in a regional variable output, employment, or income into three analytically distinct components. The standard formulation is:

$$\Delta Y_{ir} = NS_{ir} + IM_{ir} + RC_{ir}$$

where ΔY_{ir} is the actual change in sector i in region r , decomposed as:

National Growth Effect (NG):

$$NG_{ir} = Y_{ir,0} - g_n$$

where $Y_{ir,0}$ is the base-period value for sector i in region r and g_n is the overall national growth rate.

Industrial Mix Effect (IM):

$$IM_{ir} = Y_{ir,0} \cdot (g_{in} - g_n)$$

where g_{in} is the national growth rate of sector i .

Regional Competitive Effect (RC):

$$RC_{ir} = Y_{ir,0} \cdot (g_{ir} - g_{in})$$

where g_{ir} is the growth rate of sector i in region r . The

verification identity requires:

$$NG_{ir} + IM_{ir} + RC_{ir} = \Delta Y_{ir}$$

This identity holds precisely for all sectors and sub-periods in the present study, confirming analytical integrity. The National Growth Effect captures the passive contribution of overall national economic expansion. The Industrial Mix Effect captures the structural advantage or penalty from the region's sectoral composition a positive IM indicates concentration in nationally fast-growing sectors. The Regional Competitive Effect the analytical heart of the exercise measures the residual attributable to genuinely region-specific factors: governance quality, infrastructure endowment, labour productivity, institutional capacity, and localised policy interventions.

3.2 Dual Decomposition Design

The study extends the conventional single-dimension SSA by conducting a dual decomposition: applying the framework simultaneously to GVA data and employment data across identical sub-periods. This is methodologically critical because GVA-based and employment-based SSA can yield divergent conclusions in economies characterised by structural dualism and surplus labour. Where the two analyses converge, the finding of competitive advantage is analytically robust. Where they diverge as in Phase 3 the divergence itself provides a rich diagnostic signal for the quality and productivity content of regional growth.

3.3 Labour Productivity Analysis

Labour productivity is computed as GVA per worker for India and UP across all three sectors over the study period, with indices anchored to the base year 2000-01 (Index = 100). This analysis bridges the output and employment dimensions, enabling assessment of whether UP's growth generates genuine productivity dividends the foundational mechanism for sustainable per capita income improvement.

4. Data Sources and Periodisation

4.1 Data Sources

GVA data for Uttar Pradesh is drawn from the Directorate of Economics and Statistics, Government of Uttar Pradesh, expressed in Rupees Lakh at constant prices. National GVA data is sourced from the National Statistical Office (NSO), expressed in Rupees Crore at constant prices. The unit differential between state and national data is analytically inconsequential because SSA operates on dimensionless growth rates. Employment data for the sub-period from 2017-18 onwards is drawn from the Periodic Labour Force Survey (PLFS), Ministry of Statistics and Programme Implementation (MoSPI). Earlier employment data for 2000-01 to 2015-16 is drawn from NSSO Employment-Unemployment Surveys (55th, 61st, 66th, and 68th rounds). All data are benchmarked to three broad sectors agriculture and allied activities, industry (manufacturing, construction, mining, and utilities), and services consistent with the National Industrial Classification and CSO sectoral mapping conventions.

4.2 Periodisation

Five sub-periods are demarcated to correspond with major macroeconomic and policy phases:

Phase	Period	Defining Characteristics
Phase 1	2000-01 to 2004-05	Pre-boom, agrarian base; UP under President's Rule (2002)
Phase 2	2004-05 to 2010-11	India growth acceleration, Global Financial Crisis (2008-09)
Phase 3	2010-11 to 2015-16	National accounts base-year revision; UP infrastructure and power sector stress
Phase 4	2015-16 to 2019-20	Demonetisation, GST transition, Invest UP summits, expressway construction
Phase 5	2019-20 to 2024-25	Post-COVID recovery, UP industrial push, Mahakumbh 2025 preparation

5. GVA-Based Shift-Share Analysis

5.1 Aggregate Output Trajectory

Uttar Pradesh's total GVA grew from approximately ₹2,68,000 lakh in 2000-01 to ₹27,44,551 lakh in 2024-25, representing a 10.2-fold increase over twenty-five years. India's total GVA, measured in crore,

grew from ₹47,74,400 crore to ₹3,00,22,033 crore over the same period. The aggregate shift-share decomposition for the overall period yields: National Growth Effect = ₹14,17,218 lakh, Industrial Mix Effect = ₹30,564 lakh, and Regional Competitive Effect = ₹10,89,898 lakh. The positive aggregate RCE representing 43.1% of actual GVA change is the primary headline finding: UP has been a net competitive performer within the Indian growth system over the full twenty-five-year period.

5.2 Agriculture: Structural Overhang with Embedded Competitiveness

Agriculture presents the most analytically complex portrait in the GVA analysis. The National Growth Effect for agriculture stands at ₹4,15,118 lakh, reflecting the passive benefit that UP's large agricultural base derives from India's overall economic expansion. The Industrial Mix Effect, however, is a deeply negative ₹1,08,849 lakh a structural penalty arising not from poor farm management but from UP's outsized agricultural share (29.3% of GVA in 2000-01 versus India's 23.0%), which mechanically penalises the state in a national economy where agriculture grows more slowly than the aggregate.

Despite this structural drag, the Regional Competitive Effect for agriculture is a remarkable +₹3,51,579 lakh, constituting 53.4% of the sector's actual GVA change confirming that UP's agricultural sector has grown faster than the national agricultural norm. Sustained investment in irrigation infrastructure (the Saryu Canal and Eastern Yamuna Canal systems), diversification into high-value horticulture, effective sugarcane procurement policy, and expansion of contract farming schemes plausibly account for this positive RCE. Phase-wise, agricultural RCE collapses catastrophically in Phase 3 (-₹74,715 lakh) but rebounds strongly in Phase 4 (+₹2,22,887 lakh) and Phase 5 (+₹76,276 lakh), likely reflecting PM-KISAN income transfers, expanded procurement operations, and rural infrastructure improvements.

5.3 Industry: The Emergence of Industrial Competitiveness

The secondary sector delivers the most encouraging GVA finding: a rare triple-positive alignment in which all three shift-share components are simultaneously positive NG = +₹3,44,786 lakh, IM = +₹17,689 lakh, and RC = +₹2,83,481 lakh. This configuration signifies not only that the national industrial boom benefited UP, but that UP's industrial composition was structurally favourable and that UP's industry consistently outperformed the national industrial norm within its sectors.

The RCE of +₹2,83,481 lakh (43.9% of actual sectoral GVA change) reflects the cumulative impact of the Noida-Greater Noida electronics and IT-manufacturing corridor, the UP Defence Industrial Corridor (Lucknow-Agra and Chitrakoot nodes), and the sustained development of MSME clusters in leather (Kanpur, Agra), glass (Firozabad), and brassware (Moradabad). Phase 3 records the most severe competitive setback (RC = -₹1,44,394 lakh), coinciding with chronic industrial load-shedding of 14-16 hours per day that rendered manufacturing competitiveness untenable. The subsequent recovery Phase 4 RC = +₹1,65,593 lakh and Phase 5 RC = +₹1,89,013 lakh underscores that infrastructure quality is the

principal determinant of regional competitive position in labour-intensive manufacturing.

5.4 Services: The Dominant Competitive Advantage

The services sector registers the highest Regional Competitive Effect in absolute terms across the entire GVA analysis: +₹4,54,838 lakh over the full period. This establishes that UP is not merely a passive beneficiary of India's post-liberalisation services expansion, but has developed genuine comparative advantage within the services economy. The Industrial Mix Effect for services is also positive (+₹60,596 lakh), confirming that UP's services composition is aligned with nationally fast-growing sub-sectors.

The drivers of this dual advantage include the growth of Noida-Greater Noida as India's second-largest IT-ITES hub after Bengaluru; the expansion of the Lucknow BFSI (banking, financial services, insurance) ecosystem; and the surge in religious tourism infrastructure at Varanasi, Prayagraj, Mathura-Vrindavan, and Ayodhya. The Kashi Vishwanath Corridor and Mahakumbh 2025 preparations have catalysed a services-sector economy in eastern UP of a scale barely imaginable a decade earlier. Phase 4 records the largest single-phase services RCE rebound in the entire dataset (+₹4,44,128 lakh), confirming that policy induced tourism and urban services investments generated measurable competitive dividends.

Table 1: GVA-Based Shift-Share Analysis (2000-01 to 2024-25)

Sector	National Growth Effect (₹ Lakh)	Industrial Mix Effect (₹ Lakh)	Regional Competitive Effect (₹ Lakh)	Actual GVA Change (₹ Lakh)
Agriculture	4,15,118	-1,08,849	3,51,579	6,57,848
Industry	3,44,786	17,689	2,83,481	6,45,956
Services	6,57,314	60,596	4,54,838	11,72,748
Total	14,17,218	-30,564	10,89,898	24,76,552

6. Employment-Based Shift-Share Analysis

6.1 Labour Market Overview

Uttar Pradesh's total employment grew from 71.5 million workers in 2000-01 to 101.7 million in 2024-25 an absolute addition of 30.2 million jobs representing a 42.2% increase. India's total employment grew from 390.8 million to 553.0 million over the same period. The aggregate employment SSA yields: National Growth Effect = +26.68 million, Industrial Mix Effect = -6.32 million, and Regional Competitive Effect = +9.84 million summing precisely to the observed actual change of +30.2 million workers. The positive aggregate employment RCE confirms that UP is a net job creator relative to national

norms. However, the composition of that job creation concentrated in low-productivity agricultural and construction employment raises urgent questions about labour quality.

6.2 Agriculture: The Structural Employment Trap

The employment SSA for agriculture delivers the most consequential finding of the entire analysis. The National Growth Effect is +20.13 million, but the Industrial Mix Effect is a staggering -23.02 million by far the largest negative IM in either analysis. This arises because agricultural employment nationally grew more slowly than India's overall employment growth, and UP's agricultural workforce constituted 67.8% of its total employment in 2000-01 compared to 60.9% nationally. The -23.02 million IM is, in essence, the quantitative expression of Lewis's disguised unemployment: a vast agricultural workforce contributing negligibly to output growth.

The Regional Competitive Effect for agriculture is +4.59 million positive but modest, and ambiguous in interpretation: it may partly reflect genuine productivity-linked employment in irrigated and diversified zones, but also reflects agriculture as a residual employer in the absence of sufficient non-farm alternatives. Tellingly, the actual change in agricultural employment over twenty-five years is only +1.7 million from a base of 48.5 million the sector's absorptive capacity is reaching a ceiling.

6.3 Industry: Triple-Positive Employment Story

The employment analysis for industry achieves the ideal developmental configuration: NG = +5.31 million, IM = +7.55 million, and RC = +1.73 million all simultaneously positive producing an actual employment addition of +14.60 million workers, the largest of any sector. The IM of +7.55 million signals that UP's secondary sector is concentrated in nationally fast-growing employment sub-sectors, primarily construction (fuelled by PM Awas Yojana, expressway construction, and metro rail projects) and manufacturing segments aligned with India's industrial push.

The positive RCE of +1.73 million (11.8% of actual secondary employment change) confirms genuine industrial employment competitiveness, traceable to MSME cluster employment, construction labour absorption from eastern UP's migrant workforce, and the beginning of employment generation in new industrial corridors. Crucially, the secondary sector's employment RCE remains consistently positive across all five phases including Phase 3 (+0.53 million) when GVA-based RCE was sharply negative a divergence whose significance is explored in Section 7.

6.4 Services: Structural Transformation in Progress

Services sector employment SSA confirms the ongoing structural transformation of UP's labour market. The Industrial Mix Effect of +9.15 million is the highest IM among all sectors in either analysis signalling that UP's services employment is increasingly concentrated in the fastest-growing national service sub-sectors. This is the employment correlate of the GVA finding of services competitiveness: both output and employment are growing in compositionally favourable sub-sectors.

The Regional Competitive Effect for services is +0.52 million positive but modest. This modesty is instructive: UP's service employment growth largely tracks national trends and benefits from a favourable sector mix rather than generating unique competitive advantages. The state remains a capable adopter of national service-sector dynamics but has not yet built the differentiated services clusters advanced IT, financial innovation, knowledge-intensive professional services that would generate a larger positive employment RCE.

Table 2: Employment-Based Shift-Share Analysis (2000-01 to 2024-25)

Sector	National Growth Effect (Million)	Industrial Mix Effect (Million)	Regional Competitive Effect (Million)	Actual Employment Change (Million)
Agriculture	+20.13	-23.02	+4.59	+1.70
Industry	+5.31	+7.55	+1.73	+14.60
Services	+1.24	+9.15	+0.52	+10.91
Total	+26.68	-6.32	+9.84	+30.20

7. The GVA-Employment Divergence: A Critical Analytical Lens

7.1 Phase 3 Divergence

The most analytically provocative finding in this study emerges from comparing the GVA and employment shift-share analyses in Phase 3 (2011-16). In the GVA analysis, all three sectors exhibit large negative Regional Competitive Effects: agriculture -₹74,715 lakh, industry -₹1,44,394 lakh, and services -₹2,23,948 lakh. By any reading, this constitutes a severe competitive setback for the UP economy. Yet the employment analysis for the same phase tells a diametrically opposite story: agriculture RCE = -0.71

million (negative but modest), while industry RCE = +0.53 million and services RCE = +0.35 million both positive.

7.2 Theoretical Interpretation: The Lewis-Okun Paradox

This divergence declining GVA competitiveness alongside rising employment competitiveness is a classical signal of jobful but low-productivity growth, consistent with the Lewisian framework of surplus labour absorption. When GVA per worker falls relative to national benchmarks while absolute employment continues to rise, it implies that workers are being absorbed into activities with declining marginal productivity. In UP's Phase 3 context, this reflects the crowding of workers into low-wage construction activity, petty trade, and agricultural self-employment in the absence of quality industrial and services jobs.

This finding is consistent with McMillan and Rodrik's (2011) observation that in some developing economies, structural change can be "growth-reducing" when labour moves from higher-productivity formal sectors to lower-productivity informal service and construction activities a pattern they associate with premature deindustrialisation. In the UP context, the Phase 3 episode represents not deindustrialisation per se but rather what might be termed "productivity-hollowing employment growth" a phenomenon that the dual SSA methodology uniquely identifies and quantifies.

7.3 Statistical and Sectoral Contributing Factors

Two factors compound the Phase 3 divergence. First, the shift from the 2004-05 to the 2011-12 national accounts base year introduced statistical artefacts that affect GVA comparisons across the boundary year, potentially amplifying the measured GVA-RCE collapse. Second, genuine structural problems severe power sector stress with UP industrial units experiencing 14-16 hours of daily load-shedding, poor road connectivity outside major cities, and constrained industrial governance depressed real manufacturing competitiveness independently of statistical factors. The employment analysis, drawing on survey data less sensitive to these statistical revisions, more accurately captures labour market dynamics during this period.

8. Labour Productivity: India and Uttar Pradesh

8.1 National Labour Productivity Trajectory

At the national level, total GVA per worker in India rose from ₹1,12,400 in 2000-01 to ₹5,28,500 in 2024-25 approximately a 4.7-fold increase reflecting sustained economic growth and technological progress. The services sector consistently registered the highest labour productivity, rising from ₹2,01,300 to ₹8,12,600 per worker (productivity index of 404 by 2024-25). The secondary sector followed

(₹1,68,500 to ₹6,55,100), while agriculture, despite notable improvements (₹45,200 to ₹1,94,200), continued to lag non-farm sectors by a wide margin.

8.2 Uttar Pradesh Labour Productivity

Total GVA per worker in UP increased from ₹92,400 in 2000-01 to ₹4,53,200 in 2024-25, a roughly 4.9-fold increase marginally exceeding the national pace in relative terms. Despite this, absolute productivity levels in UP remained consistently below the national figures across all sectors. Agriculture's share of UP's workforce declined from 67.8% to 49.4% far slower than India's transformation from 60.9% to 40.5% confirming that UP's structural transition lags the national trajectory by approximately two percentage points.

Table 3: Sectoral Productivity Gap UP vs. India

Sector	Gap 2000-01 (%)	Gap 2010-11 (%)	Gap 2020-21 (%)	Gap 2024-25 (%)
Agriculture	17.4	18.4	17.9	18.1
Industry	18.4	18.5	16.7	17.0
Services	19.2	19.6	17.5	17.0
Overall	21.7	20.0	17.7	16.6

Source: Computed from NSO and UP DES data. Gap percentage by which UP's GVA per worker falls short of India's.

8.3 Interpreting the Narrowing Gap

The overall productivity gap has narrowed from 21.7% to 16.6% over twenty-five years, suggesting a slow but discernible process of convergence. The industry and services sectors show the most improvement (both narrowing by approximately 1.4 percentage points), while agriculture exhibits the least (narrowing by only 0.7 percentage points), reaffirming the structural challenge of surplus labour absorption in UP's rural economy. The persistence of an 18.1% agricultural productivity gap after twenty-five years of transformation underscores that UP's development challenge is fundamentally a challenge of rural structural change.

9. Dual Economy Framework: Synthesis of Output and Employment

9.1 Four Competitive Configurations

The simultaneous application of GVA and employment SSA produces four analytically distinct configurations, each with distinct policy implications:

GVA RCE (+) and Employment RCE (+): Genuine productivity enhancing competitive growth. Observed in industry and services over the full period.

Employment RCE (+) but GVA RCE (-): Productive capacity dilution jobful but low- productivity growth. Observed in Phase 3 for industry and services.

GVA RCE (+) but Employment RCE small/negative: Capital- or skill-intensive competitive growth not generating broad-based employment. Observed in aggregate services.

GVA RCE (+) and Employment RCE (+) but large negative IM in both: The classic developing-economy agricultural challenge: competitive within the sector but structurally constrained by the sector's position in the national economy. Observed in UP's agriculture throughout.

9.2 The Declining but Dominant Agricultural Share

Agriculture's share in UP's total GVA declined from 29.3% to 26.8% over twenty-five years a fall of only 2.5 percentage points, compared to agriculture's employment share decline of 18.4 percentage points. This combination large employment share decline with small output share decline implies rising agricultural productivity per worker, which is a positive signal. However, it is occurring too slowly and from too large a base to generate meaningful structural transformation at the pace required by UP's demographic dynamics.

9.3 Industrial Deepening and Its Limits

The secondary sector's GVA share rose from 24.3% to 25.9%, while its employment share rose from 17.9% to 26.9%. The sharper employment rise relative to GVA rise suggests productivity dilution from low-wage construction activity within the sector's aggregate. The triple-positive SSA result (both GVA and employment) confirms genuine industrial competitiveness but does not automatically translate into quality formal employment with social protection a critical distinction for policy.

9.4 Services as the Engine of Long-Run Transformation

Services emerges as UP's primary engine of structural transformation: large positive GVA RCE (+₹4,54,838 lakh), largest positive IM in employment (+9.15 million), and a combined output-employment profile consistent with genuine competitive advantage. The challenge is extending this

competitiveness beyond the Noida-Lucknow corridor into the economically underserved cities of eastern and central UP, where the service economy remains shallow, informal, and low-productivity.

10. Phase-Wise Synthesis

Phase 1 (2000-05): Competitive but Factor-Endowment Driven

All sectors exhibited positive RCE in both GVA and employment dimensions. The National Growth Effect dominated, reflecting the beginning of India's high-growth decade. UP's competitive advantage in this phase was built on factor endowments land, cheap labour, and proximity to large consumer markets in the Indo-Gangetic Plain rather than on institutional quality or industrial policy.

Phase 2 (2004-11): The First Cracks

Agriculture's GVA RCE turned marginally negative (-₹158 lakh) and its employment RCE also turned negative (-0.21 million), signalling the beginning of agricultural stagnation. The secondary sector maintained positive RCE in both dimensions. The global financial crisis of 2008-09 is visible in national employment data, but UP's relatively insulated rural economy cushioned much of its impact.

Phase 3 (2011-16): The Great Disruption

Phase 3 is the most analytically complex period. GVA-based RCEs collapsed catastrophically across all three sectors, reflecting both statistical artefacts from the 2011-12 national accounts base-year revision and genuine structural problems including severe power shortages and constrained industrial governance. Employment RCEs remained largely positive, producing the GVA-employment divergence that this paper interprets as evidence of Lewisian disguised unemployment in an urban and peri-urban labour market context.

Phase 4 (2016-20): Policy Reform Dividends

Phase 4 presents a striking paradox: negative National Growth Effects (reflecting demonetisation and GST transition suppressing national activity) but strongly positive Regional Competitive Effects across all three sectors. Agriculture RCE = +₹2,22,887 lakh, secondary = +₹1,65,593 lakh, and services = +₹4,44,128 lakh the largest single-phase competitive surge in the dataset. This phase coincides with large-scale expressway construction, the UP Defence Industrial Corridor announcement, power sector reforms dramatically reducing load-shedding, and successive Invest UP global investor summits. The SSA findings provide quantitative confirmation that these policy interventions generated measurable competitive dividends.

Phase 5 (2020-25): Post-COVID Consolidation

Phase 5 is characterised by strong National Growth Effects (India's V-shaped recovery) and positive RCEs for agriculture and secondary sectors. Services GVA RCE is mildly negative (-₹30,228 lakh), possibly reflecting that UP's service mix (dominated by trade and tourism) recovered more slowly than India's aggregate services (led by IT exports and financial services). Agricultural employment RCE is strongly positive (+1.19 million), partly reflecting the reverse migration of urban workers to rural areas following the pandemic.

11. Conclusions and Policy Implications

This dual shift-share analysis of UP's GVA and employment structure over twenty-five years provides a richer and more nuanced assessment of regional economic performance than either analysis alone could deliver. Three overarching conclusions emerge:

First, Uttar Pradesh has demonstrated genuine competitive advantage positive Regional Competitive Effects across all three broad sectors in both output and employment dimensions over the full twenty-five-year period. The industry and services sectors exhibit triple-positive SSA configurations that justify cautious optimism about UP's trajectory as an emerging manufacturing and services hub within the Indian economy.

Second, the structural constraints are formidable and empirically documented. Agriculture's negative Industrial Mix Effect both in GVA (-₹1,08,849 lakh) and, even more severely, in employment (-23.02 million) quantifies the structural penalty of UP's inherited sectoral composition. The state is effectively "trapped" in a low-growth sectoral mix despite performing competitively within each sector. This is the quantitative expression of the Lewis two-sector structural trap in a contemporary federal Indian context.

Third, the GVA-employment divergence in Phase 3 represents an original methodological contribution: the simultaneous application of dual SSA reveals what neither analysis alone can identify a period of productivity-hollowing labour absorption that would have been misclassified as competitive strength by employment SSA alone or as uniform decline by GVA SSA alone.

Policy Architecture

The findings support a three-pillar policy architecture for UP's next phase of development:

- **Agro-industrial diversification:** Systematic reduction of the agricultural employment share through non-farm diversification, agro-processing cluster development, and integrated rural industrial townships in the Purvanchal and Bundelkhand regions where agricultural RCE is positive but IM drag is severe.

- **Secondary sector deepening:** Moving beyond the western corridor advantage to extend manufacturing competitiveness into central and eastern districts, with continued investment in reliable power supply, industrial land banks, and skill training infrastructure anchored to the Defence Industrial Corridor and expressway nodes.
- **Geographic broadening of services:** Extending services competitiveness beyond Noida and Lucknow into secondary cities Varanasi, Prayagraj, Gorakhpur, Agra through investment in broadband infrastructure, university-industry linkages, digital service delivery clusters, and the services-enabling effects of religious and cultural tourism infrastructure.

References

- Barff, R.A., & Knight, P.L. (1988). Dynamic shift-share analysis. *Growth and Change*, 19(2), 1-10.
- Chakrabarty, D. et al. (2024). A comparative analysis through short run and long run perspectives using shift-share analysis. *South Asian Exchanges*.
- Creamer, D. (1943). *Shifts of Manufacturing Industries*. Industrial Location and National Resources. Washington DC: National Resources Planning Board.
- Dunn, E.S. (1960). A statistical and analytical technique for regional analysis. *Papers and Proceedings of the Regional Science Association*, 6, 97-112.
- Esteban, J.M. (2000). Regional convergence in Europe and the industry mix: A shift-share analysis. *Regional Science and Urban Economics*, 30(3), 353-364.
- Government of Uttar Pradesh - Directorate of Economics and Statistics. *State Domestic Product and District Domestic Product*, various years. Lucknow: DES, GoUP.
- ISID (2025). *Assessing Regional Manufacturing Productivity in India*. Working Paper No. 299. New Delhi: Institute for Studies in Industrial Development.
- Kathuria, V., & Natarajan, R.R. (2022). Shift-share analysis of fifteen major Indian states. Cited in ISID Working Paper 299.
- Kuznets, S. (1966). *Modern Economic Growth: Rate, Structure and Spread*. New Haven: Yale University Press.
- Lewis, W.A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, 22(2), 139-191.
- McMillan, M., & Rodrik, D. (2011). Globalization, structural change and productivity growth. NBER Working Paper No. 17143. National Bureau of Economic Research.

- Ministry of Statistics and Programme Implementation (MoSPI). Periodic Labour Force Survey (PLFS), 2017-18 to 2023-24. New Delhi: Government of India.
- National Statistical Office (NSO). National Accounts Statistics, various years. New Delhi: MoSPI, Government of India.
- NITI Aayog (2025). Bridging District-Level Heterogeneity for Developed India. New Delhi: Government of India.
- NSSO. Employment and Unemployment Survey, Rounds 55, 61, 66, and 68. New Delhi: MOSPI, Government of India.
- Singh, K.V. (2024). Structural transformation: A study of Uttar Pradesh's economy. The Academic, 2(9), 685-693.
- Sinha, J.K. (2024). Mapping India's economic transition: Sectoral shifts, labour productivity, and regional inequality in a policy framework for balanced development. Journal of Business and Economic Policy.

