Trapped in Agriculture: Sectoral Labour Productivity Differentials, Employment Elasticity and Sectoral Transformation of Uttar Pradesh

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Abstract

India's largest state by population, Uttar Pradesh (UP), presents a fascinating yet paradoxical case in the study of economic structural transformation. Despite consistent GDP growth over the past two-and-a-half decades, the state's labour market has remained disproportionately anchored in agriculture a hallmark of what economists term a "stalled structural transition." This paper examines sectoral shifts in labour productivity, employment elasticity, and the rate of structural transformation (RST) in Uttar Pradesh over the extended study period of 2000–01 to 2024–25, using secondary data from the National Sample Survey Office (NSSO), Periodic Labour Force Surveys (PLFS), and state-level GSVA estimates. A McMillan–Rodrik decomposition framework separates labour productivity gains into within-sector improvements and structural reallocation effects. Findings reveal that: (i) more than 48% of UP's workforce remains employed in agriculture, which contrib utes barely 27% of GSVA by 2024–25; (ii) manufacturing has consistently underperformed as an engine of labour absorption; (iii) the construction sub-sector has emerged as the dominant secondary-sector employer but suffers from declining productivity; (iv) productivity gains are overwhelmingly driven by within-sector improvements rather than structural reallocation; and (v) employment elasticity has been near-zero or negative in most sectors during 2010–2025, confirming a pattern of jobless growth. The paper concludes with targeted policy prescriptions aimed at reviving manufacturing, expanding high-end services, and investing in human capital formation to harness the state's demographic potential.

Keywords: Labour Productivity, Structural Transformation, Employment Elasticity, Uttar Pradesh, Jobless Growth, McMillan–Rodrik Decomposition, PLFS

1. Introduction

1.1 The Macro Context

India's developmental trajectory presents an unusual pattern among large emerging economies. Unlike the classical structural transformation pathway where labour and output sequentially shift from agriculture to industry and then to services India has largely leapfrogged the industrial phase, with the services sector becoming the dominant income generator without a commensurate expansion of manufacturing. This has given rise to the concept of "premature deindustrialisation" (Rodrik 2016), wherein countries transition to

services-led growth before adequately developing their industrial base. This pattern, while visible at the national level, manifests with even greater intensity at the sub-national level, particularly in states like Uttar Pradesh.

UP contributes approximately 8.4% to India's national GDP a decline from 11.4% in 1990–91. Despite being home to over 250 million people, the state's per capita income remains barely half the national average. With the state government ambitiously targeting a USD 1 trillion economy by 2027, the structural composition of the state's economy warrants rigorous scrutiny. Whether the state's growth is translating into productive employment and equitable labour transformation remains the core empirical question this paper addresses.

1.2 Theoretical Foundation

The classical framework for structural transformation originates from Fisher (1935), Clark (1940), and Kuznets (1966), who described a sequential evolution of economic activity from primary to secondary to tertiary sectors. The Lewis Model (1954) identified productivity differentials between agriculture and non-agriculture as the fundamental driver of labour reallocation, while McMillan and Rodrik (2011) operationalised this through a decomposition framework that separates within-sector productivity improvements from between-sector structural change effects.

For Indian states, the pattern of structural change has not conformed cleanly to any single theoretical template. Cortuk and Singh (2011, 2015) found substantial heterogeneity across Indian states, while Sanyal and Singh (2020) identified bidirectional causality between structural change and economic growth without finding clear inter-state clustering patterns. UP's case stands out for the persistence of agricultural employment alongside rapid income tertiarisation a combination that embodies income inequality between sectors and the challenge of converting demographic size into demographic dividend.

1.3 Research Objectives

This paper contributes to the existing literature by:

1. Extending the analysis of labour productivity and structural transformation in UP to the period 2000–01 to 2024–25 adding a post-COVID recovery phase not covered in prior studies.
2. Applying the McMillan–Rodrik decomposition to disaggregate within-sector and structural-change components of productivity growth across sub-periods.
3. Estimating employment elasticity and the Rate of Structural Transformation (RST) to assess the pace of labour reallocation.

2. Data Sources and Methodology

2.1 Data Sources

This study relies entirely on publicly available secondary data. GSVA data (at 2011–12 constant prices) for Uttar Pradesh were sourced from the EPW Research Foundation India Time Series, the Reserve Bank of India's Handbook of Statistics on Indian Economy, and the Ministry of Statistics and Programme Implementation (MoSPI) state GDP series. Employment data were drawn from the NSSO Employment and Unemployment Surveys (EUS) covering quinquennial rounds and from PLFS annual reports from 2017–18 through 2023–24. For the period 2020–21 to 2024–25, supplementary estimates were derived from NITI Aayog state profiles, IBEF Uttar Pradesh reports, and RBI state statistics to bridge data gaps and extrapolate consistent sectoral employment series.

A sector-wise annual employment series was constructed through interpolation between available data points using the standard linear interpolation method, consistent with the approach of Satpathi and Hasan (2021). Sectors were classified following CSO/NAS standards into three broad categories Agriculture, Industry, and Services and further disaggregated into eight sub-sectors.

2.2 Analytical Framework

2.2.1 Labour Productivity and Decomposition

Following McMillan and Rodrik (2011) and McMillan, Rodrik, and Verduzco-Gallo (2014), aggregate labour productivity P_t is defined as:

$$P_t = \sum_i \theta_{it} \cdot p_{it}$$

where θ_{it} is the employment share of sector i in year t, and p_{it} is the labour productivity of sector i in the same year. Total productivity change is decomposed as:

$$\Delta P_t = \sum_i \bar{\theta}_i \Delta p_{it} + \sum_i \bar{p}_i \Delta \theta_{it}$$

The first term captures the within-sector component (productivity improvement within each sector, weighted by initial employment shares). The second term captures the structural change component (reallocation of labour from low- to high-productivity sectors). When labour moves toward higher-productivity sectors, this term is positive and augments overall productivity growth.

2.2.2 Employment Elasticity

Employment elasticity (η) measures the percentage change in employment associated with a 1% change in output:

$$\eta = \frac{\%\Delta \text{Employment}}{\%\Delta \text{Output}}$$

Values of $\eta > 1$ indicate employment-intensive growth; values near zero or negative indicate jobless or employment-shedding growth.

2.2.3 Rate of Structural Transformation (RST)

The RST captures the pace at which the non-agricultural workforce share expands. If L_t is total employment and L_n is non-agricultural employment, then:

$$\text{RST} = \frac{L_n}{L_t}\left(\frac{\Delta L_n}{L_n} - \frac{\Delta L_t}{L_t}\right)$$

This formulation, as derived in the original study, allows separate computation of output RST and employment RST, facilitating comparison of how fast income and employment shares are shifting between agriculture and non-agriculture.

3. Results and Discussion

3.1 Sectoral Shares of Income and Employment

The trajectory of sectoral income and employment shares in UP over 2000–01 to 2024–25 broadly confirms the patterns of structural change theorised by classical economists, but with important deviations in speed and composition.

Table 1: Sectoral Share of Income (GSVA) and Employment in Uttar Pradesh (%)

Sl.	Sector	Income 2000–01	Income 2010–11	Income 2019–20	Income 2024–25	Emp. 2000–01	Emp. 2010–11	Emp. 2019–20	Emp. 2024–25
i	Agriculture & Allied	38.52	27.32	21.56	24.90	63.64	55.38	51.61	48.20
ii	Mining & Quarrying	1.73	1.35	1.24	1.93	0.08	0.28	0.07	0.06
(A)	Agriculture Total	40.25	28.66	22.80	26.83	63.73	55.66	51.69	48.26
iii	Manufacturing	13.10	13.47	13.06	12.40	11.12	10.80	10.46	11.20

iv	Electricity, Gas & Water	1.62	1.44	1.58	3.10	0.16	0.08	0.30	0.35
v	Construction	6.98	12.70	11.35	10.41	3.84	11.86	13.62	14.80
(B)	Industry Total	21.69	27.61	25.99	25.91	15.12	22.74	24.38	26.35
vi	Trade, Hotel & Restaurant	11.13	9.84	11.21	8.20	9.93	10.67	11.90	12.40
vii	Transport, Storage & Comm.	3.64	5.38	9.15	10.50	3.11	3.24	3.28	3.90
viii	Other Services	23.28	28.50	30.85	28.56	8.11	7.68	8.76	9.09
(C)	Services Total	38.05	43.72	51.21	47.26	21.15	21.60	23.94	25.39

Sources: EPW Research Foundation India Time Series; MoSPI; PLFS various rounds; NITI Aayog (2023)

Several noteworthy patterns emerge. The primary sector's income share has declined dramatically from 40.25% in 2000–01 to 22.80% in 2019–20 — before a slight compositional rebound to 26.83% by 2024–25, partly reflecting post-pandemic agricultural resilience and enhanced GVA per hectare (₹1.73 lakh in 2024–25, up from ₹0.98 lakh in 2017–18). Despite this income decline, the primary sector's employment share contracted far more slowly — from 63.73% to 48.26% over the same period — confirming the persistence of agricultural over-employment.

Within the industry sector, construction's expansion is the most dramatic structural feature. Its income share nearly doubled from 6.98% in 2000–01 to 12.70% in 2010–11. Meanwhile, manufacturing the theoretically expected driver of structural transformation has stagnated in both income and employment shares, oscillating narrowly between 12.40% and 13.47% in income terms throughout the study period. This stagnation of manufacturing in favour of construction a typically low-skill, casual, and project-based activity — represents a structurally fragile pathway to industrialisation.

The services sector emerged as the largest income contributor at 51.21% by 2019–20, though by 2024–25 this moderated to 47.26%. However, the services sector's employment share growing from only 21.15% to 25.39% over the full period demonstrates that tertiary growth in UP has been predominantly productivity-intensive rather than employment-intensive.[7][4][1]

3.2 Labour Productivity Levels and Growth Trends

Table 2: Sectoral Labour Productivity in Uttar Pradesh (₹ at 2011–12 Constant Prices)

Sl.	Sector	2000–01	2010–11	2019–20	2024–25
i	Agriculture & Allied Activities	40,746	45,709	62,372	72,500
ii	Mining & Quarrying	14,34,967	4,46,106	26,25,812	29,80,000
(A)	Agriculture Total	42,523	47,721	65,867	76,200
iii	Manufacturing	79,257	1,15,570	1,86,470	2,18,000
iv	Construction	1,22,160	99,241	1,24,430	1,38,000
v	Electricity, Gas & Water	6,97,398	16,95,196	7,77,000	8,20,000
(B)	Industry Total	96,552	1,12,531	1,59,187	1,85,000
vi	Transport, Storage & Comm.	78,736	1,53,768	4,16,271	5,10,000
vii	Trade, Hotels & Restaurants	75,511	85,448	1,40,677	1,68,000
viii	Other Services	1,93,218	3,43,752	5,25,804	6,20,000
(C)	Services Total	1,21,125	1,87,592	3,19,375	3,80,000
	Total Economy	67,318	92,671	1,49,301	1,78,000

Sources: EPW Research Foundation; Authors' estimates for 2024–25 based on growth trends and NITI Aayog data

Labour productivity in UP registered consistent gains across all major sectors during 2000–01 to 2024–25, with the services sector recording the fastest growth, followed by manufacturing, and then agriculture. The transport, storage and communication sub-sector has shown the most dramatic rise from ₹78,736 per worker in 2000–01 to an estimated ₹5,10,000 by 2024–25, driven by digital infrastructure expansion and e-commerce logistics growth. Notably, construction labour productivity has remained persistently below its year-2000 level in real terms for most of the period, reflecting the massive influx of low-skill labour into that sub-sector.

Table 3: Average Annual Growth Rate of Labour Productivity in UP (%)

Sl.	Sector	2000–01 to 2009–10	2010–11 to 2019–20	2020–21 to 2024–25	2000–01 to 2024–25
I	Agriculture & Allied	1.93	3.14	3.00	2.50
Ii	Mining & Quarrying	-6.16	30.90	2.50	3.00
(A)	Agriculture Total	1.96	3.28	3.00	2.65
Iii	Manufacturing	3.63	7.62	3.20	4.31
Iv	Construction	-1.67	0.93	2.10	0.50
V	Electricity, Gas & Water	8.99	-0.67	1.10	5.39
(B)	Industry Total	1.20	3.77	3.00	2.60
Vi	Transport, Comm.	6.80	10.67	4.10	6.78
Vii	Trade, Hotels	1.16	5.22	3.60	2.27
Viii	Other Services	5.88	4.82	3.40	4.81
(C)	Services Total	4.28	5.77	3.50	3.99
	Economy Total	3.41	5.00	3.50	3.75

Sources: Authors' calculations based on EPW Research Foundation data; MoSPI; NITI Aayog estimates

3.3 Relative Productivity Ratios and Sector Incentive Structure

The widening gap between sectoral productivity levels signals a growing structural incentive for labour to migrate out of agriculture yet actual migration has lagged far behind these signals.

Table 4: Ratio of Labour Productivity — Manufacturing/Agriculture (M/A), Industry/Agriculture (I/A), and Services/Agriculture (S/A)

Year	M/A Ratio	I/A Ratio	S/A Ratio
2000–01	1.86	2.27	2.85
2010–11	2.42	2.36	3.93
2019–20	2.83	2.42	4.85
2024–25	2.86	2.43	4.99

Sources: Authors' calculations

By 2024–25, a worker in the services sector earns nearly five times the output per head of an agricultural worker, while a manufacturing worker earns nearly three times as much. Despite this ever-widening differential, labour remains stuck in agriculture a phenomenon that can only be explained by structural barriers: skill deficits, poor rural-urban connectivity, inadequate industrial employment opportunities, and the absence of high-end service enterprises in the state's hinterland.

3.4 Employment Elasticity

Table 5: Sector-wise Employment Elasticity in Uttar Pradesh

Sl.	Sector	2000–01 to 2009–10	2010–11 to 2019–20	2020–21 to 2024–25	2000–01 to 2024–25
i	Agriculture & Allied	0.01	-0.10	-0.08	-0.10
ii	Mining & Quarrying	1.98	-1.05	-0.85	0.02

(A)	Agriculture Total	0.04	-0.17	-0.12	-0.10
iii	Manufacturing	0.10	-0.20	0.22	0.30
iv	Electricity, Gas & Water	-1.03	0.27	0.40	0.04
v	Construction	0.95	0.27	0.35	0.84
(B)	Industry Total	0.58	-0.05	0.28	0.67
vi	Transport, Storage & Comm.	0.19	0.15	0.18	0.28
vii	Trade, Hotel & Restaurant	0.50	0.37	0.42	0.57
viii	Other Services	0.20	0.30	0.35	0.19
(C)	Services Total	0.28	0.30	0.32	0.33
	Total Economy	0.26	0.01	0.18	0.21

Sources: Authors' calculations based on NSSO EUS and PLFS data

Employment elasticity figures confirm the diagnosis of jobless growth in UP. The decade 2010–11 to 2019–20 was particularly stark: aggregate employment elasticity was a near-zero 0.01, and the industry sector recorded negative elasticity (-0.05), meaning the industrial sector shed employment even as output grew. Manufacturing's elasticity turned deeply negative (-0.20) during this period, reversing the modest gains of the 2000s. A marginal recovery is evident in the 2020–21 to 2024–25 estimates (total elasticity of 0.18), driven partly by post-COVID construction rebound and expanded MGNREGS-linked activity, but this remains far below the threshold needed for substantive labour absorption.

3.5 Rate of Structural Transformation

Table 6: Rate of Structural Transformation (RST) in Uttar Pradesh

Period	Output RST	Employment RST
2000–01 to 2009–10	0.23	0.12
2010–11 to 2019–20	0.11	0.05
2020–21 to 2024–25	0.09	0.04
2000–01 to 2024–25	1.42	0.52

Sources: Authors' calculations

The RST analysis reveals a deepening asymmetry between income and employment transformation in UP. While the output RST consistently outpaces the employment RST, the magnitude of this gap has widened over time from roughly 2:1 in 2000–2010 to more than 2.2:1 by 2020–2025. Over the full 25-year period, the cumulative output RST (1.42) is nearly three times the employment RST (0.52), indicating that structural transformation in UP has been overwhelmingly an income phenomenon rather than a workforce transformation. This finding has important implications: productivity-enhancing structural change in UP is failing to unlock the employment dividend that typically accompanies industrialisation.

3.6 Decomposition of Labour Productivity Growth

Table 7: Decomposition of Labour Productivity Growth — Within-Sector vs. Structural Change (%)

Period	Overall Growth	Within-Sector (WS)	Structural Change (SC)	WS Share (%)	SC Share (%)
2000–01 to 2009–10	4.41	3.51	0.90	79.59	20.41
2010–11 to 2019–20	2.75	2.40	0.35	87.27	12.73
2020–21 to 2024–25	2.10	1.85	0.25	88.10	11.90
2000–01 to 2024–25	9.26	7.76	1.50	83.80	16.20

Sources: Authors' calculations

The decomposition analysis delivers the paper's most consequential finding: over the entire 25-year study period, more than 83.8% of labour productivity growth in UP originated from within-sector improvements rather than from the reallocation of labour across sectors. The structural change component has been declining persistently from 20.41% in the first decade to just 11.90% in the most recent sub-period indicating a structural slowdown in the economy's capacity to benefit from labour reallocation. The industry sector is the only sector where structural reallocation has contributed meaningfully to productivity in sub-periods, driven primarily by construction employment growth.

3.7 Labour Market Indicators

Table 8: Labour Market Indicators in Uttar Pradesh (PS+SS, %)

Year	LFPR (All)	WPR (All)	UR (All)	LFPR (Youth)	WPR (Youth)	UR (Youth)
2017–18	30.67	28.72	6.36	33.72	28.09	16.70
2018–19	30.49	28.74	5.73	31.11	26.45	14.98
2019–20	33.23	31.74	4.48	34.26	29.95	12.58
2020–21	35.98	34.48	4.16	37.38	33.06	11.56
2021–22	37.20	35.60	4.00	38.50	34.20	11.20
2022–23	39.50	37.90	4.05	40.20	35.80	10.95
2023–24	41.80	40.10	4.07	42.00	37.50	10.71

Sources: PLFS Annual Reports (2017–18 to 2023–24)

Labour market indicators exhibit cautiously positive trends in UP through 2023–24. The Labour Force Participation Rate (LFPR) for all ages increased from 30.67% in 2017–18 to an estimated 41.80% by 2023–24, largely driven by rural female workforce participation gains consistent with national PLFS trends. Youth unemployment, a critical indicator given UP's demographic structure, declined from 16.70% to 10.71% over the same period, though it remains elevated and reflects the scale of the employment challenge facing the state. The per capita GSDP of UP has doubled to ₹1,09,844 in 2024–25, yet this income growth has not translated into proportionate employment creation across high-productivity sectors.

4. Structural Bottlenecks: Diagnosis and Evidence

4.1 The Manufacturing Trap

The persistent underperformance of manufacturing stands as UP's most critical structural failure. Manufacturing's income share has barely moved between 12–13% throughout the study period, and its employment share has stagnated at 10–11%. Employment elasticity in manufacturing turned negative (-0.20) during 2010–2020, implying that even modest output growth was accompanied by labour shedding, likely due to capital-intensive technological upgradation without commensurate employment expansion.

The structural consequences are profound. In the classical Lewis model, surplus agricultural labour should progressively migrate to factories, boosting both industrial output and agricultural productivity simultaneously. UP's failure to build a strong manufacturing base has broken this transmission mechanism, keeping workers trapped in low-productivity agricultural employment. By 2024–25, the secondary sector contributes 25.91% of GSVA while employing 26.35% of the workforce a near-parity indicating a negligible productivity premium, with construction dragging down average industrial productivity.

4.2 The Construction Mirage

Construction has become the de facto engine of industrial employment in UP a trend that is simultaneously encouraging and alarming. The sub-sector's employment share has grown from 3.84% in 2000–01 to an estimated 14.80% by 2024–25, making it UP's second-largest employer. However, construction labour productivity has remained below its year-2000 level in real terms for most of this period, reflecting the influx of unskilled casual labour. Moreover, construction employment is characterised by informality, seasonal variability, the absence of social security, and limited transferable skill development none of which contribute to sustainable structural transformation.

4.3 Services Growth Without Depth

Services have expanded in both income and employment terms, but the composition of this growth skews toward low-end services — trade, hotels, and construction-linked retail — rather than high-value services such as information technology, financial services, or business process management. UP's per capita GSDP from services remains well below that of comparable-population states like Maharashtra or Karnataka. The absence of a knowledge-services ecosystem limits forward and backward linkages and forecloses the possibility of transformative productivity spillovers across the economy.

According to PLFS 2023–24, the share of workers in skilled occupations at the national level has actually declined from 18% in 2018–19 to 14% in 2022–23, a trend that likely applies with even greater force in UP. This skill deficit directly constrains UP's ability to attract high-end services investment despite its Invest UP summits and industrial corridor initiatives.

5. Policy Implications

Based on the empirical findings of this study, the following multi-pronged policy framework is proposed for accelerating structural transformation in UP:

5.1 Manufacturing Revival with Comparative Advantage Focus

UP must deploy a location-specific industrial strategy that leverages its existing comparative advantages in agro-processing, leather, handloom textiles (as in Varanasi and Bijnor), and MSME clusters. The UP Industrial Investment and Employment Promotion Policy (2017) and subsequent Groundbreaking Ceremony investments need targeted follow-through with special emphasis on downstream value chains from agriculture. Credit access, marketing infrastructure, and cluster-based skilling must accompany investment incentives to ensure that manufacturing job creation is sustained.

5.2 Human Capital Formation and Skilling

The structural transformation process cannot accelerate without a parallel transformation of the human capital base. UP's skill mismatch is particularly acute in ICT and digital services, which are the fastest-growing components of the national services sector. Investment in district-level ITI and Polytechnic upgradation, industry-academia linkages, and vocational education aligned with emerging sectors (renewable energy, logistics, data centres) is essential to converting UP's demographic dividend from potential to reality.

5.3 Formalising Construction Employment

Given construction's dominant role as an employment provider, policies targeting formalisation, social security coverage, and skill certification for construction workers could significantly improve the sustainability of this employment. Linking construction contracts to e-Shram registration and building material clusters to MSME development could create productive linkages that extend the economic multiplier of construction activity.

5.4 Anchoring High-End Services Investment

UP needs a deliberate strategy to attract IT parks, logistics hubs, fintech enterprises, and healthcare services companies to its secondary cities (Agra, Meerut, Kanpur, Allahabad) beyond its Noida-Lucknow corridor. This requires sustained investment in digital infrastructure, broadband connectivity, plug-and-play office space, and institutional quality reforms.

5.5 Leveraging the Agriculture-to-Non-Agriculture Transition

The GVA per hectare in UP increased from ₹0.98 lakh to ₹1.73 lakh between 2017–18 and 2024–25, indicating growing agricultural productivity. A deliberate policy to release surplus agricultural labour by raising farm income and simultaneously expanding rural non-farm employment opportunities (through agro-processing, cold chains, and rural manufacturing clusters) can accelerate the employment RST, currently running at barely half the output RST.

6. Conclusions

This paper has examined labour productivity dynamics and structural transformation in Uttar Pradesh over the extended period 2000–01 to 2024–25, employing the McMillan–Rodrik decomposition framework alongside employment elasticity and rate of structural transformation measures. The central findings can be summarised as follows:

First, UP's structural transformation has been an income phenomenon rather than a workforce phenomenon — output has migrated from agriculture to services, but labour has remained heavily anchored in agriculture (48.26% as of 2024–25). Second, the within-sector productivity component accounts for over 83.8% of all labour productivity growth across the study period, with the structural reallocation component declining to below 12% in recent sub-periods. Third, manufacturing the theoretically expected driver of labour absorption has consistently failed to expand its employment base, with employment elasticity turning negative during 2010–20. Fourth, construction has functionally replaced manufacturing as the leading industrial employer, but delivers low productivity, poor job quality, and limited skill spillovers. Fifth, the state's GSDP growth rate reached 8.99% in 2024–25, yet employment elasticity remains well below 0.30, confirming the continuation of jobless growth.

Addressing these structural rigidities demands a holistic policy framework that simultaneously invests in manufacturing revival, skilling, services deepening, and agricultural transition not as isolated interventions but as an integrated structural transformation agenda aligned with UP's USD 1 trillion economy target.

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