Structural Shifts, Productivity Gap & Income Inequality: Challenges to Inclusive Growth in India

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India, one of the rapidly growing economies, aspires to become a developed nation by 2047. To realize this objective, India must tackle numerous challenges spanning from growth to inequalities necessitating careful attention. Thus, current research investigates the relationship of structural change and related productivity gaps with inequality, utilizing time series data. A notable shift toward services since mid-1980s, while fostering growth, has also led to increased disparities. Findings indicate that the top 20% have been able to sustain a growing share of income, whereas the bottom 40% experienced a reduction. Further, output and employment imbalance between non-agriculture and agriculture sectors have exacerbated productivity gaps, expanding inequalities. Thus, unequal effects of sectoral transitions pose significant challenges to achieving inclusive growth, hindering the path to a developed economy.

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Introduction

India's Viksit Bharat vision represents an integrated approach to develop the nation through sustainable and inclusive growth. With pillars of sectoral development and human capital serving as the base, it ensures that all citizens benefit from growth while addressing poverty and inequality. SDGs, a global call by all member nations includes Social Sustainability that aligns with India's Viksit Bharat initiative and depends essentially on equitable distribution of growth benefits among the wider population. In fact, "Inequality impacts everyone: it doesn't matter if you're in top 1% or 0.001%, if society around you is crumbling, you're in a bad place" (Hay, 2016, as cited in Kant, 2016). In India too, "top 1% holds over 40% of wealth, while bottom 50%, merely 3%: unable to meet even basic necessities to survive" (Oxfam, 2023).

Hence, the current study focuses on development and inequality, particularly on structural shifts, which aligns with global projects (UNU-WIDER & GPID Research Network) on "structural transformation, inequalities and inclusive development. Structural transformation, entails transition from low to high productivity and from labor intensive to skill-intensive sectors, driven by productivity changes of manufacturing and services" (Das, 2023). This transformation, a key driver of growth is "both a cause and consequence of exceptionally rapid economic growth which has enabled developing Asia to raise living standards and reduce poverty at a historically unprecedented rate" (Aizenman et al., 2012). However, it has differentiated aspects with regard to income distribution, known as "Kuznets' Tension" (Ray & Kar, 2020). Kuznets observed: "during early stages of transition from agriculture to non-agricultural sectors, income inequalities increase due to productivity and income differences between sectors, however, in later stages, inequalities often decrease as productivity gaps narrow, referred as Kuznets inverted-U curve" (Kuznets, 1955, 1963). Moreover, "growth trajectory varies by country and also depends on state interventionist policies" (Das, 2023). In India, transition has been mainly towards services rather than manufacturing: agriculture value-added declined from 61% in 1951 to an average of 39% mid-1980s and further 15% in 2022. Industry was around 18% in 1951 and remained stable around 28-30% in 1980-2022. Conversely, services grew from 28% in 1951 to an average of 36% in mid-80s; and 54% in 2022. With employment in industry and services increasing to 24% and 34%, respectively, agriculture still accounts for major source of employment, 42% in 2022. This indicates: "structural transformation has been more successful in value-added than employment; more in services than manufacturing" (Das, 2023). Additionally, gap in productivity between non-agriculture and agriculture widened, increasing from 3.3 in 1980 to 4.1 in 2022.

Given India's development trends, it is essential to examine its distributive aspects to evaluate country's stance on goal of Viksit Bharat.

Review of Literature

The question of whether growth benefits poor has been a source of debate, with prevailing perspective typically favoring poverty alleviating impacts of growth. However, Munro (2019) while reviewing '*Immiserizing Growth*' highlighted: growth may not always benefit poor, as instances of growth since 1990s have been associated with decline in income of the poorest quintile. Similarly, Kim et al. (2019) noted in Indonesia: future growth driven by services with high employment potential but low productivity may make it difficult to achieve reduction in inequality. Although "structural changes outline long-term transformations observed in development patterns over time, speed and shifts towards in-

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dustry or services is also influenced by domestic policies and international economic environment" (Papola, 2012). Kuznets, discussing the relation between structural change—inequality, primarily concentrated on "industrialization process that dominated development trends of nations in 1950s" (Angeles, 2007). Nevertheless, transition towards services has gained importance in developing nations, highlighting discussions about sectoral transitions and related productivity changes, effects on inequality (UNU-WIDER).

"Benefits of growth vary by country due to differences in sectoral growth patterns and domestic policies" (McKay & Pal, 2004). In this framework, "India has experienced two distinct phases since Independence: 1960-1980, inclusion without growth: marked by state controls, resulting in low growth and low inequality and 1980-2010, growth without inclusion: a shift toward services, more liberal structural transformation caused inequality to increase" (Ray & Kar, 2020). Kwon (2016) too observed structural change and inequality to be time-contingent in US: with services employment negatively associated with inequality before 1950s and positively after. Similarly, Topuz and Daðdemir (2020) confirmed a positive impact of productivity gap on inequality, whereas, Imai et al. (2019) found a negative impact. In India, Das et al. (2014) identified a significant relation between growth and consumption inequality, attributing it to structural transformation: but did not test it empirically. While, studies emphasize significant interrelationship of structural change and productivity gaps with inequality, the same remains insufficiently investigated in India. Thus, the current study aims to address this gap using inter-temporal data.

Methodology

Structural transformation is a long-term process that necessitates time series data for a thorough analysis. Hence, two time series have been used: one from 1951-2022 to assess structural transitions' impacts on inequality, and another, 1980-2022 for sectoral productivity gap's impact on inequality. Table 1 lists the variables used, wherein, $Sectoral_{gap}$[1] is non-agricultural productivity (industry and services) measured against agricultural productivity (productivity is sector's value-added contribution percentage divided by employment contribution) based on Kuznets' (1966) methodology. Data were sourced from National Account Statistics (2024) and Back Series (Base 2011-12) for industry, services and World Inequality Database for national income shares.

Based on literature review both quadratic and linear models are examined to understand the relationship between sectoral transformations and inequality:

Model-1: $h_{20t}=x_0+x_1Iy_t+x_2Iy^2{}_t+x_3Ses_t+x_4Ses^2t+\in_{1t}$

Model-2: $l_{40t}=u_0+u_1Iy_t+u_2Iy^2{}_t+u_3Ses_t+u_4Ses^2t+\in_{2t}$

Model-3: $h_{20t}=q_0+q_1sectoral_{gapt}+\in_{3t}$

Model-4: $l_{40t}=r_0+r_1sectoral_{gapt}+\in_{4t}$

[1]Employment datasets (India KLEMS, 2024) available since 1980s restrict calculation of sectoral gaps to that time period.

Table 1 List of Variables

Variables	Codes
Percentage value-added by industry	Iy
Quadratic term of VA (industry)	Iy^2
Percentage value-added by services	Ses
Quadratic term of VA (services)	Ses^2
Productivity non-agriculture/agriculture (%)	$Sectoral_{gap}$
Percentage national income share (p80-p100)	h_{20}
Percentage national income share (p0-p40)	l_{40}

Note: p80-p100 represents top 20% & p0-p40:bottom 40%

For quadratic specifications, turning points for sample are calculated using partial derivatives:

Further, sign of turning points is confirmed by calculating second order derivative (*eqns.1-4*) as follows:

Model-1: $h_{20t} = x_0 + x_1 Iy_t + x_2 Iy^2{}_t + x_3 Ses_t + x_4 Ses^2{}_t + \in_{1t}$

$$\frac{\partial h_{20}}{\partial Iy}: x_1 + 2x_2 Iy = 0 \quad (1)$$

$$Iy = \left(-\frac{x_1}{2x_2}\right)$$

$$\frac{\partial h_{20}}{\partial Ses}: x_3 + 2x_4 Ses = 0 \quad (2)$$

$$Ses = \left(-\frac{x_3}{2x_4}\right)$$

Model-2: $l_{40t} = u_0 + u_1 Iy_t + u_2 Iy^2{}_t + u_3 Ses_t + u_4 Ses^2{}_t + \in_{2t}$

$$\frac{\partial l_{40}}{\partial Iy}: u_1 + 2u_2 Iy = 0 \quad (3)$$

$$Iy = \left(-\frac{u_1}{2u_2}\right)$$

$$\frac{\partial l_{40}}{\partial Ses}: u_3 + 2u_4 Ses = 0 \quad (4)$$

$$Ses = \left(-\frac{u_3}{2u_4}\right)$$

Eqn.1 & 2:

$$\frac{\partial^2 h_{20}}{\partial Iy^2} = 2x_2 \qquad \frac{\partial^2 h_{20}}{\partial Ses^2} = 2x_4 \quad (5)$$

Eqn.3 & 4:

$$\frac{\partial^2 l_{40}}{\partial Iy^2} = 2u_2 \qquad \frac{\partial^2 l_{40}}{\partial Ses^2} = 2u_4 \quad (6)$$

"Slope coefficients of quadratic terms indicate relationship between industry/services shares and inequality. If coefficients x_2, x_4 are positive: h_{20} share declines before increasing, resulting in a U-shaped relationship with inequality. If they are negative, share rises and then falls, indicating an inverted-U relation. Likewise, positive coefficients, u_2, u_4: suggests l_{40} share first declining and then increasing: inverted-U relationship, while, negative coefficients suggests share rising and then declining: a U-shaped relation" (Gupta, 2023).

Results

Time series analysis primarily dealing with long-period datasets, begins by testing for stationarity: "a series which fluctuates around a consistent mean and has a time-invariant variance is crucial for accurate forecasting and model analysis. Without it, OLS regression results can be misleading showing high R^2 and low DW-statistics" (Asteriou & Hall, 2007). Thus, stationarity is assessed using Augmented Dickey-Fuller and Phillips-Perron unit root tests. Among the variables listed in Table 1, l_{40}(1980-2022) is integrated of order zero; I(0), while others are of order one; I(1)[2].

As variables are mixed level stationary, the relationship is then analyzed using Autoregressive Distributed Lag method for 'cointegration', meaning: "non-stationary variables share a common trend, but when combined together, it eliminates non-stationarity, indicating a stable equilibrium relationship" (Asteriou & Hall, 2007). Along these lines, ARDL equation is formulated as follows:

$$\Delta\varphi_t = \varsigma_0 + \sum_{i=1}^{t} N_{\Phi i}\Delta\varphi_{t-i} + \sum_{i=1}^{t} \vartheta_{\sigma i}\Delta\eta_{t-i} + \varpi\Delta\eta_t + \psi\varphi_{t-1} + \Omega\eta_{t-1} + \epsilon_t \qquad (7)$$

φ_t, η_t: group of dependent and explanatory variables; 't': lag length, automatically determined by Akaike Information Criterion. "ARDL (Pesaran et al., 2001): desirable for small samples can be estimated with stationarity at I(0) or I(1). Initially, eqn.7 uses F-bounds to tests null hypothesis of no cointegration ($\psi = \Omega = 0$) against alternative ($\psi \neq \Omega \neq 0$) of a meaningful long-run relation between variables. If F stats. exceeds upper bounds critical value; I(1) from Narayan (2005), null hypothesis is rejected, however, if its below lower critical value; I(0), null is not rejected" (Jalil & Rao, 2019). Hence, Table 2, confirm a long-run relationship among variables with model 1-2, F-values, greater than I(1) at 5% significance, while, model 3-4, at 1%.

Table 2. F-Bounds Test (ARDL)

Models	1	2	3	4
Test-statistic (F)	3.824	5.043	7.210	6.561
Significance	I(0)	I(1)	I(0)	I(1)
5%	2.75	3.7550		
1%			5.593	6.333

Source: Computed

Subsequently, long-run and short-run ARDL estimates (Error Correction Mechanism) are computed as given, in eqn. 8.

"Long-run equilibrium model may be off path due to shocks, hence, Λ_1 coefficient of lagged error correction term (u^*_{t-1}) re-

[2] Detailed results are available from authors upon request

$$\Delta\varphi_t = \varkappa_0 + \sum_{i=1}^{t} \mathcal{M}_{\lambda i}\Delta\varphi_{t-i} + \sum_{i=1}^{t} \Theta_{\gamma i}\Delta\eta_{t-i} + \rho\Delta\eta_t + \Lambda u^*_{t-1} + c_t \quad (8)$$

flects feedback effect showing how quickly a system adjusts to its equilibrium. In stationary series, temporary shocks fade over time, allowing series to return to its long-run value, for which Λ must be negative and statistically significant" (Asteriou & Hall, 2007). Additionally, number of years considered is calculated by $1/\Lambda$.

Table 3. ARDL Results

Model	1	2	3	4
		LR estimates		
Iy	-4.008^{***}(1.030)	1.855^{***}(0.284)		
Iy^2	0.087^{***}(0.020)	-0.037^{***}(0.005)		
Ses	-6.017^{***}(0.719)	1.642^{***}(0.195)		
Ses^2	0.078^{***}(0.008)	-0.021^{***}(0.002)		
Sectoral_{gap}			0.182^{**}(0.071)	-0.040^{***}(0.012)
Intercept	206.047^{***}(15.928)	-39.484^{***}(4.567)	-6.331(24.259)	26.179^{***}(4.483)
		SR estimates		
B_{83}	1.752^{***}(0.273)			
B_{84}		-0.707^{***}(0.111)		
B_{15}	-2.680^{***}(0.475)	0.633^{***}(0.115)	0.073(0.298)	-0.061(0.092)
U_{t-1}	-0.511^{***}(0.101)	-0.631^{***}(0.109)	-0.074*** (0.015)	-0.113^{***}(0.024)
		ARDL-Diagnostics		
χ^2 *LM*	6.613[0.157]	6.981[0.222]	3.608[0.164]	3.888[0.273]
χ^2*BPG*	14.573[0.626]	19.063[0.387]	8.597[0.126]	9.858[0.130]

Notes:(i) Detailed SR estimates are available on request (ii) Figures in ( )indicate standard errors & [ ] p-values (iii) Significance levels are highlighted with *,** &*** to represent 10%, 5% and 1%, respectively

Source: Computed

Table 3 shows ARDL estimates for long-run and short-run along with diagnostics checks for serial correlation (LM Test: Breusch-Godfrey) and heterosk-edasticity (Breusch-Pagan-Godfrey), which provide dependable results, as p-values are insignificant.LR estimates[3] verify a U-shaped relation between structural shifts and inequality,

[3] Between 1951-2022, breaks were detected in 1983, 1984 for h_{20} and l_{40}, respectively, using ADF Breakpoint unit root test, for which respective dummies are included. No significant breaks were identified from 1980-2022. Additionally, a dummy for 2015 is included in all models to account for any "changes in data patterns that might arise due to extrapolation"

with coefficients of industry and services significant at 1%. In Model-1, Iy is negative, Iy^2 is positive and same stands for Ses, Ses^2 suggesting a decline in h_{20} share followed by an increase. Similarly, in model-2, Iy is positive, Iy^2 is negative and same is , Ses, Ses^2 suggesting an initial increase in l_{40} followed by a decline.

Minimum point for h_{20} is observed around 23.03% industry share and for services around 38.57%, whereas, for l_{40} maximum point occurred around 25.06% industry share and for services at 39.09%. Therefore, turning points for industry was roughly between 1961-64 and for services between 1987-90. Consequently, structural shifts have led to increased inequality, with impact of services being more pronounced, as growth in India has largely been led by services, without any significant shifts to industry.

Structural shifts have led to increased inequality, with impact of services being more pronounced, as growth in India has largely been led by services, without any significant shifts to industry.

Thus, "prior to 1980s, government policies resulted in restrictive structural transformation, hence, low growth and inequality, whereas, after mid-80s, government adopted a more liberal approach, resulting in loosening state controls and adoption of LPG policy. This caused more pronounced shift towards services since 1980s, benefitting the rich more than the poor" (Das, 2023;Ray & Kar, 2020). "India deviated from historical agriculture-industry-services path: directly transitioning from agriculture to service-led growth model since 1980s" (Papola, 2012). While classified as structurally underdeveloped country due to high agriculture employment (Baymul & Sen, 2020) it could be classified as structurally developing based on output, where major share is contributed by services, followed by manufacturing and least agriculture. This imbalance between output—employment has widened productivity gap leading to increased inequalities (Table 3): benefitting h_{20}, increasing their share by 0.18 percentage point, while causing to lose their share by 0.04 percentage point.

PLFS 2022-23 highlights "a concerning state of India's labor market, as only 2.37% and 8.59% of workers are classified as highly-skilled (skill-levels 3 and 4), whereas, a significant 22.15% are classified as low-skilled" (Zutshi, 2024). Thus, "structural transformation being more successful in value-added than employment, has benefitted a small segment of population. Fueled by high skill intensity of services and manufacturing, India's growth has been non-inclusive, leaving poor behind" (Balasubramanian, 2023).

Next, SR estimates confirm the stability of LR estimates seen by negatively significant coefficient at 1% of u^*_{t-1}. Thus, any shock to series is temporary, with models returning to long-run equilibrium in around: 1.96 years (model-1 at 51.1% annually), 1.58 years (model-2: 63.1%), 13.51 years (model-3: 7.4%) and 8.85 years (model-4: 11.3%).

Conclusion & Policy Suggestions

This study highlights: structural shifts since 1950s, particularly in services since mid-1980s, have widened income gaps between top and bottom. Exacerbated by productivity differentials between non-agriculture and agriculture, bottom population has been losing its share, unable to benefit from growth since 1980s.

Hence, our study suggests that high growth led by services may become unsustainable if it does not benefit the entire population. Income disparities diminish lower income share, affecting overall demand. In the short-term, government can address inequalities by taxing the rich and utilizing proceeds to enhance poor's welfare. However, in the long-run, a more proactive approach is required for Viksit Bharat. Coordinated efforts from public and private sectors to create non-agricultural jobs are crucial for facilitating structural shifts and closing productivity divide. However, all three sectors: agriculture, industry, services must develop together, as they are interdependent. To this end, a comprehensive structural transformation policy could be drafted with diverse measures supporting each sector, ranging from generating jobs in manufacturing for low skilled workers to addressing barriers that restrict benefits of structural transformation to all groups—regarding this educational and vocational facilities to help low skilled labor advance to services are required.

References

Aizenman, J., Lee, M., & Park, D. (2012), The Relationship between Structural Change and Inequality: A conceptual Overview with Special Reference to Developing Asia, ADBI Working Paper 396.

Angeles, L. (2007), A Proper Farewell to Kuznets' Hypothesis, University of Glasgow Discussion Paper 2007–15.

Asteriou, D., & Hall, S. G. (2007), Applied Econometrics: A Modern Approach (Revised ed.). Palgrave Macmillan.

Balasubramanian, S. (2023). "Could Better Jobs for Men Have Improved Gender Equality? The Relationship between Economic Growth and Gender Equality in India", *Asian Development Review*,40(2): 24169

Baymul, C., & Sen, K. (2020), "Was Kuznets Right? New Evidence on the Relationship between Structural Transformation and Inequality", *The Journal of Development Studies*, *56*(9): 164362.

Chancel, L. (2020). Indian Inequality Updates (2015-2019) ,World Inequality Lab Technical Note 2020/09.

Das, S. K. (2023), Industrialization, Inequalities, and Inclusive Development: Lessons from Global Experiences, ISID Policy Briefs #2303

Das, S., Sinha, G., & Mitra, T. K. (2014), "Economic Growth and Income Inequality: Examining the Links in Indian Economy": *Journal of Quantitative Economics*,*12*(1): 8695.

Gupta, K. (2023). Economic Growth, Structural Change and The Kuznets Hypothesis: An Empirical Investigation of Indian Economy, (Unpublished Ph.D. Thesis), Panjab University.

Imai, K., Gaiha, R., & Bresciani, F. (2019). "The Labor Productivity Gap between the Agricultural and Nonagricultural Sectors, and Poverty and Inequality Reduction in Asia", *Asian Development Review*, *36*(1): 11235.

Jalil, A., & Rao, N. H. (2019). "Time Series Analysis (Stationarity, Cointegration, and Causality)" in B. Ozcan & I. Ozturk (Eds.), Environmental Kuznets curve (EKC): A Manual", Academic Press.

Kim, K., Sumner, A., & Yusuf, A. A. (2019). "Is Structural Transformation-led Economic Growth Immiserizing or Inclusive? The Case of Indonesia", in Shaffer. P, Kanbur. R, & Sandbrook. R (Eds.), Immiserizing Growth: When Growth Fails the Poor, Oxford Academic.

Kuznets, S. (1955). "Economic Growth and Income Inequality", *The American Economic Review*, *45*(1): 1–28.

Kuznets, S. (1963) "Quantitative Aspects of the Economic Growth of Nations: VIII. Distribution of Income by Size", *Economic Development and Cultural Change*, *11*(2): 180.

Kuznets, S. (1966), Modern Economic Growth: Rate, Structure and Spread: An Adaptation. Vakils Publications.

Kwon, R. (2016), "A New Kuznetsian Dynamic: The Knowledge Economy and Income Inequality in the United States 1917–2008", *The Sociological Quarterly*, *57*(1): 174204.

McKay, A., & Pal, S. (2004), "Relationships between household consumption and inequality in the Indian States, *Journal of Development Studies*,*40*(5): 6590.

Munro, L.T. (2019), "Immiserizing growth: when growth fails the poor", *Canadian Journal of Development Studies / Revue canadienne d'études du développement*,*41*(1):16162.

Narayan, P. K. (2005). 'The saving and investment nexus for China: evidence from cointegration tests'' *Applied Economics*,*37*(17):1979-90.

Papola, T. S. (2012). Structural Changes in the Indian Economy: Emerging Patterns and Implications, ISID Working Paper 2012/02.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics*,*16*(3), 289326.

Ray, S., & Kar, S. (2020), Kuznets' tension in India: Two episodes, UNU-WIDER Working Paper 2020/24.

Kant, S. (2016), Income Inequality in India: Pattern, Causes and Consequences, Unpublished Ph.D. Thesis, Panjab University.

Topuz, S. G., & Daðdemir, Ö. (2020), "Analysis of the relationship between trade openness, structural change, and income inequality under Kuznets curve hypothesis: The case of Turkey", *The Journal of International Trade & Economic Development*, *29*(6): 64764.

Zutshi, S. (2024), "Mind the gap, then fix it: The mismatch between workforce skills and job market demands in India", *Economic Times* (July 11)