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EVALUATION OF SSS (SKILL, SELF-EMPLOYMENT AND
SOCIO-ECONOMIC SUPPORT) DEVELOPMENT PROGRAMMES
AND THEIR IMPACT ON EMPLOYMENT GENERATION IN
UTTAR PRADESH

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Keywords	Abstract
<p><i>SSS programmes, employment generation, Uttar Pradesh, skill development, regression analysis, Difference-in-Differences</i></p>	<p>This paper assesses the effectiveness of Skill, Self-Employment and Socio-Economic Support (SSS) programmes launched in various parts of Uttar Pradesh from 2015 to 2024. The study uses secondary data from the Directorate of Employment and Training, MSME census, NSSO and administrative databases from 75 districts and uses multiple regression analysis, Difference-in-Differences (DiD) estimation and time-series decomposition to measure employment outcomes. The results show that beneficiaries who participated in the SSS programs had a 14.7 percentage-point higher wage employment rate and a 9.3 percentage-point higher self-employment rate, which were both statistically significant at the 1% level ($p < 0.01$). But there are gender, geographic and sector differences. There is considerable variation in programme uptake and quality of outcomes at the district level. Policy recommendations include institutional convergence,</p>



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	tracking of infrastructure, and district-specific calibration of training curricula.
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1. Introduction

There is a structural problem of employment that is quite large in the state of Uttar Pradesh (UP), India's most populous state with more than 240 million people. Based on PLFS data, the labour force participation rate in the state was 48.2% in 2023-24, with significant degree of underemployment in the labour force, especially in rural areas and for youth aged 15-29. In this context, various government of state and central schemes like Vishwakarma Shram Samman Yojana (VSSY), the UP Skill Development Mission (UPSDM), the Chief Minister's Youth Self-Employment Scheme (CMYSES) etc. under the multi-dimensional Skill, Self-Employment and Socio-Economic Support (SSS) programmes have been launched by successive state and central government administration. However, although significant fiscal investments have been made (total expenditure on the scheme amounting to ₹14,300 crore from FY 2015-16 to FY 2023-24), impact evaluation studies are still limited. Previous research is mainly based on administrative completion measures (number of people trained, number of certificates issued) and not longitudinal employment data. This paper aims to fill in that gap with an integrated quantitative framework. The aims of the study are: (i) to capture the institutional structure and design of SSS programmes in UP; (ii) to develop a district level panel data set to connect inputs to employment outputs; (iii) to use the econometric approaches to estimate causal employment impacts; and (iv) to draw inferences for policy action.

2. Review of Literature

The linkage between government skill development programmes and employment has been studied at the national level. Mehrotra et al. (2014) reported that in India, only a small fraction of the population (5%) was covered by formal vocational training in 2012, which is significantly lower than that of other countries like China (24%) and South Korea (96%). The authors Singh and Dey (2018) employed propensity score matching to estimate wage premiums for workers who are certified by PMKVY in three northern Indian states, and found wage premiums that are small but statistically significant for workers on average (between 8% and 12%). In the assessment of UPSDM for Uttar Pradesh in 2021, NITI Aayog noted the rates remained at 56-64% for 14 SSC across Uttar Pradesh, noting the inconsistent definition of 'placement' between districts. World Bank (2020) assessed the impact of self-employment schemes in three UP districts through randomized controlled trials and reported positive results in enterprise creation (OR = 1.62, 95% CI: 1.18–2.23) and minimal income-sustainment after 18 months. The gender dimension is under-researched: Rustagi (2019) found that over the period 2015–19, the proportion of women participating in programmes increased by 13 percentage points compared to 22 percentage points for men, with the figures for women increasing from 28% to 41%. This study extends and builds upon the above by using a balanced district-level panel (covering nine years), by disaggregating outcomes by scheme, gender, sector and geographic



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region, and by using both reduced-form and structural econometric methods.

3. Data and Methodology

3.1 Data Sources

The empirical analysis is based on 6 main data sources: (i) UPSDM Management Information System (MIS) district-wise beneficiary enrolment, completion of training and placement records 2015-2024; (ii) Periodic Labour Force Survey (PLFS) 2017-18 to 2022-23 annual rounds; (iii) MSME Census 2021-22 (UP sub-sample); (iv) Economic Census 2013 and 2023 district snapshots; (v) National Sample Survey (NSS) 68th and 77th round baseline and end-line household income; and (vi) administrative data of Directorate of Employment and Training (DET). The combined panel includes 675 district-year observations over nine annual periods (2015-16 to 2023-24) covering all 75 districts in UP. The variables considered were: total SSS expenditure per capita (₹), persons trained per each 1000 labour force participant, certified placement ratio, female beneficiary share (%), sectoral allocation — manufacturing, services, agriculture, and outcome variables — wage employment rate, self-employment rate, youth NEET rate and median monthly household income.

Table 1: Summary Statistics of Key Variables (2015–16 to 2023–24)

Variable	Mean	Std. Dev.	Min	Max	N
SSS Expenditure per capita (₹)	312.4	184.7	48.2	891.6	675
Persons Trained / 1,000 LFP	23.8	11.4	4.1	67.3	675
Certified Placement Ratio (%)	58.6	14.2	21.4	88.3	675
Female Beneficiary Share (%)	36.2	9.8	11.7	61.4	675
Wage Employment Rate (%)	42.1	8.7	24.3	64.8	675
Self-Employment Rate (%)	38.4	7.3	19.6	57.2	675
Youth NEET Rate (%)	28.7	6.9	12.1	47.4	675
Median HH Monthly Income (₹)	9,842	3,214	4,120	22,680	675

Table 1: Descriptive statistics of district-year panel ($N = 675$). LFP = Labour Force Participant; HH = Household. Source: Authors' compilation from UPSDM MIS, PLFS, DET.



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3.2 Econometric Framework

There are three complementary strategies for estimating: The baseline specification is Ordinary Least Squares (OLS) with district fixed effects (α_i), year fixed effects (λ_t) and a set of time-varying district-level covariates (X_{it}). SEs are grouped at the district level.

$$Y_{it} = \beta_0 + \beta_1 \text{SSS}_{it} + \beta_2 X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}$$

(B) Difference in Differences (DiD): staggered roll-out of the programme at the district level. The districts that entered the UPSDM program during the first phase (2015–17) are treated districts while subsequent entry districts are the control districts. The ATT is the measure represented by the DiD coefficient, assuming that the parallel trends assumption is met by pre-treatment placebo tests. State-level employment series (2010-2024) are decomposed into trend, cyclical and irregular components using a Time-Series Decomposition (Hodrick-Prescott Filter) to extract secular programme effects from macroeconomic shocks and shocks in 2020-21 (COVID-19 disruption) are treated as structural breaks.

4. Results and Statistical Analysis

4.1 Aggregate Employment Trends (2015–2024) Figure 1 (tabulated below) shows the trend of wage and self-employment rates of SSS programme beneficiaries compared to the overall UP labour force. Since 2017, a stable increasing trend is noticeable, with an average increase of 6.4 percentage points in terms of wage employment and 4.1 percentage points in terms of self-employment, corresponding to the operationalisation of the first 200 UPSDM training centres.

Table 2: Comparative Employment Rates — SSS Beneficiaries vs. General Labour Force (%)

Year	Wage Emp. — Beneficiaries	Wage Emp. — General UP	Differential	Self-Emp. — Beneficiaries	Self-Emp. — General UP	Differential
2015–16	38.2	36.4	+1.8	31.4	30.6	+0.8
2016–17	40.1	37.0	+3.1	33.7	31.4	+2.3
2017–	44.6	37.8	+6.8	36.2	32.1	+4.1



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Year	Wage Emp. — Beneficiaries	Wage Emp. — General UP	Differential	Self-Emp. — Beneficiaries	Self-Emp. — General UP	Differential
18						
2018–19	47.3	38.9	+8.4	38.6	33.0	+5.6
2019–20	49.8	39.6	+10.2	40.1	33.7	+6.4
2020–21	41.2	33.1	+8.1	37.9	31.8	+6.1
2021–22	51.4	40.2	+11.2	42.3	34.9	+7.4
2022–23	54.1	41.8	+12.3	44.7	35.8	+8.9
2023–24	56.8	42.1	+14.7	47.7	38.4	+9.3

Table 2: Employment rate trajectories (%), 2015–16 to 2023–24. COVID-19 disruption visible in 2020–21. Source: UPSDM MIS merged with PLFS estimates.

4.2 Regression Results

The main OLS fixed-effects estimates are given in Table 3. In both wage employment ($\beta_1 = 0.312$, $SE = 0.047$, $p < 0.001$) and self-employment ($\beta_1 = 0.198$, $SE = 0.038$, $p < 0.001$), the key coefficient of interest — programme intensity (persons trained per 1,000 LFP) — is positive and statistically significant across all specifications. In the regression, controlling for district and year effects, a one-standard-deviation increase in training intensity (≈ 11.4 persons per 1,000) corresponds to a 3.6



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percentage-point increase in wage employment and a 2.3 percentage-point increase in self-employment.

Table 3: OLS Fixed-Effects Regression — Dependent Variables: Wage Employment Rate & Self-Employment Rate

Variable	Wage Emp. (β)	SE	p-value	Self-Emp. (β)	SE	p-value
Training Intensity (per 1,000 LFP)	0.312***	0.047	<0.001	0.198***	0.038	<0.001
SSS Expenditure per Capita (₹ 100)	0.084**	0.031	0.007	0.061**	0.026	0.019
Female Beneficiary Share (%)	0.143***	0.052	0.006	0.107**	0.044	0.015
Manufacturing Sector Allocation	0.227***	0.063	<0.001	0.068	0.058	0.243
Services Sector Allocation	0.192***	0.057	<0.001	0.114*	0.061	0.062
District Literacy Rate (%)	0.318***	0.086	<0.001	0.201**	0.074	0.007
Road Connectivity Index	0.092*	0.048	0.055	0.073	0.051	0.153
Constant	18.34***	2.14	<0.001	16.82***	1.98	<0.001
District FE	Yes	—	—	Yes	—	—
Year FE	Yes	—	—	Yes	—	—
R ²	0.736	—	—	0.694	—	—
Observations	675	—	—	675	—	—

Table 3: OLS FE estimates. Robust SEs clustered at district level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.1$. FE = Fixed Effects.

4.3 Difference-in-Differences Estimates

A difference of 8.4 percentage points (SE = 1.74, $p < 0.001$) in wage employment and 5.9 percentage points (SE = 1.42, $p < 0.001$) in self-employment at 3 years post-treatment is found between early-



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entry (Phase I, 2015–17) and late-entry (Phase II, 2018–20) districts overall. The pre-treatment parallel trend tests provide evidence of validity of identification with F-test p-values of 0.61 and 0.54 for the two outcome variables 2 years before the first phase is rolled out.

Table 4: Difference-in-Differences Estimates — Phase I vs. Phase II Districts

Outcome Variable	Pre-Treatment Mean (Control)	Pre-Treatment Mean (Treated)	ATT Estimate	95% CI	p-value
Wage Employment Rate (%)	37.4	37.9	+8.4***	[5.0, 11.8]	<0.001
Self-Employment Rate (%)	31.8	32.3	+5.9***	[3.1, 8.7]	<0.001
Youth NEET Rate (%)	32.1	31.6	-4.7***	[-7.2, -2.2]	<0.001
Median HH Income (₹ '000)	8.4	8.6	+2.1**	[0.8, 3.4]	0.002

Table 4: ATT = Average Treatment Effect on the Treated. Phase I districts (N = 31); Phase II districts (N = 44). *** $p < 0.001$, ** $p < 0.01$.

4.4 Sectoral and Gender Disaggregation

There are some noticeable heterogeneous effects. The highest wage employment returns for training in manufacturing sector are observed ($\beta = 0.227$, Table 3) due to the absorptive power of the Noida-Greater Noida-Agra industrial corridor. Robust returns to services sector training in urban districts (Lucknow, Kanpur, Varanasi) and less in remote Bundelkhand districts, indicating that infrastructure complementarities play a role.

Table 5: Gender-Disaggregated Employment Outcomes Among SSS Beneficiaries (2023–24)

Indicator	Male Beneficiaries	Female Beneficiaries	Gap (M-F)	Statistical Test
Wage Employment Rate (%)	62.4	44.8	+17.6	$t = 8.34$, $p < 0.001$
Self-Employment Rate (%)	51.3	41.2	+10.1	$t = 4.92$, $p < 0.001$



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Indicator	Male Beneficiaries	Female Beneficiaries	Gap (M-F)	Statistical Test
Median Monthly Wage (₹)	11,480	8,240	+3,240	$t = 7.61$, $p < 0.001$
Job Retention at 12 months (%)	68.4	53.1	+15.3	$\chi^2 = 28.4$, $p < 0.001$
Micro-enterprise Survival at 24 months (%)	58.2	47.9	+10.3	$\chi^2 = 14.2$, $p < 0.001$

Table 5: Comparison of employment outcomes by gender, 2023–24. Source: UPSDM MIS follow-up survey ($n = 14,872$ beneficiaries).

This gender wage gap of ₹3,240 per month (28% differential) among the trained beneficiaries is due to occupational segregation and supply side factors: women are over-represented in low wage occupations such as tailoring, food processing as compared to men in electronics, construction, IT. However, the coefficient for female beneficiary share is quite positive (Table 3), suggesting that those districts with higher female enrolment record more aggregate employment growth, as indicated in feminist economics literature on the subject.

4.5 District-Level Variation

Table 6: Top 5 and Bottom 5 Performing Districts — Composite SSS Employment Index (2023–24)

Rank	District	Training Intensity	Placement Rate (%)	Wage Emp. Rate (%)	Composite Index
1	Lucknow	64.8	84.2	61.4	87.3
2	Noida (G. B. Nagar)	62.1	86.7	63.8	86.9
3	Agra	51.4	78.3	58.2	78.4
4	Varanasi	48.7	76.1	56.7	75.8
5	Kanpur Nagar	46.2	74.8	55.9	74.2



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Rank	District	Training Intensity	Placement Rate (%)	Wage Emp. Rate (%)	Composite Index
71	Sonbhadra	12.3	34.6	28.4	31.4
72	Shrawasti	10.8	31.2	26.7	29.8
73	Lalitpur	9.4	29.7	25.3	28.1
74	Chitrakoot	8.6	27.4	24.8	26.7
75	Balrampur	7.2	24.8	24.3	24.2

Table 6: Composite SSS Employment Index = weighted mean of placement rate (40%), wage employment rate (40%), and self-employment rate (20%). Source: Authors' calculations from UPSDM MIS.

5. Discussion and Policy Implications

All the econometric evidence is consistent with the hypothesis of economically and statistically significant employment creation in Uttar Pradesh arising from SSS programmes. The DiD ATT of 8.4 percentage points in wage employment corresponds to nearly 1.2 million additional wage-employed people in treated districts, a substantial welfare improvement at scale. But there are three important policy questions that arise. First, the urban–rural divide highlighted in Table 6 reveals that programmes tailored for the industrial corridor districts are not performing as well in Bundelkhand and Poorvanchal. Redesign of the curriculum and sector-mix for agriculture allied and micro-enterprise model is required. Second, there is a gender employment gap (Table 5) which requires targeted interventions such as gender-specific occupational diversification, provision of creches at training centres and linkage with female self-help groups (SHG) credit. Third, lower benchmarking of sustainability metrics such as job retention at 12 months (68.4% for males and 53.1% for females) and enterprise survival at 24 months as compared to the recommended 75% by the National Skill Development Corporation.

7. Programme Architecture and Institutional Landscape

7.1 Scheme-Wise Design Overview

The SSS umbrella in Uttar Pradesh encompasses five primary schemes that operate in parallel yet with distinct institutional homes, funding streams, and target populations. Understanding their design logic is prerequisite to interpreting outcome differentials.

Table 7: Scheme-Wise Architecture of SSS Programmes in Uttar Pradesh (2023–24)



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Scheme	Nodal Agency	Target Group	Duration (Weeks)	Funding (₹ Cr, 2023–24)	Beneficiaries (Lakh)
UPSDM (Skill Dev. Mission)	DVESD	Youth 15–35, ITI dropout	12–24	2,840	8.72
Vishwakarma Shram Samman (VSSY)	MSME Dept.	Traditional artisans	1 (toolkit + cert.)	420	2.14
CM Youth Self-Emp. (CMYSES)	Khadi & VI Board	Educated unemployed	8–12	1,680	3.41
PMKVY (UP component)	NSDC / SSCs	School leavers 15–29	8–16	980	4.28
Mukhyamantri Gramodyog Rojgar (MGRY)	Rural Dev. Dept.	Rural BPL households	4–8	610	1.96
Total / Aggregate	—	—	—	6,530	20.51

Table 7: Programme architecture summary, FY 2023–24. DVESD = Directorate of Vocational Education & Skill Development; SSC = Sector Skill Council; BPL = Below Poverty Line. Source: UP Budget Documents 2023–24 & scheme MIS portals.

Much of the difference in outcomes can be attributed to the fragmentation of delivery, through five nodal agencies. Previously there was no standardized ID system for beneficiaries, which led to a significant overestimation in the reach figures of 12% to 18% till 2021 (NITI Aayog audit 2022). Reported levels of coverage have been reduced since the Unified Skill Registry (USR) was introduced in FY 2021–22, but tracking fidelity is showing significant improvement.

7.2 Fiscal Trend Analysis

Table 8: Fiscal Outlay and Per-Beneficiary Cost Trends, FY 2015–16 to 2023–24

Fiscal Year	Total Outlay (₹ Cr)	Beneficiaries (Lakh)	Per-Beneficiary Cost (₹)	YoY Outlay Growth (%)	GDP Deflator-Adj. Cost (₹, 2016 prices)



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Fiscal Year	Total Outlay (₹ Cr)	Beneficiaries (Lakh)	Per-Beneficiary Cost (₹)	YoY Outlay Growth (%)	GDP Deflator-Adj. Cost (₹, 2016 prices)
2015–16	1,840	6.24	29,487	—	29,487
2016–17	2,120	7.81	27,144	+15.2%	26,612
2017–18	2,680	9.43	28,419	+26.4%	27,084
2018–19	3,240	11.82	27,412	+20.9%	25,411
2019–20	3,890	14.17	27,452	+20.1%	24,608
2020–21	2,940	9.86	29,817	–24.4%	26,012
2021–22	4,610	16.42	28,077	+56.8%	23,847
2022–23	5,480	18.74	29,242	+18.9%	24,110
2023–24	6,530	20.51	31,838	+19.2%	25,640

Table 8: Fiscal data from UP Budget documents (Demand No. 43, 44, 67). Per-beneficiary cost deflated using GDP deflator (base year 2015–16 = 100). COVID-19 disruption visible in 2020–21 contraction.

Real per-beneficiary cost (constant 2016 prices) has remained remarkably stable at ₹23,847–27,084 across the study period, suggesting no significant efficiency degradation as the programme scaled from 6.24 lakh to 20.51 lakh annual beneficiaries — a 3.3-fold expansion. The COVID-19-induced contraction of 2020–21 (–24.4% outlay, –30.4% beneficiary throughput) was fully recovered by 2021–22, with the programme demonstrating strong institutional resilience.

8. Cost-Benefit Analysis and Economic Multipliers

8.1 Return on Investment Estimation

A social cost-benefit analysis (CBA) of SSS programmes is conducted using the human capital investment framework. Benefits are operationalised as the present discounted value (PDV) of incremental lifetime earnings attributable to programme participation; costs include direct fiscal outlay and the opportunity cost of training time (foregone earnings). A social discount rate of 8% (RBI benchmark) and a 30-year benefit horizon are applied



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Table 9: Social Cost-Benefit Analysis by Scheme Type (2023–24 Cohort)

Scheme	Avg. Training Cost/Person (₹)	Incremental Monthly Wage (₹)	PDV of Benefits (₹)	Benefit-Cost Ratio	Payback Period (Months)
UPSDM (Manufacturing)	32,400	4,820	6,47,310	19.98	6.7
UPSDM (Services)	28,100	3,960	5,31,680	18.92	7.1
VSSY (Artisan)	14,200	2,340	3,14,220	22.13	6.1
CMYSES (Self-Emp.)	41,600	3,180	4,27,040	10.27	13.1
PMKVY (UP)	22,300	3,420	4,59,480	20.60	6.5
MGRY (Rural)	18,700	1,840	2,47,060	13.21	10.2
Weighted Average	27,890	3,570	4,79,640	17.20	7.8

Table 9: CBA estimates for 2023–24 cohort. PDV calculated at 8% discount rate over 30-year horizon. Incremental wage = difference between beneficiary and matched-control monthly earnings at 12-month follow-up. Source: Authors' calculations from UPSDM MIS and PLFS wage data.

The weighted average benefit-cost ratio (BCR) of 17.20 is strikingly high compared to international benchmarks — the ILO meta-analysis of active labour market programmes reports median BCRs of 1.8–4.2 for developing country skill programmes. This differential likely reflects UP's large initial skills deficit and the low-cost artisan-training component (VSSY BCR = 22.13). Nonetheless, even applying a 50% downward adjustment for optimism bias, the BCR exceeds 8.0, firmly establishing positive social returns.

8.2 Employment Multiplier Effects

Indirect employment creation — through demand linkages from rising incomes of direct beneficiaries — is estimated using the Social Accounting Matrix (SAM) multiplier framework for Uttar Pradesh (NIPFP, 2022). The analysis yields a total employment multiplier of 1.84 for manufacturing-linked training and 1.62 for services-linked training, implying that every 100 direct



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jobs created by SSS programmes generate an additional 84 and 62 indirect jobs respectively in the state economy.

Table 10: Employment Multiplier Estimates by Sector (SAM Framework)

Sector	Direct Jobs Created (2023–24)	Employment Multiplier	Total Jobs (Direct + Indirect)	Value Added per Job (₹ Lakh)	GVA Contribution (₹ Cr)
Manufacturing	2,14,800	1.84	3,95,232	1.84	7,272
Services & IT	1,87,400	1.62	3,03,588	2.12	6,436
Agri-allied	98,200	1.48	1,45,336	0.96	1,395
Construction	1,12,600	1.71	1,92,546	1.42	2,734
Handicrafts / VSSY	74,300	1.39	1,03,277	0.88	909
Total / Aggregate	6,87,300	1.68 (wtd.)	11,39,979	1.72 (wtd.)	18,746

Table 10: Employment multipliers from NIPFP (2022) UP SAM model, applied to UPSDM sector-wise placement data. GVA = Gross Value Added. Wtd. = employment-share weighted average.

The aggregate GVA contribution of ₹18,746 crore in 2023–24 from SSS-linked employment — against a programme expenditure of ₹6,530 crore — represents a fiscal return of ₹2.87 per rupee invested at the state economy level. These multiplier estimates, while subject to model uncertainty, reinforce the macroeconomic case for sustained and expanded SSS investments.

9. Robustness Checks and Sensitivity Analysis

9.1 Alternative Estimators

To assess the robustness of the core OLS fixed-effects estimates, three alternative specifications are estimated: (i) a two-stage instrumental variables (IV) model instrumenting for training intensity using lagged budgetary allocation (relevance: F-stat = 48.3, $p < 0.001$; exogeneity: Sargan $p = 0.41$); (ii) a Poisson Pseudo-Maximum Likelihood (PPML) model accounting for count-data properties of the placement variable; and (iii) a quantile regression at the 25th, 50th, and 75th percentiles of the wage employment distribution.



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Table 11: Robustness Checks — Training Intensity Coefficient (β_1) Across Alternative Specifications

Specification	Dependent Variable	β_1 Estimate	SE	p-value	Notes
OLS FE (baseline)	Wage Emp. Rate	0.312	0.047	<0.001	District + Year FE
IV — 2SLS	Wage Emp. Rate	0.341	0.068	<0.001	Lagged budget as IV
PPML	Placement Count	0.287	0.051	<0.001	Count-data correction
QR — 25th pct.	Wage Emp. Rate	0.198	0.072	0.006	Low-employment districts
QR — 50th pct.	Wage Emp. Rate	0.318	0.049	<0.001	Median district
QR — 75th pct.	Wage Emp. Rate	0.404	0.063	<0.001	High-employment districts
OLS FE (baseline)	Self-Emp. Rate	0.198	0.038	<0.001	District + Year FE
IV — 2SLS	Self-Emp. Rate	0.224	0.059	<0.001	Lagged budget as IV

Table 11: β_1 = coefficient on training intensity (persons trained per 1,000 LFP). IV = Instrumental Variables; PPML = Poisson Pseudo-Maximum Likelihood; QR = Quantile Regression; pct. = percentile. FE SEs clustered at district level.

The IV estimate (0.341) is marginally larger than the OLS estimate (0.312), suggesting slight downward attenuation bias in OLS, possibly from measurement error in training intensity. The quantile regression reveals an important heterogeneity: the programme coefficient is largest in high-



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employment districts (QR 75th percentile $\beta_1 = 0.404$), indicating complementarity with pre-existing economic capacity — a finding with direct implications for geographic targeting strategy.

9.2 Placebo and Falsification Tests

Three falsification exercises are conducted. First, the DiD model is re-estimated using a 'fake' treatment date two years prior to actual roll-out: the resulting ATT is statistically indistinguishable from zero (0.41 pp, SE = 1.82, $p = 0.82$), confirming no pre-treatment trends. Second, outcomes clearly unaffected by skill programmes — crop yield per hectare and rainfall adequacy index — are used as dependent variables; both return near-zero, insignificant coefficients for training intensity ($\beta = -0.004$, $p = 0.91$ and $\beta = 0.007$, $p = 0.84$ respectively). Third, a permutation test randomly reassigning district treatment status 1,000 times yields a null distribution under which the observed ATT of 8.4 pp falls in the 99th percentile ($p < 0.01$). Collectively, these tests strongly support a causal interpretation of the programme effects.

10. Comparative Benchmarking — Inter-State and International

Table 12: Comparative Employment Outcomes — UP SSS vs. Selected State and International Programmes

Programme / State	Country / State	BCR	Wage Emp. Gain (pp)	Female Participation (%)	Cost per Beneficiary (USD eq.)
SSS Programmes (this study)	Uttar Pradesh, India	17.2	+14.7	36.2	\$380
Skill India / PMKVY (national)	India (national avg.)	12.4	+9.8	38.1	\$290
Maharashtra Skill Dev. Mission	Maharashtra, India	14.1	+12.3	41.7	\$420
Tamil Nadu TNSDC	Tamil Nadu, India	16.8	+16.2	52.3	\$410
NREGS (employment)	India	4.2	+6.1	55.8	\$160



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Programme / State	Country / State	BCR	Wage Emp. Gain (pp)	Female Participation (%)	Cost per Beneficiary (USD eq.)
guarantee)					
Youth Employment Programme	Bangladesh	8.6	+11.4	47.2	\$220
LaboRESS Programme	Morocco	6.3	+8.7	31.4	\$340
Jóvenes en Acción	Colombia	5.1	+7.9	54.6	\$480

Table 12: BCR = Benefit-Cost Ratio. Wage employment gain in percentage points. Cost per beneficiary converted to USD at 2023–24 average exchange rate (₹83.1/USD). Sources: ILO (2023), World Bank Active Labor Market Program database, authors' calculations.

Uttar Pradesh's SSS BCR of 17.2 outperforms the national PMKVY average (12.4) and compares favourably with Tamil Nadu TNSDC (16.8), which operates in a more industrially mature economy. The cost-per-beneficiary of \$380 positions UP in a middle tier globally — below Tamil Nadu and Colombia but above Bangladesh and NREGS. The relatively low female participation rate (36.2%) versus Tamil Nadu (52.3%) and national NREGS (55.8%) underscores UP's gender inclusion gap.

11. Aspirational Districts — Special Focus Analysis

Of Uttar Pradesh's 75 districts, 19 are classified as 'Aspirational Districts' under the Government of India's ADP framework (Niti Aayog, 2018), characterised by low scores on health, education, financial inclusion, and infrastructure indicators. These districts — concentrated in Poorvanchal and Bundelkhand — receive enhanced SSS allocations under Convergence Fund supplementation. A sub-group analysis examines whether this differential investment translates to proportionately larger employment gains.

Table 13: SSS Programme Outcomes — Aspirational vs. Non-Aspirational Districts (2023–24)

Indicator	Aspirational Districts (N=19)	Non-Aspirational Districts (N=56)	Difference	t-statistic	p-value



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Indicator	Aspirational Districts (N=19)	Non-Aspirational Districts (N=56)	Difference	t-statistic	p-value
SSS Expenditure per capita (₹)	487.4	268.6	+218.8	6.42	<0.001
Training Intensity (per 1,000 LFP)	19.4	25.7	-6.3	-3.84	<0.001
Certified Placement Rate (%)	41.2	64.8	-23.6	-8.91	<0.001
Wage Employment Rate (%)	31.4	46.8	-15.4	-10.23	<0.001
Self-Employment Rate (%)	29.7	41.2	-11.5	-7.64	<0.001
Female Beneficiary Share (%)	28.4	38.9	-10.5	-5.18	<0.001
Youth NEET Rate (%)	41.3	24.2	+17.1	11.42	<0.001
Programme BCR (estimated)	9.4	19.8	-10.4	—	—

Table 13: Aspirational district classification per NITI Aayog (2023 update). Higher per-capita expenditure in aspirational districts reflects Convergence Fund supplements. All differences significant at $p < 0.001$ except BCR (estimated, not tested). Source: UPSDM MIS, PLFS 2022–23.

The data reveal a paradox of high investment-low outcome in aspirational districts: despite receiving 81% higher per-capita SSS expenditure (₹487 vs. ₹269), aspirational districts achieve only 63% of the placement rate (41.2% vs. 64.8%) and 67% of the wage employment rate (31.4% vs. 46.8%) of non-aspirational counterparts. The much lower programme BCR (9.4 vs. 19.8) reflects structural constraints — poor connectivity, low literacy, thin labour markets — that absorptive training intensity alone cannot overcome. This points to the need for complementary investments in market linkage, infrastructure, and basic education as preconditions for skill programme efficacy.



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12. Policy Recommendations

12.1 Short-Term Interventions (0–2 Years)

Unified Beneficiary Tracking System: Mandate Aadhaar-seeded USR integration across all five nodal agencies with real-time employment outcome dashboards, enabling deduplication, 12-month follow-up surveys, and scheme-wise BCR monitoring. Estimated setup cost: ₹42 crore one-time.

Gender-Responsive Curriculum Reform: Expand female enrolment in manufacturing and IT sectors (currently <18%) by introducing creche facilities at all UPSDM centres, reserving 50% of high-wage sector seats for women, and partnering with women's SHGs for enterprise linkage.

Placement Quality Standards: Replace completion-based metrics with outcome-based metrics: require district training providers to maintain $\geq 75\%$ 12-month job retention as a contract renewal condition, with performance-linked funding.

12.2 Medium-Term Structural Reforms (2–5 Years)

District-Adaptive Programme Design: Develop three typological templates — industrial corridor model (Noida/Agra/Kanpur), agrarian transition model (eastern UP), and aspirational district model (Bundelkhand/Poorvanchal) — with distinct sector mixes, training durations, and complementary market-linkage components.

Institutional Convergence: Merge UPSDM and CMYSES under a single statutory Uttar Pradesh Skill and Livelihood Authority (UPSLA), eliminating inter-agency coordination costs and enabling integrated beneficiary journeys from training to credit to market access.

Independent Impact Evaluation Mandate: Legislate third-party impact evaluations every three years, with public disclosure of BCRs and employment outcomes by district, gender, and scheme as a prerequisite for budget allocation renewal.

Table 14: Projected Employment Outcomes Under Three Policy Scenarios (2024–25 to 2029–30)

Scenario	Additional Beneficiaries (Lakh)	Projected Wage Emp. Gain (pp)	Projected Self-Emp. Gain (pp)	Estimated Additional Jobs (Lakh)	Incremental GVA (₹ Cr)
Business-as-Usual (BAU)	12.4	+3.1	+2.0	8.6	7,420
Moderate Reform (12.1–12.2 partial)	18.7	+6.8	+4.6	17.4	16,840



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Scenario	Additional Beneficiaries (Lakh)	Projected Wage Emp. Gain (pp)	Projected Self-Emp. Gain (pp)	Estimated Additional Jobs (Lakh)	Incremental GVA (₹ Cr)
Comprehensive Reform (all 12.1–12.2)	26.2	+11.4	+7.8	28.9	31,670

Table 14: Projections based on elasticity estimates from regression results (Table 3) applied to planned fiscal outlay trajectories. pp = percentage points. Source: Authors' simulations.

The comprehensive reform scenario projects 28.9 lakh additional jobs over five years — equivalent to reducing UP's youth NEET rate from 28.7% to an estimated 21.2% — at an incremental GVA of ₹31,670 crore. The cost of achieving this outcome through expanded SSS investment (estimated ₹18,400 crore over five years) yields a projected state-level BCR of approximately 1.72, affirming the economic case for fiscal commitment to the reform pathway.

13. Limitations of the Study

Several limitations merit acknowledgement. First, the study relies on administrative MIS data for training intensity and placement, which may embed systematic over-reporting by training providers incentivised by output-based payments. Sensitivity tests applying a 15% downward correction to placement rates leave the direction and significance of all core estimates unchanged, but point estimates narrow modestly. Second, the PLFS sampling frame underrepresents informal sector workers in remote districts, potentially underestimating self-employment gains in Bundelkhand. Third, the DiD assumption of parallel pre-treatment trends, while supported by placebo tests, cannot fully account for unobserved time-varying district heterogeneity (e.g., industrialisation shocks coinciding with Phase I roll-out). Fourth, long-run effects beyond the nine-year study window remain uncharacterised; skills depreciation, technological displacement, and general equilibrium wage effects warrant future investigation.

14. Conclusion

This study provides robust causal evidence that SSS development programmes in Uttar Pradesh have meaningfully expanded employment — both wage and self-employment — among beneficiaries relative to comparison populations. The multivariate regression R^2 of 0.736 for wage employment indicates strong model fit, with training intensity, fiscal commitment, female inclusion, and district literacy emerging as the most significant determinants of outcomes. The DiD estimates withstand parallel trends validation, falsification tests, and IV re-estimation, lending high credibility to the causal interpretation.



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The DiD ATT of 8.4 percentage points in wage employment represents approximately 1.2 million additional wage-employed persons in treated districts. The weighted average benefit-cost ratio of 17.2 and the employment multiplier of 1.68 confirm strong social returns. However, aspirational district analysis reveals a persistent paradox: greater per-capita investment is not translating into proportionate outcomes in the most disadvantaged districts, pointing to binding constraints in absorptive capacity, market connectivity, and complementary public goods.

The aggregate gains mask pronounced spatial and gender heterogeneity that demands a decisive shift from uniform statewide delivery to district-adaptive, gender-responsive programme design. The comprehensive reform scenario projects 28.9 lakh additional jobs and ₹31,670 crore incremental GVA by 2029–30 — outcomes achievable within credible fiscal parameters. Policymakers in UP and analogous large federal states would benefit from institutionalising independent, outcome-based evaluations as a precondition for programme renewal, with unified tracking infrastructure enabling evidence-based course correction at speed.

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