



# Industrial Growth and Employment Dynamics in Small Scale Industries: A Longitudinal Study of Pulwama District, Jammu and Kashmir

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## Abstract

The small-scale industries sector makes a significant contribution to job creation and regional economic development through its industrial activities. This study examined the growth of small-scale industrial units in Pulwama District from 2000-01 to 2020-21 and their contribution to job generation. Secondary data from the Directorate of Industries & Commerce, Jammu & Kashmir was taken to analyze long-term changes in the number of industrial units in the district which stimulated employment. The researcher conducted an analysis to identify overall trends and also determine how the growth of small-scale industrial units affected job creation. From 2000-01 until 2017-18, there was an overall increase in both the number of units and the number of jobs created by these units, but this growth was interrupted in 2018-19. The researcher also estimated a regression model to assess the ability of small-scale industries to create jobs. The results showed that there is a positive and statistically significant association between the change in the number of small-scale industrial units and the number of jobs created by these units. The estimated coefficient of the regression model showed that every additional industrial unit creates close to three jobs, on average. The results highlight the labor-intensive character of small-scale industrial units and their vital role in Pulwama district's regional economic development and livelihood creation.

**Keywords:** Industrialization, Employment, Small Scale Industries, Jammu and Kashmir

## I. Introduction

The industrial development of the country is generally considered to be the backbone on which the economic future of any nation will stand. Industrialization is the foundation for the creation of more jobs, higher levels of production, and regionalization. This is particularly true for the

underdeveloped economy of India, where the process of industrialization creates further opportunities for more than enough labour supply and creates a means for a large majority of Indian people to purchase products manufactured in India (Dar & Bhat, 2013). Within the country, the growth of Small Scale Industries (hereafter abbreviated as SSI), has contributed significantly to the overall industrial picture of the country because of their many advantages of requiring little capital, requiring a high level of labour absorption, having a flexible production system, and being able to create industrial activity in both rural and semi-urban areas (Jain & Jain, 2019). The Government of India has implemented a variety of frameworks through the years to promote industrialization in both public and private sectors, with particular emphasis on encouraging SSIs in order to help alleviate regional disparity and to assist in promoting economic participation at the grassroots level (Jain & Jain, 2019). Over the time, SSI sector has emerged as one of the fastest-growing sectors in the Indian economy, and has made contribution in generating millions of jobs. Along with this, it has also made significant addition in total industrial value of the Country. Its presence has been reported in range of industries which span from manufacturing, agro processing, and textiles to services sector as well which underscore their relevance in utilization of resources and generating revenue henceforth (Singh, 2023). SSIs helps in plugging the inequality in regions in terms of industrial development. Growth parameters of SSIs like number of these units, investment patterns, production level and employment generation, adequately represent robustness of local and regional industries (Chowdappa, 2024). India being a country which has large reserve of labors and limited availability of capital makes it a convenient option for setting up SSI which have positive ripple effects in terms of creating several economic benefits (Hussain, 2003). As far as Jammu



and Kashmir (hereafter abbreviated as J&K) is concerned, it has a crucial role to play in several avenues. It is a key driver of regional economic growth, making contribution in employment generation, motivating entrepreneurs and providing a level playing field in developing the region primarily due to unique geographical and climate conditions in the absence of large scale units (Ministry of MSME, 2016). As there is relatively lesser need of capital for setting up the units, involve more labour in its varied production processes and use more amount of local resources, SSIs become a natural choice for industrial development of the State. These units has found to be catalyst for economic growth and the employment generation which has resulted in rise in opportunities of development (Raja and Hindurwade, 2024).

Besides there are several obstacles which comes in its way such as structural limitation, geographical isolation, insufficient infrastructure, unstable socio-political condition (Butt, 2005). Therefore, there is need for a well-crafted strategy which focuses directly on industrial growth of the region with special emphasis on small and resource-oriented industries which contributes in generating jobs with limited range of capital.

### 1.1 Industrial Profile of District Pulwama

Pulwama district is located within the south-central region of the Kashmir Valley and represents one of the more important factors that contribute to the overall economy of J&K through its contribution to Industrialization. Despite agriculture being the prime occupational activity of Pulwama, presence of industrial activities can't be negated. It has made the way in creating varied kind of industrial base that flourishes in growing into a micro, small, and medium enterprises (MSMEs). There are two major industrial developments in Pulwama district; the first being located in Khrew with J&K Cements Ltd., while the second is Industrial Growth Centre (IGC) located at Lassipora. The second one is the main industrial hub for the district and contains numerous manufacturing, processing, and service-providing units (Ganaie et al., 2023, Ministry of MSME, 2012). Agro-based industries, including dairy and food processing, constitute a significant component of the district's industrial structure, supported by favorable agro-climatic conditions and raw material availability. Wood-based industries have gained prominence in recent years, particularly in Oukhoo village, which was given the title of Pencil Village of India by Prime Minister Narendra Modi in his "Mann Ki Baat" radio show, which supplies a substantial share of India's raw material for pencil production, which further contribute to local employment and

industrial output (Ahmad & Raina, 2025).

## II. Objectives of the Study

- To analyze the growth trends of small-scale industrial units and employment in Pulwama district from 2000-01 to 2020-21.
- To examine the relationship between the number of registered small-scale industrial units and employment generation using regression analysis.

## III. Database and Methodology

The study is based on secondary data, which is obtained from the Directorate of Industries and Commerce, J&K, covering the period from 2000-01 to 2020-21. The study period from 2000-01 to 2020-21 was chosen because data from earlier years were sporadic and non-uniform in nature. Therefore, based on data availability and to maintain continuity of the secondary data, to ensure consistency and reliability of the time-series analysis, a specific period was taken.

To examine temporal trends in the number of registered Small Scale Industrial units and the corresponding employment generated in Pulwama district, a descriptive and analytical research design was used. Under the descriptive statistics, measures of central tendency and dispersion were used to summarize the characteristics of the data, and annual growth rates were computed to capture year-wise variations in industrial expansion and employment generation, respectively.

$$AAGR = \frac{1}{n} \sum_{t=1}^n \left( \frac{X_t - X_{t-1}}{X_{t-1}} \times 100 \right)$$

Where:

- $X_t$  represents the value of the variable (number of SSI units or employment) in year  $t$ ,
- $X_{t-1}$  represents the value of the variable in the preceding year, and
- $n$  denotes the number of years under consideration.

A simple linear regression model was used to examine the quantitative relationship between industrial expansion and its impact on employment creation.

$$Y_t = \alpha + \beta X_t + \varepsilon_t$$

Where:

- $Y_t$  = Employment generated in year  $t$
- $X_t$  = Number of registered SSI units in year  $t$
- $\alpha$  = Intercept term
- $\beta$  = Regression coefficient
- $\varepsilon_t$  = Error term

The model concerned takes employment as the



dependent variable and number of SSI units as the independent variable. Simple Linear Regression was applied using the Ordinary Least Squares (OLS) method, which helps in estimating the magnitude and direction of the concerned continuous variables. For analyzing annual changes and to extract the potential issues surfaced from non-stationarity and correlation, the variables, therefore, were transformed into first differences for smooth running of regression analysis.

The transformed variables are defined as:

$$\Delta \text{SSI Units}_t = \text{SSI Units}_t - \text{SSI Units}_{t-1}$$

$$\Delta \text{Employment}_t = \text{Employment}_t - \text{Employment}_{t-1}$$

Employment<sub>t-1</sub> the final estimated model is expressed as below:

$$\Delta \text{Employment}_t = \alpha' + \beta \Delta \text{SSI\_Unit}_t + v_t$$

$\alpha'$  denotes transformed intercept,  $\beta$  is coefficient and  $v_t$  is the differenced error term.

### Hypothesis Testing Framework

To test the relationship between the two variables, the following hypotheses were formulated:

Null Hypothesis (H0):  $\beta = 0$

(Change in SSI units has no effect on employment generation)

Alternative Hypothesis (H1):  $\beta > 0$

(Growth of SSI units significantly contributes to employment generation)

## IV. Results and Discussion

### 4.1 Growth Dynamics of SSI Units and Employment in Pulwama District

In line with the first objective of the study, this section focuses on examining the growth trends of SSIs and their employment contribution in Pulwama district. These two variables are intrinsically linked to each other as they indicate industrial performance and regional economic development. The increase in the number of SSI units indicates an increase in business activity, availability of funds to invest, and expansion of productive capacity. In contrast to an increase in SSI units, the jobs created by those SSI's demonstrate the potential for that industry to absorb labor and create jobs for people in the area. For example, in India, most of the population lives on an agricultural income, and while many parts of India are considered labor-abundant, it is considered a huge success for a region like Pulwama for the SSI units to create many opportunities to stimulate employment.

**Table 1: Performance of SSI in Pulwama District: Growth Analysis**

Sr. No	Year	Number of Units	Growth Rate	Employment (In Numbers)	Growth Rate
1	2000-01	2017	-	9305	-
2	2001-02	2066	2.43	9578	2.93
3	2002-03	2115	2.37	9934	3.72
4	2003-04	2175	2.84	10113	1.80
5	2004-05	2276	4.64	10492	3.75
6	2005-06	2383	4.70	10942	4.29
7	2006-07	2500	4.91	11543	5.49
8	2007-08	2577	3.08	12070	4.57
9	2008-09	2660	3.22	12564	4.09
10	2009-10	2747	3.27	12953	3.10
11	2010-11	2816	2.51	13307	2.73
12	2011-12	2897	2.88	13893	4.40
13	2012-13	2997	3.45	14344	3.25
14	2013-14	3086	2.97	15003	4.59
15	2014-15	3216	4.21	15058	0.37
16	2015-16	3281	2.02	15529	3.13
17	2016-17	3336	1.68	15931	2.59
18	2017-18	3433	2.91	17095	7.31
19	2018-19	2061	-39.97	13456	-21.29
20	2019-20	2082	1.02	13686	1.71



21	2020-21	1971	-5.33	13842	1.14
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Source: Computed from Digest of Statistics 2020-21, Directorate of Economics and Statistics J&K  
 Note: Growth rates denote as Average Annual Growth Rate (AAGR)

An analysis of the number of registered industrial units and the number of jobs created over the last two decades is presented in Table 1. Both variables are assessed by their respective annual growth rates, providing an insight into the historical growth trends and variations of the Pulwama District's industrial sector over this twenty-year time frame. The number of SSI in Pulwama has increased from 2017 units in the fiscal year 2000 to 3400 units during FY 2017 to 2018 in consonance with Hussain (2003) and Dar and Bhat (2013). The number of SSI in J&K has exhibited similar growth patterns as documented by Jain and Jain (2019) and Raja and Indurwade (2021), establishing that SSIs serve as a strong foundation for developing the region's industrial base. Over most years of this study, moderate positive growth has occurred, with most years showing annual growth rates in the two to five percent range, with the highest positive rate being reported for the fiscal year 2006-07 at 4.91% indicating increased industrial expansion for this time period. However, during the fiscal year 2018-2019, there was a large decrease of 2061 units, resulting in an estimated negative annual growth rate of -39.97%. This significant decrease indicates an extensive shock to the industrial sector of the district, likely due to changes in government policies, disruptions due to natural and/or civil unrest, and/or interruption of supply chain processes and availability of market opportunities.

The downturn observed in the sector after 2018-19 was still evident in 2019-20, where it registered a rise of only 1.02% and an additional downturn back down to -5.33% for the next period of

2020-21, continuing to be stable for the period after 2018. The drastic decline in SSI is supported by literature indicating that the industrial activities of J&K are at risk of the impacts of policy changes, disruptions to markets, socio-political conflict, etc. (Butt, 2005), and it also confirms Raja and Indurwade (2024) finding of a similar trend of contraction observed in Pulwama district in India, indicating that external shocks' effect is greater on small enterprises.

The employment numbers also show a similar pattern to that described for industrial units, where most of the study period shows a trend of gradually increasing employment; this pattern was evident in the increase in employment from 9305 employees in 2000-01 up to 17095 by the end of the study period (2017-18). Yearly increases in employment rates ranged from approximately 2 percent to 5 percent over the period studied. The highest levels of growth were reached during 2006-07 (5.49 percent) and again during 2017-18 (7.31 percent), and it is likely that these years represent periods of rapid employment generation associated with the expansion of industrial activity and an ongoing utilization of capacity expansion. Like the industrial unit growth, employment fell significantly in 2018-19, dropping to 13456 employees. This represents a negative annual growth rate of -21.29 percent. The slight recovery in employment in subsequent years (i.e., 1.71 percent in 2019-20 and 1.14 percent in 2020-21) was less than positive. It can be reasoned with contraction of industrial units and associated job opportunities specifically in the year 2018-19 which had a direct and damaging effect on job opportunities within the study area.

**Table 2: Descriptive Statistics of SSI Units and Employment**

Variables	N	Minimum	Maximum	Mean	Std. Deviation	Variance
No. of Units	21	1971.0	3433.0	2604.38	489.40	239512.65
Employment	21	9305.0	17095.0	12887.52	2243.06	5031328.86

Source: Calculations based on SPSS 24

Note: Figures in numbers

As per Table 2, average number of SSI units which were registered during the study period was 2,604, ranging from 1,971 to 3,433 units. Standard deviation of the units found to be of 489, highlighting a moderate degree of variability in expansion of industries over the span of time.

On the one hand, SSI sector showed overall growth,

and on the other experienced noticeable oscillations during the study period. Employment generated through SSIs averages 12,888 workers, with employment levels varying between 9,305 and 17,095. Standard deviation of 2,243 reflects a higher amount of variability in employment compared to the number of units, showing that changes in



employment were evident and possibly influenced by differences in scale of operations and external economic conditions.

**Relationship between SSI Units and Employment: Regression Analysis**

In order to fulfill the second objective of the study, i.e., to examine the relationship between the number of registered SSI units and employment generation in Pulwama district, a regression analysis was carried out. The following regression model was used for the purpose:

$$Y_t = \alpha + \beta X_t + \epsilon_t$$

Where:

- $Y_t$  = Employment generated in year  $t$
- $X_t$  = Number of registered SSI units in year  $t$
- $\alpha$  = Intercept term
- $\beta$  = Regression coefficient
- $\epsilon_t$  = Error term

Employment was specified as the dependent variable, while the number of SSI units was treated as the independent variable.

**Diagnostic Adjustments and Regression Model**

To examine the relationship between the growth of SSI units and employment generation in Pulwama district, a simple linear regression analysis was initially proposed. Details of the model given as below:

$$Y_t = \alpha + \beta X_t + \epsilon_t$$

Where,  $Y_t$  denotes total employment, and  $X_t$  denotes the number of registered SSI units in year  $t$ . below are the details of the diagnostic tests which were performed to verify model integrity:

- Normality of Residuals: The findings were found to be supporting the use of  $t$  and  $F$  statistics for

testing the hypothesis by confirming that residuals are normally distributed ( $p > 0.05$ ).

- Homoscedasticity: The results indicated that the variance of the error terms is constant across all the observations, ensuring that the standard errors and  $t$ -statistics are not inflated.
- Absence of Multicollinearity: The Variance Inflation Factor (VIF) was found to be well below the critical threshold of 10.
- Linearity and Model Specification: The relationship between  $\Delta$  Units and  $\Delta$  Employment was found to be linear through the scatter plot analysis, which indicated no evidence of omitted variable bias.

Though preliminary estimation using Ordinary Least Squares (OLS) hinted towards a high degree of positive correlation (low Durbin-Watson statistic), which violates the Gauss-Markov assumption of independent errors. Therefore, to ensure the reliability of the estimates, the data were transformed into first differences ( $\Delta$ ). This approach helps in removing the time-trend bias and focuses entirely on the relationship between the annual changes in units along with annual change in employment. The final estimated model is:

$$\Delta Y_t = \alpha + \beta \Delta X_t + \epsilon_t \text{ or}$$

$$\Delta \text{ Employment}_t = \alpha + \beta (\Delta \text{ SSI\_Units}_t) + \epsilon_t$$

**The First-Difference Transformation Diagnostic**

In order to clean the data and make it appropriate for Linear Regression, the Difference Operator ( $\Delta$ ) was used. Below is the equation for reported results:

$$\Delta \text{ Employment}_t = \alpha + \beta \Delta \text{ SSI\_Units}_t + \epsilon_t$$

After differencing,

$$(\text{Employment}_t - \text{Employment}_{t-1}) = \alpha + \beta (\text{SSI\_Units}_t - \text{SSI\_Units}_{t-1}) + (\epsilon_t - \epsilon_{t-1})$$

**Table 3: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	N
1	0.971	0.943	0.940	77.06	20
a. Predictors: (Constant), $\Delta$ Units					
b. Dependent Variable: $\Delta$ Employment					

Note: Calculations based on SPSS 24 statistical software

Table 3 exhibits that the model has a high degree of explanatory power, with an R-squared value of 0.943 and an adjusted R-squared of 0.940, which indicates that approximately 94 percent of the variation in changes in employment is explained by changes in the number of SSI units.

**Table 4: Analysis of Variance (ANOVA)**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	17,81,401.49	1	17,81,401.49	299.978	0.00



Residual	1,06,894.19	18	5,938.57		
Total	18,88,295.68	19			
a. Dependent Variable: $\Delta$ Employment					
b. Predictors: (Constant), $\Delta$ Units					

Note: Significant at one percent

Table 4 delves into the results of ANOVA, which further confirms the overall significance of the model. The regression sum of squares holds for the major share of the total variation, and the calculated F-statistic is significant at the one percent level. This leads to the rejection of the null hypothesis that changes in SSI units have no effect on employment generation.

**Table 5: Regression Coefficients**

Model	Unstandardized Coefficients (B)	Std. Error	t	Sig.
(Constant)	233.28	51.325	4.545	0.00
$\Delta$ Units	2.796	0.161	17.32	0.00

a. Dependent Variable:  $\Delta$  Employment

Regression coefficients are presented in Table 5. The final equation can be written as below:

$$\Delta \text{ Employment} = 233.28 + 2.796(\Delta \text{ SSI\_Units}) + \epsilon$$

The coefficient of the change in SSI units ( $\Delta$  Units) is positive and statistically significant at the one percent level. The estimated coefficient value of 2.796 indicates that an increase of one SSI unit is directly associated, on average, with an increase of nearly three additional employment opportunities in the district of Pulwama, aligning with Chowdappa (2024). Unlike large-scale capital-intensive industries, SSI units demonstrate a high level of employment elasticity where relatively small increases in the number of industrial units have the potential to increase substantial gains in local livelihoods in consonance with the employment elasticity hypothesis advanced by Hussain (2003) and Dar and Bhat (2013).

## V. Conclusion

Empirical evidences highlighted growth of units being oscillating which confirmed impact of external shocks though do not negate their importance in stimulating industrial activities and resulting impact on employment generation. These units found holding immense capacity to absorb labour in a region which lacks large-scale industrialization and faces several socio-political instabilities. Further regression analysis reconfirmed the above findings showing a positive impact of growth of SSI units on growth and the creation of employment. Statistical analyses supports relevance of SSI units and their ability to provide job opportunities through building robust institutional support along with

strong political environment, credit availability, improving infrastructure and streamlining marketing channels.

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