



# ANALYSIS OF LABOUR PRODUCTIVITY-WAGE LINKAGES IN THE TEXTILE INDUSTRY: EVIDENCE FROM HARYANA

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## ABSTRACT

This research paper looks at growth, labour productivity, and wage associations with the textile industry in the state of Haryana and in the NIC-131 and NIC-139 sectors. The trend, correlation, and regression methods has been used to analyse secondary data on the Annual Survey of Industries (2008-09 to 2021-22) of the survey. Both sectors reported a rise in employment and NIC-139 had a higher growth. Real wages and NVA recorded peak growth of 1.05% and 1.13% in NIC-131 (2016–17), while NIC-139 showed 0.58% wage growth (2011–12) and 0.81% NVA growth (2012–13). Correlation findings show that there are positive significant relationships between wages and NVA ( $r = 0.924$  in NIC-131 and  $r = 0.976$  in NIC-139). Regression results show labour productivity significantly affects wages ( $\beta = 0.497$ ,  $R^2 = 0.67$  in NIC-131;  $\beta = 0.382$ ,  $R^2 = 0.55$  in NIC-139). The textile industry in Haryana greatly depends on labour productivity that influences the rate of wage growth and development.

**KEYWORDS:** Textile manufacturing, labour productivity, engagement, NVA, Wage

**JEL Code:** L6, L67

## 1 INTRODUCTION

Haryana is a growing economy in India. Developed robust textile centres in Haryana such as Panipat, Gurugram, Faridabad, Hisar and Sonapat. Production of in cotton Haryana is the fourth largest in India and shares approximately six per cent of the country. Easy accessibility of raw materials provides Haryana with a competitive advantage in the textiles sector, which provides employment to approx. one million people in Haryana. That is why readymade garments cotton are one of the major exports of Haryana. The textile industry is a labour-intensive industry, it provides large employment after agriculture not only in Haryana but also in India. Trained and Untrained workers are working in textiles Manufacturing. It is a significant contribution to the economy. Haryana is a textile hub across the whole value chain. The district of Panipat is famous for handloom products terry towels etc. Gurugram is a hub of manufacturing readymade garments. Faridabad is the industrial hub of Haryana and is famous for fabric manufacture. Sonipat is famous for technical textiles. Bhiwani is the centre of non-woven textiles. The textile industry is the focus sector for Haryana and has the probability of creating high worth and revenue realization. The government of Haryana has a set of incentives by the Enterprises Promotion Policy 2015 to encourage the textile sector. Haryana has set up cluster-based progress tactics to encourage industries in textiles and handloom. According to, the Statistical Abstract of Haryana 2022-23 Cotton production was 223285 lakh in 2010-11 and 883670 lakh in 2022-23.

### Growth in Engagement, Labour productivity and Wages in the manufacturing of Textile

The relationship between earnings and labour productivity in the textile industry shows a positive but moderate correlation, indicating that wage rates are moderately associated with productivity levels. (Norina, et al 2019). The paper analyses the progress and relationship between labour productivity and earnings in Indian textile manufacturing, a significant employment sector after agriculture in India. (Ahlawat & Renu, 2018). Higher wages due to unionization in Indian cotton mills led to increased labour productivity, countering the notion that low productivity was solely due to union resistance. (Gupta, 2016). Low wages in Indian cotton mills due to surplus labour led to low productivity. Unionization increased wages, prompting managers to enhance productivity by employing fewer workers per machine in unionized mills. (Gupta, 2010). The paper analyzes factors influencing labour productivity in textile enterprises but does not specifically address the relationship between labour productivity and wage rates in the textile industry. (Tukhtabaev, 2021). The study focuses on the association between real wage rate and labour efficiency in the industrial division in India, not specifically in the textile industry. (Chakraborty, 2018). The study shows that wages significantly affect labour productivity in PT. Delta Merlin Sandang Textile, while incentives do not. Wage structuring methods include performance-based and seniority-based. (Rauuf, et al 2022). The paper discusses the relationship between labour efficiency and export competitiveness in Indian textile manufacturing, emphasizing the importance of productivity-based wages to enhance competitiveness. (Dhiman & Sharma, 2019). Wage rates in the textile industry are influenced by direct and indirect aspects leading to disparities among workers, as discussed in the study on South India's global production system. (Ramamurthy, 2021). Hourly wage rates and piece rates in the textile industry show high similarity, with time rates resembling disguised piece rates due to close output monitoring, leading to work intensification and exploitation. (Chand, 2012). Increased female presence in the textile industry empowers women economically but also exposes them to gender-based violence,



harassment, and poor working conditions, highlighting gender disparity in employment. (Li, 2023). Gender diversity in the Tanzanian textile industry influences employee performance, with affective engagement positively influencing adaptive, contextual, and task performance, partially mediated by gender diversity. (Amsi, 2022). The study explores gender differences in employment in India's unincorporated textile sector, highlighting states with high female ownership and employment, particularly in weaving industries. (Swami & Padma, 2015). The research highlights gender disparity in the textile industry, where women face low wages, poor working conditions, occupational health issues, and discrimination in employment based on age and gender. (Sivasubramanian, 2019).

## 2. OBJECTIVES OF THE STUDY

1. To analyse the progress and structure of the workforce involved in the textile industry in Haryana.
2. To investigate the progress in engagement, net value added and wages by textile manufacturing in Haryana.
3. Examine the correlation between the progress of net value added, man-days, real wages and entire engagement in textiles manufacturing in Haryana.
4. To study the effect of labour productivity on wage rate in textile manufacturing in Haryana.

## 3. HYPOTHESIS OF THIS STUDY

H01: The labour productivity does not affect the wage rate in the NIC industry code 131.

H02: The labour productivity does not affect the wage rate in the NIC industry code 139.

H03: The rise of real wages, NVA, man-days, and entire engagement in Haryana's textile sectors do not significantly correlate with each other.

## 4. MATERIALS AND METHODS

The present study is based on secondary information. The data has been extracted from an annual industry survey (ASI) published by the Ministry of Statistics and Programme Implementation (MOSPI). The information is analysed in two industry groups and the classification of textile manufacturing in both groups in the three-digit code based on the National Industrial Classification (NIC-2008). As per National Industrial Classification, the first group of industry Code-131 includes the following Spinning, Weaving and Finishing of Textiles

As per National Industrial Classification, the second group of industry Code-139 include Manufacture of Other Textiles

The data from 2008-09 to 2021-22 are included in this research. The Pearson correlation coefficient has applied to indicate the correlation among real wages, employment, man-days working, and net value added. To identify, the influence of labour productivity on wage rate is examined through simple linear regression analyses. The following formula has been used to calculate Labour productivity and Wage rate:

$$\text{Wage rate} = \frac{\text{Total emoluments}}{\text{No. of people engaged}}$$
$$\text{Labour productivity} = \frac{\text{Net value added}}{\text{No. of people engaged}}$$

## 5. RESULTS AND DISCUSSION

Table 1 analyses the arrangement of workforces involved in the textile manufacturing information from 2008-09 to 2021-22. This period trend of male and females workers is growing but indicates a males' participation is more in association with females in the industry. In other words, gender disparity exists in the textile industry. In NIC- code-131 first group of industry workers indicate an upward trend from 2008-09 to 2021-22, with a peak in 2016-17 and after that a slight decline.

**Table 1. Arrangement of Workforces Involved in Textile Manufacturing in Haryana**

| Group                                                 | Years   | No. of Person Engaged | Workers |       | Employees other than workers |                 | Unpaid                          |
|-------------------------------------------------------|---------|-----------------------|---------|-------|------------------------------|-----------------|---------------------------------|
|                                                       |         |                       | Men     | Women | Supervisory and Managerial   | Other Employees | Family Members/ Proprietor etc. |
| NIC-131<br>Spinning weaving and finishing of textiles | 2008-09 | 15228                 | 9667    | 586   | 1174                         | 1687            | 59                              |
|                                                       | 2009-10 | 15423                 | 9771    | 499   | 1757                         | 1527            | 41                              |
|                                                       | 2010-11 | 14097                 | 9355    | 596   | 1659                         | 1246            | 96                              |
|                                                       | 2011-12 | 16543                 | 10914   | 577   | 1663                         | 1934            | 46                              |
|                                                       | 2012-13 | 13812                 | 8623    | 863   | 1906                         | 1290            | 42                              |
|                                                       | 2013-14 | 19595                 | 10419   | 912   | 3195                         | 3443            | 202                             |
|                                                       | 2014-15 | 18845                 | 11177   | 713   | 1810                         | 2454            | 157                             |
|                                                       | 2015-16 | 15889                 | 10059   | 946   | 1688                         | 1634            | 255                             |
|                                                       | 2016-17 | 31799                 | 23103   | 1198  | 1946                         | 2399            | 198                             |
|                                                       | 2017-18 | 19870                 | 11514   | 1268  | 1895                         | 1893            | 286                             |
|                                                       | 2018-19 | 21490                 | 13506   | 978   | 1954                         | 1631            | 235                             |
|                                                       | 2019-20 | 23666                 | 13382   | 1142  | 2029                         | 2428            | 241                             |
|                                                       | 2020-21 | 24749                 | 13741   | 1703  | 1862                         | 2128            | 264                             |
|                                                       | 2021-22 | 26220                 | 13724   | 1760  | 1719                         | 2093            | 304                             |
| NIC-139<br>Manufacture of other textiles              | 2008-09 | 18686                 | 10920   | 445   | 1707                         | 2530            | 28                              |
|                                                       | 2009-10 | 23458                 | 15430   | 201   | 1895                         | 1527            | 42                              |
|                                                       | 2010-11 | 23131                 | 13369   | 235   | 1960                         | 2243            | 47                              |
|                                                       | 2011-12 | 27235                 | 14136   | 309   | 2610                         | 3092            | 67                              |
|                                                       | 2012-13 | 24063                 | 13822   | 364   | 2339                         | 3128            | 98                              |
|                                                       | 2013-14 | 25881                 | 15225   | 405   | 2569                         | 3053            | 182                             |
|                                                       | 2014-15 | 38409                 | 20306   | 985   | 3178                         | 4592            | 164                             |
|                                                       | 2015-16 | 34395                 | 18998   | 750   | 3083                         | 4015            | 164                             |
|                                                       | 2016-17 | 44059                 | 26429   | 1413  | 4303                         | 4694            | 211                             |
|                                                       | 2017-18 | 48187                 | 28180   | 1020  | 4265                         | 5402            | 228                             |
|                                                       | 2018-19 | 52970                 | 29205   | 1654  | 5107                         | 6172            | 298                             |
|                                                       | 2019-20 | 52910                 | 28856   | 1754  | 4679                         | 5782            | 201                             |
|                                                       | 2020-21 | 58205                 | 30884   | 2544  | 4859                         | 5537            | 251                             |
|                                                       | 2021-22 | 75856                 | 33488   | 2557  | 5357                         | 6303            | 237                             |

**Source:** Collected from ASI from 2008-09 to 2021-22 by MOSPI

Women workers generally increase over the period, with fluctuations. Supervisory and managerial have increased, showing growth in higher-level employment. NIC-139 (manufacture of other textiles) workers show significant growth, mainly visible from 2014-15 onwards. Women workers indicate progressively growing. Supervisory and managerial indicate a stable increase, reflecting progress in managerial roles. In NIC-139, there is a visible decay in unpaid workers over time, signifying a shift towards paid employment.

**Overall Growth:** Both groups of industries indicate an overall rise in the number of workers and other employees over the years. The data advocates a positive growth trend in textile manufacturing employment in Haryana, with rises in both worker numbers and managerial positions.

Table 2 provides insights into the progress of the textile manufacturing in Haryana, NIC-code-131, real wages experienced a peak growth rate of 1.05 per cent in 2016-17 and a decline of -0.31 per cent in 2017-18. Man -days per employee fluctuate over time. High growth of 1.10 per cent in 2016-17 and significant negative growth of -0.50 per cent in 2016-17. Employment growth was most prominent in 2016-17 with an increase of 0.83 per cent and a decline in subsequent years. NVA high growth of 1.13 per cent in 2016-17 and a decline of -0.40 per cent in 2017-18. Several factories grew from 273 in 2008-09 to 516 in 2021-22.

**Table 2. Growth of Textile industry in Haryana**

| NIC131 | Year    | Real wage | Man-days per Employee | Total employed | NVA    | Real wage | Man-days per Employee | Employment | NVA   | No. of factory |
|--------|---------|-----------|-----------------------|----------------|--------|-----------|-----------------------|------------|-------|----------------|
|        | 2008-09 | 15576     | 355.14                | 15228          | 44935  | -         | -                     | -          | -     | 273            |
|        | 2009-10 | 14668     | 312.46                | 15423          | 28194  | -0.06     | -0.12                 | 0.01       | -0.37 | 291            |
|        | 2010-11 | 15658     | 308.01                | 14097          | 38371  | 0.07      | -0.01                 | -0.09      | 0.36  | 404            |
|        | 2011-12 | 22544     | 309.68                | 16543          | 57676  | 0.44      | 0.01                  | 0.17       | 0.50  | 410            |
|        | 2012-13 | 20411     | 312.84                | 13812          | 37022  | -0.09     | 0.01                  | -0.17      | -0.36 | 339            |
|        | 2013-14 | 25619     | 322.89                | 19595          | 57247  | 0.26      | 0.03                  | 0.42       | 0.55  | 447            |
|        | 2014-15 | 30815     | 314.99                | 18845          | 63781  | 0.20      | -0.02                 | -0.04      | 0.11  | 471            |
|        | 2015-16 | 30062     | 156.56                | 34395          | 46080  | -0.02     | -0.50                 | 0.83       | -0.28 | 460            |
|        | 2016-17 | 61669     | 328.09                | 31799          | 98132  | 1.05      | 1.10                  | -0.08      | 1.13  | 473            |
|        | 2017-18 | 42387     | 319.78                | 19870          | 59159  | -0.31     | -0.03                 | -0.38      | -0.40 | 525            |
|        | 2018-19 | 48418     | 312.75                | 21490          | 84539  | 0.14      | -0.02                 | 0.08       | 0.43  | 481            |
|        | 2019-20 | 53325     | 307.83                | 23666          | 89812  | 0.10      | -0.02                 | 0.10       | 0.06  | 463            |
|        | 2020-21 | 48541     | 277.18                | 24749          | 86674  | -0.09     | -0.10                 | 0.05       | -0.03 | 515            |
|        | 2021-22 | 57461     | 301.75                | 26220          | 122956 | 0.18      | 0.09                  | 0.06       | 0.42  | 516            |
| NIC139 | 2008-09 | 18329     | 305.14                | 18686          | 39818  | -         | -                     | -          | -     | 152            |
|        | 2009-10 | 21257     | 301.85                | 23458          | 50486  | 0.16      | -0.01                 | 0.26       | 0.27  | 198            |
|        | 2010-11 | 23050     | 303.57                | 23131          | 48438  | 0.08      | 0.01                  | -0.01      | -0.04 | 226            |
|        | 2011-12 | 36345     | 305.01                | 27235          | 71539  | 0.58      | 0.00                  | 0.18       | 0.48  | 303            |
|        | 2012-13 | 29108     | 302.2                 | 24063          | 129242 | -0.20     | -0.01                 | -0.12      | 0.81  | 336            |
|        | 2013-14 | 37387     | 303.07                | 25881          | 93060  | 0.28      | 0.00                  | 0.08       | -0.28 | 324            |
|        | 2014-15 | 57489     | 301.56                | 38409          | 133724 | 0.54      | 0.00                  | 0.48       | 0.44  | 443            |
|        | 2015-16 | 59731     | 108.86                | 95609          | 119051 | 0.04      | -0.64                 | 1.49       | -0.11 | 407            |
|        | 2016-17 | 89723     | 302.43                | 44059          | 171625 | 0.50      | 1.78                  | -0.54      | 0.44  | 489            |
|        | 2017-18 | 93739     | 298                   | 48187          | 167479 | 0.04      | -0.01                 | 0.09       | -0.02 | 528            |
|        | 2018-19 | 122202    | 300.45                | 52970          | 240175 | 0.30      | 0.01                  | 0.10       | 0.43  | 703            |
|        | 2019-20 | 120171    | 298.03                | 52910          | 220877 | -0.02     | -0.01                 | 0.00       | -0.08 | 624            |
|        | 2020-21 | 127227    | 279.06                | 58205          | 263832 | 0.06      | -0.06                 | 0.10       | 0.19  | 642            |
|        | 2021-22 | 177244    | 302.34                | 75856          | 359863 | 0.39      | 0.08                  | 0.30       | 0.36  | 697            |

**Source:** Annual Survey of Industry (ASI) from 2008-09 to 2021-22 by MOSPI

NIC-139 (manufacture of other textiles) indicate the real wage is significantly high growth of 0.58 per cent in 2011-12 and 0.39 per cent in 2021-22. Man-days per employee's highest increase of 1.78 percent in 2016-17. Total employed had a high growth of 1.49 per cent in 2015-16 and smaller variation in other years. Net Value Added has significant growth of 0.81 per cent in 2012-13 and 0.36 per cent in 2021-22.

Overall, the textile industry in Haryana has experienced significant growth, with fluctuations in wages, employment, and productivity metrics. NIC-139 has shown more consistent growth compared to NIC-131. The number of factories has increased substantially in both sectors, indicating sectoral expansion.

#### **Association Matrix of Net Value added, real wages and man-days per employee, engagement in Textile manufacturing of Haryana**

An association matrix is calculated for the relative progress of all variables like real wages, man-days, NVA and entire engagement in both groups of textile industries.

**Table 3. Association of first group industry of four variables in Haryana**  
**First group of Industry Code: 131**

|            | <b>Real wages</b> | <b>Man-days</b> | <b>Employment</b> | <b>NVA</b> |
|------------|-------------------|-----------------|-------------------|------------|
| Real wage  | 1                 |                 |                   |            |
| Man-days   | -0.041            | 1               |                   |            |
| Employment | 0.702             | -0.618          | 1                 |            |
| NVA        | 0.924             | 0.072           | 0.580             | 1          |

**Source:** Author's calculation

Table 3. Show a strong positive correlation between real wages and employment. It indicates that real wages increase and employment tends to increase as well. This shows significant at the 5% level. Real wages and NVA between robust positive correlations are likely to be significant at the 5% level. All the other pairs have no significant correlation. The study found that moderate to strong positive correlation between employment and NVA. It is indicated that real wages and employment are similar to real wages and NVAs in the textile sector in Haryana.

**Table 4. Association of second group industry variable in Haryana**  
**Second group of industry Code: 139**

|            | <b>Real wages</b> | <b>Man-days</b> | <b>Employment</b> | <b>NVA</b> |
|------------|-------------------|-----------------|-------------------|------------|
| Real wage  | 1                 |                 |                   |            |
| Man-days   | 0.014             | 1               |                   |            |
| Employment | 0.690             | -0.705          | 1                 |            |
| NVA        | 0.976             | 0.037           | 0.657             | 1          |

**Source:** Author's calculation

Table 4 represents a strong positive correlation between real wages and employment. There is high real wages are related to high employment levels. It is likely to be significant at 5 per cent. Real wages and NVA between robust positive correlations. This correlation is highly significant at the 5 per cent level. Man-days and employment represent a strong negative correlation. The other remaining pairs have no significant correlations. The null hypothesis is rejected in only two pairs one is real wage and employment and the second is real wage and NVA. Thus, all found employment increase with growth in real wage rate in the together groups of manufacturing.

**Influence the wage rate through Labour productivity in the textile industry in Haryana**

Labour productivity defines the growth of the textile industry. This study examined the influence of labour productivity on the wage rate defined in textile manufacturing in Haryana. To find the effect of labour productivity, this is the equation study has been applied:

$$y = \alpha + \beta.X + \varepsilon$$

y = is the Wage rate of textile employees

$\alpha$  = is the intercept

$\beta$  = is the Regression coefficient

X = is the Labour productivity of textile employees

**Table 5. Simple Linear Regression among Labour Productivity and Wage Rate in Haryana**

| <b>Industry</b> | <b>Constant</b> | <b><math>\beta</math></b> | <b>t- value</b> | <b>R-Square</b> | <b>F-Value</b> | <b>P-Value</b> |
|-----------------|-----------------|---------------------------|-----------------|-----------------|----------------|----------------|
| code-131        | 26119.49        | 0.497                     | 4.72            | 0.67            | 22.29          | 0.001          |
| code-139        | 40727.87        | 0.382                     | 3.63            | 0.55            | 13.21          | 0.004          |

**Source:** Author's Calculation

Table 5 shows the first group of industry a one-unit increase in the labour productivity found in a 0.497 per cent increase in wage rate. For other industry code-139, the increase is 0.382 per cent. This indicates higher labour productivity are associated with higher wage rate in both industries. The t-value of both industries is statistically significant at a five per cent level. In the first group of industry, 67 per cent of the variability in productivity is described to wage rate, the second group of industry, 55 per cent is explained. The F-value tests the overall significance of the model in both industries. The P-value indicates there is strong evidence that labour productivity has a significant effect on wage rates in both industries. Overall analysis shows labour productivity is a vital factor in influencing wage rate in both industries.



## 6. CONCLUSION

The study concluded that the first group of industry code-131, overall labourers and other than labourers increased over time. Women workers generally increase but fluctuate, on other textile industry code-139 women workers progressively increase compared to industry code-131. The second group of industry like manufacturing of other textiles is more consistent progress in real wage, employment, man-days per employee, and net value added compared to spinning, weaving and finishing of textiles. Both groups of industries shows that strong association among the employment and wage rates and similar real wages and NVA. The simple regression analysis indicates labour efficiency has a strong significant effect on wage rate in both groups of textile industries in Haryana.

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