

ARTICLES

RECENT TRENDS IN WAGE-INCOME AND ITS INEQUALITY AMONG INFORMAL WORKERS IN INDIA

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ABSTRACT

Using the 68th round of National Sample Survey data on Employment and Unemployment for 2011-12 and the Periodic Labour Force Survey data for the years 2018-19 and 2019-20, it is revealed that there is a gradual increase in employment share among the informal workers in Indian labour market. Mean nominal wage income has increased, while real mean wage income has decreased in 2018-19 as compared to that in 2011-12. It is observed that wage-income inequality has been higher in the rural sector in the initial period of the decade, while the same has been higher in the urban sector during the latter period. Out of the overall estimate of the Gini index, the contribution of the overlap index has been the highest signifying that the factors determining wage-income inequality have been negligible. It is proved that a significant increase in the wage-income inequality is observed among all types of informal workers between 2011-12 and 2018-19. The increase is maximum among the urban female informal workers. But, between 2018-19 and 2019-20, the increase in the wage-income inequality is observed only among the urban male and female informal workers whereas no change is observed among the rural male and female informal workers.

Keywords: *Informal sector, labour market, inequality, India*

JEL Classifications: *J40, O17, J31, O15*

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1. Introduction

The importance of ensuring equal opportunities among all individuals can hardly be ignored. Unfortunately, throughout the world there has been a notable inequality in the distribution of income. Various literatures documented the shocking increase in overall inequality and consumption expenditure in India (Tapalova, 2008). It is easily understood that wage inequality has been an important component of income inequality. Just like income inequality, wage inequality also increases rapidly during the new economic policy regime in India (Dutta, 2005; Das, 2012; and Abraham, 2017). The wage differential is quite prominent in India across various sectors and groups of workers. Even more disappointing is that there has been a remarkable discrepancy in wages among the workers not only having identical qualifications and skills but also doing almost similar kinds of jobs. More specifically, temporary workers are significantly ill-paid as compared to their counterparts in permanent employment (Das, 2012). Thus, it is extremely crucial to examine wage inequality among the workers working in various sectors, and types of employment to understand the extent of deprivation among the workers. Moreover, given the differences in the wage income and standard of living across states, the requirement of calculating wage inequality across states can hardly be ignored.

In India the incidence of informal employment has been rising over the years after economic reforms (Sanyal and Bhattacharyya 2009; Narayanan., 2015). So, it is even more essential to investigate the pattern of the remuneration gap among the informal workers. The higher wage gap among them strongly emphasizes the prominent destitution among a large part of the workforce in India. Indian society being dominantly patriarchal, looking into wage-income inequality between female and male informal workers is also mandatory. The informal sector is defined as a group of production units comprising unincorporated enterprises owned by households including informal own-account enterprises as well as enterprises of informal employers (typically, small, and non-registered enterprises). Furthermore, informal employment is defined as all remunerative work (i.e. both self-employment¹ and wage employment) that is not registered, regulated, or protected by the existing legal or regulatory frameworks. Apart from that, informal workers hardly get any secure employment contracts, work benefits, social protection, or workers' representation (15 ICLS at the ILO, 2003).

This paper is structured in the following manner: Section 2 provides some of the important literature relating to income inequality in the Indian economy. The research gap and objectives of the study are explained in Section 3. Section 4

1 Although self-employed workers are an inherent part of informal employment, wage information among most of the self-employed workers are unavailable in our data set. As a result, those informal workers are considered for our analysis whose wage information is given in our data set.

presents the source of data used in the study. Section 5 discusses the employment share among formal and informal workers across gender and sector. Estimates of mean wages (weekly) among informal workers are explained in Section 6. Section 7 provides a picture of the extent of wage inequality across states, sectors, and genders. We have tried to calculate the extent of wage inequality among the informal workers across states² over the years in the last decade. Section 8 sheds some lights on significant changes in wage-income inequality which were observed in the last decades i.e. between 2011-12 and 2019-20. Section 9 furnishes the conclusions.

2. A Brief Review of Literature

Padhi and Motkuri (2021) based on the Employment-Unemployment Survey published by NSSO in 2011-12 and Periodic Labour Force Survey data (1 and 2) published in 2017-18 and 2018-19 respectively, observed that there is a mere improvement in employment in the last decade and also a decline in the size of the workforce. They have also mentioned that the unemployment rate among the youth remains historically high and a sizeable portion of the female labour force has withdrawn from the labour market. In this background, it is required to investigate the wage-income inequality among the Indian workforce, mostly of which are informal. The structure of wage and income inequality in India has been documented in some of the literature. Das (2019) using the 68th round NSSO data on Employment and Unemployment Survey found that wage distribution in permanent employment is more unequal than in temporary employment. Furthermore, it is observed that the incidence of wage penalties increases progressively at the top of the wage distribution. Das (2012) again using the NSSO data reconfirms that workers in the informal sector are paid less than one-third of the formal sector wage. Moreover, the average wage of the private formal sector is higher than that of the informal sector. Apart from that, the incidence of wage inequality increased among the regular workers between 1983 and 1999, but it reduced among the casual workers (Dutta, 2005). Anand et al. (2016) claim that there has been a rise in wealth inequality during the period of high growth from 2008-12 in India. However, the gains from the growth have hardly been distributed equally. The estimates of income inequality have been discussed by Sarkar et al. (2010) where it is found that there has been an increase in the income inequality over time in the post-reform period. During the post-reform period, income inequality has increased by more than 4 per cent (Rani, 2008). According to Galbraith (2004), there has been an increase in inequality in the organized manufacturing sector in India. Banga (2005) points

2 It is essential to calculate wage-income inequality across states in India because wage structure as well as standard of living differs a lot across states in India. A comparative analysis of the same across states would definitely shed some light on the diverse economic situation of India. Along with that, the state with highest inequality of wage-income can also be identified.

out that inequality in the manufacturing sector has increased due to economic liberalization. An increase in capital intensity has resulted from an increase in inequality in the manufacturing sector in India (Kapoor, 2016). Abraham (2017) in her paper reveals that informal workers in informal enterprises have faced larger wage inequality as compared to informal workers in formal enterprises. It is further revealed in this paper that education does not have a significant role to play in determining wage inequality among them. According to Kundu et al. (2022), significant wage discrimination exists among the regular salaried non-SC/ST workers (general social group) and among SC/ST workers. They further found that 19 per cent of the total wage-income gap among them results from the discrimination during 2019-20. In their paper it is observed that wage discrimination also exists among the self-employed workers who are non-SC/ST and SC/ST workers.

3. Research Gap and Objectives of the Study

Before investigating the wage-income inequality among the Indian informal workers, first, we need to investigate whether there is any change in the composition of the labour force between formal and informal workers in India in the last decade. Employment share across male and female informal workers is also extremely important to understand in order to investigate whether there is any change in women's participation in informal employment which however has hardly been covered so far in the existing literature.

Before comparing the wage-income inequality among the informal workers in India, secondly, we need to investigate whether there is any actual change in the mean-wage income among the informal workers of India over time. For doing that, it is required to compare the mean money wage income of informal workers in 2011-12 and the real mean wage income of informal workers in 2018-19 and 2019-20, considering its nominal value of 2011-12 as the base period. It is well documented in the literature that women are ill-paid as compared to their male counterparts in all types of employment. Therefore, it is necessary to calculate the extent of the mean wage gap between male and female workers in informal employment.

The literature mentioned above provides a comparative study of the wage-income inequality among the formal and informal workers in India in the post-reform period but mainly within 2010. The existing literature hardly covers the same aspect in the current economic scenario. None of the papers provides a comparative analysis of the wage-income inequality among informal workers over the years, particularly in the last decades among the states. It is therefore imperative to understand the extent of wage-income inequality among the informal workers in the rural vis-a-vis urban areas. It is also important to

investigate whether wage-income inequality among the informal workers (who occupy the major share of earning members in India) has increased over time during the last decade from 2011-12 to 2019-20. During the time of collection of data for PLFS, 2019-20, data from the rural areas were collected only during the first visit of data collection. Thus, data from rural areas might have been collected even before the start of the COVID-19 pandemic. However, the data from the urban sector has been collected until the middle of 2020 when the effect of the pandemic was very prominent. As a result, the impact of the pandemic should be reflected in the urban data. Hence, the unit-level data set of PLFS, 2019-20 cannot be totally considered as the information of the pandemic period. Thus, we can say that our paper partially covers the impact of the pandemic and that too in urban areas only.

Based on this research gap, the objectives of the study are framed as below:

- i) To establish the dominance of informal workers in the Indian labour market: It is important to show how much changes in the employment share among the formal and informal workers have been observed recently, specifically across genders and in rural and urban India.
- ii) To compare mean wage income over the years among the informal workers: The paper attempts to give a first-hand picture of whether the wage income of the informal workers all over India has increased recently or not.
- iii) To provide a comparative analysis of and the recent trend in the wage-income inequality among the informal workers across genders, and rural and urban sectors in recent periods across states and union territories of India. The Gini co-efficient of wage income among different types of informal workers has been calculated for each state and union territory. Using the Gini decomposition technique, it can also be concluded whether the conventional causes of wage-income inequality among the informal workers in India can be responsible for this inequality or not.

4. Sources of Data

This study uses the 68th round of NSS data on employment and unemployment for the period 2011-12, Periodic Labour Force Survey (PLFS) data for 2018-19 and also 2019-20. During 2019-20, the data in the rural area has been collected only on the first visit while that of the urban area was collected on the first visit and revisit.³ For calculating the employment share we have considered the whole data set. However, for analysing the wages and wage inequality among the informal workers we have extracted data containing only

3 Data in urban area had been collected during the period July-September, 2019, October-December, 2019, January-March, 2020, and April- June, 2020.

self-employed workers,⁴ regular salaried workers, casual workers in the public sector, and casual workers in other sectors. Hence, in this analysis, we have considered all types of informal workers. For doing this, we have subtracted all samples whose principal activity status is: employer, student, housewife, beggar, retired and handicapped. In this study, the informal workers in the formal sector are considered as those workers who work in formal sectors like the public sector, private sector, cooperative institutions and so on as contractual workers and are not getting social security benefits. On the other hand, informal workers are the workers of proprietary enterprises, partnership enterprises, domestic enterprises, and other enterprises. In general, informal employment can be considered as work without job security (GOI, 2007). Thus, the total number of extracted samples is 89, 288, 183,272 and 185,599 during 2011-12, 2018-19 and 2019-20 respectively. In this study we have considered the weekly wages of the informal workers and compared the same over the years and across states. Weekly wages have been calculated simply by adding the wage income of each working day of the reference week.

5. Employment Share

In order to understand the economic condition of an economy, it is very much important to look into the size of the workforce and the unemployment rate. In the study of Padhi et al. (2021), it was found that there has been positive growth in unemployment from 2017-18 to 2018-19. Moreover, there has been a decline in the share of agriculture in the workforce without a corresponding increase in the share of the workforce in the non-agricultural sector. Not only that, there has been a reduction in the employment share of the female workforce during this time. In this scenario employment share of the formal workforce is bound to decline. Abraham (2017) confirms that the employment share of formal workers declined for both male and female workers from the period 1999-2011. Thus, it is important to look into the employment share of male and female workers in both formal and informal sectors.

Table 1 confirms the fact that the share of informal employment in the Indian labour market is dominating as compared to formal employment. During 2011-12, more than 84 per cent of the total workers were informally employed. The incidence of informal employment has increased over time during 2018-19 and further during 2019-20. In rural areas, the percentage of informal workers out of the total workers in the Indian labour market is even higher. On the other hand, the incidence of informal workers is less in the urban area as compared to that of rural area and rural-urban areas combined. This phenomenon has been observed for all the three years.

4 We have considered those self-employed workers for our analysis whose wage information is available in our data set.

Table 1: Employment Share among the Formal and Informal Workers (in per cent)

Employment Share	2011-2012		2018-2019		2019-2020	
	Formal Workers	Informal Workers	Formal Workers	Informal Workers	Formal Workers	Informal Workers
Overall	15.56	84.44	12.5	87.5	11.06	88.94
Rural Sector	11.3	88.7	6.86	93.14	5.79	94.21
Urban Sector	21.32	78.68	14.93	85.07	14.47	85.53

Source: Authors' calculation

Table 2 points out the share of overall male and female informal workers (combining rural and urban areas) as well as rural and urban areas separately. It is observed that the lion's share of the workforce in informal employment has been occupied by male workers in both rural and urban sectors. Moreover, the share of female employment has also declined over the years in the last decade. Apart from this, it can also be observed that as compared to rural India, the incidence of male informal employment is slightly higher in urban India.

Table 2: Employment Share among Male Informal Workers and Female Informal Workers (in per cent)

Employment Share	2011-2012		2018-2019		2019-2020	
	Male Informal Workers	Female Informal Workers	Male Informal Workers	Female Informal Workers	Male Informal Workers	Female Informal workers
Overall	82.15	17.85	88.53	11.47	88.75	11.25
Informal Workers in the Rural Sector	81.53	18.47	87.89	12.1	87.8	12.2
Informal Workers in the Urban Sector	83.25	16.75	88.96	11.03	89.95	10.05

Source: Calculated by authors

6. Comparing the mean wage income of the informal workers over time

From Table 1 it is clear that the Indian workforce is fully dominated by informal workers. In this part the mean wage income is calculated among the informal workers over time and across genders. Initially, the mean wage income of the informal workers in India for the period 2011-12, 2018-19 and 2019-20 are calculated separately. This is required before looking into their wage-income inequality. Since money-wage income overtime is not comparable as different periods of the last decade are considered, we need to estimate the real wage income for 2018-19 and 2019-20, considering 2011-12 as the base year

with the mean nominal wage income of informal workers during 2011-12, so that one can observe whether there exists any actual mean wage increase among the informal workers over time or not. To execute this, the real wage income among the informal workers in India is calculated considering the consumer price index of rural areas and urban areas of India as provided by the Reserve Bank of India (2020) after considering 2012 as the base year. To get the value of real wage income of the overall informal workers of India for the period 2018-19, we have to consider $(\text{Nominal mean wage income in 2018-19} \times 100)/139.6$; for the rural area $(\text{Nominal mean wage income in 2018-19} \times 100)/141.3$ and for the urban area $(\text{Nominal Mean wage income in 2018-19} \times 100)/137.7$. Similarly, for the period 2019-20, to get the mean real wage income of the overall informal workers, we have to consider $(\text{Nominal mean wage income 2019-20}/146.3) \times 100$; for the rural area $(\text{Nominal mean wage income 2019-20}/147.3) \times 100$ and for urban areas $(\text{Nominal Mean Wage Income 2019-20} \times 100)/145.1$. Since in both the above cases 2011-12 is the base period, therefore the mean wage in the base period is kept nominal. Table 3 illustrates mean wage earnings among the informal workers in India and compares the same with male and female informal workers. The estimates of real wage income among them are also provided so that the actual change in the wage income can be compared over the years considering 2011-12 as the base year. It is found that money wage income has shown improvement over time for all the informal workers taken together as well as for male and female informal workers separately. However, there has been a decline in the actual mean wage income among all types of informal workers as well as male and female informal workers from the period 2011-12 to 2018-19, while the same has enhanced a little bit from 2018-19 to 2019-20.

Table 3: Weekly Mean Wage Income among Male and Female Informal Workers

Categories	2011-2012	2018-2019		2019-2020	
	Money Wages (Rs.)	Money Wages (Rs.)	Real Wages (Rs.)	Money Wages (Rs.)	Real Wages (Rs.)
Mean Weekly Wages for Informal Workers	1289.89	1694.4	1213.75	1882.33	1286.62
Mean Weekly Wages among Male Informal Workers	1359.89	1776.77	1272.75	1965.61	1343.54
Mean Weekly Wages among Female Informal Workers	920.66	1086.81	777.94	1198.87	819.46

Source: calculated by the authors

Table 4 presents the estimates of monetary as well as real mean wage income among the informal workers in India for the period 2011-12, 2018-19

and 2019-20 in both rural as well as urban sectors respectively. Mean wage income in the rural area among informal workers is lower than that among their counterparts in the urban area, both in monetary terms and in real terms. In the rural sector, both money wage income as well real wage income has escalated over the years. On the other hand, in the urban sector, only money wage income has shown improvement while real wage income has dwindled from the period 2011-12 to 2018-19. However, from the period 2018-19, not only does the weekly money wage increase but the mean weekly real wage has also enhanced a little bit among the urban informal workers in India.

Table 4: Weekly Mean Wage Income across Rural and Urban Informal Workers

Sectors	2011-2012	2018-2019		2019-2020	
	Money Wages	Money Wages	Real Wages	Money Wages	Real Wages
Rural Sector	1080.64	1654.35	1170.81	1814.09	1231.26
Urban Sector	1449.3	1852.35	1345.21	2037.11	1375.49

Source: Same as Table 1

7. Wage-Income Inequality among the Informal Workers in India

A higher incidence of informal employment in the Indian labour market is clearly observed in Table 1. Sahoo and Neog (2017) also showed the existence of heterogeneity among different types of non-cultivator informal workers. Given the diversity of employment, it is difficult for policy workers to prescribe inclusive growth in the Indian economy. The wage income among the informal workers in different states is not the same. It is also not the same among different types of workers within a particular state. Wage-income inequality among informal workers is calculated with the help of the Gini index (GI). GI is a very useful tool to measure income inequality because it allows negative values of income and wealth.⁵

Here, wage-income inequality among informal workers in India is considered. To know the cause of wage-income inequality across states,⁶ the decomposition exercise of the Gini index is extremely important.

5 According to many scholars, GI gives better results as compared to General Entropy measures (GE).

6 In this paper we have decomposed wage inequality among the informal workers across states and not across other relevant parameters like gender, caste, educational qualification and so on. The reason is that, in this paper we would like to investigate wage inequality across states and accordingly we have tried to shed some light on the causes of wage inequality across different states of India. Hence, we have decomposed wage inequality across states only.

Conventionally, in the economic literature, the Gini index is decomposed into various subcomponents like the contribution of within-group inequality (G_w), the contribution of between-group inequality (G_b) and the contribution of group overlap inequality (G_o) (Das, 2012 & Ariz et al., 2014). The importance of G_o appears when G_w and G_b fail to capture the extent of inequality. In that case, a researcher has to depend on the third component of the Gini coefficient G_o which occurs when a portion of one group of workers coincides with another group of workers. G_o helps to identify whether there exists any cause⁷ of wage inequality (e.g. working conditions, sector, educational qualification, caste and so on). Higher values of G_o indicate that factors like working conditions, sector, educational qualification etc. do not play any major role in determining the overall wage inequality (Costa, 2016). Thus, the overlapping analysis provides a very important conclusion regarding the discussion of wage inequality. In this study we have used the Gini index (Gini, 1912)⁸ as a summary measure of wage-income inequality among the informal workers, both within and between groups of workers, across rural and urban India.

We consider G as the Gini coefficient of wage-income inequality and the population subgroups are indexed by $k = 1, 2, \dots, 36$.

$$G = G_B + \sum_{k=1}^{36} a_k G_k + R \quad \dots (1)$$

Here, G_B is nothing but the between-group inequality. G_B is defined as the one which can be obtained if every wage income in every subgroup can be replaced by the mean of the relevant subgroup. Here, ' a_k ' is the product of population share and wage income share corresponding to each subgroup k . G_k is the Gini coefficient for wage income within subgroup k . R is the residual whose value will be zero when the subgroups of the wage income hardly overlap. According to Lambert et al. (1993), the residual part is nothing but the group overlap inequality. Thus, we can say that G can be decomposed into three components: Within-group inequality (G_w), Between-group inequality (G_b) and Group overlap inequality (G_o).⁹ Here, the extent of wage inequality among informal workers across states will be addressed. Here, a state is considered a

7 The most important determinants of wage inequality are nothing but the factors affecting wage inequality in the economic literature. Das (2012) reveals that educational qualification, technical skill and experiences are the factors affecting wage inequality. Sengupta et al. (2021) also reveals that higher wage inequality exists among scheduled castes and scheduled tribes as compared to higher castes.

8 Associated with Lorenz (1995)

9 The aim of inequality decomposition is related to the identification of relevant factors determining the inequality structure. Gender, working conditions, education level, and area of residence are the factors which may possibly influence the wage-income inequality. But if high value of overlapping factor is observed in the value of Gini coefficient after decomposition, then it can be said that the above indicated possible factors slightly contribute to the total wage-income inequality. The decomposition of Gini index and its interpretation have been vividly done in Lambert et al. (1993), which has further been used in Das (2012).

“group”. It is found the overall wage inequality among informal workers across states. For doing that, wage-income inequality of the informal workers within a particular state as well as wage-income inequality among the informal workers between two or more states are considered. The third component, the overlap inequality of wage income among informal workers across states has also been found. Since the characteristics and wage patterns of informal workers vary a lot across states, we need to find out the extent of wage inequality across states.

Hence, $G = G_w + G_b + G_o$ Eq. 2

7.1 Recent trend in Wage-Income (weekly) Inequality among different types of Informal Workers in India

Table 5 provides an overall picture of wage-income inequality during 2011-12, 2018-19 and 2019-20 respectively. The estimates of wage-income inequality have been shown with the help of GI. It is observed that the estimates of the Gini Coefficient are not only very high during the base year i.e. 2011-12 but also the same have increased over time during the latter years. The fact that wage inequality among the informal workers in India has been very high is not at all surprising. It is already shown in the wage-inequality report of OXFAM, India (2022). It is also true that informal workers occupy a major share of the working labour force as well as earning sources in India. Wage inequality has been surprisingly higher in India during the recent decades and is escalating rapidly. In our analysis, we also found that in 2011-12 wage-income inequality among the informal workers in rural areas was higher than that in urban areas. However, the opposite is happening for both 2018-19 and 2019-20. It is also observed that within the rural sector, as compared to the male workers, wage-income inequality has been higher among the female workers in all the three concerned periods. On the other hand, in the urban sector, wage-income inequality has been higher among male informal workers during the former period and female informal workers during the latter period.

Table 5: Wage-Income (weekly) Inequality among the Informal Workers in India

Categories	2011-2012	2018-2019	2019-2020
Informal Workers	0.77	0.88	0.91
Informal Workers in the Rural Sector	0.79	0.85	0.87
Informal Workers in the Urban Sector	0.72	0.90	0.93
Informal Workers among Rural Male Workers	0.79	0.84	0.85
Informal Workers among Rural Female Workers	0.80	0.89	0.90

Informal Workers among Urban Male Workers	0.72	0.89	0.92
Informal Workers among Urban Female Workers	0.70	0.93	0.96

Source: Same as Table 1

7.2 Recent Trend in Wage-Income (weekly) Inequality among the Informal Workers of India across States (including Union Territories)

The GI indicating the extent of wage-income inequality among the informal workers across states of India have been calculated separately in the rural sector, urban sector as well as rural and urban sector combined. The three different periods are considered here to provide a comparative study about the same over the years and the results are presented in Table 6.

In our analysis, we have tried to estimate inequality measurements of the informal workers in India in the recent decade and also tried to compare the same across states. Since the economic condition of the state varies a lot hence the quality of jobs as well as wage structure also varies significantly. Thus, we not only have calculated the Gini index among the informal workers across various states but also decomposed the same across G_w , G_b and G_o . Here, the state is considered as a group. G_w indicates inequality in wage income among the informal workers within the states, while G_b means wage-income inequality between two or more states. The importance of G_o appears when both G_w and G_b fail to capture the extent of wage inequality. The positive value of G_o indicates that a portion of one group of workers coincides with another group of workers. As the state has been considered as a group, the positive value of G_o is obtained when a particular percentage of informal workers in a particular state coincides with a particular percentage of informal workers in some other states. Here, we have got positive values of G_o indicating that a given portion of informal workers in a particular state coincides with a given percentage of informal workers in some other states.

It is found that the overall measure of GI among the informal workers increases over the years in the rural area, urban area as well as rural and urban areas combined. Out of the overall measure of GI, the contribution of G_w is 0.4 which remains the same over the years but G_b and G_o have enhanced in the last decade in rural areas, urban areas and in the overall or combined situation. Out of the overall GI estimate, the contribution of G_o has been the highest while that of G_w is the least. This happens for rural and urban areas taken separately and when both are combined. Thus, the high values of G_o indicate that in determining wage inequality important factors like sector, educational qualification of the worker etc. contribute very less to the overall wage inequality. Moreover, as the values of G_o have increased over the years in the last decade, it can be

emphasised that the contribution of the factors¹⁰ possibly influencing wage inequality has reduced over time.

From Table 6 it is observed that during 2011-12, the estimated overall value of GI was highest in Arunachal Pradesh and lowest in Pondicherry followed by the islands. However, during 2018-19, the estimated value of the same was highest in Daman & Diu followed by Dadra & Nagar Haveli, while it was lowest in Lakshadweep. During 2019-20, the estimates of GI are very high in various states including Chandigarh, Delhi, Sikkim, and Goa. The smallest measure of GI is found in Bihar.

After that, rural and urban areas are considered separately. This is done because there has been much contrast in the economic conditions and wage rate among the workers in the rural as well as in the urban areas. So, it is necessary to compare the wage inequality among the rural and urban informal workers separately across states. Table 6 shows that the estimates of GI have increased from 2011-12 to 2018-19 for all the states. But for the same from 2018-19 to 2019-20 it is observed that enhancement happened in some states and fall in some states. More specifically, the estimates of GI have increased in states like Uttaranchal, Rajasthan, Nagaland, Assam, West Bengal, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Daman & Diu, Maharashtra, Karnataka, Lakshadweep, Kerala, Pondicherry, and Telangana over the period 2018-19 in rural sector. On the other hand, the values of GI remain the same across the period 2018-19 and 2019-20 in the states like Uttar Pradesh, Sikkim, Arunachal Pradesh, Manipur, Andhra Pradesh, and Tamil Nadu.

Considering the urban sector separately it is found that as compared to the rural sector the estimates of overall GI in the urban sector have been lower during 2011-12 and it is higher during 2018-19 and 2019-20. The estimates of overall GI have increased over the years from 2011-12 to 2019-20. Not only that, it is further found that the estimates of GI have increased for all the states. During the former period, Manipur and Dadra & Nagar Haveli are the states with the highest and lowest estimates of GI respectively. During 2018-19, Delhi and Dadra & Nagar Haveli are the states with the highest estimates of GI while Lakshadweep records the least estimate of GI. During 2019-20, Sikkim and Goa are the states with the highest estimates of GI. On the other hand, the lowest estimates of GI are found in Lakshadweep.

10 Era Dabla, Narris, Kalpana Kachar & F.Rica (June, 2015) had shown that trade, financial literacy, technological upgradation, credit availability, skill formation, education, caste, religion are possible factors responsible for income inequality in any area. When Go increases over time, then the influence of these factors on wage-income inequality gradually becomes negligible.

Table 6: Wage Inequality among the Informal Workers across States in the Rural Sector, Urban Sector, and Combined

States	Rural Sector			Urban Sector			Combined		
	2011-2012	2018-2019	2019-2020	2011-2012	2018-2019	2019-2020	2011-2012	2018-2019	2019-2020
Jammu & Kashmir	0.73	0.83	0.81	0.73	0.92	0.94	0.73	0.89	0.90
Himachal Pradesh	0.80	0.88	0.86	0.65	0.90	0.94	0.78	0.88	0.89
Punjab	0.66	0.80	0.78	0.63	0.92	0.94	0.64	0.89	0.91
Chandigarh	0.65	0.91	0.90	0.62	0.95	0.96	0.63	0.95	0.96
Uttaranchal	0.84	0.89	0.91	0.77	0.92	0.95	0.82	0.91	0.94
Haryana	0.73	0.85	0.80	0.69	0.92	0.93	0.72	0.90	0.90
Delhi	0.54	0.97		0.64	0.96	0.96	0.64	0.96	0.96
Rajasthan	0.75	0.88	0.90	0.67	0.92	0.95	0.72	0.91	0.94
Uttar Pradesh	0.79	0.86	0.86	0.76	0.91	0.94	0.79	0.89	0.92
Bihar	0.81	0.82	0.80	0.80	0.83	0.90	0.81	0.82	0.86
Sikkim	0.75	0.94	0.94	0.64	0.95	0.97	0.73	0.94	0.96
Arunachal Pradesh	0.94	0.96	0.96	0.84	0.93	0.93	0.93	0.94	0.94
Nagaland	0.94	0.95	0.96	0.86	0.92	0.95	0.92	0.94	0.95
Manipur	0.89	0.90	0.90	0.92	0.89	0.93	0.91	0.89	0.92
Mizoram	0.94	0.92	0.90	0.83	0.87	0.90	0.88	0.88	0.92
Tripura	0.69	0.86	0.83	0.68	0.84	0.90	0.69	0.85	0.87
Meghalaya	0.84	0.83	0.81	0.68	0.84	0.90	0.79	0.84	0.87
Assam	0.84	0.86	0.87	0.81	0.91	0.93	0.83	0.88	0.90
West Bengal	0.79	0.82	0.85	0.72	0.90	0.94	0.76	0.88	0.92
Jharkhand	0.72	0.78	0.83	0.74	0.88	0.91	0.73	0.84	0.89
Orissa	0.80	0.82	0.83	0.76	0.91	0.93	0.79	0.86	0.88
Chhattisgarh	0.83	0.86	0.88	0.68	0.90	0.94	0.78	0.89	0.92
Madhya Pradesh	0.80	0.85	0.89	0.75	0.89	0.93	0.78	0.88	0.92
Gujarat	0.77	0.93	0.91	0.67	0.94	0.96	0.73	0.94	0.95
Daman & Diu	0.68	0.93	0.96	0.65	Not Available	Not Available	0.67	0.97	0.91
Dadra & Nagar Haveli	0.57	0.94	0.93	0.47	0.96	Not Available	0.53	0.96	0.96
Maharashtra	0.83	0.89	0.90	0.68	0.90	0.93	0.76	0.90	0.93
Andhra Pradesh	0.78	0.84	0.84	0.66	0.89	0.92	0.73	0.87	0.90

Karnataka	0.80	0.86	0.87	0.70	0.86	0.91	0.75	0.86	0.90
Goa	0.71	0.92	0.91	0.58	0.94	0.97	0.63	0.94	0.96
Lakshadweep	0.67	0.46	0.96	0.72	0.61	0.86	0.70	0.55	0.93
Kerala	0.74	0.75	0.79	0.70	0.81	0.89	0.73	0.80	0.87
Tamil Nadu	0.72	0.76	0.76	0.67	0.84	0.90	0.7	0.82	0.87
Pondicherry	0.64	0.78	0.85	0.60	0.87	0.94	0.61	0.86	0.94
Islands	0.62	0.86	0.85	0.52	0.91	0.90	0.57	0.90	0.91
Telangana	Nit formed	0.86	0.93	Nit formed	0.89	0.92	Nit formed	0.88	0.92
GI	0.79	0.86	0.86	0.72	0.90	0.93	0.78	0.89	0.92
G_w	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
G_b	0.2	0.21	0.24	0.18	0.26	0.27	0.2	0.23	0.24
G_o	0.55	0.61	0.58	0.50	0.60	0.62	0.54	0.62	0.64

Source: calculated by authors

7.3 Recent Trend in Wage-Income (weekly) Inequality among the Informal Workers across States in terms of Region and Gender

In this section the estimates of wage inequality among the male and female informal workers across different states of the rural and urban sectors during 2011-12, 2018-19 as well as 2019-20 is calculated separately and the results are presented in Table 7. Since female labour force participation is quite lower than that of males, it is essential to look into the wage inequality among male and female informal workers separately to understand how wage inequality varies across genders. It is found that the overall value of GI increases over time among male and female workers in the rural as well as urban sectors. Among the rural male and female informal workers as well as urban male and female informal workers, most states have witnessed an increase in GI during 2018-2019 as compared to 2011-12; while among the rural male informal workers, some states have witnessed an increase in GI from the period 2018-19 to 2019-20. These states are Uttaranchal, Rajasthan, Uttar Pradesh, Assam, West Bengal, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Andhra Pradesh, Karnataka, Goa, Lakshadweep, Pondicherry, and Telangana; while the reverse has been experienced by the other states. As compared to the rural male informal workers, overall weekly wage inequality reflected in terms of GI is higher among the rural females during all the three time periods. The values of GI are also higher among the female informal workers as compared to their male counterparts in the states except Punjab, Bihar, Sikkim, Manipur, Tripura, Assam, West Bengal, Jharkhand, Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Goa (only during 2011-12), Arunachal Pradesh (only during 2018-19), Mizoram (only during 2019-20), Chandigarh, Delhi, and Telangana respectively.

As compared to the rural male informal workers, it is found that the overall wage inequality as measured by GI among the urban male workers has been less during 2011-12 and higher during 2018-19 and 2019-20. Among the urban male informal workers most states have witnessed an increase in the estimates of GI from the period 2018-19 to 2019-20 except Arunachal Pradesh where the reverse is witnessed.

GI is also measured separately among the female informal workers in the urban sector. It is found that the overall wage inequality as measured by GI has been higher among the male informal workers as compared to female informal workers in the urban sector during the former period; while this estimate has been higher among females during 2018-19 and 2019-20.

Furthermore, the decomposition results of GI provide the same inference. Out of the total GI, the contribution of G_o has been the highest followed by that of G_b and the least contribution comes from G_w for rural males, rural females, urban males as well as urban female informal workers. This is true for all the three years. This undoubtedly indicates that the contribution of the factors determining wage inequality is very negligible. The increase in G_o over the years also indicates that the contribution of these factors reduces over time.

Table 7: Wage Inequality among the Male and Female Informal Workers across States in terms of Region and Gender

States	Rural Sector						Urban Sector					
	Male			Female			Male			Female		
	2011-2012	2018-2019	2019-2020	2011-2012	2018-2019	2019-2020	2011-2012	2018-2019	2019-2020	2011-2012	2018-2019	2019-2020
Jammu & Kashmir	0.72	0.82	0.78	0.76	0.96	0.94	0.75	0.91	0.93	0.59	0.95	0.96
Himachal Pradesh	0.72	0.82	0.78	0.91	0.95	0.95	0.64	0.90	0.93	0.65	0.92	0.94
Punjab	0.66	0.77	0.76	0.62	0.93	0.89	0.64	0.91	0.93	0.55	0.94	0.87
Chandigarh	0.64	0.92	0.88	0.58	0.88		0.59	0.94	0.96	0.78	0.96	0.96
Uttaranchal	0.81	0.87	0.89	0.94	0.95	0.95	0.77	0.91	0.94	0.73		0.79
Haryana	0.72	0.84	0.79	0.77	0.94	0.91	0.70	0.91	0.92	0.59	0.95	0.96
Delhi	0.55	0.97		0.29			0.64	0.95	0.96	0.67	0.95	0.84
Rajasthan	0.73	0.87	0.89	0.81	0.91	0.94	0.66	0.92	0.95	0.72	0.95	0.95
Uttar Pradesh	0.79	0.85	0.86	0.84	0.95	0.93	0.76	0.91	0.94	0.77	0.94	0.95
Bihar	0.81	0.81	0.79	0.75	0.96	0.94	0.80	0.82	0.89	0.68	0.95	0.95
Sikkim	0.75	0.92	0.91	0.74	0.96	0.95	0.66	0.94	0.96	0.57	0.96	0.92
Arunachal Pradesh	0.93	0.96	0.95	0.94	0.95	0.95	0.83	0.92	0.91	0.87	0.96	0.93
Nagaland	0.93	0.95	0.95	0.95			0.85	0.91	0.94	0.90		

Manipur	0.91	0.88	0.88	0.82	0.96	0.94	0.91	0.86	0.90	0.95	0.95	0.96
Mizoram	0.92	0.91	0.88	0.95	0.89	0.95	0.80	0.81	0.88	0.90	0.96	0.95
Tripura	0.71	0.86	0.81	0.58	0.90	0.88	0.70	0.85	0.89	0.53	0.80	0.95
Meghalaya	0.83	0.79	0.78	0.85	0.89	0.86	0.64	0.80	0.86	0.80	0.92	0.96
Assam	0.85	0.85	0.86	0.67	0.91	0.92	0.83	0.91	0.93	0.61	0.92	0.96
West Bengal	0.79	0.80	0.84	0.76	0.92	0.91	0.73	0.88	0.93	0.67	0.95	0.93
Jharkhand	0.72	0.77	0.83	0.71	0.88	0.88	0.74	0.88	0.90	0.65	0.84	0.95
Orissa	0.80	0.82	0.83	0.76	0.82	0.81	0.77	0.92	0.93	0.67	0.87	0.96
Chhattisgarh	0.85	0.87	0.89	0.72	0.84	0.85	0.69	0.89	0.93	0.64	0.92	0.94
Madhya Pradesh	0.81	0.85	0.89	0.67	0.83	0.87	0.76	0.88	0.92	0.66	0.93	0.95
Gujarat	0.78	0.93	0.91	0.71	0.94	0.93	0.69	0.95	0.96	0.63	0.89	0.95
Daman & Diu	0.68	0.95	0.96	0.50	0.82		0.64			0.51		
Dadra & Nagar Haveli	0.58	0.93	0.95	0.50		0.80	0.47	0.96		0.39		
Maharashtra	0.84	0.88	0.89	0.78	0.90	0.93	0.68	0.89	0.92	0.67	0.94	0.95
Andhra Pradesh	0.77	0.82	0.83	0.79	0.88	0.88	0.65	0.87	0.90	0.63	0.93	0.95
Karnataka	0.80	0.84	0.86	0.78	0.93	0.94	0.69	0.84	0.90	0.67	0.91	0.95
Goa	0.74	0.92	0.94	0.52	0.94	0.77	0.59	0.94	0.96	0.54	0.94	0.96
Lakshadweep	0.69	0.45	0.96	0.40			0.73	0.60	0.88	0.64		
Kerala	0.73	0.71	0.76	0.73	0.83	0.83	0.70	0.78	0.85	0.68	0.89	0.96
Tamil Nadu	0.71	0.74	0.74	0.71	0.74	0.74	0.66	0.81	0.88	0.68	0.90	0.94
Pondicherry	0.67	0.73	0.79	0.52	0.85	0.93	0.60	0.84	0.93	0.54	0.94	0.93
Islands	0.63	0.85	0.85	0.56	0.88	0.87	0.51	0.89	0.90	0.53		0.95
Telangana		0.88	0.93		0.81	0.90		0.87	0.90		0.94	0.96
G _I	0.79	0.84	0.85	0.81	0.89	0.90	0.73	0.89	0.92	0.71	0.93	0.96
G _w	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.05
G _b	0.20	0.22	0.25	0.30	0.35	0.36	0.18	0.28	0.29	0.24	0.30	0.29
G _o	0.55	0.58	0.56	0.47	0.49	0.50	0.51	0.57	0.59	0.43	0.58	0.62

Source: calculated by authors

As the informal workforce occupies the maximum percentage of the workforce in India, our result supports the findings of the Oxfam report (2022) which points to the incidence of high-income inequality in present India. Tables 6 and 7 show that after the decomposition of the value of the Gini Coefficient, the value of G_o is maximum in all situations. This establishes the fact that the possible factors responsible for income inequality contribute slightly to wage-income inequality. Lee and Lee (2018) have shown that a more equal distribution of education significantly reduces income inequality. According to them, expansion of education is a major factor in reducing educational inequality which in the long run will also reduce income inequality of the country's

people. Sherawat & Singh (2019) have also shown that expansion of education in India and enhancement of average years of schooling can reduce income inequality. Biswas & Kundu (2021) have shown that in India both the Gross Enrolment Ratio (GER) and Gender Parity Index (GPI) in primary education are impressive. They have also shown that different types of government grant necessary to improve the infrastructure of the public primary schools have percolated down to every corner of India even in rural India. Despite all this, informal workers still consider education as their luxury item (Roy & Kundu, 2022). This supports the reason behind the high value of G_o in each situation. Some government policies need to be formulated to help the informal workers' households to treat expenditure on education as necessary. This may reduce the wage-income inequality among the informal workers of India.

8. Changes in Wage-Income Inequality among the Informal workers in India in the Last Decade

It has already been proved that in the Gini Coefficient of wage income among any type of informal worker, the contribution of G_o i.e. group overlap inequality is always highest in all the concerned periods. To investigate whether there is any decrease in wage-income inequality among a particular group of informal workers in India over time, the following equation is considered.

$$GI_{jit} = \beta_0 + \beta_1(\text{Time}) + \varepsilon_{jit} \dots \dots \dots \text{Eq. 3}^1$$

GI_{jit} indicates the value of the Gini coefficient of the j^{th} type of worker (described in Table 8) of the i^{th} state in the t^{th} period. Time will take the value 0 for any state in the baseline period and 1 for the endline period. If the value of the parameter estimates of $\widehat{\beta}_1$ in Eq.3 becomes statistically significant and negative, then only one can claim that wage-income inequality among the informal workers in India has decreased between the baseline period and the end-line period. But, if the estimated value is positive, then it is obvious that the wage-income inequality among the informal workers has increased between the concerned periods. Initially, we consider 2011-12 as the baseline period and 2018-19 as the end-line period. Next, we consider 2018-19 as the baseline period and 2019-20 as the end-line period. According to the Periodic Labour Force Survey report of 2018-19, the samples of the urban workers were collected during the lockdown period but that has not happened for the rural workers. Table 8 provides the results of the above-mentioned equation to grasp the changes in wage-income inequality across states over time. Here, exercises are done separately for rural, urban, rural male and female workers and urban male and female workers. It is found that the estimate of $\widehat{\beta}_1$ has been positive and significant in all the cases, meaning that wage-income inequality of all types of considered workers has increased significantly over the years from 2011-12 to 2018-19.

Next, it is required to investigate whether there is any increase in wage-income inequality among the informal workers due to the first phase of the pandemic. Here, 2018-19 is considered the base period where there is no pandemic and 2019-20 is considered as the end-line period. Unlike the former case, we do not find significant results in all the cases between 2018-19 to 2019-20. Significant and positive results of $\widehat{\beta}_1$ are found among the overall informal workers, urban workers, urban male as well as urban female workers. This means that in the case of overall informal workers and specifically urban informal workers (including males and females), there has been a significant increase in wage-income inequality during the concerned time period when the pandemic covers the end-line period for urban informal workers. But for the rural informal workers, the result of $\widehat{\beta}_1$ has been insignificant indicating no change in the wage-income inequality during that period.

Table 8: Changes in Wage-Income Inequality in the Last Decade

Type of Workers	Changes in wage inequality from 2011-12 to 2018-19			Changes in wage inequality from 2018-19 to 2019-20 (the impact of the Covid-19 Pandemic)		
	α		R ²	α		R ²
Overall Informal Workers	0.74 (0.01)	0.18*** (0.02)	0.62	0.88 (0.009)	0.03* (0.01)	0.39
Overall Rural Workers	0.77 (0.01)	0.1*** (0.02)	0.31	0.85 (0.01)	0.02 (0.02)	0.22
Rural Male Workers	0.77 (0.01)	0.09*** (0.02)	0.25	0.84 (0.01)	0.02 (0.02)	0.25
Rural Female Workers	0.74 (0.02)	0.16*** (0.02)	0.41	0.90 (0.01)	-0.001 (0.01)	0.46
Overall Urban Workers	0.71 (0.01)	0.22*** (0.02)	0.76	0.89 (0.008)	0.04*** (0.01)	0.45
Urban Male Workers	0.71 (0.01)	0.21*** (0.02)	0.74	0.88 (0.009)	0.04*** (0.01)	0.55
Urban Female Workers	10.7 (0.80)	13.53*** (1.13)	0.71	0.93 (0.006)	0.02* (0.008)	0.47

Source: Same as Table 1

* => significant at 10 percent level ** => significant at 5 percent level ***=> significant at 1 percent level

9. Conclusion

It is established that the informal labour force occupies the lion's share in the Indian labour market and its share has escalated over the years in the last decade. It is found that nominal wage income among the male and female

informal workers has increased over the years from 2011-12 to 2018-19 while the same for real wage earnings which is a symbol of workers' purchasing power hardly shows any improvement. However, as compared to 2018-19, estimates of nominal and real wage income indicate an improvement among them during the period 2019-20. Along with the reduction in employment share in the informal employment among the female workers as compared to their male counterparts, it is also found that the mean wage earning among the former is considerably lower than the latter. It is observed that wage-income inequality among informal workers has increased over the years from 2011-12 to 2019-20 for most of the states. The GI estimates of the wage income have also increased among rural, urban, and male and female informal workers. It is also observed that as compared to the urban sector, wage-income inequality has been higher in the rural sector during 2011-12 and lower during 2018-19 and 2019-20 respectively. Moreover, within the rural sector, the estimates of GI have been higher among females as compared to males. While in the urban sector, the estimate of the same has been higher among the males during the former period while lower among them during the latter period. The overall estimate of GI has also been decomposed into G_w , G_b as well as G_0 and the states were considered as groups. It is found that the contribution of G_0 in 'G' is very high which points out that the major possible factors determining wage-income inequality across states have been very insignificant. It is identified that between 2011-12 and 2018-19, a maximum positive impact on wage-income inequality is observed among the female workforce, though this positive impact was observed among all types of the informal working population in India. It is found that there has been an enhancement in wage-income inequality among the informal workers of India during the latter period as compared to that of the former period. However, this enhancement is mainly observed among the urban informal working class.

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