FORMS OF INFORMAL EMPLOYMENT AND WAGE INEQUALITY IN INDIA: A REVIEW OF TRENDS

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Abstract

The 'alternative', 'atypical' or informal workforce has grown in developed and developing countries alike. One of the more recent evolutions of informal employment has been of informal employment within *formal* enterprises. In the interest of flexibility and cost-reduction, many formal firms in India and across the world increasingly hire workers on a temporary or informal basis. Alongside, and perhaps, as a result of the persistence and pervasiveness of informal employment, issues relating to inequality in outcomes and opportunities have come to the fore. In India, consumption inequality has risen since the 1990s, particularly in urban areas and across almost all states ((Topalova, 2008) alongside increases in income and wealth inequalities (Anand and Thampi 2016; Banerjee and Piketty 2010). Wage inequality, examined to a lesser extent, has declined in rural areas while increasing in urban (Cacciamali, Rodgers, Soundaryarajan, & Tatei, 2015).

This paper is motivated by these two intertwining aspects of the Indian labour market – informality and wage inequality. Using nationally representative sample data, it reviews the various manifestations of informal employment and chronicles recent trends, with particular focus on recent forms of informality. It examines the trends in wage inequality among the various forms of informal workers, overlaying these findings with the broader trends in inequality. Using a regression based inequality decomposition, the paper also examines the contribution of various factors to wage inequality across different employment groups.

1. Introduction

In India, consumption inequality has risen since the 1990s, particularly in urban areas and across almost all states ((Topalova, 2008) alongside increases in income and wealth inequalities ((ADB, 2007; Anand & Thampi, 2016; Banerjee & Piketty, 2010). Since the 2000s, there is some evidence to suggest a decline in inequality in disposable incomes (Rani & Furrer, 2016). Wage inequality, on the other hand has registered a marginal increase over the years (Cacciamali et al., 2015). However, when disaggregated by sectors (rural and urban), while wage inequality has declined in rural areas, it has increased in urban regions (Cacciamali et al 2015). Labour income being the most important factor contributing to overall income inequality and to changes in income inequality (Rani & Furrer 2016), it is worthwhile to explore the contributions and trends in different forms of labour to overall labour income inequality.

In India, the structure of employment and the sources of labour income have changed over time. In particular, labour is increasingly engaged informally, either through an increase in the number of informal workers in the informal enterprises (IIE), or an increase in the hiring of workers informally in the formal enterprises (IFE), the latter being referred to as 'casualisation' of the workforce. Firms create a dual structure within their enterprises, preferring to hire unskilled workers as contract/temporary staff rather than as regular workers (Ramaswamy, 2008).

In terms of their educational attainment, age and gender composition, the IFE And IIE comprise two distinct groups with younger men and older women, moderate to highly educated, particularly in urban areas, being more likely to be in IFE than IIE (Abraham, 2016). Formal firms, having access to financial capital and hence, more advanced technological processes, are also likely to pay higher wages. At the same time, these firms in the formal sector being more likely to resort to mechanisation and automisation, have preference for skilled workers and hence are more likely to generate larger income disparities. Over time, with greater liberalisation, wage inequality is expected to fall (Figini & Gorg, 2011) but some liberalisation in its early phases leads to increase in capital intensity, increasing the skill premium and thereby increasing inequality if the distribution of skills is asymmetric, as is the case in India. Therefore, within these forms of workers, i,e IFE, it is likely that wage dispersion may have increased. The presence of the IFE can also diminish the bargaining power of the regular or formal workers(Kapoor, 2016). For instance, Kapoor(2016) and Banga (2005) find an increase in wage dispersion within the organised sector with an increase in contractualisation.

Given these distinct forms of employment, the question arises as to how these have fared in terms of wage inequalities as well as their contribution to overall wage inequalities. Could different forms of work have a differing implication for inequality outcomes?

In this context, this analysis examines the following. Firstly, it examines whether the trends in inequality among different employment groups has differed from overall trends. Secondly, a regression-based decomposition is used to examine two questions in separate analyses, a) the extent of contribution of informality in employment to overall wage inequality, and b)the relative contribution of various factors such as age, education and industrial affiliation to the extent of wage inequality in each type of employment. Finally, using Yun's (2008) extension of the regression-based decomposition, it examines the factors accounting for differences in wage inequality between different categories of informal employment.

The next section describes the definition used in defining informal employment and presents an overview of trends. Section 3 describes broad trends in wage inequality across employment groups. In order to identify the sources of wage inequality, Section 4 details the methodology used to identify sources of wage inequality. It also provides an insight into the distribution of workers' characteristics across wage deciles. The empirical share of these attributes in explaining wage inequality within employment groups and difference in wage inequality across employment groups is presented in section 4.3. Section 5 concludes.

2. Informal Employment in India - Definitions, Measurement and Trends

2.1 Informal Employment - Operational Definition and Trends

In India, the National Commission on Employment in the Unorganised Sector (NCEUS, 2007) defines "unorganised workers consist of those working in the unorganised enterprises or households, excluding regular workers with social security benefits, and the workers in the formal sector without any employment/ social security benefits provided by the employers". According to the Unorganised Workers' Social Security Act, 2008, an unorganised worker includes "home-based worker, self-employed worker or a wage worker in the unorganised sector and includes a worker in the organised sector who is not covered by any of the Acts mentioned in Schedule II to this Act" where these Acts are related to the provision of workmen's compensation (Workmen's Compensation Act, 1923), job security and fair dispute settlement (Industrial Disputes Act, 1947), insurance (The Employee's State Insurance Act, 1948), provision of provident funds (The Employees' Provident Funds and

Miscellaneous Provision Act, 1952), maternity benefits (The Maternity Benefit Act, 1961) and gratuity (The Payment of Gratuity Act, 1972) .

As per the definitions of unorganised/informal work given above, employment, in any sector (formal or informal), is informal if it is not accompanied by statutory social security benefits. Here, the terms unorganised employment and informal employment are used interchangeably. However, indicators of social security benefits vary and this has resulted in a number of operational definitions with various indicators being used to proxy for the provision (or lack thereof) of social security benefits. Social security benefits may be proxied by the presence of insurance facilities, provident fund contributions or gratuity (NCEUS 2007; Sastry 2004; Unni and Naik 2013). Other indicators of 'formality' of employment include having paid leave (Unni and Rani 2003) or a written contract (Kolli and Sinharay 2011; Kolli and Sinharay 2014) or full-time employment status (Sastry, 2004)..

In the context of available primary data, questions related to the provision of social security benefits were first asked only in the 55th Round (1999-2000) EUS (NSSO, Government of India, 1999). Specifically, working individuals were asked if they were 'covered under Provident Fund' where Provident Fund includes PPF (Public Provident Fund), GPF (General Provident Fund) or CPF (Central Provident Fund). From NSS 61st Round (2004-05) EUS onwards, the question was expanded to include other social security benefits – pension, gratuity, health care and maternity benefits. Additionally questions relating to whether workers received a written job contract or had access to paid leave were also asked.

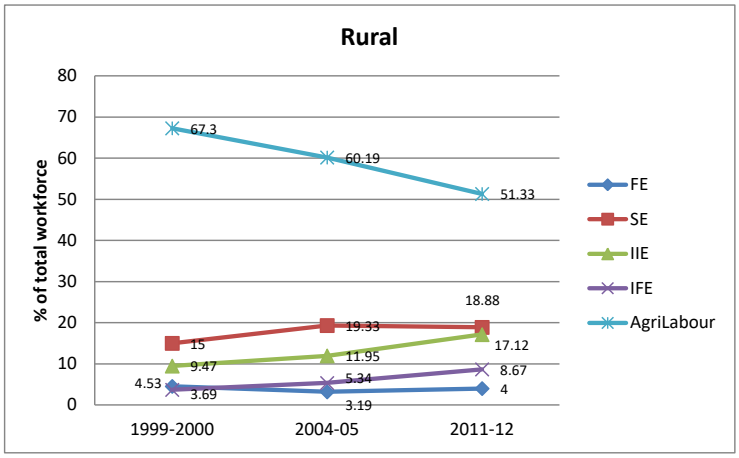
Information on PF as a social security benefit is available in all the three NSS EUS Rounds since 1999-2000 (NSSO, Government of India, 1999, 2004, 2011). Thus, we use the provision and beneficiary of PF as an indicator of statutory social security for workers. Accordingly, any employment which is not accompanied by the benefit of PF is identified as informal employment. Consequently, any employment with (without) the benefit of PF qualifies as formal (informal) employment. An analysis of the provision of PF alongside the provision of other benefits, based on data available since 2004-05, suggests considerable overlap further supporting the adoption of this definition

Consequently, employment is categorized into formal employment (FE), informal employment in informal enterprises[1] (IIE), informal employment in formal enterprises (IFE),

[1] Informal enterprises are defined as unincorporated proprietary or partnership enterprises, while formal enterprises are comprised of public/private limited companies, government/public sector units and cooperatives. In the case of

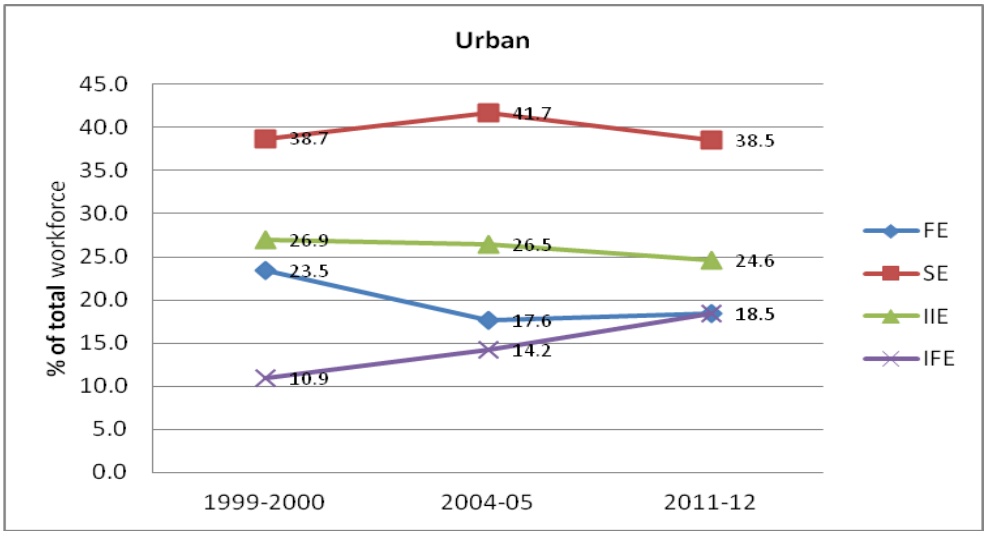
and self employment (SE). The broad trends in these forms of employment since 1999-2000 are given in Figure 1 and 2.

Figure 1: Trends in Forms of Employment, Rural, 1999-2000 to 2011-12



Source: Author's computations
Note: FE- formal employment, IIE-informal employment in informal enterprises, IFE- informal employment in formal enterprises, SE- self-employment, AgriLabour – Agricultural Labourers.

Figure 2.: Trends in Forms of Employment, Urban, 1999-2000 to 2011-12



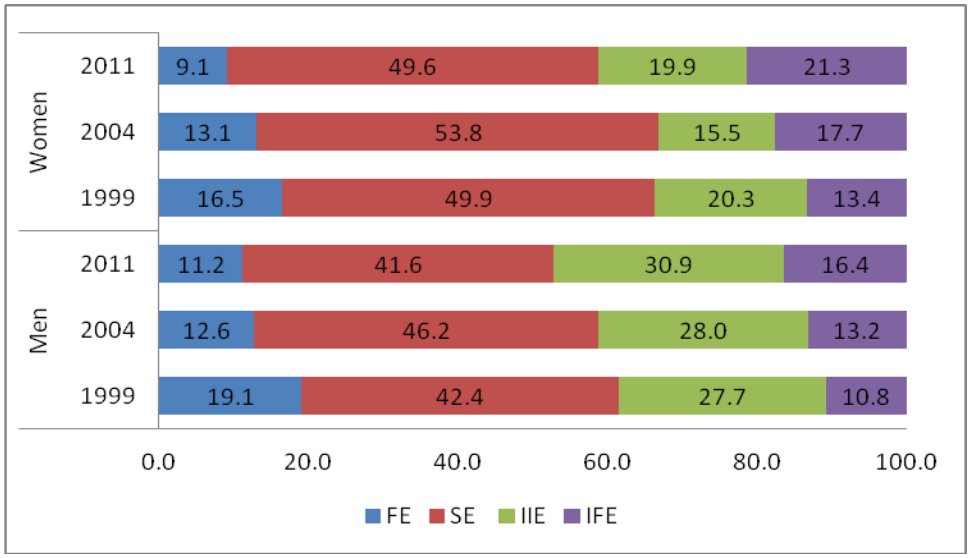
Source: Author's computations
Note: FE- formal employment, IIE-informal employment in informal enterprises, IFE- informal employment in formal enterprises, SE- self-employment.

employment, any employment without the provision of social security benefits (proxied by the provision of provident fund(PF) benefits) is identified as informal employment, irrespective of the enterprise type.

Formal employment has declined consistently. Since 2004-05, self employment has also fallen, although it continues to engage the largest share of the population. On the other hand, there has been a consistent increase in informal hiring in both formal and informal enterprises. The growth in IFE is particularly prominent in urban areas.

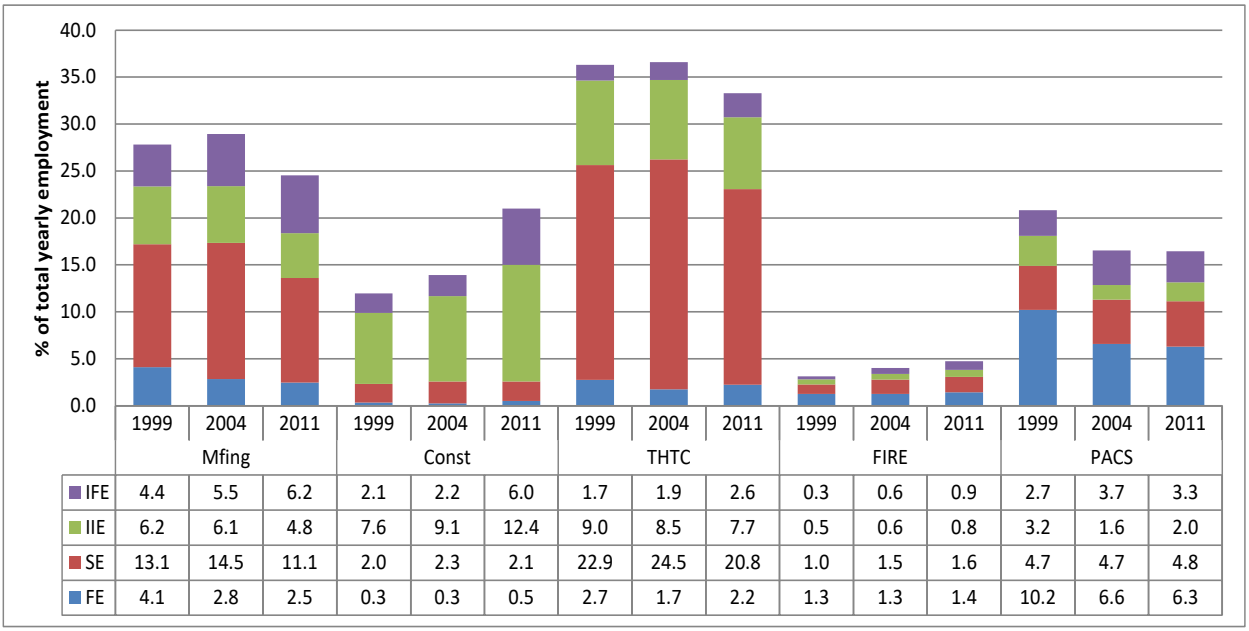
In terms of the demographic profile of workers in each type of employment, IFE is increasingly an employment opportunity for women, with their participation as SE declining over the years.

Figure 3: Prevalence of Types of Employment by Gender (% of total employment)



In all sectors, informalisation is a prominent trend, particularly in manufacturing and construction.

Figure 4: Sectoral Distribution of Types of Employment, 1999-2000 to 2011-12 (as % of total employment in that year)

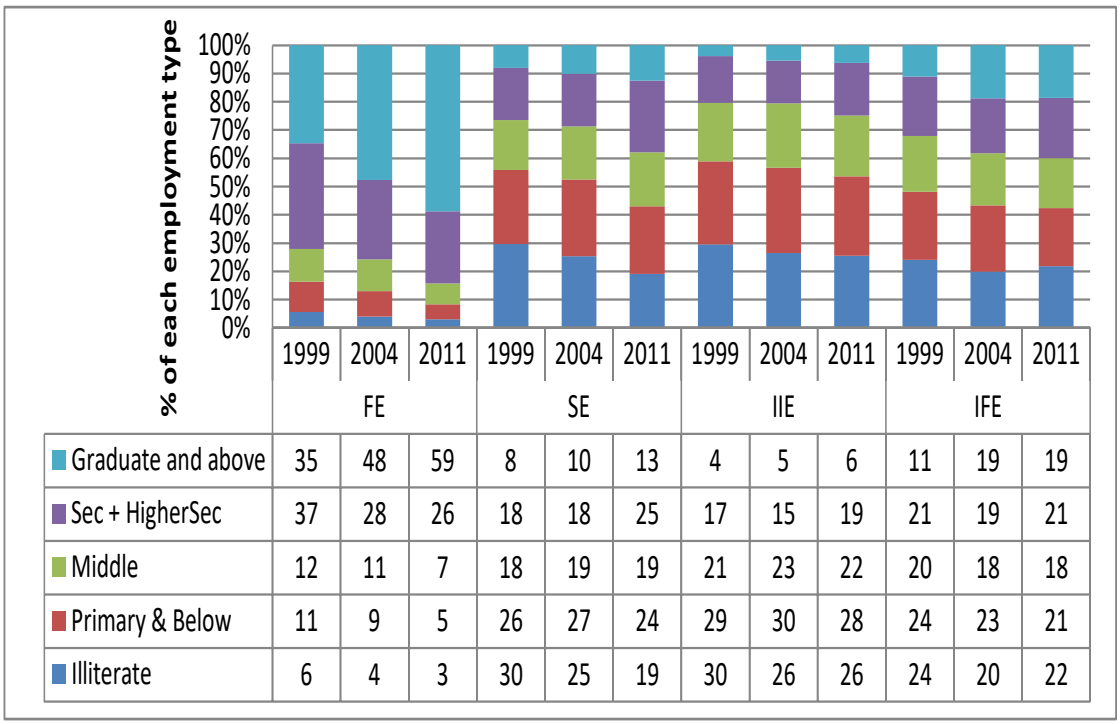


	1999	2004	2011	1999	2004	2011	1999	2004	2011	1999	2004	2011	1999	2004	2011
	Mfing			Const			THTC			FIRE			PACS		
IFE	4.4	5.5	6.2	2.1	2.2	6.0	1.7	1.9	2.6	0.3	0.6	0.9	2.7	3.7	3.3
IIE	6.2	6.1	4.8	7.6	9.1	12.4	9.0	8.5	7.7	0.5	0.6	0.8	3.2	1.6	2.0
SE	13.1	14.5	11.1	2.0	2.3	2.1	22.9	24.5	20.8	1.0	1.5	1.6	4.7	4.7	4.8
FE	4.1	2.8	2.5	0.3	0.3	0.5	2.7	1.7	2.2	1.3	1.3	1.4	10.2	6.6	6.3

Note: FE- formal employment, IIE-informal employment in informal enterprises, IFE- informal employment in formal enterprises, SE- self-employment. Mfing – Manufacturing, Const- Construction, THTC – Trade, Hotels, Transport and Communication, FIRE – Financial Services, Insurance and Real Estate, PACS – Public Administration, Community Services
Source: Author's computations using NSS EUS Rounds

Finally, high share of illiterates is seen among the SE and IFE (22 to 25 per cent are illiterate). At the same time, these employment types also have a relatively large share of well-educated individuals. By 2011-12, about 40 per cent of the IFE workforce has at least secondary education. For SE, the corresponding share is 38 per cent. This suggests that more and more highly educated individuals are engaged in these two types of informal employment.

Figure 5: Educational Attainment by Employment Types



	1999	2004	2011	1999	2004	2011	1999	2004	2011	1999	2004	2011
	FE			SE			IIE			IFE		
Graduate and above	35	48	59	8	10	13	4	5	6	11	19	19
Sec + HigherSec	37	28	26	18	18	25	17	15	19	21	19	21
Middle	12	11	7	18	19	19	21	23	22	20	18	18
Primary & Below	11	9	5	26	27	24	29	30	28	24	23	21
Illiterate	6	4	3	30	25	19	30	26	26	24	20	22

Note: FE- formal employment, IIE-informal employment in informal enterprises, IFE- informal employment in formal enterprises, SE- self-employment. Mfing – Manufacturing, Const- Construction, THTC – Trade, Hotels, Transport and Communication, FIRE – Financial Services, Insurance and Real Estate, PACS – Public Administration, Community Services
Source: Author's computations using NSS EUS Rounds

3. Wage Inequality in India – an overview of trends

The consequence on wages due to the presence of a dual labour market has been documented in India and elsewhere. In India , in 1983, casual workers earned about 62% of what regular workers earned. By 2004-05 this declined and they earned only 44%. At the same time income inequality had grown by 4% in the intervening years (Rani, 2008)

Galbraith (2004) document an increase in inequality among workers in organised manufacturing. Banga (2005) finds that liberalisation, as proxied by FDI, had a significant and positive impact on inequality. Kapoor (2016) finds that the increase in capital intensity has a significant impact on increasing inequality. Notably, the contractualisation of the workforce also exacerbated inequality. Based on their relative marginal impacts, the author concludes that contractualisation of the workforce contributed more to inequality than an increase in capital intensity and the marginal impact of contractual hiring was larger than the marginal impact of rising capital intensity.

All of the above studies are restricted to the organised manufacturing sector. The exceptions in this regard are Das (2012) and Dutta (2005). Das (2012) using the 61st (2004-05) Round Employment Unemployment surveys, explore different dimensions of wage inequality. He finds, for instance, that the private formal sector had the highest mean wage but also recorded the highest levels of wage inequality, more than the informal sector. Dutta (2005) uses a similar regular-casual distinction. More recently, Cacciamali *et al.* (Cacciamali et al., 2015) compare the wage structure and labour market inequality between India and Brazil. Categorising workers in India into regular-casual workers, as in other studies, they use an accounting decomposition, and a regression-based decomposition to account for the forms and sources of wage inequality between 1993—94 and 2011-12. However, despite their focus beyond organised manufacturing, Das (2012) and Dutta(2005) do not examine the inequality aspect from the perspective of the formal-informal workforce. They do however use a regular-casual worker distinction which however, may have its own limitations since most 'regular' workers do not have basic employment/job security. This analysis seeks to address this gap.

Using information on weekly wages from NSS EUS, trends in wage inequality is examined. Weekly wages includes wage/salary earnings in cash or in kind, received or receivable for work done during the reference week.

Table 1: Summary Statistics of Real Weekly Wages

	2011-12			2004-05			1999-2000		
	Mean	**Median**	**CV**	**Mean**	**Median**	**CV**	**Mean**	**Median**	**CV**
All	1094	629	1.2	748	415	1.4	829	500	1.0
FE	2231	1973	0.8	1638	1454	0.9	1439	1250	0.6
IFE	774	543	1.07	605	388	1.08	556	400	1.05
IIE	548	493	0.7	362	291	0.8	405	350	0.9

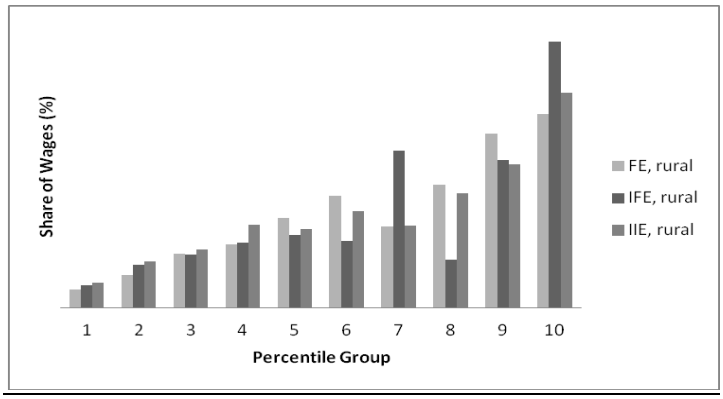
**CV – coefficient of variation*
Source: Author's computation

There is a consistent ordering with respect to average earnings, with formally employed earning the highest, followed by IFE and then IIE. Despite their higher mean earnings, IFE has highest variation in earnings, represented by coefficient of variation.

Examining wage quantiles, the earlier conclusion of higher inequality within the IFE is further reiterated. Among the IFE, the top 10 percent earns more than Rs.2100 (rural)/Rs 3733 (urban) in weekly wages. This is almost two to three times the median earnings. In the other forms of employment, the ratio between the earnings of the top quantile and the median is less than two. Moreover, top 10 percent in IFE account for almost thirty percent of total

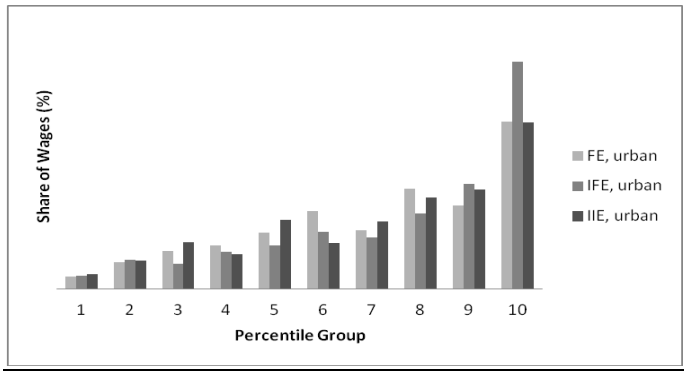
wage earnings[2]. The top 10 percent in IIE and FE account for between 12 to 18 percent of total wage earnings. In other types of employment, although the distribution of wage earnings is not even across quantile groups, there are no disproportionately large shares accruing to any given quantile. But in the IFE, the share of wages accruing to the top quantile is much higher than other quantile groups, as well as the same quantile group in other employment types.

Figure 6: Share of Wages (%) by Percentile Group, Rural 2011-12



Source: Author's computation

Figure 7: Share of Wages (%) by Percentile Group, Urban, 2011-12



Source: Author's computation

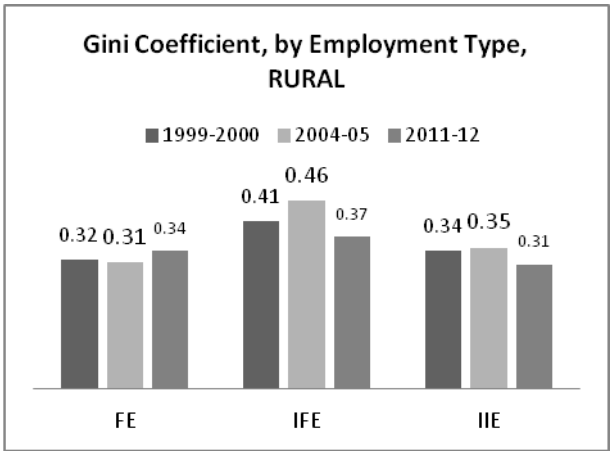
Among all three groups, the least paid 10 percent accounted for less than 3 percent of total wages, while the highest paid 10 percent accounted for more than a fifth (20 percent) of total wages paid. Figures 6.1 and 6.2 also point towards the apparently higher within-group

[2] If the top 10% of the IFE is dropped from the analysis, wage distributions resemble those of the other employment groups indicating that the inequality here is led by this category of wage earners.

inequality in the case of the IFE. Wage earnings above the median account for much larger wage shares in the case of the IFE, compared to IIE and FE. The distribution of wages is comparatively less equitable above the median in the case of the IFE, as compared to the IIE, or FE.

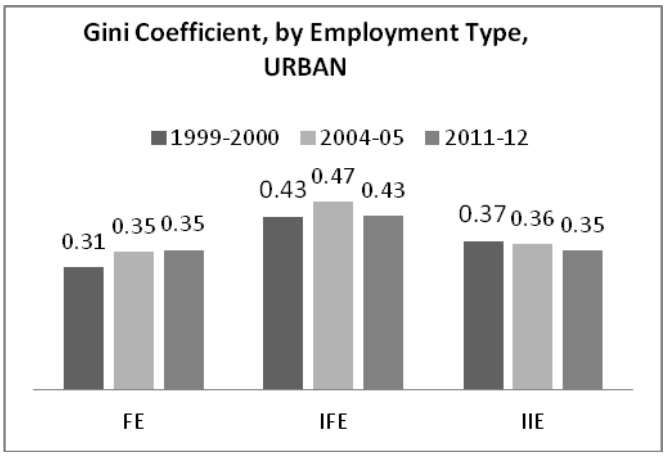
The Gini coefficient provides an insight into the evolution of wage inequality across employment groups (Figure 8 & Figure 9). Amongst the IFE inequality increased initially followed by a decline. For the formal workers, on the other hand, there has been an increase in wage inequality in both rural and urban areas, while the informal workers in informal enterprises (IIE) have seen a gradual decline in wage inequality. These results are most apparent in the urban areas, compared to the rural.

Figure 8: Changes in Wage inequality (Gini), Rural 1999-2000 to 2011-12



Source: Author's computation

Figure 9: Changes in Wage inequality (Gini), Urban, 1999-2000 to 2011-12



Source: Author's computation

Among the FE and IIE, the estimates of inequality by different measures give similar conclusions, confirming the robustness of these results. Between 1999-2000 and 2011-12, inequality levels rose among the FE, for all measures of inequality while it declined among the IIE. For IFE, wage inequality rose between 1999-2000 and 2004-05, but declined by 2011-12. The secular trends observed among the FE and IIE are not seen at the overall level, because IFE dominates overall wage inequality trends.

The decile dispersion ratios provide information on the extent of deviation between selected deciles of the wage distribution. For instance, in 2011-12, the 90^{th} decile wage was 5 to 6 times higher among the IFE and FE than the 10^{th} decile. The 90-10 dispersion is highest among the IFE in urban areas, and among the FE in rural areas. On the other hand, in comparing the 90^{th} decile with the 50^{th} decile, i.e. the median group, the dispersion continued to be higher among the IFE in all the years. The high inequality is prominent in upper half of distribution in case of IFE. Wage inequality below the median (10-50) is lower. For IIE, all measures show gradual improvement in the direction of greater equity in wage earnings.

Table 2: Measures of Wage Inequality

RURAL

	FE			IFE			IIE		
	1999-00	**2004-05**	**2011-12**	**1999-00**	**2004-05**	**2011-12**	**1999-00**	**2004-05**	**2011-12**
MeanLogDeviation GE(0)	0.22	0.20	0.24	0.30	0.37	0.25	0.21	0.22	0.18
Theil index GE(1)	0.18	0.17	0.20	0.32	0.39	0.27	0.21	0.22	0.17
Half of CV Squared GE(2)	0.19	0.19	0.23	0.49	0.56	0.41	0.31	0.30	0.24
Gini	0.32	0.31	0.34	0.41	0.46	0.37	0.34	0.35	0.31
Atkinson(0.5)	0.09	0.09	0.10	0.14	0.17	0.12	0.10	0.10	0.08
Atkinson(1)	0.20	0.18	0.21	0.26	0.31	0.22	0.19	0.20	0.16
Atkinson(2)	0.43	0.42	0.46	0.47	0.51	0.41	0.36	0.38	0.34
p90/p10	7.21	5.524	6.67	6.33	9.17	5.25	4.62	4.8	4.29
p90/p50	1.73	1.79	1.88	2.44	3.67	2.1	2	2.06	1.8
p10/p50	0.24	0.32	0.28	0.38	0.4	0.4	0.43	0.43	0.42
p75/p25	2.03	2.02	2.38	2.38	2.56	2	2.1	2.08	2

URBAN

	FE			IFE			IIE		
	1999-2000	**2004-05**	**2011-12**	**1999-2000**	**2004-05**	**2011-12**	**1999-2000**	**2004-05**	**2011-12**
Mean Log Deviation GE(0)	0.17	0.22	0.24	0.32	0.38	0.33	0.25	0.24	0.22
Theil index GE(1)	0.16	0.23	0.22	0.34	0.39	0.36	0.26	0.24	0.22
Half of CV Squared GE(2)	0.20	0.51	0.30	0.54	0.55	0.57	0.43	0.35	0.32
Gini	0.31	0.35	0.35	0.43	0.47	0.43	0.37	0.36	0.35
Atkinson(0.5)	0.08	0.10	0.11	0.15	0.18	0.16	0.12	0.11	0.10
Atkinson(1)	0.16	0.20	0.21	0.27	0.32	0.28	0.22	0.21	0.20
Atkinson(2)	0.32	0.38	0.47	0.46	0.52	0.48	0.41	0.39	0.39
p90/p10	4.37	5.32	6.16	6.67	9.52	6.58	0.15	5.33	5.33
p90/p50	2.01	2.08	2.05	2.83	3.94	2.87	0.27	2.13	2.00
p10/p50	0.46	0.39	0.33	0.42	0.41	0.44	0.46	0.40	0.38
p75/p25	1.97	2.20	2.27	2.54	2.90	2.50		2.33	2.12

Source: Author's computation

4. Sources of Wage Inequality by Employment Type

4.1 Methodology:

4.1.1 Accounting for Sources of Wage Inequality

Income/wages may be described by a stochastic process, typically a regression, with specific explanatory factors including age, education. The inequality decomposition would then

identify the contribution of each part to overall inequality. This regression-based decomposition has been popularised by Fields (2003).

Assuming a semi-log wage model,

$$\ln(Y_i) = \alpha + \sum_j \beta_j x_j + \varepsilon_i \quad \ldots.(4)$$

which may be re-written as,

$$\ln(Y_i) = \sum_{j=1}^{J+2} a_j \, Z_j \quad \ldots(4a)^3$$

where,

$$a = \left[\alpha \; \beta_1 \; \beta_2 \; \ldots \; \beta_j \; 1\right] \; \ldots(4b)$$

and,

$$Z_i = \left[1 \; x_1 x_2 \; \ldots x_j \; \varepsilon_i\right] \; \ldots(4c)$$

Adapting the methodology of Shorrocks (1982), Fields shows that

$$\sigma^2(\ln Y) = \sum_{j=1}^{J+2} cov\left[a_j Z_j, \ln Y\right] \; \ldots(5)$$

or,

$$100\% = \frac{\sum_{j=1}^{J+2} cov\left[a_j Z_j, \ln Y\right]}{\sigma^2 \ln (Y)} = \sum_{j=1}^{J+2} S_j(\ln Y) \quad \ldots(6)$$

$$s_j = \frac{cov\left[a_j Z_j, lnY\right]}{\sigma^2 \ln Y} \; \ldots(7)$$

$$\sum s_j = 100 \quad \ldots(8)$$

where each $S_j(\ln Y)$ represents the 'factor inequality weight' capturing the contribution of factor variable Xj to overall inequality . This decomposition is applicable to virtually all

[3] It is summed across J+2 , so as to include the J terms corresponding to each explanatory variable , as well as the residual and constant terms.

inequality measures including the Gini, the Atkinson index , the GE measures and the coefficient of variation.

In most empirical applications of this regression-based decomposition method, the semi-log wage equation is not corrected for selection bias. Dutta (2005) is an exception and she uses the Lee(1983) method to correct for selection bias in a polychotomous choice model. Those unobserved factors that influence an individual's employment outcome may also influence his/her earnings. Additionally, if workers self-select into sectors, there is likely to be sample selection bias in estimating the wage equations. Those attributes that resulted in a worker being (in)formally employed may also influence her (in)formal wage earnings.

So, let wages (w) of individual i in j outcome be

$$w_{ji} = x_{ji}\beta_j + u_{ji} \quad , j = (1, \dots P) \qquad \dots (9)$$

An individual has an unobservable utility from his employment choice, based on a set of attributes z_i . So,

$$I_{ij}^{*} = z_{ji}\gamma_j + \eta_{ji} \qquad \dots\dots (10)$$

An outcome j is chosen iff

$$I_{ij}^{*} > Max\ I_s^{*}\ (s = 1 \dots P), \qquad j \neq s \qquad \dots\dots (11)$$

Define ε_i such that,

$$\varepsilon_{ji} = Max\ I_s^{*} - \eta_{ji}\ (s = 1 \dots . P, j \neq s) \dots\dots (12)$$

Although utility (I_{ij}^{*}) is not observable, the employment choice is, represented by an indicator function *I*. So,

$I = j$ if and only if $I_{ij}^{*} > Max\ I_s^{*}\ (s = 1 \dots P),\ j \neq s$, or,

$$z_{ji}\gamma_j + \eta_{ji} > \varepsilon_i + \eta_{ji} \qquad \dots\dots (13),$$

So, I=j iff $\varepsilon_i < z_{ji}\gamma_j \qquad \dots\dots (14)$

Then, assuming a type I extreme value distribution for ε_i, the probability that sector j is chosen is

$$P(I = j) = P\left(\varepsilon_i < z_{ji}\gamma_j\right) = F(z_{ji}\gamma_j) \qquad \dots\dots (15)$$

This is the first stage multinomial choice selection model.

In the second stage, the wages are observed only for those who are working and on the basis of the sectoral choice. The conditional wage equation is

$$E(w_{ji}/I = j) = \ E(w_{ji}/\varepsilon_i < z_{ji}\gamma_j) = x_{ji}\beta_j + E(u_{ji}/\varepsilon_{ji} < z_{ji}\gamma_j) \qquad \ldots\ldots (16)$$

The second term captures the selection bias in the wage equation. While equation (13) forms the first stage polynomial choice selection model, the second stage model is an OLS wage equation. The selectivity bias is corrected using Lee(1983)'s analogue of the inverse Mill's ratio. So,

$$E(w_{ji}/I = j) = x_{ji}\beta_j + \delta_j\lambda_j + \vartheta_{ji} \quad \ldots\ldots (17)$$

where,

$$\lambda_j = -\phi\left[\Phi^{-1}\left[F_j(z_j\gamma_j)\right]\right]/F_j\left(z_j\gamma_j\right) \qquad \ldots\ldots (18)$$

and, $\delta_j = \sigma_j\rho_j$

where, σ_j is the variance of u_{ji}, and ρ_j measures the correlation between u_j and ε_j.

Therefore, the semi log model used for the Fields decomposition will also contain a lambda term which is introduced to correct for the selection bias. However, while selection bias due to the nature of labour force participation is accounted for, the sampling bias created due to the non-availability of self employed earnings and their exclusion from the estimation sample is not being accounted for here.

4.1.2 Accounting for Sources of Differences in Wage Inequality

Further, a comparison of differences in wage inequality is examined using the methodology of Yun (2006). Yun (2006) synthesises the methods of Fields (2003) and John, Murphy & Pierce (John, Murphy, & Pierce, 1991) to decompose the difference in log-earnings between two groups/time periods into coefficients (price) effects and characteristics (quantity effects). The coefficient/price effect captures the differences in inequality due to a difference in the returns to a factor between the two groups. The quantity/characteristics effect, on the hand, captures the differences in inequality due to a difference in the distribution of that particular factor between the two groups.

For any two wage distributions (A and B), the differences in inequality where inequality is measured as variance of log, is given by,

$$\sigma_A^2 - \sigma_B^2 = \sum_{j=1}^{J-1}(s_{j*}\sigma_*^2 - s_{kB}\sigma_B^2) + \sum_{j=1}^{k=J-1}(s_{jA}\sigma_A^2 - s_{j*}\sigma_*^2) + (\sigma_{\epsilon A}^2 - \sigma_{\epsilon B}^2) \quad \ldots.(6)$$

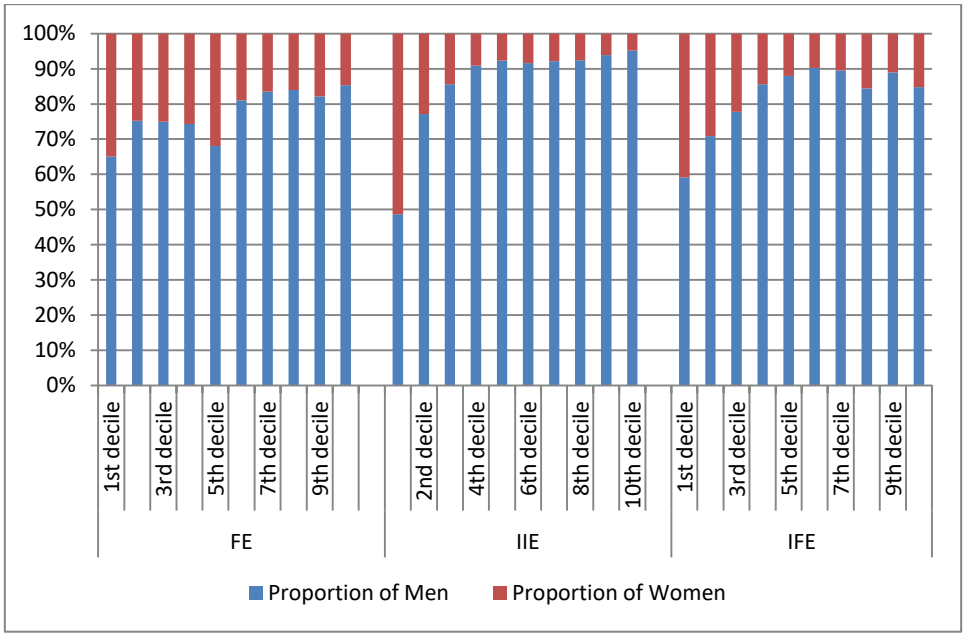
The first term on right hand side represents the characteristics (quantity) effects, second represents the coefficient (price) effects and last term captures the residuals effect.

4.2. Results

4.2.1. Distribution of Worker Characteristics across Decile Groups

Wage inequality may occur as a result of difference in worker's characteristics across wage earnings. Figure 10-15 describe the distribution of workers' demographic profiles across the wage spectrum, by employment type.

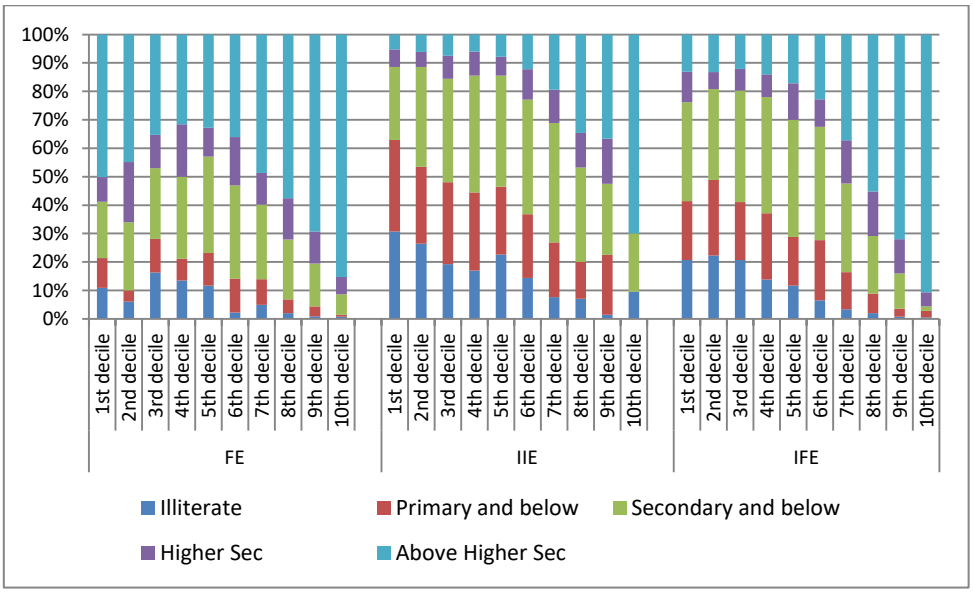
Figure 10: Gender-distribution across wage deciles, by employment type, 2011-12



Source: NSS EUS 2011-12

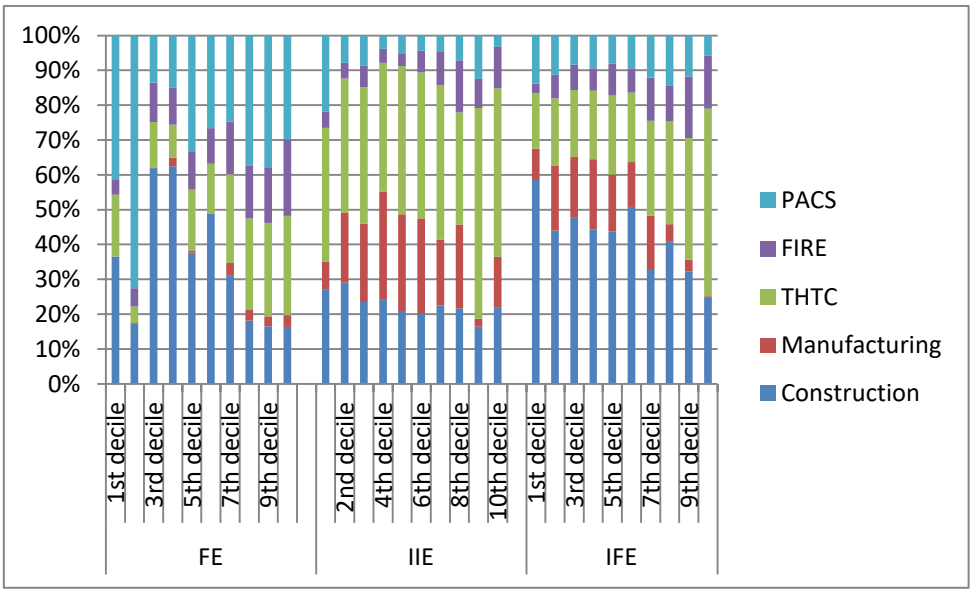
As wage increases, the share of women declines, although the trend is less obvious among the FE and IFE. The proportion of women in the upper deciles in IFE is similar to that in FE.

Figure 11: Educational attainment across wage deciles, by employment type, 2011-12



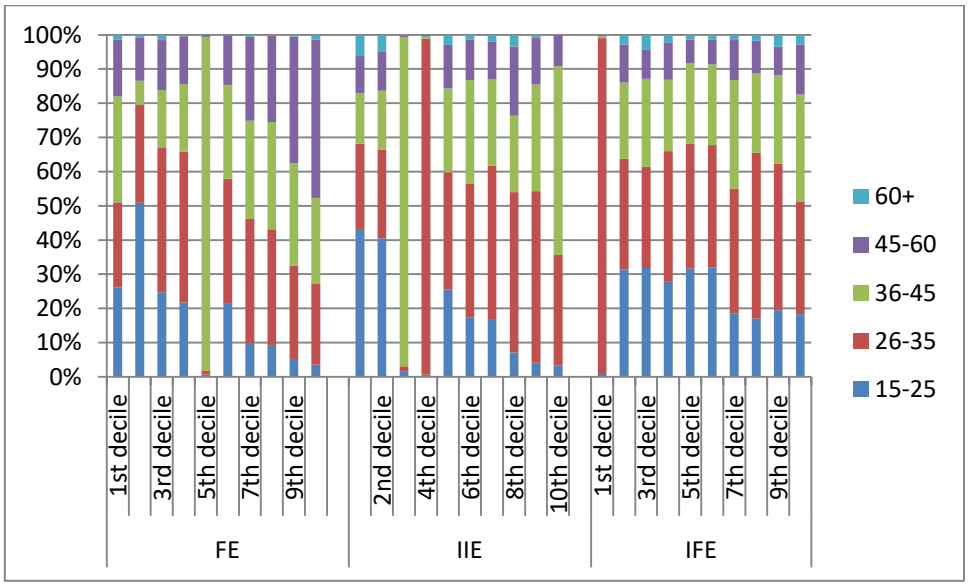
IIE and IFE show similar educational attainment in the lower deciles. For the IIE, there is a broadly similar attainment of education across most deciles, with the exception of the tenth decile. In the upper wage deciles, the IFE and FE are similar in terms of their educational attainment.

Figure 11: Sectoral distribution across wage deciles, by employment type, 2011-12



Manufacturing is predominant in the lower and middle wage deciles. High skill services sector FIRE and high-value construction activities are present in the higher wage deciles. THTC engages across all wage groups.

Figure 12: Age distribution across wage deciles, by employment type, 2011-12



Higher wage earnings in FE accrue largely to individuals who are highly experienced and prior to their retirement. On the other hand, in IIE, it is the younger age group of 36 to 45 year olds who enjoy higher earnings, while for IFE, the higher earnings accrue largely to a younger working age group.

4.2.2. Sources of Wage Inequality by Employment Type

Following Fields (2003) and Shorrocks (1984), the contribution to inequality by various factors including age, gender, education level is analysed. For the decomposition a selectivity-corrected semi-log wage equation is estimated for each of the subgroups. Selectivity bias is corrected using the Lee (1983) technique which models the labour market outcome as a polychotomous choice model and then estimates wages after correcting for the selection bias. The estimates of the wage equation are presented in Table 3.

Being a male worker had significant positive effects on wage outcomes, irrespective of the nature and sector of employment. Further, age seemed to have a linear monotonic relation with wages, as seen by the positive and significance of the age-squared term. Higher age meant more experience earning higher wages. Education, as would be expected, increased wage returns in the case of FE. In the case of IIE, higher levels of education had insignificant impact on earnings. The marginal returns to higher education was positive and significant among the IFE, suggesting the premia on education among this labour force. Interestingly, the marginal return from increasing educational attainment was higher in the case of IFE, than FE for all levels of education. Being in a large enterprise, having a written job contract as well as union membership had positive influences on wage earnings. Finally, in terms of

the industry of occupation, while PACS in rural areas earned the highest in FE, in the case of urban, it was the Trade, Hotels and Transportation sector that was lucrative. Similarly, for the IIE, being employed in manufacturing/construction had a larger positive impact on wages compared to other sectors. Finally, for the IFE, the marketed services sector (THTC and FIRE) proved to be the most lucrative in terms of marginal returns on employment.

Table 3: Semi-Log Wage model, 2011-12, Rural & Urban

Dependent Var – Ln Weekly Wages	RURAL			URBAN		
	FE	IIE	IFE	FE	IIE	IFE
male	0.37***	0.6***	0.54***	0.25***	0.58***	0.47***
primary	0.09*	0.01	-0.05**	0.19***	-0.01	0.05**
secondary	0.06	0.01	0.01	-0.1***	-0.06***	0.09***
highsec	0.05	0.07**	0.19***	-0.26***	-0.15***	0.25***
grad	0.06	0.14***	0.44***	-0.25***	-0.07*	0.62***
age	0.03***	0.03***	0.01***	0.04***	0.04***	0.04***
agesq	0*	0***	0**	0***	0***	0***
vocattr	-0.01**	0	0	0	-0.02***	-0.02***
occ_ptm	0.11***	0.06	0.07*	0.41***	0.08***	0.33***
occ_ptmW	0	0.14*	0.03	0.02	0.07	-0.04
hhSC	-0.07**	0.04	-0.01	-0.31***	0.1***	-0.15***
hhST	0	-0.04	-0.07**	-0.4***	-0.02	-0.24***
hhOBC	0.05**	0.030***	-0.01	-0.12***	0.04**	-0.15***
hhHindu	-0.06	0	0.02	-0.09***	-0.08***	-0.03
hhMuslim	0.05	0.05	0.12**	0.02	-0.14***	-0.15***
entsize	0.11***		0.09***	0.05***		0.12***
hascontract	0.02	0.06	0.08***	0.15***	0.19***	0.23***
isunionm	0.23***	0.17***	0.12***	0.2***	0.19***	0.22***
indl_mfcon	-0.21***	0.24***	0.14***	0.16***	0.11***	0.17***
indl_thtc	-0.06	0.13***	0.13***	0.33***	0	0.27***
indl_fire	-0.03	-0.1	0.03	0.3***	0.02	0.19***
indl_pacs	0.02	-0.07*	-0.02	0.16***	-0.07**	0.08**
lambda0r Selection term	0.49***	-0.24***	-0.06	0.8***	-0.8***	-0.25***
_cons	7.71***	5.35***	5.98***	7.84***	4.95***	5.17***
MODEL STATISTICS						
Adjusted R-Squared	0.39	0.24	0.23	0.46	0.31	0.48
Prob>f	0.000	0.000	0.000	0.000	0.000	0.000

Note: *, **, *** indicates significance at 10%, 5% and 1% level of significance. THTC – Trade Hotels Trasnport and Communication, FIRE- Financial Services, Insurance and Real Estate. PACS – Public Administration and Community Services

Based on the regression estimates of wages, the wage inequality shares are derived using the Fields method. The relative factor inequality share is represented as in equation 6 such that.

$$s_j \ln(y) = \frac{cov[a_j Z_j, lnY]}{\sigma^2(lnY)}$$

In order to get the inequality shares of specific attributes, say age, education etc, the relative inequality shares of each corresponding dummy variables are summed together. For instance the relative inequality share of age given in Table 4 including the sum of inequality shares of age and age squared. Similarly, for education, the inequality shares attributed to education is essentially the sum of the inequality share of primary, secondary and other related variables.

Table 4: Relative Factor Inequality Shares, 1999-2000 to 2011-12

RURAL	FE			IIE			IFE		
	1999-2000	2004-05	2011-12	1999-2000	2004-05	2011-12	1999-2000	2004-05	2011-12
Gender	7.7	**14.6**	6.5	27	27.6	34.9	29.9	21.1	54.7
Education	-2.3	-13.1	1	9.3	2.8	1.5	10.6	3.8	21.8
Age	3.2	8.3	**10.5**	18.3	22.5	6.6	3.8	12.5	0.7
Vocational Training	NA	2	0.1	NA	0	0	NA	1.5	0.2
Occupation	1.2	0	4.3	2	0	-0.4	5.5	0	0.4
SocialGroup/Religion	0.6	1.2	-0.1	2.6	3.5	0.3	3.3	2.5	2.1
Enterprise Attributes	2.6	13.1	8.5	1.7	6.5	4	8.2	22.5	6.8
Industry	**18.5**	**18.3**	7.1	6	3.7	8	2	1.6	2.9
State	**13.9**	9.5	**11.8**	30.1	37.9	46.9	31.4	20.9	11.1
Lambda Selection	54.6	46.1	50.3	3	-4.5	-2	5.3	13.7	-0.7
Total	100	100	100	e100	100	100	100	100	100

URBAN	FE			IIE			IFE		
	1999-2000	2004-05	2011-12	1999-2000	2004-05	2011-12	1999-2000	2004-05	2011-12
Gender	1.9	-0.4	2.4	8.7	20.9	35.4	18.9	8.6	10.5
Education	6.3	20.2	-9.5	1.4	-1.5	-4.2	28.7	31.4	37.0
Age	4	6.1	6.6	46.4	23	4.3	10.4	21.9	3.3
Vocational Training	NA	-0.2	0	NA	1	1.9	NA	0.2	0.8
Occupation	8.8	0	21.6	-9.4	0	1.2	5.5	0	16.8
SocialGroup/Religion	2.5	13	6.1	15	7.4	0.1	6.7	5.5	5.3
Enterprise Attributes	2.1	6.4	9.1	27.9	4.4	4.5	2.6	16.9	14.7
Industry	4.5	10.3	2.4	18.7	1.5	2.6	3.1	8.2	2.5
State	5.2	8.9	6.5	-27.2	18.8	15.4	16.6	9.4	9.3
selection	64.7	35.8	54.8	18.4	24.5	38.8	7.7	-2.1	-0.1
Total	100	100	100	100	100	100	100	100	100

Note: The relative inequality shares of different groups of categorical variables, say education (primary, secondary, middle etc) or religion(Hindu or Muslim) is aggregated for ease of interpretation.

Enterprise Size includes dummy for having written contract, being union member, and being part of a large enterprise (more than 6 workers). Education captures primary to graduate and above dummies. Age include age and age-squared terms. Occupation captures dummy for being a professional/technical/managerial role. Industry includes manufacturing, construction, and services

While the wage regression models for each of these employment types indicate that most of these variables contributed significantly to wages, as pointed out by Dutta (2005), their contribution to wage inequality varied considerably. Moreover, there are notable differences in the structure of wage inequality between the rural and urban. Among FE, selection was an important factor explaining inequality indicating the significant segmentation of the labour market. In the case of rural FE, industry affiliations played an important role in explaining wage inequality. By 2011-12, state-level distinctions as well as age were important contributors to wage inequality. In urban FE, occupation was a significant factor. In rural areas, among the IIE , the structure of inequality was almost similar with that in urban areas. Among the IIE too, state-level differences contributed significantly to differences in wage earnings and thereby wage inequality. Gender was also an important factor for IIE.

Among the IFEs too states contributed to wage inequalities. But more importantly education was an important explanatory factor. Variations in returns to education within this sector accounted for a large share in variations in wages. This was seen in urban and rural areas, with the share increasing over time. This is not surprising since the IFE is comprised of a substantial number of highly educated individuals as well as under educated individuals. These large disparities in human capital attainments within this workforce may explain the large within group inequality accruing from education here. Additionally, variations across the IFE workforce in having a written contract as well being an union member also explained a moderate share of the wage inequality in this employment group.

3.2.3 Sources of Differences in Wage Inequality between IFE and IIE

Based on Yun (2006), the relative influence of coefficient (price) and characteristics (quantity) effects of factors on the differences in wage inequality between two employment categories is examined. On comparing the differences in wage inequality between the IFE and IIE, it is found that gender accounts for almost half of the difference in wage inequality between the two groups.

The contribution of each factor to difference in wage inequality is disaggregated into the characteristic effect and coefficient effect. The price/coefficient effect is due to the change in the returns/coeffients of two variables. The characteristic effect, on the other hand, is due to the difference in the distribution of the particular variable between the two groups.

Table 5: Source of Differences in Wage Inequality between IFE and IIE, 2011-12 (% contribution)

	Characteristic Effect	Coefficient Effect	Residual
			79.7
Gender	132.8	-84.9	
Education	10.2	20.0	
Age	5.2	-17.7	
Vocational Training	0.1	0.2	
Occupation	-0.5	2.3	
Caste	4.9	-4.1	
Religion	0.1	1.1	
Enterprise Attributes	16.6	-11.2	
Industry	19.8	-26.7	
State	68.4	-116.5	

Source: Author's computation using NSS 68th Round EUS data

Here, in the case of gender, the characteristics effect had a positive impact on wage inequality, i.e. the average distribution of men in the sample changed in such a way that there was an increase in wage inequality. The lower labour force participation of women, and the higher relative inequalities among men explain this. The price effect of gender, on the other hand was negative, i.e. the differences in returns to male and female workers had a wage inequality dampening effect. However the quantity effect of gender dominated. Education also had a positive effect on the wage inequality differences between the workers. Price effect contributed largely to this implying that the difference in returns to education exacerbated wage inequality across the two employment groups. The industry of occupation reduced the differences in wage inequality and this was largely due to the price effect.

5. Conclusion

The implications for wage inequality in the presence of a growing informal workforce remains relatively unexplored. While wage inequality, on the whole, has declined in the first decade of the 21st century, the analysis in this chapter reveals that this trend is not borne out across all employment groups. Wage inequality has declined among the IIE, increased among the FE, while remaining stagnant or increasingly marginally among the IFE.

While inequality in the IIE and FE was one of large deviation between either ends of the distribution, inequality amongst IFE is a result of large deviation between the middle, i.e. median earners and the top earners. The top quantile groups in the IFE held a disproportionate share of wages. The growth incidence curves revealed which wage groups

were propelling changes in wage inequality. The decline in inequality seen amongst the IIE was a result of a relatively high wage growth among the lower quantile groups, while the increase in inequality among the FE was a result of high growth rates among the top quantiles. Among the IFEs, consistent increase in wages among the high quantiles has meant persistence of wage inequality despite a growth in wages in the population with below-median wages.

Although the IFE have witnessed an increase in their inequality, the analysis of contribution of different forms of employment to wage inequality reveal that the IIE accounts for a larger share of overall wage inequality. The comparatively lower wage earnings among this group of workers contribute more to overall wage inequality than the higher deviation in wages within the IFEs.

The comparative analysis of sources of wage inequality within each employment group reveals the differing contributions of various factors by employment types. Education does not have a significant role to play in explaining wage inequality within FE and IIE. This is because of the relatively homogenous distribution of educational attainment within this group of workers. For the IIE, the greater participation of women in this form of employment, alongside their relatively lower wages meant that the contribution of gender to wage inequality is high. For the IFE, on the other hand, education accounts for a significant share of wage inequality and this can be attributed to the large dispersion in educational attainment within these workers.

Finally, examining the sources of differences in the observed wage inequality between the IIE and IFE highlights the influence of gender as well as education. The characteristic effect has a wage inequality enhancing effect implying that the greater participation of women in the IFE workforce at lower wages compared to men has increased wage inequality. On the other hand, the price effect, i.e. the differences in returns to women and men between IFE and IIE, has reduced wage inequality. The return to wages among women being higher in IFE has meant that women workers in IFE earn relatively more than their counterparts in IIE. This has reduced the overall wage inequality.

Some broad limitations of the analysis include the reliance on the NSS data and the lack of availability of self employed wages. Self employed income forms a major source of labour income. However, since NSS EUS does not collect this information, it is not analysed here. Therefore, the analysis is limited to the contribution of informal *wage* employment to wage

inequality. Moreover, the NSS EUS may tend to exclude the very rich, the outliers in the upper tail of the distribution. This would imply that the estimates here are lower bounds.

Also the inequality decomposition methodology is limited. When regressing wages on employment status, there is no accounting for interaction effects between status and other explanatory variables since this could confound the decomposition results. Consequently, the wage regression is limited and all variables are assumed to enter additively. This can be limiting. When dummies are defined as explanatory variables, the impact of the base category is included in the constant variable which is not accounted for in the inequality share.

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