

Working Paper 221

**Employment Vulnerability to
Adverse Working Conditions:
Evidence from Formal Enterprises in
Uttar Pradesh**

**Nomita P. Kumar
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August 2020

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ABSTRACT

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Nomita P. Kumar*

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Gender inequality in labour markets is significant in terms of the sex distribution between formal and informal employment and also within the informal economy (ILO, 2011). The distinction between formal and informal employment is of importance for policy related to gender issues. Therefore, an attempt has also been made for measuring the gender inequality in formal labour markets through the analysis of multidimensional nature of the vulnerability in formal and informal employment through empirical analysis we have tried to examine various vulnerabilities faced by women in the formal urban labour market. The Specific objectives of this paper are: firstly, to measure the risk of vulnerability related to employment in the urban formal market with the help the multidimensional vulnerability index; secondly, to construct the multidimensional vulnerability index separately for formal and informal workers; thirdly, to assess the differentials in the vulnerability status of informal and formal workers in Uttar Pradesh and lastly, to test the extent of vulnerability of female formal and informal workers in terms of nature and quality of employment, social security and job security as compared to their male counterparts.

Employment Vulnerability to Adverse Working Conditions: Evidence from Formal Enterprises in Uttar Pradesh

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1. Introduction:

Workforce vulnerability has come to the forefront in the recent policy discourse as the economy searched for driver of inclusive growth and with the aim of protecting workers against adverse working conditions. In the informal sector of the economy, majority of workers are engaged in informal employment. Beside this, informal workers work informally in the formal sector of the economy as maid, sweeper, aaya, guard and in other types of low paid jobs. According to Chen (2006) “the distinction between formal and informal is not strict, and we may also define various levels of informality”. There are formal sector enterprises that use informal labor, and there are formally employed persons who besides their formal job also work informally. Currently, there is wide consensus that formal and informal work depend on each other, both nationally and globally (Guha-Khasnobis et al. 2006). Thus, informal employment exists both in the formal and informal sectors of the economy. Manila (2015) stated in his paper that informal work could be used as an overarching term to cover both sector and employment aspects of informality. The present paper deals with formal and informal nature of formal labour market in UP and also tries to examine the concept of vulnerability, informality and gender inequality among workers. Gender inequality in labour markets is significant in terms of the sex distribution between formal and informal employment and also within the informal economy (ILO, 2011). The distinction between formal and informal employment is of particular importance for policy related to gender issues. Therefore, an attempt has also been made for measuring the gender inequality in formal labour markets through the analysis of multidimensional nature of the vulnerability in formal and informal employment. Through which we have tried to examine various vulnerabilities faced by women in the formal urban labour market.

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The objectives of this paper are:

1. To measure the risk of vulnerability related to employment in the urban formal market with the help the multidimensional vulnerability index
2. To construct the multidimensional vulnerability index separately for formal and informal workers.
3. To assess the differentials in the vulnerability status of informal and formal workers in Uttar Pradesh.
4. To test the extent of vulnerability of female formal and informal workers in terms of nature and quality of employment, social security and job security as compared to their male counterparts.

2. Review of Literature:

Dogrul (2012) examines the determinants of formal and informal sector employment in the urban areas of Turkey and found that the determinants of formal and informal employment vary by gender. According to his finding sex, marital status and HH headship determine s the disadvantaged position of women in the labour market. Gunther and Launov (2012) test the existence of segmentation in the informal sector in their study and found that impact of education and experience are higher in the formal sector, however gender wage gap is wider in the informal sector. McCaig and Pavcnik (2015) examines work transitions between the formal and informal sector in Vietnam using panel data and finds that educated male workers in urban areas are more likely to switch to the formal sector than other workers initially in the informal sector. Similarly, Shapland and Heyes, (2017) observed in their study that workers in the formal economy receive benefits from the state and their employers, whereas workers in the informal economy are not seen as benefiting from the regulation imposed by the state, so they will not automatically receive sick pay, holiday pay, good employment conditions inspected by workplace regulators, pensions, etc. The distinctions between formal and informal work have arisen economically and sociologically in the last half of the last century (Verhage and Shapland, 2013), a time at which centralised forms of work organisation with predominantly formal were well established (Shapland and Heyes, 2017). Though, informal workers, both men and women, were affected by the crisis in many of the same ways as formal workers, but informal workers were affected more severely than formal workers because they had no social protection, had to contend with increased competition as retrenched formal workers entered the informal sector (ILO and ADB, 2011) and the process of

informalisation of formal jobs initiated. According to Chen (2006) many formal firms prefer informal employment because of the flexible specialized production, global competition, or reduced labour costs, hence to avoiding their formal obligations as employers. Chen (2006) further found that the formal and the informal ends of the economic continuum are often dynamically linked. For instance, many formal enterprises hire wage workers under informal employment relations and many part-time workers, temporary workers and home workers work for formal enterprises through contracting or sub-contracting arrangements. Narayan's paper (2015) shows that the Indian labor market is segmented between formal and informal employment and observed that informal workers earn significantly less than formal workers. The Indian labour market thus is conceived as a segmented market viz; the formal sector composed of workers who have salaried work, good working conditions, and are employed in organised business, and the informal economy consisting of small self-employed traders and business people, and casual workers in the informal or formal sectors (Shonchoy and Junankar, 2014). Bazillier et al (2015) reveals that three main approaches are used to define employment vulnerability, viz; the first one is developed by the ILO (2010a) and focuses on the population of own-account and unpaid family workers; second approach focuses on the low level of income and the third approach captures multidimensional aspects of vulnerability at work.

The most disturbing characteristic of the workforce structure in India is the link between gender, informality and poverty (Unni, 2002). Moreover, gender-based inequities in the labour market persist, in part due to the expansion and feminization of informal employment (ILO & ADB, 2011). Yahmed (2016) examined how gender wage inequality defers across formal and informal jobs in Brazil and found that the raw gender wage gap is higher in informal jobs (13 percent) compared to formal jobs (5 percent).

3. Data and Sample Design:

The study is based on the empirical investigation into the formal enterprises. Those enterprises were selected in which formal and informal type of workers exists. Thus, we have selected following two occupational categories for this purpose:

- i. Nursing Personnel (Persons engaged in Hospitals as Nurses, Compounder, Ward boy, Aaya (maid) and School Staff (teacher, peon, maid),

- ii. Persons engaged in private enterprises like mall, superstore etc. as Manager, Accountant, Cashier, Receptionist, Watchman and Maid/Sweeper for cleaning of the workplace.

A multistage stratified random sampling method has been designed; firstly, four districts (Lucknow, Jhansi, Varanasi and Ghaziabad) from different regions of Uttar Pradesh were selected; secondly, the selection of urban areas of the selected districts to conduct survey on wage and salary workers were done; thirdly, selection of the respondents were done randomly from the selected urban areas. The total sample has been 75 female respondents and 44 male respondents i.e. 119 respondents in total. This sample consists of 34 female informal workers, 18 male informal workers, 41 female formal workers and 26 male formal workers.

4. Analytical Framework:

A strong aspect in the vulnerability literature comes from international economics and more specifically from development economics. This is mainly done from the perspective of poverty and applied to developing countries (Hoddinott and Quisumbing, 2008; Ligon and Schechter, 2003). The last decades come with new risks at the workplace such as work intensification, job insecurity or mental stress, leading to the beginning of the concept of vulnerability in the labour studies literature (Greenan et.al. 2017). Greenana et.al, (2017) identifies three components within this literature that conceptualize vulnerability in terms of job-related risks. The employment vulnerability literature identifies low wages and non-unionism as threats to worker's well-being. Studies on measurement of vulnerability like Bocquier et al. (2010) developed various indicators of employment vulnerability for seven economic capitals of West Africa. Saunders (2003), proposes a multidimensional approach of market vulnerability in the Canadian context. According to O' Regan et al. (2005) and Taylor (2008) vulnerable workers are those with higher risk of exposure in terms of job quality, namely the work contract characteristics, the working condition or the work itself and lower protection capacities. Diaz (2012) constructed a multidimensional index of decent work using Aikire and Foster's methodology. This index is multidimensional incorporating eight dimensions. They classified the labour status in four types; decent work, on decent work MEL (vulnerable por Minimos Estandares Laborales i.e. vulnerability by minimum labour standards) and wage vulnerable. Bazillier et al. (2015) were the first to construct an employment vulnerability index depending on several dimensions of work in Europe and to compare individual levels of employment vulnerability between migrants and local workers, using

propensity score matching methods. Generally, at global level there are numerous studies available on different employment vulnerability criteria, centered on various features of work-related hazards. But in Indian economic literature there is paucity of studies based on multidimensional approach on various work-related risks. Studies in context of multidimensional vulnerability of female workers are very few and far between. Hence, we have tried to construct the multidimensional vulnerability index in the present paper.

5. Methodology:

To measure the vulnerability of female workers it is essential to examine the dimension-wise vulnerability among female workers. A multidimensional composite index, using the binary vulnerability scores of individual workers, has been developed separately for each Sector i.e. Informal and formal and gender (male and female). The index is an average of the sum of binary scores of all variables for each respondent (workers). Each indicator takes the value of 0 or 1, where 0 indicates that no worker is vulnerable and 1 indicates everyone is vulnerable. For the computation of this index a following simple average formula has been used.

$$VI = (V_1 + V_2 + V_3 + \dots + V_n) / n$$

$$= \sum_{i=1}^n V_i / n$$

Where, VI is the composite vulnerability index, V₁, V₂, V₃..., V_n is respective binary values assigned to dichotomous variable and n is the number of indicators used for computing the index of vulnerability of workers. Vulnerability index has been computed separately for five different dimensions and finally average value of the five dimensions is defined as multidimensional vulnerability index (MVI), which can be denoted as:

$$MVI \text{ (Multidimensional vulnerability index)} = \frac{D_1 + D_2 + D_3 + D_4 + D_5}{5}$$

Where, D=dimension

Finally, the MVI scores or index have been grouped in six categories of vulnerability. The maximum vulnerability is gauged by a highest vulnerability score and least vulnerability is measured by a lowest score. Further to examine the extent of vulnerability of informal and formal female workers the intensity of vulnerability is computed, which is the sum of selected

vulnerability indicators. In other words, it is the total score of individual worker who is vulnerable in every dimension / indicators.

6. Vulnerabilities in Employment:

Socio-economic conditions of the workers in Uttar Pradesh are vulnerable in terms of their working status, livelihood, educational status etc. After globalization migrated families are facing stress to sustain a living, as a result more and more women enter the urban labour market under vulnerable conditions. In this background an attempt has been made in this section to identify issues affecting informal as well as formal workers in the socio - economic spheres through the construction of multi-dimensional vulnerability index.

7. Difference in Vulnerability Status between Formal and Informal Workers:

Although formal sector is still dominated by males, female workers account for over quarter of the formal sector workers. In urban India, National Sample Survey Organisation (NSSO) data in 2011–2012 showed that only about 20 percent of the working population above the age of 15 were in formal employment; 80 percent were informally employed, either self-employed or with no social security cover from the employer. Even among those in the formal sector, 25 percent of the men and 30 percent of the women were informally employed, i.e. without any social security cover from the employer and often without access to paid leave or other benefits (Unni 2017). Here we attempt to gauge the extent and differences in vulnerabilities between informal and formal workers prevailing in the formal sector. Moreover, clearly there are differences in degree of vulnerability between (formal/informal) workers in formal sector, for example, informal workers may have lower pay and less access to non-statutory benefits and formal workers engaged in formal employment are covered by most statutory employment standards, and have greater employment security.

Table 1 highlights key patterns of vulnerability that creates multidimensional vulnerability among workers in formal sector i.e. it presents percentage of deprived /vulnerable workers for selected indicators that measures vulnerability. Four indicators viz. contract of job, small size of enterprises, irregular and low wage and part time workers that measure quality of job of female workers contributes more towards vulnerability. The most striking is the percentage of workers not having written job contract and part time workers, about 79.41 percent informal female workers and 68.29 percent female formal workers, had not received written job contract. 76.47 percent of informal workers were engaged in small size of enterprises (< 10 workers), this percentage was 48.78

percent for female formal workers. Similarly, 79.41 percent of the informal worker and 56.1 percent formal workers did not receive fixed wages. Such precarious status of the informal workers in formal sector can be explained by their low education level.

Table 1: Difference in vulnerability Status between formal/informal workers (%)

Indicators /Dimensions	Informal worker	Formal worker	Difference
Nature and Quality of job			
No written job contract	79.41	68.29	11.12
No improvement in job status	14.71	4.88	9.83
Part time employment	79.41	68.29	11.12
Irregular wages	79.41	56.1	23.31
Long working hours	29.41	41.46	-12.05
Small size of the enterprises	76.47	48.78	27.69
Adverse Working Condition			
No enough water availability	67.65	7.32	60.33
No toilet facility	67.65	14.63	53.02
No enough place to work	50	9.76	40.24
Being a Female			
Facing stress	73.53	43.9	29.63
Sexual harassment	14.71	9.76	4.95
Health problems	5.88	0	5.88
Social Security Variable			
No social security	85.29	70.73	14.56
No maternity leave facility	100	82.93	17.07
No weekly leave (paid)	32.35	17.07	15.28
Empowerment Variable			
No knowledge of employment laws	79.41	7.32	72.09
No knowledge of trade unions	41.18	24.39	16.79
No saving A/c in Bank/PO	79.41	24.39	55.02
No participation in voting	70.59	26.83	43.76
No aadhar card	20.59	0	20.59
No knowledge of FIR method	70.59	34.15	36.44
No family help/support in domestic chores	91.18	68.29	22.89

Source: Primary Survey, 2019.

Moreover, approximately 68 percent of female informal workers in formal sector have no enough water availability and toilet facility. Percentage of workers vulnerable by long working hours in formal sector was 41.46 percent in case of formal workers and 29.41 percent in case of informal workers and were not been using LPG gas for cooking. More than 75 percent of female informal

workers and only 24.39 percent of female formal workers do not have any saving account in bank/post office. As expected, percentage of vulnerable workers are highest among informal workers i.e., about, 85.29 percent and 70.73 percent formal female employees were deprived of social protection. Likewise, percent of females who were getting maternal facility in formal sector is extremely low (Table 1) i.e. only 17.07 percent. Contrary to this, no informal female workers had ever maternal leave facility.

This indicates that the difference between formal and informal employment is not enough to examine workers vulnerabilities. The main sources of vulnerability among informal workers in formal sector are social security i.e. in terms of paid leave, maternity leave and other social security related variable like PF, pension and gratuity etc. However, vulnerability in this dimension is slightly less for the formal workers than informal workers. A total of 17.07 percent of formal workers are not found vulnerable in terms of selected indicators because they are not vulnerable (Table 4 and Figure 3). In general, these results explain considerable difference prevailing between the formal and informal workers. All the informal workers (34) are vulnerable due to two or more indicators in formal private sector.

Table 2 shows the mean score of vulnerability for different dimension of workers in the formal sector. Nature and quality of job affects adversely to 59 percent of informal workers in formal sector and 55 percent formal workers in formal sector.

Table 2: Mean Score

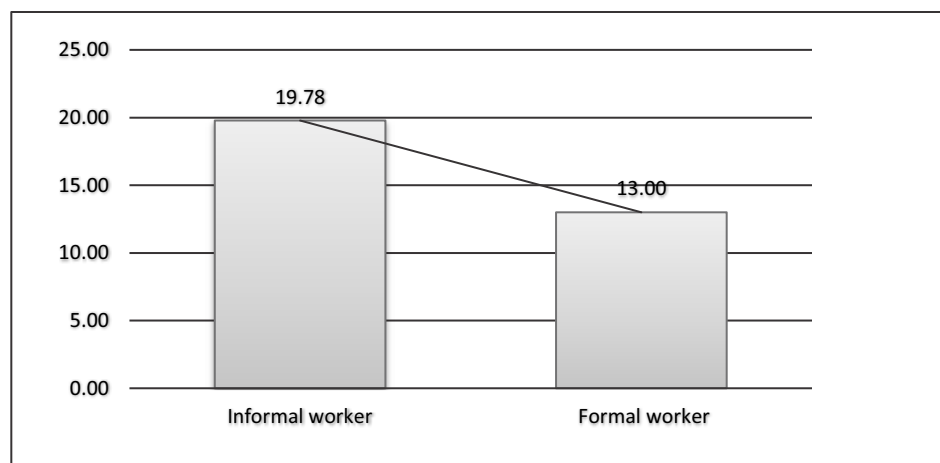
Dimensions	Informal worker	Formal worker
Nature & Quality of Job	59.80	55.56
Adverse Working Condition	26.69	20.86
Being a Female	31.37	7.41
Social Security Variable	72.55	40.74
Empowerment Variable	60.29	29.86
Total	58.18	36.71

Source: Primary Survey, 2019.

Dimensions related to social security show that majority of informal workers (72.55 percent) are vulnerable and 40.74 percent formal workers are vulnerable. About 60.29 percent informal workers are vulnerable in empowerment or awareness related dimension whereas only 29.86 percent formal workers are vulnerable. In the dimension related to adverse working condition, the condition of workers was not found much vulnerable. Being female dimension enhances the

vulnerability of female informal workers in terms of stress, health problems and problems related to sexual harassment. These three variables reveal the disadvantageous position of women. In the nutshell, it can be asserted that in formal sector, the informal workers are more vulnerable than their formal counterparts of the formal sector of urban areas, suffering from various vulnerabilities related to written job contract, social security, awareness, health and stress etc. Most are deprived in aspects of social security such as maternity leave facility, paid leave facility, provident fund, pension and gratuity etc. A significant proportion of the informal workers experience deprivation across indicators that measure awareness and empowerment level of workers such as knowledge of employment laws, participation in trade unions, having saving account in bank and post office etc. This deprivation in almost every dimension is severe and contributes towards vulnerability not only by reducing their socio-economic wellbeing and status but also hamper them to fully utilise their potential in the labour market.

Figure 1: Intensity of vulnerability



Source: Primary Survey, 2019.

The intensity of vulnerability which is the strength to which workers are vulnerable in the different dimensions among informal worker is 19.78 percent and among formal workers it is 13 percent (Figure 1).

8. Contribution of Different Indicators in Vulnerability:

Table 3 shows the percent contribution of each indicator to Vulnerability score. The overall picture shows that social security had the highest contribution to vulnerability i.e., 6.37 percent.

Table 3: Percent Contribution of each Indicator to Vulnerability

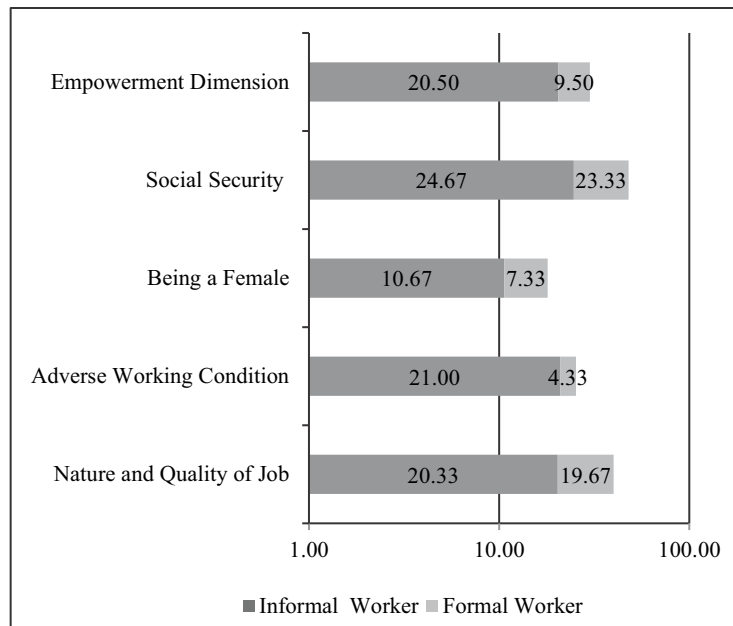
	Informal	Formal
Nature and quality of Employment		
No written job contract	5.93	9.36
Part time employment	1.10	0.67
Irregular wage/not fixed wage	5.93	9.36
Long working hours	5.93	7.69
Size of the enterprises	2.20	5.69
No improvement in job status	5.71	6.69
Adverse Working Condition		
No enough water availability	5.05	1.00
No toilet facility	5.05	2.01
No enough place to work	3.74	1.34
Being a Female		
Facing stress	5.49	6.02
Sexual harassment	1.10	1.34
Health problems	0.44	0.00
Social Security Variables		
No social security	6.37	9.70
No maternity leave facility	7.47	11.37
No weekly leave(paid)	2.42	2.34
Empowerment Variable		
No knowledge of laws related to employment	5.93	1.00
No knowledge of Trade Unions	3.08	3.34
No saving account in Bank/PO	5.93	3.34
No participation in voting	5.27	3.68
No aadhar card	1.54	0.00
No Knowledge of FIR Method	5.27	4.68
No family Help in domestic chores	6.81	9.36
Not using LPG gas for cooking	2.20	0.00

Source: Primary Survey, 2019.

As around 85.29 percent informal workers reported being vulnerable (table1) which leads to their low economic status. Similarly, variables such as contract of employment, long working hours, stress, no support of family members in household chores, social security (in terms of PF & gratuity) and maternity leave equally contribute to the vulnerability index of formal workers.

Figure 2 highlight that, the dimension related to empowerment and nature and quality of job contributes largely to vulnerability of informal workers i.e., 20.50 percent and 20.33 percent respectively. Indicators related to adverse working condition such as sanitation (toilet facility), access to safe drinking water as well as enough place for work play an important role in explaining vulnerability particularly among informal workers (21 percent). Social security contributes to vulnerability in case of both informal and formal employment. On an average 23.33 percent of the formal workers do not have access to social security facilities leading to low job security and high vulnerabilities in formal sector (Figure 2).

Figure 2: Contribution of Selected Dimension in Overall Vulnerability



Source: Primary Survey, 2019.

Hence, there is a divide within the formal sector, where a growing proportion of regular salaried workers seem to be in informal without social security facility. This implies that the formal sector too continues to rely on the use of casual and contract labourers in high proportions.

1. Multidimensional Vulnerability:

Estimates of multidimensional vulnerability index have been presented in table 4 both for formal and informal workers.

Table 4: Estimates of Multidimensional Vulnerability Measures

Vulnerability Measures / Classification of Workers according to Vulnerability Status	Informal	Formal
Percentage of workers who are multidimensional vulnerable	100.00	82.93
Least Vulnerable ¹	20.59	34.15
Moderately Vulnerable ²	5.88	14.63
Quite vulnerable ³	2.94	9.76
Most Vulnerable ⁴	38.24	24.39
Highly vulnerable ⁵	17.65	0.00
Extremely vulnerable ⁶	14.71	0.00
Intensity of vulnerability	19.78	13.00
Multidimensional vulnerability index (MVI) \$	0.816	0.795
Percentage of workers who are severely vulnerable*	70.59	24.39
Percentage of workers who are not vulnerable	0.00	17.07

Source: Primary Survey, 2019.

*Severely vulnerable if vulnerable in 50% or more indicators

\$ Computed by Principal component loading (PCA)

Range: 1-(0.43-.261), 2-(.304-.391), 3-(.435-.478), 4-(.522-.696), 5-(.739-.870), 6-(.957-.1.000)

A worker is severely vulnerable if he/she is deprived in over 50 percent of the selected indicators. Table 4 provides the distribution of our vulnerability index for our two samples (formal/informal). 17.07 percent of formal workers show no sign of vulnerability (score= 0.00 in index) and categorized as non-vulnerable in figure 3. Those who are multidimensional vulnerable (one indicator in each dimension) are much higher in case of informal worker. The composite vulnerability index based on Principal component score for informal workers is 0.816 and 0.795 for formal workers. 17.65 percent and 14.71 percent of the informal workers appear in the highly and extremely vulnerable category. Over 80 percent of formal workers were found deprived and vulnerable in two or more indicators in formal sector.

1. Difference between Determinants of Vulnerability:

An attempt has been made here to present the result of t statistics to find out the significance of difference between formal and informal employee regarding the selected socio-economic indicators. The main objective of this analysis is to find out the difference in socio-economic determinants of vulnerabilities of workers, working in formal sector as informal and formal employees. Inferential statistics presented in table 5 brings out inferences about the sample under study (i.e., informal and formal female workers in our case).

Table 5: Inferential Statistics for Determinants of Informal and Formal Employment

	Test for Equality of Variances (F- test)	t-test for Equality of Means			95% Confidence Interval of the Difference	
	F- value	t-value	Mean Difference	Std. Error Difference	Lower	Upper
Household Headship(HH head)	1.26(0.266)	0.55(0.582)	0.057	0.104	-0.149	0.264
Wages less than minimum wage	1.69(0.198)	0.64(0.524)	0.053	0.083	-0.112	0.218
Migration Status	0.86(0.358)	6.43(0.000)***	0.604	0.094	0.417	0.791
Caste	0.02(0.904)	0.06(0.951)	0.007	0.117	-0.227	0.241
Education	9.87(0.002)***	1.52(0.133)	0.148	0.097	-0.046	0.342
Marital Status	8.05(0.006)***	1.73 (0.088)**	0.194	0.112	-0.030	0.417

Source: Primary Survey, 2019.

*** Significant at 1 % level

**significant at 10 % level

In table 5 t-tests has been computed, which is used to find out the significance of difference between means of two independent samples. The two independent samples considered here are informal workers and formal workers with the hypothesis that “There is no significant difference between female informal and formal workers with respect to the selected determinants of vulnerabilities”. For this the significance of difference between the mean score of informal and formal workers with respect to the six indicators has been calculated. It has been observed from table 5 that the p value is greater than 0.05 for HH head (0.582), wages less than minimum wages (0.524), caste (0.951) and education (0.133), indicating the fact that there is no significant difference between these determinants between two groups (i.e., informal and formal worker). However, the null hypothesis is rejected in case of migration status ($p=0.00$) and marital status ($p=0.088$). Hence there is significant difference found between informal and formal workers due to migration and marital status. Mean difference in migration status is found 0.604 between the workers, indicates that most of the informal workers had migrated from other area for work. This model assumes that a difference in the mean score of the dependent variable i.e. formal and informal workers is found because of the effect of the independent variable that differentiates the two groups of informal and formal workers. Similarly, the F-test (Levene's **test for equality**) in column 1 of table 5, observe that the difference in the two groups (formal and informal workers) are equal, which is the one of the hypothesis of the independent t-test. However, in our analysis this test (F) shows that the significant difference in the level of education ($p=0.002$) and marital status ($p=0.006$) between the informal and formal sector workers affects the difference in position and status of informal and formal workers in urban labour market. Contrary to this, in case of wages less than minimum wage, household head and caste we see t value of 0.057, 0.053 and 0.007 respectively. For which the probability or significance ($p=.582$, $p=.524$, $p=.951$) is more than 0.05. In this case we cannot reject the null hypothesis of no differences between the two groups in these three variables and may conclude that there was no significant difference in variables (wages or salary, caste and HH head) related to vulnerability between formal and informal workers. Hence these three factors affect women formal and informal workers equally. However, the difference between the two groups is found due to the difference in their education, marital and migration status i.e. respondent's education, marital status (married) and migration emerge as the main determinants for differential status in the urban labor market.

Gender and Vulnerability:

Informal employment is more common among women than men (ILO, 2012). The majority of females in the informal employment are illiterate or less educated than their male counterparts. Gender disparity has poorly affected the employment of female informal workers as well as formal workers in formal private sector of the economy. Discrimination exists not only in terms of salary but also in terms of access to employment. Often women are found concentrated in occupations where the wage rates, as well as working conditions, are poor and unsafe.

Extent of Vulnerabilities between Male and Female Workers:

Female workers in the selected districts face multiple vulnerabilities as compared to male workers hence, identification and measurement of vulnerability and identifying the context leading to vulnerability is necessary for reaching the vulnerable workers. The present section in Table 6 reveals that almost all the female informal workers (100 percent) were found multidimensionally vulnerable as the proportion of multidimensionally vulnerable was highest among informal female workers followed by informal male (83.33 percent), formal female (82.93 percent) and formal male (76.92 percent).

Table 6: Percentage of Vulnerable Workers in Informal & Formal Employment

Workers	Sex	Percentage of workers who are multidimensional vulnerable*	Percentage of workers who are severely vulnerable**
Informal	Female	100.00	70.59
	Male	83.33	38.89
Formal	Female	82.93	24.39
	Male	76.92	19.23

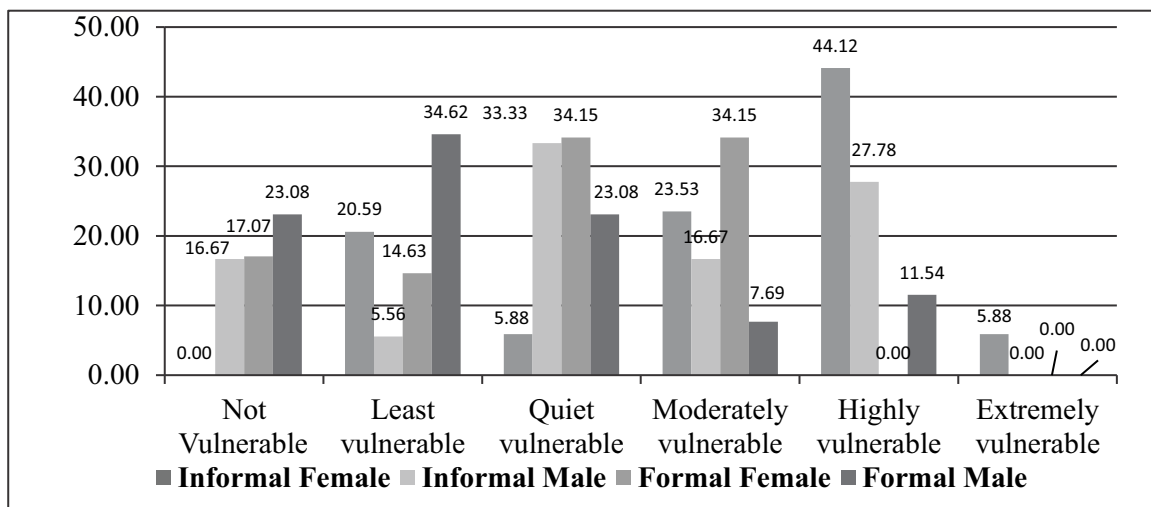
Source: Primary Survey, 2019.

*Vulnerable in one variable of each dimension

**Extremely vulnerable if vulnerable in 50% or more indicators

It is also clear from the table 6 that proportions of workers who are severely vulnerable are higher among female workers (in both formal and informal employment) than male workers, indicating the fact that being female enhances their chances as vulnerable employment.

Figure 3: Distribution of Workers by Vulnerability Status (Index)



Source: Primary Survey, 2019.

Figure 3 shows that female workers engaged in the informal employment are associated with higher levels of gender inequality in terms of their vulnerability score. It shows that vulnerability among female informal workers is considerably high as compared to their male counterparts in formal sector. The percentage of the highly vulnerable workers is 44.12 percent for females and 27.78 percent for males. In fact, no male worker was found in the category of extremely vulnerable worker. On the contrary, the gender gap between male and female formal workers is high in the category associated with least vulnerable workers (14.63 percent females and 34.62 percent males) indicating that male formal worker is less vulnerable (in only one or two categories) than female workers. However, in the other vulnerability group (quiet and moderately vulnerable) proportion of female workers is high compared to male (Figure 3). Moreover, gender inequality is higher in informal employment where women get lower pay despite long working hours and their condition of work are poor.

To examine the extent of gender gap between male and female workers we have included various vulnerability indicators/dimensions for computation of composite index of vulnerability by sex and by type of employment, using principal component analysis (PCA). This index is an average of five dimensions viz; quality and nature of employment, adverse working condition, being a female, social security and empowerment/awareness. Figure 4 shows composite index of vulnerability for male - female and informal/formal workers. It has been observed that vulnerability index value i.e., 0.816 is highest for female informal workers followed by female formal workers (0.795), male informal workers (0.633) and male formal workers (0.543). The intensity of vulnerability is high for informal female (19.78 percent) than informal male. Similarly, intensity of vulnerability among formal female workers is more (13.0 percent) than formal male workers (Figure 5). As expected, the value of multidimensional vulnerability index is higher for female informal and formal workers than their male counterparts, exhibiting the reality that female workers are more vulnerable than their male counterparts in formal sector. Secondly, female informal workers are the most vulnerable segment of the formal labour market in urban areas. The intensity of vulnerability also found is high amongst female informal workers. Thus, it could be asserted that the higher levels of gender inequality (higher index values) are associated with high vulnerability of women in formal sector as compared to men, paving link between gender inequality and insufficient employment opportunities for women workers.

Figure 4: Gender Gap in Vulnerability Status

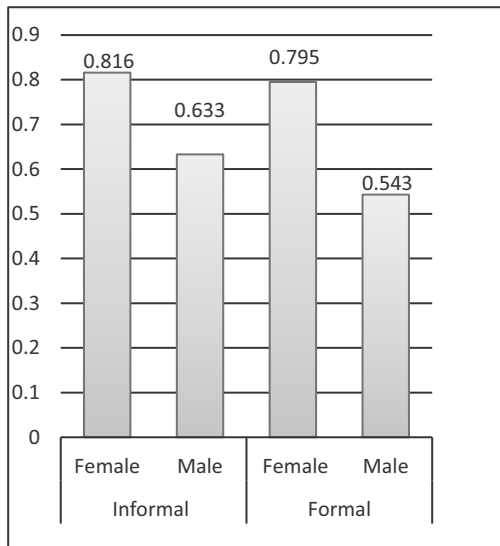
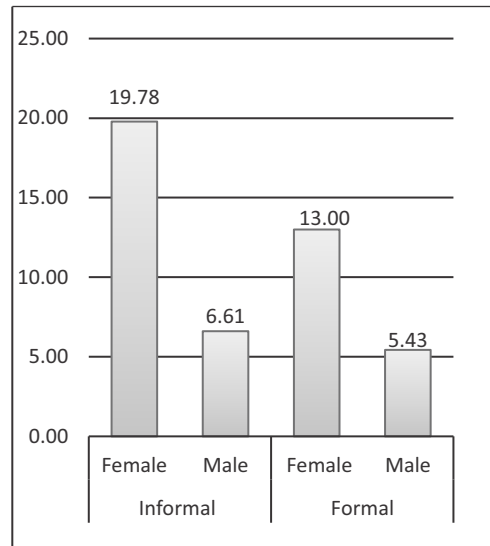


Figure 5: Intensity of Vulnerability



Source: Primary Survey, 2019.

Independent samples t-test for gender difference:

We could test the hypotheses “any **gender** differences that might exist among informal and formal workers engaged as formal sector employees” using the t-test for showing that two groups (male /female) do not differ on gender in formal sector.

Informal Employment

The main purpose of the inferential statistics (independent t-test) is to find out whether the difference between two groups is statistically significant, or not. For this analysis gender (male /female) is considered to be a *quasi-independent variable* as we cannot control gender. **T- test has been used** to explain differentials between male and female informal and formal workers on various dependent variables given in table 7 & 8. And to corroborate whether the differentials in vulnerability indicators between male and female workers is significant, **t-test for equality of means is shown** in the columns 4 of table 7. The mean scores for male worker derived was 0.389 and for women worker was 0.765 for size of enterprises with the mean difference of 0.376, indicating that women workers had significantly higher mean scores than men (Table 7) thus establishing that females are more likely to be vulnerable than males. We see t- value of 2.83 for variable, size of enterprises (in the **Equal variances not assumed part of the table 7**) for which the probability in the **Significance** ($p=.011$) is lower than 0 .05, meaning that we need to reject the null hypothesis of no differences between male–female informal workers. Thus, there was significant difference in the variable small size of enterprises, between male and female informal employees. Further the results indicate that there was significant difference in facing stress and having no saving account in bank/PO between male and

female workers, $t = 4.00$ & 4.14 , $p = .000$. i.e., the mean score of female workers ($M = .794$, $.735$, $SD = .410$, $.448$) was considerably different from that of male worker ($M = .278$, $.222$, $SD = .461$, $.428$). The first two columns show Levene's **Test for Equality of Variances** which presents that the difference in the two groups are similar. The **F** test and its significance value present this test.

Table 7: Significance of Difference between Male and Female Informal Workers with respect to the dimension of vulnerabilities

	F- test#	P-value	Mean Difference	T- test ##
No written job contract	.04	.834	-.013	-.104
Part time Employment	.07	.791	.016	.135
Irregular age	.07	.791	.016	.135
Long Working hours	2.90	.095	-.261*	-1.870
No enough water availability	.73	.397	.065	.463
No toilet Facility	.73	.397	.288*	2.038
Facing Stress	.46	.500	.513***	4.00
No Social Security	1.71	.196	.075	.671
No Weekly leave(paid)	1.89	.176	-.121	-.851
No Knowledge of Employment Laws	.47	.496	-.039	-.335
Having no Saving Ac in Bank/PO	1.23	.273	.516***	4.14
No participation in voting	3.53	.066	.206	1.469
No Knowledge of FIR Method	2.90	.095	.150	1.075
Equal variances not assumed				
No improvement in Job Status	4.36	.042	.092	.973
Small size of the enterprises	4.07	.049	.376***	2.828
No enough Place to work	8.05	.007	.222	1.549
No Knowledge of Trade Unions	9.31	.004	.190	1.365
No Aadhar Card	32.71	.000	.206**	2.118

Source: Primary Survey, 2019.

Levene's Test, ## T-test for equality of means

*Significant at 10 % level

** Significant at 5% level

*** Significant at 1 % level

Analysis of the equality of variances confirms that difference between the male and female informal workers are not equal in some variables. These variables are improvement in job status, enough place to work and knowledge of trade unions because the probability for the F value is less than 0.05 (Table 8).

Formal Employment

Generally, involvement in the formal economy has been possibly the important path for the

empowerment of women and increased gender equality between women and men. In table 8 Levene's Test of equality of variances for formal employment shows that the male and female workers have a similar dispersion of scores (equality of variance). In table 8 there are six variables in which significant differences between two groups has been found. This particularly belongs to variables related to adverse working condition (not enough water availability, no toilet facility, not enough place to work) and empowerment and awareness (no knowledge of employment laws, no knowledge of trade unions, no knowledge of FIR method). The value of F is significant for these variables, exhibiting the fact that there are significant differences between male and female workers in variables related to adverse working condition and empowerment. Hence, the assumption of equality between them has not been met and in this case, variances cannot be assumed to be equal as the F-value is significant ($p = .000$) for these (six) variables (Table 8).

Table 8: Equality of Variances between Male and Female Formal workers

	F- test#	P-value	Mean Difference	T- test ##
No written job contract	3.53	.065	.130	1.089
Part time Employment	2.34	.131	.106	.874
Irregular age	0.80	.375	.176	1.407
Long Working hours	0.02	.895	-.008	-.067
Small size of the enterprises	2.15	.148	.103	.819
Facing Stress	0.80	.375	.054	.434
No Social Security	1.29	.261	-.062	-.550
No Weekly leave(paid)	0.19	.662	-.022	-.221
No Saving Ac in Bank/PO	0.06	.808	.013	.121
No participation in voting	0.48	.492	.038	.339
Equal variances not assumed				
No enough water availability	27.45	.000	-.115**	-2.278
No toilet Facility	65.26	.000	-.192***	-3.077
No enough Place to work	65.26	.000	-.192***	-3.077
No Knowledge of Employment Laws	27.45	.000	-.115**	-2.278
No Knowledge of Trade Unions	32.08	.000	.205**	2.263
No Knowledge of FIR Method	225.67	.000	.341***	3.616

Source: Primary Survey, 2019.

Levene's Test, ## T-test for equality of means

*Significant at 10 % level

** Significant at 5% level

*** Significant at 1 % level

Similarly, t-test for equality of means also show significant difference in these six variables (table 8). For example, case of six variables belong to the equal variance not assumed part, the t-test is significant as the p-value is less than 0.05 ($p < .05$) and male workers who had no knowledge of trade unions had lower scores ($M = .038$, $SD = .196$) than female workers ($M = .244$, $SD = .435$) with MD

=.205. Hence, an independent t-test found this pattern to be significant, $t(33.00) = -2.26$, $p < 0.05(0.27)$ as shown in table 8. Together these results suggest the significant difference between the workers by gender, supporting our hypothesis.

In majority of studies researcher are more concerned in finding statistically significant results, however, sometimes the insignificant difference can be more meaningful for analysis, as we find in our analysis. Above findings points out that *there is constant difference in vulnerability* between male and female workers in different indicators (belonging to the category of equal variance assumed) in formal employment (table 7 & 8). This finding may be useful in determining the vulnerabilities of male workers in formal sector who are considered to be in better position in the labour market as compared to their female counterparts.

Conclusion:

In general, this analysis reveals important similarities and dissimilarities between the formal and informal employment and also between the gender. This confirms that the urban labour market in Uttar Pradesh is diverse in nature. The study found that most of workers in formal sector experience vulnerability at the medium level. In general, vulnerability of female informal workers is higher also varies between the sexes (male and female).

In short, this analysis reveals that female informal workers in formal sector (private) of the economy are predominantly poor and vulnerable as compared to formal workers. Vulnerability of women in the formal labour market is not limited to the informal workers but also extends to the formal workers and growing informalisation is critical for policy formulators to tackle. Secondly, women are the larger workforce of the informal employment in Uttar Pradesh because they are more likely than men to undertake unpaid or low paid economic activities. The widespread employment of women in vulnerable jobs characterizes a huge loss for an economy. Besides this, increased awareness of the employment and social security policies/schemes among the workers and more focus on females in the labour market are needed because the informal employment is widely neglected in public policies. Upadhyaya (2003) drafts four dimensions to reduce vulnerabilities in informal employment. He suggested that a mix of occupation-based, caste or ethnicity-based, area-based and gender-based methods should be utilized when designing policies. These policies could be useful for women workers to establish formal enterprises, promote equal opportunities for women to access quality education and training, and help to reduce the gender inequality in labour markets (ILO, 2011).

References

- Bazillier, R., Cristina B. and Oana C. (2015). Employment vulnerability in Europe: Is there a migration effect?
- Bocquier, P., Nordman, C. J. and Vescovo, A. (2010). Employment Vulnerability and Earnings in Urban West Africa, *World Development*, 38(9), pp. 1297-1314
- Chant, S. and Pedwell C. (2008). Women, gender and the informal economy: An assessment of ILO research and suggested ways forward, International Labour Office, Geneva, ILO.
- Chen M. A. (2006). Rethinking the Informal Economy: Linkages with the Formal Economy and the Formal Regulatory Environment.
- Diaz, A. O. (2012). Defining a Multidimensional Index of Decent Work for Mexico, Novena reunión internacional, Políticas públicas, La importancia de las estadísticas nacionales. 29-30, de agosto, México.
- Greenan, N. and Seghir M. (2017). Measuring vulnerability to adverse working conditions: evidence from European countries Nathalie, Working Paper Milestone 104. <https://inclusivegrowth.be/downloads/output/ms104m21-13c.pdf>
- Isabel, Gunther and Launov, A. (2012). Informal Employment in Developing Countries: Opportunity or Last Resort , *Journal of Development Economics*, 97(1), PP.88-98, DOI: 10.1016/j.jdeveco.2011.01.001
- Dogrul H. G. (2012). Determinants of formal and informal sector, employment in the urban areas of turkey, *International Journal of Social Sciences and Humanity Studies*, Vol 4, No 2, 2012 ISSN: 1309-8063 (Online)
- Hoddinott, J. and Quisumbing, A. R. (2008). Methods for Micro-econometric risk and vulnerability assessments, International Food Policy Research Institute, Washington, D.C.
- ILO, (2002). Decent work and the informal economy. Geneva 1: International Labor Office. <http://www.ilo.org/public/english/standards/relm/ilc/ilc90/pdf/rep-vi.pdf>. Accessed 1 June 2013.
- ILO, (2010a). Global Employment Trends, Geneva: ILO, 84p
- ILO/ADB (2011). Women and labour markets in Asia: rebalancing towards gender equality in labour markets in Asia. 56 p.
- ILO, (2012). Statistical update on employment in the informal economy, ILO Department of Statistics. http://laborsta.ilo.org/informail_economy_E.html.

- Joanna Shapland and Jason Heyes, (2017). How close are formal and informal work? International Journal of Sociology and, Permanent link to this document: <https://doi.org/10.1108/IJSSP-06-2016-0071>
- Khasnabis, B.G., Kanbur, R. and Ostrom, E.(2006). Beyond Formality and Informality, <https://www.researchgate.net/publication/239814357>. DOI: 0.1093/0199204764.003.0001
- Ligon, E. and Schechter, L. (2003). Measuring Vulnerability, Economic Journal, vol. 113(486), pages C95-C102.
- Mannila, Simo (2015). Informal Employment and Vulnerability in Less Developed Markets, Vuori et al. (eds.), Sustainable Working Lives, Aligning Perspectives on Health, Safety and Well-Being, DOI 10.1007/978-94-017-9798-6_2.
- Macaig Brian and Pavcnic Nina. (2015). Informal Employment in a Growing and Globalizing Low-Income Country, American Economic Review 105(5):545-550, DOI: 10.1257/aer.p20151051.
- Narayanan A (2015). Informal employment in India: voluntary choice or a result of labor market segmentation?
- O.Regan, S., Hill, D. and Neathey, F. (2005).The Vulnerable Worker: A Definition and Research Approach, Brighton: Institute for Employment Studies.
- Yahmed, S.B. (2016). Formal but less equal, Gender wage gaps in formal and informal jobs in Brazil, Centre for European Economic Research (ZEW), December, 2016
- Saunders, R. (2003). Defining Vulnerability in the Labour Market, Research Paper W/21 Work Network, Canadian Policy Research Networks Inc., <http://www.cprn.org>.
- Shapland and Heyes, (2017).How close are formal and informal work? International Journal of Sociology and Social Policy, Vol. 37 Issue: 7/8, pp.374-386,<https://doi.org/10.1108/IJSSP-06-2016-0071>
- Shonchoy, A. S. and Junankar PN Raja, (2014).The informal labour market in India: transitory or permanent employment for migrants? Journal of Labor & Development, 3:9, <http://www.izajold.com/content/3/1/9>, 2014, 3:9
- Taylor, S. (2008). Defining and Researching 'Worker Vulnerability, unpublished research paper, Department for Business, Enterprise and Regulatory Reform.
- Unni Jeemol (2002). Size, Contribution and Characteristics of Informal Employment in

- India, The Gujarat Institute of Development Research, Ahmedabad, India, Country Case Study, commissioned by the International Labour Organization, Geneva, for document relating to the International Labour Conference, June 2002.
- (2017). Formalization of the Informal Economy: Perspectives of Capital and Labour, the Indian Journal of Labour Economics (2018) 61:87–103, <https://doi.org/10.1007/s41027-018-0121>.
- Upadhyaya, U. (2003). Social protection for workers in informal economy, General Federation of Nepalese Trade Unions, <http://www.gefont.org/>.
- World Bank. (2001). World Bank Annual Report 2000/2001, Attacking Poverty, New York, NY: Oxford University Press.

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