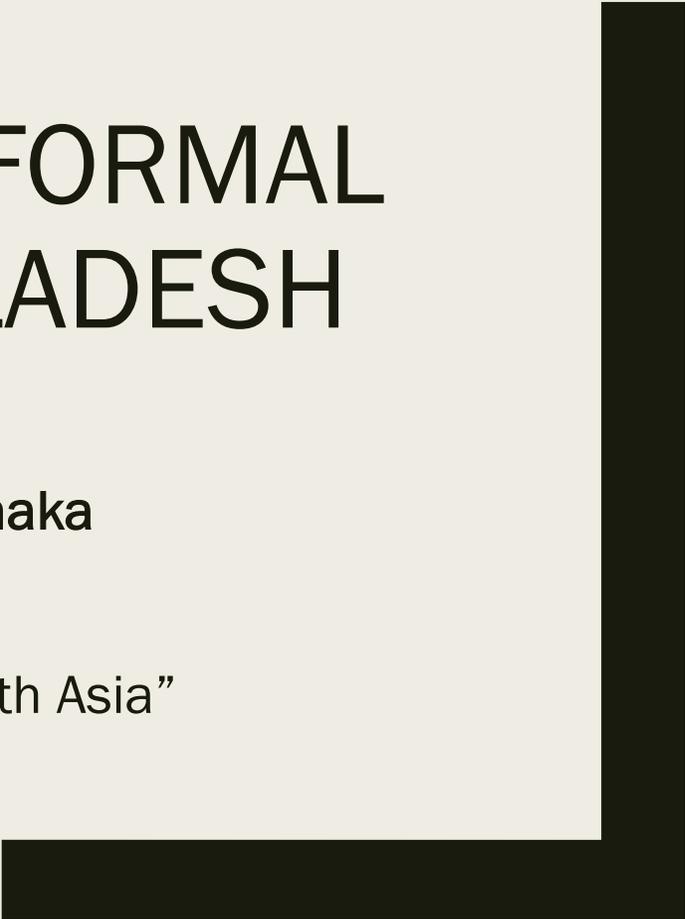




# DYNAMICS OF URBAN INFORMAL EMPLOYMENT IN BANGLADESH

Selim Raihan  
Professor of Economics, University of Dhaka  
and Executive Director, SANEM

ICRIER Conference on “Creating Jobs in South Asia”  
3-4 December 2015, New Delhi



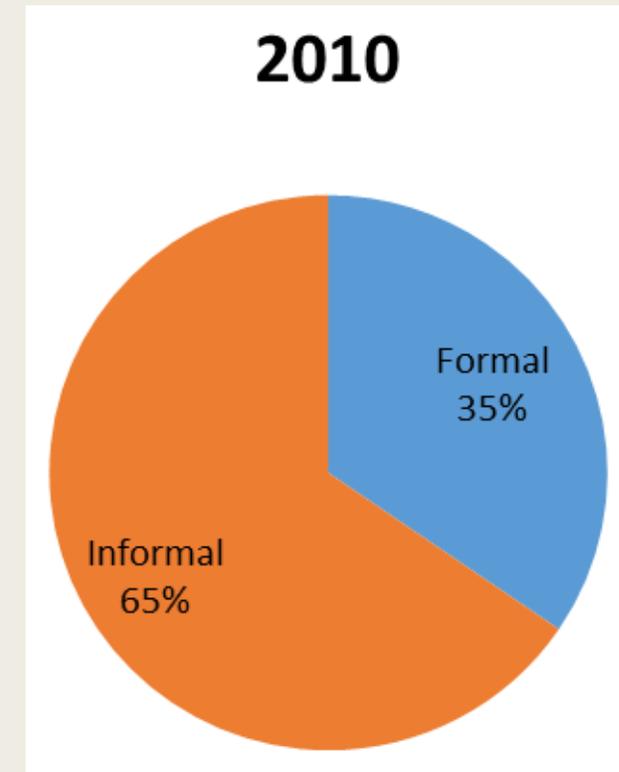
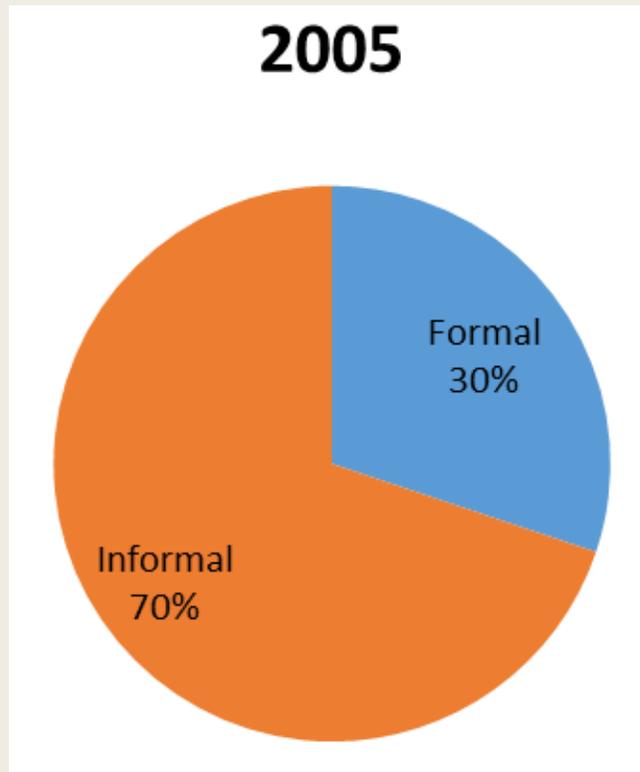
# Definition of Informality

- Several studies have defined informality based on certain characteristics ranging from ease of entry, low resource-base, family ownership, small-scale, labor-intensive, adapted technology, unregulated, but competitive markets, and informal processes of acquiring skills.
- However, for this paper we relied on information from the Labor Force Survey (LFS) 2005 and 2010 for Bangladesh. The LFS provides a limited amount of information which can be used to define informality.

# Definition of Informality...

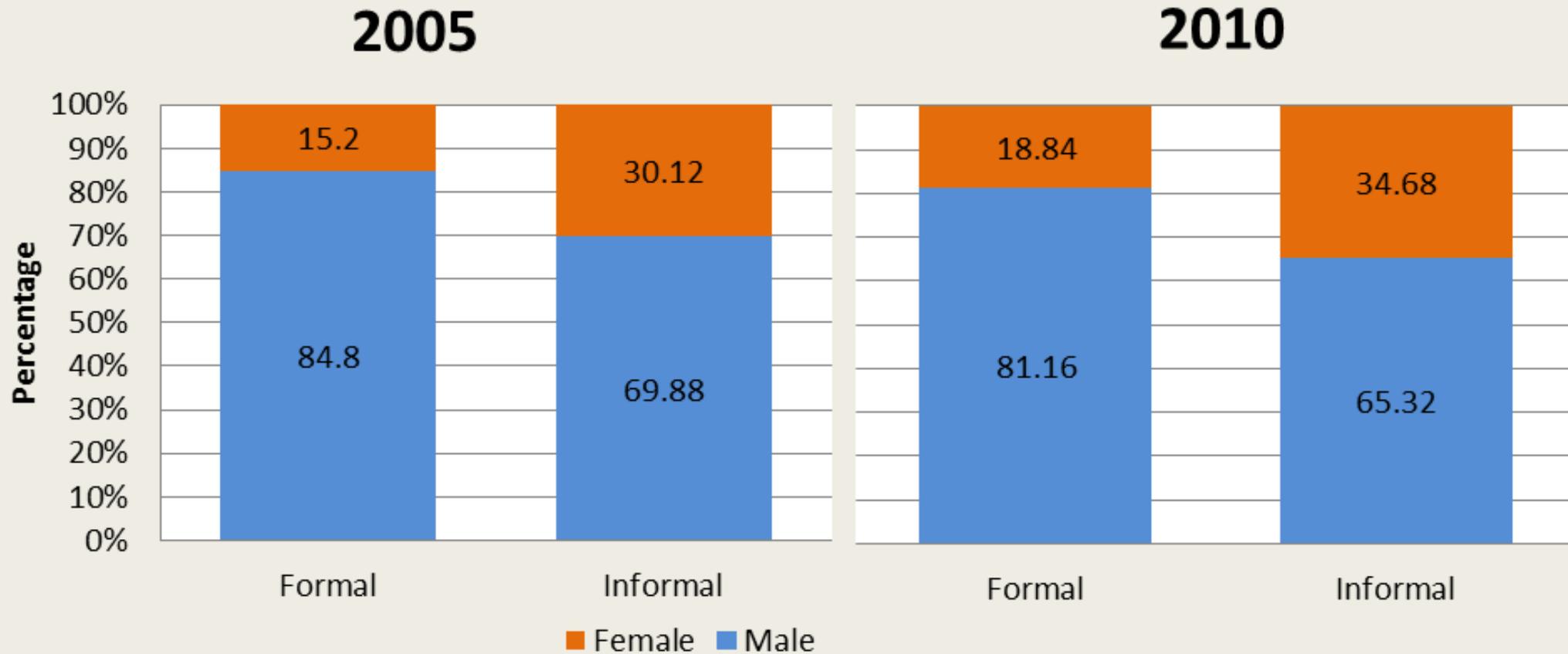
- We have defined informality in this paper by using three dimensions.
  - *The first dimension relates to the production unit or enterprise in which the workers work. More specifically, if the production units or enterprises are not registered with the concerned authority then we consider those units fall under the informal sector.*
  - *The second dimension relates to the existence of contract between the workers and the employers. If there is no contract between workers and employers either in written or verbal form, then we classify those workers as belonging to the informal sector.*
  - *In addition to the above two criterion, for the wage employed workers, if the workers do not get any kind of pay slips or any kind of documents for their wages then they are considered to be involved in the informal sector.*

# Relative Sizes of Urban Formal & Informal Employment



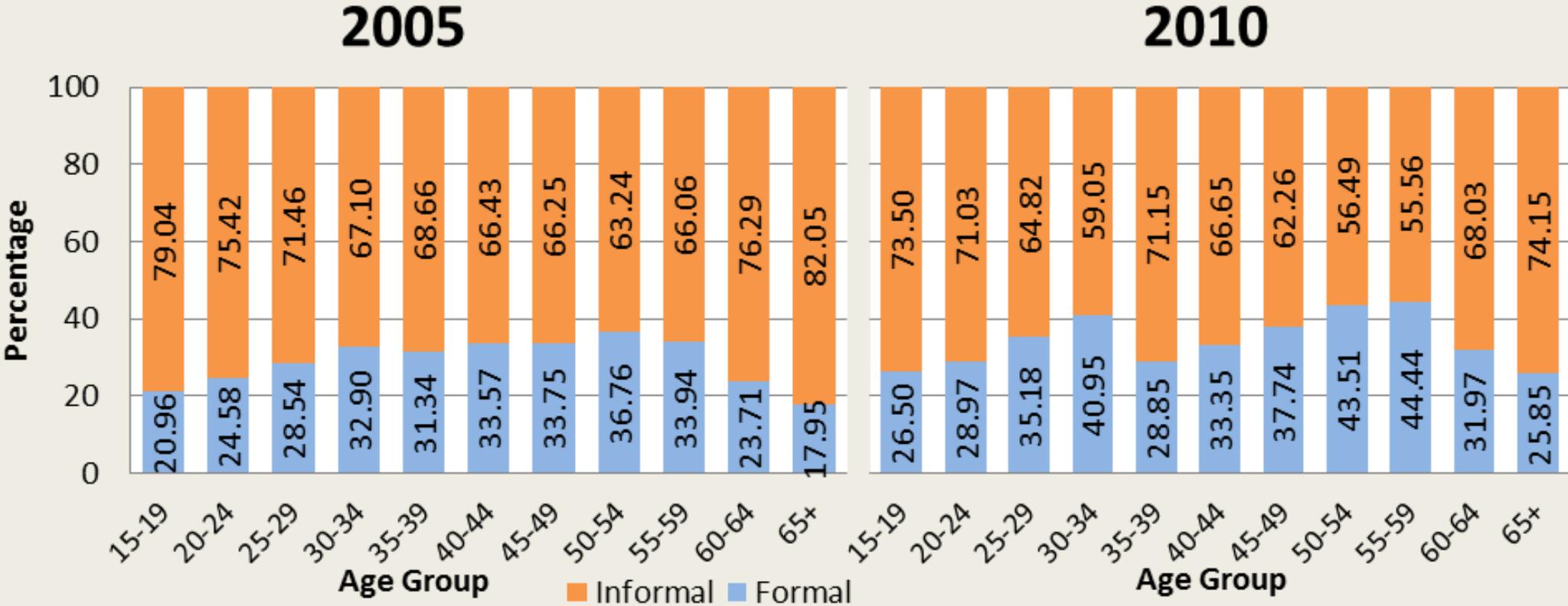
Source: LFS, 2005 & 2010

# Nature of Employment by Gender



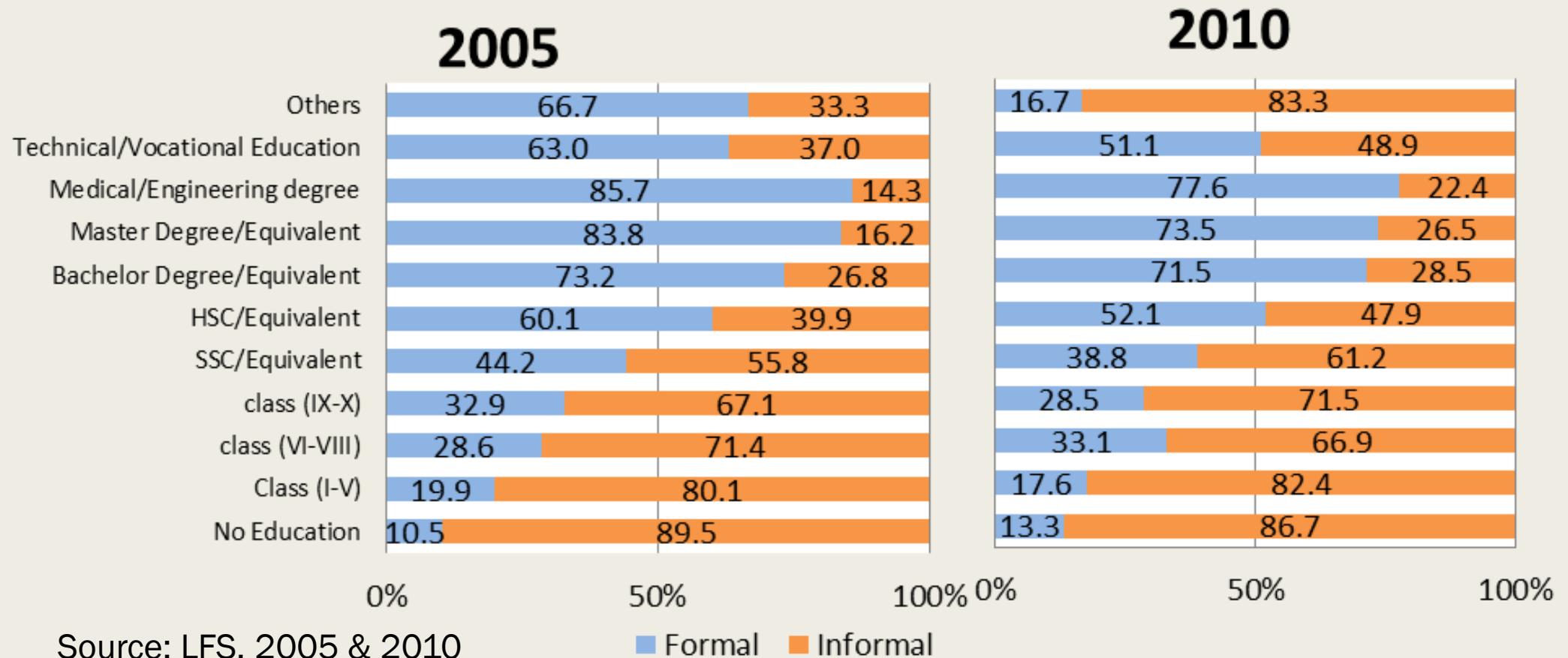
Source: LFS, 2005 & 2010

# Age and Nature of Employment

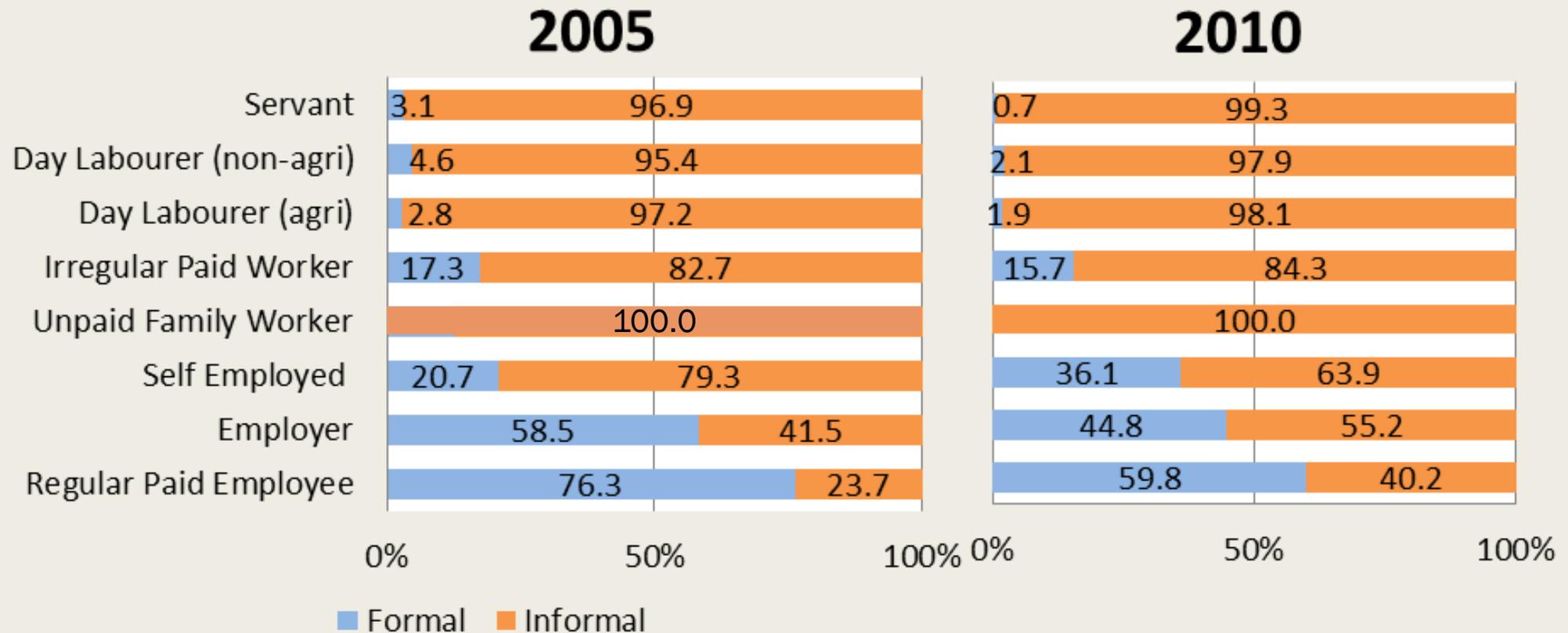


Source: LFS, 2005 & 2010

# Level of Education and Nature of Employment



# Employment Status and Nature of Employment



Source: LFS, 2005 & 2010

# What determines employment in the urban informal sector?

- Probit estimation from a pooled data of 2005 and 2010
- Fixed Effect & Random Effect Estimators with Pseudo Panel Data

# Probit estimation from a pooled data

- We have constructed a pooled data base from the Labor Force Survey of year 2005 and 2010. And estimate the regression with a time dummy (a dummy of year 2005, equal to 1 if the observations come from year 2005 and 0 otherwise) and interaction of time dummy with each of the explanatory variables to estimate effect of each of the explanatory variables as well as to examine whether there are any changes in those effects in 2010 from 2005.
- Our dependent variable is a binary outcome variable, that is we are modeling how the probability of being entering the informal sector is influenced by each of the explanatory variables.
- We have also introduced industry dummies to control for the industry fixed effect but the coefficients of industry dummies are not represented in the result.

# Empirical model

$$\begin{aligned} & \textit{informal}_{it} \\ & = \beta_0 + \beta_1 \textit{edu}_{it} + \beta_2 \textit{deprto}_{it} + \beta_3 \textit{age}_{it} + \beta_4 \textit{age\_sqr}_{it} + \beta_5 \textit{land}_{it} \\ & + \beta_6 \textit{female}_{it} + \beta_7 \textit{wage}_{it} + \beta_8 \textit{self}_{it} + \mu_{it} \end{aligned}$$

$\textit{informal}_{it}$  = is dummy variable equal to 1 if the person is employed in informal sector.

$\textit{edu}_{it}$  = is the years of education of labors

$\textit{deprto}_{it}$  = the dependency ratio is defined as  $\frac{\textit{Number of dependents in a famiy}}{\textit{Total number of working members in the family}}$

$\textit{age}_{ait}$  = is the age of the labor

$\textit{age\_sqr}_{ait}$  = is the square of the age of the labor

$\textit{land}_{it}$  = is the total landholding of the family from where the labor comes

$\textit{female}_{it}$  = is dummy equal to 1 if the individual is female

$\textit{wage}_{it}$  = is dummy equal to 1 if the labor is a wage employed

$\textit{self}_{it}$  = is dummy equal to 1 if the labor is self employed

$\textit{unpaid}_{it}$  = is dummy if the labor is an unpaid labor. This category is omitted from the regression as we are taking this group as the base category.

# Probit regression of informal participation

	Coefficient	Marginal Effect
Education	-0.077***	-0.01805
Dependency	-0.054***	-0.01271
Age	-0.018***	-0.00421
Age square	0.0002***	0.0000403
Landholding	-0.00003***	-0.00000717
Wage Employed	-0.269***	-0.06293
Self Employed	0.005	0.001084
Female	0.392***	0.091411
Time 2010	-0.058	-0.01361
Education_2010	0.016***	0.003675
Dependency_2010	0.055***	0.01294
Age_2010	0.002	0.000468
Age square_2010	0.000001	0.0004676
Landholding_2010	-0.00007	-0.0000175
Wage Employed_2010	-0.127***	-0.02979
Self Employed_2010	-0.747***	-0.1745
Female_2010	-0.224***	-0.05238
Constant	2.57	
Number of Observation	36906	
LR Chi Square (141)	15141.28	
P- Chi Square	0.000	
Pseudo R <sup>2</sup>	0.3288	

# Probit estimation results

- As we know for a non-linear model like 'probit' the estimated coefficients can't be interpreted as marginal effect directly.
- As the marginal effect would be  $\frac{dy}{dx_i} = \beta_i * g(z)$ , this implies that marginal effect will depend not only on estimated coefficients but also on the values of explanatory variables. Here  $g(\cdot)$ , is the standard normal distribution function. That means we need to multiply by an adjustment factor ( $g(z)$ ) which depends on the value of explanatory variables. More specifically the adjustment factor has been calculated for each of the observations and the mean of those values are then multiplied with each of estimated coefficients to get the estimated marginal effect which is known as average marginal effect.

# Probit estimation results..

- From the 'probit' regression results it is confirmed that increase in education significantly affects the probability of participating in informal sector adversely.
- In 2005 one year increase in years of schooling would lower the probability of participating in the informal sector on an average by 0.18. In 2010 the effect of education became lower as then the probability of participating in the informal sector on an average would decrease by 0.014 due to one year increase in years of education and this change is statistically significant. This indicates that overtime the effectiveness of higher education to decrease the informal sector participation has become lesser.

# Probit estimation results..

- The coefficient of dependency ratio states that in 2005 the individuals with larger family dependency ratio are less likely to be associated with the informal sector. But from the coefficient of interaction terms between 'dependency ratio' and 'time dummies', it can be said that in 2010 this relationship has been reversed as in 2010 one unit increase in dependency ratio would increase the probability of informal sector participation. This implies that overtime individuals with larger family dependency ratio have been associating with the urban informal sector.
- The coefficient of age is negative and significant and the coefficient of age square is positive and significant which implies a quadratic relationship. More specifically it can be said that initially the probability of informal sector participation reduces with age; then at a certain level of age the effect of age on the probability of informal sector participation becomes positive. The turning point is estimated to be 52 (approximately).
- The coefficient of interaction term between age and time dummy is statistically insignificant which implies that the effect of age on the probability of informal sector participation remains unchanged in year 2010.

# Probit estimation results..

- The coefficient of landholding is negative and significant which implies that holding other things constant workers with larger land holdings are less likely to be associated with the urban informal sector. From the coefficient of interaction term between landholding and time dummy states that over the years the effect of landholding remains unchanged.
- The coefficient of female dummy indicates that probability of female labor participating in the informal sector is 0.09 more compared to male in 2005. In 2010 the coefficient of female dummy is significantly lower and it can be said that in 2010 the probability of female workers participating in the informal sector is 0.04 larger compared to male workers. This change is statistically significant. This infers that in the course of time relative association of female workers with formal sector employment has increased.
- Compared to the base category of 'unpaid labor', for both 'wage-employed' and 'self-employed' the probability of participating in the informal sector is significantly lower. But in 2010 these differences enlarged.

# Fixed Effect & Random Effect Estimators with Pseudo Panel Data

- Unobserved heterogeneity (i.e., individual) ability can result in the inconsistency of the estimated parameters and fixed effect estimator is used to control for the unobserved heterogeneity. To apply we need to have panel data which is currently unavailable.
- We develop a pseudo panel by constructing the cohorts using the “industry types”. Cohorts are the sub groups of the sample. By taking the average by each cohort we are able to construct a pseudo panel where each of the observation represents a particular industry type.
- Though there are several industry types in the Labor Force Survey of 2010 and 2005, we have reclassified (i.e. merged comparable industry types into one, recoded where necessary) the industry types so that data of 2005 and 2010 become comparable.

# Definition of variables under the Pseudo Panel regression

- The definition of each of the variable has been changed. For example the dependent variable is no longer a binary outcome variable. It is now showing the informal intensity, that is the percentage of informal participation in a particular industry type out of total employed person in that industry type. The independent variables include the following:
  - *Education level: average years of schooling of the labor employed in a particular industry type.*
  - *Family dependency: average family dependency ratio of the labor employed in a particular industry type.*
  - *Family landholding: average landholding of the family of the labor employed in a particular industry type.*
  - *Age: average age of the labor employed in a particular industry type.*
  - *The effect of employment characteristics for example the variable of  $wage_{it}$  percentage of wage employed labor in a particular industry type out of total employed person in that industry type. Other two independent variables of employment characteristics will be reinterpreted similarly.*

# Pseudo Panel regression

- Once we get the pseudo panel we can apply Fixed Effect (FE) estimator which is basically applying OLS on time demean data and in the process of time demeaning the unobserved heterogeneity (the industry fixed effect) had been removed.
- We have also applied the Random Effect (RE) estimator which is basically applying the OLS on quasi demeaned data and widely used with panel data.
- RE estimator is used when it is assumed that the unobserved heterogeneity is not correlated with any of the explanatory variables appeared in the regression model.

# Informal Intensity (Pseudo Panel)

Independent Variables	Fixed Effect	Random Effect
	Coefficient	Coefficient
Education	-0.048***	-0.041***
Dependency	0.140**	0.085**
Landholding	-0.0005	-0.001
Age	-0.058***	-0.049***
Age square	0.001***	0.001**
Female	0.034	-0.010
Wage Employed	-0.567***	-0.555***
Self Employed	-0.297	-0.251*
constant	2.076***	2.052***
Number of observations	235	235
F	8.475***	
chi2		510.23***
R2	0.539	0.569

# Pseudo Panel estimation results..

- Higher level of education reduces the informal sector participation.
- Workers coming from a family with high dependency ratio have to resort to urban informal sector activities for their livelihood.
- Similar to the case of pooled OLS younger people are less likely to be associated with the urban informal sector.
- Gender has no significant effect on informal intensity.
- Landholding does not affect a worker's decision to get involved in urban informal sector.
- Unpaid workers are more likely to be associated with the informal sector employment compared to wage workers but there is no significant difference between unpaid and self-employed workers as far as informal sector employment is concerned.

# Comparison between pooled OLS Probit model and Pseudo panel model

	Pooled OLS	Pseudo Panel (FE)	Difference
<b>Education</b>	Negative significant	Negative significant	Same
<b>Dependency</b>	Negative significant (2005) Positive significant (2010)	Positive significant	Difference (2005) Same (2010)
<b>Landholding</b>	Negative significant	Negative not significant	Difference in significance
<b>Age</b>	Negative significant	Negative significant	Same
<b>Age square</b>	Positive significant	Positive significant	Same
<b>Wage Employed</b>	Negative significant	Negative significant	Same
<b>Self Employed</b>	Positive not significant (2005) Negative significant (2010)	Negative not significant	Both insignificant (2005) Difference in significance (2010)
<b>Female</b>	Positive significant	Positive not significant	Difference in significance