Formality and Informality in Labour Market: Evidence from Pakistan

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"In the Name of Allah, the Most Gracious and the Most Merciful
Peace and Blessing of Allah on His Last Prophet Muhammad,
Who Taught the Humanity to Human Beings"

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ABSTRACT

Informal sector provides employment to a large number of workers in Pakistan. Its presence in the economy draw the attention of researchers from across the world. This thesis focusses on three main themes such as the size and determinants of informal employment, wage differential and qualification mismatch in formal and informal employment by using the Pakistan's Labour Force Survey (LFS) 2017-18 data. Different measures are used to study the informal employment in Pakistan. It is found that the size of informal employment varies across different measures. Further, the logit regression model is applied to find the determinants of informal employment. Results show that the determinants of informal employment are roughly stable across the different measures. Male workers, very young and old age groups, having vocational training, less educated, unmarried, belonging to joint family are more inclined to informal employment. Blinder-Oaxaca decomposition results show that only 56.1 (62%) of wage differential among two types of workers can be explained by worker's characteristics differential. The wage differential of 34.4 (38%) remains unexplained, which is due to differences in incentives or compensation structures between the formal and informal workers group. Further, quantile regression (Machado-Mata) decomposition indicates that wage gap is higher at the bottom of the wage distribution and declines after that. A logit model is used to analyze the qualification mismatch in formal and informal employment. The results show that males and those who are working in urban areas are more inclined to qualification mismatch. Mismatch reduces with experience. Policy is required to protect informal employment by making contributions to social security, old age benefits and pension, because it will help to documents the employment and enterprise and will also reduce the wage gap and qualification mismatch. This contribution for social protection will be redistributed to the economy for the wellbeing of the whole society.

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LIST OF ABRIVATIONS

AQU	Agency for the Quality of the University
ASPRs	Age Specific Participation Rates
CBS	Central Bureau of Statistics
CEEC	Central and Eastern European Countries
CHS	Colombian Continuous Household Survey
CSSP	Continuous Sample Survey of Population
DOT	Dictionary of Occupational Titles
FATA	Federal Administrative Tribal Areas
FLFP	Female Labour Force Participation
GDP	Gross Domestic Product
HCT	Human Capital Theory
ICLS	International Conference of Labor Statisticians
IEGISS	International Expert Group of Informal Sector Statistics
ILO	International Labour Organization
IMR	Inverse Mills Ratio
ISTAT	Italian National Institute of Statistics
JA	Job Analysis
JAE	Journal of Applied Econometrics
JCT	Job Competition Theory
KLFS	Kazakhstan Labor Force Survey
LFPR	Labour Force Participation Rate
LFS	Labour Force Survey
LPM	Linear Probability Model
NLFS	Nepal labour Force Survey
NSSO	National Sample Survey Organisation
O*NET	Occupational Information Network
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
PBS	Pakistan Bureau of Statistics

PHS	Permanent Household Survey
PKR	Pakistani Rupees
PSLM	Pakistan Living Standards Measurement Survey
PSU	Primary Sampling Units
QCD	Quantile Conditional Decomposition
RES	Review of Economics and Statistics
RLFS	Russian Labor Force Survey
RLMS	Russian Longitudinal Monitoring Survey
RM	Realized Matches
SD	Standard Deviation
TURKSTAT	Turkish Statistical Institute
UN	United Nation
UNDP	United Nation Development Program
VHLSS	Vietnam Household Living Standard Survey
WA	Worker's Self-Assessment

CHAPTER 1
INTRODUCTION

This chapter outlines the background and rationale for the study of formal and informal employment in Pakistan. Objective and research questions are presented subsequently in this chapter. This chapter also highlights the contributions and importance of the study. It also provides an outline and chapter wise overview of the thesis.

1.1. Background

Informal employment is the main component of global labour market and it is also a main type of employment in developing countries (Zuo, 2013). Informality in the labour market is most prominent social and economic phenomena. Its persistence draw the attention of many researchers from across the world. A clear and sound understanding of the concept and dimensions of informal employment is needed (Acar & Tansel 2014). The literature on labour informality made up several attempts to measure the size, causes and consequences of informality to establish improved economic models which can be helpful for policy makers to make suitable policies (Batini et al., 2010).

There is no better definition and description of this concept and nor any analysis which shows its importance for development dialogue (Bangasser, 2000). So many researchers made attempts to define the concept of labour informality for a better understanding and used different definitions and criteria for empirical analysis to make suitable policies to deal with it. Perry et al. (2007) tried to elaborate this concept. In his view, informality refers to different but almost bad things for different people, like lack of

workers protection, excessive regulations and evasion of tax laws, unfair competition, low productivity of workers, non-payment of taxes and underground works.

Initially, it was considered a temporary problem that would be solved by the process of industrialization. According to Harris and Todaro (1970) economic growth takes place when traditional agriculture sector transforms into modern manufacturing sector by absorbing extra labour from agriculture sector. This terminology was extended by Hart (1973). Author used the words of formal and informal sector. Self-employed and the activities of small enterprises, to generate income, of the urban unemployed and underemployed were defined as informal (Hart, 1973). Informality was characterized as easy entry; family owned and small scale enterprises; reliance on local resources, labour intensive technology; informal skills and free and unregulated markets (ILO, 1972).

All jobs in informal enterprises or at least in one informal enterprise, in a given reference period is classified as informal employment (Hussmanns, 2005). The informal enterprises were defined as: small scale units, without division of factor of productions as labour and capital, producing goods and services to generate employment and income based on causal employment, personal or social relations rather than a written contract (ILO, 1993). So this definition is based on the characteristics of production units or enterprise having less than 5 workers. For Mexico, De Paula and Scheinkman (2007) and Rani (2008) used this definition. Definition of less than six worker is used for Mexico by Maloney (1999). Marcoullier et al. (1997) used this definition for Mexico and Peru. In another study Livingstone (1991) uses the data of fewer than ten employees for Kenya. Cohen and House (1996) increased the number to fewer than twenty for Sudan. Further, informal sector was defined as unincorporated private enterprises with less than five paid

employees, involved in goods and services production for sale or exchange, who are unregistered and involved in non-agriculture activities (ILO, 2002).

Another concept emerged and defined informal employment as employment that is not entitled to any labor law, social security and taxation or other employment benefits. In 2003, the 17th ICLS adopted the new broader informality specification relating the informal sector employment to informal employment. This related the enterprise based concept to job based concept (Hussmanns, 2004). New labour informality concept was restated by Chen (2007) referring to the informal jobs that are not entitled to social or legal protection.

Using this definition of informality, researchers used different criteria for empirical work. Amuedo-Dorantes (2004) and Packard (2007) considered employment as informal if there is no written contract; Portes et al. (1986), Bosch and Maloney (2005), Loayza et al. (2009) and Mondragón-Vélez et al. (2010) considered it informal if there is no contribution to social security coverage and after retirement pension; Gasparini and Tornarolli (2007) defined as informal employment if there is no pension entitlement after retirement; Henley et al. (2009) used both criteria as defined by no written contract and no social security contribution; Saavedra and Chong (1999) defined informal employment without labour legislation.

In a developing country a large share of output comes from informal sector and provides jobs to about 70 percent workers. This large informal sector has influential role in the economies of developing countries. ILO (2018) reports that two billion of world population depends on informal sector to make their livings, which is greater than 60 percent of the employed population of the world. Data from more than 100 countries provides the estimates of informal economy that 50 percent of employment is informal,

when excluding agriculture. In Africa it is very large and accounts for 85.8 percent of total employment. For Asia and the Pacific, the proportion of informal sector is 68.2 percent. In Arab States informal employment is 68.6 percent, America 40.0 percent and it is 25.1 percent for Central Asia and Europe. According to this report, 93 percent informal employment of the world exist in emerging and developing countries. In most of these countries, labor force participation rates are about 50 percent, which make informality figures more revealing.

In Pakistan, according to labour force survey 2017-18, Informal sector is about 72 percent for non-agricultural employment, informality is more in rural areas as 76 percent are informal as compared to 24 percent formal employment while more than 68.3 percent workers in urban areas are informal and 31.7 percent are formal. These figures demands for a detailed discussion of informality in Pakistan.

Informal employment has adverse effects on workers employed in informal sector. They face high risks and lack of protection against any loss of employment, job insecurity, no social protection, no health insurance, no pension, low wages and mismatched jobs. As compared to formal workers, the informal workers are not provided any job related trainings and any career planning. Informality has a significant cost for the whole economy. Informal activities reduce the revenues by escaping from taxes and social security gains and results into revenue loss. These taxes are used to provide public goods and services to the society as a whole. Informality also creates unjust and inequitable competition in the labour market. Firms are operating under the body of labour laws and rules and regulations are remains in depressed position. This creates the inequality among workers and violates the rule of law and employment ethics and put the society in to a bad situation. It also has

many consequences like poverty, income inequality and inefficiency. Informality is considered as survivalist strategy for those workers who are unable to find a formal sector job (Fields, 1975; Mazumdar, 1976; Bernabè, 2002; Perry et al., 2007). Informal worker are subject to lower wages as compared to formal workers, in a segmented labour market (Günther & Launov, 2006).

Due to labor market rigidities and minimum wage laws, workers are forced into unprotected and insecure jobs with very low wages. The rigidities associated with formal jobs and the consequences of informal employment can affect how workers match their acquired education and qualification with the required qualification and education to do a job. Some characteristics may be rewarded well in formal sector. Education may not provide access to better job for those who cannot afford a formal job and accept a low qualification required informal job. For a low qualification required job, worker will be considered as over-qualified. If the actual education of a worker is high than that is required to perform a job, the worker is said to be over-qualified worker. It implies that resources are not efficiently used and over-qualified worker get low rewards on their investment as compared to appropriately qualified workers. Over-qualification or job mismatch is affected by or not independent of market segmentation as formal/informal division in a developing country like Pakistan.

To address the consequences of inequality and vulnerability, identifying the extent of informal employment is important. Objectives of the thesis are as follows:

1.2. Research Objectives

The objectives of this thesis are to find out the determinants of informal employment in Pakistan using different measures and its relationship with wages of workers and the qualification mismatch. The objectives are:

1. To find out the determinants of informal employment in Pakistan.
2. To find out the wage differential among formal and informal workers of Pakistan.
3. To find out the determinants of qualification mismatch in the labour market of Pakistan.

1.3. Research Questions

Research questions of this thesis are as below:

1. What are the main determinants of informal employment in Pakistan?
2. Is there any wage differential exists among formal and informal employment in Pakistan?
3. Is there any qualification mismatch exist in formal and informal employment? And what are the determinants of qualification mismatch?

1.4. Contributions

The aim of this thesis is to examine and analyze the nature of informality in the Pakistani labour market by complementing the existing literature on informality. Pakistan has a large informal sector and also provides evidences for informal labour market. Comparable analysis are missing because of data limitations in Pakistan. So this thesis makes three main contributions by examining the informality in Pakistani labour market in

three folds. First by defining and measuring the labour informality and analyzing its determinants using multiple criteria which are consistent with the guidelines of ILO. Second, this study analyze the wage differentials among formal and informal employments. Third this study analyze the qualification mismatch in formal and informal employment.

1.5. Significance

First, this study attempt to define the informal employment in Pakistan using multiple characterizations. By linking it to the development of formal and informal labour market theory, study tried to find out the determinants of labour informality in Pakistan.

Second, this study provides an investigation of wage gap between formal and informal employment by using a new pension based definition of informality in Pakistan. This study analyze the differences in wages of formal and informal workers in Pakistan.

Third, informality has negative consequences, bad working environment, low productivity, job insecurity and unavailability of social security. One aspect of informality was missing yet that how informality affects workers to match their actual qualification and education with the job's required qualification and education.

1.6. Organization of Thesis

This thesis is organized as chapter 1 will present an introduction, chapter 2 will present an overview of formal and informal employment in Pakistan. Demographic trends and formal and informal employment according to gender, location, industry and occupation wise furnished in this chapter. The third chapter consists of literature review on informal employment, wage differential and job mismatch, chapter four consists of data

and methodology, chapter five present descriptive analysis, chapter six analyze the results and discussion and finally conclusion and policy recommendations are presented in chapter seven.

CHAPTER 2

LABOUR MARKET INFORMALITY IN PAKISTAN: AN OVERVIEW

This chapter presents an overview of formal and informal employment in Pakistan. Demographic trends are presented in this section and formal and informal employment according to gender, location, industry and occupation wise also furnished in this chapter.

2.1 Demographic Trends

Pakistan is facing rapid increase in population which became almost double during two decades from 1975 to 1995. Although the birth rate was decreased during this time period from 39.9 to 33.9 per thousand, the population was increased from 66817 thousands to 123777 thousands (Table 2.1).

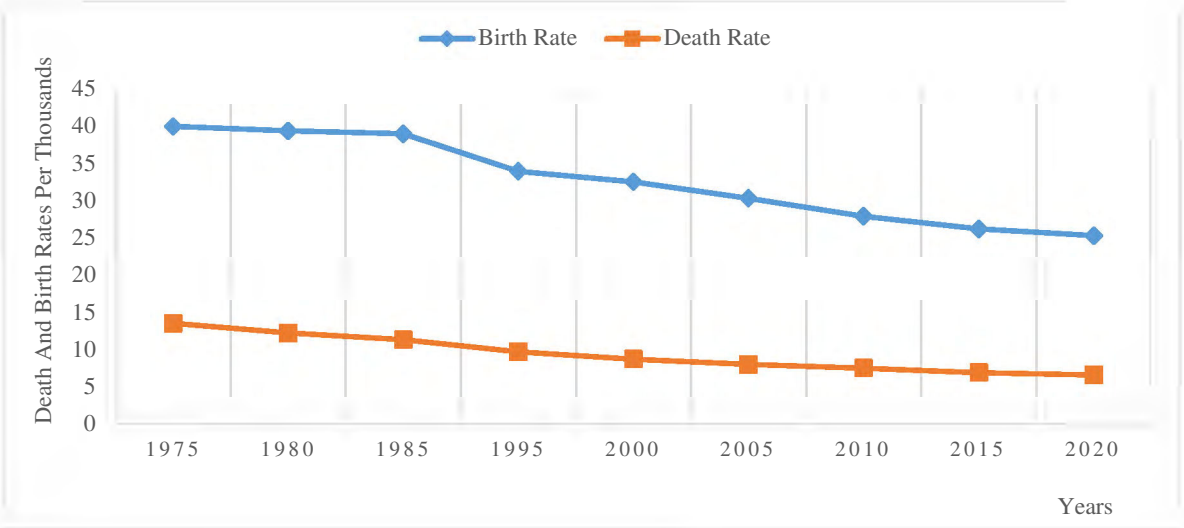
Table 2.1: Population in Thousands (1975-2020)

	1975	1980	1985	1995	2000	2005	2010	2015	2020
Total Population	66817	78054	92192	123777	142344	160304	179425	199427	220892

Source: UN Population Statistics.

Figure 2.1 shows that the death rate was also decreased from 13.5 to 9.7 per thousand during these two decades. Both, the birth and death rates were decreased to 25.3 and 6.6 per thousands, the population is not increased to double even after two and half decades and reached to 220892 thousands. It is also evident that death rate and birth rate both have a decreasing trend.

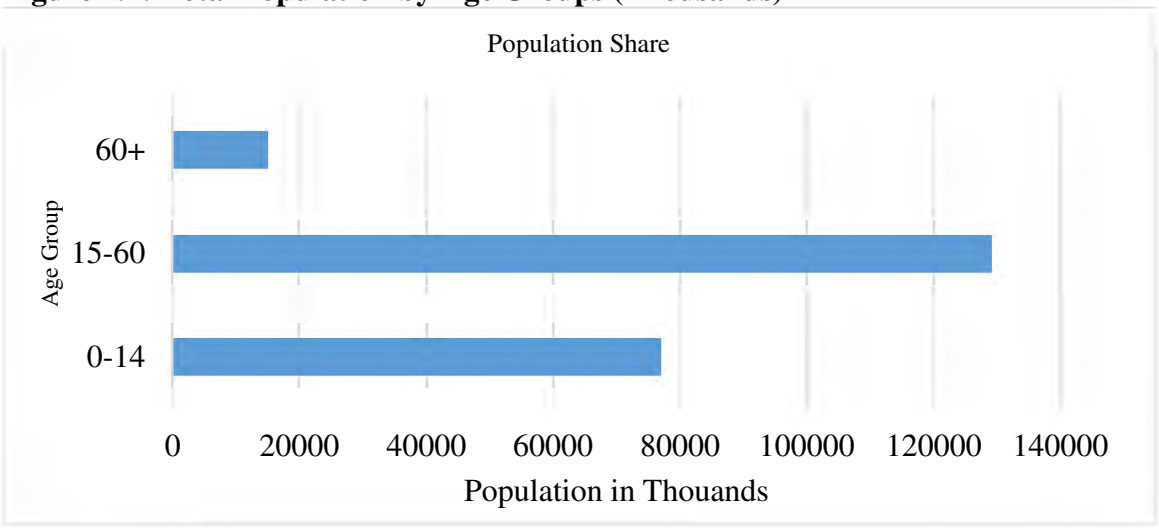
Figure 2.1: Death and Birth Rates per Thousands (1975-2020)



Source: UN Population Statistics.

Population of young age people is high especially less than 14 years children in the economy which shows high dependency ratio on older age people. The population of working age people is considered as a gift and the share of this category of people is also higher than those who crossed the 60 years of age (Figure 2.2).

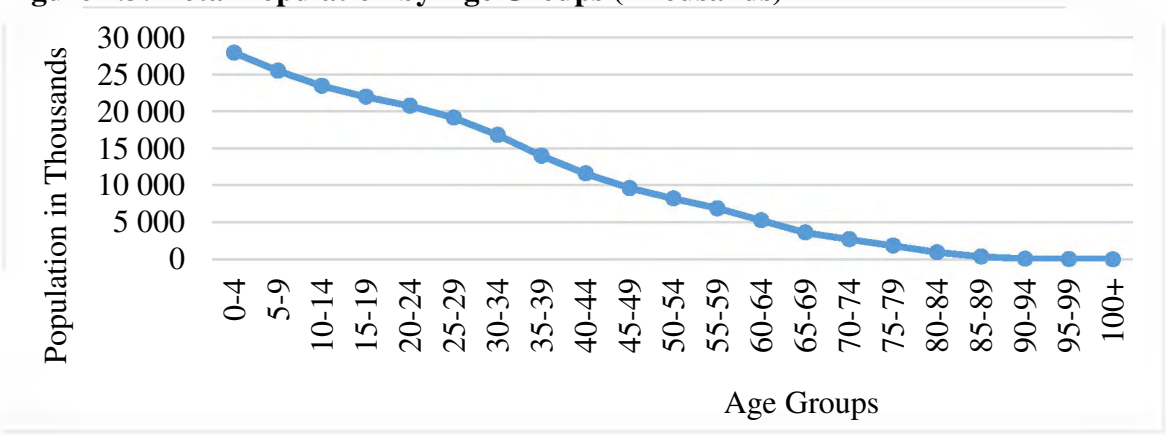
Figure 2.2: Total Population by Age Groups (Thousands)



Source: UN Population Statistics.

Figure 2.3 shows that a declining trend exists, there is fewer people in old age groups. The working age group bears the burden of children and old age people and also contribute in the process of development of country.

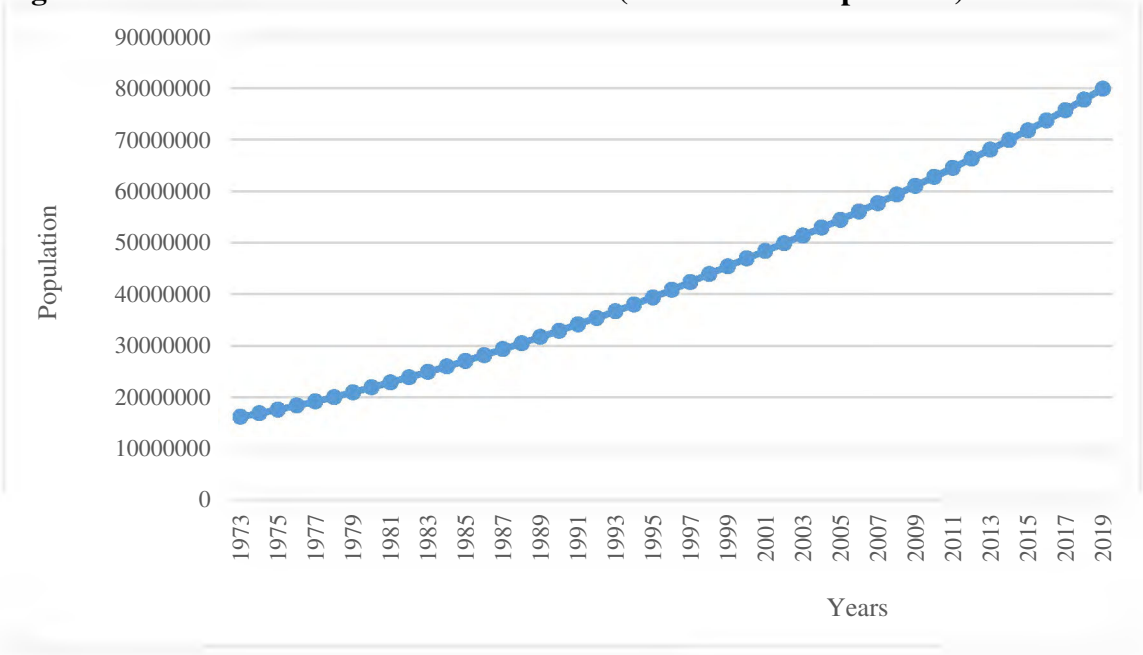
Figure 2.3: Total Population by Age Groups (Thousands)



Source: UN Population Statistics.

As Figure 2.4 shows that the urban population has increased over time rapidly with an increasing rate which shows that country is facing an urbanization process. People are migrating from rural areas to big cities to join the industrial sector.

Figure 2.4: Urbanization Trends in Pakistan (Total Urban Population)



Source: World Development Indicators.

This is also evident from the Table 2.2 that the urbanization is taking place as agriculture sector share is declining over time and the industrial and services sector share is increasing which shows the process of urbanization. Employment in agriculture sector declined from 45.55 to 35.89 percent and share of industrial and services sector employment increased from 20.25 and 34.20 percent to 25.79 and 38.32 percent respectively.

Table 2.2: Sectorial Employment Shares in the Pakistan Economy (%)

Year	Agriculture	Industry	Services	Year	Agriculture	Industry	Services
1991	45.557	20.248	34.195	2006	43.392	20.73	35.878
1992	45.488	20.15	34.361	2007	43.641	20.975	35.385
1993	45.288	20.178	34.534	2008	44.699	20.112	35.189
1994	45.163	20.104	34.733	2009	43.308	20.985	35.708
1995	45.008	20.023	34.97	2010	43.389	21.418	35.192
1996	44.697	20.053	35.25	2011	43.493	21.768	34.738
1997	44.423	20.154	35.422	2012	42.839	22.369	34.791
1998	44.228	20.195	35.577	2013	42.237	22.922	34.842
1999	43.826	20.166	36.007	2014	42.233	22.873	34.894
2000	43.294	20.385	36.321	2015	41.01	24.02	34.97
2001	42.805	20.557	36.638	2016	42.274	23.592	34.133
2002	42.334	20.698	36.968	2017	39.847	24.299	35.854
2003	42.09	20.76	37.15	2018	37.416	24.989	37.595
2004	42.666	20.44	36.894	2019	36.661	25.326	38.013
2005	43.067	20.318	36.615	2020	35.893	25.792	38.316

Source: World Development Indicators.

Table 2.3 shows total labour force in Pakistan. If we turned to the trend of labour force participation rate over time, female participation rate in employment increased

whereas male labour force participation rate declined slightly and remains more or less stable.

Table 2.3: Total Labour Force in Pakistan

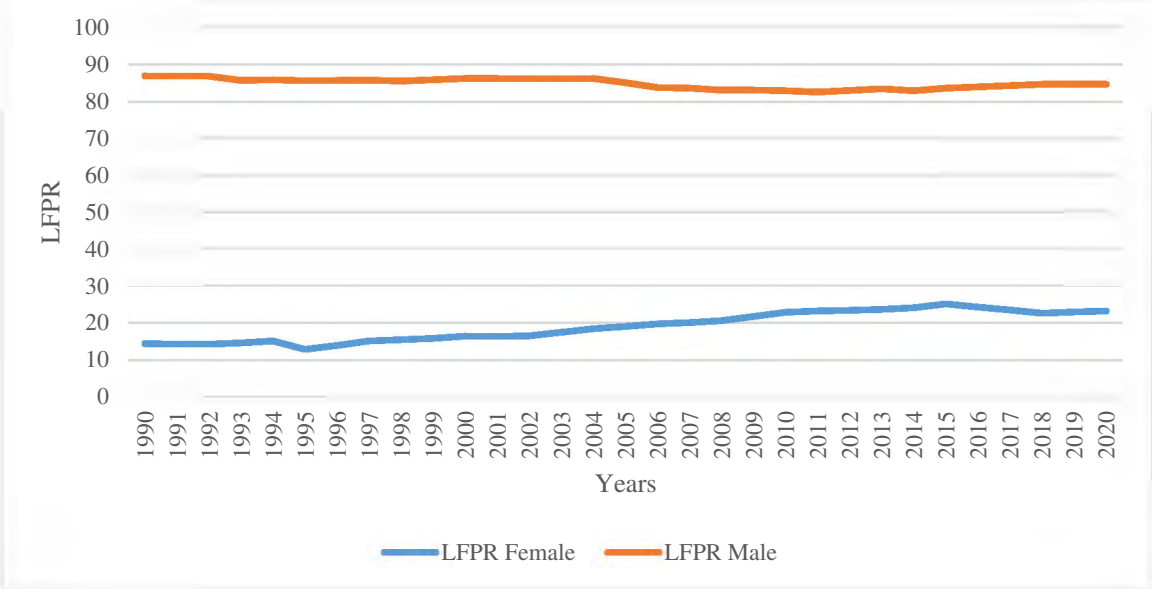
Year	Total Labour Force
1990	31125055
1991	31861873
1992	32679345
1993	33219725
1994	34393806
1995	34623037
1996	36114640
1997	37754656
1998	38981417
1999	40510311
2000	42187598
2001	43334222
2002	44598494
2003	46385762
2004	48265201
2005	49367625
2006	50436609
2007	51949186
2008	53493295
2009	55580747
2010	57625791
2011	59221677
2012	61250812
2013	63325687
2014	64834459
2015	67754731
2016	69170840
2017	70602092
2018	72040845
2019	73943766
2020	75862533

Source: World Development Indicators.

It is clear from the Figure 2.5 that the LFPR for male is almost constant or have very small variations between 82 to 87 but the trend for the female workers is increased from 14.43 in 1990 to 25.09 in 2015 and declined to 23 and 22 for some periods. Total

LFPR remained stuck between 51 to 55 percent with an increasing rate over the time period from 1990 to 2020.

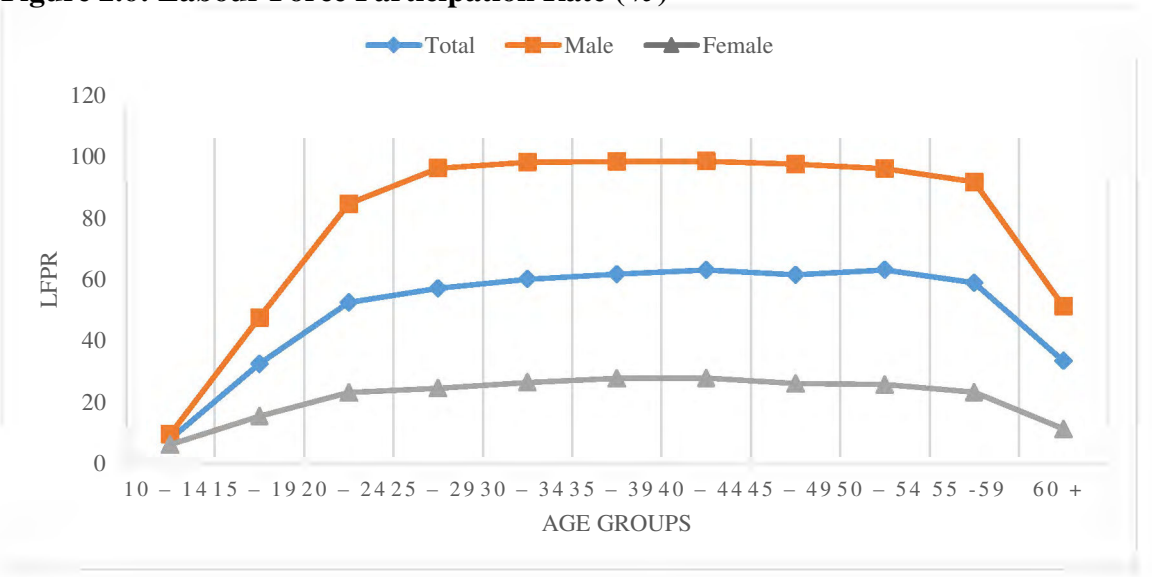
Figure. 2.5: Labour Force Participation Rate in Pakistan (%)



Source: World Development Indicators.

According to labour force survey 20017-18, Figure 2.6 presents labour force participation rates by age (age specific participation rates). Not surprisingly, the most productive period of life is between twenty and sixty (20-59) age group.

Figure 2.6: Labour Force Participation Rate (%)



Source: Labour Force Survey 2017-18

However, across all age groups, the comparative size of the gender disparity, has generally widened over time. Regarding the evolution during the comparative periods, the ASPRs of adolescents, twenty, thirty and forty decrease slightly, while those of fifty and sixty and over decrease significantly. The sex-disaggregated rates create a mixed pattern of marginal changes.

2.2 Informality in Pakistan

Workers in informal sector face inequalities and exploitations, lack of opportunities of productive growth and lack of social protection. These factors are considered as barrier to inclusive growth. Informality is multidimensional and complex phenomenon having a weak administration system which cannot record all economic units, on the other hand, the units are not recording their transaction and economic activities. It involves lack of education, costly and complex registration system, low profits and inability to pay taxes and free rider problem (that land lords and industrialists do not pay taxes or pay less so why we pay).

In Pakistan, according to Pakistan labour force survey annual report 2017-18, as shown in Table 2.4, informal sector is around 72 percent for non-agricultural employment, a large share of informality is in rural areas (76 percent) as compared to urban areas (68.3 percent).

Table 2.4: Formal and Informal Sectors (Distribution of Non-agriculture Workers %)

	All Pakistan		**Rural**		**Urban**	
Gender	Formal	Informal	Formal	Informal	Formal	Informal
Male	28.00	72.00	24.30	75.70	31.40	68.60
Female	28.20	71.80	22.30	77.70	33.90	66.10
Over all	28.00	72.00	24.00	76.00	31.70	68.30

Source: - Labour Force Survey Annual Report 2017-18

But formal sector employment is more in urban areas and account for more than 31 percent than 24 percent in rural areas. There is no huge gender wise difference as 28 percent males are formal and 28.2 percent female are formal where 72 percent male and 71.8 percent females are informal. In rural areas male are more formal than females as 24.3 percent and 22.3 percent respectively where as in urban areas male are less formal than female as 31.4 percent male are formal and 33.9 percent females are formal.

Distribution of workers of informal sector by major industries and divisions is represented in Table 2.5. Wholesale and retail trade has the largest number of informal workers as it accounts for 32.5 percent out of total informal workers. Second industry is of manufacturing, which has 22.8 percent informal workers. Construction is at third number with 16.2 percent, community, social and personal services has 16 percent, transport, communication and storage has 11.5 percent and all other industries (includes water, gas and finance, mining and quarrying; , insurance , electricity, real estate and business services) have only percent informal workers. If we see the gender wise distribution of informal employment, we find that a large number of female, as 61.5 out of total informal females, belong to manufacturing industry whereas 36 percent informal male workers out of total male informal workers are belonging from wholesale and retail trade. Second industry having a large number of informal female workers is community, social and personal services with 31 percent female workers. In all other industries, the share of informal female worker is less than 8 percent. Construction (18.2 percent), manufacturing (17.7 percent), community, personal and social services and transport, communication and storage (14 and 13 percent respectively) have a substantial number of informal male workers.

Table 2.5: Informal Sector Workers (Distribution by Major Industries Divisions %)

Major Industry Divisions	Total	Male	Female
Total	100.00	100.00	100.00
Manufacturing	22.80	17.70	61.50
Construction	16.20	18.20	0.90
Wholesale and retail trade	32.50	36.00	5.90
Transport, storage and communication	11.50	13.00	0.70
Community, social and personal services	16.00	14.00	31.00
Others	1.00	1.1.	-

Source: - Labour Force Survey Annual Report 2017-18

If we look at major occupational groups, service and sales workers (31.8 percent) has a large number of informal workers.

Table 2.6: Informal Sector Workers (Distribution by Major Occupational Groups %)

Major Occupational Groups	Total	Male	Female
Total	100.00	100.00	100.00
Managers	2.40	2.60	0.30
Professionals	3.50	2.60	10.40
Technicians and associate professionals	3.80	4.10	1.20
Clericals	0.40	0.50	-
Service and sales	31.80	34.80	10.40
Skilled agricultural, fishery and forestry	0.10	0.10	-
Craft and other related trades	29.40	25.40	59.70
Plant operators or machine operators	11.10	12.40	0.90
Elementary occupations	17.50	17.50	17.10

Source: - Labour Force Survey Annual Report 2017-18

Craft and related trades workers, the second largest occupational group, accounts for 29.4 percent, elementary occupations 17.5 percent, plant and machine operators and assemblers 11.1 percent, technicians and associate professionals 3.8 percent, professionals

3.5 percent, managers 2.4 percent and clerical support workers 0.4 percent are informal workers. 59.7 percent craft and related trades female workers are informal whereas 34.8 percent service and sales and 25.4 percent craft and related trades male workers are informal as shown in Table 2.6.

Table 2.7: Informal Sector Workers (Distribution by Employment Status in %)

Employment Status	Total	Male	Female
Total	100.00	100.00	100.00
Employers	2.60	2.90	0.30
Own account workers	41.00	41.80	35.10
Contributing family workers	8.90	8.10	15.10
Employees	47.50	47.20	49.50

Source: - Labour Force Survey Annual Report 2017-18

According to employment status (Table 2.7) 47.5 percent employees are informal, 41 percent own account workers, 8.9 percent contributing family workers and 2.6 percent employers are informal. Females are more informal employees than males as 47.2 percent males and 49.5 percent females are informal employees. 41.8 percent informal males are own account workers, 8.1 percent contributing family workers and only 2.9 percent employers are informal. 35.1 percent females are own account workers, 15.1 percent female contributing family workers and 0.3 percent female employers are informal.

2.3 Summary of Chapter

This chapter presented an overview of formal and informal employment in Pakistan. Demographic trends show that Pakistan is facing rapid increase in population and the urban population has increased over time rapidly with an increasing rate which shows that country is facing an urbanization process. Female participation rate in employment

increased whereas male labour force participation rate declined slightly and remains more or less stable. According to Pakistan labour force survey annual report 2017-18, informal sector is around 72 percent for non-agricultural employment, a large share of informality is in rural areas (76 percent) as compared to urban areas (68.3 percent).

CHAPTER 3
LITERATURE REVIEW

This chapter presents review of literature on determinants of informal employment, wag differentials and disparities between formal and informal employees and on qualification mismatch. Definition, measurement and determinants of labour informality are discussed in section 3.2 of this chapter, wage differentials among formal and informal employment is reviewed in section 3.3 and qualification mismatch definition and determinants review is presented in section 3.4 of this chapter.

3.1. Introduction

Informal employment is the main component of global labour market and also the main type of employment in developing countries (Zuo, 2013). Informality in the labour market is most prominent social and economic phenomena. Its persistence draw the attention of many researchers from across the world. A clear and sound understanding of the concept and dimensions of informal employment is needed (Acar & Tansel 2014). The literature on labour informality made up several attempts to measure the size, causes and consequences of informality to establish improved economic models which can be helpful for policy makers to make suitable policies (Batini et al., 2010).

The aim of this thesis is to examine the nature of informal employment in Pakistan labour market by complementing the existing literature on informality. Pakistan has a large informal sector and also provides evidences for informal labour market. Comparable analysis are missing because of data limitations in Pakistan. So this thesis makes an attempt to examine the informality in Pakistan labour market in three folds: finding determinants

of labour informality, earnings differences and job mismatch among formal and informal labour markets.

This section presents a review on existing literature on informal employment, its measurement and determinants, wage differential among formal and informal employment and lastly on the incidence and determinants of job mismatch in formal and informal employment.

3.2 Definitions, Measurement Methods and Determinants of Labour Market Informality

It is important to define the informality because there exists a vulnerable group of worker including women and young workers vary between unpaid family workers and employees of formal and informal enterprises who work informally. It is also important for developing country like Pakistan because of informal sector has an important and crucial role in the development process.

3.2.1. Definitions and Measurement Methods of Labour Market Informality

There is no better definition and description of this concept and nor any analysis which shows its importance for development dialogue (Bangasser, 2000). So many researchers made attempts to define the concept of labour informality for a better understanding and used different definitions and criteria for empirical analysis to make suitable policies to deal with it. Perry et al. (2007) tried to elaborate this concept. In his view, informality refers to different but almost bad things for different people, like lack of workers protection, excessive regulations and evasion of tax laws, unfair competition, low productivity of workers, non-payment of taxes and underground works.

Initially, it was considered a temporary problem that would be solved by the process of industrialization. According to Harris and Todaro (1970) economic growth takes place when traditional agriculture sector transforms into modern manufacturing sector by absorbing extra labour from agriculture sector. This terminology was extended by Hart (1973). Author used the words of formal and informal sector. Self-employed and the activities of small enterprises, to generate income, of the urban unemployed and underemployed were defined as informal (Hart, 1973). Informality was characterized as easy entry; family owned and small scale enterprises; reliance on local resources, labour intensive technology; informal skills and free and unregulated markets (ILO, 1972).

All jobs in informal enterprises or at least in one informal enterprise, in a given reference period is classified as informal employment (Hussmanns, 2005). The informal enterprises were defined as: small scale units, without division of factor of productions as labour and capital, producing goods and services to generate employment and income based on causal employment, personal or social relations rather than a written contract (ILO, 1993). So this definition is based on the characteristics of production units or enterprise having less than 5 workers. For Mexico, De Paula and Scheinkman (2007) and Rani (2008) used this definition. Definition of less than six worker is used for Mexico by Maloney (1999). Marcoullier et al. (1997) used this definition for Mexico and Peru. In another study Livingstone (1991) uses the data of fewer than ten employees for Kenya. Cohen and House (1996) increased the number to fewer than twenty for Sudan. Further, informal sector was defined as unincorporated private enterprises with less than five paid employees, involved in goods and services production for sale or exchange, who are unregistered and involved in non-agriculture activities (ILO, 2002).

Another concept emerged and defined informal employment as employment that is not entitled to any labor law, social security and taxation or other employment benefits. In 2003, the 17th ICLS adopted the new broader informality specification relating the informal sector employment to informal employment. This related the enterprise based concept to job based concept (Hussmanns, 2004). New labour informality concept was restated by Chen (2007) referring to the informal jobs that are not entitled to social or legal protection.

Using this definition of informality, researchers used different criteria for empirical work. Amuedo-Dorantes (2004) and Packard (2007) considered employment as informal if there is no written contract; Portes et al. (1986), Bosch and Maloney (2005), Loayza et al. (2009) and Mondragón-Vélez et al. (2010) considered it informal if there is no contribution to social security coverage and after retirement pension; Gasparini and Tornarolli (2007) defined as informal employment if there is no pension entitlement after retirement; Henley et al. (2009) used both criteria as defined by no written contract and no social security contribution; Saavedra and Chong (1999) defined informal employment without labour legislation.

3.2.2 Determinants of Labour Market Informality

Gasparini and Tornarolli (2007) used two measures of informality for Latin America and Caribbean. According to productive measure a worker is informal if he belongs to any one of the following category i.e. unskilled self-employed worker, paid worker in small private firms or workers without income. The second definition is legalistic or social protection definition that defines informal workers as those who have no right to get pension after retirement. They found that a large share of formal workers

turned to informal when defined according to social protection definition but informal workers according to productive based definition remains also informal in legalistic sense.

Wamuthenya (2010) studies the attributes of the labor supply related with the employment of formal and informal sector, during a period of considerable increase in the labour force participation rate of women (especially married women) with a better level of education. Author applied a multinomial logit regression on cross-sectional labor force surveys data 1998. Results show similarities and dissimilarities among: formal and informal employment; samples of different periods; among male and female; and married women separately. This shows the heterogeneous nature of Kenya's labour market and indicates gender discrimination. Particular importance was attached to age of workers, schooling, gender, marital status, head of household and spouse characteristics vis-à-vis married female workers. It is found that education and experience are highly rewarded in the formal sector employment.

Comparison of two sampling periods revealed an increasing positive effect of schooling (especially at secondary and tertiary level) and its overwhelming influence on the employment of formal sector. It is observed that low levels of schooling (none or up to primary education) are important in classifying workers in informal sector jobs. Another observation is that education seems to be more important for women as compared to men. However, the importance given to education to improve the employment prospects of women in the formal sector decreases while it is the reverse for men between the both periods. In addition, women are more likely to join labor market and seek employment in the informal sector due to the decrease in their partner's income over time.

Khamis (2009) used the Mexican survey data to study the labour informality for Mexico. Author classified the informality on having no written contract for main job, having no social security benefits for main job, illegally migrated to US, employers of small firms with up to five workers or self-employed. Under these four measures, a probit model was used to analyze the effects of individual characteristics and household characteristics on informality. Author focused on implication of each definition rather than comparing their relevance. It is found that age, education, marital status and scores as individual characteristics, are significant determinants of informality for different measures although there is some degree of variation.

In another study by Kapeliushnikov (2013) used the data of 2009 supplement on informality to the Russian Longitudinal Monitoring Survey (RLMS). Author founds that informal employment can change for Russian labour market between slightly more than 10 and almost less than 25% depending on its definitions and by using different definition, the social and demographic profile of informal workers also changes dramatically. Econometric estimates show that with the change in definition of informal employment (dependent variable), the determinants of informality also change and thus confirms that the determinants of informal employment are hardly robust in the case of Russian labour market. Angel-Urdinola and Tanabe (2012) conducted a seminal study and revealed that more than two third informal sector workers have no health insurance facility and do not contribute for pension system in Middle East and North Africa region. After their retirement, they remains unable to gain benefits from economic and social security.

Lehmann and Zaiceva (2013) used the data of Russian Longitudinal Monitoring Survey (RLMS) for 2003 to 2011 with its informality supplement to analyze the incidence

of informal employment and its determinants for the labour market of Russian economy. Authors used different definitions of informal employment and found that incidence of informal employment changes across different measures. However, the study shows that the determinants of informal employment, according to different measures, are stable roughly. Male, young age, unskilled workers and people working in construction, trade and other related services are more likely to have informal employment.

In a study for urban areas of Turkey, Doğrul (2012) considering economic theory, applied a multinomial logit model on household budget survey data, separately for men and women, to study the determinants of formal and informal sector employment. Results confirms that determinants of employment for both formal and informal varies by gender wise for Turkey`s urban labour market. Gender (being a male is more likely to determine employment as compared to female), head of household, marital status and education are the main determinants of employment. For women some variables show the disadvantaged position in the labour market. Despite the significant improvements in education attainment, most of the female are working in the informal sector. It is confirmed by the results that urban labour market is heterogeneous and indicate the sex discrimination exists in the labour market. Results also reveal that how factors of labour supply are rewarded in the labour market.

Gillani and Khan (2013) used data of 506 participants from District Bahawalpur of Punjab province. To analyze the employment and its determinants in informal sector, author applied the logit model. The results of the study indicate that education, gender, marital status, vocational training, parental education, household size and migration from the countryside to the city are the main factors influencing the employment in the urban

informal sector in Bahawalpur district. Parajuli (2014) used data set of NLFS produced by UNDP/CBS/ILO 2008 for Nepal. Probit Regression Model is estimated to find out the determinants of informality. It is found that the gender, schooling, geography, age of worker, marital status, and ethnicity determines whether an employee joins formal or informal employment sector.

Williams (2015) analyzes Central and Eastern European Countries (CEECs) and show that in developed economies which are less corrupt and equitable with high tax revenues, social protection and social transfer (efficient redistribution) have the lower level of informal work and informal employment (envelope wages) are mainly associated with overtime works. In addition, the author also analyzed the prevalence of informal employment. Williams and Horodnic (2015) show that some disadvantaged people such as young, with no or little education, unemployed, single person households, unable to pay bills are more inclined to work as informally. Moreover, they confirms that there is no any association between a greater propensity to work informally and social class, marital status, number of children or residence in rural area.

Tingum (2016) used the data of EESI-2 2010 (Second Survey on Employment and the Informal Sector. Two models were estimated to analyze the determinants of FLFP and sectorial choices of female workers. By applying a probit regression, author found age and education as key determinants of FLFP. Furthermore, female residing in urban areas, being a head of household and having higher level of schooling are more likely to participate in the labour market. To analyze the sectorial choices for women given their participation in the labour market, a multinomial Logit model was used. Findings show that female with

higher level of education, married and divorced, Protestants and belonging to urban areas are more likely to employ in the services, industrial and commerce sectors.

In another study for Cameroon, Tchakounte and Mbam (2016) used National Institute of Statistics of Cameroon (CNIS) data set. They obtained a three-wave panel (2001, 2005 and 2010 respectively) for a sample of people in the labor market to analyze the LFPR of informal employment. The results show that the LFPR in the informal sector has increased considerably in recent years, especially for young employees. This increase is mainly explained by the significant rise in activity of the urban young workers in the labor market who have been reinforced by migration. Results of logistic regression model for LFPR in the informal labor market in Cameroon show that age, poverty and urbanization were associated significantly to the labour force participation rate.

Karabchuk and Zabirova (2018) used national Labour Force Survey (LFS) data of Russian Federation. Probit Regression modelling technique is used to determine the determinants of informality. It is found that in services, gender, age, education and area are main determinants of informality. Hernández et al. (2019) used National Survey of Occupation and Employment, 2010-2017 for Mexico. By applying logistic regression method, authors found that a higher level of informal employment is associated with lower levels of schooling, residence in a rural area and low incomes. Annicet and Ayekeh (2019) collected data for Cameron (CLFS-2). Probit regression model's results show that gender, religion, age, education, marital status and residence in urban area are significantly influencing informal LFP.

3.3 Wage Differentials among Formal and Informal Employment

Pakistan has a large informal sector near about 72 percent according to Labour Force Survey 2017-18. The nature and the position of large informal sector is important for the economic structure and functioning of the labour market as well. It has many consequences like poverty, income inequality, inefficiency and the distortions of markets due to labour market regulations, social security and taxes charged on the formal sector.

There are many studies in the literature about earning wage differential among formal and informal employment. This study considered most relevant and appropriate to our study. Two main views exist in literature, one considers informal job as a hope for survival for those deprived workers who fail to get formal sector job and works as informal. According to this view, job is attractive due to wage. Their wages in informal employment are less than the potential wages they can earn in formal employment sector. The second view sees formal and informal sector symmetric and competitive. Some workers can be more productive in one sector but not in another. So they chose sectors where they can earn more.

In the mainstream literature of economics, informal employment is analogous with low earning, inequality and poverty. Informality is considered as survivalist strategy for those workers who are unable to find a formal sector job (Fields, 1975; Mazumdar, 1976; Bernabè, 2002; Perry et al., 2007). Informal worker are subject to lower wages as compared to formal workers, in a segmented labour market (Günther & Launov, 2006). According to competitive labour market theory, on the basis of private cost-benefit calculations of workers and firms, informal employment may be voluntary (Maloney, 1999; Gong & van

Soest, 2002). Some worker voluntarily remains informal and others cannot afford formal job and cannot remain unemployed (Fields, 1990). Upper-tier is considered as self-employment and the lower-tier as informal salaried workers.

Carneiro and Henley (2001) used the data of Brazilian household survey for 1997 to analyze the determinants of earnings choice of workers to join formal and informal employment. They used three step procedure of simultaneous modeling proposed by Lee (1978) for participation decision and earnings. They investigated the determinants of formal and informal employment and then the impact of different factors of labour market on earnings in the two states. First they estimated a reduced form probit model for sector choice as formal or informal and then compute the selectivity correction term. Further they incorporated the selectivity correction term into the Mincer earning function. Lastly, by using the estimated earning function they constructed the predicted earnings differentials. They found that tenure, age, gender and education are significantly determine the earnings differential. They also find the selectivity correction term to be significantly effecting earning equation.

Gong and van Soest (2002) used the panel data of 5 quarterly waves from Mexico. They analyzed the formal and informal sector wage differentials and transitions in urban Mexico. A dynamic random effect panel data model with two different wage equations separately for both formal and informal sectors and a logit model with wages included as explanatory variables for explaining the labour market state. Simulated maximum likelihood method was used to estimate the model. It is found that with an increase in education, wage differential also increase. Probability of informal employment also increase with wage differential. Wage differential is an important factor for male to choose

the sector. Only formal sector wages are affected by age. It is also found that, in the process of wage determination, random effects are insignificant.

Pratap and Quintin (2006) used propensity score matching methodology (PSM) in a study for Argentina, to deal with sample selection problem. Using OLS estimation, study found 25 percent wage premium, when controlled for both individual and establishment characteristics. They also found that no wage premium remains when controlled for self-selection. Glinskaya and Lokshin (2007) used cross-sectional data to analyse the wage differential between the public, formal and informal private sectors of India. Results indicate that the wages of public sector are highest among all of the three sectors.

EI Badaoui et al. (2008) reinvestigated the possibility of wage penalty for non-self-employed male informal workers of South Africa. They compared simple average gross earnings of formal and informal workers and found that 75 percent wage penalty is the result of human capital and job characteristics differences. After controlling for these characteristics, informal workers have still 37 per cent lower gross logged wages. It further reduced to 18 percent after controlling for unobservable time invariant factors.

Arias and Khamis (2008) analyzed the labour market of Argentina in the participation and earning performance of urban formal and informal workers. Authors used econometric models of essential heterogeneity developed by Heckman and Vytlacil (2001), (2005); Heckman et al. (2006). Study show that formal worker and informal self-employed workers have no wage differences once accounted for positive selection bias into formal work which is consistent with comparative advantage considerations. Study also found significant earning penalties for informal salaried employment after controlling for negative selection bias, which are consistent with segmentation. Alzúa (2008) analyzed the

evidences of dualism in the labour market of Argentina, with two different wage setting mechanisms and rationing for primary sector job. Study used the data of Permanent Household Survey (PHS) for the period 1975-2001. System of equations comprises of two separate wage equations for each sector (primary and secondary) and a switching equation too which measures the probability of remaining in the primary sector. An endogenous switching wage regression was estimated by using Maximum Likelihood Search algorithms with an unknown separation regime for each period. The estimation was conducted without resorting to an ex-ante definition of sector attachment. Author concluded that dual labor market theory exist in this case as results show different returns to experience and education with different wage-setting mechanisms.

Sookram and Watson (2008) used data from the 2006 CSSP for Trinidad and Tobago to find out the important determinant of the wage gap. To measure the wage discrimination among formal and informal workers and male and female in the informal sector, Oaxaca decomposition technique is used. Results show that workers in formal sector earn more as compared to informal workers and as compared to female, male workers work for higher wages. Among male and female workers, majority of the difference is attributed to the discrimination in wages rather than differences in human capital.

According to Borjas (2008) wage disparities may be due to an increase in the wages of highly skilled workers, which is not the same as an increase in the wages of low-skilled workers, resulting in a lower supply of low-skilled workers. Furthermore, this may be due to an increase in the number of capital goods required by large-scale workers, resulting in demand for highly skilled workers. Another reason is the less bargaining power of low

skilled workers although they are in a large number but they are not united in the union to show bargaining power.

Wahba (2009) used Egyptian Labor Market Panel Survey 2006 data to analyze the labor mobility between the both informal and formal sectors. Author estimated the probability of 'shifting' from informal to semi-formal and formal employment by controlling for the selectivity of informal jobs. Results indicate that the workers with higher levels of education are more likely to move from sector to semi or formal sector. Workers with little education and women are stagnate in informal sector.

Bargain and Kwenda (2009) investigated the wage differential of formal and informal sectors of Brazil, Mexico and South Africa. Authors used a panel data set and estimated a fixed effects quantile estimations model, while accounting for workers unobserved heterogeneity, to perform a distributional analysis. The sample was restricted to only male workers of urban area between the age of 15 to 65, and are not engaged in education and training, working in private sector and observed consecutively at least twice in the data. The results show significant informal sector wage penalties in the lower earnings part which disappears at the top.

Aslam and Kingdon (2009) analyze the wage differential for male and female between public and private sector jobs using the Pakistan Living Standards Measurement Survey, PSLM, 2005). Ordinary Least Squares, Sample-selectivity-corrected and household fixed-effects methodologies are used to find out the robust results. The vector of coefficients differed quite significantly between the salary functions of men and women in the public and private sectors, stressing the importance of estimating wage functions separately by gender. Oaxaca decomposition revealed that if the differences in the

characteristics of public-private workers explained about 66% of the public-private difference in the log salary for men, the corresponding figure for women was only 40%. While for men, household fixed effects could be used in attempting to control for unobserved characteristics of workers, this was not possible on the small sample of female employees. While in OLS estimates, 66% of the public-private pay gap for men was explained by the differing observed characteristics of public and private employees, in household estimates with fixed effects for men, the proportion explained fell to about 40%, that is, the residual or unexplained part was about 60%.

Ramos et al. (2010) used micro data of CHS for Colombian economy between 2002 and 2006 to examine the wage curve existence or not in Colombia by focusing on the differences between formal and informal workers. Results show a negatively sloped wage curve for Colombian labour market. Elasticity of individual wages to local unemployment rates were -0.07. When the data is divided between two groups, results show significant differences for formal and informal employment groups. Particularly, for the least protected groups of the labor market, the informal workers men as well as women, a wage curve with a strong negative slope was found. This result is consistent with the findings of theoretical models of efficiency wages and should be taken into account when analyzing the functioning of regional labor markets in developing countries. The results show that women's wages are significantly lower than those of men and that workers in the informal sector earn 30% less than workers with similar characteristics in the formal private sector. Conversely, public sector workers earn almost 30% more.

Baskaya and Hulagu (2011) used cross sectional data of TurkStat Household Labor Force Survey for the period 2005-2009 to study the wage gap between the formal and

informal sectors in Turkey. They control for observable characteristics and find that the wages of formal workers are much higher than informal workers.

Tansel and Kan (2012) meanwhile, find evidence of lower wages in the informal sector using panel data from Turkey. They also find that this differential disappears after controlling for observable and unobservable effects. Rand and Torm (2012) used a survey data from 2009 in Vietnam to analyze the wage differential among formal and informal manufacturing household enterprises. Blinder-Oaxaca decomposition method is used to investigate the wage gap which is attributed to differences in observable characteristics or to variations in the returns to these characteristics between formal and informal firms. It is found that average wages in formal firm are higher (10%–20%) then informal firms and most of this gape is due to differences in size of firm, location and workforce characteristics which are observable characteristics. Differences in age of firm, gender of owner, education of owner and level of technology of the sector have no significant role in explaining the differential.

Zuo (2013) analysed the wage differential between formal and informal workers of urban labour market of China. Results indicate that 33% causes of the wage gap can be explained by worker characteristics, while the 67% remaining are due to the labour market segmentation effect in which the informal female workforce is the largest who is more affected by segmentation. Daza and Gamboa (2013) used the Nationwide Household Survey during 2008-2012 to analyze the wage gap of formal and informal workers of Colombian labour market by applying non-parametric procedure methodology. Results show that formal workers earn on average 30 to 60 percent more as compared to informal workers.

Lehmann and Zaiceva (2013) used the data of RLMS regular waves for 2003 to 2011 with its informality supplement. In addition to determinants of informality, authors estimated the formal and informal wag gap at the mean and across all wage distributions to analyze the issue of labour market segmentation. Estimating informal and formal pay gap for salaried workers on mean, results indicate very weak evidences of labour market segmentation for Russia. The results of the quantile regressions show a wage penalty in the bottom half of the distribution and no wage differential in the top half for informal workers. In contrast, the self-employed and informal entrepreneurs have conditional mean wages higher than the average wages of formal employees. Across the entire pay distribution, indicating a segmented informal sector. Authors find a negative pay gap in the bottom quartile and a strongly positive pay gap in the top quartile, with a lower free entry tier and upper rationed tier.

Nguyen et al. (2013) in Vietnam used the data of VHLSS, its three-wave panel data (2002, 2004, 2006) to analyze the formal and informal wage gapes addressing heterogeneity at three different levels: the worker, the job (salaried job vs. self-employment) and the distribution of earnings. Results of fixed effects and quantile regressions, control for unobserved individual characteristics, show that the income gap in the informal sector strongly depends on the professional status of workers and their relative position in the distribution of income. In some cases penalties turn into bonuses. Results show that in many cases informal jobs are more rewarding, this is due to low wages of formal salaried workers who earn less than informal self-employed workers. Finally, women always hurt more than male workers and get less financial benefits when they are informally employed.

Staneva and Arabsheibani (2014) define employment in the informal sector and decompose the wage differential among employees in the formal and informal sector in Tajikistan for 2007. Considering the self-selection of individuals in different types of employment, author used the quantile regression decomposition technique, proposed by JAE 2005 and finds a significant wage advantage for informal employment over the entire income distribution. By taking advantage of the matching approach of RES, 2008 find a wage gap in favor of informal sector workers, considering the possibility of misleading results due to the different observed characteristics of formal and informal workers.

Bargain and Kwenda (2014) estimate the wage gap between the informal and formal sectors for Brazil, Mexico and South Africa. They control for time-invariant unobservable, and identification stems from inter sector movers. They control observables in a nonlinear fashion using propensity score reweighting and carefully check for potential measurement errors. They obtained consistent results, using similar measures of informality, for the three countries: due to lower observable and unobservable skills, informal workers earn much less than formal workers. Estimates of the conditional pay gap show that informal sector workers are underpaid as compared to formal workers. In all three countries, the informal wage penalty is larger at the bottom of the conditional distribution and at the top it tends to disappear (i.e. wage dispersion increases in the informal sector). The magnitude of these effects varies from country to country, with the largest penalties in the lower conditional quantiles in South Africa and smaller wage differentials in Latin America. They suggest explanations based on different legal and labor market conditions.

Kumar and Ranjan (2015) used the data for India for 1999-2000 and 2009-2010 to analyze the wage gap. Results indicate that informal workers earn about half as much as formal workers, but this gap is greater in the top level of more skilled workers. Dasgupta et al. (2015) estimate the wage differential among formal and informal employment in Thailand using a sample of employees and self-employed. Study found that although most of the pay gap is attributed to observed characteristics, there is a large unexplained component. Quantile regression method is applied to an earning function to analyze the factors that explain the differences in earnings for different quartiles. Results, controlling for other factors, show that informal workers consistently have lower income at all income levels and this differential increases with an increase in income. Moreover, marginal effects of gender on income remain more or less constant across all quartile with negative sign while returns to education increase with income quartile having positive sign. Working in services or industry has higher advantage at the bottom of the income distribution and the self-employed non-farm person are more inclined to earn more than others.

Tansel et al. (2015) used data from the Egyptian Labor Market Panel Survey for the period 1998-2012 to examine the wage distribution of private sector employees in Egypt. The results show that the wage penalty is higher at the top of the wage distribution, implying that higher paid formal and informal workers incur a larger penalty. It can be seen that the wage penalty for informal workers increases over time. It is also find that wage penalty is lower for experienced workers and higher for educated workers.

Nordman et al. (2016) used panel data (four-wave panel data set 2000–04) to analyze the magnitude of formal and informal sector wage gap in Madagascar. At three different levels: the worker, employment status and earning distribution, heterogeneity

issues were discussed. At the mean and at various conditional quantiles of the earnings distribution, standard earning equations were estimated. It is found that sign and magnitude of the wage gap between formal and informal sector is depend on employment status and earning distribution.

Singhari and Madheswaran (2017) used data from the ONSS survey for the years 2004-05 and 2011-12. The study found that the formal and informal sectors have different wage structures. Informal sector workers receive lower wages than formal sector workers. In the informal sector, there is a huge difference in pay between the sexes compared to workers in the formal sector.

Mussurov et al. (2019) used the data of Kazakhstan Labor Force Survey (KLFS) 2013, to analyze the wages of formal and informal workers receive for a set of given characteristics. Authors used a matching technique to decompose the wage gap. Workers with low levels of education and dropped out of university are interestingly have higher returns to education in the informal sector. In addition, they have also shown that it is useful to analyze the unexplained average differences in income with the unexplained gap along the wage distribution between formal and informal workers. It can be seen that only half of the pay gap can be attributed to differences in individual characteristics.

Wulandari et al. (2018) uses Blinder-Oaxaca decomposition to determine the wage differential among skilled and unskilled workers of formal and informal sector in Indonesia in 2017. They states that the informal sector treats the formal sector as a complementary or of a pro-cyclical nature. Such conditions allow wage disparities between sectors, even within the same education group. It is shown that discrimination factor had a greater influence on pay inequality than the endowment factor. The endowment factors that

contributed to the increase in pay inequality between the two groups were the experience, age squared and vocational training.

Kahyalar et al. (2018) analyzed the wage differential in Turkish labour market among formal and informal sectors using the data for 2004 and 2009 conducted by Turkish Statistical Institute (TURKSTAT). Three different econometrics methods are used, namely, Oaxaca-Ransom, Machado and Mata, and quantile regression. Results show the wage differential among formal and informal divide. Further it is found that experience and education are the important determinants of earnings. Workers earns more as an increase in the level of education whereas experience contributes to a certain level and then reduces the wages. Wage gap is also analyzed at different quantiles of the wage distribution, between the two sectors, after the matching procedure. In accordance with the results of the MM decomposition, Nopo's matching decomposition also shows that informal workers face a wage penalty across the wage distribution.

Rahman and Al-Hasan (2019) analyze the gender wage gap and discrimination using Quarterly Labour Force Survey 2015–2016 in Bangladesh applying both Oaxaca–Blinder and quantile decomposition. Results show that women on average earn 12.2 percent less than men. Further it is revealed that wages of formally hired women are higher than informally employed women.

Liwinski (2020) used Polish Labour Force Survey (LFS) for 2009–2017 period to analyze the wage differential of formal and informal workers in Poland labour market. By using the two different definitions of informal employment (without written contract and officially declared unemployed), author estimated the wage gap between the formal and informal employment. The results show that informal workers earn less at both monthly

and hourly wages after controlling for observed heterogeneity. They bear 11.7% and 7.9% monthly and hourly wage penalty respectively when defined according to employment without written contract. The penalties (19% and 9.7% monthly and hourly respectively) are higher when defined according to officially declared unemployed. This result is stable across the entire time period from 2009 to 2017 and also not sensitive to definitions of informal employment. At the bottom of the wage distribution, wage penalty to informal employment is higher showing the two-tier structure of the Poland informal labour market.

Tansel et al. (2020) uses panel data of Egyptian Labor Market Panel Survey between 1998 and 2012 to analyze the size of the wage differential of male employees in the informal sector in Egypt. Considering the unobservable and observable characteristics with a fixed-effect model, Mincer wage equations are estimated both at the mean and at different quantiles of the wage distribution. A persistent informal wage penalty in the face of in-depth sensitivity checks is found. It is lower when unobserved heterogeneity is taken into account and there are very few differences in the conditional distribution of wages. They also analyze the informal wage penalty over time and across different sub-groups based on education and age. They found that the informal wage penalty is larger for the more educated and younger workers and has increased recently over time.

Bahar et al. (2020) used the Salaries and Wages Survey 2016 for Malaysia to analyze the determinants of wages. Analyses based on the mean differences, shows that average wages are significantly different for age, marital status, ethnicity, education and occupation. It is found that education, race, job and industry characteristics are the important factors of this wage differential. It is also found that for all groups i.e. skilled,

semi-skilled and low-skilled workers, women earns lower wages as compared to men in all industries except construction.

Williams and Gashi (2021) used a survey data of 8,533 household of Kosovo during 2017 to analyze the wage gap of male and female workers of formal and informal employment. Decomposition analysis, after controlling for other determinants of the wage gap, indicate that the net hourly wages of male are 26% higher and for female it is 14% higher in formal employment as compared to informal employment.

There are numerous of studies on earnings in Pakistan but few of them are related to our study. In an early study, Khan (1983) used the data of 570 households of Lahore city to determine the earning function of urban formal and informal sectors. The model was estimated on the bases of data of 745 working males and 57 working females. Formal sector was consist of all government officers, professional, executives and successful business man whereas informal sector included private employee, skilled workers, pretty business man, mechanics, artisans, causal labour and unclassified workers. Author estimated separate earning functions for male and female workers by sectors. The equation for all male workers sample show that differences in wage rate is significantly affected by formal and informal variable dummy. The first equation for all workers make it clear that variation in wage rate is affected significantly by the sector of employment as shown by the formal sector dummy. In other words, the dummy shows that wage rates in formal sector pushes overall wages by 41 percent upward. Second equation for females show that wage rate is not affected by formal sector variable. Author further concluded that the earnings in informal sector were more than double as compared to formal sector.

Nasir (2000) analyzed the wage differential among public and private (private formal and private informal) sectors employees. Author used the data of Labour Force Survey (LFS) 1996-97. Study defined the informal sector as all household enterprises (irrespective of size) owned and operated by own account workers or by employers with less than ten employees excluding agriculture or non-market production activities. The sample consists of 4997 working individuals where 56 % workers employed in public sector, 26 % employed in informal and 18 % are employed in private formal sector. A human capital model was used to find the earning determinants. Author estimated three different earning equations for different sectors. Earning differentials are comprises into two parts, (1) personal characteristics and (2) structural characteristics. It is found that informal workers were exploited due to poor skills and wage structure. Wage structure of public sector was found not in favor of endowments of workers. It is found that skills and wage structure is beneficial for private formal workers. The decomposition of wage differential indicates that earning of public workers are higher than private formal and informal workers. Informal workers are earning less than private formal and public employees due to differential in personal and structural characteristics.

Hyder and Barry (2005) investigated the public and private sector wage differential by using the data of LFS 2001-02. Working sample is based on wage employment of total 7352 workers where 3694 works in private sector, 3310 work in public sector and rest of them 348 belong to state owned enterprises. They used Quantile Regression Decompositions technique. Results show that about two-fifth raw differential is due to differential in average characteristics between the two sectors. The mark-up was found to decrease with monotonically with an increase in the conditional wage distribution.

Choudhary et al. (2016) used the data of 960 manufacturing firms of informal sector of Pakistan. Informal sector is defined as enterprises having less than ten paid employees, operated by single individuals or households that are not separate legal entities from their owners. They found that there is a wage gap in the formal and informal sector workers.

3.4 Informality and Qualification Mismatch in the Labour Market

Qualification mismatch have three different types. Workers can be over-qualified, under- qualified or adequately qualified. In bellow sections I differentiated between all three definitions in detail.

3.4.1 Definition of Over-Qualification

Over- Qualification or over-education can be defined in many ways but the most popular and commonly used definition is that if a worker's acquired education is more than the required education of his/her job, then the individual is considered to be over-educated (Duncan and Hoffman, 1981). Whereas, adequate-qualified and under-qualified can be constructed as when the attained education is equal to the required education for job, the individual will be considered as holding adequate-qualification and if his/her education is less than the required education of his/her job, it will be considered under-qualified. In three ways it can be described: the first is if one's economic status is lower, than the people who have same qualification, to a certain level of education. Second, if one's expectations are not consistent with the condition of his actual job (Tsang & Levin, 1985). Third, if one's acquired qualification or education is greater than the educational qualification required for his/her job (Rumberger, 1981).

The definition of over-education is further divided into two groups by Chevalier (2003) as apparently overeducated and genuinely overeducated. If the graduates are satisfied with their jobs in non-graduate jobs, they are called as apparently over-educated or qualified and if they did not satisfied with their jobs they will be treated as genuinely over-educated or qualified. This definition makes only a classification of over-educated workers. Whether the workers are satisfied or not satisfied with their jobs and they are apparently or genuinely over-educated, the main definition remains still valid that they are over-educated or qualified for their jobs.

3.4.2 Measuring Over-Qualification

The presence of over-qualification is normally measured by comparing the acquired education (in years) with education or qualifications required to perform a job in a particular occupation of labour market. Almost all the literature on over-education and skills uses qualification to measure the skills of individuals. It assumes that the qualifications are acquired or obtained by formal education (Halaby, 1994) and ignores the possible skills acquired by individuals such as on the job training etc., and expects that there is no skills heterogeneity exists across individuals (Verhaest & Omey 2006).

Chevalier (2003) differentiated between the two types of over-education, apparently and genuinely overeducated workers. Given the wide spectrum of possible forms of measurement and advances in the measurement and discussion of over-qualification, the measurement of over-education still remains under debate. The empirical research has mainly depend on three main methods to measure the over-education. We can classify these methods as Job Analysis (JA), Realized Matches (RM) and Worker's Self-

Assessment (WA). These first two measures are known as objective indicators and third one is referred to subjective approach. Below these measures will be discussed in detail:

Job Analysis or Job Analysts Method (JA); Eckaus (1964) introduced this method and pioneer research on over-education commonly used this method (Burris 1983; Rumberger 1981; Scoville 1966). For a certain job/occupation, an expert construct a criteria and sets the minimum educational requirements (Hartog, 2000; Battu et al., 2000). According to this method, the over-education is considered when acquired education exceeds the assigned education to perform it.

DOT (Dictionary of Occupational Titles) is, an American dictionary of occupational titles, known as a best classification. DOT was previously built by labor analysts who visited workplaces and gathered information about the tasks involved in the job. DOT is recently replaced by the online database O*NET (Occupational Information Network). It is constantly updated by interviewing a wide range of workers from different occupations.

Realized Matches (RM); this method, developed by Verdugo and Verdugo (1989), is extensively used in the literature of over-education. This method use the years of education and occupational group of workers to measure the degree of over-education. Workers, whom education exceeds the mean education by more than one standard deviation for their occupational group, are considered as over-educated. In every occupation there is a benchmark of matched (exactly educated) workers so the mismatch is measured by relation to this measure. To avoid the statistical biasness and as a less sensitive statistic to outliers, mode and median instead of mean education can be used (Mendes de Oliveira et al. 2000).

Worker self-Assessment (WA); Duncan and Hoffman (1981) first proposed this subjective measurement of over-education which is based on individual's opinion whether he considers him/her over-educated or not. Later on this method was used by many more researchers (Battu et al., 2000; Sicherman 1991; Sloane et al., 1999; Verhaest & Omey 2010). In this method, workers are asked whether they think their education is exactly what which is needed for the job they are doing or they think themselves over-educated or it can be asked that, to perform this type of job how much education is required in your opinion. Their answer can be compared with their acquired level of education to address mismatch.

3.4.3 Advantages and Disadvantages of Each Measurement

Choice and validity of measures of over-education or mismatch heavily depend upon the availability of data. Above all measures of over-education has some advantages as well as drawbacks. It is argued that Job Assessment (JA) is the most accurate indicator because it take into account the requirements to get and perform the job. Generally, they have been considered normatively superior on these grounds (Halaby, 1994). These measures have some problems, they are very costly to construct and are affected by credential inflation (Barone & Ortiz 2011). Usually, they are nationally targeted and not available for many countries, so they do not allow cross country comparison.

The JA approach according to Halaby (1994) ignores the capacity and possible difference in employment levels within a given same occupational titles. Secondly, the level of required skills in workplace organizations may change due to the reforms and introduction of new technologies (McGuinness, 2006). Thirdly, with some consensus, training requirements should be converted to years of study (Rumberger, 1987).

The Realized Method (RM) are considered good indicators to address the relative position of individuals with respect to others in the occupation. They can be updated according to new formal education requirements and can be compared across countries and regions. These indicators can be easily constructed by making decisions on statistics (mean or mode) with some cut off points (SD) to consider over-education and the data for this purpose is available in almost all the countries.

These indicators also have some disadvantages as well, it will underreport or overestimate the level of over-education when there is excess supply or excess demand of labour respectively (Kiker et al., 1997; Mendes de Oliveira et al., 2000). For determining over-education and under-education, this realized matches method is therefore of least adequate (Chevalier, 2003; McGuinness, 2006). Although, demand and supply are not changing suddenly for education and qualification and strongly affect the population mean, this method is not too much accurate for assessing the incidence of over-education of specific groups affected by credential inflation.

Worker self-Assessment (WA) are considered flexible and less biased indicators to assess the incidence of over-education. Workers their selves provide the information about required education of the jobs they are doing (Alba-Ramirez, 1993). This benchmark of their position may vary with the size and structure of organization where they are working. This may create an upward bias as individuals may overstate their skills and education to inflate their status (Verhaest & Omey 2010).

As the advantages and disadvantages of each measure are given above, the question is which criteria researcher should use to address the phenomenon of over-education in the labour market. One measure can be more appropriate over another depending on the scope

and focus of research. For robustness, it is advised to use more than one indicators. Halaby (1994) emphasized the importance of WA measures and argue that as we classify the unemployment by asking the people question about their effort for job search, this is also subjective assessment. When comparing different countries, regions, industries, occupations, as individuals are more aware of their national and local labour markets, the subjective indicators may be better useful and advisable. However, in countries not affected by credential inflation, RM indicators can produce more appropriate results. It is an objective way to assess over-education and can also facilitate comparison between cohorts of workers. JA indicators are very precise but, as mentioned above, they represent a huge effort in terms of time and resources to build and keep up to date. Nevertheless, if such an effort has already been made and continues as in the United States with the O*NET database, it is advisable to use it because of its precision and its singularity of cases.

Whatever the preferences of researchers and the relevance of the indicators, the availability of data generally allows the choice of method and measure (Hartog 2000; McGuinness 2006; Verhaest & Omey 2006). Although, from the years, in empirical research WA indicators outpaced objective indicators and became more dominant, but for a large sample size to represent all regions and sector of the country, it is time consuming and costly to collect the data. In such cases, RM measure can be used to assess the incidence of over-education which is easily calculate able.

3.4.4 Determinants of Over-Qualification

Almost in all developing and emerging countries like Pakistan, a large share of workers make their livings in unprotected and unregulated informal sector. Due to labour

market rigidities and minimum wage laws, workers are forced to accept unprotected and insecure jobs with low wages. The rigidities associated with formal jobs and consequences of informal job may affect the way workers match their actual education and qualification with required qualification and education to perform a job. Some characteristics may be rewarded well in formal sector. Education may not provide access to better job for those who cannot afford a formal job and accept a low skill informal job. For a low qualification required job, he will be considered as over-educated. If the actual education of a worker is higher than that is required to perform a job, is said to be over-educated worker. It implies that resources are not efficiently used and over-educated worker get low rewards on their investment as compared to appropriate qualified workers. Over-education or job mismatch is affected by or not independent of market segmentation as formal and informal division in a developing country like Pakistan.

Many studies addressed the phenomenon of over-education and tried to explain the over-education relevant with any one theoretical framework of the labour market: human capital theory presented by Becker (Becker, 1964), the job competition model (Thurow, 1975) or the assignment models Duncan and Hoffman (1981). To some extent, earnings depends on individual characteristics and job characteristics, many studies support this assignment interpretation. These models imply that wages are not only correlated to level of education or other individual characteristics (human capital theory) nor to individual productivity or job characteristics (job competition theory). Many studies investigated the effect of over-education or mismatch on earnings of workers, and found that workers with over-education earn higher returns to their education as compared to those who are not

over-educated but earns lowers than the similar educated workers possessing same level of education that is required by the job they are doing.

Franzen and Hangartner (2006) uses a sample of 8,000 graduates of Swiss universities from Swiss Graduate Survey data 2001 of new entrants into labour market. Results show that who got their jobs through social contact have an appropriate job according to their qualification. Di Pietro and Cutillo (2006) used the data of survey carried out in 2001 by ISTAT to analyze the relationship between over-education and wages in Italy using a double-selection approach. The decision to work and the choice of occupation are the two fundamental decisions of individuals are explicitly taken into account in the analysis. It is found that over educated workers earn less as compared to appropriately educated peers. It is found that men are more likely to be over-educated as compared to females. University degrees in the field of political sciences, literature and languages are at most risk. Medicine, law, philosophy, sciences, mathematics, engineering, agriculture and architecture reduce the chance of over-education with respect to economics.

Kucel and Byrne (2008) analyzed the sample of individuals of age 16-65 from Quarterly Labour Force Survey United Kingdom for years 2003-2005. They found that type of information about labour market impact on good match even controlling for self-section of individuals into employment according to marital status, gender, level of education and ethnicity. Individuals can get better matched jobs according to their qualification if they apply for a job through specialized private employment agencies or in response to employer's job advertisements as compared to those who get jobs through personal contacts or relations.

Cuesta and Mora (2010) uses cross-sectional survey data of individuals who graduated from public Catalan universities in the academic year 1997-1998 provided by the Quality Assurance Agency for the University System in Catalonia (AQU). The analysis also reveals other interesting results. First, the "sector" variable seems to play an important role in determining over-education, with the education branch showing the lowest incidence (as expected, since job seekers in this sector must have the appropriate qualifications). For women, this effects appear to be greater. Field of study and age are also of paramount importance in explaining over-education. Finally, the results suggest that those who got their first job through a college counseling office are the least likely to be overqualified three years after graduation.

Klein (2011) used the data of 'HIS-Absolventenpanel 1997' to addresses the question of why fields of study differ in early returns to the labor market in Germany. Other than law, all graduates have a significantly higher risk of being overeducated than their health and wellness peers. By keeping the individual variables constant, graduates of humanities, arts and agriculture have the greatest risk of under-utilizing their skills in the first important work. Analyses also show that the specificity of the tasks of a job considerably reduces the risk of have a job mismatch. The more a job requires specific expertise, the more likely the job is the tasks align well with the skills acquired in the curriculum. So, both on the side of specific educational and professional requirements increase the chances of an immediate match between employer and employee in the labor market.

Baert et al. (2013) used the data of SONAR survey representative sample of two cohorts (birth years 1978 and 1980), conducted when respondents were 23 years old. They

analyzed how a decision to accept job that requires low levels of education affects the duration of the search for a suitable job by applying the Timing of Events approach. Results show that young people, even for long-term unemployment, retards the transition to an adequate job by accepting the jobs which requires the lower levels of education. Rather than accepting a matched job, accepting a job for which the worker is overeducated, monthly transition rates into adequate employment fall by 51– 98%, depending on the elapsed unemployment duration.

Carroll and Tani (2015) using data from the 2011 Beyond Graduation Survey, analyze the relationship between job search and over-education for recent Australian bachelor degree graduates. Results show that jobs found through university job and career counseling offices have lower probability of over-education as compared to jobs received through personal contacts and through job advertisements in respective of gender and age. Direct contact of employer is beneficial only for males of older age. As compared to other methods of job search, university career office and job fairs are more effective in matching the skills acquired by graduates with those required or needed by employers.

Akhtar et al. (2018) analyze the determinants of three types of occupation and job mismatch; field, education and qualification mismatch between teaching and admin staff of educational institutions consisting a sample of 181 respondents of school, college and universities in Pakistan. For the measurement proposes of education job mismatch they used self-assessment (WSA) and job analyst (JA) methods, whereas for qualification mismatch subjective approach was used. To find out the determinants of qualification job-mismatch and education-job mismatch, multinomial logistic regression was used. It revealed from results that age, income, area and nature of job were the major determinants

of job mismatch in teaching and non-teaching staff. It is also found that the teaching staff has more matched jobs as compared to non-teaching and admin staff. The JA and WSA methods also show that teachers were under and over-educated. Regarding the mismatch of qualifications, the majority of men on the administrative side were underqualified while the majority of female teachers were overqualified. The results show that in the field of study, job mismatch, the majority of female teachers have a relevant education while the majority of men on the administrative side have an education irrelevant to their profession.

Ermini and Scaturro (2017) used the survey data of Italian National Institute of Statistics (ISTAT) drawn from four cohorts 2004, 2006, 2008, 2010 to examine the determinants of over-education among Italian PhD graduates in Italy. They analyze the over education according to different definitions i.e. over-qualification, over-skilling and genuine over-education. Contradictory results found for PhD graduates as socio-demographic variables do not exert a relevant influence on the over-education of doctoral graduates. In particular, an experience abroad is always a positive factor in overcoming any type of job mismatch. Likewise, job-related characteristics are also relevant determinants of over-education, with jobs in academia or research being more often associated with successful workforce matching. Conversely, accessing employment through informal channels or working as a self-employed person increases the risk of over-education. The survey on the effect of the recent economic crisis highlights how the recession makes the labor market more selective with doctorate and job-related variables, increasing the risk of job-education mismatch.

Mekonnen and Tekleselassie (2018) investigate the labour market mismatch incidence, causes and its consequences on the well-being for Ethiopian urban labour

market. It is found that over-qualification being the most prevalent problem, around a quarter of employees are unsuitable by using different qualification mismatch indicators. Over qualified workers report less job satisfaction as compared to well-matched workers and these results are also consistent with the results of studies for developed countries. It is also found that over-educated workers earn less than those who are well matched implying a wage penalty while education is positively and significantly associated with wages.

Liu et al. (2021) analysed the determinants and wage effects of over-education using the data of Talent Cultivation and Employment Survey for local universities of China in 2016. They used only exactly educated and over educated groups for regression analysis and removed the under educated group due to low (less than 4 percent) proportion in the sample. By using a logit model, they explored the determinants of over education. Results show that graduate with practical courses are less likely to be over educated as compared to those who has fewer practical courses. Study also suggest that over education can be reduced by guidance for internship and students rule-based input was found to significantly reduce the odds of over education among graduates.

Farooq (2011a) analyzed the job mismatch by using the primary and secondary data sets of formal employed graduates of Pakistan. He divided job mismatch into three different categories; education-job, qualification and field of study mismatch. He found one-third graduates are mismatched in education job, more than one-fourth are mismatched in qualification, among them 50 percent are over-qualified and 50 percent are under-qualified. According to field of study, 11.3 % graduates have irrelevant and 13.8 %

have slightly relevant jobs. It also shows that in field of study, as compared to male, females are more likely to be mismatched.

Farooq (2011b) further concluded that belonging to political families has a better qualification match but a lower field of study match. Graduates with higher qualifications are less likely to under qualify for jobs, this raises the possibility of over-education and over- qualification. Regular fulltime and semester system education reduces job mismatch and distance learning system increases job mismatch. In lower occupations, job and skill mismatch is more prevalent.

Farooq (2015) in another study, under different approaches, he found that over-qualified graduates face wage penalty. Author controlled for skill heterogeneity, and found that there is less penalty to apparently over-qualified graduates and more penalty to genuinely over-qualified graduates. The study show that over-skilled graduates bear wage penalties and the under-skilled get wage premiums as compared to the matched graduates. Wages of graduates can be improved by a good field of study and job matches.

Akhtar et al. (2018) studied the determinants of three types of occupation and job mismatch; mismatch of fields of study, mismatch of education and mismatch of qualifications between administrative and teaching staff of educational institutions in Pakistan using data from 181 respondents from schools, colleges and university. For the measurement of the education-job mismatch, they used the worker self-assessment (WSA) and job analyst (JA) methods, while the qualification mismatch is measured by a subjective approach. The multinomial logistic regression was estimated to find the determinants of the qualification-employment and education-employment mismatch. The results show that the job mismatch is determined by the age, monthly income, location and nature of the job

of respondents for teaching and non-teaching staff. Teachers have jobs depending on their training, but this is not the case for non-teaching staff. The JA and WSA methods also show that teachers were under and over-educated. The men on the administrative side are underqualified and the women on the teaching side are overqualified in terms of the mismatch of qualifications. Regarding the mismatch of fields of study, the majority of women occupy jobs relevant to their training in the teaching staff, and men occupy irrelevant jobs on the administrative side.

All the above studies of Pakistan ignored the labour market segmentation as formal and informal employment in their analysis but they found the incidence of over-education. Average years of schooling in developing countries is less than high income countries. Average educational attainment for the age of 21 to 24 are 9.6 years for females and 9.3 years for males in Latin American and Caribbean countries (Duryea et al., 2007). In OECD countries it is 12.5 years for males and 12.8 years for females of age 25-34 (OECD Education at a Glance, 2010).

As compared to developed countries, educational attainment in developing countries is low which indicates for these economies, that over-education is a somewhat contradictory phenomenon. Quinn and Rubb, (2006) in a study for Mexico found the incidence of over-education and reported that the prevalence of over-education is same to that present in advanced and developed countries. In developing countries, labour markets are characterized by high level of informality. Although, informality has negative implications and poor working conditions but a segmented labour market (divided into formal and informal sectors) also affect the way workers match their qualification with the education needed to execute a job.

As Berry and Sabot (1978) affirm, one inefficiency of segmentation is the failure of the market to move right resources to the high wage sector, this failure is known as mismatch. Based on this statement and with a large informal sector, the study of over-education can examine the role played by this segmentation. According to Charlot and Decreuse (2005) over-education takes place due to inefficient self-selection in education. Many workers want to get education and do not consider the effect of their education on the employment and wages of other workers. This explanation of over-education seems reasonable, in our opinion, for a developing country with segmented labour market. I want to examine that in which sector the incidence of over-education prevails.

Pakistan is a developing country with a large informal sector. Informal employment in the country is an interesting case to study for many reasons. Firstly, large informality in the country is at the center of economic debate. On one hand, non-payment of taxes and social security contribution and on the other, poor working conditions, job insecurity, non-availability of health and insurance benefits and uncovered jobs are associated with this sector. Secondly, previous studies focused on the size of informal sector, labour market rigidities and its impact on earnings, distribution and employment. Thirdly and most importantly, previous studies have found the incidence of over education in Pakistan. In best of my knowledge, no body has tried to examine the effects of a large informal sector on education job mismatch. This education occupation mismatch, due to labour market segmentation, will affect the allocation of resources in educational system, and will be bias toward academic training (Berry & Sabot, 1978). Study hypothesize that workers with higher level of education fails to get formal job and accept an informal job for which they are over-educated.

3.5. Summary of Literature

There are some studies who defined labour informality on the basis of characteristics of production units and it ignores the job characteristics of workers. The enterprises definition of informality built on ILO's measurement that have 5 or lesser workers. For Mexico, De Paula and Scheinkman (2007) and Rani (2008) used this definition. Definition of less than six worker is used for Mexico by Maloney (1999). Marcoullier et al. (1997) used this definition for Mexico and Peru. In another study Livingstone (1991) uses the data of fewer than ten employees for Kenya. Cohen and House (1996) increased the number to fewer than twenty for Sudan. International Expert Group of Informal Sector Statistics (IEGISS) made some adjustment to increase its comparability between countries in 1997. So informal sector was defined as unincorporated private enterprises with less than five paid employees, involved in goods and services production for sale or exchange, who are unregistered and involved in non-agriculture activities (ILO, 2002).

In 2003 the 17th ICLS adopted the new broader informality specification relating the informal sector employment to informal employment. This related the enterprise based concept to job based concept (Hussmanns, 2004, p. 5). New labour informality concept was restated by Chen (2007) referring to the informal jobs that are not entitled to social or legal protection. In simple words, informal employment means the employment that is not entitled to any labour law, social security and taxation or other employment benefits.

Using this definition of informality, researchers used different criteria for empirical work. Amuedo-Dorantes (2004) and Packard (2007) considered employment as informal if there is no written contract; Portes et al. (1986), Bosch and Maloney (2005), Loayza et

al. (2009) and Mondragón-Vélez et al. (2010) considered it informal if there is no contribution to social security coverage and after retired pension; Gasparini and Tornarolli (2007) defined as informal employment if there is no pension entitlement after retirement; Henley et al. (2009) used both criterion as defined by no written contract and no social security contribution; Saavedra and Chong (1999) defined informal employment without labour legislation.

Labour informality in Pakistan is also defined on the basis of characteristics of production units (enterprise with less than 10 workers) and it ignores the job characteristics of workers. Gillani and Khan (2013) analyzed the urban informal sector employment in District Bahawalpur. Khan (1983) used the data of 570 households from Lahore city to study the wage differences of formal and informal workers. Nasir (2000) and Hyder and Barry (2005) used labour force survey to study the wage gap between formal and informal sector. Kishwar, S. (2021) used multiple criteria to define informal employment for father and son sample from HIICS (2015-16) data set.

Farooq (2011a) used primary and secondary data sets of formal employed graduates of Pakistan, Farooq (2011b) used Survey of Employed Graduates (SEG) 2010, Farooq (2015) used SEG 2010 and Akhtar, et al (2018) also analysed the over education in Pakistan using data of 181 respondents from schools, colleges and a university. None of the above study discussed the qualification mismatch in informal employment using job characteristics of informality in Pakistan.

This study attempt to measure the informal employment using different approaches (formal sector job, no written contract, no pension and no social protection) in the context of Pakistan which will improve the concept of informality in labor market. Secondly, this

study provides an investigation of wage differentials between formal and informal employment by using a new definition of informality based on pension entitlement criteria in the context of Pakistan. Thirdly, this study attempts to analyze the incidence and determinants of qualification mismatch separately in formal and informal employment of Pakistan labour market.

CHAPTER 4

METHODOLOGY

In this section the theoretical and conceptual framework for informal employment is presented first, then the model and estimation techniques for determinants of informal employment, wage differential and qualification mismatch are presented.

4.1. Theoretical Framework

Though the informal employment is a phenomenon of the informal sector fundamentally, it is present in both formal and informal sector of developing countries. According to Harding and Jenkins (1989) criteria for informal sector and informal employment that is used in most of studies, the political, economic and social scopes are the institutional patterns that shape the informal sector. The dividing factors of formal and informal employment are the same in both developing and developed countries. Sum of all economic engagements, excluding legally recognized and regulated sector, are the informal activities from an economic point of view. There are many sub-criteria that are used to identify the informal employment. This sub-criteria is based on: (i) status of labour; (ii) status of profession; and (iii) tax evasion.

Regarding status of labour or labour market, it includes undeclared labour, absence of social security and other benefits, lack of minimum wage law and poor working conditions and environment. This type of employment is considered as informal employment. According to this criteria, sum of all economic activities, excluding contractual and regulated employment, are the informal sector activities and employment is informal employment. On the status of profession, there are two distinguished categories,

one is paid employees and others are self-employed. Paid employees are considered as formal whereas informal employment is the sum of the self-employed, family workers and domestic servants (Hart, 1973). However, if the employment of wage employee is informal according to labour status, it will be considered informal employment and the self-employment will be considered formal if they work in formal sector. The tax evasion or national statistics, the informal sector hides all economic activities from statistical systems, under report or avoid to report information altogether (Feige, 1989).

To understand the labour market, an important question is whether the earning gap or differences of formal and informal workers are due to market segmentation or despite these earning differences, the competitive labour market holds. In simple words, whether informal employment is voluntary or forced due to burdensome rules and regulations of formal employment. Relating to this, another question is whether informal workers are poor because of informal jobs (segmentation of labour market) or they are poorly endowed to earn high income (competitive labor market).

There are three main approaches on informal sector in the theoretical literature. These approaches are dualistic labour market approach, neo-liberal approach and structural articulation approach. According to dualistic labour market approach there are two main sectors, a modern sector with capital mode of productions and a subsistence sector with agriculture. These two sectors has different wage determination processes. This theoretical model was first developed by Lewis (1954) which is based on classical school foundations having two sectors, has rejected the neoclassical assumptions of perfect competition, full employment and market clearance. He showed how surplus labour from traditional

agriculture sector could be employed in modern industrial sector. His model was further expended by Harris and Todaro (1970) and Fields (1975).

Harris and Todaro (1970) expended the model by explaining the process of migration of workers from one sector to another. They showed that wage gap and formal sector job availability can affect the reallocation of labour. If a migrant can't get a formal job, he will remain unemployed because he has only two choices. Fields (1975) expended the model by introducing the third possibility of urban informal sector job. Cole and Sanders (1985) analyzed how migrant with low endowments focus on urban subsistence sector rather than modern sector. In his view, population pressure on fixed agriculture land reduces the wages of rural subsistence sector below that of urban subsistence sector, the urban subsistence sector with easy entry as compared to modern sector, is more attractive for migrants with low endowments.

The second approach is neo-liberal approach in which informal sector is influenced by legal instruments (De Soto, 1990). Costs, complex and lengthy process involved in registering the enterprises, are induce entrepreneurs to operate informally. Economic units view informal sector as optimal response to excessive taxations and minimum wages. Rauch (1991) describes that firms enjoy legal exemption from minimum wage policy that distorts resources away from first best allocations and considers it a voluntary phenomenon.

The third, Structural articulation approach differentiate formal and informal sector on the basis of character of production and distribution processes. According to this approach, there is lack of association between the extent of constraint imposed by the institutional and legal framework, costs incurred by the entrepreneurs and the size of the

informal sector. The different mode and form of productions are not independent, they are connected. In the process of expansion of modern sector, the traditional sector also impoverished and marginalized (Quijano, 1974; Mingione, 1984). Informal sector is heterogeneous with at least two sub sectors; a disadvantaged sector with informal activities with direct subsistence goals and an integrated to the formal sector with dynamic activities with decreasing labour costs and capital accumulation goals (Flórez, 2002). The dependent structural links between the informal and formal sectors are shaped by the wage and labor strategies of capitalist enterprises, which seek to reduce costs by maintaining an army of surplus labor reserves.

In developing countries, both formal and informal sectors have informal employment, though it is a phenomenon of informal sector fundamentally. The conceptual framework for informal employment suggests that jobs rather than persons should be used to assess informality because persons hold one or more than one jobs and among these jobs one or more can be informal job. Total employment can be disaggregated into two dimensions as type of job and type of production unit ILO (2003). Table 4.1 shows the conceptual framework of informal employment.

In Table 4.1 there are three type of cells; dark gray, light gray and white cells. Dark gray cells refers to jobs that do not exist in the type of production unit, light gray cells refers to formal jobs and white cells represents informal jobs. According to the cells of framework, following definitions are presented.

Table 4.1: Conceptual Framework of Informal Employment

Production units by type	Jobs by status in employment								
	Own-account workers		Employers		Contributing family workers	Employees		Members of producers' cooperatives	
	Informal	Formal	Informal	Formal	Informal	Informal	Formal	Informal	Formal
Formal sector enterprises					1	2			
Informal sector enterprises*	3		4		5	6	7	8	
Households**	9					10			

Source: ILO (2003). * Fifteenth ICLS definition where paid domestic workers are excluded.
** Households employing paid domestic workers and producing goods for their own use.

Cells 1 and 5: contributing family workers having no contract agreement of employment and no social security for the job, in formal and informal sector enterprise (cell 1 and cell 5 respectively). Cells 2, 6 and 10: Employees having informal jobs, employed in formal (cell 2) or informal (cell 6) sector enterprises or domestic paid workers employed by households (cell 10). Cells 3 and 4: own account workers (cell 3) and employers (cell 4) having jobs in their own informal sector enterprises. Cell 7: Employees in the informal sector enterprises holding formal jobs. Cell 8: Members of informal producers' cooperatives. Cell 9: Own-account workers producing goods for own final use. In developing countries, the debate on informal sector has been conceptual while in industrialized countries it has been methodological. It is difficult to distinguish the employment in developing countries. Informal sector refers to production units as the unit of observation while informal employment refers to the job of worker as unit of observation (ILO, 2003; Hussmanns, 2004). In case of employers and own account workers, if their enterprise is informal than the job will be considered informal. For employees, according to international statistical standards, an informal employment is defined according to the

employment relationship. An employee is considered as informal if the employment relationship is not in law, labour legislation, income tax, social security or other employment benefits like sick leave, job security or severance pay. In practice, formal and informal nature of job is determined on operational criteria, mainly on social protection but also on entitlement to paid sick and annual leave. In the harmonized approach to identify the informal employment, the following criteria is used:

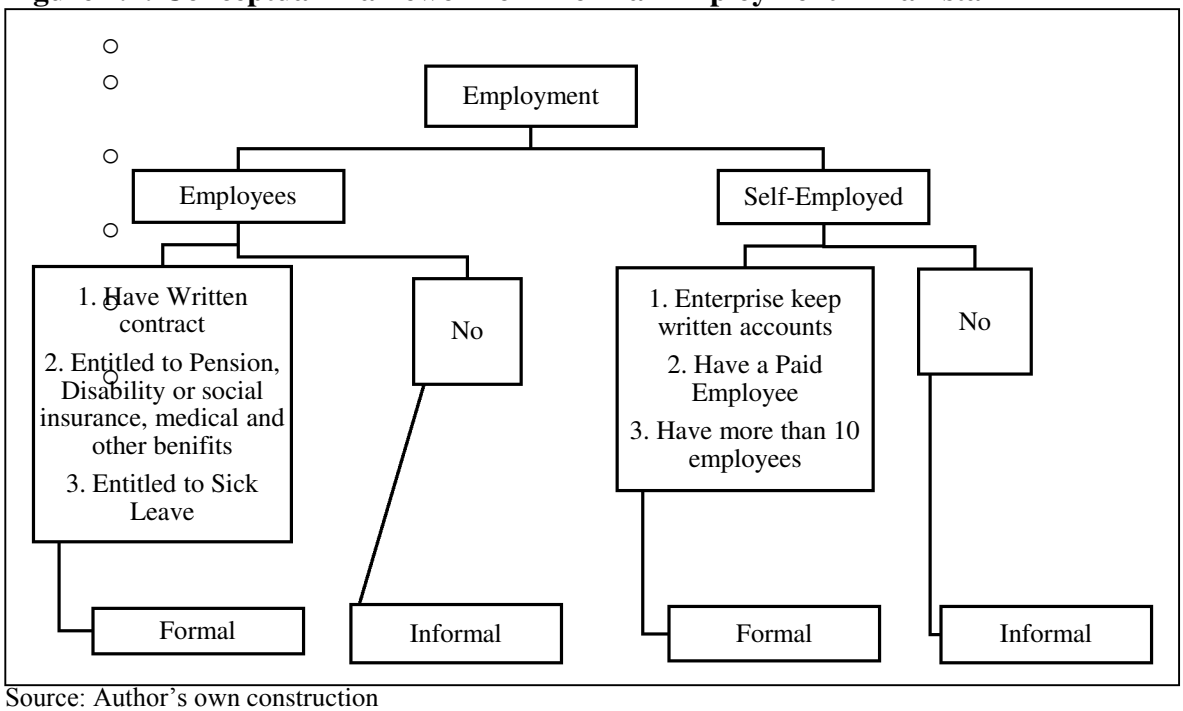
1. All contributing family workers are classified as having informal employment.

2. Employers, own account workers and members of a producer cooperative are classified as informal or formal on the basis of the economic unit of the workers job.

The statistical treatment of employees depends on the social security contribution criteria or entitlement to paid sick and annual leave.

> Contributions to social security or alternatively pension, is commonly used in countries and applied by ILO. If such a contribution is made by employer for employee, than the worker is employed formally otherwise the worker is employed informally.
>
> If this contribution is made by the employee himself or entitled to have pension, then he is also considered as formal. If there is no such question in survey or respondent does not know, then two other criteria's are used to identify the status of job.
>
> Paid sick leave and paid annual leave: if the respondent effectively benefits from paid annual leave or paid sick leave then he is considered as formal employee otherwise he is employed informally.

Figure 4.1: Conceptual Framework of Informal Employment in Pakistan



Source: Author's own construction

According to ILO guidelines and data availability in Pakistan, the above Figure 4.1 will illustrate the criteria to measure the employment in Pakistan into formal and informal employment.

If an employee has a written contract and entitled to old age benefits and social security and entitled to sick leaves he is considered formal otherwise he will be informal. For the self-employed they are distinguished between formal and informal on the basis of status of their enterprises. If the enterprise is formal then their work is also considered formal otherwise it will be informal. For self-employed there are three question in LFS 2017-18 questionnaire to classify them into formal and informal employment as; whether the enterprise keep written accounts, have any regular paid employees in the enterprise and number of persons are engaged in the enterprise. This study focus only on most relevant and closely related criteria, which is underpinned by Harding and Jenkins (1989) and also based on ILO's guidelines.

4.2. Empirical Models

Following models are estimated for different objectives of this thesis. To find the determinants of informal employment and qualification mismatch, logit model is used. For wage differential, Oaxaca-Blinder decomposition and quantile regression decompositions are used.

4.2.1 Empirical Model of Determinants of Informal Employment

The logit model that is adopted to achieve first objective in this study, is widely used in research related to the situation having a binary dependent variable. Maddala (1983) presented details on application and estimation of logistic models. Few examples are; Zhang (2008) and Gunatilaka (2008) used logit model, Slonimczyk and Gimpelson (2015) and Boisjoly et al. (2017) used multinomial logit models and Ali et al. (2021) used logit model to study informality. In our case of determinants of informal employment where the dependent variable is binary in relation to gender, age, education and region etc., the logit model depicts it as

$$L_i = ln\left[\frac{P_i}{(1-P_i)}\right] = \beta_1 + \beta_2 G_i + \beta_3 A_i + \beta_4 T_i + \beta_5 E_i + \beta_6 M_i + \beta_7 HH_i + \beta_8 FT_i +$$

$$+ \beta_9 HS_i + \beta_{10} EP_i + \beta_{11} C_i + \beta_{12} U_i + \mu_i \qquad (4.1)$$

Where: L_i is logit, *Ln* = natural logarithm or $\log_{exp}$, p = probability of occurrence or in our case informality, P/(1-P) = odds ratios , $\ln\left[\frac{p}{1-p}\right]$= logit or log odds ratio. Above logistic regression is estimated for informality vs formality sample and P_i is the probability of informal employment. The dependent variable is informal employment =1 otherwise =0, explanatory variables in the model are *G* for gender (male =1, female =0), *A* is the age

of worker (categories 15-25, 26-40, 41-60 and 61+), *T* is technical and vocational training (yes =1, no =0), *E* for education categories (No formal education = 1, Primary = 2, Middle =3, Matric =4, Intermediate =5, Bachelor =6, Professional education =7, Graduation = 8, Masters and above =9), *M* is marital status (unmarried =1, otherwise =0), *HH* is head of household (head =1, otherwise =0), *FT* is family type (joint =1, nuclear =0), *HS* is household size, *EP* is employed persons in household, *C* is number of child in household and *U* is work location of worker (urban =1, rural =0).

4.2.2. Empirical Model of Wage Differential

In order to analyze the second objective of determinants of wage differential of formal and informal workers the following models are used.

$$lnW_{IFi} = \beta_1 + \beta_2 G_{IFi} + \beta_3 T_{IFi} + \beta_4 E_{IFi} + \beta_5 Exp_{IFi} + \beta_6 Con_{IFi} + \beta_7 NoCon_{IFi} + \beta_8 R_{IFi} + \beta_9 Pro_{IFi} + \beta_{10} Tech_{IFi} + \beta_{11} Cler_{IFi} + \beta_{12} Ser_{IFi} + \beta_{13} SAgri_{IFi} + \beta_{14} Craft_{IFi} + \beta_{15} Ope_{IFi} + \beta_{16} Elem_{IFi} + \mu_i \quad (4.2)$$

$$ln\, W_{Fi} = \beta_1 + \beta_2 G_{Fi} + \beta_3 T_{Fi} + \beta_4 E_{Fi} + \beta_5 Exp_{Fi} + \beta_6 Con_{Fi} + \beta_7 NoCon_{Fi} + \beta_8 R_{Fi} + \beta_9 Pro_{Fi} + \beta_{10} Tech_{Fi} + \beta_{11} Cler_{Fi} + \beta_{12} Ser_{Fi} + \beta_{13} SAgri_{Fi} + \beta_{14} Craft_{Fi} + \beta_{15} Ope_{Fi} + \beta_{16} Elem_{Fi} + \mu_i \quad (4.3)$$

Where lnW_{IFi} and lnW_{Fi} represent log monthly wages of informal and formal workers, *G* is used for gender of individuals, *T* is used for vocational training, *E* is the educational levels of workers, *Exp* is experience, *Con* is job with contract, *NoCon* is job without contract, *R* is the region (Urban=1, rural= 0), for occupation dummies; *Pro* for professional (Pro =1, otherwise =0), *Tech* for technicians(Tech =1, otherwise =0), *Cler* for clerks (Cler=1, otherwise= 0), *SAgri* for skilled agriculture workers (SAgr=1, otherwise =0),

Craft for crafts (Craft = 1, otherwise =0), *Ser* for services (Ser=1, otherwise =0), *Ope* for operators (Ope=1, otherwise=0), *Elem* for elementary (Elem=1, otherwise= 0).

Further the total difference in wages for both sectors can be expressed by using the Oaxaca-Blinder Decomposition (1973)

$$\Delta \ln W = \ln \overline{W}_F - \ln \overline{W}_{IF} \tag{4.4}$$

$$\ln \overline{W}_F - \ln \overline{W}_{IF} = \overline{X}_M \widehat{B_{IF}} - \overline{X}_F \widehat{B_F} + \overline{X}_F \widehat{B_{IF}} - \overline{X}_F \widehat{B_{IF}} \tag{4.5}$$

$$\ln \overline{W}_F - \ln \overline{W}_{IF} = \left(\overline{X}_F - \overline{X}_{IF}\right)\widehat{B_F} + \left(\widehat{B_F} - \widehat{B_{IF}}\right)\overline{X}_{IF} \tag{4.6}$$

$$\ln \overline{W}_F - \ln \overline{W}_{IF} = \left(\overline{X}_F - \overline{X}_{IF}\right)\widehat{B_F} + \left(\widehat{B_F} - \widehat{B_{IF}}\right)\overline{X}_{IF} + \left(\widehat{B_F} - \widehat{B_{IF}}\right)\left(\overline{X}_F - \overline{X}_{IF}\right) \tag{4.7}$$

The selectivity-corrected wage equation using Neuman-Oaxaca (2004) Wage Gap Decomposition,

$$ln\,\overline{W}_F - ln\,\overline{W}_{IF} = \left(\overline{X}_F - \overline{X}_{IF}\right)\widehat{B_F} + \left(\widehat{B_F} - \widehat{B_{IF}}\right)\overline{X}_{IF} + \left(\widehat{\theta_F}\widehat{\lambda_F} - \widehat{\theta_{IF}}\widehat{\lambda_{IF}}\right) \tag{4.8}$$

4.2.3. Empirical Model Determinants of Qualification Mismatch

To study the third objective, the determinants of qualification mismatch in formal and informal sector, the following model will be used.

$$L_i = ln\left\lfloor\frac{P_i}{(1-P_i)}\right\rfloor = \beta_1 + \beta_2 G_i + \beta_3 Ex_i + \beta_4 T_i + \beta_5 E_i + \beta_6 M_i + \beta_7 HH_i + \beta_8 FT_i +$$

$$+ \beta_9 HS_i + \beta_{10} EP_i + \beta_{11} C_i + \beta_{12} U_i + \mu_i \tag{4.9}$$

Where the dependent variable takes two outcomes; over-qualified =1, otherwise = 0. explanatory variables in the model are *G* for gender (male =1, female =0), *Ex* is the

experience of worker, *T* is technical and vocational training (yes =1, otherwise =0), *E* for education, *M* is marital status (unmarried =1, otherwise =0), *HH* is head of household (head =1, otherwise =0), *FT* is family type (joint =1, nuclear =0), *HS* is household size, *EP* is employed persons in household, *C* is number of child in household and *U* is work location of worker (urban =1, rural =0).

And impact of informality on qualification mismatch can be analyzed by

$$L_i = ln\left[\frac{P_i}{(1-P_i)}\right] = \beta_0 + \beta_1 Inf_i + \beta_2 G_i + \beta_3 Ex_i + \beta_4 T_i + \beta_5 E_i + \beta_6 M_i + \beta_7 HH_i + \beta_8 FT_i + + \beta_9 HS_i + \beta_{10} EP_i + \beta_{11} C_i + \beta_{12} U_i + \mu_i \quad (4.10)$$

Where the dependent variable takes two outcomes; over-qualified =1, otherwise = 0. Other explanatory variables in the model are *Inf* is informal employment (informal employment =1, otherwise =0), *G* for gender (male =1, female =0), *Ex* is the experience of worker, *T* is technical and vocational training (yes =1, otherwise =0), *E* for education, *M* is marital status (unmarried =1, otherwise =0), *HH* is head of household (head =1, otherwise =0), *FT* is family type (joint =1, nuclear =0), *HS* is household size, *EP* is employed persons in household, *C* is number of child in household and *U* is work location of worker (urban =1, rural =0).

4.3. Estimation Techniques of Determinants of Informality

If dependent variable is a categorical in nature (formal or informal) in the case of determinants of informality and qualification mismatch, taking only two values (1 or 0), taking value 1 for occurrence and 0 for otherwise respectively. There are several models to handle this situation, where the depended variable is binary in nature, taking 1 or 0 values. For example we are interested to find out the determinants of informality as a function of

age, sex, schooling, occupation, region and firm size etc. Our objective is to find whether the individual is employed in formal or informal sector. Here informality is a dummy variable and it can take only two values; 1 if worker is employed in informal sector and 0 otherwise. Dependent variable in such a model, mentioned above, has a yes or no answer. In such a situation, if we use a linear regression model, to find out the probability of Informality, it will called linear probability model. This type of models are associated with several problems:

Violation of linearity assumption as disturbances are not normal

Disturbances have heteroscedastic variances

$0 \leq E(I \mid X_{ij}) \leq 1$ shows conditional probability of informality (I given X_{ij}) is outside the range of 0 and 1 as

R^2 has very low values

LPM model assumes that probability increases linearly with X, that is, the marginal or incremental effect of X remains constant throughout. For this reason, LPM models are not logically attractive and seems unrealistic. Here, we need a probability model with two features: (1) as X increases, $P_i=E(I=1|X_{ij})$ also increase but falls in 0-1 interval and never steps outside this range, and (2) P_i and X_{ij} has a nonlinear relationship as X_{ij} obtain really big value, P_i approaches to 1 and as X_{ij} obtain really small values, P_i approaches to 0.

To solve such problems, there is logit model for binary dependent variables other than LPM:

$$ln\left[\frac{p}{(1-p)}\right] = a + BX + e \tag{4.11}$$

$$\left[\frac{p}{(1-p)}\right] = exp^{(a+BX+e)} \tag{4.12}$$

Where:

- Ln = natural logarithm or $\log_{exp}$,
- P =probability of occurrence or in our case informality
- p/(1-p) = odds ratios
- $\ln[\frac{p}{1-p}]$= logit or log odds ratio

The logit model or logistic regression model is a non-linear transformation of the linear regression. It has S-shaped distribution function. It is similar to the probit regression model's standard-normal distribution. We can calculate probabilities very easily with the help of this logistic model. These probabilities will lie between 0 and 1 range.

For example, we estimated the probability:

$$p = \frac{1}{[1+exp^{(-a-BX)}]} \tag{4.13}$$

With this functional form:

- if we suppose $(a + BX)$ =0 the value of p will be 0.50
- as $(a + BX)$ obtain really big values the p will be approaches to 1
- as $(a + BX)$ obtain really small values the p will be approaches to 0.

In LPM and OLS, the slope coefficients (B) is the rate of change in Y (the dependent variable) as X changes. Where as in logit model the slope coefficient is the rate of change in the "log odds" as X changes.

Logistic regression models and probit models are extensively used in research where a binary dependent variable involves. The choice of the model is depends on

researcher because both the model produce same results but the coefficients are comparable after small adjustment rather than directly. Probit model assumes normally distributed error term whereas error terms in logit model is assumed logistic distribution. We can test the normality of error terms to choose a best model.

4.4. Estimation Technique of Wage Differential

We can divide labour market into two parts as formal employment and informal employment on the basis of registration or entitlement to social security. Separate earning functions are estimated for each sector on the characteristics of workers.

Below a semi-log earning function is shown.

$$\ln W = \beta_0 + \Sigma\beta_i X_i + \mu \tag{4.14}$$

Where W represents the monthly wages of workers and X_i is the vector of human capital, personal and other characteristics of the worker which are important to determine the earning function. These include age, gender, marital status, education, work experience, and occupation of the workers. Becker (1964) and Mincer (1974) used the quadratic term of age as a proxy for experience and found the diminishing returns to experience with time. Schooling is another important human capital variable. Education is known as investment in human capital which increases the rewards of individuals. Level of schooling is the important factor of Beker and Mincer Model. Different levels of education are added in earning model. Primary, Middle, Secondary, Inter, Graduation, Masters, M Phil and PhD are different categories of schooling. Studies has shown that there is wage differential among formal and informal employment of the world economies as well as Pakistan. This equation is estimated for each sector separately.

There are two reasons of the wage differential. First is related to personal characteristics. Due to different level of human capital, occupational differences and endowments, wages may be different. Worker with higher education, vocational training and more productive will get higher wages as compared to those who have low levels of productivity. The second is due to wage structure in different sectors. Workers with same level of productivity and endowment will get different wages due to differences in wage structure.

Mean of log wages of both the sectors is used to measure the difference in wages. The absolute difference in wages, *Dij* is calculated as:

$$D_{ij} = LnW_i - LnW_j \tag{4.15}$$

Where *i* represents high-wage sector and *j* represents the low wage sector. Different sectors have different qualification and qualification requirements, there might be a difference in wage structure also. The total wage differential can be divided into two parts, difference in wage structure and difference in endowments and productivity related personal characteristics.

Wage differential model among sector *i* and *j* can be written as:

$$LnW_i = f_i(X)_i = \Sigma\beta_i X_i \tag{4.16}$$

$$LnW_j = f_j(X)_j = \Sigma\beta_j X_j \tag{4.17}$$

Where *Xi* is the mean value of the vector of characteristics of sector *i* and *Xj* is the mean value of the vector of characteristics of sector *j*

Total gross difference is represented as:

$$D_{ij} = LnW_i - LnW_j = [f_i(X_i) - f_i(X_j) + f_i(X_j) - f_j(X_j)] \quad (4.18)$$

If the workers of *j* sector were paid according the wage structure of sector *i,* they would get mean wage *fi*(*Xj*)

$$D_{ij} = \left[\Sigma\beta_i X_i - \Sigma\beta_i X_j\right] + \left[\Sigma\beta_i X_j - \Sigma\beta_j X_j\right] \quad (4.19)$$

$$= \Sigma\beta_i\left[X_i - X_j\right] + \Sigma\left[\beta_i - \beta_j\right]X_j \quad (4.20)$$

Equation (4.19) has two parts, the first part gives the difference in the average logarithmic earnings that is due to the differences in earning related characteristics like gender, experience and education of the two groups. Second is due to the different pay structure of the two sectors, they compensate their worker differently having the same characteristics. Differences in the values of the coefficients of equations of two groups will determine the size of this term. By this strategy, we can analyze the difference in pay structure and in the endowment of the workers, which drives a gap in pay levels of different sectors.

The selectivity-corrected wage equation is,

$$D_{ij} = \sum\beta_i\left[X_i - X_j\right] + \sum\left[\beta_i - \beta_j\right]X_j + \left(\theta_i\lambda_i - \theta_j\lambda_j\right) \quad (4.21)$$

Where the term $\left(\theta_i\lambda_i - \theta_j\lambda_j\right)$ shows the selectivity bias effect. To control any biasness or inconsistency in estimators, the new wage equation is used which is corrected for selectivity. This term $\left(\theta_i\lambda_i - \theta_j\lambda_j\right)$ has two symbols namely θ and λ, where the parameter (θ) is the product of the standard deviation of the errors in the salary equation and the correlation between the wage equation error wage and the selection equation error, and (λ) is an estimate of the mean inverse mills ratio (IMR). Heckman (1979) stated that

selection bias can be measured by examining the correlations between exogenous variables and an indicator of treatment.

Oaxaca–Blinder decomposition has a limitation that the differences in wages across the wage distribution cannot be accounted for. To overcome to this problem, QCD method is used to the wage gap variation across the distribution of wage. This technique was proposed by Machado and Mata (2005). The following equation is used to analyze the counterfactual decomposition of wages.

$$Q_{w(F|F)}(\tau) - Q_{w(IF|IF)}(\tau) = \left(Q_{w(IF|IF)}(\tau) - Q_{w(F|IF)}(\tau)\right) + \left(Q_{w(F|IF)}(\tau) - Q_{w(F|F)}(\tau)\right) \quad (4.22)$$

The raw differences in this equation is equal to two parts, the first part of the equation represents the characteristics effect and the second part represents coefficient effect. To show that the wage gap between formal and informal is due to the presence of large informal sector, the conditional quantile regression model introduced by Koenker and Bassett (1978) is applied. In the first step the probability of workers being in formal and informal employment is estimated, in the second step, a linear quantile regression is performed by additionally including the derived correcting factor (inverse Mill's ratio and its square).

4.5. Estimation Technique of Qualification Mismatch

Except the definition of qualification mismatch, other estimation technique is same as stated above in section 4.3. Qualification mismatch is defined as, if the actual education of a worker is exceeding than the education required to perform a job, is classified as over-qualified. There are many methods to measure the over- qualification. LFS allow us to use two methods as Job Analysis (JA) and Realized Matches (RM). Dictionary of Occupational

Titles issued by the US Employment Service contains all information about education required by an occupation. The education required in Pakistan can be somewhat different from the workers of US. Second method is RM or Realized Matches which is used by many researchers. Verdugo and Verdugo (1989) defined mean level of education as required education in each occupation. If education of worker falls within 1 SD range around the mean value, worker will be considered as adequately educated, if their education is greater than 1 SD above the mean level of education the worker will be considered as over-educated or if actual education is greater than 1 SD below than the mean level of education, the worker will be under educated. This method is also known as VV method.

Mathematically, if S_a is the actual qualification (education in years) and S_r is required qualification (mean years of education) for a job, thus (S_o) over-qualified or over-educated is represented by;

$$S_o = 1 \text{ if } S_a > S_r \tag{3.23}$$

And perfectly matched (S_m) is as;

$$S_m = 1 \text{ if } S_r = S_a \tag{3.24}$$

Likewise under-qualified is represented by

$$S_u = 1 \text{ if } S_r > S_a \tag{3.25}$$

4.6. Data, Variable Definition and Theoretical Impact

For this study I used Labour Force Survey and Pakistan Social and Living Standards Measurement Survey data. Below section presents some details on the data sets.

4.6.1 Data

The data of Labour Force Survey (LFS) 2017-18 is mainly used for this analyses and Pakistan Social and Living Standards Measurement Survey (PSLM) 2019-20 is also used only to find out the incidence of over education but not used in the regression analyses. These data sets have been conducted by the Pakistan Bureau of Statistics (PBS). PBS has been doing this job since 1963. Panel on Labour Statistics has revised its questionnaire and methodology many times to incorporate new improvements which made it useful for this thesis. The sample size of LFS 2017-18 comprises 43,361 households consisting 272,478 observations which are disaggregated at gender, rural/urban and provincial levels. All four provinces of Pakistan and Islamabad are the universe of LFS where FATA and restricted areas by military are not included in it. These areas accounts for around 2 percent of total population. The whole sample of households (SSUs) is drawn from 3032 (1772 rural and 1260 urban) Primary Sampling Units (PSUs).

The LFS 2017-18 provides data of employment status of 73,266 individuals with complete set of required information for different variable out of them 44,606 are non-agriculture workers. These sample sizes are used for determinants of formal and informal employment. There are only 30,409 paid employees having complete data for the variables to analyze the wage differential. Only 13,902 individuals have some level of education and other relevant information to analyze the skill mismatch. PSLM 2019-20 data comprises 75,621 individuals which is used only to find incidence of skill mismatch and not used in any regression analyses because of its limitation to divide between formal and informal employment.

The LFS comprises all important information of the population on main key variables like; personal and regional characteristics (i.e. gender, age, marital status, household size, acquired education and current enrolment and region), principle activities (employed, unemployed and underemployed), major occupational trades, status of employment (i.e. own account workers, contributing family workers, paid employees or employers,), wages of paid employees and on pension and health benefits.

4.6.2 Variables Definition and Theoretical Impact

Informal employment can be analyzed by bivariate analysis as well as by multivariate probit regression model. First of all four definitions are compared using gender, age, size of household, education, sector, region of residence, firm size and employment status. Descriptive analysis takes only one variable into account ignoring the fact that many independent variables act together to determine the informality (Yu, 2012). For this reasons, study will use a multivariate probit regression model to find out the determinants of informality. A logit regression model of informality on different individual and job characteristics will be estimated. The explanatory or independent variables are consists of demographic and socio-economic variables. Variables are selected on theoretical knowledge, data availability and the usage in previous studies of informality.

Age:

Age is an important factor of informality. Funkhouser (1996) suggests that younger and old age people allocate more time in informal employment. It implies that young and old age workers are more likely to informal. As an explanatory variable age can be incorporated in the model to find out the impact of age on informality. We can use age as

complete years of age as well as age groups (15-25, 26-40, 41-60, 61+) to capture the relationship between age and informal employment. Age is a continuous variable starting from 15 years of age of worker. It is expected that the likelihood of informal employment reduces with the increase of age. As most of the young workers at their early age stage enters into small firms which are operating in informal sector to acquire experience and later on they join the formal sector jobs to earn high wages (Boyd, 1990). As age of worker increase, wages also increase (Kozel & Alderman, 1990). Young and old age workers are more likely to work as informal (Funkhouser, 1996). Therefore the sign of age can be positive or negative.

Gender:

In Pakistan families are male dominant and they earn for their families. Women remains disadvantage as compared to male workers. Women faces more unemployment than men and be more affected by underemployment, inactivity and vulnerable employment (ILO, 2016). Gender variable is used to analyze its relationship with informal employment. Flórez (2003) found negative correlation between gender and urban informal sector (dynamic). As compared to female, male are more in the informal employment sector (Ozcan et al., 2003).This variable is included in the model to capture its effects.

Education:

Education is among the most important factors that induce any person to work in formal sector. People having education are more mobile and more alert to changing opportunities. It is noted that as an increase in education increases the probability to work in formal sector also increases. Among the educated people formal employment is higher. Education acts

as a signaling device which increases the likelihood of securing formal employment. It is included as an explanatory variable and expected that it effect informality negatively. Variable for education is constructed by different levels of education, starting from no informal education (denoted by 0) to college/university (denoted by 5). Categories of education include no formal education, primary, middle, secondary, college and tertiary education. As the education level of worker increases, it may discourage the participation in informal labour force in favor of more formal jobs. Different studies have shown negative as well as positive association between education and informal employment. Banerjee (1983) found that in the informal sector, returns to education are higher. Funkhouser (1996) in a study for Central America, found that the workers with low education, are more involved in informal employment. It is expected that there is negative relation between education and choice of employment sector and positive relationship between education and earnings.

Technical and Vocational Training:

More technical and skilled people are more mobile and change their jobs and location for higher earnings. Vocational and technical can increase the informality for both genders as they start home based or road side jobs. House (1984) found that low qualification of workers motivate them to work as informal. Smith (1998) found positive association between training and earnings of the workers. Variable is used as technical and vocational training with expectations of positive sign.

Head of Household:

This shows the position of worker in household whether individual is head or a member. Household head is more likely to become formal because of his responsibilities of running the system of house as a head. Funkhouser (1996) found that workers (head of household) having children (male or female) were participated more or less in the informal employment across countries. The position of individual in household as a head is expected to make decision to work formally as compared to its other status in household. The model will also use the size of house hold as a variable.

Family Type:

Family type is divided into two parts as joint family and nuclear family. Type of family (joint family or nuclear family) is also an important variable to choose the sector of employment in labour market. Both type are important for the decision of employment. It is expected that the workers belonging to a joint family are more likely to join informal employment to fulfill the requirements of family. This variable is used to analyze the relationship between participants in the informal sector and joint family system.

Marital Status

Marital status variable can also affect the employment decision. Married female are more expected to work informal as compared to male married workers. Gunatilaka (2008) and Wamuthenya (2010) found that the married worker are more like to join informal sector. Data set provides the information on marital status. The marital status has four categories like never married, married, widow and divorced.

Household Size:

Household size can affect the decision of employment to join formal or informal sector. Large size of household can force to join informal sector for making family financially strong enough to meet his large expenses. A large family supplies more labour in the labour market which joins informal sector employment due to limited formal jobs.

Number of Children:

Number of children in household show the dependent members of family and it can affect the participation in informal employment to cover the expenses of large family. Male and female both want to work but less opportunities in formal sector force them to work in informal sector. It is expected that number of children is positively associated with informal employment in Pakistan.

Occupation:

Occupation is most important variable in the study of informality. It means type of work during a reference period, irrespective of industry. If we look at major occupational groups, there are 9 main occupations as, service, craft and related trades, elementary occupations, plant/ machine operators and assemblers, technicians and associate professionals, professionals, managers and clerical support workers. Occupation is most powerful and significant determinant of informal employment. Acar and Tansel (2014) found that occupations, except legislators and technicians, have a higher probability of being informal when compared to the reference group of professional workers.

Region or Location:

Cities are remained more attractive for people throughout the history. Many studies indicate that main flow of migration is from rural areas to the urban areas because the urban centers offer superior educational opportunities, health and sanitation, wider contacts, and other benefits. Geographical location can play an important role in employment. Basically more informal jobs are there in rural areas of developing countries. In developing economies a few number of formal employment exists in rural areas or they are completely informal and formal employment opportunities are only available in big cities or in urban areas. This dualism is also a salient feature of developing economies.

4.7 Summary of Chapter

In this chapter the theoretical and conceptual framework for informal employment was presented, the logit model and estimation techniques for determinants of informal employment are discussed, Blinder-Oaxaca decomposition method for wage differential and a logit model for qualification mismatch are also discussed. Further data source and variable construction and the impact of dependent variables on the independent variable is also discussed this chapter.

CHAPTER 5
DESCRIPTIVE ANALYSIS

5.1 Introduction

To analyze the informality in Pakistan, study adopted four different definitions of labour informality which are consistent with the guidelines of ILO and found in literature and used extensively in studies. Under each definition, informal employment is defined as:

Measure 1 (Formal Sector Job): Household enterprises (irrespective of size) operated and owned by own-account workers, enterprises (with less than ten workers) operated and owned by employers, and excluded all enterprises involved non-market production or agricultural activities.

Measure 2 (No Written Contract): All those workers who have not permanent jobs or do not have a written contract are classified as informal.

Measure 3 (No Pension): All those workers from formal and informal sector, who are not entitled to pension.

Measure 4 (No Social Protection): All the workers (whether from formal or informal sector) who are not entitled to any form of social security are defined as informal. Bye using the standards laid down by ILO and criterion used in the literature, I will distinguish between formal and informal employment in Pakistan and then estimate the total size of informal employment according to LFS 2017-18 data set.

Workers in informal sector face inequalities and exploitations, lack of opportunities of productive growth and lack of social protection. These factors are considered as barrier

to inclusive growth. Informality is multidimensional and complex phenomenon having a weak administration system that cannot record all economic units, on the other hand, the units are not recording their transaction and economic activities. It involves lack of education, costly and complex registration system, low profits and inability to pay taxes and free rider problem (that land lords and industrialists do not pay taxes or pay less so why we pay).

5.2 Formal and Informal Employment in Pakistan

Before starting discussion on multivariate analysis, it is necessary to shed light on bivariate analysis. If we look at gender wise distribution in Table 5.1, among female workers, according to Formal Sector Job measure more than 69 percent female are informally employed. This figure goes high if we move to other measures as more than 79 percent have informal employment due to No Written Contract, 83.99 percent have job with No Pension and 93.19 percent have No Social Protection coverage. The numbers differ for male workers as 71.69 percent among the male worker are informal according to Informal Sector Job measure, 81.85 percent have no written job contract, 86.75 percent have no pension facility and 94.69 percent have no social security coverage. Informal employment is high in rural areas as compared to urban areas. Numbers show that more than 75 percent worker are informal who work at rural places where as less than 70 percent workers are informal among those who work at an urban area according to Informal Sector Job measure.

According to "Formal Sector Job" measure more than 71.4 percent workers are informally employed and 28.6 percent are employed formally. This figure goes high if we

move to other measures as more than 81.54 percent have informal employment whereas 18.46 percent have formal jobs according to the measure of "No Written Contract", 86.45 percent have informal job and 13.55 percent have formal jobs according to "No Pension" measure and 94.53 percent have informal jobs and 5.47 percent have formal jobs according to "No Social Protection" measure of informality.

Table 5.1: Gender, Rural Urban and Marital Status Wise Formal and Informal Sectors (Percentage Distribution)

	Informal Sector Job		**No Written Contract**		**No Pension**		**No Social Protection**	
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
Female	30.99	69.01	20.99	79.01	16.01	83.99	6.81	93.19
Male	28.31	71.69	18.15	81.85	13.25	86.75	5.31	94.69
Rural	24.61	75.39	14.55	85.45	10.56	89.44	3.45	96.55
Urban	30.94	69.06	20.75	79.25	15.29	84.71	6.65	93.35
Married	30.03	69.97	20.8	79.2	15.93	84.07	6.36	93.64
Unmarried	25.08	74.92	12.71	87.29	7.69	92.31	3.28	96.72
Total	28.6	71.4	18.46	81.54	13.55	86.45	5.47	94.53

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Percentages are row-wise separately for each measure.

In rural areas workers have very few access to social protection and pension after retirement. Only 14.55 percent workers from total rural labour force have written contract whereas 10.56 percent have pension and only 3.45 percent have social security coverage. Workers in urban areas have 20.75 percent formal jobs according to written job contract, 15.29 percent and 6.65 percent are formal according to No Pension and No Social Protection measure respectively. Among the married and unmarried workers, it is clear that married workers join formal jobs more frequently than unmarried workers.

According to different measures, there is very high informality in wholesale and retail industry. Table 5.2 shows more than 88 percent workers have informal employment according to Informal Sector Job measure. It is evident that the whole industry is almost

informal on the basis of other three measures as 98.4 percent have No Written Contract and more than 99 percent have informal employment according to No Pension and No Social Security measure. The workers in wholesale and retail sector have no or less social protection, job without any written contract and have no pension or old age benefits. This situation also prevails in construction and accommodation and food industries. According to Informal Sector Job measure manufacturing sector has informal employment more than 64 percent out of its total labour force. Informality is less among community and other services industry because most of the public and private sector jobs fall in this category that offers formal and permanent jobs with social security and pension. More than 35 percent workers are employed informally in this industry according to Informal Sector Job measure, 45.33 percent have no written contracts, 55.64 percent have no pension facility and 81.64 percent have no social protection coverage.

Table 5.2: Formal Informal Sector Workers (Distribution by Major Industries Divisions in Percentage)

	Informal Sector Job		**No Written Contract**		**No Pension**		**No Social Protection**	
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
Manufacturing	35.91	64.09	10.5	89.5	5.37	94.63	2.01	97.99
Construction	7.5	92.5	2.95	97.05	1.22	98.78	0.12	99.88
Wholesale and Retail	2.77	97.23	1.6	98.4	0.17	99.83	0.06	99.94
Transportation	11.39	88.61	7.89	92.11	4.72	95.28	1.65	98.35
Accommodation and Food	8.67	91.33	4.37	95.63	0.36	99.64	0	100
Community and Other Services	65.22	34.78	54.67	45.33	44.36	55.64	18.36	81.64
Total	28.6	71.4	18.46	81.54	13.55	86.45	5.47	94.53

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Percentages are row-wise separately for each measure.

Among the services work 85.66 percent are employed informally according to Informal Sector Job measure and more than 88 percent have no written job contract. 91.75 and 96.85 percent are working without pension and social security protection respectively in this occupation. Craft related, plant and machinery operator and elementary occupations also experience high levels of informality in employment. Informal employment is low among managers, professionals, technicians, clerks and skilled agriculture workers because of their high levels of education and qualification (Table 5.3).

Table 5.3: Informal Sector Workers (Distribution by Major Occupational Groups in %)

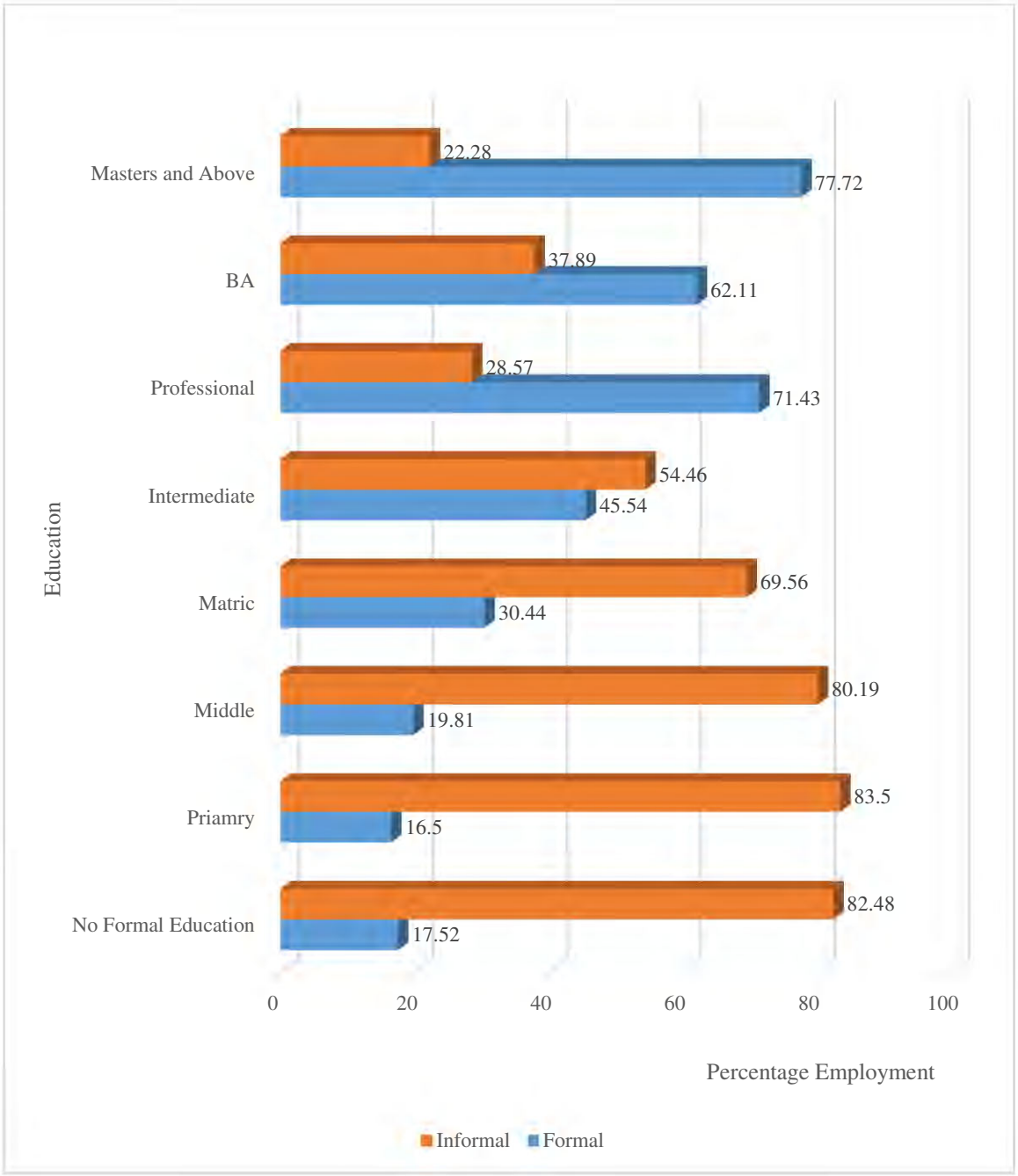
	Informal Sector Job		**No Written Contract**		**No Pension**		**No Social Protection**	
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
Managers	45.34	54.66	29.13	70.87	19.88	80.12	10.12	89.88
Professionals	71.25	28.75	56.31	43.69	44.34	55.66	16.58	83.42
Technicians	55.69	44.31	44.38	55.62	33.81	66.19	15.01	84.99
Clerks	85.38	14.62	70.1	29.9	55.1	44.9	23.27	76.73
Services Work	14.34	85.66	11.49	88.51	8.29	91.71	3.15	96.85
Skilled Agriculture	82.11	17.89	65.85	34.15	54.47	45.53	26.83	73.17
Craft Related	10.47	89.53	4.87	95.13	2.91	97.09	1.2	98.8
Plant and Machinery Operator	24.86	75.14	10.13	89.87	5.81	94.19	2.7	97.3
Elementary Occupations	32.43	67.57	13.85	86.15	10.01	89.99	3.66	96.34
Total	28.6	71.4	18.46	81.54	13.55	86.45	5.47	94.53

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Percentages are row-wise separately for each measure.

As the level of education increases the formal employment also increases. A large share of informal workers belong to no formal education category. Up to intermediate level of education, the percentage of informal employment for a specific educational category is

high whereas it is reverse at higher levels of educations. Very less workers are employed as informally who have a professional degree or masters and above level of education (Figure 5.1).

Figure 5.1: Percentage Distribution of Educational Attainment of Formal and Informal Workers

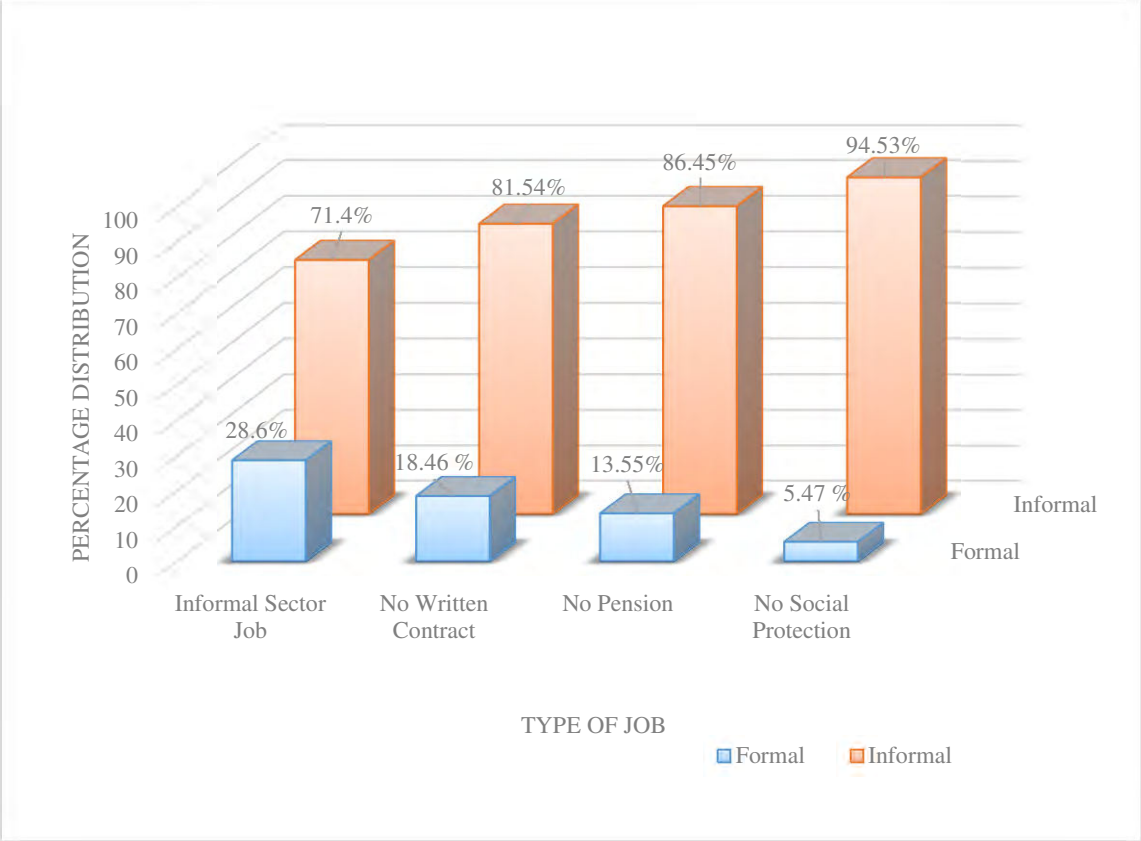


Source: - Author's Calculations from Labour Force Survey 2017-18

More than 82 percent workers belong to informal employment having no formal education whereas more than 72 percent belong to formal employment having masters and above education.

The level of informality increases if the measure is changed from the Informal Sector Job definition to another. 71.4 percent workers are informal according to informal sector job measure, 81.54 percent are informal according to No Written Contract measure, and 86.45 percent and 94.53 percent are informal because they have no pension and social security protection respectively (Figure 5.2).

Figure 5.2: Percentage Distribution of Formal and Informal Workers



Source: - Author's Calculations from Labour Force Survey 2017-18

5.3 Wage of Formal and Informal Workers of Pakistan

Table 5.4 shows that mean wages increases with age up to 55 years of age and declines after that. Mean wages (35253.35) of formal workers are high than the mean wages (14958.37) of informal workers whereas the mean wages of formal workers are almost two times higher than the average wages. Informal workers receive less than overall mean wages which shows disparities in wages among sectors. Female workers earn (13322.01) less than their male (19835.9) counterparts. The mean wages of female is also less than the overall mean wages.

If we disaggregate mean wages according to different age groups for formal and informal employment, we will see that the mean wages of both sector increases till 46-55 years age group, but the increase in the wages of formal sector workers is higher than the increase of informal workers. After this age group it declines for informal worker's group but the wages of formal workers increases to 56-65 years age group and reaches to its peak point. After that point, the mean wages decline for formal sector with a small amount. The mean wages of informal workers for 66+ years of age group come to same point as for age group of 15-25 years.

Table 5.4: Monthly Mean Wages (PKR) of Age Categories

Age Categories	Monthly Mean Wages (PKR)
15-25	13239.72
26-35	18674.81
36-45	21896.77
46-55	26296.59
56-65	25368.69
66+Above	14464.18

Source: - Author's Calculations from Labour Force Survey 2017-18

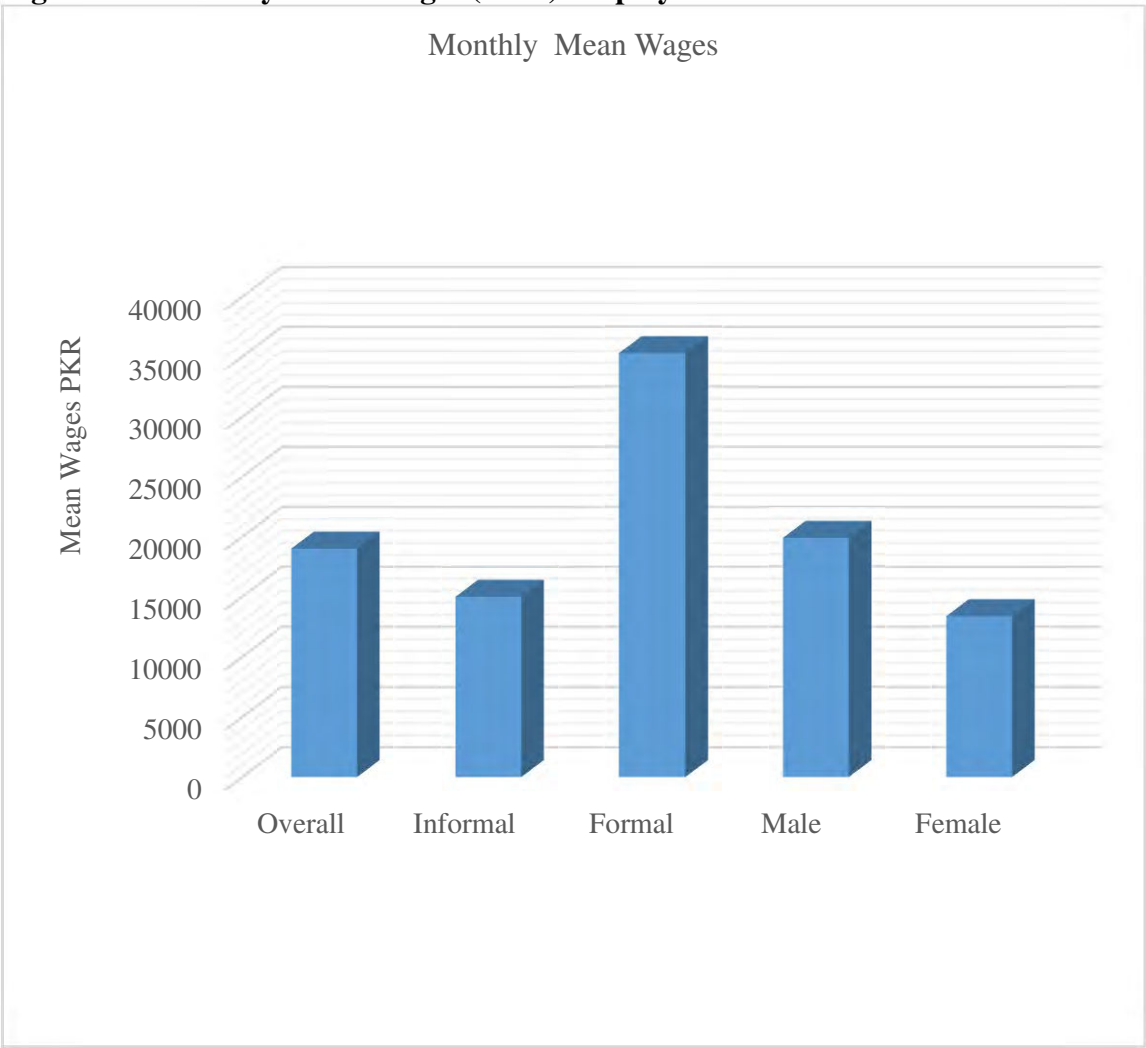
Interestingly, the peak in the informal sector 46-55, comes much earlier than in the other sector. The peak of earnings of the informal sector are also lower than the peak of earnings of formal sectors. This is in conformity with the characteristics of informal employment. The profile of these workers remains below the profile of formal sector. This means that the life-long earnings of the workers in the informal sector is lower than the formal sector of employment. This shows the vulnerability of the workers to the conditions of the informal sector, where workers have no legal protection against unjust wages and working conditions (Figure 5.3).

Figure 5.3: Monthly Mean Wages (PKR) Sector of Employment and Age Categories

Source: - Author's Calculations from Labour Force Survey 2017-18

It is evident from Figure 5.4 that monthly mean wages of formal workers are higher than informal workers, similar mean wages of male workers are greater than female workers.

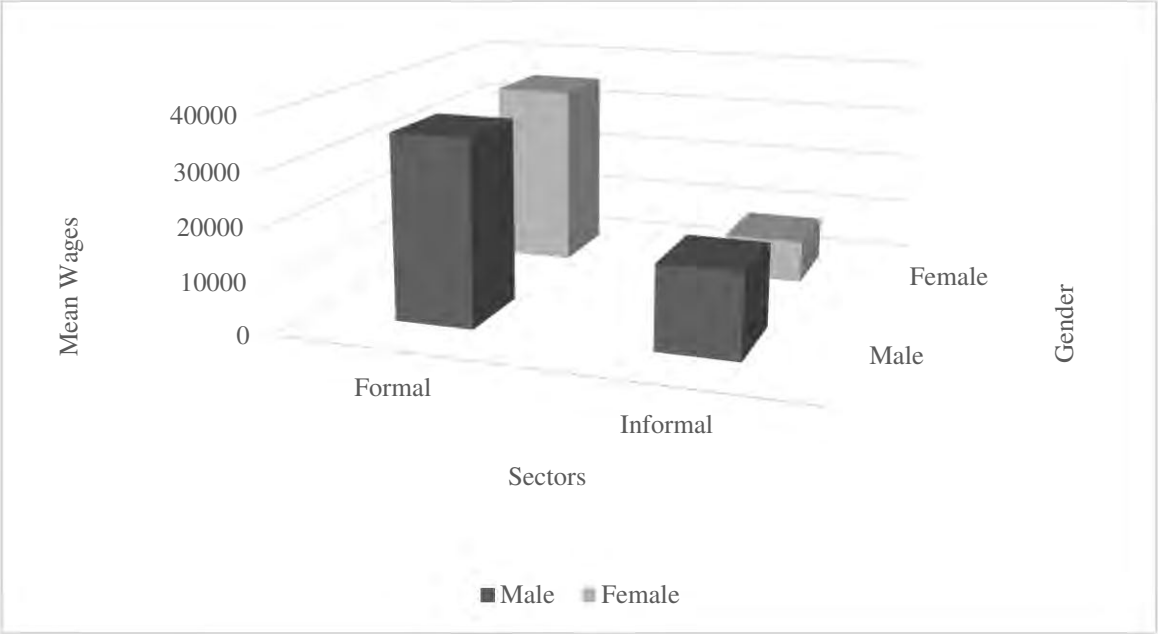
Figure 5.4: Monthly Mean Wages (PKR) Employment and Gender Wise



Source: - Author's Calculations from Labour Force Survey 2017-18

Disparities in wages among male and female in formal employment are very small and the wages are almost equal but this is not valid for informal employment where female are receiving half of what male receives. Female workers in formal sector are receiving more than four times than the female workers in informal employment receives (Figure 5.5).

Figure 5.5: Monthly Mean Wages (PKR) of Formal and Informal Employment Gender Wise



Source: - Author's Calculations from Labour Force Survey 2017-18

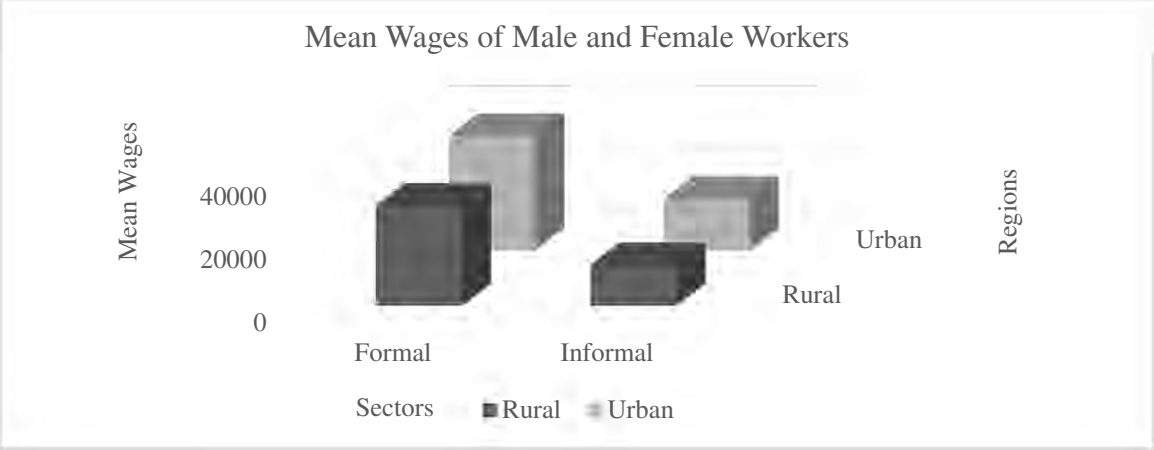
If we analyze according to marital status, the mean wages of married workers are higher than those who are unmarried (Figure 5.6).

Figure 5.6: Monthly Mean Wages (PKR) of Formal and Informal Employment-Marital Status Wise

Source: - Author's Calculations from Labour Force Survey 2017-18

Wages are higher in urban areas for both type of employment as formal and informal than the workers who work in rural areas (Figure 5.7).

Figure 5.7: Monthly Mean Wages (PKR) of Formal and Informal Employment -Region Wise



Source: - Author's Calculations from Labour Force Survey 2017-18

As the level of education increases, the mean wages also increase and are higher for professional degree holders in formal and informal employment. The mean wages of master and above degree holder in informal sector are less than the mean wages of workers holding matric degree in formal sector (Table 5.5).

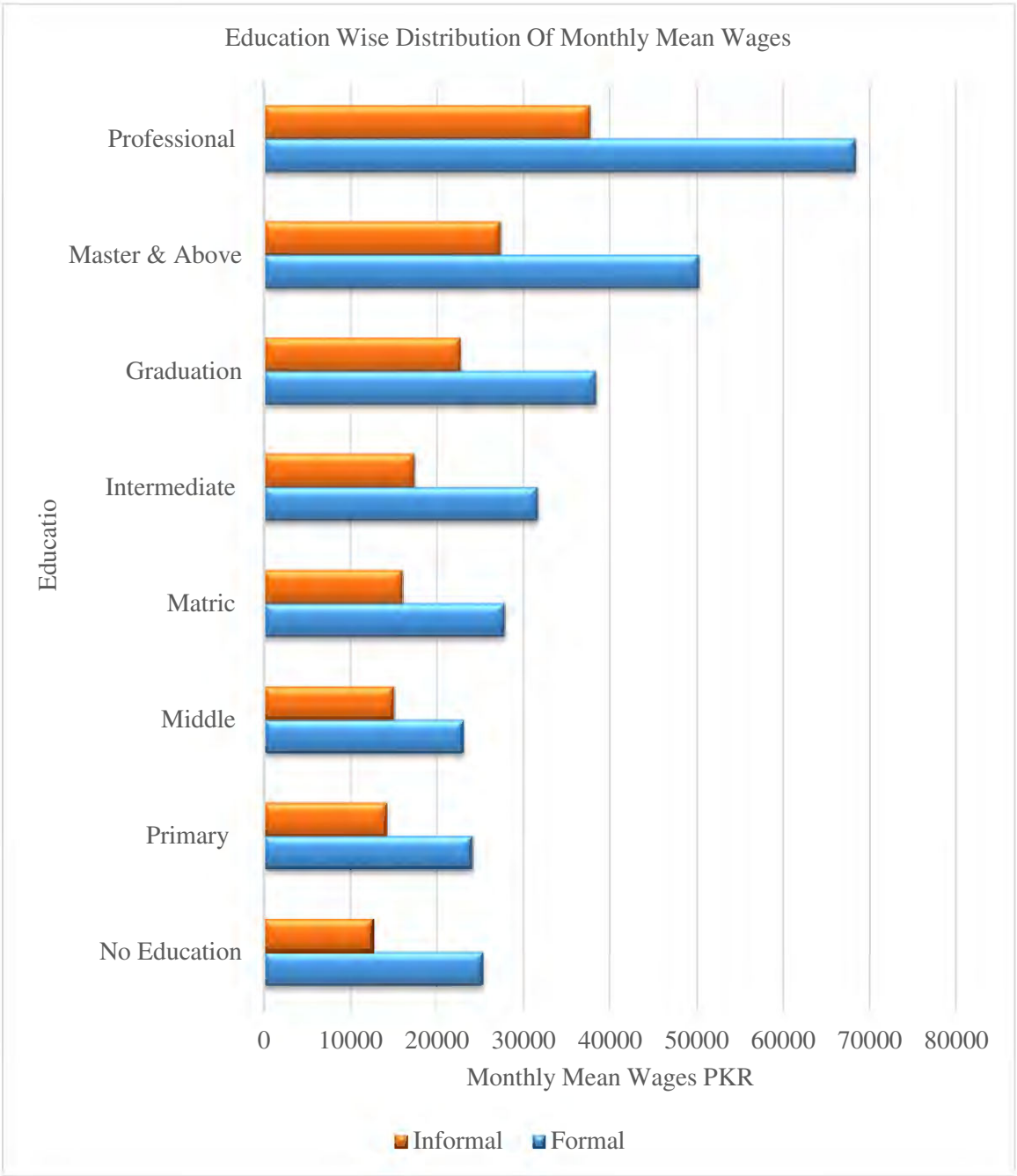
Table 5.5: Monthly Mean Wages (PKR) of Workers Education Wise

Education	Monthly Mean Wages (PKR)
No Formal Education	13265.98
Primary	14940.7
Middle	16070.25
Matric	19180.73
Intermediate	23307.31
Graduation	55055.81
Master and Above	31037.78
Professional	41593.03

Source: - Author's Calculations from Labour Force Survey 2017-18

Over all mean wages of informal workers are lower in all educational categories which shows that informal sector pays lower wages to the workers according to their qualifications (Figure 5.8).

Figure 5.8: Monthly Mean Wages (PKR) of Formal and Informal Workers -Education Wise



Source: - Author's Calculations from Labour Force Survey 2017-18

It is evident from Table 5.6 that the wages of permanent job holder are higher than those who has jobs with contracts and without contracts in both type of employment as formal and informal whereas the wages of workers without contract are lowest in formal and informal employment as well as overall.

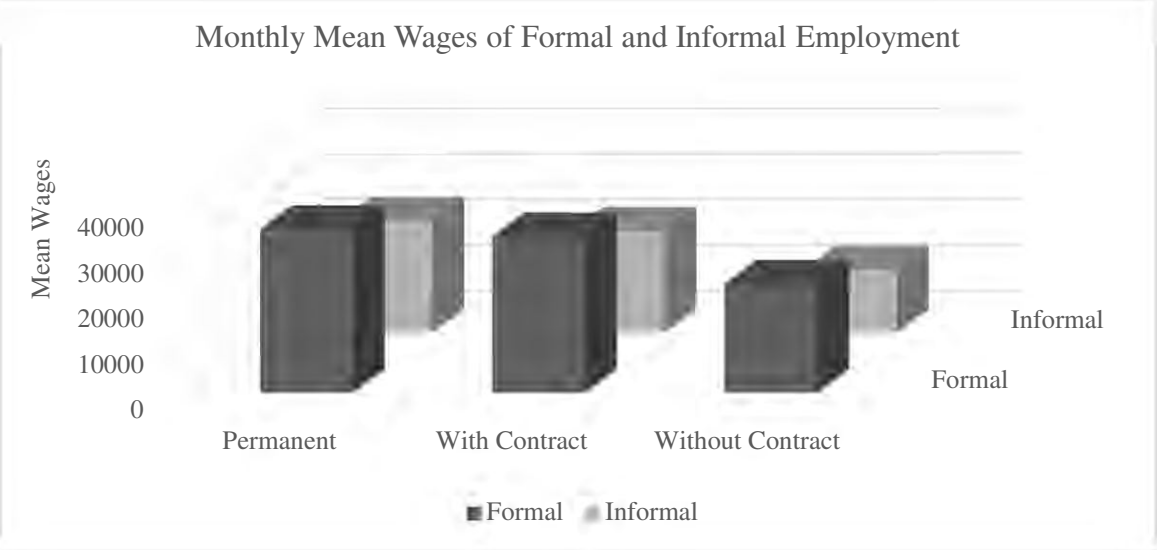
Table 5.6: Monthly Mean Wages (PKR)-Type of Job Wise

Job Type	Monthly Mean Wages (PKR)
Permanent	33668.63
With Contract	24090.11
Without Contract	14070.65
Public Job	33884.53
Private Job	15230.49

Source: - Author's Calculations from Labour Force Survey 2017-18

Public sector offers higher wages than that of private sector and workers employed formally in both public and private sector receives higher wages than those employed informally in respective sector (Figure 5.9).

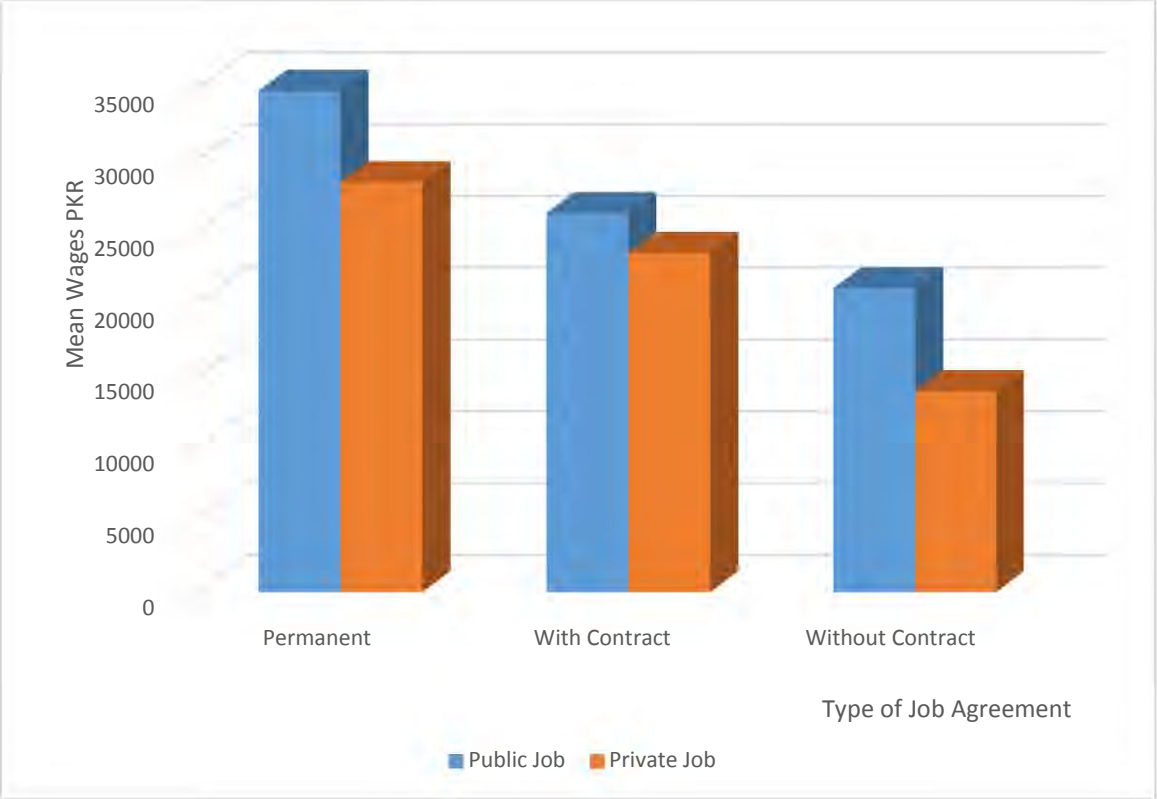
Figure 5.9: Monthly Mean Wages (PKR) of Formal and Informal Employment -Type of Job Wise



Source: - Author's Calculations from Labour Force Survey 2017-18

Wages are highest for those who are employed formally and having a permanent jabs and decreases with the type of job agreement. Workers having permanent public job are earning more as compared to private job holders. Public contractual job holders are also earning more than as compared to private contractual workers.

Figure 5.10: Monthly Mean Wages (PKR) - Sector Wise



Source: - Author's Calculations from Labour Force Survey 2017-18

5.4 Educational Profile of Workers

Average education according to mode method, in occupations of managers and pro professionals is 16 years education, which is the highest education among all occupations. The means education of these two occupations is also highest in both data sets.

Table 5.7: Mean and Mode Education of Workers (Evidences from LFS and PSLM)

Occupations	Mode LFS	Mode PSLM	Mean LFS	Mean PSLM
Managers	16	16	14.56	12.60
Pro Professionals	16	16	13.97	14.12
Technicians	10	10	11.70	11.52
Clerks	14	14	12.29	12.23
Services Work	10	10	9.03	9.18
Skilled Agriculture	5	8	7.86	8.03
Craft Related	5	10	7.42	8.06
Plant Operator	5	10	7.28	8.08
Elementary	5	10	7.26	7.76

Source: - Author's Calculations from Labour Force Survey 2017-18

The mean education for manager's occupational group is little bit different in LFS and PSLM data sets but for all other occupations it is same. The mode education is same up to the services work occupation and there is some difference below this occupation but mean education is almost stable. In these occupations (skilled agriculture, craft related, plant operator and elementary occupations) mostly people have 5 to 10 years of education (Table 5.7). It is observed that people with highest educational qualifications work in formal sector. Workers who have primary level education are mostly (more than 88 percent) employed informally. This figure declines for informal workers as level of education increases. People having 12 grades are equally employed by formal and informal sector but for higher level of qualifications (BA/BSc 58.18 percent and MA/MPhil/PhD 64.41 percent) or have a professional degree are mostly (64.3 percent) employed formally (Table 5.8).

Table 5.8: Formal and Informal Workers (Distribution by Level of Education)

	Formal	Informal	Total
Primary	378	2,885	3,263
	[11.58]	[88.42]	[100]
	(7.62)	(32.27)	(23.47)
Middle	410	1,764	2,174
	[18.86]	[81.14]	[100]
	(8.26)	(19.73)	(15.64)
Matric	1,065	1,991	3,056
	[34.85]	[65.15]	[100]
	(21.46)	(22.27)	(21.98)
FA/FSc	845	862	1,707
	[49.5]	[50.5]	[100]
	(17.03)	(9.64)	(12.28)
BA/BSc	1,010	726	1,736
	[58.18]	[41.82]	[100]
	(20.35)	(8.12)	(12.49)
MA/ M.Phill /PhD	1,055	583	1,638
	[64.41]	[35.59]	[100]
	(21.26)	(6.52)	(11.78)
Professional	200	128	328
	[60.98]	[39.02]	[100]
	(4.03)	(1.43)	(2.36)
Total	4,963	8,939	13,902
	[35.7]	[64.3]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

According to mode method 36.88 percent workers are over-educated whereas 36.02 workers are over-educated according to mean method from LFS data (Table 5.9).

Table 5.9: Qualification Mismatch by Mode and Mean Method (LFS Data)

Mismatch (LFS)	Mode Method	Mean Method
Adequate Qualification	4,982	3,616
	(35.84)	(26.01)
Over Qualification	5,127	5,007
	(36.88)	(36.02)
Under Qualification	3,793	5,279
	(27.28)	(37.97)
Total	13,902	13,902
	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Column-Wise Percentages are in Parentheses.

According to mode method 17.40 percent workers are over-educated whereas 37.38 percent workers are over-educated according to mean method from PSLM data (Table 5.10).

Table 5.10: Qualification Mismatch by Mode and Mean Method (PSLM Data)

Mismatch (PSLM)	Mode Method	Mean Method
Adequate Qualification	23,322	19,490
	(30.84)	(25.77)
Over Qualification	13,161	28,270
	(17.40)	(37.38)
Under Qualification	39,138	27,861
	(51.76)	(36.84)
Total	75,621	75,621
	(100)	(100)

Source: - Author's Calculations from PSLM 2019-20
Note: Column-Wise Percentages are in Parentheses.

According to mode method, 38.62 percent male are over-educated whereas 20.92 percent female are over-educated. Among female, mostly are exactly educated as 46.23 and 32.85 percent are under educated according to mode methods (Table 5.11).

Table 5.11: Qualification Mismatch (Distribution by Gender Wise, Mode Method)

Mode Method	Female	Male	Total
Adequate Qualification	632	4,350	4,982
	[12.69]	[87.31]	[100]
	(46.23)	(34.7)	(35.84)
Over Qualification	286	4,841	5,127
	[5.58]	[94.42]	[100]
	(20.92)	(38.62)	(36.88)
Under Qualification	449	3,344	3,793
	[11.84]	[88.16]	[100]
	(32.85)	(26.68)	(27.28)
Total	1,367	12,535	13,902
	[9.83]	[90.17]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

Males are less over-educated (35.01 percent) as compared to female (45.21 percent). Male are mostly under educated and females are over educated according to mean method of over-education (Table 5.12).

Table 5.12: Qualification Mismatch (Distribution by Gender Wise, Mean Method)

Mean Method	Female	Male	Total
Adequate Qualification	283	3,333	3,616
	[7.83]	[92.17]	[100]
	(20.7)	(26.59)	(26.01)
Over Qualification	618	4,389	5,007
	[12.34]	[87.66]	[100]
	(45.21)	(35.01)	(36.02)
Under Qualification	466	4,813	5,279
	[8.83]	[91.17]	[100]
	(34.09)	(38.4)	(37.97)
Total	1,367	12,535	13,902
	[9.83]	[90.17]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

According to mode method mostly workers are over educated in private sector and in public sector, mostly workers are exactly educated (Table 5.13).

Table 5.13: Qualification Mismatch (Distribution by Sector Wise, Mode Method)

Mode	Private Sector	Public Sector	Total
Adequate Qualification	3,140	1,842	4,982
	[63.03]	[36.97]	[100]
	(35.46)	(36.5)	(35.84)
Over Qualification	3,449	1,678	5,127
	[67.27]	[32.73]	[100]
	(38.95)	(33.25)	(36.88)
Under Qualification	2,266	1,527	3,793
	[59.74]	[40.26]	[100]
	(25.59)	(30.26)	(27.28)
Total	8,855	5,047	13,902
	[63.7]	[36.3]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

In private sector, the mostly workers are under-educated according to mean method but not according to mode method whereas a large share of workers are over-educated in public sector according to mean methods. Over all large share of worker is mismatched (Table 5.14).

Table 5.14: Qualification Mismatch (Distribution by Sector Wise, Mean Method)

Mean	Private Sector	Public Sector	Total
Adequate Qualification	2,256	1,360	3,616
	[62.39]	[37.61]	[100]
	(25.48)	(26.95)	(26.01)
Over Qualification	2,647	2,360	5,007
	[52.87]	[47.13]	[100]
	(29.89)	(46.76)	(36.02)
Under Qualification	3,952	1,327	5,279
	[74.86]	[25.14]	[100]
	(44.63)	(26.29)	(37.97)
Total	8,855	5,047	13,902
	[63.7]	[36.3]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

According to mode method 36.57 percent workers are exactly educated in formal sector and 38.3 percent workers are over educated in informal sector (Table 5.15).

Table 5.15: Qualification Mismatch (Distribution by Formal and Informal Sector Wise, Mode Method)

Mode	Formal	Informal	Total
Adequate Qualification	1,815	3,167	4,982
	[36.43]	[63.57]	[100]
	(36.57)	(35.43)	(35.84)
Over Qualification	1,703	3,424	5,127
	[33.22]	[66.78]	[100]
	(34.31)	(38.3)	(36.88)
Under Qualification	1,445	2,348	3,793
	[38.1]	[61.9]	[100]
	(29.12)	(26.27)	(27.28)
Total	4,963	8,939	13,902
	[35.7]	[64.3]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

Formal sector has more over-educated workers as compared to informal sector. In formal sector 47.95 percent are over-educated according to mean method. Informal sector has 29.39 percent over educated workers and 37.97 are under educated according to mean methods (Table 5.16).

Table 5.16: Qualification Mismatch (Distribution by Formal and Informal Sector Wise, Mean Method)

Mean	Formal	Informal	Total
Adequate Qualification	1,332	2,284	3,616
	[36.84]	[63.16]	[100]
	(26.84)	(25.55)	(26.01)
Over Qualification	2,380	2,627	5,007
	[47.53]	[52.47]	[100]
	(47.95)	(29.39)	(36.02)
Under Qualification	1,251	4,028	5,279
	[23.7]	[76.3]	[100]
	(25.21)	(45.06)	(37.97)
Total	4,963	8,939	13,902
	[35.7]	[64.3]	[100]
	(100)	(100)	(100)

Source: - Author's Calculations from Labour Force Survey 2017-18
Note: Row-Wise Percentages are in Brackets and Column-Wise Percentages are in Parentheses.

5.5 Summary of Chapter

Four different definitions of informal employment are used to find out the determinants of informal employment in Pakistan. In this chapter a descriptive analysis was presented which show that the size of informal employment increases if the definition is changed from enterprise characteristics to job based characteristics. It is also found that there is a substantial differences between the wages of formal and informal worker. Data show that a qualification mismatch exists in formal and informal employment of Pakistan labour market.

CHAPTER 6
RESULTS AND DISCUSSION

This chapter presents the results and discussion of determinants of informality, wage differential among formal and informal workers using Oaxaca-blinder decomposition and quantile decomposition at different quantiles of distribution. In last section, results of Qualification mismatch are discussed.

6.1. Determinants of Informality

According to first objective, estimates of the probability of employment from nonagricultural sample are represented in Table 6.1 for the year of 2017-18. It seems from the results that males are more likely to work informal as compared to female counterparts in all four models. One male worker is 1.02, 1.239, 1.263 and 1.481 times more likely to be employed informally as compared to female worker according to informal sector job, no social protection, no written contract and no pension definition respectively. It means that the women prefer formal jobs and participate in informal labour market only to help their families especially during financial crises. Ayyoub and Gillani (2019) also found that male workers participate in urban informal sector to earn for their families. In Pakistan families are male dominant and they earn for their families. Female labour force participation remains very low and works only in financial crises and prefers to work in formal sector. Women may increase self-employment during crises in order to substitute for their husbands who lost jobs.

Workers of age group 26-40 and 41-60 are both significantly less likely to be employed as informal as compared to the workers of 15-25 age group. Age group of 26-40

is 0.758, 0.458, 0.625 and 0.572 times less likely to be employed informally as compared to age group of 15-25 according to informal sector job, no social protection, no written contract and no pension definition respectively. Young workers have less experience and qualification so they face barriers to enter formal sector jobs and are more prone to work informally. Ayyoub and Gillani (2019) also show that the young workers prefer to work informally. The age group of workers of over 60 years are also more likely to work informally. Odds in favor of informal employment are 1.890, 1.820, 2.495 and 2.718 times higher than age group of 15-25 according to informal sector job, no social protection, no written contract and no pension definition respectively. These results support the findings of Funkhouser (1996) that young and old age workers are more likely to work as informal.

Vocational Training has a positive impact on informal employment in three models. Results show that worker with vocational training are 1.762, 1.802 and 1.724 times more likely to be employed informally according to informal sector job, no written contract and no pension definition respectively as compared to workers without vocational training. Gillani and Khan (2013) also found same results. The odds for vocational training only in no social protection model show that vocational training reduces the likelihood of informal employment by 0.935 times. If an individual acquires vocational training, his probability of working as an informal employee increases compared to those without any vocational training. Because a large number of worker who have received training in electrical and auto mechanical work, welding, carpentry, garment making, embroidery and driving, join the informal sector. After acquiring skills and training in this particular job, these semi-skilled workers are easily absorbed in to the informal sector. Vocational and technical

training has positive effect on informality for both genders when they start working at home or at the roadside.

House (1984) found that a low level of qualification encourages workers to work in the informal sector. As the level of education increases, its decreases the chances of informal employment, the negative association for all the categories of education show that if individual has some education, he is less likely to join informal employment as compared to those who has no formal education.

Odd ratios for education categories show that as the level of education increases, the likelihood of informal employment decreases as compared to no formal education. Workers with primary education are 0.980, 0.747, 0.775 and 0.787 times less likely to be employed informally as compared to workers with no formal education. The other categories of education variable shows same pattern. Workers with masters and above level of education are 0.064, 0.054, 0.044 and 0.043 times less likely to be employed informally as compared to workers with no formal education. This result is also consistent with the findings of Gillani and Khan (2013) for Pakistan and Funkhouser (1996)'s study for Central America, that the workers having less education, are more involved in informal employment.

The odds for the marital status show that the unmarried workers are 1.133, 1.349, 1.295 and 1.481 times more likely to work as informal according to informal sector job, no social protection, no written contract and no pension definition respectively as compared to those who are married. As married workers are more responsible for their family so they are more likely to join formal sector jobs. This can be a result of scarcity of better employment opportunities in informal sector of developing countries. This results is

contradicting with the findings of Ayyoub and Gillani (2019) for a study from Lahore city. Position as head in a household hurts to work as informal. The odds are significant only for no written contract and no pension definition and show that workers with said position in household are 0.892 and 0.814 times less likely to accept informal job respectively.

Joint family has positive impact on informal employment which is consistent with the findings of Gillani and Khan (2013), except second measure, it increases the chances of informal employment by 1.120, 1.089 and 1.084 times according to informal sector job, no written contract and no pension definition respectively. The odds for joint family only in no social protection model show that it reduces the likelihood of informal employment by 0.929 times as compared to nuclear family. Joint family increase the chances of informal employment. At least one member (spouse) of nuclear families remains busy in different home activities like cooking, cloth washing and looking after children at their homes and less participate in labour market.

Size of household is negatively associated with informal jobs. Large family needs large amount of money for their expenses. Workers with large family compete for formal jobs to feed their large families. If a household has large number of employed persons then he is less conscious about formal jobs and joins informal job. Odds ratios show that one member of household reduces the likelihood of informal employment by 0.984, 0.966, 0.962 and 0.944 times according to informal sector job, no social protection, no written contract and no pension definition respectively. Results show that according to informal sector job, no social protection, no written contract and no pension definition one more employed person in household increases the likelihood of informal employment by 1.017,

1.044, 1.123 and 1.161times respectively. Gillani and Khan (2013) also found positive relation for urban informal sector.

Large number of children below the age of 14 increases the chances of informal employment. Odds show that one more child in household increases the likelihood of informal employment by 1.082, 1.084, 1.072 and 1.071 times according to informal sector job, no social protection, no written contract and no pension definition respectively. This is happens due to working time rigidity in formal jobs where female cannot adjust their timing and work as informal to cope with domestic works and child care activities so they are less conscious about formal jobs. Gillani and Khan (2013) also found association between decency and urban informal employment.

Cities are remained more attractive for people throughout the history. Odds for urban location show that workers working in urban area are 0.913, 0.680, 0.856 and 0.869 times less likely to be employed informally as compared to workers with rural location according to informal sector job, no social protection, no written contract and no pension definition respectively. Many studies indicate that main flow of migration is from rural areas to the urban areas because the urban centers offer superior educational opportunities, health and sanitation, wider contacts, and other benefits. Geographical location can play an important role in employment. Basically more informal jobs are there in rural areas in developing countries. In developing economies a few number of formal employment exists in rural areas or they are completely informal and formal employment opportunities are only available in big cities or in urban areas. This dualism is also a salient feature of developing economies. Results show that the location of urban area will decrease the informal employment.

Further the results obtained from different criteria based definitions, reveal that the results are almost same across all the definitions (informal sector, contract, pension and social security based definitions) but pension based definition seems most appropriate. It is highly correlated with other measures of informality and produces more significant and expected signs according to the theory of informal employment.

Table 6.1: Determinants of Informal Employment According To Different Measures from Non-Agriculture Group

Variables	Sub Group	Informal Sector Job	No Social Protection	No Written Contract	No Pension
		Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Demographic Characteristics					
Gender	Male	1.020	1.239	1.263*	1.481*
		(0.044)	*(0.095)*	*(0.064)*	*(0.084)*
Age	26-40	0.758*	0.485*	0.625*	0.572*
(15-25 Base		*(0.028)*	*(0.040)*	*(0.029)*	*(0.032)*
Category)	41-60	0.621*	0.297*	0.410*	0.358*
		(0.027)	*(0.027)*	*(0.022)*	*(0.022)*
	61 Above	1.890*	1.820**	2.495*	2.718*
		(0.185)	*(0.519)*	*(0.375)*	*(0.526)*
Vocational	Trained	1.762*	0.935	1.802*	1.724*
Training		*(0.048)*	*(0.046)*	*(0.060)*	*(0.065)*
Education	Primary	0.980	0.747*	0.775*	0.787*
		(0.037)	*(0.083)*	*(0.042)*	*(0.053)*
	Middle	0.814*	0.433*	0.543*	0.500*
		(0.033)	*(0.046)*	*(0.030)*	*(0.034)*
	Matric	0.483*	0.210*	0.269*	0.236*
		(0.017)	*(0.019)*	*(0.013)*	*(0.013)*
	Intermediate	0.255*	0.135*	0.132*	0.115*
		(0.011)	*(0.013)*	*(0.007)*	*(0.007)*
	Professional	0.089*	0.073*	0.054*	0.057*

		(0.009)	*(0.010)*	*(0.005)*	*(0.006)*
	Graduation	0.136*	0.095*	0.079*	0.075*
		(0.006)	*(0.009)*	*(0.004)*	*(0.005)*
	Master and	0.064*	0.054*	0.044*	0.043*
	Above	*(0.004)*	*(0.005)*	*(0.003)*	*(0.003)*
Marital Status	Unmarried	1.133*	1.349*	1.295*	1.481*
		(0.042)	*(0.098)*	*(0.059)*	*(0.078)*
Household characteristics					
Household Head	Head	0.974	0.970	0.892*	0.814*
		(0.037)	*(0.068)*	*(0.041)*	*(0.042)*
Family Type	Joint	1.120*	0.929	1.089**	1.084**
		(0.033)	*(0.051)*	*(0.038)*	*(0.043)*
Household Size		0.984**	0.966**	0.962*	0.944*
		(0.008)	*(0.014)*	*(0.010)*	*(0.010)*
Number of Employed Person In		1.017	1.044***	1.123*	1.161*
Household		*(0.012)*	*(0.025)*	*(0.018)*	*(0.021)*
Number Of Child in Household		1.082*	1.084*	1.072*	1.071*
		(0.012)	*(0.022)*	*(0.014)*	*(0.015)*
Job Related characteristics					
Place of Work	Urban	0.913*	0.680*	0.856*	0.869*
		(0.023)	*(0.035)*	*(0.026)*	*(0.030)*
Constant		4.548*	150.631*	15.852*	29.359*
		(0.278)	*(20.443)*	*(1.229)*	*(2.646)*
Number of Observations		44606	44606	44606	44606
LR $chi^2(19)$		7485.29	2936.65	8730.19	7617.86
Pseudo R^2		0.1402	0.1552	0.2046	0.2153
Log likelihood		-22956.977	-7994.013	-16970.93	-13884.646

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.
Standard Errors are in parenthesis.
Dependent variable for Model 1 Informal Sector Job=1 if worker is informal 0 otherwise, for Model 2 No Social Protection=1 if worker is informal (having no social protection) 0 otherwise, for Model 3 No Written Contract=1 if worker is informal (having no job contract) 0 otherwise and for Model 4 No Pension=1 if worker is informal (having job without any entitlement to pension) 0 otherwise.

Results reported in Table 6.2 for a logit model estimated from full sample including agriculture workers shows that male are less likely to participate in informal sector jobs only in first measure of informality. More over expected negative association of education turns to positive for primary and middle education in this measure. As education increases, the likelihood of informal employment decreases for all other measures in all categories of education. All other variables have same signs as shown in table 6.1.

Table 6.2: Determinants of Informal Employment According To Different Measures

Variables	Sub Group	Informal Sector Job	No Social Protection	No Written Contract	No Pension
		Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Demographic Characteristics					
Gender	Male	0.859*	1.138***	1.016**	1.279*
		(0.028)	*(0.088)*	*(0.049)*	*(0.071)*
Age	26-40	0.857*	0.485*	0.650*	0.578*
(15-25 Base		*(0.026)*	*(0.040)*	*(0.029)*	*(0.032)*
Category)	41-60	0.900*	0.311*	0.471*	0.389*
		(0.032)	*(0.029)*	*(0.024)*	*(0.024)*
	61 Above	2.528*	2.179*	3.044*	3.403*
		(0.186)	*(0.619)*	*(0.435)*	*(0.653)*
Vocational	Trained	1.403*	0.821*	1.467*	1.446*
Training		*(0.035)*	*(0.041)*	*(0.049)*	*(0.055)*
Education	Primary	1.134*	0.564*	0.629*	0.588*
		(0.034)	*(0.063)*	*(0.033)*	*(0.040)*
	Middle	1.062***	0.315*	0.434*	0.361*
		(0.037)	*(0.034)*	*(0.023)*	*(0.024)*
	Matric	0.660*	0.148*	0.213*	0.167*
		(0.020)	*(0.013)*	*(0.010)*	*(0.009)*
	Intermediate	0.365*	0.092*	0.103*	0.079*
		(0.013)	*(0.009)*	*(0.005)*	*(0.005)*
	Professional	0.115*	0.048*	0.040*	0.037*

		(0.011)	*(0.007)*	*(0.004)*	*(0.004)*
	Graduation	0.176*	0.061*	0.057*	0.047*
		(0.007)	*(0.006)*	*(0.003)*	*(0.003)*
	Master and	0.074*	0.033*	0.028*	0.025*
	Above	*(0.004)*	*(0.003)*	*(0.002)*	*(0.002)*
Marital Status	Unmarried	1.053***	1.308*	1.219*	1.406*
		(0.032)	*(0.095)*	*(0.054)*	*(0.074)*
Household characteristics					
Household Head	Head	0.920*	0.938	0.834*	0.769*
		(0.029)	*(0.066)*	*(0.037)*	*(0.039)*
Family Type	Joint	1.181*	0.961	1.134*	1.129*
		(0.028)	*(0.053)*	*(0.038)*	*(0.044)*
Household Size		0.981*	0.942*	0.930*	0.911*
		(0.007)	*(0.014)*	*(0.009)*	*(0.010)*
Number of Employed Person In		1.056*	1.105*	1.212*	1.252*
Household		*(0.010)*	*(0.026)*	*(0.018)*	*(0.022)*
Number Of Child in Household		1.085*	1.112*	1.114*	1.111*
		(0.010)	*(0.022)*	*(0.014)*	*(0.016)*
Job Related characteristics					
Place of Work	Urban	0.658*	0.405*	0.438*	0.457*
		(0.014)	*(0.021)*	*(0.013)*	*(0.015)*
Constant		5.415*	436.813*	53.669*	104.676*
		(0.233)	*(56.667)*	*(3.774)*	*(8.842)*
Number of Observations		73,266	73,266	73,266	73,266
LR $chi^2(19)$		9038.81	4673.03	13597.56	11537.95
Pseudo R^2		0.1166	0.2183	0.2614	0.2764
Log likelihood		-34229.408	-8366.886	-19213.59	-15105.76

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.
Standard Errors are in parenthesis.
Dependent variable for Model 1 Informal Sector Job=1 if worker is informal 0 otherwise, for Model 2 No Social Protection=1 if worker is informal (having no social protection) 0 otherwise, for Model 3 No Written Contract=1 if worker is informal (having no job contract) 0 otherwise and for Model 4 No Pension=1 if worker is informal (having job without any entitlement to pension) 0 otherwise.

6.2. Wage Differentials

According to the second objective, Table 6.3 shows that the overall rate of return varies from formal to informal employment. Male workers can perform well in the informal sector and can earn more than female workers who can earn in the formal sector. Vocational training can also play a positive role in improving earnings in formal employment as well as in informal sector. Better wage outcomes favor formal workers in terms of the schooling they will receive better than those of informal worker. This result is consistent with the findings of Nasir (2000) that Informal workers are earning less than private formal and public sector workers due to personal and structural characteristics.

Returns to education are higher in formal employment. Gillani et al. (2013) found that an increase in education increases the earnings. Positive sign of experience shows that returns will increase with an increase in experience in both sectors. Workers with non-permanent jobs have lower returns. There is a clear preference for location for both groups in terms of urban settlement and importantly, this is more prevalent for formal, as evidenced by the high coefficient. As compared to managers, other occupations reduces the returns for both sectors.

The standard application of the Blinder-Oaxaca technique is applied to divide the wage gap between, say, two groups a part that is explained by differences in determinants of wages such as education or work experience and a part that cannot be explained by such group differences.

Table 6.3: Regression Results of Wage Function for Formal and informal Groups

	Formal	Informal
Log of Monthly Income	**Coefficients**	**Coefficients**
Male	0.164*	0.806*
	(0.020)	*(0.011)*
Vocational Training	0.056*	0.058*
	(0.016)	*(0.010)*
Education In Years	0.042*	0.027*
	(0.002)	*(0.001)*
Experience	0.016*	0.008*
	(0.001)	*(0.000)*
Job With Contract	-0.085*	-0.085*
	(0.034)	*(0.023)*
Job Without Contract	-0.269*	-0.319*
	(0.027)	*(0.017)*
Urban	0.135*	0.112*
	(0.014)	*(0.008)*
Professionals	-0.310*	-0.604*
	(0.029)	*(0.036)*
Technicians	-0.535*	-0.568*
	(0.031)	*(0.038)*
Clerks	-0.586*	-0.533*
	(0.033)	*(0.043)*
Services Work	-0.594*	-0.742*
	(0.032)	*(0.036)*
Skill Agriculture	-0.757*	-0.694*
	(0.064)	*(0.071)*
Craft and Related	-0.685*	-0.683*
	(0.040)	*(0.036)*
Plant and Machinery operator	-0.712*	-0.581*
	(0.041)	*(0.036)*
Elementary Occupations	-0.759*	-0.711*
	(0.035)	*(0.035)*
Constant	9.729*	9.247*
	(0.048)	*(0.041)*
Number of observations	6,009	24,400
F(17, 5993, 24384)	230.68	691.14
Prob > F	0	0
R-squared	0.3660	0.2983
Adj R-squared	0.3645	0.2979
Root MSE	0.46481	0.57951

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.
Standard Errors are in parenthesis.
Note: If worker is informal (having job without any entitlement to pension) =1, 0 otherwise. Permanent job is reference category. Managers are reference category.

The decomposition output (Table 6.4) reports the mean predictions by groups and their difference in the first panel. In our sample, the mean of the log wages is 10.29 for the formal and 9.39 for the informal, which gives a wage gap of 0.90. In the second panel of the decomposition output the wage gap is divided into three parts. The first part reflects the average increase in the wages of informal workers if they had the same characteristics as formal workers. The first term $[(\overline{X}_F - \overline{X}_{IF})\widehat{B_F} = (0.52)]$ in the model represents that about more than half of the wage gap is due to differences in endowments. The second term $[(\widehat{B_F} - \widehat{B_{IF}})\overline{X}_{IF} = (0.25)]$ quantifies the variation in the wages of informal workers by applying the coefficients of the formal worker to the characteristics of the informal worker. The third part $[(\widehat{B_F} - \widehat{B_{IF}})\,(\overline{X}_F - \overline{X}_{IF}) = (0.14)]$ is the interaction term which measures the simultaneous effect of differences in endowments and coefficients.

Table 6.4 Blinder-Oaxaca Decomposition

Panel	Log Monthly	Coefficients	Std. Err.
First	Formal	10.295*	0.008
	Informal	9.390*	0.004
	Difference	0.905*	0.009
Second	Endowments	0.519*	0.015
	Coefficients	0.249*	0.024
	Interaction	0.136*	0.027
Third	Explained	0.561*	0.013
	Unexplained	0.344*	0.015

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.

Oaxaca-Blinder technique is applied on average monthly wages of formal and informal groups to find the wage gap and break it down into two parts “explained” and “unexplained”. The part of wage gap known as “explained” part asserted to differences in human and social capital endowments or simply the differences in worker’s characteristics

while the "unexplained" part is due to differences in incentives or compensation structures between groups.

Blinder-Oaxaca decomposition presented in Table 6.4 show that only 56.1 (62%) of wage differential among two types of workers can be explained by worker's characteristics differential. 34.4 (38%) of the wage differential remains unexplained and cannot be explained by human and social capital endowments differences. This part, which is unexplained, is due to differences in incentives or compensation structures between the formal and informal workers group. This happens because wages of formal workers are governed by pay scales and minimum wages specified by the government law in public and formal private sector respectively. Whereas wages of informal workers are mainly market-driven which are low due to surplus labour supply. Hyder and Barry (2005) found two-fifth raw differential in wages due to differential in average characteristics between the two sectors

Table 6.5: Blinder-Oaxaca Decomposition with Selectivity Bias Adjustment

Panel	Log Monthly	Coefficients	Std. Err.
First	Formal	10.246*	0.022
	Informal	9.205*	0.010
	Difference	1.041*	0.024
Second	Endowments	0.442*	0.015
	Coefficients	0.397*	0.030
	Interaction	0.202*	0.028
Third	Explained	0.499*	0.013
	Unexplained	0.542*	0.029

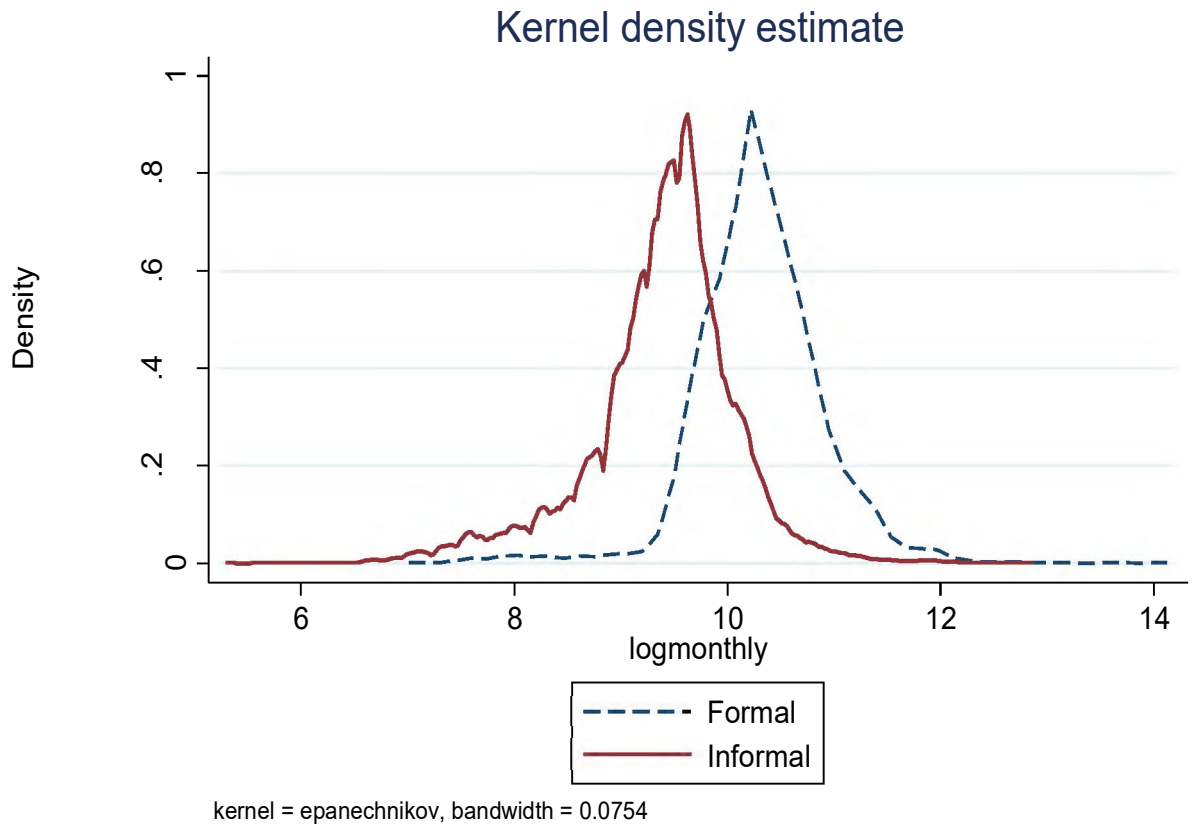
*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.

Comparison of the results (Table 6.5) with the output of the first panel reveals that the unadjusted wages of informal workers are slightly biased upward (9.390 versus

adjusted selectivity 9.205) and the wage gap is somewhat underestimated (0.905 versus 1.041 adjusted).

Figure 6.1 shows that wage for both formal and informal workers follows a similar pattern, but formal wage is slightly rightward than informal wage.

Figure 6.1: Kernel Density Estimate



Source: Authors' calculation using LFS (2017-18).

The results of quantile regression shows that wage gap is higher at the bottom of the wage distribution as (115.1 percent) at first decile and has a declining trend as 95 percent at second decile, 87.8 percent at third decile, 84.6 percent fourth decile, 83.3

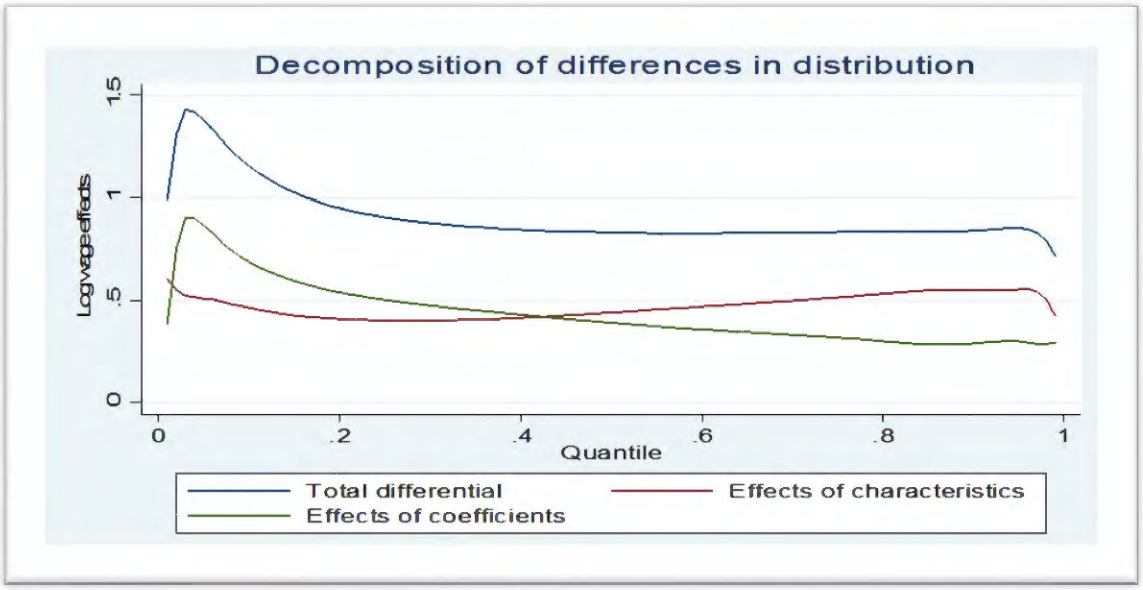
percent at median. It goes to minimum at 6th decile (82.9 percent) and then increases slightly at 8th and 9th decile 83.5 and 84.2 percent respectively (Table 6.6).

Table 6.6: Quantile Regression (Machado-Mata) Decomposition of the Wage Differentials between Formal and Informal Workers

	Without Selectivity Correction			**With Selectivity Correction**		
Quantile	**Raw difference**	**Characteristics**	**Coefficients**	**Raw difference**	**Characteristics**	**Coefficients**
0.10	1.151*	0.464*	0.686*	1.149*	0.483*	0.666*
	(0.010)	*(0.023)*	*(0.011)*	*(0.010)*	*(0.023)*	*(0.011)*
0.20	0.950*	0.410*	0.540*	0.951*	0.421*	0.530*
	(0.008)	*(0.015)*	*(0.006)*	*(0.008)*	*(0.014)*	*(0.007)*
0.30	0.878*	0.402*	0.475*	0.878*	0.408*	0.471*
	(0.007)	*(0.014)*	*(0.004)*	*(0.007)*	*(0.013)*	*(0.005)*
0.40	0.846*	0.416*	0.430*	0.846*	0.419*	0.427*
	(0.006)	*(0.014)*	*(0.003)*	*(0.006)*	*(0.014)*	*(0.003)*
0.50	0.833*	0.442*	0.391*	0.833*	0.442*	0.391*
	(0.006)	*(0.015)*	*(0.003)*	*(0.006)*	*(0.014)*	*(0.003)*
0.60	0.829*	0.471*	0.359*	0.830*	0.469*	0.361*
	(0.006)	*(0.015)*	*(0.003)*	*(0.006)*	*(0.015)*	*(0.003)*
0.70	0.833*	0.500*	0.333*	0.833*	0.499*	0.334*
	(0.007)	*(0.016)*	*(0.003)*	*(0.007)*	*(0.015)*	*(0.003)*
0.80	0.835*	0.534*	0.301*	0.836*	0.532*	0.304*
	(0.009)	*(0.015)*	*(0.004)*	*(0.009)*	*(0.016)*	*(0.004)*
0.90	0.842*	0.551*	0.291*	0.842*	0.548*	0.294*
	(0.014)	*(0.016)*	*(0.005)*	*(0.014)*	*(0.015)*	*(0.005)*

Blaise Melly, 2006, Estimation of counterfactual distributions using quantile regression, mimeo.
Note: The table reports coefficient estimates of different quantile regression and standard errors are in parenthesis.
*Significant at less than 1 percent, ** less than 5 percent and *** less than 10 percent
Bootstrap standard errors are obtained with 50 replications.

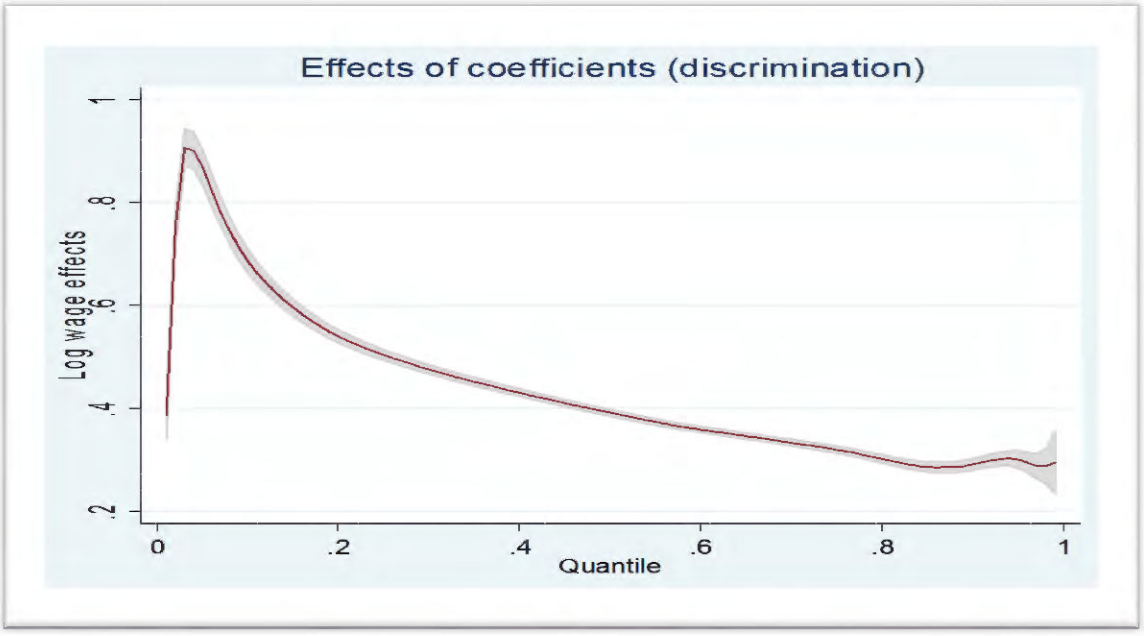
Figure 6.2: Machado and Mata Decomposition for Formal and Informal Employment



Note: Machado and Mata decomposition.

Above Figure 6.2 shows that effect of coefficients is stable over the all quantile whereas the effect of coefficients declines, high at bottom and lower at top quantile.

Figure 6.3: Wage Differential by Formal and Informal Employment



Note: Machado and Mata decomposition.

6.3. Qualification Mismatch (Over-Education)

According to the third objective, determinants of qualification mismatch of overall employment, formal employment and informal employment are presented below in Table 6.7, 6.8, 6.9 and 6.10 respectively.

Men are more likely to over-schooling than women and this result is consistent across the three samples of each skill mismatch method. Khan et al. (2022) also found that male workers are more over educated as compared to female workers in a particular occupation. The odds show that male workers are 4.121 and 3.148 times more likely to be overqualified as compared to female workers according to mode and mean method of over qualification respectively. In formal employment sector male are 3.560 and 2.638 times and in informal employment 4.484 and 3.527 times more likely to be overqualified as compared to female workers according to mode and mean method of over qualification respectively. The odds show that there is a positive relationship between over qualification and the gender variable, this is also confirmed by Kiker et al. (1997). Men are more responsible to support their families as compared to women, so they are more inclined to take jobs that require a lower level of education than they have.

More experienced workers are less likely to be overeducated according to both methods. Odds show that one year more experience reduces over qualification by 0.977 and 0.972 times according to mode and mean method of over qualification respectively. In formal employment sector one year more experience reduces the likelihood of over qualification by 0.968 and 0.963 times and in informal employment 0.989 and 0.989 times

less likely to be overqualified according to mode and mean method of over qualification respectively.

Table 6.7: Determinants of Over- Qualification (Overall Employment)

	Model 1: Mode Method	**Model 2: Mean Method**
Variables	**Odds Ratio**	**Odds Ratio**
Male	4.121*	3.148*
	0.330)	*0.296)*
Experience	0.977*	0.972*
	(0.002)	*(0.003)*
Vocational Training	2.145*	2.225*
	(0.089)	*(0.128)*
Education	1.112*	1.771*
	(0.006)	*(0.019)*
Marital status	0.989	1.020
	(0.060)	*(0.080)*
Household Head	0.910	0.949
	(0.056)	*(0.076)*
Family Type (Joint)	1.090***	1.171**
	(0.053)	*(0.074)*
Household Size	0.948*	0.947*
	(0.013)	*(0.017)*
Number of Employed Person	1.035***	1.054***
In Household	*(0.021)*	*(0.028)*
Number Of Child in	1.072*	1.070*
Household	*(0.019)*	*(0.024)*
Urban	1.203*	1.330*
	(0.049)	*(0.073)*
Constant	0.078*	0.001*
	(0.010)	*(0.000)*
Number of Observations	13,902	13,902
LR $chi^2(11)$	1331.58	7529.81
Pseudo R^2	0.0727	0.4144
Log likelihood	-8486.059	-5320.2239

Significant at less than 1 percent*, 5 percent** and 10 percent***
Standard errors are in parenthesis.

More work experience reduces the chances of over qualification. Over-qualification is regarded as a compensation for the deficiency of professional experience to do a task or

job. Khan et al. (2022) found a declining trend in over education with an increase in experience. Farooq (2011) found a negative relationship with over qualification and age.

Workers with vocational training are 2.145 and 2.225 times more likely to be overqualified as compared to workers without vocational training according to mode and mean method of over qualification respectively. Odds show that one more year of education increases the likelihood of over qualification by 1.112 and 1.771 times according to mode and mean method of over qualification respectively. This is also supported by the human capital theory that whether or not a worker is able to perform a specific job is determined by the total human capital (Sicherman, 1991). Kiker at el. (1997) with empirical analysis also supported this view.

Marital status has no statistically significant impact on the probability of being over-schooled and has a positive effect in one method and negative in other. Consistent results fond that people working as head of household compared to people working as other members are less likely to be overeducated in overall and informal employment. Although results are insignificant in most of the models, but odds for informal employment sector show that position as head in household reduces likelihood of over qualification by 0.842 times according to mode method. This can be explained by two reasons, on the one hand, the head is less likely to join informal sector. The formal sector has high wages, a stable working environment and attractive social protection, which facilitates the hiring of the corresponding workers. On the other hand, individuals can find private sector jobs temporarily to gain experience in order to find matching and stable public and formal sector jobs in the future. Patrinos (1997) argues that the public sector is a good place to address the problem of qualification mismatch.

Table 6.8: Determinants of Over- Qualification (Formal Group)

	Model 1: Mode Method	Model 2: Mean Method
Variables	**Odds Ratio**	**Odds Ratio**
Male	3.560*	2.638*
	(0.473)	*(0.388)*
Experience	0.968*	0.963*
	(0.004)	*(0.005)*
Vocational Training	1.736*	1.442*
	(0.132)	*(0.145)*
Education	1.003	1.856*
	(0.010)	*(0.034)*
Marital status	0.891	1.010
	(0.102)	*(0.143)*
Household Head	1.000	1.014
	(0.108)	*(0.137)*
Family Type (Joint)	1.254*	1.179
	(0.102)	*(0.119)*
Household Size	0.964	0.998
	(0.022)	*(0.027)*
Number of Employed	0.980	0.976
Person In Household	*(0.038)*	*(0.047)*
Number Of Child in	1.063**	1.019
Household	*(0.031)*	*(0.036)*
Urban	1.975*	2.264*
	(0.146)	*(0.200)*
Constant	0.190*	0.000*
	(0.044)	*(0.000)*
Number of Observations	4,963	4,963
LR $chi^2(11)$	413.10	2693.62
Pseudo R^2	0.0647	0.3920
Log likelihood	-2985.1358	-2089.1255

Significant at less than 1 percent*, 5 percent** and 10 percent***
Standard errors are in parenthesis.

Workers with joint families are more likely to be overeducated. One joint family reduces the likelihood of over qualification by 1.090 and 1.171 times as compared to nuclear family according to mode and mean method of over qualification respectively. Only for informal employment, it increases the chances of over qualification by 1.132 times

for mean method. One more family member is 0.948 and 0.947 times less likely to be over qualified according to mode and mean method of over qualification respectively. Having large household size negatively affects the over education. Workers of these types prefers to work with matched jobs where jobs are offered according to qualifications

One more employed person in household increases the likelihood of over qualification by 1.035 and 1.054 times according to mode and mean method of over qualification respectively. For formal employment, odds show that one more employed person in household reduces the likelihood of over qualification by 0.980 and 0.967 times according to mode and mean method of over qualification respectively. However, workers having more children are more likely to be overeducated. One more child in household increases the likelihood of over qualification by 1.072 and 1.070 times according to mode and mean method of over qualification respectively. They normally join flexible timing jobs. This is happens due to working time rigidity in formal jobs where female cannot adjust their timing to cope with domestic works and child cares so they are less conscious about executive jobs where jobs are consistent with qualifications.

Working in urban area is positively associated with over-qualification than working in rural areas except for informal employment. Odds show that urban workers are 1.203 and 1.330 time more likely to over qualify as compared to rural workers according to mode and mean method of over qualification respectively. It is observed that workers in urban areas have a better and higher quality and a higher average level of education than the workers of rural areas (Rong & Shi, 2001). Although more abundant job are offered in the urban labor market than in rural market, there is more competition in urban labour market as compared to rural. In the competitive urban labor market, workers may take jobs below

their educational level to earn for survival. Therefore, urban workers are more likely to be more over-educated than rural workers.

Table 6.9: Determinants of Over- Qualification (Informal Group)

	Model 1: Mode Method	**Model 2: Mean Method**
Variables	**Odds Ratio**	**Odds Ratio**
Male	4.484*	3.527*
	(0.468)	*(0.459)*
Experience	0.989*	0.989*
	(0.003)	*(0.004)*
Vocational Training	2.470*	2.573*
	(0.128)	*(0.184)*
Education	1.226*	1.879*
	(0.010)	*(0.028)*
Marital status	0.955	1.014
	(0.071)	*(0.100)*
Household Head	0.842**	0.909
	(0.065)	*(0.093)*
Family Type (Joint)	0.990	1.132
	(0.061)	*(0.094)*
Household Size	0.939*	0.927*
	(0.017)	*(0.022)*
Number of Employed Person	1.055*	1.074**
In Household	*(0.026)*	*(0.036)*
Number Of Child in	1.080*	1.092*
Household	*(0.025)*	*(0.034)*
Urban	0.899**	0.934
	(0.046)	*(0.067)*
Constant	0.033*	0.000*
	(0.006)	*(0.000)*
Number of Observations	8,939	8,939
LR $chi^2(11)$	1354.26	4568.99
Pseudo R^2	0.1138	0.4220
Log likelihood	-5272.0696	-3128.8756

Significant at less than 1 percent*, 5 percent** and 10 percent***
Standard errors are in parenthesis.

By comparing informal and formal employment it is found that the formal employment group is less likely to be overeducated. Informal workers are 1.614 and 1.713

times more likely to over qualify as compared to formal workers according to mode and mean method of over qualification. Results show that there is positive association between informal employment and over-education and informal workers are more inclined to be overeducated than their formal counterparts (Table 6.10).

Table 6.10: Impact of Informal Employment on Over- Qualification

	Model 1: Mode Method	**Model 2: Mean Method**
Variables	**Odds Ratio**	**Odds Ratio**
Informal	1.614*	1.713*
	(0.071)	*(0.096)*
Male	4.048*	3.086*
	(0.325)	*(0.293)*
Experience	0.981*	0.976*
	(0.003)	*(0.003)*
Vocational Training	2.088*	2.146*
	(0.087)	*(0.124)*
Education	1.142*	1.840*
	(0.007)	*(0.021)*
Marital status	0.956	0.974
	(0.058)	*(0.078)*
Household Head	0.917	0.954
	(0.056)	*(0.077)*
Family Type (Joint)	1.085***	1.158**
	(0.053)	*(0.074)*
Household Size	0.952*	0.951*
	(0.013)	*(0.017)*
Number of Employed	1.024	1.040
Person In Household	*(0.021)*	*(0.028)*
Number Of Child in	1.071*	1.069*
Household	*(0.019)*	*(0.025)*
Urban	1.207*	1.332*
	(0.050)	*(0.073)*
Constant	0.040*	0.000*
	(0.006)	*(0.000)*
Number of Observations	13,902	13,902
LR $chi^2(11)$	1452.11	7625.03
Pseudo R^2	0.0793	0.0831
Log likelihood	-8425.796	-8391.6372

Significant at less than 1 percent*, 5 percent** and 10 percent*** Standard errors are in parenthesis.

6.5 Summary of Chapter

Study identified the determinants of informal employment in Pakistan according to different definitions. There are various socio-economic determinants whether people opt for informal employment. Gender, age, vocational training, education and other household characteristics are the main determinants of informal employment. The mean wages of formal workers are high than the mean wages of informal workers. Blinder-Oaxaca decomposition show that only 56.1 (62%) of wage differential among two types of workers can be explained by worker's characteristics differential. 34.4 (38%) of the wage differential remains unexplained and cannot be explained by human and social capital endowments differences. This part, which is unexplained, is due to differences in incentives or compensation structures between the formal and informal workers group. This study finds the determinants of qualification mismatch in formal and informal employment of Pakistan labour market. It is found that males and workers in urban areas are more prone to be overeducated than rural people. It is found that that there is positive association between informal employment and over-education. Informal workers are more inclined to be overeducated than their informal counterparts.

CHAPTER 7
CONCLUSION AND POLICY IMPLICATIONS

This chapter consists of three main parts. In part one conclusions of the thesis are presented and then in section two policy implications are given. Lastly some data limitation and directions of future research are discussed.

7.1. Conclusion

Pakistan has a large informal sector like other developing countries. Informality in the labour market is most prominent social and economic phenomena. Informal employment is associated with bad working environment and poor conditions, low wages and inequality, absence of social security and poverty. In the developing countries, there is very limited consensus among the researchers on how to define labor market informality. Researchers have limited choice of measurement and used different measures to estimate the size of informality due to data limitations and unavailability. In this thesis, study used four different measure of informality using Pakistan labour force survey 2017-18. Informality is defined according to written employment contract, social security protection, job entitlement to pension and by the nature of the employment and the characteristics of the employer.

Study identified the determinants of informality in Pakistan according to the guidelines of ILO and international statistical standards. There are various socio-economic determinants whether people opt for informal employment. Gender coefficient is positive showing that the male workers, as compared to female workers, are more likely to work as informal. Age has an influential impact on the decision of working as formal or informal

and very young and old age groups of worker are more likely to employ informally as compared to middle aged workers. Vocational training has positive impact on informal employment while, as the level of education increases, its decreases the chances of informal employment, the negative coefficients for all the categories of education show that if individual has some level of education, he will join formal employment as compared to those who has no formal education. It is shown that the unmarried persons are more inclined to work as informal as compared to those who are married. Joint family, number of children in household and the number of employed persons has a positive impact on informal employment. I further obtained results from different criteria based definitions, and found that the results are same and consistent across all the definitions (Informal Sector Job, No Written Contract, No Pension and No Social Protection based measures) but No Pension measure seems most appropriate. All occupations and industries has significant and expected signs according to the theory of informal employment.

It is shown that mean wages of formal workers are high than the mean wages of informal workers. Female workers earn less than their male counterparts. If we analyze according to marital status, the mean wages of married workers are higher than those who are unmarried. Wages are higher in urban areas than the workers who work in rural areas. As the level of education increases, the mean wages also increase and are higher for professional degree holders. It is evident that the wages of permanent job holder is higher than those who has contracts and without contracts. Public sector offers higher wages than that of private sector.

Further regression analysis shows that return to education as a whole varies between groups. Male workers can perform well in informal sector and can earn higher as

compared to female workers who can earn in formal sector. Vocational training can also play a positive role to enhance earnings in formal employment. Better wage outcomes are favorable for formal workers in terms of schooling, they will receive better than those of informal worker. Workers having non-permanent jobs have less returns. There is clear location favor for both groups in terms of the urban settlement and most importantly this is more prevalent for formal as evident from the high coefficient. As compared to manager's occupation, all other occupations will reduce the earnings.

Blinder-Oaxaca decomposition show that only 56.1 (62%) of wage differential among two types of workers can be explained by worker's characteristics differential. 34.4 (38%) of the wage differential remains unexplained and cannot be explained by human and social capital endowments differences. This part, which is unexplained, is due to differences in incentives or compensation structures between the formal and informal workers group. This happens because wages of formal workers are governed by pay scales and minimum wages specified by the government law in public and formal private sector respectively. Whereas wages of informal workers are mainly market-driven which are low due to surplus labour supply.

With the expansion in educational institutions in recent times, it has been seen that most of the peoples are doing jobs which are not matching with their qualifications. This study finds the determinants of qualification mismatch in formal and informal employment of Pakistan labour market. It is found that males are more inclined to over-educate as compared to females and this result is consistent in all three samples. Because male in this society are more responsible for their families to finance, they are more inclined to accept jobs with lower required qualification despite to remain unemployed.

Workers in urban areas are more prone to be overeducated than rural people in all three samples. Although more abundant job are offered in the urban labor market than in rural market, there is more competition in urban labour market as compared to rural. In the competitive urban labor market, workers may take jobs below their educational level to earn for survival. Therefore, urban workers are more likely to be more over-educated than rural workers. It is found that that there is positive association between informal employment and over-education and informal workers are more inclined to be overeducated than their informal counterparts.

7.2. Policy Implications

Males are more likely to work informal as compared to female counterparts, means that the women participate in informal labour market only to help their families especially during financial crises. They also earn less in informal sector as compared to male. This can be due to discrimination or can be due to working time flexibilities where female can adjust their timing and work as informal to cope with domestic works and child cares. Policies should be made to remove any gender discrimination and to encourage the flexible working hours for female workers so they can adjust themselves in formal sector.

Young workers have less experience and qualification so they face barriers to enter formal sector jobs and are more prone to work informally. The age group of over 60 years workers are also more inclined to work informally. For young workers and new entrants, government should support them via internships and apprenticeship to gain experience in formal sector to gain formal employment.

Vocational Training has a positive impact on informal employment. If an individual acquires vocational training, his probability of working as an informal employee increase compared to those without any vocational training and he earns more than the worker without vocational training. There should be more factories and industries for vocational workers to get formal employment. Government should provide social protection for such workers even though they work at their own.

As the level of education increases, its decreases the chances of informal employment, the negative association for all the categories of education show that if individual has some level of education, he is more inclined to join formal employment as compared to those who has no formal education. Workers with higher education can earn more. There is a serious need to increase the literacy rate and to urge the people for higher education.

The coefficient for the marital status is positive which show that the unmarried persons are more inclined to work as informal as compared to those who are married. Position as head in a household hurts to work as informal. Joint family increases the chances of informal employment and large family decreases the probability of informal employment as an increase in family member will decrease the chances of informal employment. It shows our family system is very important for formal employment. Policies should encourage the family system where family members look after each other.

Results show that the location of urban area will decrease the informal employment. Cities are remained more attractive for people throughout the history. Many studies indicate that main flow of migration is from rural areas to the urban areas because the urban centers offer superior educational opportunities, health and sanitation, wider contacts, and

other benefits. Geographical location can play an important role in employment. Basically more informal jobs are there in rural areas in developing countries. In developing economies a few number of formal employment exists in rural areas or they are completely informal and formal employment opportunities are only available in big cities or in urban areas. This dualism is also a salient feature of developing economies. Rural areas should be provided with better educational, health and other basic life facilities to provide them better employment opportunities there.

7.3. Limitations

The data set of labour force survey 2017-18 don't provide information on the registration of enterprises and the contribution of self-employed persons for the social security. It also does not provide the information about earnings of self-employed workers and the exact year of schooling or education. This data set does not provide sufficient information to study the dynamics of labour market. Despite these weaknesses labour force survey provide the reliable data to achieve the objectives of this study.

7.4. Future Research

On availability of earning data of self-employed workers, the earning gap between formal and informal self-employed workers can be analysed. Further, on the availability of data, research on dynamics of labour market can be beneficial for policy analysis for minimum wage law and payment of wages through bank accounts and record keeping of workers salary.

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Appendix

Table A1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Informal Sector Job	73266	0.778	0.415	0	1
No Pension	73266	0.917	0.275	0	1
No Written Contract	73266	0.886	0.318	0	1
No Social Protection	73266	0.967	0.179	0	1
Gender	73266	0.802	0.399	0	1
Age categories	73266	2.089	0.852	1	4
Vocational Training	73266	0.216	0.412	0	1
Current Enrollment	73266	0.990	0.101	0	1
Educational Categories	73266	2.573	1.893	1	8
Marital Status	73266	0.271	0.445	0	1
Head of Household	73266	0.484	0.500	0	1
Family Type	73266	0.449	0.497	0	1
Household Size	73266	7.311	3.588	1	48
No. of Employed in Household	73266	1.708	1.677	0	19
Number of Children	73266	2.811	2.334	0	25
Work Hours	73266	6.680	1.952	0.14	14.14
Urban	73266	0.401	0.490	0	1
Occupation	73266	6.123	1.960	1	9
Industry	73266	3.036	2.192	1	7

Source: - Author's Calculations from Labour Force Survey 2017-18

Table A2: Blinder-Oaxaca Decomposition

	Endowments		**Coefficients**		**Interaction**	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Male	0.005	*0.004*	-0.556**	*0.020*	-0.004	*0.003*
Vocational Training	-0.004*	*0.001*	0.000*	*0.005*	0.000	*0.001*
Education In Years	0.160*	*0.006*	0.074**	*0.011*	0.089*	*0.013*
Experience	0.001	*0.001*	0.186**	*0.016*	0.001	*0.001*
Job With Contract	0.001*	*0.000*	0.000*	*0.002*	0.000	*0.001*
Job Without Contract	0.267*	*0.014*	0.045**	*0.028*	-0.042	*0.027*
Urban	0.019*	*0.002*	0.013*	*0.009*	0.004	*0.003*
Professionals	-0.131*	*0.009*	0.021*	*0.003*	0.064*	*0.010*
Technicians	-0.065*	*0.005*	0.001*	*0.002*	0.004	*0.006*
Clerks	-0.041*	*0.004*	-0.001*	*0.001*	-0.004	*0.004*
Services Work	-0.024*	*0.004*	0.019*	*0.006*	0.005*	*0.002*
Skill Agriculture	-0.005*	*0.001*	0.000*	*0.000*	0.000	*0.001*
Craft and Related	0.112*	*0.006*	-0.001**	*0.011*	0.000	*0.009*
Plant and Machinery Operator	0.034*	*0.003*	-0.014*	*0.006*	0.008*	*0.003*
Elementary Occupations	0.188*	*0.010*	-0.020**	*0.020*	0.013	*0.013*
Constant			0.482***	*0.064*		

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.

Table A3: Blinder-Oaxaca Decomposition (Explained and Unexplained)

	Explained		**Unexplained**	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**
Male	0.005*	0.003	-0.559*	0.023
Vocational Training	-0.004*	0.001	0.000	0.004
Education In Years	0.173*	0.006	0.150*	0.023
Experience	0.001*	0.002	0.187*	0.017
Job With Contract	0.002*	0.000	0.000	0.002
Job Without Contract	0.265**	0.012	0.005	0.010
Urban	0.017*	0.001	0.018	0.011
Professionals	-0.095*	0.007	0.049*	0.010
Technicians	-0.063*	0.004	0.003	0.006
Clerks	-0.047*	0.003	0.001	0.003
Services Work	-0.023*	0.004	0.023*	0.008
Skill Agriculture	-0.006*	0.001	0.000	0.001
Craft and Related	0.111*	0.005	0.001	0.007
Plant and Machinery Operator	0.034*	0.003	-0.006	0.004
Elementary Occupations	0.189*	0.009	-0.007	0.015
Constant			0.482*	0.073

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.

Table A4: Blinder-Oaxaca Decomposition with Selectivity Bias Adjustment

	Endowments		**Coefficients**		**Interaction**	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Male	0.005	*0.004*	-0.533*	*0.020*	-0.004	*0.003*
Vocational Training	-0.004*	*0.001*	0.000	*0.005*	0.000	*0.001*
Education In Years	0.107*	*0.007*	0.112*	*0.011*	0.133*	*0.014*
Experience	0.000	*0.000*	0.296*	*0.020*	0.002	*0.002*
Job With Contract	0.001*	*0.000*	0.000	*0.002*	0.000	*0.001*
Job Without Contract	0.251*	*0.014*	0.030	*0.028*	-0.028	*0.027*
Urban	0.017*	*0.001*	0.019**	*0.009*	0.006**	*0.003*
Professionals	-0.127*	*0.009*	0.020*	*0.003*	0.060*	*0.010*
Technicians	-0.063*	*0.005*	0.001	*0.002*	0.002	*0.006*
Clerks	-0.039*	*0.004*	-0.001	*0.001*	-0.006	*0.004*
Services Work	-0.022*	*0.004*	0.015**	*0.006*	0.004*	*0.002*
Skill Agriculture	-0.005*	*0.001*	0.000	*0.000*	-0.001	*0.001*
Craft and Related	0.108*	*0.006*	-0.006	*0.011*	0.005	*0.009*
Plant and Machinery Operator	0.033*	*0.003*	-0.016*	*0.006*	0.009*	*0.003*
Elementary Occupations	0.179*	*0.010*	-0.032	*0.020*	0.021	*0.013*
Constant			0.492*	*0.063*		

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.

Table A5: Blinder-Oaxaca Decomposition with Selectivity Bias Adjustment (Explained and Unexplained)

	Explained		**Unexplained**	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**
Male	0.005	0.003	-0.536*	0.023
Vocational Training	-0.00*4	0.001	0.000	0.004
Education In Years	0.130*	0.006	0.221*	0.025
Experience	0.001	0.001	0.298*	0.023
Job With Contract	0.002*	0.000	-0.001	0.002
Job Without Contract	0.252*	0.012	0.002	0.010
Urban	0.016*	0.001	0.026**	0.011
Professionals	-0.093*	0.007	0.046*	0.010
Technicians	-0.061*	0.004	0.001	0.006
Clerks	-0.046*	0.003	0.000	0.003
Services Work	-0.022*	0.004	0.018**	0.008
Skill Agriculture	-0.006*	0.001	-0.001	0.001
Craft and Related	0.108*	0.005	-0.002	0.007
Plant and Machinery Operator	0.033*	0.003	-0.008***	0.004
Elementary Occupations	0.184*	0.009	-0.015	0.015
Constant			0.492*	0.073

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %.

Table A6: Correlation Matrix

	Informal Employment	Gender	Age	Vocational Training	education	Marital Status	Head of Household	Family Type	Household Size	No. of Employed in Household	Number of Children	Urban
Informal Employment	*1.00*											
Gender	0.03	1.00										
Age	-0.13	0.07	1.00									
Vocational Training	0.09	-0.13	-0.03	1.00								
education	-0.34	-0.01	-0.04	-0.04	1.00							
Marital Status	0.11	-0.09	-0.53	-0.01	0.03	1.00						
Head of Household	-0.09	0.31	0.59	-0.06	-0.06	-0.55	1.00					
Family Type	0.03	0.00	-0.08	0.06	0.05	0.04	-0.34	1.00				
Household Size	0.04	0.04	-0.07	0.06	0.00	0.02	-0.31	0.47	1.00			
No. of Employed in Household	0.11	-0.14	-0.22	0.07	-0.10	0.31	-0.50	0.39	0.54	1.00		
Number of Children	0.03	0.05	0.01	0.04	-0.08	-0.20	0.00	0.18	0.78	0.14	1.00	
Urban	-0.07	0.07	0.02	0.01	0.15	0.03	-0.03	0.04	0.02	-0.02	-0.05	1.00

Source: - Author's Calculations from Labour Force Survey 2017-18

Table 7A: Correlations of Informality Measures

	Informal Sector Job	No Written Contract	No Pension	No Social Protection
Informal Sector Job	1			
No Written Contract	0.6127	1		
No Pension	0.5563	0.7833	1	
No Social Protection	0.3469	0.5034	0.619	1

Source: - Author's Calculations from Labour Force Survey 2017-18