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Determinants of Voluntary and Involuntary Underemployment in Pakistan

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Abstract

Having to work in a sub-optimal capacity is a socio economic problem which is apparently veiled, but it is equally detrimental as having no work to do. This study intends to compare the demographic factors of Pakistan which determine the underemployment and two sub-components such as voluntary underemployment and non-voluntary underemployment which lacked focus in the past studies conducted in Pakistan. The present study filled this gap by measuring the different dimensions and the determinants of underemployment using the micro data from Labor Force Survey (2010-11). The estimates indicate that females, people living in rural areas and the province Khyber Pakhtunkhwa (KPK) have a higher tendency to be voluntarily underemployed. Also, the heads of households are less likely to be underemployed. Employees are less likely to be voluntary underemployed. Out of underemployed persons, only a small percentage of people have involuntary reasons for working less than 35 hours otherwise a high percentage of employed people have voluntary reasons. This shows the presence of voluntary underemployment at a very large extent in Pakistan.

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JEL Classification: J22, J64

1. Introduction

Economists and Policymakers related to labour market are very much interested in knowing the causes of imbalance between demand and supply of labour. This disequilibrium is the cause of persisting unemployment and its various forms in the country. Two of the most common issues caused by labour market imbalance are unemployment and underemployment, both of them represent the insufficiency in economy's capacity to absorb its labour force. In developed or industrialized countries, government provides unemployment benefits to excess labour who are not engaged in any economic activity, whereas in developing countries, due to the lack of this support system, workers are forced to work in unfavourable conditions and required capacity. So, this problem of partial attachment with the work is termed as underemployment, which with unemployment are two important socioeconomic problems of populous developing countries like Pakistan (Arndt & Sundrum, 1980; Sadie, 2003).

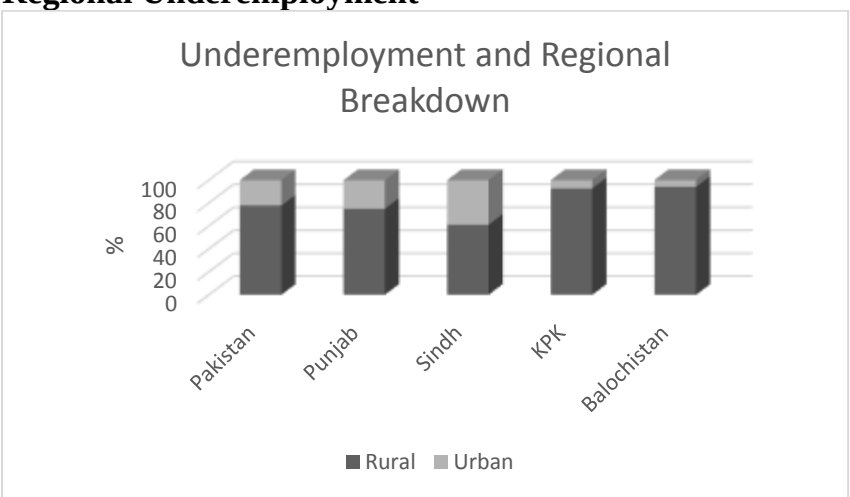
Economies where employment generation is outpaced by the growing labour force, the labour force is more likely to be engaged in jobs with over qualification, less than required work time or work with unfavourable conditions (Felipe & Hasan, 2006). The weakness of the labour market is measured by an underemployment rate in a broader perspective; can also unveil underemployment among various racial groups (Nunn, Parsons, & Shambaugh, 2019). Number of underemployed persons increased during recessions. During this current pandemic of Covid-19, people who were underemployed in April, 2020 in USA were 22.8% (Rampell, 2020).

Since 2013, underemployment rate is rising more sharply than unemployment rate in Australia. Part-time workers wanted to work more 11 hours per week in February 2019. However, 50% workers were voluntarily underemployed and did not seek any additional working hours (Economics Resource Centre, 2019). One out of three young people is underemployed in Australia. They lack enough working hours and suffer from low wage growth. This

situation makes it hard for them to meet the cost of living (Youmshajekian, 2019). In 2018, 4.6 million people wanted to work more hours in Germany and 2.2 million were officially underemployed (Martin, 2019).

Pakistan bureau of statistics uses the same definition of underemployment as defined by the International Labour Organization (ILO) (1997). Hereby, underemployment is defined as all the persons that are employed but working less than 35 hours per week irrespective of voluntary and involuntary reasons. Those people who are available for the additional work are involuntary underemployed and those who are not available or seeking additional work are voluntary underemployed. The percentage distribution of underemployed persons out of total labour force in Pakistan with respect to region, provinces and gender is given in figure 1 and 2.

Figure 1: National and Provincial decomposition of Regional Underemployment

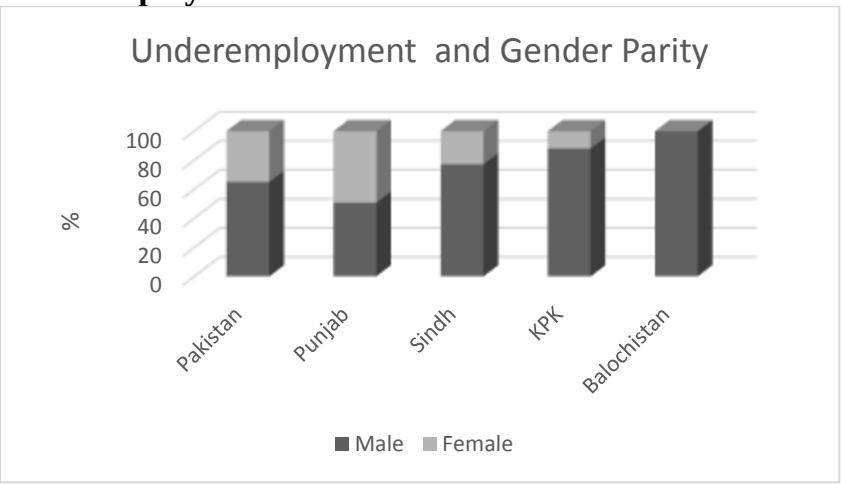


Source: Labor Force Survey: 2010-11

In Pakistan, the labour force participation in 2010-11 was 53.4 million which has decreased to 51.9 million in 2017-18 which marks a 1.5% decrease in the potential labour force in the economy. In 2012-13, 59% workers were engaged in vulnerable employment because of weak institutional employment arrangements. In 2017-

18, the percentage of vulnerable employment reduced to 55.6% (Pakistan Employment Trends, 2018).

Figure 2: National and Provincial Gender Parity of Underemployment



Source: Labor Force Survey: 2010-11

Using the data of labour force survey 2011, figure 1 indicates how regional underemployment conditions are different for different provinces while figure 2 shows that there is parity between different genders in terms of underemployment. The differences in the employment conditions depicted in figure 1 and 2, necessitate that there is a need to identify and explore the demographic factors which led to deviations in employment quality in Pakistan.

1.2. Objective of the Study

Based on the facts, this study is designed to investigate the factors which increase the likelihood of a person to become underemployed. This study then differentiates the factors and their intensities determining the voluntary and involuntary underemployed persons.

2. Literature Review

Different empirical research studies tackled the concept of underemployment differently. Following are some of the studies that broadly cover the discussion.

Regarding the demographic factors, a study conducted by (Clogg & Sullivan, 1983; Clogg & Shockey, 1985) analyzed the behaviour of labour force over the past 10 to 20 years, compositional adjustments are not required to make in the crude rates of unemployment and underemployment. The findings of this study suggested that although a big change in the age-sex composition of the labour force occurred in the 1960s, but its net effect remained negligible on crude rates of both unemployment and underemployment. The result contradicts the previous researches as these results are based on recent trends and comparisons of adjusted and crude rates were made on short-to-medium terms.

Similarly, while studying the demographic indicators for underemployment, Lichter (1988, 1989) pointed that the racial differences do determine the chances of being underemployed, especially if the marginalized race has a lower level of education. Similarly, Zhou (1993) examined the interracial differences in the positions and economic status of the labour force in which Puerto Ricans, Blacks, Mexicans, Cubans, Chinese and Japanese are being studied. The findings suggested that 40% of the members of every minority group are underemployed in different ways. Sub-unemployment, unemployment and non-participation are mostly common in Blacks and Puerto Ricans. Mexicans fall into the category of low wage or part time employment. Chinese have a higher rate of occupational mismatch and low wage employment. Cubans and Japanese also fall into the category of an occupational mismatch but they are relatively more adequately employed than Chinese.

Another study of (De Anda & Sobczak, 2011) also compared the determinants of unemployment, involuntary part-time employment and working poor among Mexican-origin and white women. The study explored the differences that exist between these two groups in terms of job nature. The study also explored the effects of personal characteristics and job locality on underemployment. The results showed that ethnicity affects the chances of being working poor, while personal characteristics and job locality affects each ethnic group differently (Meow, 1983).

Eamets and Ukrainski (2000) estimated the different components of hidden unemployment (discouraged workers, involuntary part time workers and unemployed). The results concluded that if the labour is employee as compared to employer, he has higher chances of being underemployed. While having basic education also increases the chances of underemployment.

Slack and Jensen (2007) conducted a study, which focused on exploring underemployment and its causes among immigrants from first generation to third. The findings of the study suggested that in the first generation, prevalence of underemployment is more than second or third generation.

Caputo and Cianni (2001) examined the differences in the nature of work status between voluntary and involuntary part time workers. This study used psychological, demographic, family and other characteristics, and noted that empirically these indicators have very low prediction power against underemployment. The estimations showed that females are more likely and married people are less likely to be voluntary underemployed.

Similarly, Niyimbanira (2016) analyzed the time-related underemployment by taking into consideration the personal and demographic factors of South African rural Municipality. The study found out that prevalence of underemployment is more among females relative to males. Young people are more likely to suffer underemployment comparing to old workers. Education was also found to be an important determinant of underemployment as higher education level reduces the risk of underemployment.

Moreover, another study of Kamerade and Richardson (2018) also argued that after the recession of 2008 involuntary part-time work increased in UK labor market and its prevalence depends on gender differences in different occupations. It is more common in occupations, industries and public sectors where proportions of female workers are high relative to male dominated jobs, industries and private sector. The study also found out a relationship of the consequence of underemployment, that is, well-being of males and female workers with their level of underemployment and concluded that a negative relation exists between the well-being of male and female workers and underemployment.

Barrett and Doiron (2001) distinguished between involuntary and voluntary part time workers. The study also examined how employers' select workers into three groups i.e. full time, voluntary part time and involuntary part time. The effect of personal and family related characteristics and skills of the workers was analyzed on labour supply decision. The study concludes that involuntary part time workers get 18% fewer wages than other part time workers. Age, gender and education are important factors in explaining involuntary part time work.

The extent of underemployment in Pakistan was measured by (Robinson & Abbasi, 1979). Direct and indirect approaches were used to measure the extent of underemployment in Pakistan. The direct approach considers the workers to be underemployed who are working less than 35 hours. While the indirect approach, productivity per worker is estimated to determine the underemployment in different sectors.

The findings of both the approaches suggested that the extent of underemployment is very low in Pakistan but it is highly concentrated in rural areas and the sectors which are characterized by family enterprise units such as agriculture, trade and services sector in which high proportion of unpaid family helpers are working.

Another study in Pakistan conducted by Shahnaz and Khalid (2008). This study explored the underutilization of youth of Pakistan for the period 1991-2004, during this period, underemployment rate was between 0.4% and 3.1%. The results concluded that workers in rural areas are twice as likely to be underemployed as compared to workers in urban areas and is very little with respect to ILO and LFS definitions. Similarly, females' underemployment rate is twice as that of males according to the definition of LFS.

To explore the determinants of underemployment among young adults group Ruiz-Quintanilla and Claes (1996) collected data from six different countries. For data collection, the interview of two occupational groups, office technological workers and machine operators of years 1988 & 1990 was conducted. The findings of the study suggested that labour market and

organizational factors are important in determining underemployment. With the perspective of individual level, only education and occupational group are affecting underemployment.

Flynn (2003) examined the effects of contextual factors such as occupation, gender, and size of the industry and openness of the labour market on an inadequate employment (involuntary part time and low wage work) in the early phase of the 1990s. It was found that women have higher chances to work for low wages than men. The difference in the location does not affect the involuntary part time work for women. Labour market factors have a greater effect on the return of human capital than personal characteristics.

Slack and Jensen (2004) tried to find out the rate of underemployment among the workers working in extractive industries (agriculture, forestry, mining and fishing) by comparing them with the employment circumstances of the people working in other industrial sectors. The study has included unemployment, discouraged workers, involuntary part-time workers and working poor as different measures of underemployment. The results of the logistic regression model showed that the rate of underemployment is higher in extractive industries as compared to other industries.

Similarly, Warren (2015) examined the impact of 2008 economic crises in the UK labor market. The study found that the recession changed the supply of working hours dramatically particularly for the workers engaged in low manual occupation jobs. Although middle-class workers also hit harder by the economic crises and lost their sound financial positions, this financial hardship still was not able to eliminate the class differences among UK workers.

Julian, Hall and Yerger (2010) found the impact of age and education on underemployment in rural areas of U.S from 1996-2004. Underemployment variable includes involuntary part-time workers, discouraged workers and other marginally attached workers. The results of the study showed that underemployment showed a rising trend for the person who is less than 20 years and the person who are above the age of 55. The educational trend has shown that underemployment rates were increasing for the students who attain education beyond the bachelors' level.

Similarly, Sackey and Osei (2006) conducted a study on Ghana to examine the trends in unemployment and underemployment and its determinants. It also examined the standard of living of unemployed persons, their expectations and job search methods. The findings of the study suggested that demographics, education and sizes of the firms along with the type of employment have a great impact on the rate of unemployment and underemployment. Moreover, Acosta-Ballesteros et al. (2018) used Spanish Labor Force Survey 2006-14 data to find out the effect of education and field of study on the probability of time-related underemployment for young people of Spain at various stages of the business cycle. The result showed a negative relationship between the time-related underemployment and level of education. Workers having specializations related to science, technology and health are less likely to be underemployed even during the recession periods. Those related to the fields of education, arts and humanities are more likely to suffer underemployment. Fewer working hours imply insufficient earnings that lead to an increase in the number of working poor.

The study of Wilkins (2007) focused on personal outcomes on underemployed workers for the period 1978-2004. The study compared these outcomes for the analysis of gender which was done separately by using Hilda survey. This was pointed out that this is the most severe social and economic problem and it needs to get greater attention by policy makers.

The issue of time-related underemployment was also addressed in Australia by Campbell (2008). The study also explored the factors which were responsible for the increase in underemployment and the effects of cyclical movements and structural factors. The data is taken from Australian Bureau of Statistics (ABS) Labor Force Survey. This study highlighted the poor quality of part time jobs and government policies did not contribute to increasing the number of full-time jobs to absorb involuntary part time jobs in Australia.

The study of Walling and Clancy (2010) also measured the extent of underemployment in UK labour market and estimated the part-time work and unemployment for the period 2000-2009. The

time-related underemployment was measured using the LFS definition. It was found that the potential hours of employed persons which are unutilized are approximately 3.4% and they contribute to underemployment. In the period when there was no economic recession, rates of underemployment and unemployment were relatively stable, but it has been increased during the recession period.

To measure the correlation between underemployment and job satisfaction, Kifle, Kler and Shankar (2019) carried out a study among the part-time workers of Australia from 2002 to 2014. The study found out the negative relationship between these two variables. The relationship also varies on the basis of gender as underemployed females have a low negative correlation with job satisfaction relative to underemployed males. The study also highlighted underemployment as an importent issue of Australian labor market that has an adverse consequence in the form of low job satisfaction rates especially among male workers.

Salin and Natti (2019) conducted a cross-national study of underemployment using a data of 22 European countries by focusing particularly on working mothers. The study revealed that although underemployment exists in all countries examined; the existence varies significantly from country to country. Mothers particularly living in Poland and Hungary want to supply more hours than they currently do. The results of the examination of prevalence and depth of underemployment showed that necessary association does not exist between these two dimensions of underemployment. Considering the country-level factors; mothers living in countries characterized by poor economic situation, less provision of child-care facilities and worse labor market conditions are more likely to suffer underemployment. Moreover, mothers lacking secure economic and job positions at their work places suffer more by underemployment at the individual level.

It is concluded that previous research studies have listed the determinants of underemployment such as race, minorities, immigrants and women. It is evident that LUF based time-related underemployment is a more comprehensive indicator, which is greatly determined by gender, age, region and education. Time-

related underemployment by LFS only includes the visible underemployment whereas in LUF components visible and invisible underemployment is included. Previous studies failed to compare the determinants to total underemployment, voluntary underemployment and involuntary underemployment for the case of Pakistan. Thus there is a need of a demographic based comparative study which can clarify the supply side factors of underemployment.

3. Methodology

3.1. Theoretical Framework

The shortage of jobs provision force people to become unemployed, have a low skilled job or work for a fewer time and accept low wages (Borgen Amundson, & Harder, 1988). Similar case for underemployment earlier described for the informal sector, where people have potential to work in a better productive environment, and named it '*disguised unemployment*' (Robinson, 1937).

Surplus labour theory in Lewis model (1954) iterates that, when businesses are working low levels of capital and technology, they enforce the workers to work in unproductive and irregular job durations. Because of this, the workers are unable to earn sufficient livelihood (Brown, Sessions, & Watson, 2007). The study of Bender and Skatun (2009) also investigated the effect of working hour's constraints on changing job which was also based on the theory of "Unlimited Supply of Labor". It originated when Professor Lewis noticed that in less developed countries, people are involved in temporary and part time jobs such as the waiters, shoe-shiners etc.

In less developed countries, due to increased population growth, there is an excess supply of labour and the shortage of demand for labour. Consequently, these countries face the problem of unemployment, underemployment and disguised unemployment. To overcome these problems, surplus labour can be withdrawn from unproductive work to productive employment without affecting the output and by improving the production methods of organizations (Lewis, 1954).

3.2. Estimation Model

The logistic regression model is used as an econometric methodology to analyze the determinants of underemployment, voluntary underemployment and involuntary underemployment.

Flynn (2003) and Slack and Jensen (2007) employed this model to measure underemployment. The present study also used three models using logistic regression to measure underemployment and its two forms with the help of "Maximum Likelihood Estimation" technique. The estimation model includes the demographic determinants of the worker's employment status which is further bifurcated into determinants of voluntary underemployed or involuntary unemployed.

$$L_i = Ln\left(\frac{P_i}{1-P_i}\right) = \alpha + \beta_1 X_{1i} + \cdots + \beta_n X_{ni} + \varepsilon_i \qquad \textbf{(1)}$$

L_i represents the Logit model. Ln represents the natural Log. X_i…… X_n represents the independent variables (personal, household and regional characteristics). Now consider the dependent variable $P_i = 1$ if a worker is underemployed in model one, voluntary underemployed in model two and involuntary underemployed in model three respectively. $P_i = 0$ if a worker is not underemployed in model one, not voluntary underemployed in model two and is not involuntary underemployed in model three respectively.

3.2.1 Tests for Maximum Likelihood Estimation Technique

The following two tests have been applied for maximum likelihood estimation technique.

3.2.1.1 Wald Test

Let the parameter estimates is represented by a vector $\hat{\beta}$ and some restrictions have been imposed. So, the hypothesis Ho is $\beta = 0$. $\hat{\beta}$ will satisfy the restrictions if they are valid so the Wald statistics is

$$W = \hat{\beta}' \left[Var\left(\hat{\beta}\right) \right]^{-1} \hat{\beta} \qquad \textbf{(2)}$$

In case of large samples under null hypothesis, Wald statistics follows chi-square distribution. The degrees of freedom for this will be equal to the number of imposed restrictions.

3.2.1.2 Likelihood Ratio (LR) Test

To test the overall significance of the model, (LR) statistic is used. It is basically used to obtain logarithm of the ratio of likelihood function twice. For this purpose, two different models have been evaluated which includes the full model and reduced model on the basis of maximum likelihood estimation. Log of full model and reduced model is calculated then the LR test statistic is defined as

LR = -2[ln {L (2^{nd} model which is reduced)}-ln {L (1^{st} model which is a full model)}]

LR test follows chi square distribution and the degrees of freedom are equal to the difference of estimated parameters of the two models.

3.3. Description of Dependent and Independent Variables

The detailed description of the dependent and independent variables in the model are described in Table 1

3.4. Source of Data

The above-mentioned variable will be extracted from the Labor Force Survey of Pakistan (2010-2011). This survey collects identity concealed information regarding personal and socio-demographic characteristics of individuals in households. Data related to the reasons of voluntary and involuntary underemployment was also extracted from the Labor Force Survey (2010-11). The sample size of the survey is 36,464 households from all over Pakistan using stratified two-stage sampling procedure where 200 to 250 households were covered in each enumeration block constructed on the basis of population census of 1998. This data is comprised of 69,347 observations. The indicators for underemployed workers (working less than 35 hours), voluntary underemployed and involuntary underemployed were constructed under the definition of ILO.

Table 1: Table of Description of Dependent and Independent Variables

Model	Dependent Variables	Description
1	Underemployment	0 = if a worker is not underemployed and 1 = if a worker is underemployed
2	Voluntary Underemployment	0 = if a worker is not voluntary underemployed and 1 = if a worker is voluntary underemployed
3	Involuntary Underemployment	0 = if a worker is not involuntary underemployed and 1 = if a worker is involuntary underemployed
Independent variables	**Sub Category**	**Description**
Personal Characteristics		
Age	Age at the time of Survey	
Experience	Proxied by Square of Age	
Gender	0 = if a worker is female and 1 = if worker is male	
Marital Status	1 = if a worker is married and 0 = if a worker is otherwise	
Current Enrollment	0 = if a worker is currently enrolled in any educational institution and 1 = if a worker is currently not enrolled	
Education Level	Below primary	0 = otherwise and 1 = if a person is illiterate or below primary education level
	Between Primary and middle	0 = otherwise and 1 = if a person a primary and below middle education level
	Between Middle and Matriculation	0 = otherwise and 1 = if a person has a middle and below matric education level
	Between Matric and Intermediate	0 = otherwise and 1 = if a person has a matric and below intermediate education level
	Between Intermediate and Graduation	0 = otherwise and 1 = if a person has a matric and below intermediate education level
	Graduation or above	Reference category
Employment	Employee	0 = if a person is not an employee and 1 = if a person is an employee
	Employer	0 = if a person is not an employer and 1 = if a person is an employer
Head of House	0 = if a person is not a head of household and 1 = if a person is a head of household	
House Size	Number of people resident at the time of survey	
Number of siblings	Number of siblings at the time of survey	
Province	Sindh	0 = if a person does not live in Sindh and 1 = if a person lives in Sindh
	KPK	0 = if a person does not live in KPK and 1 = if a person lives in KPK
	Balochistan	0 = if a person does not live in Balochistan and 1 = if a person lives in Balochistan
	Punjab	Reference Category
Region	0 = if a person lives in a rural region and 1 = if a person lives in an urban region	

Source: Kanwal et al. (2019)

4. Estimation and Results

Underutilization of human abilities and physical capacity is determined by analyzing the supply of working hours of employed persons. It shows the extent of unused labour resources of potential

labour supply. This is also influenced by the income of other family members, household activities and occupation (Robinson & Abbasi, 1979). Table 2 describes the percentage and frequency of people who are supplying less than 35 hours, normal working hours (35-48) and excessive working hours[5] (greater than 48) in Pakistan. Out of 69,347 employed individuals of all four provinces, only 68,606 persons reported their working hours. The distribution of these persons in the three categories of working hours are as follows:

Table 2 : Distribution of Employed Persons in Total Working Hours

Working Hours	Frequency	Percent
Less than 35 hours	8183	11.9
35-48 hours	32842	47.9
Greater than 48 hours	27581	40.2
Total	68,606	100

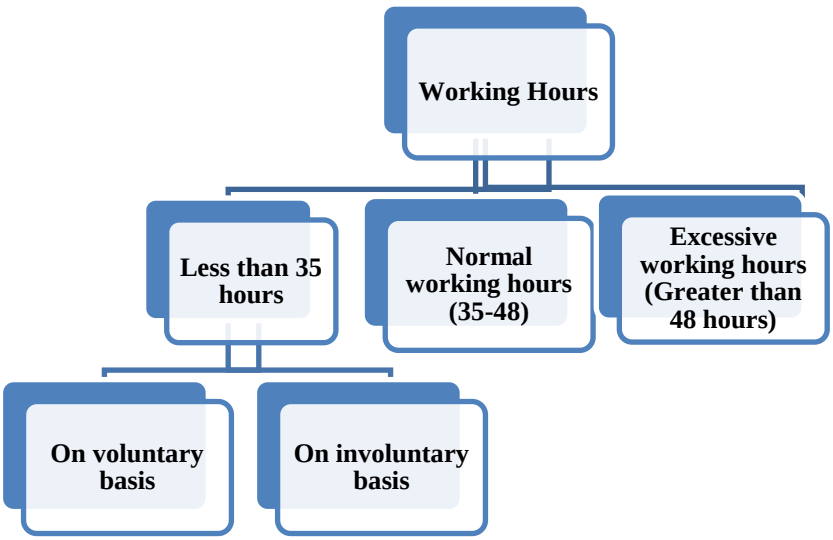
Source: Calculated from LFS, 2010-2011

On the basis of working hours, employed people of Pakistan, supplying less than 35 hours are further divided into two categories. One category includes persons who are supplying less than 35 hours in a week on a voluntary basis. The second category includes those who are supplying lesser hours on an involuntary basis, shown in figure 3.

Table 3 enlists the reasons of those who are supplying less than 35 hours on a voluntary basis. A large percentage of people, who normally work for the fewer number of hours and do not want to work for additional hours, clearly shows that they are underemployed on a voluntary basis. This represents the social problem in Pakistan society where people, particularly, females are reluctant to be engaged in a productive and full-time employment.

[5] In factories act of 1934, a worker is not allowed to work in a factory for more than 48 hours in a week. In a seasonal factory, only 50 hours of work in a factory is allowed. For details, see Pakistan Factories Act, 1934 as amended in ILO (1997) available at: http://www.ilo.org/dyn/natlex/docs/WEBTEXT/35384/64903/E97PAK01.htm

Figure 3: Categories of Working Hour



Source: Labor Force Survey: 2010-11

Table 3: Voluntary Reasons for Working Less than 35 Hours a Week

Reasons	Percentage of Employed People
It is normal to supply fewer number of hours	83.8
Due to educational and training leave	0.6
Due to maternity or parental leave	0.1
Due to other personal reasons	1.3

Source: Calculated from LFS, 2010-2011

Table 4 enlists the reasons for people who are involuntary underemployed. These are the people who are affected by structural issues or nature of labour demand.

5. Empirical Results

Table 5 presents the estimates of logistics regression for the model of underemployment, voluntary employment[6] and involuntary employment[7].

Table 4: Involuntary Reasons for Working Less Than 35 Hours a Week

Reasons	Percentage of Employed People
Due to illness or injury	1.4
Due to strike or layoff	0.2
Due to holiday, Ramzan or vacation	3.5
Due to off-season inactivity	2.9
Due to bad weather	2.3
Due to mechanical or electrical breakdown	0.1
Due to shortage of raw materials	0.2
Due to a reduction in economic activity	2.1
Unable to find work or due to law and order situation	1.2

Source: Calculated from LFS, 2010-2011

The sample size for these three models were 68,605, 19,432 and 19,432 respondents respectively. The significant value of likelihood ratio (LR) indicates that all of these models are statistically fit in explaining the respective dependent variables. The pseudo R^2 indicates that the proposed variables are able to explain 21% variation in overall underemployment, 23.6% variation in voluntary employment and 7.4% variation in involuntary employment.

While interpreting coefficients of personal characteristics in table 5, it can be seen that increase in age of a young worker (15-29 years) will decrease the chances of being underemployed and voluntary underemployed by 0.6 percentage points. This may be due to the reason that with the increase in age, a worker acquires experience and know-how of work. Physical potential also increases

[6]The underemployment in which the condition of working less than 35 hours and non-availability for additional work is fulfilled is called voluntary underemployment. See KILM 12 "Time Related Underemployment" by ILO, (2011) http://www.ilo.org/public/english/employment/strat/kilm/download/kilm12.pdf

[7]The underemployment in which the condition of working less than 35 hours and availability for additional work is fulfilled is called involuntary underemployment. See KILM 12 "Time Related Underemployment" (2011) by ILO, available at http://www.ilo.org/public/english/employment/strat/kilm/download/kilm12.pdf

with an increase in age. This indicates that the combination of youth and experienced worker in his middle age is demanded in the market.

Table 5: Logistic Regression Results of Determinants of Underemployment

Dep. Variable		**Underemployment**		**Voluntary Underemployment**		**Involuntary Unemployment**	
Category = 0		Worker is supplying greater than 35 hours		Worker is supplying greater than 35 hours		Worker is supplying greater than 35 hours	
Category = 1		Worker is supplying less than 35 hours		Worker is supplying less than 35 hours and not willing to work more		Worker is supplying less than 35 hours and willing to work more	
Covariates	**Subgroups**	**Coeff.**	**Marginal Effect**	**Coeff.**	**Marginal Effect**	**Coeff.**	**Marginal Effect**
Personal Characteristics							
Age		-0.085*	-0.006	-0.101*	-0.006	-0.043	-0.000
Experience	Square of Age	0.001*	0.0001	0.001*	0.0001	0.0004	0.000
Gender	Male = 1 & Female = 0	-2.086*	-0.255	-2.453*	-0.290	-1.235*	-0.014
Marital Status	Married = 1 & Otherwise = 0	0.059	0.004	-0.284*	0.017	-0.377	-0.003
Current Enrolment	Not enrolled = 1 & Enrolled = 0	-2.537*	-0.422	-2.357*	-0.352	0.177	0.001
Education Level (graduation or above = 0)	Below primary = 1	-0.661*	-0.045	-0.27**	-0.016	0.554	0.004
	Between primary & middle = 1	-0.680*	-0.039	-0.24**	-0.016	0.223	0.001
	Between middle & matric = 1	-0.815*	-0.043	-0.458*	-0.024	0.175	0.001
	Between matric & intermediate = 1	-0.717*	-0.040	-0.437*	-0.023	0.007	0.000
	Between intermediate & graduation=1	-0.358*	-0.022	-0.42**	-0.022	0.219	0.000
Employment Status (vulnerable employed = 0)	Employee = 1	-0.421*	-0.028	-0.541*	-0.032	0.698*	0.006
	Employer = 1	-0.07	-0.0047	0.076	0.005	-1.465**	-0.007
Head of House	Yes = 1 & No = 0	0.030	0.002	0.225*	0.014	-0.361**	-0.003
Household Characteristics							
Household Size		0.002	0.0002	0.02**	0.001	-0.071**	-0.000
Number of Siblings		0.008	0.001	-0.045**	0.003	0.049	0.000
Regional Characteristics							
Province (Punjab = 0)	Sindh = 1	-0.40*	-0.026				
	KPK= 1	0.486*	0.039				
	Balachistan = 1	-1.021*	-0.052				
Region	Urban = 1 & Rural = 0	-0.524*	-0.034	-0.281*	-0.017	-0.368**	-0.003
Constant		4.030*		3.633*		-2.544*	
		Obs.= 68,605 LL = -19712.6	LR^2= 10718(0.00) R^2 = 0.2138	Obs. = 19,432 LL = -5186.05	LR^2 = 3213(0.00) R^2 = 0.2365	Obs.= 19,432 LL= -1164.44	LR^2 = 186.8(0.00) R^2 = 0.0743

Similarly if the worker is male, it significantly reduces the chances of total underemployment (Their probability decreases by 25.5 percentage points) and its types, indicating that male workers

have high sense of social responsibility which forces them to fully utilize their available working hours, while females traditionally get themselves employed in household chores hence the chances are higher (Görg & Strobl, 2003). The results of variable marital status show that married workers are more likely to be voluntarily underemployed. The reason behind this could be that married workers especially females have other household responsibilities as well. So, they prefer to remain voluntarily underemployed.

While exploring the dimensions of education, the probability of being voluntarily underemployed decreases by 35.2 percentage points for those who are not currently enrolled in any institution. This is due to the fact that enrolled people has to pursue their learning goals. Also, it is observable that with the increase in the educational qualification of the worker the chances of being underemployed reduces. This is because higher qualification increases the demand for the labour.

When we compare the worker type, both employee and employer are less likely to be underemployed by 2.8 and 4.7 percentage points respectively as compared to the vulnerably employed worker. Also, it is indicated that the employer is less likely to be involuntarily underemployed as compared to the employee, these results are contradicting the outcome of (Shahnaz & Khalid, 2008).

Exploring household characteristics, it can be seen that an increase in the house size increases the chances of voluntary underemployment by 0.1 percentage points but reduces the chances of involuntary underemployment. This indicates that in a bigger family, their earning burden is shared so members can reduce their work hours while because of advice and experience of other members the chances of involuntary reduction of work hours diminish. While the increase in a number of siblings only reduces the chances of voluntary underemployment significantly, indicating that having employed brothers and sisters inspire the worker to utilize total working hours. Head of the house has low chances of being involuntary underemployed (probability decreases by 0.3 percentage points) as he has a responsibility to manage the expenditures while the chances of being voluntary underemployed

are increased this is because in most cases the head of the house is the most elder person hence he intentionally works fewer hours to conserve his energy.

The regional characteristics indicate that people living in urban areas, Sindh and Balochistan have lower chances of being underemployed while people living in the mountainous region of KPK has higher chances of being underemployed. The study of Shahnaz and Khalid (2008) found that in KPK, most of the workers are working less than 35 hours on a voluntary basis. While people living in rural areas are mostly hired in terms of intermittent (seasonal) employment contract.

6. Conclusions and Discussions

On an aggregate level, the statistic of underemployment is hidden under the employment level of the country but if observed individually, the supplied resources are not fully utilized. If the worker is underemployed then his life time income will be lower than the fully employed worker which in turn affects his well-being. He might have to suffice with a job in a non-specialized sector which might not assist in gaining access to full-time employment.

The demographic based labour supply determinants are explored using linear logistic regression model. The present study contributes to the previous literature by measuring the different dimensions of underemployment and their determinants. From the detailed analysis of determinants of underemployment, a study has concluded the following main points.

Overall in Pakistan, 11.9% people are underemployed. Out of underemployed persons, only a small percentage of people have involuntary reasons for working less than 35 hours otherwise a high percentage of employed people have voluntary reasons. This also depicts that the supply side determinants are dominant for the case of Pakistan.

With the increase in age, percentage and probability of people supplying less than 35 hours decreases but this probability diminishes with age too. This very young and aged labour are highest in a number of underemployed people. People in the rural region have a high percentage of underemployment because the law

of child labour is not fully implemented and the job contracts are seasonal.

While comparing male and female workers, male workers are less likely to be working less than 35 hours in both regions and in all provinces. Marital status has a positive effect on voluntary underemployment which represents a high proportion of married females who have to work with their husbands to meet the basic needs of life in this poor country of Pakistan. People who are enrolled in any educational institute have higher chances of being underemployed but once they are graduated their chances decrease. As compared to employees, the employers have lower chances of being involuntary underemployed.

Head of households supply fewer hours as compared to other persons in the family, such that their probability of being voluntarily underemployed increases and are less likely to be involuntary underemployed. With the increase in a number of siblings, the effect of a probability of a worker to be voluntary underemployed is quite negligible. As compared to Punjab, people living in other three provinces tend to supply fewer hours. In the case of Sindh and Baluchistan, a very small percentage of people are underemployed. In KPK, the probability of being underemployed is higher.

Hence in order to reduce the underemployment, strategies should be adopted to expand well paid full time jobs by starting the new businesses, investing in the new companies and organizations especially in KPK and Balochistan. Policy makers must ensure that the workers are pursuing the learning and skill development, this will help in aligning their abilities with the market requirements. For women, child care should be subsidized as it would decrease the probability of part time work and increase the labor force participation of women. Government should invest in secondary and tertiary industries instead of primary industries. In this way, vulnerabilities due to the existence of informal sector can be decreased. The problem of underemployment is prominent in KPK and rural areas, where policy makers should mobilize the labour resource in construction roads, power plants and projects like the project of China Pakistan Economic Corridor (CPEC).

Future research in case of Pakistan will be performed by measuring underemployment in different industrial sectors. The sectors in which people are involved in agriculture, fishing and forestry as these industries provide substandard work to the people. The study can be extended if the data on desired hours and wages will be incorporated in the questionnaire of LFS while conducting this primary survey next time around with same correspondents.

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