

Causes of Long-term Unemployment: A Case Study of Survival Analysis

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Longer and repeated unemployment spells due to inappropriate employability opportunity resulted in exclusion from labour market. Long-term unemployment is evident for all ages, gender, and racial and ethnic groups, and it is also prominent for major occupation, for major industry, and at all levels of educational attainment. The major objective of the study is to address the causes of long-term unemployment in Pakistan by observing the duration of worklessness specifically demand-side anxiety of job availability and those factors that increases the length of unemployment are investigated. The analysis of micro aspects of long-term unemployment elaborates regional disparity across the provinces. Both Parametric and non-parametric approaches of survival analysis are used to evaluate the objectives. Long-term unemployment is evaluated by constructing unemployment duration spells for Labour Force Survey of Pakistan for the period 2013-14. Estimation of Kaplan Meir indicates that survival function of a person decreases over the period of time. Transition from unemployment state to employment state is significantly higher for male than female, senior age group worker and secondary and higher education level. The unemployment duration of young workers is relatively longer than old age group. The finding reveals that the existence of longer duration of unemployment and demographic association presents the labour market. Unemployment is major issue in urban areas and, according to data set, existence of longer spell of unemployment is high in Punjab. Specifically the study emphasised that wage dispersion in labour market leads to prolong duration of unemployment of workers. Result of Weibull distribution found that significant wage dispersion leads to a longer spell because economy is not generating required numbers of job for capable workers. Consequently study suggested that there is need for formulating labour market policy by considering targeted groups. In addition to this there is also need to structure vocational training programmes and apprenticeships so that transition from unemployment to employment would be easy.

Keywords: Long-term Unemployment, Duration Analysis, Wage Dispersion

1. INTRODUCTION

Unemployment is the core issue of Pakistan's economy that leads the workers productivity towards downfall. According to Economic Survey of Pakistan estimated population in 2016 is 195.4 million that is quite higher among its neighbouring countries except India. Age group pyramids of Pakistan shows that large proportion of young people is in productive age, which is the indication of prosperity of the economy but job creation is not sufficient to fulfil requirement of its industrious job seekers. Employers

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consider duration of unemployment as a critical evaluation at the time of hiring. Population age composition shows 56 percent of aged group (15-64) and 48 percent of aged 15-49 fall in industrious age group. During the era of 50s a large number of people registered themselves as unemployed and it remained unchanged in the era of 60s. According to the LFS, unemployment in 1950-51 was amounted to 22 percent as proportion of total population of the labour force but at that time Pakistan's human resources were unutilised. In absolute terms unemployment increased from 6 million man-years in 1950-51 to 8.04 million man-years in 1960-61 in spite of a 2.4 percent [Ahmad (1972)]. Unemployment rate in Pakistan was decreased to 5.9 percent in 2014. Average value of unemployment rate in Pakistan from 1985 until 2015, reached at a high of 7.8 percent in 2002 and a recorded a very low of 3.10 percent in 1987.

In context of Pakistan a vast literature is available that encounters unemployment on its macroeconomic perspective. While long-term unemployment is completely ignored. Long-term unemployment is not only creating worst impact on the economy, but it is also affecting mental and physical health and higher mortality rates among individuals. The link between longer duration of unemployment and its worst consequences is comprehensible. People are unemployed for a longer period of is less powerful to affect market wages. Lower wages and lifetime incomes are associated with longer periods of unemployment, the reason for the decreasing earnings prospects are not clear [Stephan (1998) and Pierre (2000)]. However, both studies did not cover the aspect that how long-term unemployment affects the wage structure in labour market.

The aim of this article is to factor out the elements of widening the unemployment spells by considering individual's characteristics and geographical area. It also investigates the wage dispersion that leads to comparatively longer duration of unemployment. Long-term unemployment is measured by considering the unemployment duration; that is, the length of time that an unemployed person spends seeking for a job. Spell of unemployment as an indicator of long-term unemployment by measuring probability of quitting unemployment status and simultaneously captures to what extent an inflow in unemployment occurs in a given year. Person's probability to exit from unemployment depends on average eminence of inflow. The duration of unemployment gets longer due to insufficient availability of employment opportunity, recession, rise in demand of skilled labour and structural changes. Kaplan Meier's hazard risk model is used to analyse the length of unemployment duration. Kaplan Meier Estimate is used as non-parametric approach and exponential and Weibull as parametric approach for finding the causes that can lead to elongate the spell of unemployment.

The article is arranged in following section: In Section 2 reviewed past literature that encounters longer spell of unemployment and turnover by human characteristic. Survival analysis and its approaches are methodically discussed in Section 3. Section 4 contains estimation of non-parametric approach. Sections 5 have parametric modelling that encounter elements that increase unemployment spell longer. Section 6 finally discuss the concluding analysis and policy recommendation.

2. THEORETICAL FRAMEWORK

There are many theories available in context of longer duration of unemployment. Job search theory given by Lipman and McCall (1976) and Mortensen (1970) is more

commonly chosen theoretical frame work. Searching models give the decision making choices of individual either to be an active participant in the labour market or to be apart from job. In order to explore the duration of unemployed person study simply focuses on the unemployed person's job searching behaviour. It is assumed that worker is actively searching for job but has imperfect information so that he may come across inappropriate jobs before getting a job. When an unemployed person get a job offer, he has to decide either to accept or reject it on the bases of past decided set of criterion. These criterions are more important in the process of decision making for both employer and workers. Employers give more weight on these set of criterion that makes a worker more attractive for employer when offering a job. These criterion includes educational attainment, local market condition, skill level and experience. Job offer acceptance by the unemployed persons is determine by unemployed persons set of preference.

Human characteristics consider an important set of indicators for decision making process for both employer and employee. Set of human characteristics are found to be more influential in increasing the length of unemployment sell in different studies. Cross section analysis has shown that age has positive probabilistic association with unemployment spell however past literature does not give genuine explanation of this relationship. However, variation in age-productivity and age wages as well as employer discrimination may lead to increase in unemployment spell. This prior result is evident in all cross section study where age is found to be statistically significant in all age category [Pedersen, *et al.* (1993); William (2003); Roberto, *et al.* (2011); Toshihiko and Sahin (2004); Alexandra, *et al.* (1999); Namkee Ahn, *et al.* (2000)].

Whereas educational attainment and age square as a proxy of work experience are another important indicators of human characteristics and employer give more value at the time of evaluation for hiring process. In the same notion, hypothesis was developed by Nickel (1979) in order to address educational framework with prevalence of unemployment, it stated that unemployment is lower among graduates. Higher education is considered to be subject to a body of buildup human capital with high productivity of worker. Employers are more conscious about workers' productivity. In recent year a bulk of highly qualified people are entering in the labour market so that available employability opportunity are not sufficient to meet their wants so that highly qualified people are also facing problem of unemployment. [Nunez and Livanos (2010); Stephen (1998)]. Age pyramid of Pakistan shows that a large proportion of youth are fall in industrious age group so that job creation is insufficient to absorb them. Demographic transition in Pakistan is resulted in high unemployment in educated young labour force [Arif and Chaudhry (2008)]. Public job preferences of unemployed resulted in longer duration of unemployment among professional educated persons, whereas in general educational qualified people suffer less [Tasnim, *et al.* (2013)]. In addition to this gender is another important variable that shows employers discrimination because they prefer less to hire female as compare to male, so that gender inequality arises in terms of employability opportunity available to both. [Steiner (1989) and WestergBrd-Nielsen (1990)]. Number of children is another important variable that shows dependency ratio of a household. Female having child less likely to quite unemployment state as compare to male because of social and household responsibility whereas male has to put effort in searching job because he is the main earning person in the household [Westergird-Nielsen (1993); Gerard, *et al.* (1998); Anders, *et al.* (2006); Namkee Ahn, *et al.* (2000)].

Quantitative analysis of searching model in order to capture labour market indicator impact on unemployment shows that both an increase in wage dispersion and decrease in incidence of unemployment can cause the average duration of unemployment significantly longer [Toshihiko and Sahin (2004)]. So that there is positive probabilistic association is found in wage equality and longer duration of unemployment.

3. LITERATURE REVIEW

Evaluating the factor that prolonged the unemployment duration, existing literature is portraying a clear picture of individual behaviour and labour market functioning. There is a sufficient amount of literature that encounters the issues of long-term unemployment and its impact on socio-economic stability and labour market condition. Most of the studies focused on job search behaviour by using hazard rate model [i.e., Gerard, *et al.* (1998); Anders, *et al.* (2006); Roberto, *et al.* (2011); Namkee, *et al.* (2000); Tasnim, *et al.* (2013) and Alexandra, *et al.* (1999)]. This section firstly reviewed issues on world perspective and followed by Pakistan context.

Wage reservation plays key role in the job search theory there is positive probabilistic association between these two elements but it is not significant factor in explaining incomplete unemployment spells. Variable that captures the attractiveness of the job seeker to potential employers such as past experience, and educational attainment, and factors which influence the search effectiveness of job seekers such as eligibility for unemployment benefit were important for explaining unemployment duration. So that presence of unemployment is not caused by an inflow of workers in unemployment highly qualified person is also hindered due to recession. A moderate increase in minimum wage increases outflow from unemployment only for those that are receiving unemployment insurance but there is not any significant impact on those who does not get any unemployment insurance. However, it makes situation worse for unskilled worker [Gerard, *et al.* (1998); Stephen (1998); Alexandra, *et al.* (1999) and Roberto, *et al.* (2011)].

Toshihiko (2008) evaluates that increase in unemployment duration is caused by an increase in wage inequality within group and an increase in incidence of unemployment. He concludes that both an increase in wage dispersion and decrease in incidence of unemployment can cause the average duration of unemployment significantly longer.

Unemployment insurance benefits privilege and size of unemployment insurance benefits during unemployment spells can longer the spell and it has impact on post unemployment earnings. A weak influence has found on length of privilege phase on the conditional distribution of unemployment duration for entitlement lengths up to 12 months. There is perceptible effect on quitting from unemployment for privilege lengths more than 12 months. These effects are smaller for after short unemployment durations; it increases for the higher quantiles of the unemployment duration distribution, in particular for the older unemployed with extended entitlement periods for unemployment benefits [Ralf, *et al.* (2010) and Stefan, *et al.* (2014)]. Long-term unemployment weighs on negative pressure that unemployment has on wages. There is no contradiction in the unemployment elasticity of wages either considers wages together with overtime or not. To distinct between manual and non-manual worker a separated model is made and it has

found that the unemployment elasticity of wages is higher for manual. Probabilities for reemployment for those who are in active labour force in link quarter are higher than unemployed. Magnitude of predicted employment probability losses is getting wider [Pierre (2000) and Katherine, *et al.* (2015)].

Regional disparity and individual heterogeneity are important factors that cause an increase in the unemployment duration. Duration of unemployment is significantly influenced by individual heterogeneity, labour market mobility; educational achievement and job seek activity those areas where unemployment is high and literacy rate is low, young labours are more inclined to work on low wages. There is a declining trend in job security due to change in FLFP and permanent job loss duration [Ferhan (2016); Farhat, *et al.* (2009); Robert, *et al.* (2005); William (2003) and Namkane (2000)]. Unemployment in youth shows acute position in Pakistan. In regional context it is basically an urban phenomenon. In rural areas it is less intensive because of disguised unemployment and presence of informal social safety nets' in terms of land holding, extended families and strong family ties that cushion the pressure of youth to aggressively pursue jobs. Skill acquisition and vocational training do not have significant impact in increasing the probability of employment in regional context. Unemployment is high in KPK. Female unemployment is higher in urban areas than in rural areas. Age and marital status had significantly negative influence on making transition from labour force to outside the labour force. Being head of the household was positively related with moving out of the labour force [Arif, *et al.* (2002); Akhtar and Shahnza (2006) and Waqqas (2007)].

Nunez and Livanos (2010) investigates the impact of academic degree and field of study on short term unemployment and long-term unemployment. He concluded by declaring that employment chances increase due to higher education. It was also found to have a (more moderate) impact on avoiding long-term unemployment. The effect of higher education on long-term unemployment is both less intense and more homogeneous than on short term unemployment. The estimated magnitude of the long-term coefficients is smaller and the cross country differences are also minor in this category.

In Pakistan youth starts their career in early stages so there is large possibility to face higher unemployment. Highly educated youth having educated parents are more likely to face higher unemployment because they are choosier than less educated youth. The potential wage advantage an unemployed individual would enjoy in a public sector job was found to exert no independent influence on the stated preference indicating that fringe benefits and work conditions are perhaps more important considerations [Haider (2007) and Rizwan, *et al.* (2010)].

A general concluding this section, spell of unemployment gets longer due to unemployment benefits, wage inequality and insufficient job creation. While in context of Pakistan unemployment is high in urban areas due to job skilled mismatch and transition from agriculture subsistence to industrialisation.

4. DATA AND METHODOLOGY

The micro data that shall be used in this study will be taken from the Labour Force Survey of Pakistan (LFS). It is main source of detailed information of labour force market characteristics. It is covered representative sample of 40,747 households to produce disaggregated estimate at provincial and national level with rural/urban breakdown. The

survey also provides quarterly representative results at national, rural/urban level. For duration analysis LFS 2013-14 has taken to estimate all human and market characteristics.

4.1. Survival Analysis

It is necessary to address both inflow in unemployment and outflow from unemployment as well as to what extent job creation satisfies job seekers, and to what extent it affects different groups of labour force in order to formulate adequate policy for labour market. A person remains out of work for a longer period of time; that period of time refers to as unemployment duration. The unemployment spell is a core variable that can draw clear picture about the variation in labour markets and it is extensively used in the job search models when studying the flows into employment, unemployment and inactivity status. Duration analysis methods deal with estimating models of time to event data. The time that a person spends in a particular state (e.g., unemployment, poverty, marriage, etc.), i.e., the duration of that spell, is considered to be a random variable. The aim of analysis is to understand what determines the duration of these spells (or in other words what determines transition out of this state).

There are different analysis methods that depend on time variable either it is discreet or continuous. Most spell durations are determined by behavioral processes it should be considered continuous. Unemployment spells is measured in terms of days. Survival time is considered as a causal variable and it is the actual realisation.

Let consider T as the causal variable that is representing unemployment duration in number of day whereas actual realisation of spell duration is represented by t . T is considered as a continuous causal variable, with a cumulative density function (cdf) shown as $G(t)$, and a probability density function (pdf) shown as $g(t)$, probability that a person fail having duration less than actual realisation spell is:

$$\Pr(T \leq t) = G(t) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (i)$$

The possibility that a spell is longer and equal to actual realisation of time t considered as survival function that is represented as:

$$\Pr(T > t) = 1 - G(t) = S(t) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (ii)$$

Analysing of survival spells based on Hazard function. In continuous study, it is the ratio of the survival time density function (or the probability density function of the random variable, spell duration) to the survivor function.

$$\phi(t) = \frac{g(t)}{1-G(t)} = \frac{g(t)}{S(t)} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (iii)$$

The integrated hazard function is

$$h(t) = -\log_e(S(t)) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (iv)$$

As is evident the hazard function is always nonnegative. Hazard rates are predicted by maximum likelihood estimation (MLE) methods. It is assumed that there is no left-censoring and it is not dependent of spell across i th person, it assumes only single state of transition, Maximum likelihood function can be described as:

$$L = \prod_{i=1}^N \phi(T_i)^{I_i} S(T_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (v)$$

Or in logarithmic form

$$\text{Log } L = \sum I_i \log \phi(T_i) + \log S(T_i)$$

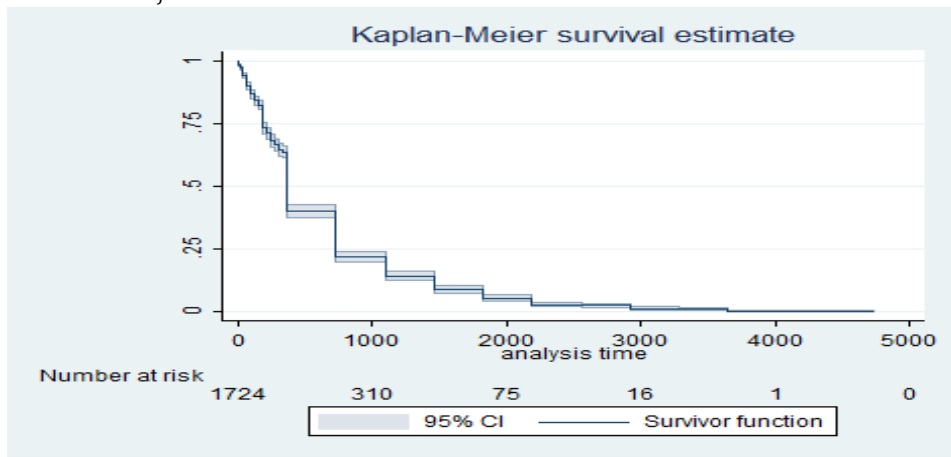
Where $\phi(T_i)$ represents hazard function and $S(T_i)$ is the survivor function, i and T is measure the time-span of the entire or right censored duration for individual i , the number of durations is N and I_i is an indicator for whether this is a completed spell or not.

4.2. Duration of Unemployment by Non-parametric Estimation

Recent economic analysis is focusing on the use of survival analysis in empirical analysis of different economic phenomenon. In biomedical traditional approach used this Survival analysis in order to study a well-defined event for a group individual. Probably event is described in terms of a failure event. Failure event happens subsequent to a given spell of time it is termed as failure time. It can happen once and most of the time for any i th individual of group or phenomenon under assessment. Unemployment spell of individual is an example of failure event.

It is expedient to show estimation of the dispersion of unemployment spell without incorporating regressor. Non-parametric estimation is used for this purpose that provides descriptive analysis as well as gives empirical support to baseline hazard. The standard formula that is widely practiced in estimation of survivor function is $S(t) = 1 - F(t)$ in which censored observation is controlled with the help of non-parametric approximation.

Kaplan Meier in Annex Table 3.1.1 is showing both survival and failure function of unemployed persons. Individuals those fall in risk at initial time is 2088 (that is unemployed individuals). So that $n_j = 2088$. In the first day 2 individuals left the state of unemployment implying $d_k = 2$. Survival function for the first day is estimated as $s(t) = (1 - \frac{d_k}{n_j}) = 0.9990$.



Source: Author's estimation.

It is an indication that individuals will be staying in unemployment state given that person survived at the start of the first day (99.9 percent of initial risk set). The failure function increase rapidly over the period of time and survival function decreases vice versa, and after that reduction in survival function is steady. Reliable information can be

obtained by using this precise estimation. The estimated survival function is a product of the conditional survival probability for surviving beyond t_j , the conditional survival probability is an increasing function of time. The survival function decreases as unemployment duration increases. This is one characteristic of a survival function [Collett (2003)]. Graphical presentation of Kaplan Meier survival function is given above. Y axis is representing approximation of survival function without regressor, at 95 percent confidence interval. Unemployment duration is experienced above 5000 days (showing at x axis). It signifies that exit probabilities from unemployment is lower in initial period of unemployment. unemployment in short term might be due to lack of required. Unemployment spell increases from more than a year, the proportion of decline in survival function becomes faster. It is an indication that people having longer unemployment spell have higher leaving probabilities.

Survival curves are contrast in order to capture univariate association between unemployment and a vector of regressor covariates. Survival curves are plotted for age group, gender, education level, occupation groups. Parallel curves imply that the covariates have a significance influence on unemployment duration.

In Table 3.1.2 the length of unemployment is shown by considering age groups. People in the age category (21-30) are facing long duration of unemployment that is longer mean duration time in days as compared to senior workers age group. Large proportion of the representative falls in this age group who have been facing longer unemployment spell. This is an important indication showing that young people who start their career at early stages, probability to face longer unemployment spell is higher for them. The overlies lines in graph given in annex 3.1.2 suggests that adults and youth have similar probability of exiting the state of unemployment in short period of time. Individual falls in the category of (age group 15-34), survival function of them decreased faster than one that falls in the category of (35-64). Reason behind this is that employers have a preference to invest in young labours once they acquire some experience.

Proportion of male who registered themselves as unemployed is thrice time higher than unemployed female but mean duration of unemployment for male is less than female duration. Married women have longer duration of unemployment spell because of having a working husband and due to household chores. Above result reveals that probability of re-entering in labour force for female declined due to taking care of older relatives and young children in the household. Numbers of children has a negative influence on the probability of joining labour force. Highly educated females are more inclined to be a participant of labour force in urban areas than in rural areas, the educational impact is double in urban areas compared to rural areas.

The survival function for male and female is not identical and it can be seen in graph 3.1.3. Female has higher survival function than male; it is an indication that transition from unemployment to employment is higher for male as compared to female. In short run both have lower leaving probability from state of unemployment. It can be shown by the small declining variation in their survival functions during short period of analysing time.

Those people, who had experienced in tough daily routine task, have longer spell of unemployment. Skilled workers are more inclined to switch their jobs from tough routine task work to easy work while on contrary less skilled workers are

searched manual jobs instead of tough routine task. Study analyse the approximation of unemployment duration for executive, managers, professionals, technicians, clerks, sales workers, fishes and forestry, skilled agriculture workers, craft and related workers, plant and machine operators and elementary group as well. Armed forces occupations are excluded from the data. Those persons who have experienced in white collar jobs their survival function is not much higher than those who are experienced in elementary, sales, clerks and agriculture workers. It indicates the possibility of quitting unemployment significantly depends on the exceptional work. People can find out employment opportunity if they have experience in related field. The graph (Annex 3.3) apparently illustrates the impact of previous experience of job on the possibility of exiting unemployment. People have longer unemployment spells that have past experience in daily tough routine work. Job searching is a time-consuming procedure and it is related to the occupation in which job is searched. Workers employed in an occupation that contain regular tough routine work, probability of finding jobs decreases. According to Kaplan Meir survival functions, workers employed in occupation like clerk 21.1 percent, sales worker 12.1 percent, Skilled agricultural, forestry and fishery workers 26.85 are less likely to quit unemployment.

The duration of unemployment is significantly longer for dismissal for a personal reason than a dismissal for economic reason, especially for less educated people served as unskilled workers. Unemployment is high in urban areas in Pakistan. According to our data set incidence of longer unemployment is relatively high in Punjab as compared to other provinces. Workers are unemployed in Punjab to the extent of 47.68 percent. KPK is another province where unemployment is quite high. As we can see in the graph give (Annex 3.4) in short period of time probability of quitting unemployment status is similar for all provinces except Balochistan. Balochistan is less developed province as compared to other provinces. People living in Balochistan mostly associated with government or private job and engage in agriculture farming. Water crisis in the province made situation worst in rural Balochistan.

Another main characteristic of the labour force is education. It helps individuals to establish a successful career. It is an important aspect in order to link education and labour market condition as well as economic situation of country.

Educational achievements are represented by primary secondary and tertiary level schooling of selected sample. Survival function of eight sub groups of educational attainment represents probability of living in the state of unemployment in a particular time period. Survival rates decreased quickly in starting period of unemployment showing that people can easily leave unemployment spell. Before reaching 2 years and 9 months, survival rate decreased at a decreasing rate showing that probability of leaving unemployment state is quite difficult. Kaplan Meir graph shows that people having tertiary schooling leaves unemployment state earlier as compare to secondary and primary school leavers. Human capital considers an important asset in any organisation. At the time of scrutiny employer gives more weight to education more even when they have imperfect information about required skill. Diploma holders probably find job easily in labour market.

4.3. Parametric Approach

4.3.1. Exponential and Weibull Distribution

Exponential distribution is based on the assumption of constant hazard rate over the period of time. It is often called as memory less distribution because the length of living in particular state is not affect the probability of leaving that state. By formulation, the exponential probability density function can be written as:

$$f(t) = \lambda \exp(-\lambda t) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

And survival function is:

$$S(t) = \exp(-\lambda t) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Whereas instantaneous hazard rate is:

$$h(t) = \lambda \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Exponential distribution holds both assumptions of PH model and accelerated failure time(AFT) model. Exponential model assumes constant hazard rate over the period of time that is identical to Ph model so that it can be used as a PH distribution model. It also holds assumption of AFT model that survival time decelerate (accelerate) by invariant factor at different levels of covariate. Exponential model coincides with Weibull distribution. Weibull distribution is based on two parameters. CDF of Weibull distribution is:

$$F(t) = 1 - \exp(-\lambda . t^\alpha) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

Where both parameters (α & λ) are non-negative. Probability distribution function is:

$$f(t) = \alpha \lambda . t^{\alpha-1} \exp(-\lambda . t^\alpha) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

Survival function is:

$$s(t) = \exp(-\lambda . t^\alpha) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (6)$$

Whereas instantaneous hazard rate of Weibull distribution is:

$$h(t) = \frac{f(t)}{s(t)} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

Or

$$h(t) = \frac{\alpha \lambda . t^{\alpha-1} \exp(-\lambda . t^\alpha)}{\exp(-\lambda . t^\alpha)} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7.a)$$

Weibull distribution is reduced to form exponential distribution when $\alpha = 1$ and form exponential as:

$$\lambda(t) = \lambda \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

Hazard rate is continuously increasing that shows a positive duration dependence where $\alpha > 1$. Hazard rate is decreasing showing negative duration dependence where $\alpha < 1$. Within the nonparametric approach, one may use the partial likelihood framework suggested by Cox (1972) which estimates the covariate effects but not the baseline

hazard, or the approach suggested by Han and Hausman (1990) which estimates both the covariate effects and the baseline hazard parameters (also some times referred to as the incidental or nuisance parameters) simultaneously (the Han and Hausman approach is an alternative formulation of the approach originally proposed by Prentice and Gloeckler, 1978 and extended by Meyer, 1987). Between these approaches, the Han and Hausman (HH) approach has many advantages.

In order to describe factors that leads to unemployment duration Cox proportion hazard model is used. Cox proportion hazard model does not make any assumption about the shape of hazard function. It treats time as a continuous and also it assumes that covariates have constant effect over the period of time. The model of hazard can be written as:

$$\lambda(t; z) = \lambda_o(t)e^{z(t)\beta} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

Where $z(t)$ is the vector of time-varying covariates that describe the unemployment duration of an individual, $\lambda_o(t)$ is considered as baseline hazard that is a nonparametric approach (search from net). Problem of heterogeneity is aroused during analysis of hazard rate. Individuals' having low unobserved heterogeneity among unemployed persons has longer unemployment spells. Thus, the baseline hazard corresponds to an observation with $x_i = 0$. Assumption of constant hazard rate over the period of time of PH model is usually not considered as realistic. Hazard rate should be identical for per unit variation in covariate. Variable age is used in mostly micro dataset of duration model that infringes PH assumption. Hazard rate should be identical to all sub group of age (e.g. sub group of age 10-25 years old, 25-40 years old, 40 and above years old). PH assumption can be verified by different test like log minus log graph with partial residuals.

5. RESULT ANALYSIS

Dependent variable in the model has been taken as duration of unemployment of ith individual in the sample that is measured in days. Left censored are not considered for estimation. 1457 observation are right censored spell are also incorporate in the study because it is feasibly managed in likelihood framework. For model specification individual characteristic, demographic characteristic and market characteristic are used in Weibull model.

For Exponential and Weibull distribution 1724 Individual has been selected from original sample (means those individual who has experienced of unemployment). So that there were 267 people who have left unemployment status at the time of conducting survey, whereas 1457 people are still searching for employment. This study mainly focuses on single unemployment duration. Transitional state from out of work to inactive from labour force is same for transition from out of work to employment. It is sometime noticed that shape parameter of hazard function and values of independent variable parameters are different when hazard estimation is restricted to a particular state of transition.

Personal characteristics are used in the analysis that captured their effect on unemployment spells: age, gender where male represents 74.65 percent of the total sample, educational attainment—referred as years of schooling, Prov hastaken as provincial dummies as Khyber Pakhtunkwah, Punjab, Sindh and Balochistan, children in a house represents number of children in the household and wage deviation represents wage dispersion in the sample.

Economic performance started deteriorates from 2008 due to global crisis fuel shock and internal electric shortages, political environment and natural disasters; flood in 2010 and 2011. Result shows that unemployment spells is significantly high in Punjab. It is significant at 10 percent level where p value is 1.158 showing positive duration dependence. Result shows that quitting probability of unemployed person in Punjab from unemployment state to employment state are quite low than any other region and it is highly significant at 1 percent. Flood and power breakdown may be the result that severely affected both agriculture and industrial sector of Punjab. Industrial production capacity decline due to this hinders leads to long unemployment duration. Another possible explanation may be that absorption capability and job creation in labour market is low. Result shows that these elements adversely affect the labour market at provincial level. Hazard rate of province Sindh and Balochistan is highly significant and it is different from 0 that is 0.50 for Sindh and 0.23 for Balochistan.

Distribution Result also shows that gender and age have a positive association with length of unemployment spell. Young labour who is just going to start their career, experience shorter duration of unemployment as compare to those who are already in labour force and seeking for job. There is a significant withdrawal's of female from LFP in favor of household chores and child care. Age is found statistically significant at 1 percent level of significant with positive sign: getting older increases the hazard rate of leaving the state by $[\exp(\beta_k) - 1] \cdot 100 = [\exp(0.674) - 1] \cdot 100 = 96.2$ percent. Probability of transit from unemployment to employment is low for female but it is not statistically significant in Exponential and Weibull distribution. Gender inequality exists while recruiting the workers employer prefers to hire male worker in some occupation especially heavy routine work industry. Employer avoids female hiring because of their domestic responsibility. While female has experienced shorter duration of unemployment than male. Thus highly educated females are more inclined to be a participant of labour force in urban areas than in rural areas.

Human capital theory considers educational attainment as a key instrument to enhance productivity of worker as well as help in boosting economic activity. The educational impact is double in urban areas as compared to rural areas. Tertiary education is considered as a crucial device for socioeconomic progress and plays vital role in economic mobility. Highly educated workforce is substantial for intergeneration mobility. Those children having less educated parents with low income have high probability to be in the same income level at adult age while this probability is less with educated parents. Highly educated youth having educated parents are more likely to face higher unemployment duration because they are choosier than less educated youth. Those young workers having less education and living in the area where unemployment rate is high are more inclined to accept low wage jobs in order to support their families. Exponential result shows rate of transit from unemployment to employment is higher but hazard ratio of years of schooling is insignificant, while Weibull Outcome of hazard ratio $[\exp(0.981) - 1] \cdot 100 = 166.7$ percent for educated person states that educated person suffer less unemployment duration as compared with illiterate person. The lack of required qualifications has adverse impact on employment opportunities and bound them in limited field of work choice. Advancement in technology increased substitution of physical capital for heavy routine worker in production process. Technical infrastructure

like machinery, equipment, plants and robotic computers are raised demand for educated and skilled workers as well as decreased the employment opportunity for heavy routine workers. Workers who have higher education but unemployed or underemployed are engaged in violent extremism similarly a worker who is unemployed or working in low wages and less satisfactory job are more frustrated and has complaint against societal system that is not providing him or her according to their qualification. So that longer spells is positively related to wage dispersion and availability of employment opportunity in local labour market. Hazard rate of wage dispersion $[\exp(0.9999) - 1] \cdot 100 = 171.801$ percent increases unemployment duration. Wage dispersion is found significant at 1 percent significant level. So that the reason behind it market is providing different pay scale job for skilled unskilled or semi-skilled worker.

Decision to stay unemployed is worker's choice. Workers who are looking for a good employment opportunity along with high pay scale and work facility always preferred to remain unemployed than accepting a low scale job that is already available. So wage dispersion leads to a longer spell if economy is not generating required job for capable workers. Local market is a significant indicator to show a clear picture of job creation in the market. Thus study concluded that length of unemployment is significantly influenced by required job characteristics, regional labour market condition incident of unemployment and wage structure.

6. CONCLUSION

The purpose of this study is to examine social and labour market factors that lengthen the unemployment spell by constructing duration data of Pakistan. Both parametric and non-parametric approaches of survival analysis are used as methodology. Personal characteristics market condition and household heterogeneity are key element for explaining length of unemployment. Result found that getting older has a positive association with longer spell. While young workers start working early so their probability is high to live in unemployment state because of less knowledge about prevailing market. Female workers experience longer spell of unemployment as compare to male because of childcare and social restriction on her. Educational attainment has significant impact on leaving probability. Less educated workers are less choosy than educated worker so that they leave the unemployment state earlier. Employment opportunity for educated worker is high. Furthermore, a positive association is found between wage dispersion and longer spell of unemployment. Workers having higher education become choosier about quality of job and work environment.

After analysing it is suggested to formulate a dynamic labour market policy for accumulation of human capital and absorption of bulk of educated young people in labour market. low participation of female in labour force than male need attention of policy makers to raise female participation rate. Government should focus on job creation in order to absorb the bulk of capable labour force as well as provide standardised apprenticeship training programme that will enhance not only their skills as well as their employability chances will also rise. First-time-job-seekers should be provided some sort of counselling and perfect information about labour market needs for enhancing their skills. Individuals living in high unemployment provinces should be encouraged and subsidised to migrate to provinces where higher employment possibilities exist.

Table 3.1.1

Kaplan Meier Survival and Failure Function

Time of Event(t)	No. of Pt. Failed	Beginning Total	Estimated Failure Probability	Estimated Survival Probability	Probability of Surviving at the End of Time (L)
1	2	2088	0.001	0.999	0.999
2	5	2078	0.0034	0.9966	0.9956
3	8	2070	0.0072	0.9928	0.9884
4	6	2062	0.0101	0.9899	0.9784
5	1	2056	0.0106	0.9894	0.968
6	4	2055	0.0125	0.9875	0.9559
7	4	2051	0.0144	0.9856	0.9422
8	1	2047	0.0149	0.9851	0.9281
10	3	2046	0.0164	0.9836	0.9129
11	1	1987	0.0169	0.9831	0.8975
13	1	1983	0.0174	0.9826	0.8819
15	10	1982	0.0223	0.9777	0.8622
16	0	1962	0.0223	0.9777	0.843
20	6	1960	0.0253	0.9747	0.8216
25	1	1933	0.0258	0.9742	0.8004
30	51	1896	0.052	0.948	0.7587
35	0	1844	0.052	0.948	0.7193
40	0	1840	0.052	0.9078	0.6983
60	78	1839	0.0922	0.9078	0.6339
62	0	1713	0.0922	0.9078	0.5754
90	56	1705	0.122	0.878	0.5052
120	41	1644	0.1439	0.8561	0.4325
121	0	1544	0.1439	0.8561	0.3703
130	0	1542	0.1439	0.8561	0.317
135	0	1536	0.1439	0.8561	0.2714
145	0	1533	0.1439	0.8561	0.2323
150	27	1532	0.159	0.841	0.1954
180	151	1485	0.2445	0.7555	0.1476
210	31	1329	0.2622	0.7378	0.1088
240	48	1295	0.2895	0.7105	0.0773
270	24	1242	0.3032	0.6968	0.0539
300	34	1218	0.3227	0.6773	0.0365
330	17	1184	0.3324	0.6676	0.0243
365	445	1167	0.587	0.413	0.01
450	1	722	0.5875	0.4125	0.0041
730	341	721	0.7826	0.2174	0.0009
910	1	380	0.7832	0.2168	0.0001
1095	147	379	0.8673	0.1327	0.00002
1460	91	232	0.9193	0.0807	0.000002
1825	59	141	0.9531	0.0469	0.00000098
2190	42	82	0.9771	0.0229	
2555	6	40	0.9806	0.0194	
2920	18	34	0.9808	0.0092	
3285	3	16	0.9926	0.0074	
3650	12	13	0.9994	0.0006	
4745	1	1	1	0	

Note: time event of "t" is measured in number of days and the surviving probability at end period of time "L". The median survival time is 0.4130 for 365 median days. The approximation are obtained and inflexibly showed in graphical form. The graph is plotted between probabilities of survival time (on vertical axis) and time duration (on horizontal axis).

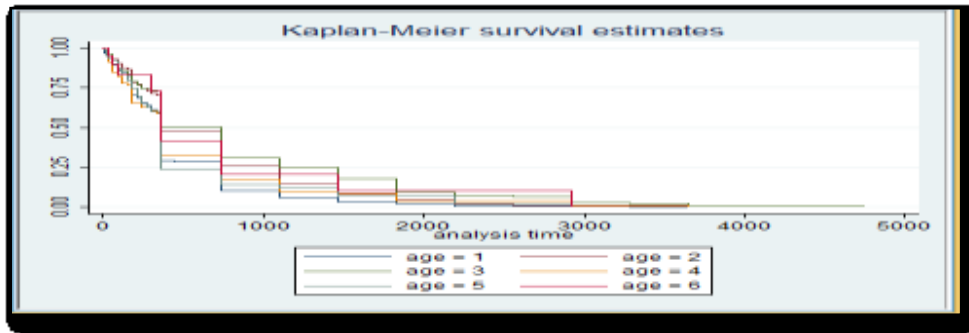
Table 3.1.2

Showing Unemployment Duration by Age

Age Groups	N	Percent	Mean Duration	Incident Rate
11-20	523	25.05	451.2409	.002089
21-30	1,045	50.05	632.8919	.0014409
31-40	269	12.88	600.4796	.0011639
41-50	146	6.99	335.3562	.0017769
51-60	81	3.88	308.6173	.0018401
61-70	24	1.15	347.75	.001318
Total	2088	100	446.0559	

Source: Author's estimation.

Graph 3.1. Kaplan Meier Survival Estimates for Age Groups



Source: Author's estimation.

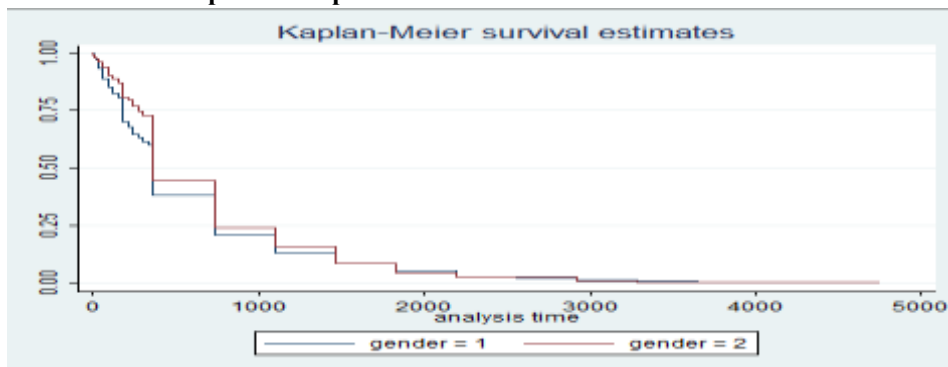
Table 3.1.3

Showing Unemployment Duration by Gender

Gender	N	Percent	Mean Duration	Incident Risk
Male	1560	74.71	526.9564	.0016082
Female	528	25.29	604.4583	.0016082
Total	2088	100	565.7073	

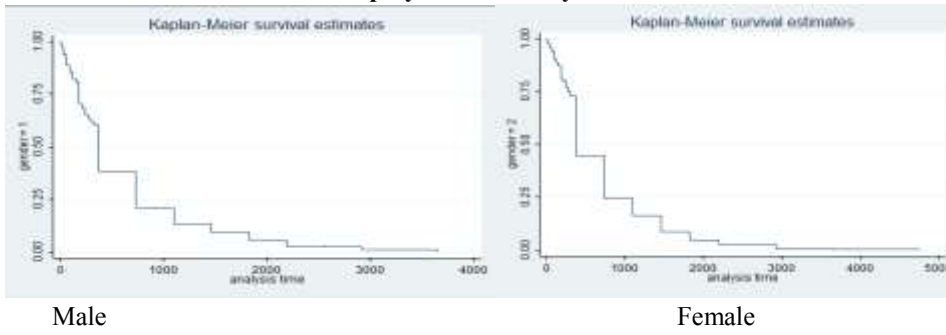
Source: Author's estimation.

Graph 3.2. Kaplan Meier Survival Estimates for Gender

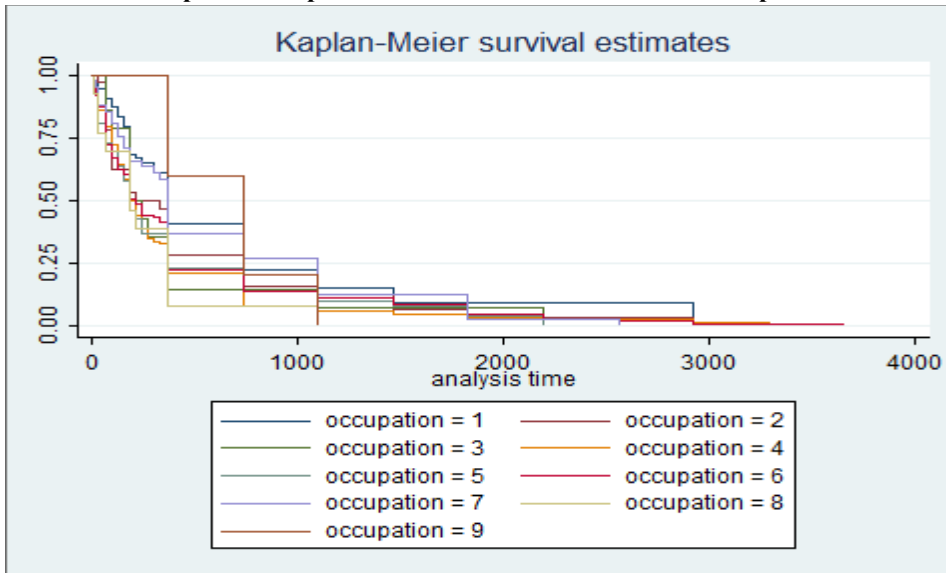


Source: Author's estimation.

Unemployed Persons by Gender

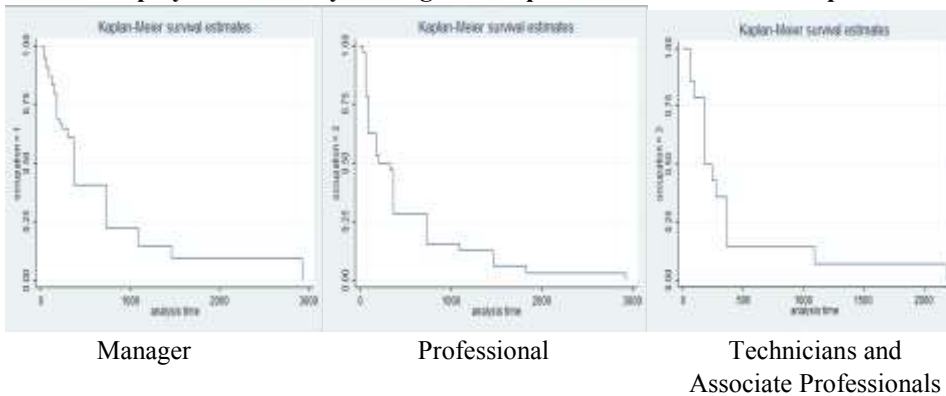


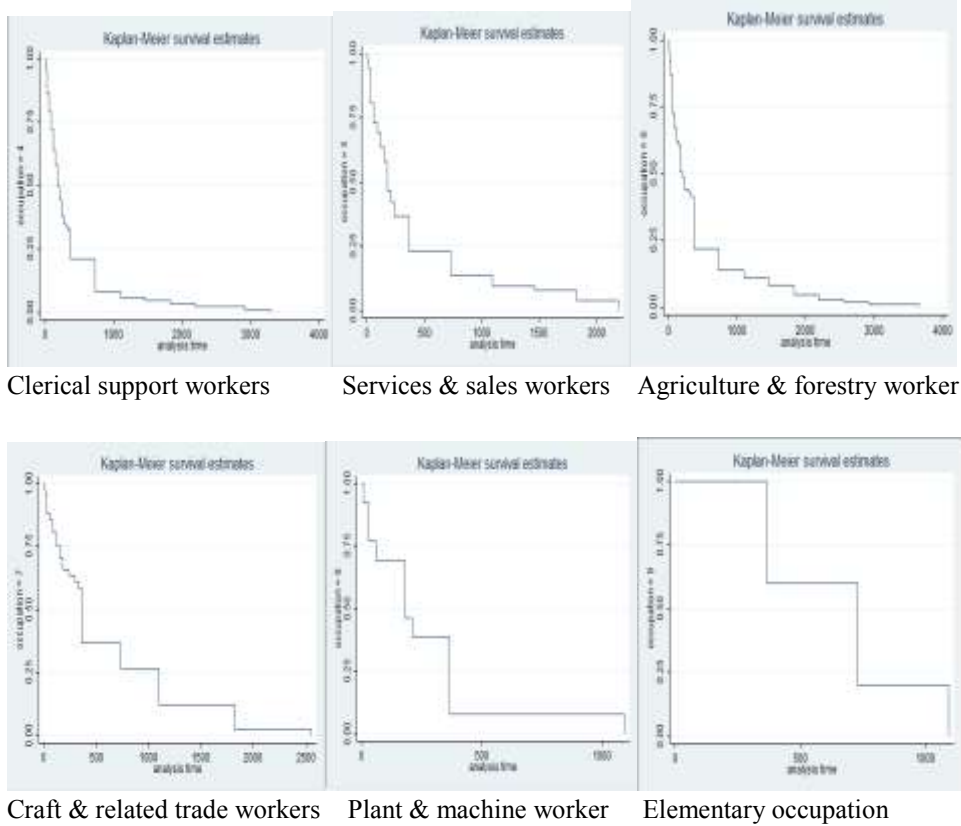
Graph 3.3. Kaplan Meier Survival Estimates for Occupation



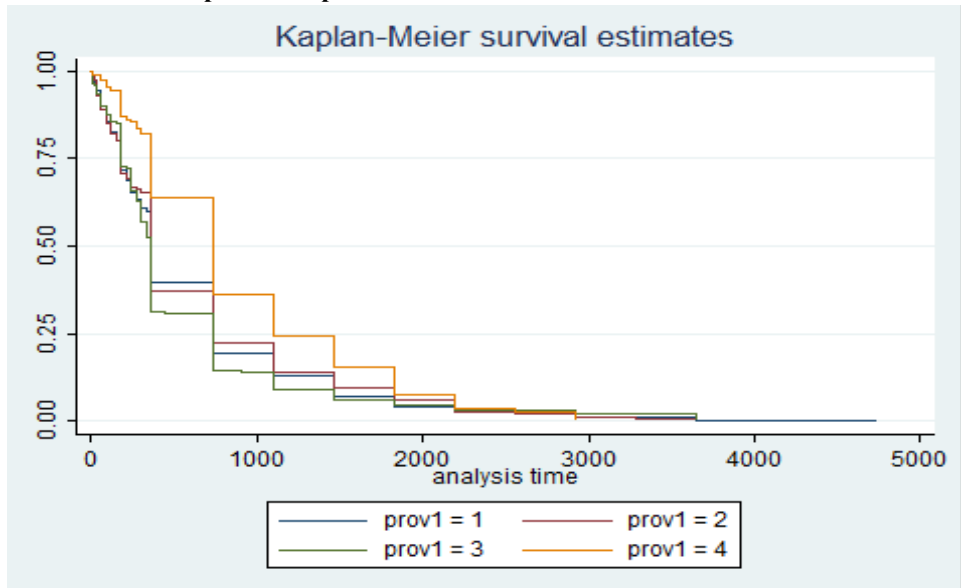
Source: Author's estimation.

Unemployed Persons by Having Past Experience in Different Occupation



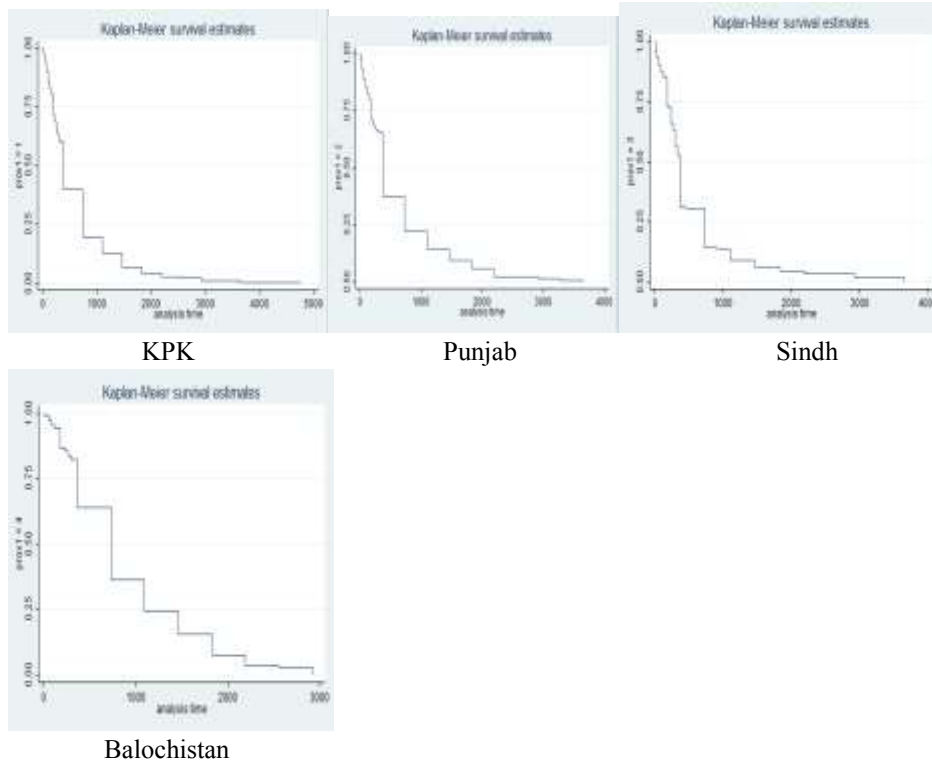


Graph 3.4. Kaplan Meier Survival Estimates for Province

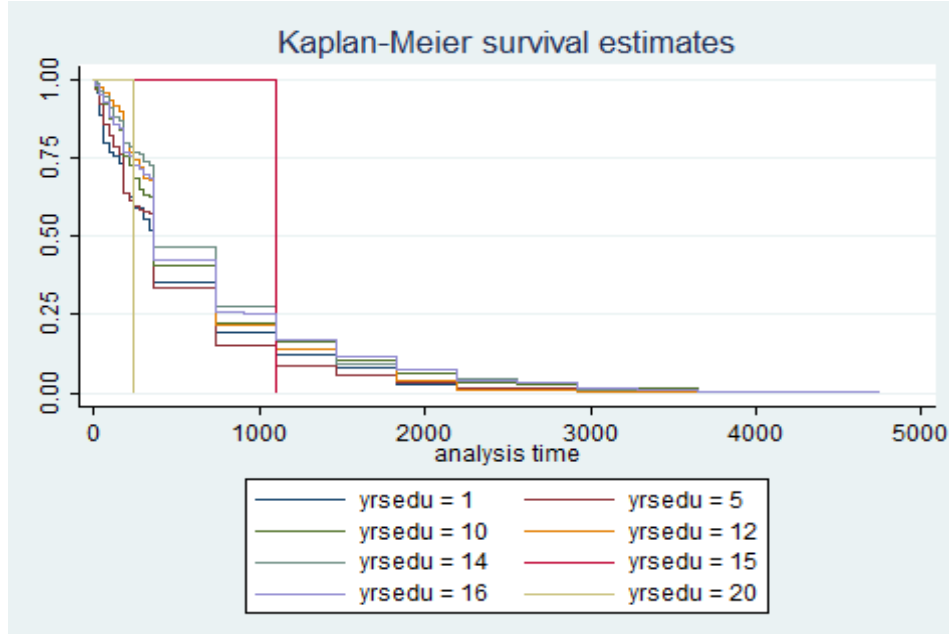


Source: Authors estimation.

Unemployed Persons by Region

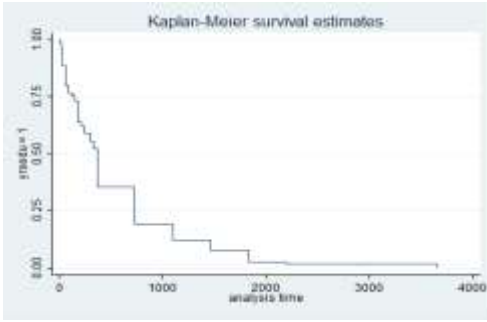


Graph 3.5. Kaplan Meier Survival Estimates for Educational Attainment

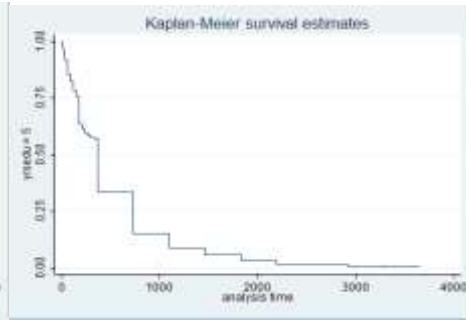


Source: Author's estimation.

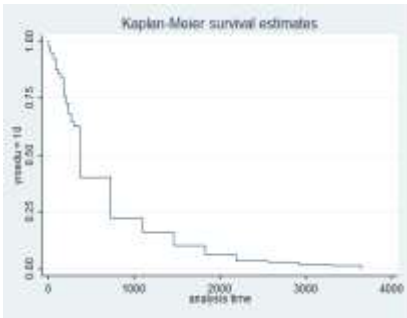
Unemployed Person by Level of Education



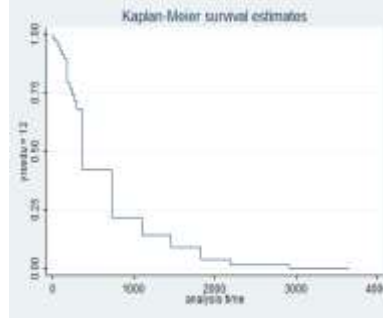
Primary



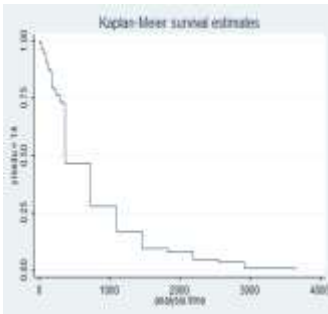
Middle



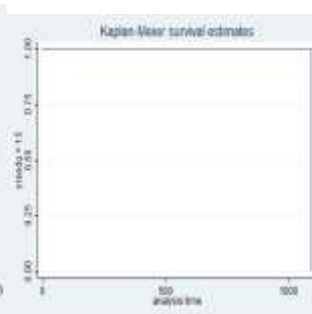
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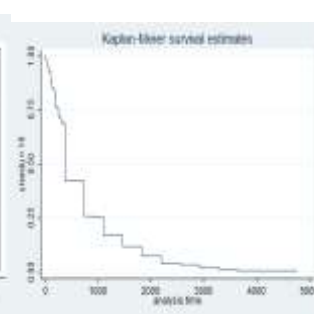
Inter



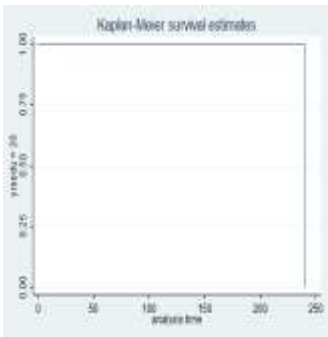
Graduation



Graduation (Honors)



Masters



PhD

Table: 3.2.1

Regression Result of Exponential and Weibull Distribution

Variables	Exponential Hazard Ratio	Weibull Hazard Ratio
Age	0.7072 *	0.6746*
Age2	1.0045*	1.0051*
Years of Schooling	0.9886	0.9814*
Province		
Punjab	0.5065*	0.4607*
Sindh	0.5534*	0.5062*
Balochistan	0.3008*	0.2367*
Gender		
Male	0.9444	0.9287
Number of Children in Household	0.9012*	.8884*
Wage Deviation	.99996*	.99995*
/ln_the /ln_p	-1.528	0.1473
Theta	0.2168	0.3972
1/p	----	0.8629
No. of Observation	1724	1724
Wald chi2	28739	1099.68
Prob > chi2	0.000	0.000
Log Likelihood	-2432.6159	-2423.25

Note: Parenthesis *showing significant at 1 percent confidence level.

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