

Job Finding Rate and Female Labor Supply- A Heterogeneity

Perspective: Evidence from Pakistan

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Summary

This study is an endeavour to determine the female labor supply in Pakistan with an initiative to incorporate an endogenous job finding rate in the labor supply model. The study used a distinct set of control variables that incorporates the ‘Composition Effect (CE)’ and ‘Dispersion Effect (DE)’. The paper estimates labor force supply of females, using data from the PSLM Survey 2013-14, constructing age-specific conditional flows of female workers between the labor market states employing two stage estimation procedure. Using the estimates of job finding rates, it is concluded that differences in participation rates can be attributed to the flow of female workers from inactivity and unemployment to employment. The study stresses that two-state labor market (employment and unemployment) models are not adequate to perform counterfactual experiments for policy analysis, despite the fact even though they may provide a good fit to unemployment facts. The main conclusion stresses on including the inactive group to determine job finding rate and unobserved heterogeneity of female’s decision making. Not doing so would bias the imputed importance of other factors determining participation and unemployment and thus, aggregate participation and unemployment rates. The results provide a hint for policy makers to consider the relevant flows for improvement in female employment. Instead of relying on the current policies, the implementation of such policies may be more effective.

Abstract

In contemporary labor economics, the concept of job finding rate is central as it defines the job search and measures the employment potential of the labor market. Considering this fact, economists primarily counts on measuring the flows of labor among three states i.e. employment, unemployment and inactivity. The study determines female labor supply considering labor market flows and job finding rate in Pakistan by employing cross sectional data from Pakistan Social and Living Standards Measurement (PSLM) Survey for the year 2013-14. The prime objective of the study is to incorporate the observed and unobserved heterogeneity in female labor supply model. Therefore, the study evaluates decision-making process of females regarding labor supply, taking into consideration endogenous household job finding rate including non-participation of the female. It presents both theoretical as well as empirical analysis to show how job finding rate affects labor supply of female. We have incorporated a divergent set of control variables to cover the composition effect and dispersion effect of the labor market in this analysis. The main conclusion stresses on including the inactive group to determine job finding rate and unobserved heterogeneity of female's decision making. Not doing so would bias the imputed importance of other factors shaping aggregate participation and unemployment rates. The results provide a hint for policy makers to consider the relevant flows for improvement in female employment in Pakistan.

1. Introduction

The fortune of an economic agent is determined by one's labor market experiences. These labor market experiences rely on multidimensional constructs such as participation, wages, unemployment rates and spells; and inactivity etc. Hence, the economists and specifically labor economists are more concerned about documenting these constructs empirically. (Rogerson et al., 2005)

The standard concept of job finding rate defines it as a probability of a job seeker to find a job in the given time (Hall & Wohl, 2015). It is a key concept in understanding turnover in the labor market as fluctuations in the job finding rate have a mechanical outcomes for participation and unemployment rates. This association is justified due to the composition and dispersion effect. (Barnichon & Fugura, 2013) The former effect conventionally defines the unemployed pool and arises if the characteristics of the job seekers change over time, making job finding more or less likely. The later comes from the dispersion in the labor market conditions and arises if the tight labor market coexists with the slack labor market. Intuitively, dispersion in labor market negatively affects the average job finding rates and positively impacts the labor force participation.

Heterogeneity is central to explain these two affects as it leads to job search and measurement of employment potential of the workers. This further segregates in to observed and unobserved heterogeneity of workers characterizing various time-invariant and time-variant features such as age, gender, education, skills, region, and sector. Consequently, the flows of workers differ

across such factors. This further changes the aggregate rates due to variations either dimensions. In this regard, economists primarily counts on measuring these affects for the labor market. The traditional search models employ only flows from unemployment to employment for the estimation of job finding rate. A wide range of literature distinguishes between the job seekers and inactive considering the former as the key determinant of the unemployed pool. Choi et al. (2013) argued that search models seeking to explain the work patterns should not ignore the changes in the labor market due to flows in and out from inactivity. Kudlyak and Lange (2017) argued that employment possibilities of inactive population cannot be ruled out as new employment flows can not only be filled by the unemployed pool but also with the entrance of inactive population.

This study is an endeavour to determine the female labor supply in Pakistan with an initiative to incorporate an endogenous job finding rate in the labor supply model. The study used a distinct set of control variables that incorporates the ‘Composition Effect (CE)’ and “Dispersion Effect (DE)”. The CE incorporates the observed and unobserved heterogeneity in the model while the DE includes the labor market dispersion for female workers. Basically, the, decision making of females captures the unobserved heterogeneity across females and allows for estimating the CE for more accurate job finding rate. This will not only assess to study the progress of worker flows but also helps to identify the bahavorial theories of search. Moreover, the idea is inspired by the potential benefits provided by the search models of Kudlyak and Lange (2017); and Choi et al. (2012).

Female labor force participation in Pakistan displays several striking features as it is lower than several other emerging economies, and it has been persistently declining since the mid-2000s. There is also a hefty gap in between the employment to population ratios for men and women.

According to the recent modelled International Labor Organization (ILO) estimates, the employment to population ratio shows a declining trend despite the fact that females comprise more than 50 percent of the total population. The ratio waxes a bit while in between 2008-10, yet it is consistently falling. The unemployment rate is just the monetized image of the employment to population ratio as the rate declined in 2010 and then started rising over the last few years.

Considering this scenario, there is a dire need to observe the labor market flows and heterogeneities across individuals to evaluate the job finding rate. Therefore, we are interested here to find out an endogenous household job finding rate as it is the primary parameter to evaluate the labor market absorption for workers and in our case for females in Pakistan.

The structure of the paper is as follows. Section 2 evaluates various search theories. Section 3 discusses divergent studies on employment and unemployment segregating the international and national studies. Section 4 presents a framework for the study and describes how worker flows and job finding rate are generated and other relevant information of the variables with the methodology. Section 5 provides main results. Section 6 provides a discussion of the results while section 7 concludes.

2. Theoretical Framework

This section serves two prime objectives, first, to explain the conventional and relevant theoretical models of job search, and second to develop a conceptual perspective for the development of the model for this study. Although, we have not justified here with all the search theories in this section as we do not have space to do so, yet, the section endeavours to illustrate the relevant concepts of search theory.

The basic search model begins with the discrete time design where an individual seeks the job in given market conditions. This model assumes a frictionless job market where a worker can

immediately responds to work at the offered wage. The relaxation of such extreme conventions allows search models to contemplate about wages and unemployment in a different light.

It is often said that the equilibrium models of unemployment begin with a simple model of job search by Stigler (1961). Stigler formulated a static model and hashed out the problems in economics to show some important aspects of economic organization that came up with a new implication of job search. The sequential search theory was first proposed by McCall and Mortensen. However, these basic search models cannot address various complex issues of the labor market such as worker's transitions, estimation of unemployment duration, determination of reservation wages and so on.

Intuitively, the flow of individuals from employment to unemployment was generalized by worker turnover model. The model assumes some exogenous reasons for transition to unemployment considering wages, tenure, and separation rates. It is based on the reality that a worker continues her job for a long time until he finds a better one.

A popular line of research is originated from search model by Pissarides (1985, 2000) knotting the random matching in search to determine job arrival rates, wages and match formation and destruction i.e. matching technology. This technology is intended to signify a simple notion that firms and workers takes time to get together in the labor market. This is just like a production function mapping capital and labor into output. The concept of matching and bargaining is combined by considering the endogenous decision making of firms to post a vacancy with a condition of free entry. The single agent model shows that an increase in unemployed benefits/layoff induces a worker to raise the level of reservation wage and thus endogenous search intensity will be reduced. (Rogerson et al., 2005)

Mortensen and Pissarides (1994) used the endogenous job separation rate incorporating the variations in on-the-job wages. The authors ended up with a framework capturing endogenous flows into and out of unemployment. Although, these flows vary from country to country overtime, this allows one to consider the factors accounted for these differences. A number of quantitative studies applied and extended this framework such as Heifke & Reiter (2006), Hall (2005), Shimer (2005), Den Haan, Ramey, & Watson (2000), Cole and Rogerson (1999), Merz (1999) and Andolfatto (1996). There is also another dimension in this literature that introduces heterogeneous firm and workers. These studies include the work of Shimer and Smith (2000), Mortensen and Pissarides (1999c), Acemoglu (1999, 2001) and Shimer (1999). Moreover, the consequences of this model were studied by Caballero and Hammour (1994, 1996) and Barlevy (2002).

The dynamic model of search provides a unique solution. It allows the unemployed workers to anticipate wage and ratio of unemployment to vacancy. The model concludes that an increase in unemployment lay off enables a worker to take the risk for higher wages. Consequently, firms end up with offering high remuneration but fewer jobs. Predominantly, it elucidates about matching process and wage determination. The potential drawback of dynamic models is its failure to explain that why workers do not bargain for different wage with employers in a decentralized market. Shimer (2007) proposed and extended the dynamic search model and added heterogeneity in the model to introduce the wage dispersion among heterogeneous workers.

The modern theory of wage dispersion combines the models of Random matching and posting theories of search. The philosophy of this wage theory tries to understand the involvement of worker heterogeneity during search. In this regard, two models of dispersion were proposed on

the bases of job search and worker heterogeneity. The on -the- job search model accounts for wages disregarding employment histories while models with heterogeneity discuss worker's employment histories ignoring wage. An integrated model may account both perspectives such as Bontemps, Robin, and Berg, 1999 and thus the area has the potential for theoretical and empirical research.

Based on the theoretical models discussed in this section, it is evident that diverse models of search underline different limitations, yet, there is not a single canonical model that addresses all the issues in job seeking. Thus, the framework for this study is conceptualized in section 4 by considering similarities of the search models underlying few alterations.

3. Review of Related Studies

Intuitively, a wide range of literature discusses the unemployment or job seeking and inactivity separately while considering the former as the key determinant of the unemployment fluctuations. However, a growing literature is endeavouring to explain the possibilities of attachment of non-employed to the labor market and refining the concept of job finding rate. This section elaborates an in detail review of these studies to join the two distinct but related strands of the search models.

Kudlyak and Lange (2017) categorized the labor market into three labor force statuses (LFS) and observed the histories of individuals and heterogeneity in job finding rates. The sample consists of the four month Current Population Survey (CPS) longitudinal panels for the time span of 1994-2016 employing linear probability model with gender, age education and race. The study proposed an innovative approach that focused on non-employed individuals including unemployed and inactive. The result revealed that inactive individuals (recently) had more chances to get a job than the individuals seeking for job.

Bachmann et al. (2015) used micro data to analyse the labor market flows in a large number of European countries. The study investigated the hypothesis that how these flows have been affected by the recent financial and economic crisis during its early phase i.e. 2008-2010 employing a multinomial logit model. The authors identified that females had higher inflows to unemployment than male before crisis and this difference reversed sturdily in 2008. The study revealed that crisis also showed heterogeneous effects for different age groups and thus these heterogeneities were responsible for the evolution of labor market.

Deriving sixteen labor-market statuses, Hall and Wohl (2015) measured matching efficiency with heterogeneous job seekers. The authors developed an efficiency index for each category of job seekers for the period of 1999-2015 from CPS and the job Openings and Labor Turnover Survey (JOLTS) and computed monthly job finding rates using fractional logit model.

Furthermore, these rates were adjusted for the general labor market tightness with dummy variables for female, married, six age groups, four education groups, and five unemployment duration groups. The study observed an overall decline in matching efficiency from 2001 through 2013 and concluded that neglecting heterogeneity among the job seekers suggest further decline in efficiency between 2007 and 2009.

In the extended version, Barnichon and Figura (2015), proposed a two-stage estimation procedure by employing matching technology approach. Stage 1 captured the effect of worker's characteristics using micro data from CPS to calculate the job finding rates for specific market segments. The second stage netted the first stage data with the Help Wanted Online (HWOL) data to calculate the matching function elasticity over the period of 1976–2007. The results showed that heterogeneous labor and labor market segmentation improved the aggregate job

finding rate over 1976–2012. The authors propagated that worker heterogeneities and labor markets are key facets of fluctuations in unemployment.

Shimer (2012) reassessed the ins and outs of unemployment and measured the job finding and employment exit probabilities in the United States for the time period of 1948-2010. Shimer found that finding probability is more prominent in explaining the unemployment fluctuations than job exit probabilities and thus the later probabilities are quantitatively irrelevant.

Using monthly CPS data, Choi et al. (2012) observed the worker's flow between January 1976 and July 2010 and segregated male and female samples. The authors estimated life-cycle probabilities considering the three labor market states controlling for age, gender and race. The Seemingly Unrelated Regressions (SUR) method was implemented to estimate the profiles including equations for unemployment and participation rates. The main finding of the study bands around the idea that inactivity state is a significant component to be included in traditional search models to explain the job market experiences over the life-cycle and thus, aggregate participation and unemployment rates.

Following Shimer (2007), Smith (2011) examined the relative significance of job search and job separation that drive the UK unemployment rate using British Household Panel Survey (BHPS). The authors took the cyclical features of gross flows from 1990-91 to 2008-09. Smith decomposed the actual employment rate considering the past transition rates of workers in the labor market. He figured out that separation rates are relevant when economy is facing rapid changes in unemployment while changes in job finding rate play its primary role in the period of great moderation.

Fabrizi and Mussida (2008) followed the Markov chain approach and multinomial logit model for the time span of 1993-2003 for Italy. The authors took flow of workers between the states of

employment, unemployment, and inactivity. The indicator variables were gender, age, marital status, age square, size of the family, education level, industry dummies and geographical dummies. Considering the state of unemployment, the study found that male workers were more accelerated to transit from unemployment to employment than female job seekers. Moreover, female workers had high probability to transit to be inactive after the experience of being an unemployed due to the probable existence of discouragement effect.

Hobijn and Sahin (2007) provided comparable estimates of job finding and separation rates for a panel of twenty seven OECD countries for the period of 1968-2004. The authors reported the imputed flows of employed, unemployed, and not-in-the-labor-force individuals and found that cross- country evidence on search models is scant and differences in job separation rates are much smaller than those in the job finding rates.

Using survey data of 1972 to 1993 from the Panel Study on Income Dynamics (PSID), Rocha and Fusster (2005) developed a model to relate female labor participation and fertility decisions. The authors proposed that females search for a job with an exogenous probability and devalued human capital during job disruptions. Additionally, females have to decide that how would they split their time between working and searching (market activities) and raising children and enjoying leisure (non-market activities).

Hyslop (1999) analysed the intertemporal labor force participation behavior Arellano and Meghir (1992) of married women, using longitudinal data to allow for a rich dynamic structure. The probit model and Maximum Simulated Likelihood (MSL) estimation had been applied. The results from both the linear and nonlinear models found that the participation decisions are characterized by substantial unobserved heterogeneity and women's participation response was stronger to permanent than current non labor income.

Arellano and Meghir (1992) developed a novel approach to develop a model for the consistency of job search with the female labor supply. The authors combined the Family Expenditure Survey with the Labor Force Survey of UK for 1983. The results revealed a strong effect of age, education, demographics and wage while job search reduces working hours.

A comprehensive review of the growing international literature of job finding rate argues that search models should not ignore the inflows and outflows of inactivity to explain labor market variations. Besides this, numerous scholars have endeavoured to push the idea for the search models in the labor market. The authors emphasize that search theories converging on to the labor market dilemma should rely more on employment rather than unemployment to figure out the evolution of labor market. In this regard, this study is a compliment to this other strand of literature.

National Studies

The national literature knots the two distinct strands of labor market. The first strand focuses on the effects of demographic characteristics and educational attainment on female labor force participation in Pakistan. In a separate but limited literature, the unemployment of female is being put forth by a well-known rigidity in labor market. Here is a review of some recent studies that are considered significant for our analysis.

Saeed (2017) reported the perilous situation of labor force in Pakistan with a focus on female workers as this segment of population is economically marginalized than the male workers. Females face difficulties in access to decent work opportunities and unwillingly, getting low remunerations than their male counterparts in similar occupations due to lack of education and skills. Furthermore, nor surprisingly, socio-cultural restrictions and participation in care economy also creel the economic visibility of females.

Shaheen et al. (2011) evaluated the various factors of employment by observing the females in different employment activities with a field survey of 402 females. The results of binomial logit regression confirmed the positive impact of marital status, age and education; and a negative impact of presence of children (above 10 years), accumulation of assets, major diseases and large household size on female employment. The female is found to be economically active member in the households with more working people while the labor supply declines for females with self-employment and underemployment.

Faridi and Rashid (2014) explored the factors affecting educated women's decision to participate in the labor force through a field survey for the districts of Multan. Linear probability; and logit and probit model estimates showed variations in different age groups of females. The coefficients of education (all levels), the presence of an educated husband, marital status, family structure, and family expenditure enhances the labor supply of females between 35–54 years of age. Yet, location, being an educated married female, the presence of an educated head(father), husband's employment status and income, distance from the district headquarters and ownership of assets were reducing female's labor force input.

Bashir et al. (2013) surveyed the district of Bahawalnagar to identify the causes of unemployment in educated youth of Bahawalnagar. The authors surveyed that education, age, husband's father's education, mother's education, employed persons at household, mother's status of job and technical education were reducing unemployment while household size, joint family system, and number of children were creating more unemployment. The authors hassled on the need of technical education for females as it turned out to be marginally significant with negative coefficient for educated but unemployed women.

Isran and Isran (2013) quantitatively analyzed the constraints faced by female job seekers. The authors highlighted the issue in the lens of socio-cultural impediments and limitations that hinder the entrance of female in the labor market. These socio-cultural constraints largely arises from the traditional patriarchal set up that exists in Pakistan creating hitches for working women in both the formal and informal sectors. The mass flow of females in the informal sector is attributed to the reality that such constraints have a great weightage against employment of women in the formal sector.

Ejaz (2011) applied instrumental variable regression and used PSLM data for 2006-07 to determine female labor supply in rural and urban areas of Pakistan. An indirect and statistically significant relationship was found between female labor supply and birth rate; and wage gaps. Contrary, a direct association was explored between female labor supply and distinct set of variables such as use of appliances, household labor, asset ownership and joint family system. Ahmad and Azim (2010) computed employment probabilities for youth by employing logistic regression analysis. The author utilized micro data of LFS 2006-07 to incorporate the heterogeneity outlook for Pakistan. The results estimated that gender, age, marital status, training, education level, migration, location and characteristics of household were significantly associated with employment of youth in Pakistan. Moreover, the heterogeneity of jobless people must be taken into account in labor employment policies of Pakistan.

Zulfiqar and Chaudhary (2007) measured unemployment rate by converting published unemployment rates into duration-adjusted unemployment rates. The analysis revealed that official unemployment rates did not reflect the actual level of unemployment in Pakistan. Additionally females were declared as most suffering segment with much higher underemployment rates however, these differentials differ with provinces. The authors pointed

that national literature is not rigorously addressing the issue of unemployment of females and thus the aspect should not be ignored for policy making.

Lubna et al. (2006) encountered micro and macro aspects of female youth unemployment in Pakistan by considering gender and region using labor force survey data for 2003-04. The macro-micro analysis evaluated that in a regional context youth unemployment in females appears to be an acute urban phenomenon. Comparatively, it is less in rural areas, prominently; because of ‘disguised unemployment’ and presence of ‘informal social safety nets (land holding, extended families and strong family ties).

Sheikh (2002) captured the labor market dynamics in Pakistan from the longitudinal data for both male and female. The author used the data of Pakistan Socio-Economic Survey (PSES) for the 1998-99 and 2000-01. It was concluded that age and marital status had significantly negative influence on making transition from labor force to outside the labor force for both male and female. However, education had significantly negative impact on moving outside the labor force. A comprehensive review of national literature highlights that the literature of labor market on female labor force participation and unemployment have often moved in different directions. Thus, not surprisingly, these two strands are presently so detached. The main goal of this study is to foster the procedure of reattachment. The search theoretic models provide a framework to perform a micro empirical research combining these two distinct but joint aspects to determine the labor market status of females in Pakistan. At the same time, the analysis will be greatly enriched as it incorporates the insights of the job finding rate.

4. Methodology

The section presents the framework and approach of the study to estimate the job finding rate and its contribution in determining the female labor supply in Pakistan. The estimation procedure

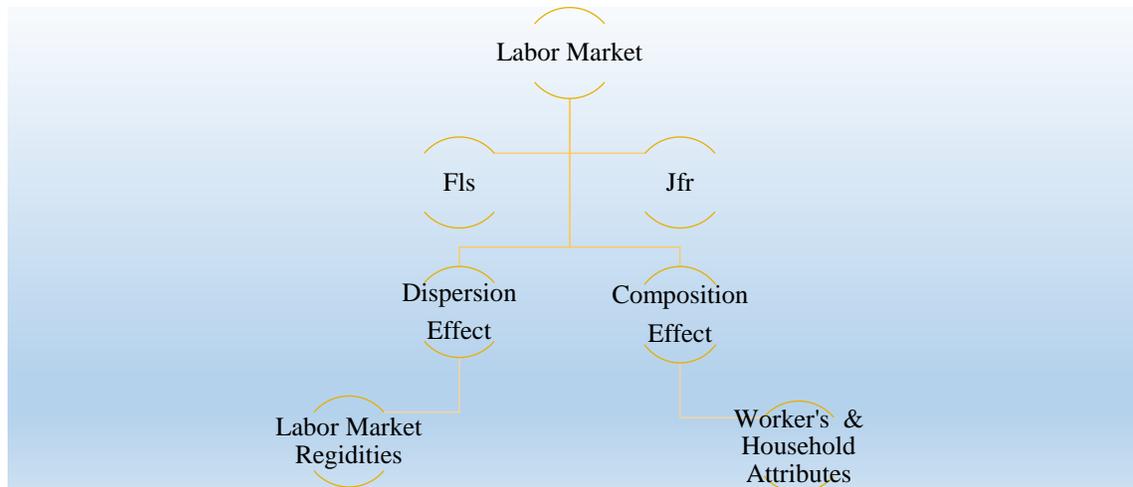
is divided into two stages. This study investigates the endogeneity of job finding rate while the second stage evaluates the female labor supply.

4.1 Framework of the Study

The labor market is distinguished by its three states- employment, unemployment or job seeking and inactivity based on the results of household surveys. Comparatively, the distinction between employment and inactivity is clear-cut. However, there is very thin line between unemployment and inactivity and yet it is difficult to determine these two states. Undoubtedly, there exists a considerable observed and unobserved heterogeneity in the inactive group of labor market. The category might have a close link to unemployed group as some workers start searching recently or have just desire for employment. The other group might be detached due to low skills or no desire to participate. The next group classifies a worker as a “Discouraged worker” who wants to work but did not seek work due to lack of work opportunities. Summing up these categories, the inactive state of the labor market consists of those workers desiring to work but are not seeking or doing work due to for some personal or economic reasons. (Jones & Riddell, 1998)

In the light of these facts, we agree with Choi et al., (2012) that unemployment models should not ignore the ins and outs of the inactivity. Although, these models provide a good fit for employment and unemployment changes, they are probably not providing efficient measures to perform counterfactual analysis nor effective for policy analysis. Considering the idea, we have developed the following framework for the study

Figure 1: Framework of the Study



Source: Prepared by the Authors

This framework highlights the idea that changes in composition and dispersion can lead to changes in the employed pool. In other words, a well mix of worker's characteristics, household characteristics and labor market rigidities justifies the association of female labor supply and job finding rate in the model.

4.2 Data

The study used the data from the Pakistan Standard of Living Measurement (PSLM) for 2013-14. This data allows to incorporate the employment, education, health, consumption expenditures and decision making of female. Furthermore, as we are here interested in identifying flows of females in the labor market, this data provides information for unobserved heterogeneity that is associated with the flows of female in the labor market.

Considering the labor market flows of females we first generate a matrix of nine flows from previous year to the current year i.e 2013-14. Following Shimer (2007), we derive a matrix of nine labor market flows. Precisely, in order to derive the matrix, we construct labor market flows by combining the information on the labor market of status of a female in a given year with the information of the labor market status in the preceding year. This allows computing yearly flows

between the three states.(Bachman et al., 2015) Letting \mathbf{jf} as the job flows from the state to $A \in \{E, U, I\}$ to state $B \in \{E, U, I\}$, we have;

$$Jf = \Gamma_B S_A = \begin{pmatrix} EE & EU & EI \\ UE & UU & UI \\ IE & IU & II \end{pmatrix} \text{ With } \Gamma_B = \begin{pmatrix} E \\ U \\ I \end{pmatrix} \text{ AND } S_A = \begin{pmatrix} E \\ U \\ I \end{pmatrix} \dots\dots\dots(1)$$

It is pertinent to mention here that these flows are generated by setting age-specific condition, while the condition didn't create any attrition in the data and thus provides efficient estimation for the job finding rate. The study does not include the female remaining in the same labor market states(EE, UU, II) as we are here interested in determining the job finding rate of females considering the labor market flow of females. Therefore, we removed these states from the estimation of job finding rate. (Shimer, 2007; Choi et al., 2012) The remaining flows are then used to calculate the job finding rate that is the ratio of new hires and unemployed pool.

(Barnichon & Figura, 2013; Epstein, 2012; Hall & Wohl, 2015)

A major limitation in estimating the job finding rate is the absence of decision making data for females less than 15 and greater than 49, and hence the sample is restricted to females of age in between 15 and 49. Precisely, this is quite convincing as this age bracket provides sufficient information of females for getting education, work, job seeking and inactivity.(Bachman et al., 2015)Table 1 gives a quick glimpse of variables used in the study while table explains the descriptive statistics in the appendix.

4.3 Estimation Strategy

4.3.1 Stage I: Estimating the Job Finding Rate

The study identify the job finding rate as endogenous due to the fact that it is determined by the observed and unobserved heterogeneity. This allows to add worker's characteristics such as demographics (observed heterogeneity) and decision making of females (unobserved heterogeneity) for females aged between 15 to 49. The demographics of females include age,

experience, and highest years of education while decision making of females is discussed by considering her decision for education, work or seeking job or staying inactive. The household attributes include family size, family income and education of household head. The labor market dispersion of females is observed by wage differentials of employed females, province and location. Equation 2 demonstrates the model for first stage estimation.

$$jfr_i = \alpha_0 + \alpha_1 age_i + \alpha_2 exp6_i + \alpha_3 fsize_i + \alpha_4 wd_i + \alpha_5 fi_i + \alpha_6 hedu_i + \alpha_7 hhedu_i + \alpha_8 pro_i + \alpha_9 loc_i + \alpha_{10} uhedu_i + \alpha_{11} uhemp_i + \alpha_{12} uhjsi_i + \epsilon_i \dots \dots \dots (2)$$

The estimated job finding rate for females is then used to estimate female labor supply equation in the second stage.

4.3.2 Stage II: Measuring Female labor Supply

The second stage allows to relate the job finding rate with the female labor supply. The association of these two variables combines the CE and the DE in the model employing the OLS estimation in the second stage. Equation 3 explains the formal model of the study.

$$flfp_i = \beta_0 + \beta_1 jfr_i + \beta_2 age_i + \beta_3 exp6_i + \beta_4 exp6_i + \beta_5 fsize_i + \beta_6 wd_i + \beta_7 fi_i + \beta_8 hedu_i + \beta_9 hhedu + \beta_{10} pro_i + \beta_{11} loc_i + \epsilon_i \dots \dots \dots (3)$$

5. Estimation Results

This segment represents the results of estimation with the analysis of female labor supply through the lens of age-specific job finding rate. The section first explains the coefficients estimates and then accounts the age-specific job finding rate of female workers with a discussion on the economic rationale of the estimated results in this study.

5.1 Coefficient Estimates

Table 3 reports the results of the two stage estimation procedure which explicitly takes into account functional relationship between job finding rate and female labor supply. The positive

association of female labor supply and job finding provides an evidence that labor market experiences varies from female to female or from household to household or even with the dispersion of the labor markets. The evidence suggests deviations in the participation rates of female workers can be attributed to the flow to and from inactivity. We observe that 85.9 percent females had changed their employment status from inactivity to employment while only 7.2 percent flows are observed from unemployment to employment. Additionally, the employment to unemployment and inactivity to unemployment flows account 17.87 percent and 34.71 percent respectively. The data showed a very small share (0.80 percent) of females in employment to inactive flow while the flow from unemployment to inactivity is 8.62 percent. These results provide a useful insight about the focused labor market group i.e inactive group of the females in Pakistan. A further segmentation of these results would support our approach to specify these flows according to the age of female workers. These estimates are in line with the Choi et al. (2012). In a companion study, Kudlyak and Lange (2017) focused on the inclusion of inactive group.

The significant individual characteristics were age and experience, however, both coefficients provide different outcomes for the dependent and core variables. The positive coefficient of age for female labor force participation and job finding implies that after a certain age females prefer to work or search for job. This could be due to various reasons. First, it is possible that the respective female was busy in getting education. Second the discouragement effect could also lead them for not doing the job. Third, female's own choice for not participating due to fertility and child rearing. Fourth, the so called "added worker effect" when a female has to flow from inactivity to job seeking or employment due to loss of her spouse's job and becomes the wage earner of the family.

Turning to the coefficient of experience, a negative association is observed for both female labor force participation and job finding rate. The negative and significant coefficient of experience for job finding rate implies that experience provides job stability to female and thus she prefers to remain employed or does not seek the job. The negative association of female's participation with experience is in line with the conventional fact that females with more experience would choose to stay at home. We have also found that females with higher education would prefer to remain inactive or seek job as they look for better job and remunerations and this may also lead to quit the labor market for some time.

Wage differential is the other important determinant in the model. The positive coefficient of this control variable provides a useful insight that an increase in wage not only motivates females to go for better jobs but also attracts the inactive and unemployed segment to strive for employment for better wages. The positive connection of wage differentials could be an indication of better quality jobs and flexible labor markets for females in Pakistan.

The findings of the coefficient of family size contradict. The variable is positive and significant for job finding rate. This implies that large family size will induce a female of the household to participate in the labor market for better living standard or requires her to contribute in household expenditures and thus she starts seeking job. Contrary to this, the variable is negative and insignificant for female labor force participation. Family income shows a negative impact on job finding rate that is quite convincing as families with high income discourage females to enter in the labor market.

The unobserved heterogeneity for education and reason for not participating in the labor market shows significant results in the model. The estimates reveal that there is a considerable role of household head in the decision making of the respective female's education decision. Thus, job

finding rate declines when the household head is involved in taking decisions for female's education while female's own decision making has no impact on job finding rate. Underpinning the results, it is usually observed that young females who are engaged in getting education are dependent on the decision making of their household head. Meanwhile, the female is obliged to follow her family head and remain inactive or does not seek job.

Considering the unobserved heterogeneity of reasons for not seeking job or inactivity, personal attributes of females is found negative and significant. This provide two important implications. First, the labor market rigidities are not hindering females to enter in the labor, second, the household attributes of female are also not a barrier for females in Pakistan, as both categories are found to be insignificant in the model.

To have a deeper sense of these insights, a number of studies had figured out that female workers in Pakistan are unable to find a god job due to low skills and job quality, working environment and glass ceiling aspects that discourage search and thus restricts female to enter in the labor market. Besides, temporary layoffs could also associated in this regard. (Gomes, 2012)

These significant associations of unobserved heterogeneity are in line with various search studies such as Shimer (2012); Gerard et al., (1998); and Hyslop (1999). Table 4 represents the results of test of endogeneity and table 5 provides the results of over-identification restrictions for instrumental regression. Table 6 represents the variance-covariance matrix that highlights the heterogeneity in the sample. Table 7 provides the correlation matrix of the variable used in the study.

6. Discussion

The concept of female force participation clusters around the household characteristics of females as these factors are apparent in determining the female labor supply in Pakistan. Undoubtedly, these factors do improve the participation of women and meanwhile, very

informative for variations in labor market. However, these often plunge to explain the complex nature of this labor market indicator.

In a developing economies such as Pakistan, women are engage in low productive jobs with low remunerations, and mostly overrepresented in unpaid family work. This in turn results in the detachment of female from labor market and thus a potential economic agent declines to contribute in the labor market. Although, we have a plenty of literature discussing the labor force participation with many diverse determinants bur yet no study has focused on the detachment or reentering of females in the labor market.

The inclusion of job finding rate in the labor supply model allows to observe the improvement in the economic empowerment of females, rather, it is also a reflection of the sub-ordinate position of the female in the household. The results discussed in the subsequent section reveal that job finding rate depends on two channels. First, relative labor market experiences are important for assessment of variations across demographic groups. Second, the potentially substantial ‘inactive’ segment of labor market that may vary due to unobserved heterogeneity is a significant parameter for the estimation of job finding rate. (Jones & Ridell, 1998) Therefore, corresponding economic interpretation of the functional association of job finding rate and female labor supply requires a breakdown of the total effect into composition and dispersion effect.

A quite different explanation for the differences in job finding rates across the jobseekers is due to loss of human capital with the passage of time. This is of great proportion making women less employable and further depressing the job finding rate. Pissarides (1992) anticipated that persistent unemployment or inactivity may lower an individual’s expertise relative to other jobseekers or workers, making them less desirable to employers. It may also shrink their contacts

in job finding networks, making it harder to find employment. Second, unobserved worker heterogeneity allows for more probability to find a job and thus high search efficiency.

The results in the study are more explained by the composition effect as individual characteristics of female workers are more prominent than dispersion effect.

The traditional patriarchal set up in Pakistan, woman as unpaid family worker or the care taker of the household, society's expectations, gender stereotypes, females in rural settlements and responsibilities of family limit the employment possibilities for women. All these impediments continue to inhibit and shape labor market prospects for women in Pakistan.

In a nutshell, the participation rate of females tend to increase with improvement in the job finding rate, however, the association is not consistent or straightforward. There is considerable supply-side variation of labor supply across industries, skills and wages for women than men.

Therefore, improvement in women's access to the labor market is a critical policy zone in enhancing female labor supply.

7. Conclusion

This paper estimates labor force supply of females, using data from the PSLM Survey 2013-14, constructing age-specific conditional flows of female workers between the labor market states in Pakistan. This procedure provides a consistent set of flows from which we can identify age specific job finding rate. Using the estimates of job finding rates, it is concluded that differences in participation rates can be attributed to the flow of workers from inactivity and unemployment to employment. The study stresses that two-state labor market (employment and unemployment) models are not adequate to perform counterfactual experiments for policy analysis, despite the fact even though they may provide a good fit to unemployment facts.

The main conclusion is that study of job market experiences should always include the inactivity state and endogenous job finding rate and unobserved heterogeneity of female's decision making. Not doing so would bias the imputed importance of other factors determining participation and unemployment and thus, aggregate participation and unemployment rates. The results provide a hint for policy makers to consider the relevant flows for improvement in female employment and unemployment rates. Instead of relying on the current policies, the implementation of such policies may be more effective.

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Appendix

Table 1: Description of Variables

| Dependent Variable | | |
|--------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Female Labor Force Participation (flfp) | A ratio between total females employed and total employment | |
| Control Variables | | |
| Women's Attributes | | |
| Age (age) | Respondent's age | |
| Experience (exp6) | Age- years of education -6 | |
| Education (hedu) | Highest year of education of female | |
| Labor Market Characteristics | | |
| Wage Differential (wd) | The difference between current year income (cyi) and previous year income (pyi) | |
| Location (loc) | 1=Rural, 2= Urban | |
| Province (pro) | 1=Khyber Pakhtunkhwa, 2=Punjab, 3= Sindh, 4= Balochistan | |
| Household Attributes | | |
| Household head education (hhedu) | Highest years of education of the head | |
| Family income (fi) | Sum of Monthly income of the family in an year | |
| Family size (fsize) | Total number of family members in the household | |
| Endogenous Variable | Instruments | Explanation |
| Job Finding Rate (jfr) | Unobserved heterogeneity of education (uhedu) | The decision to get education depends on 1=female's decision, 2= female and household head combine decision and 3= household head decision |
| | Unobserved heterogeneity of work or job seeking (uhemp) | The decision to work or search depends on 1=female's decision, 2= female and household head combine decision and 3= household head decision |
| | Unobserved heterogeneity of reasons for not seeking job/ inactivity (uhjsi) | The decision of remaining economically inactive relies on 1= Personal attributes of female, 2= labor market rigidities and 3= household attributes |

Source: Compiled by Authors

Table 2: Descriptive Statistics

| Variable | Mean | Std. Dev. | Min | Max | Label |
|-----------------|-----------|-----------|---------|----------|-------------------------------------------|
| flfp | 0.0109 | 0.0390055 | 0 | 0.333333 | Female Labour Force Participation |
| njfr | 0.2368288 | 0.9741721 | 0 | 13 | Job Finding Rate |
| age | 26.79785 | 8.680399 | 15 | 49 | Age (years) |
| exp6 | 5.060221 | 7.875328 | 0 | 40 | Experience (years) |
| fsize | 9.673991 | 4.845589 | 2 | 47 | Total family members |
| wd | 303.4255 | 10283.25 | -216000 | 386000 | Wage Differential |
| fi | 19691.5 | 24415.71 | 0 | 315000 | Family income |
| hedu | 3.640625 | 4.840051 | 0 | 20 | Highest years of Education |
| hhedu | 4.897461 | 5.06377 | 0 | 16 | Household head highest years of Education |
| province | | | | | |
| 2 | 0.425944 | 0.4945255 | 0 | 1 | Panjab |
| 3 | 0.1839193 | 0.3874499 | 0 | 1 | Sindh |
| 4 | 0.1162109 | 0.3205038 | 0 | 1 | Balochistan |
| Locatio | | | | | |
| n | 0.3697917 | 0.4827875 | 0 | 1 | Urban, 2 Rural |

Source: Estimated by Authors

Table 3: Coefficient Estimates of Two Stage Estimation

| | Jfr | | | flfp | | |
|-----------------|-------------|---------|-------|-------------|-------|-------|
| | Coefficient | t value | P>t | Coefficient | z | P>z |
| njfr | - | - | - | 0.036537 | 5.82 | 0.000 |
| age | 0.0068178 | 3.83 | 0.000 | 0.0001665 | 2.35 | 0.019 |
| exp6 | -0.0083996 | -4.74 | 0.000 | -0.0001142 | -1.54 | 0.125 |
| fsize | 0.0133566 | 3.38 | 0.001 | -0.001281 | -8.51 | 0.000 |
| wd | 0.000014 | 4.93 | 0.000 | 3.20E-07 | 2.75 | 0.006 |
| fi | -1.23E-06 | -2.33 | 0.02 | 2.55E-08 | 1.45 | 0.146 |
| hedu | -0.0072395 | -2.96 | 0.003 | -4.51E-07 | -0.01 | 0.996 |
| hhedu | 0.00045 | 0.18 | 0.856 | -0.0001371 | -1.69 | 0.091 |
| province | | | | | | |
| 1 | - | - | - | - | - | - |
| 2 | 0.0282313 | 0.91 | 0.362 | -0.0008049 | -0.83 | 0.409 |
| 3 | 0.1826327 | 4.17 | 0.000 | -0.0009008 | -0.51 | 0.608 |
| 4 | 0.0273599 | 0.54 | 0.592 | -0.0047172 | -3.42 | 0.001 |
| region | | | | | | |
| 1 | - | - | - | - | - | - |
| 2 | -0.1214493 | -5.09 | 0.000 | -0.0040424 | -3.38 | 0.001 |
| uhedu | | | | | | |
| 1 | - | - | - | - | - | - |
| 2 | -0.1072362 | -1.87 | 0.062 | - | - | - |
| 3 | -0.1043202 | -2.28 | 0.023 | - | - | - |

| uhemp | | | | | | |
|--------------|------------|-------|-------|-----------|------|-------|
| 1 | - | - | - | - | - | - |
| 2 | 0.0836586 | 1.21 | 0.227 | - | - | - |
| 3 | 0.0201399 | 0.39 | 0.697 | - | - | - |
| uhjsi | | | | | | |
| 1 | - | - | - | - | - | - |
| 2 | -0.157742 | -5.95 | 0.000 | - | - | - |
| 3 | -0.0360533 | -0.97 | 0.331 | - | - | - |
| _cons | 0.0948105 | 1.15 | 0.248 | 0.0133831 | 6.13 | 0.000 |

| | | | | | |
|---------------|---|--------|----------------|---|---------|
| Number of obs | = | 6144 | Number of obs | = | 6144 |
| F(17, 6126) | = | 12.2 | Wald chi2 (12) | = | 473.86 |
| Prob > F | = | 0.000 | Prob > chi2 | = | 0.000 |
| R-squared | = | 0.0552 | R-squared | = | 0.3482 |
| Adj R-squared | = | 0.0526 | - | = | - |
| Root MSE | = | 0.9482 | Root MSE | = | 0.03149 |

Source: Estimated by Authors

Table 4: Results of test of Endogeneity

| Test of endogeneity | |
|------------------------------------|------------------------|
| Ho: variables are exogenous | |
| Robust score chi2(1) | 4.42201 (prob =0.0355) |
| Robust regression F(1,6130) | 4.4134 (prob=0.0357) |

Source: Estimated by Authors

Table 5: Results of Test of Overidentifying Restrictions

| Sargan Test of Overidentifying Restrictions | |
|----------------------------------------------------|------------------------|
| Score chi2(5) | 8.15511 (Prob =0.1479) |

Source: Estimated by Authors

Table: Variance-Covariance Matrix

| e(V) | njfr | age | exp6 | fsize | wd | fi | hedu |
|-------------------|--------------|-------------------|-------------------|-------------------|-----------------|--------------|-------------|
| njfr | 0.00003939 | | | | | | |
| age | -2.69E-07 | 5.02E-09 | | | | | |
| exp6 | 2.69E-07 | -4.04E-09 | 5.53E-09 | | | | |
| fsize | -4.05E-07 | 2.28E-09 | -2.90E-09 | 2.27E-08 | | | |
| wd | -5.51E-10 | 3.81E-12 | -3.74E-12 | 5.26E-12 | 1.35E-14 | | |
| fi | 4.54E-11 | -3.15E-13 | 4.42E-13 | -1.68E-12 | -6.33E-16 | 3.07E-16 | |
| hedu | 2.52E-09 | 1.19E-09 | -2.54E-09 | 4.55E-10 | 3.74E-14 | -2.11E-14 | 6.47E-09 |
| hhedu | 6.46E-08 | -1.89E-10 | -1.26E-10 | 6.53E-10 | -1.30E-12 | -1.83E-13 | -1.05E-09 |
| 2.province | -8.52E-07 | 1.44E-08 | -2.21E-08 | 5.86E-08 | 1.20E-11 | -6.79E-12 | -3.55E-10 |
| 3.province | -6.68E-06 | 4.10E-08 | -4.27E-08 | 1.28E-07 | 8.97E-11 | -1.14E-11 | -4.73E-09 |
| 4.province | 3.69E-08 | 6.19E-09 | -2.89E-09 | 1.87E-08 | -3.12E-12 | -3.71E-12 | 9.00E-09 |
| 2.region | 5.65E-06 | -3.59E-08 | 3.50E-08 | -1.45E-08 | -7.87E-11 | 2.47E-12 | 3.29E-09 |
| _cons | -3.61E-07 | -7.32E-08 | 5.27E-08 | -1.91E-07 | 1.22E-11 | 1.10E-11 | -4.04E-08 |
| | hhedu | 2.province | 3.province | 4.province | 2.region | _cons | |

| | | | | | | |
|-------------------|-----------|-----------|-----------|-----------|-----------|----------|
| hhedu | 6.57E-09 | | | | | |
| 2.province | 9.32E-09 | 9.49E-07 | | | | |
| 3.province | -2.07E-08 | 6.98E-07 | 3.08E-06 | | | |
| 4.province | 8.59E-09 | 3.86E-07 | 3.43E-07 | 1.90E-06 | | |
| 2.region | 2.02E-09 | -2.02E-08 | -9.65E-07 | 1.63E-07 | 1.43E-06 | |
| _cons | -4.44E-08 | -1.09E-06 | -7.47E-07 | -8.19E-07 | -8.02E-07 | 4.77E-06 |

Source: Estimated by Authors

Table 7: Correlation Matrix

| | flfp | age | exp6 | fsize | wd | fi | hedu |
|-----------------|--------------|-----------------|---------------|--------------|--------------|--------------|--------------|
| flfp | 1 | | | | | | |
| age | 0.0868 | 1 | | | | | |
| exp6 | -0.072 | 0.3248 | 1 | | | | |
| fsize | -0.1015 | -0.0347 | -0.11 | 1 | | | |
| wd | 0.2308 | 0.0491 | -0.0023 | -0.0072 | 1 | | |
| fi | -0.1045 | 0.0016 | 0.1012 | 0.2741 | -0.0395 | 1 | |
| hedu | -0.0997 | 0.0064 | 0.5632 | -0.1091 | -0.0317 | 0.2262 | 1 |
| hhedu | -0.0648 | 0.0396 | 0.2391 | -0.0626 | -0.0131 | 0.28 | 0.3216 |
| province | -0.0035 | -0.034 | -0.0656 | 0.0548 | -0.0445 | 0.0499 | -0.0564 |
| region | -0.1417 | 0.0267 | 0.1857 | -0.0565 | -0.0465 | 0.2937 | 0.2866 |
| njfr | 0.6264 | 0.054 | -0.0769 | 0.0597 | 0.1541 | -0.0537 | -0.0972 |
| uhedu | -0.0275 | -0.1011 | -0.1676 | 0.1194 | 0.043 | -0.0598 | -0.1646 |
| uhemp | 0.0122 | -0.0322 | -0.1403 | 0.0886 | 0.0532 | -0.0868 | -0.1744 |
| uhjsi | -0.0233 | -0.1232 | -0.0726 | -0.0413 | -0.0483 | 0.0242 | 0.0032 |
| | hhedu | province | region | njfr | uhedu | uhemp | uhjsi |
| hhedu | 1 | | | | | | |
| province | -0.0158 | 1 | | | | | |
| region | 0.2379 | -0.0442 | 1 | | | | |
| njfr | -0.0511 | 0.0388 | -0.1048 | 1 | | | |
| uhedu | -0.0823 | -0.0058 | -0.1013 | -0.0025 | 1 | | |
| uhemp | -0.0687 | -0.0267 | -0.1101 | 0.02 | 0.6301 | 1 | |
| uhjsi | 0.0377 | -0.0253 | 0.0474 | -0.0481 | -0.0852 | -0.1264 | 1 |

Source: Estimated by Authors