

Review Article

# Job Finding Rate and Female Labor Supply- A Heterogeneity Perspective

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## Abstract

**Background:** 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 count on measuring the flows of labor between the labor market states. The study is an endeavour to design a conceptual framework to determine female labor supply considering these labor market flows and job finding rate in Pakistan.

**Methodology:** The study evaluates various search models and provides a comprehensive review of literature taking into consideration job finding rate and female labor supply. Electronic databases including Google Scholar & Medline were used. Articles, books, and conference proceedings were cited using keywords like Job Finding rate, female labor and labor market, etc.

**Result:** The study has introduced the perspective of heterogeneity to incorporate the composition effect and dispersion effect of the labor market. The framework of the study provides a hint for policy makers to consider the relevant flows for improvement in female employment in Pakistan.

**Conclusion:** The main conclusion stresses on including the inactive group to link up the job finding rate with female labor supply. Not doing so would bias the imputed importance of factors shaping aggregate participation and unemployment rates.

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## Keywords

Job Finding Rate, Female Labor Supply, Heterogeneity, Labor Market Flows, Inactivity.



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## Introduction

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The standard concept of job finding rate defines it as a probability of a job seeker to find a job in the given time<sup>1</sup>. It is a key concept in understanding turnover in the labor market as fluctuations in the job finding rate have a mechanical outcome for aggregate participation and unemployment rates. This association is further justified due to the heterogeneity of composition and dispersion effect<sup>2</sup>. The former heterogeneity conventionally defines the non-employed pool and arises if the characteristics of individuals change over time, making job finding more or less likely<sup>2</sup>. The later comes from the dispersion in the labor market conditions and arises if the tight labor market coexists with the slack labor market. In this regard, heterogeneity is considerable for better job search and efficient measurement of employment potential of the workers.

Despite the significant association of job finding rate and labor force participation, the academic research on measuring and assessing job finding rate is still a work in progress<sup>3</sup>. There is a clear distinction between the traditional and contemporary methods for observing job finding rate. The traditional search models employ only flows related to unemployment and employment for the estimation of job finding rate<sup>3</sup>. Therefore, a wide range of literature distinguishes between the job seekers and inactive considering the former as the key determinant of the non-employed pool. However, the recent research argues that employment possibilities of inactive population cannot be ruled out. This implies that new employment flows can not only be filled by the unemployed but also with the entrance of inactive population<sup>3</sup>. Hence, 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<sup>4</sup>. This has provided an initial insight to conduct this study.

Besides, the other possible explanation for this study is a fact that female labor force participation in Pakistan displays several striking features. The recent report of Labor Force Survey (LFS) of Pakistan reported a 14.5 percent crude participation rate for women while for men the rate is 48.3 percent<sup>5</sup>. The refined rate also depicted the same situation as it was 20.1 percent for women and 60.8 percent for men in the year 2107-18<sup>5</sup>. In the preceding years, the employment rate for females still shows a declining trend despite the fact that they comprise 49.2 percent of the total population<sup>6</sup>. Furthermore, women had higher unemployment rate (8.3percent) than men (5.1 percent) in 2017-18<sup>5</sup>. On the whole, the declining trends of participation and ambiguities in unemployment rates of females indicate that female contribution in labor market is yet not up to the mark. The reasons behind this situation are yet to be considered. Consequently, the concept of determining female labor supply in Pakistan is still an intellectual curiosity despite its extensive dimensions.

Hence, reservations in measuring job finding rate and declining female labor force participation in Pakistan has provided an insight to conduct this study. The novelty of the study is that it has incorporated various search models and a comprehensive literature review to develop a conceptual framework linking job finding rate and female labor supply in Pakistan. In this regard, we have first analysed various conventional and relevant theoretical models of job search in the labor market to develop theoretical support for the framework. Correspondingly, we analysed a growing literature to explain the fact that there are many possibilities of attachment of non-employed to the labor market and thus the concept of job finding rate needs to be refined. 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.

## **Theoretical background of study**

### ***Basic Search Model***

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 respond to work at the offered wage. The relaxation of such extreme conventions allows search models to anticipate 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 in 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<sup>7</sup>. Moreover, the Sequential Search Theory was first proposed by McCall<sup>8</sup>, Mortensen<sup>9</sup> and Gronau<sup>10</sup>. 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.

### ***Worker Turnover Model***

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<sup>11</sup>. It is based on the reality that a worker continues his or her job for a long time until he or she finds a better one.

### ***Random Matching Search Model***

A popular line of research is originated from search model by Pissarides in 1985<sup>12</sup> and 2000<sup>13</sup> 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 take 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 also combined by considering the endogenous decision making of firms to post a vacancy with a condition of free entry. Contrary to this, 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<sup>14</sup>.

### ***Endogenous Search Model***

Mortensen and Pissarides<sup>15</sup> 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 Hall<sup>16</sup>, Shimer<sup>17</sup>, Den Haan, Ramey and Watson<sup>18</sup>, Cole and Rogerson<sup>19</sup>, Merz<sup>20</sup> and Andolfatto<sup>21</sup>. There is also another dimension in this literature that introduces heterogeneous firms and workers. These studies include the work of Shimer and Smith<sup>22</sup>, Mortensen and Pissarides<sup>23</sup> and Acemoglu<sup>24</sup>. Meanwhile, the consequences of this model were studied by Caballero and Hammour<sup>25</sup> and Barlevy<sup>26</sup>.

### ***The Dynamic Search Model***

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<sup>15</sup>. Therefore, Shimer<sup>27</sup> proposed and extended the dynamic search model and added heterogeneity in the model to introduce the wage dispersion among heterogeneous workers.

### ***Modern Theory of Wage Dispersion***

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<sup>15</sup>. 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 done by Bontemps, Robin, and Berg<sup>28</sup>; 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 by considering similarities of these search models with the help of comprehensive review of literature, however, underlying few alterations. In the subsequent section, we will discuss the relevant studies that assessed to include relevant aspect that can be easily utilized to for the empirical estimation as well.

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## **Review of Related Studies**

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### ***International Studies***

Deriving sixteen labor-market statuses, Hall & Wohl measured matching efficiency with heterogeneous job seekers<sup>1</sup>. 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.

Kudlyak & Lange categorized the labor market into three labor force statuses (LFS) and observed the histories of individuals and heterogeneity in job finding rates<sup>29</sup>. 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.

Sedlacek considered the CPS and Job Openings and Labor Turnover Survey (JOLTS) of US for the time period of December 2000 to June 2013<sup>3</sup>. The author employed the Latent Variable technique to estimate an aggregate matching function (relates new hires, job openings and job seekers) while considering the job seekers from employment, unemployment, and inactivity. The author found that US labor market was filled by the flows from employment and inactivity. Importantly, the unobserved group of inactive individuals was often ignored in empirical studies of the US labor market.

Bachmann, Bechara, Kramer & Rezekpa used micro data to analyze the labor market flows in a large number of European countries<sup>30</sup>. 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<sup>30</sup>. 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.

In the extended version, Barnichon & Figura, proposed a Two-Stage Estimation procedure by employing Matching Technology Approach<sup>31</sup>. 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<sup>31</sup>. 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.

Using monthly CPS data, Choi, Janiak & Villena-Roldan observed the worker's flow between January 1976 and July 2010 and segregated male and female samples<sup>4</sup>. 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<sup>4</sup>. 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.

Shimer 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<sup>32</sup>. 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<sup>33</sup>. Following Shimer, Smith examined the relative significance of job search and job separation that drive the UK unemployment rate using British Household Panel Survey (BHPS)<sup>34</sup>. 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 & Mussida followed the Markov Chain approach and Multinomial Logit Model for the time span of 1993-2003 for Italy<sup>35</sup>. 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<sup>41</sup>. 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<sup>35</sup>.

Hobijn & Sahin provided comparable estimates of job finding and separation rates for a panel of twenty-seven OECD countries for the period of 1968-2004<sup>36</sup>. 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), Da Rocha & Fuster developed a model to relate female labor participation and fertility decisions<sup>37</sup>. 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)<sup>37</sup>.

Hyslop analyzed the intertemporal labor force participation behavior of married women, using longitudinal data to allow for a rich dynamic structure<sup>38</sup>. 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 were characterized by substantial unobserved heterogeneity and women's participation response was stronger to permanent than current non labor income<sup>38</sup>. Arellano & Meghir 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<sup>39</sup>. The results revealed a strong effect of age, education, demographics and wage while job search reduces working hours.

A comprehensive review of the emergent international literature on job finding rate clusters around the empirical estimation and more concentrated towards efficient estimations. This could be the reason that these studies had focused on modifying search models. Besides, the traditional concept of estimation job finding relied more on including flows in and out of unemployment while the contemporary perspective stresses that one should not ignore the inflows and outflows of inactivity to explain labor market variations. Hence,

numerous scholars have endeavoured to push this idea for advanced search models of the labor market. These scholars emphasize that search theories converging on to the labor market dilemma should rely more on enhancing employment of inactive population to figure out the dynamics of the labor market. In this regard, this study is a contribution to this other strand of literature.

### National Studies

It was 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<sup>40</sup>. 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<sup>40</sup>.

Shaheen, Shabir, Faridi & Yasmin evaluated the various factors of employment by observing the females in different employment activities with a field survey of 402 females<sup>41</sup>. 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<sup>41</sup>.

Moreover, the factors affecting educated women's decision to participate in the labor force through a field survey for the districts of Multan was explored by Faridi & Rashid<sup>42</sup>. 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<sup>42</sup>. 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.

Isran and Isran qualitatively analyzed the constraints faced by female job seekers. The authors highlighted the issue in the lens of socio-cultural impediments and margins that hindered the entrance of female in the labor market<sup>43</sup>. These socio-cultural constraints ascended the traditional patriarchal structure in Pakistan creating more hitches for females. Besides, the mass flow of females in the informal sector was largely attributed to the reality that these constraints showed a great weightage against employment of women in the formal sector. A survey revealed 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<sup>44</sup>. 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.

Ejaz applied Instrumental Variable Regression and used PSLM data for 2006-07 to determine female labor supply in rural and urban areas of Pakistan<sup>45</sup>. 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<sup>45</sup>. Ahmad & Azim computed employment probabilities for youth by employing

Logistic Regression analysis<sup>46</sup>. 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<sup>46</sup>. Moreover, the heterogeneity of jobless people must be taken into account in labor employment policies of Pakistan.

Zulfiqar & Chaudhary measured unemployment rate by converting published unemployment rates into duration-adjusted unemployment rates<sup>47</sup>. 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<sup>47</sup>. Naqvi & Shehnaz identified the micro-level factors that lead to women participation in the economic activities<sup>48</sup>. These factors included various characteristics of female, household, and household head with connotation of economic status of the household and residence of the household. The study covered the Pakistan Integrated Household Survey (PIHS) data for the year 1998-99 and developed Probit Model for female decision making for employment. Primarily, the study outlined that a female's chances to be employed enhanced when she belonged to the rural family background or head of the household was uneducated or was unemployed. Consequently, these circumstances were backing females to seek employment and to contribute through the remuneration supplements for their families. It is pertinent to mention here that these results hold for low skilled and low paid economic activities. However, women with more age, educated female household

head and small yet stronger family background were more empowered to take decision for being employed, unemployed or inactive.

In a study, the authors used the data of two Pakistan Socio-Economic Survey (PSES) for the year 1998-99 and 2000-01<sup>49</sup>. The data intrinsically accounted gross flow data of the three labor market states, age, gender, place of residence, marital status, education and training through Bivariate and Logistic Regression Analysis. The study outcomes revealed that flow rate from unemployment to employment was slow while fifty percent of the total unemployed pool were facing short term unemployment. Meanwhile, more than quarter of this pool were striving with transitory unemployment and chronic unemployment affected 15 percent of total unemployed group. The other five control variables turned out to be significant as well. Moreover, the results explained no difference of outcomes between the male and female samples. The study conclude that labor market absorption had been decline over the time in Pakistan and hence, policy makers would supposed to be focusing more on flows in labor markets with improvement in job openings.

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. Thus, national literature has yet not properly addressed the issues of employment, unemployment and inactivity. This is the reason that we have developed a conceptual framework that not only links up the female labor supply with job finding rate but also emphasizes on including more inactive females in the labor market for better estimates of female participation in Pakistan.

### *Conceptual Framework of the Study*

The study assumes that the labor market is independently distributed in employed, unemployed and inactive working age population. Thus, if a female relates to working age population then her employment status (previous and current) is a matter of concern to observe the labor market outcomes. This idea has provided an intuition to determine the job finding rate with the help of labor market flows of female between the three labor market states. This further illustrates to determine female labor supply and her optimal choice regarding the labor market status.

The framework of the study (figure 1) highlights this idea considering various relevant observable and unobservable factors. This cannot be done without introducing the heterogeneity perspective. Here, the framework essentially proposes that heterogeneity allows a female to opt for work instead of staying inactive. Furthermore, a female's decision making for participation in the labor market is attributed to the observed and unobserved heterogeneity. Hence, the employment of female will rely on two main effects – "Composition Effect" and "Dispersion Effect". These two dimensions of the heterogeneity include various worker, household and labor market characteristics. Meanwhile, these two aspects allow to integrate female labor supply and job finding rate with an instinct that a well mix of all the variables would enhance the labor supply of females in Pakistan. Alternatively, the conceptual framework of this study provides a reasonable justification to associate the job finding rate with female labor supply taken into account the heterogeneity of composition and dispersion effect.

The composition effect of the framework incorporates relevant worker and household characteristics in the model to identify the observed and unobserved heterogeneity. The observed heterogeneity of females may be captured by female's own



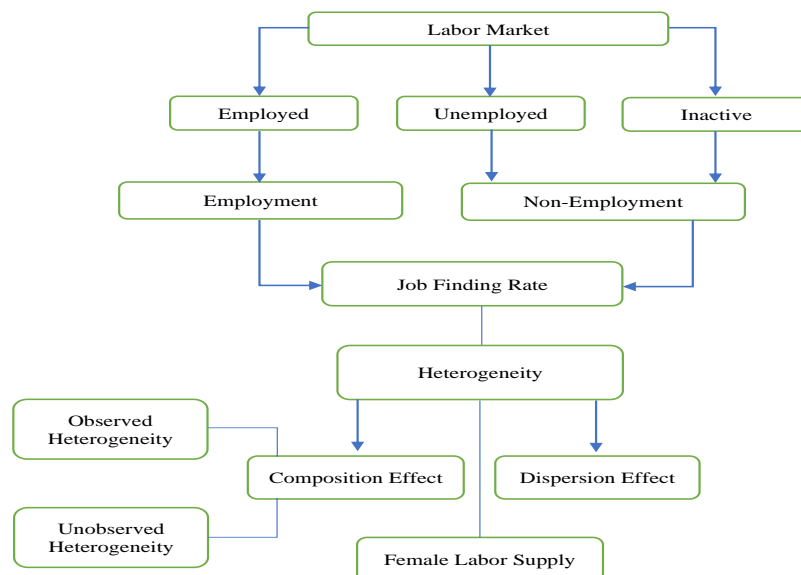
characteristics such as her age, education; and work experience while including her household characteristics such as family size, family income dependency ratio, household head education etc. The decision making of females captures the unobserved heterogeneity for education, employment and non-employment. Precisely, this allows for estimating the composition effect in an effective and efficient manner considering the distinct categories at household level.

The dispersion effect of the labor market has been included to visage the labor market disruptions for female in Pakistan. Moreover, the dispersion of females in the labor market would offer an opportunity to assess that how labor market is facilitating female workers in Pakistan. Hence, rejecting the possibility of a unified market for females, the conceptual model of the study proposes to encounter location of female, regionalism and wage differentials. Considering these, it is presumed that indirect association of dispersion effect with job finding rate would be associated to more dispersion for females with a direct impact on overall participation rate.

Consequently, a unique combination of composition and dispersion effects ends up with an optimal solution for a female given the characteristics. In this study, the optimal solution of a female results in her participation in the labor market. The proposed parameters of the model explain that a female’s participation in the labor market depends on the job finding rate. Moreover, female’s decision making for labor force participation will be instantaneous and her labor market status depends on the heterogeneity that differs from female to female.

It is pertinent to mention here that this conceptual framework can also be utilized as econometric model as it is mutually effective to measure the potential of the labor market. Specifically, the empirical model will relate the labor supply module with the non-employment of females to empower them in Pakistan. This will provide useful analysis to witness a female’s ability to decide for work or leisure or household activities, yet with a different perspective

**Figure 1: Conceptual Model**



*Source: Illustrated by Authors*

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## Conclusion

This paper presents a conceptual framework for labor force supply of females using the novel idea of flows of female workers between the three labor market states in Pakistan. This procedure provides a consistent set of flows from which we can identify better job finding rates. Hence, it is thus anticipated that differences in participation rates can be attributed to the flow of workers from inactivity and unemployment to employment. The main conclusion stresses on inclusion of inactivity state and job finding rate through the heterogeneity. Not doing so would bias the imputed importance of factors determining participation and unemployment and thus, aggregate participation and unemployment rates. The conceptual framework designed in the study provides 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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