



Advance Journal of Econometrics and Finance

Online ISSN

2959-8990

Print ISSN

2959-8982

https://aieaf.com/index.php/Journal/About

Name of Publisher: SCHOLAR CRAFT EDUCATION & RESEARCH HUB

Review Type: Double Blind Peer Review

Journal Frequency: Quarterly Research Journal (4- Issue)



Determinants of Occupational Segregation in Labor Market: A Case Study of Urban Punjab, Pakistan

<sup>1</sup>Hamna Shafiq, <sup>2</sup>Maria Faiq Javaid, <sup>3</sup>Shabbir Ahmad, <sup>\*4</sup>Atif Khan Jadoon

	Abstract
<p><b>Hamna Shafiq</b> School of Economics, University of the Punjab, Lahore, Pakistan. Email: <a href="mailto:humnashafiq10045@gmail.com">humnashafiq10045@gmail.com</a></p> <p><b>Maria Faiq Javaid</b> School of Economics, University of the Punjab, Lahore, Pakistan. Email: <a href="mailto:mariafaiq.eco@pu.edu.pk">mariafaiq.eco@pu.edu.pk</a></p> <p><b>Shabbir Ahmad</b> School of Economics, University of the Punjab, Lahore, Pakistan. Email: <a href="mailto:shabbir.eco@pu.edu.pk">shabbir.eco@pu.edu.pk</a></p> <p><b>Atif Khan Jadoon*</b> School of Economics, University of the Punjab, Lahore, Pakistan. Corresponding Author Email: <a href="mailto:atifkhan.eco@pu.edu.pk">atifkhan.eco@pu.edu.pk</a></p>	<p>The present research is designed to empirically examine the determinants of occupation segregation in the workforce of urban Punjab, Pakistan. This research is conducted by using the most recent available Labor Force Survey of 2020-21. The Duncan Index, a tool that helps measure gender inequality across different professions, is used to determine occupational segregation. After determining the occupational segregation, the Tobit regression model is used to examine how factors such as women's age, education, training, working hours, marital status, and wage gaps affect segregation levels. The regression results indicate that older women are more likely to experience higher levels of segregation. However, the study finds that as the wage gap between genders grows wider, occupational segregation also increases. Furthermore, when women have higher levels of education, segregation reduces. While training and working hours show a positive association with segregation, which indicates that women are still restricted to roles that are traditionally female-labeled, and they find it difficult to manage their work commitments alongside their household chores.</p>
<b>Keywords</b>	Female Labor Force Participation, Occupational Segregation, Socioeconomic Factors, Pakistan, LFS (2020-21)

### 1. Introduction

Empowering women in the labor force is not just about equality; it's a crucial step toward significant social change, strong economies, and ensuring sustainable development. To improve work quality and achieve gender equality, it's necessary to address gender-based segregation (Das & Kotikula, 2019; Zhengzheng, 2019; Kessey & Nyarko, 2021). Over many years, extensive research has been conducted in economics and sociology, yet the causes of occupational gender segregation remain untouched (Anees & Yan, 2019; Adams-Prassl et al., 2024; Audi, 2024). Despite women's significant contribution to the labor force, a clear difference persists in the types of jobs that women & men usually do. This pattern of gender segregation in the labor market persists and contributes to the pay gap (Acemoglu & Autor, 2011; William, 2021).

The female labor workforce is one of the main reasons that contribute to gender disparities in the outcome of the labor market, which takes place due to job segregation between men and women. This phenomenon, known as occupational segregation, plays a key role in shaping these differences (World Bank, 2023; Ibrahim & Simian, 2023; Yan & Sriboonchitta, 2024). This leads to inequality between men and women in different fields. This can happen in two ways. Horizontal segregation occurs when different sectors or jobs are mostly filled by one gender. Vertical segregation occurs when there are gender differences in job positions, with one gender more likely to hold higher-status roles or managerial positions, or to have greater promotion opportunities (Ali, 2015; Das & Kotikula, 2019; Martin, 2025).

When we consider both the paid and unpaid work women do at home, they generally work longer hours than men. Around the globe, women spend significantly more time on household chores (Ferrant et al., 2014; Ali, 2018; Mohammadi, 2022). In Pakistan, the traditional and male-dominated social structure explains that men are inclined to be the main earners, whereas women are responsible for taking care of the elderly family members and doing house chores, which can restrict women's ability to access different opportunities and resources (Ali & Bibi, 2017; Sarfraz et al., 2022; William, 2023). Beside this, Maqsood et al., (2012) explained how male dominance persists in Pakistani society, as men are the main breadwinners and hold the primary authority.

Women make up half of the world's population; yet, in many countries, their workforce participation is almost 25% lower than men's (Horne, 2023). According to recent World Bank data, this inequality is especially pronounced in South Asia. The low level of female labor force participation contributes to the country's poor ranking on the global gender gap index, placing it at 151st out of 153.

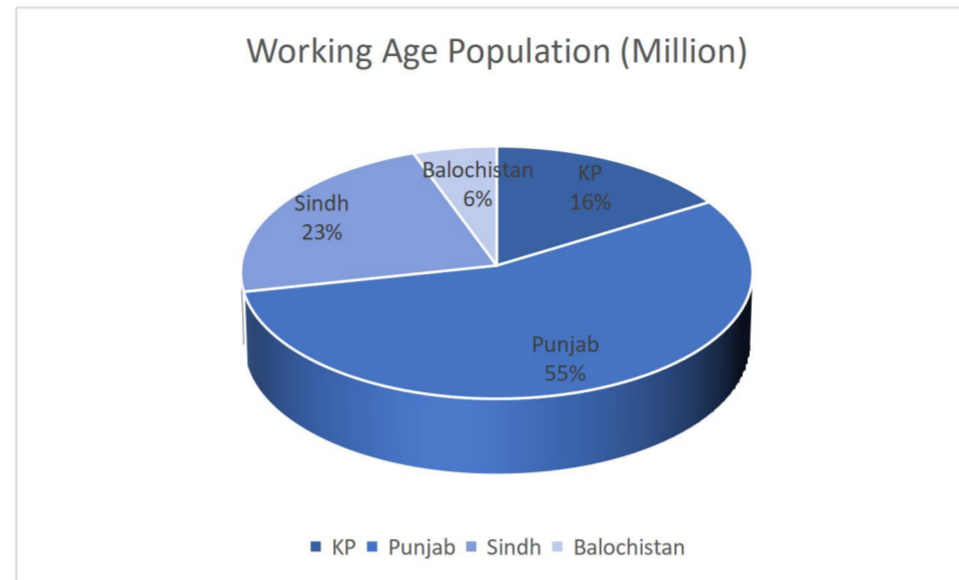
Despite being the fifth most populous country in the world, Pakistan ranks lowest among countries in gender equality, particularly regarding female labor force participation. The Pakistan Labor Force Survey (PLFS) 2021 shows that labor force activity rates vary across provinces: Punjab leads with 44.2%, followed by Sindh at 42.1%, Balochistan at 38.6%, and KP at 36%. However, a more alarming issue is the ongoing decline in women's participation. While overall labor force participation rose slightly from 44.8% to 44.9% between 2018 and 2019, only 21.3% of women are part of the workforce, compared to 67.9% of men. This trend is concerning since women's participation has dropped from 24% to 21% between 2016 and 2021 (Labor Force Survey, 2021). This inequality is illustrated by higher female unemployment rates in urban areas (16.4%) compared to rural areas (7.4%). Table 2.1 presents labor force statistics for Pakistan and Punjab from 2020 to 2021. Punjab, chosen for its demographic prominence as the most populous region, offers valuable insight for this study.

**Table 1: Pakistan Statistics Overview for 2020-2021**

Figures (millions)	Pakistan	Punjab
Working age population	159.5	88.2
Total population	224.3	120.1
Female Population	78.8%	44.3
Male Population	80.7%	44.2
Labor Force Participation Rate	44.6%	47.3%
Female Participation Rate	21.1%	19.3%
Male Participation Rate	67.2%	50.1%
Male Unemployment Rate	8.6%	8.2%
Female Unemployment Rate	5.2%	6.1%

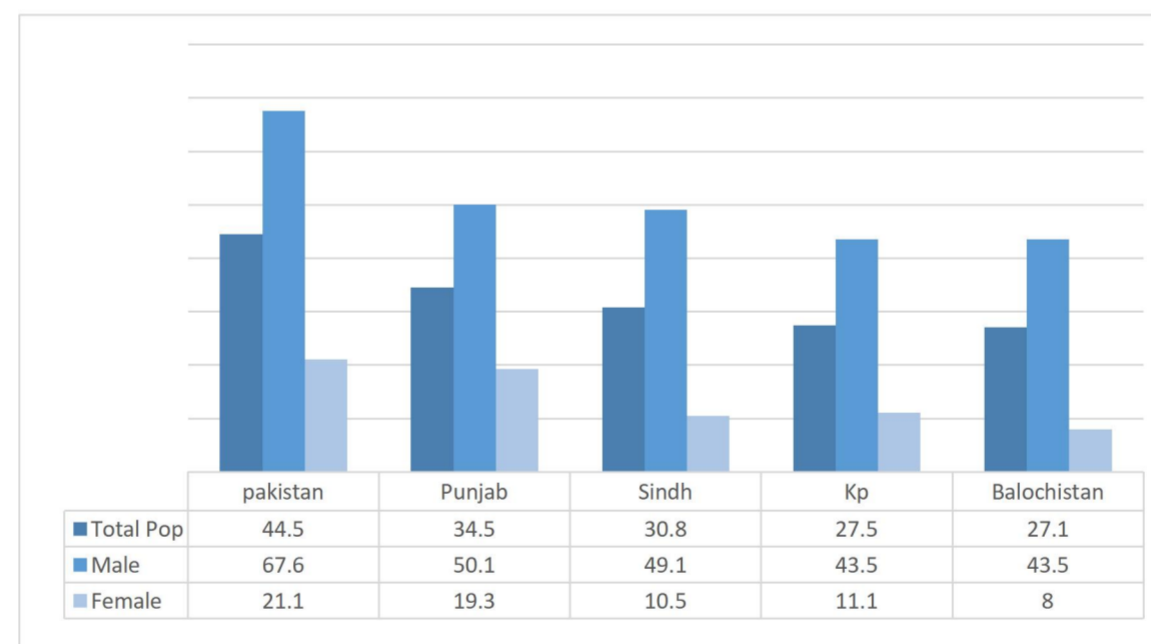
Source: PLFS (2021)

Figure 1 shows the distribution of the working-age population by province for 2020-2021, based on PLFS (2001), and compares the unemployment rates of women and men across all provinces.



**Figure 1: Distribution of provincial population in Pakistan, 2020-2021**

In Figure 1, the labor force participation rates provide important insights into the economies of both Punjab and Pakistan. As we can see in Punjab, the overall labor force participation stands at 34.5%. However, a significant gender gap is evident: 50.1% of men are employed, compared to only 19.3% of women. This reflects a lower level of female workforce participation despite Punjab having the largest working-age population.



**Figure 2: Labor Force Participation, 2020-2021**

According to labor market statistics in Pakistan, a significant portion of female workers is primarily involved in the agriculture, forestry, and fishing sectors. Most women work as skilled farm workers, basic laborers, or in crafts and related trades (Ali & Ahmad, 2014; Khan et al., 2023). Then again, a high number of women are employed in teaching and the agricultural sector, while fewer females are appointed to managerial and service roles in Punjab. and service roles have relatively fewer female representations as well. Even though there are about the same number of men and women in the population, there is variation in the types of jobs they hold. Given this complexity, the present study investigates factors contributing to increased occupational segregation across professions in Punjab, Pakistan's most populous province.

Table 2 presents summary statistics on the occupational structure of the labor force for males and females, based on the PLFS (2011).

**Table 2:** *Gender Inequalities in Occupations in Urban Punjab*

Professions	Ratio of women to men
Directors & Chief Executives	4:39
Organizational & Commercial Manager	3:2
Science & Engineering Professionals	8:15
Health Specialists	52:81
Production & Specialized Services Managers	11:25
Hospitality, Retail & Other Services Managers	1:4
Business & Administration Experts	1:3
Health Specialists	52:81
Teaching Sector	563:274
Associate Science & Engineering Associate Professionals	4:51
Information & Communications Professionals	5:43
Legal Professionals	9:82
Legal, Social & Related Associate Professionals	1:18
Health Professionals	6:13
Business & Administration Associate Professionals	1:18
Numerical & Material Recording Clerks	1:22
Information & Communications Technicians	5:47
Customer Services Clerk	2:9
General & Keyboard Clerks	8:185
Personal Service Workers	9:32
Sales Workers	8:307
Protective Services Workers	5:115
Market-Oriented Skilled Agricultural Workers	64:173
Subsistence Farmers, Fishers, Hunters	5:4

### 1.1. Objective of the Study

The objective of the study is to measure job-market segregation by constructing a dissimilarity index and to identify the socioeconomic factors contributing to occupational segregation. The research gap addressed in this study relates to the relationship between occupational segregation and determinants of the Female Labor Force Participation (FLFP) rate. Existing research in this area often examines factors that influence segregation from both male and female perspectives. However, this study uniquely focuses on the female-centric factors contributing to labor market segregation within the context of the Punjab province and its urban areas in Pakistan, because Punjab has the largest working-age population (PLFS, 2021).

### 1.2. Research Hypothesis

$H_0$  There is no association between occupational segregation & factors such as female age, education, training, marriage, working hours, and wage gap.

## 2. Literature Review

Conceptual clarity is foundational to this research; therefore, it is imperative to define the key concepts of occupational segregation and women's labor force participation. Occupational segregation is the distribution of workers across different professions, influenced by demographic factors, often gender (Ali & Audi, 2018; Javed et al., 2022; Marc



et al., 2026). Whereas FLFP is defined as the “female choice to participate in the economically active populace, whether they are employed or unemployed, as opposed to being part of the economically inactive populace who are neither working nor seeking work” (HOSNEY, 2016).

Mostly jobs are done by one gender, which creates disparity in opportunities and wages (Cotter, Hermsen, & Vanneman, 2003). Usually, men are found in jobs involving natural resources, construction, and transportation, while women are more frequently found in jobs such as textiles and education. This inequality in workers across jobs makes it harder for women to enter higher-paying roles and perpetuates existing pay gaps between women and men (Das & Kotikula, 2019; Khalil et al., 2025). It also increases the gender wage gap, slows progress toward gender equality (Anker, 1997), distorts employment experience, and makes it harder for laws that promote equal pay (Burchell, 1996). In Pakistan, men excel in most occupations other than teaching, where women are dominant. The role of what men and women should do is still influenced by traditional customs, leading many women into areas such as farming, basic labor, and crafts (Marc, 2024; Khan et al., 2023; Ali et al., 2021; Maqsood et al., 2012).

Gender bias remains a prominent issue in many workplaces, hampering women's progression in their careers. The "glass ceiling" effect prevents women from reaching top positions in male-dominated fields, primarily due to discrimination (Babic & Hansez, 2021; Singh et al., 2023; Al-Masri & Audi, 2026). Women still face everyday obstacles in accessing education, skills development, and even basic mobility, all of which affect their economic opportunities (Ali et al., 2022; Naeem et al., 2026). Additionally, the term "speaking while female" is seen as a struggle for women in professional environments, hindering their career growth.

Social customs and traditional norms significantly shape how women participate in the labor force. These social norms define the roles females are expected to play in their homes and often create challenges for them to participate in the workforce. Marriage and child care responsibilities often keep women out of the job market (Ejaz, 2007). After having children, women are most likely to leave the labor force (ILO, 2020). In Asia, women face greater difficulties in participating in the labor market than in Western countries due to mobility restrictions (Belitski & Desai, 2021; Tahir et al., 2026). Mostly, culture forbids women from interacting with the opposite gender, limiting their opportunities in the labor market (Boudet, 2013; Fatima et al., 2026). Differences in employment between genders can be explained by variances in the skills people have and the personal choices they make (Becker, 1985; Polachek, 2006; Pacillo, 2022). Psacharopoulos and Tzannatos (1989) noted that education is a very important factor for women contributing to the labor force. However, almost half of women worldwide lack access to proper education. Singh et al. (2023) revealed that the head of the household and male family members influence female choices about joining the labor market. In general, having more education increases the likelihood that women will enter the labor force. In addition, Chatterjee et al., (2018) found a "U-shaped" association between education and female labor force participation.

Khan et al. (2023) observed segregation in Pakistan, utilizing data collected from the Pakistan Labor Force Survey (2013-2018). Their research uncovered an important point that even though women are less represented in the overall labor force, they are still segregated in occupations. In addition, it revealed that older males and females with higher levels of education experience greater segregation. In fact, higher education does not reduce segregation. Beton et al., (2019) observed the patterns of segregation in the labor market of North Cyprus between 2004 and 2014. They used data from Household Employment Surveys. The study used the D-Index and analyzed nine main professional categories in both rural and urban areas of North Cyprus. Their study found that the level of gender segregation remained constantly high throughout the whole 11-year period. Borrowman and Klasen (2020) conducted a study to find the causes that influence gender-based segregation in professions and industries across developing countries. They used a vast dataset of household surveys from 69 countries spanning 1980 to 2011. The results revealed that a nation's level of income does not significantly affect either segregation. Additionally, an increase in women's participation in the labor force decreases sectoral segregation but increases job segregation, and higher education was found to increase segregation.

Keats (2018) found that higher levels of education among women are positively associated with improved health outcomes for their children in Uganda. From a young age, children are exposed to traditional norms that impact their perceptions of future roles. Girls and boys are often given different messages about the careers they should pursue and the skills they should develop. These early messages can have a lasting effect on the educational choices they make and the abilities they choose to develop later in life. Keane et al., (2017) studied the effect of a significant increase in women's participation on occupational segregation in Ireland. The decomposition method was used to observe the data from 1991 to 2006. They found that women's participation in male-dominated sectors can decrease segregation. The increase in female employment is mainly due to greater employer demand in those fields. Alonso-Villar and Del Río (2017) observed occupational segregation among African American women using local segregation indices based on educational attainment. Their study showed that segregation reduced significantly from 1940 to 1980, then declined more slowly from 1980 to 2000. Between 2000 and

2010, segregation remained relatively stable. They also found that women who had multiple university degrees experienced considerably lower levels of segregation compared to those with low levels of education.

Most earlier studies have focused on the national picture, often overlooking significant regional variations and locally specific developments. To tackle this issue, the current study focuses on urban areas in Punjab, Pakistan. Additionally, another problem with previous research is that it often examined only a few factors affecting women's workforce participation, leaving out broader ones that may be at play. This research aims to incorporate the determinants of female labor force participation that affect occupational segregation.

### 3. Data and Research Methodology

#### 3.1. Data Source

In Pakistan, labor market research mostly depends on data from PLFS. This study uses the latest data from the PLFS 2021, which represents a cross-sectional view of the labor market.

#### 3.2. Description of Variables

The variables used in the present study along with data sources and references are presented in 3.

**Table 3:** *Description of Variables*

Variables	Indicator	Reference Category	Data source	References
Duncan Index	The Duncan Index is a metric used for measuring segregation with values ranging from 0-1	NA	T. E. Duncan and Duncan (1995)	Irfan, Anwar, Akram, and Waqar (2013) Ahmed and Hyder (2008)
Age	Three groups: 1- young (18-29 years old females), middle-aged (30-48 years old females), and elderly (49 years & above females).	Young	PLFS	Khan et al. (2023)
Education	Three categories of females: those with no education, graduates, and post-graduates.	Undergraduates	PLFS	Irfan et al. (2013); Khan et al. (2023)
Marriage	Marriage is split into two groups married and unmarried.	Unmarried	PLFS	Amber and Chichaibelu (2023)
Training	Training is a key variable in the research and we use this as a dummy variable to study its influence.	No training	PLFS	Irfan et al. (2013)
Working hours	Two categories: females working less than 50 hours and more than 50 hours per week.	Hours per week < 50 is Reference category.	PLFS	Jung, Kim, Kim, Paek, and Cho (2017)
Wage gap	(Males wages - Female Wage) / Male wages		Pakistan bureau of statistics.	Javed et al. (2022)

Source: Author's own compiling.

#### 3.3. Occupational Groups Classification

The International Standard Classification of Occupations (ISCO) is used in this study. Six occupational groups classified are as under:

- Managers
- Professionals
- Technicians and Associate professionals
- Clerks
- Services and market sales workers
- Skilled agriculture and fishery workers

### 3.4. Research Methodology

This research employs the Tobit model, which assumes the dependent variable is censored; its true value is unknown because measurement is limited to a specific range. The Tobit model is also used to analyze gender-based occupational segregation, following Irfan et al. (2013). Segregation is commonly measured using the Dissimilarity Index (DI), developed by Duncan and Duncan (1955), and the Coefficient of Female Representation (CFR). In this study, segregation is analyzed using the Dissimilarity Index. Diagnostic tests then evaluate the Tobit model's significance and reliability, including the Wald Chi-Squared Test (to assess coefficient significance) and the Redundant Variable Test (to identify variables that do not meaningfully contribute).

#### 3.4.1. Formulation of Duncan Index

The Duncan Index of Dissimilarity, created by Duncan and Duncan (1955), is a common way to measure occupational segregation. Ahmed and Hyder (2008) also used the same method.

$$D = \frac{1}{2} \left[ \frac{M_{occupi}}{LF_{occupi}} - \frac{W_{occupi}}{LF_{occupi}} \right]$$

Where

$D$  = Dissimilarity index of gender for each occupation

$M_{occupi}$  = No of male

$W_{occupi}$  = No of female

$LF_{occupi}$  = No of female in labor force

#### 3.4.2. Tobit Regression

In 1958, James Tobin introduced the Tobit regression model, specifically designed to handle continuous, non-negative variables with a high proportion of zero observations, such as household spending. The Tobit regression model is defined in the following manner:

$$Y_i^* = \beta^* x_i + \varepsilon_i$$

$Y_i^* = Y_i$ , and  $Y_i > 0$  otherwise  $Y_i \leq 0$

- The dependent variable in this model is  $Y_i^*$  which is regarded censored.
- $x_i$  is a vector of independent variables, where  $\beta^* = [\beta_1, \beta_2, \dots, \beta_p]$
- The error term  $\varepsilon_i$  which is linked to  $Y_i^*$  is supposed to follow a normal distribution with a constant variance  $\sigma^2$  and a zero mean

The Tobit Regression model is mentioned below.

$$D_{0,1} = \beta_0 + \beta_1 age + \beta_2 education + \beta_3 training + \beta_4 marriage + \beta_5 working hours + \beta_6 wagegap + \varepsilon$$

Where

$D_{0,1}$  represents the Dissimilarity Index

$\beta_0$  is the intercept or constant term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  and  $\beta_6$  are the coefficients of the independent variables

$\varepsilon$  represents the error term

### 3.5. Diagnostic Tests

To evaluate the model's efficiency or verify its accuracy, diagnostic tests are performed after the analysis. There are two tests for the overall significance of the Tobit model:

#### 3.5.1. Wald Chi-Squared Test

The Wald chi-squared test is a statistical test used to assess the significance of the model. It assesses whether the model's independent variables have a significant effect on the dependent variable. It is shown as:

$$(R\hat{\beta} - r)' [RVar(\hat{\beta})R']^{-1} (R\hat{\beta} - r)$$

The alternative hypothesis of the test is as:

$H_1$  The coefficients are statistically different from zero

### 3.5.2. Redundant Variable Test

To remove or to detect variables that do not contribute to the model we use the test called redundant variable test. To check significance of the variables. It is shown as:

$$\text{Likelihood Ratio} = -2 \times [\text{Restricted logL} - \text{Unrestricted logL}]$$

The alternative hypothesis of the test is as:

The variables are jointly significant

## 4. Results and Discussions

### 4.1. Results of Dissimilarity Index

The Duncan Index ranges from 0 to 1, which is commonly used to measure occupational segregation. A score of 0 implies that there is no discrimination in a given profession, whereas a score of 1 indicates total segregation.

**Table 4:** *Dissimilarity Index*

Occupations	Dissimilarity Index
Managers	0.14
Professionals	0.03
Technicians	0.13
Clerks	0.09
Services	0.99
Skilled	0.17

Source: Author's calculation

Table 4 presents the Duncan Index findings for six major occupational groups, with one category, "services," showing an index score of 0.99, indicating segregation by gender in employment. In other words, both genders are mostly working in completely separate parts of the sector. This is especially noteworthy given the services sector's vital role in Pakistan's economy. It accounts for approximately 62.6% of the country's Gross Domestic Product, more than the combined contributions of agriculture and industry (Labor Force Survey, 2021). Across sectors such as trade, transportation, finance, education, healthcare, and services, the sector is a key driver and major source of both employment and economic growth. However, despite its significant size and importance, there is a noticeable gender imbalance within this sector. According to the Labor Force Survey (2020–2021), about 19.6% of men are employed in services, compared to just 2.1% of women. This large gap shows that women still face significant barriers to accessing many jobs in the service industry, even though they are slowly making progress in certain areas like education and healthcare.

On the contrary, the occupation group classified as "Professionals" has the smallest dissimilarity index (0.035), suggesting gender equality. In comparison, the dissimilarity indices for other occupation groups, such as "Managers," "Technicians," "Clerks," and "Skilled" workers, range from 0.099 to 0.177. These numbers indicate some level of gender disparity in these groups, though not as extreme as in others.

### 4.2. Tobit Regression Results

**Table 5:** *Results of Tobit Regression*

	Co-eff	St. er	P-value
Intercept	0.50326	0.02282	0.00
Middle age	0.07610	0.01636	0.00
Eldest	0.08576	0.02370	0.00
Graduate	-0.34612	0.01927	0.00

Tertiary	-0.37144	0.01761	0.00
Training	0.08008	0.01956	0.00
Marriage	0.02926	0.01657	0.07
Working hours	0.22795	0.02596	0.00
Wage gap	0.79024	0.05096	0.00
Mean dep		0.20934	
SE of Regression		0.24586	

Source: Author's own calculation

**Table 6: Diagnostic Tests**

Test statistic	Value	Probability
Wald test	122,4954	0.000
Redundant test	722,9932	0.000

Source: Author's calculation

### 4.3. Empirical Results

Age is grouped into three brackets: young (15–29), middle-aged (30–48), and elderly (49+). Both the middle-aged and elderly groups show positive coefficients. For women aged 30–48, each additional year is linked with a 0.077-unit rise in occupational segregation. Among women over 49, the effect is even stronger—the dissimilarity index increases by 0.085 units for every extra year of age.

Occupational segregation is lower among the younger generation because they face fewer restrictions than the older generation. The reason is that the younger generation has access to education and lives in a society more open to gender equality. On the contrary, older workers often face barriers such as age limits and limited career opportunities. Education is divided into three main categories: no education, graduate-level, and postgraduate-level. The findings indicate that for every extra year of schooling someone completes, the level of occupational segregation decreases by 0.34 units. This means that as females gain more education, segregation decreases. Women with postgraduate degrees' experience significantly less occupational segregation than those with only a basic graduate degree.

In most developed countries, women generally have less education than men, which leads them to work in low-skilled sectors and ultimately into lower-paying jobs. In fact, when women attain higher education, they are more likely to be employed in better, higher-skilled jobs, which can help reduce occupational segregation.

The training variable is split into two groups: "no training" and "training" (formal or informal). Training is linked to higher segregation. Each additional year of training is associated with a 0.080-unit increase in segregation compared with women without training. Women are expected to be hired in professions that involve lower training investments, resulting in shorter training durations. Also, training openings may not be equally dispersed between genders or may be influenced by certain sectors.

Marriage is categorized into two groups: single and married females, with the latter showing a slight positive effect on the dissimilarity Index. Specifically, an increase of one unit in the number of females getting married increases the segregation by 0.02 units. Furthermore, it is well known that married women are more likely to be involved in household chores such as cooking, cleaning, and childcare than to work outside the home or join the workforce.

Women's employment is influenced by the "motherhood penalty," where having children negatively affects their occupations. In addition, marriage often triggers the beginning of women's exit from the labor force, a trend that frequently occurs before the birth of their first child. The weekly hours variable is categorized into two groups: working less than 50 and more than 50. Weekly working hours are positively associated with segregation. An increase of one hour in working hours results in a 0.22-unit increase in segregation.

Job timing plays a crucial role in determining women's occupational choices, as they often have household responsibilities. In Pakistan, societal norms usually cast females as secondary earners, which makes longer working hours very hard for them to manage. Consequently, women's availability in the marketplace is limited, and many end up avoiding careers altogether. Taken together, these factors not only limit women's career options but also make it impossible for them to pursue certain jobs. The wage gap has the strongest influence on occupational segregation. It shows a clear, positive, and statistically significant effect. In simple terms, when the wage gap widens by just 1%, men and



women in the same occupations are paid even more unequally. The Dissimilarity Index rises by about 0.79 units. This means greater pay inequality accompanies more pronounced workplace segregation.

Discrimination against gender not only limits women's economic participation, but it also affects wage gaps between the genders. The root cause of this inequality arises from societal customs and occupational segregation. The wage gap persists because women are concentrated in low-paying jobs due to caregiving responsibilities, and their work is consistently undervalued as a result.

The p-value from the Wald test is less than 0.05, so we reject the null hypothesis. This shows the variables are significant to the model fit. The p-value for the Redundant Test is also less than 0.05, so we reject the null hypothesis and conclude that the variables jointly explain occupational segregation.

#### 4.4. Discussion

This study shows that age, education, training, working hours, and the wage gap all significantly impact occupational segregation in the Punjab labor market. Segregation increases with age, aligning with findings by Campos-Soria and Roper-García (2016) and Khan et al. (2023), also found higher segregation among older women. This study shows that young women experience lower segregation than older women. This pattern shows how traditional ideas about gender roles, discriminatory hiring, and limited career progression for older women still exist. On the other hand, younger women have more access to good education these days.

Education shows a negative relationship with segregation. This aligns with Blau et al., (2013), Alonso-Villar and Del Río (2017), and Irfan et al. (2013), who found that higher education reduces occupational segregation among women. The current study also shows that women with higher education face lower segregation, as there are more chances to enter market jobs at a high-skilled level than with lower education and no education at all.

The findings show a positive relationship between training and segregation. Similar to Irfan et al. (2013), the results suggest that women are concentrated in occupations with lower training requirements. In Punjab, mostly government organizations offer traditional training, which is free and is female-friendly and easier to learn, such as dressmaking, baking, cooking, and beautician courses, which are far removed from technical training. This gender-based division of opportunities leads to occupational segregation.

Marriage also shows a small positive effect on segregation. This aligns with Najeeb et al., (2020), who stated that married women are less likely than single women to join the labor force. In Punjab, societal norms place significant domestic and caregiving household tasks on married women, restricting their ability to pursue various occupations and pushing them toward family-oriented jobs. Women who have children face greater time constraints, which reduce their ability to work long hours (Khan et al., 2023). Employers discriminate against married women due to their less commitment. According to survey evidence, 33% of married women are less likely to participate in the labor force than unmarried women, mainly due to childcare and domestic responsibilities.

Weekly working hours also exhibited a positive effect on segregation. Women working more than 50 hours per week face higher segregation, consistent with Usui (2015). In Pakistan, traditional customs still place women in a secondary role, with their primary tasks centered on household care and supporting children and the elderly (Khan et al., 2023). These expectations often limit their ability to take on full-time roles in male-dominated managerial fields. Therefore, women are more often found in flexible positions, resulting in higher levels of occupational segregation.

Finally, the study showed that the wage gap has the strongest effect on occupational segregation. Previous work also found that segregation contributes to the gender wage gap (Das & Kotikula, 2019; Shauman, 2006). In Punjab, women are constantly paid less across all sectors. Even when working at the same occupational level as men, they earn less (LFS, 2021). Wage inequality deters women from entering male-dominated occupations and pushes them into female-dominated jobs. Segregation and the wage gap are closely linked, mutually reinforcing.

### 5. Conclusion and Policy Recommendations

#### 5.1. Conclusion

This study reveals the factors affecting occupational segregation, focusing on female labor force participation in Punjab, Pakistan. The rate of women's participation in the professions is lower across Punjab than that of men. Using the Duncan Index, the analysis showed that males dominate nearly all six major occupational groups, except professional occupations. Tobit regression using the latest Labor Force Survey (2020–2021) produced several key findings, with age being a significant factor influencing segregation, indicating that older women experience greater inequality in job opportunities. Education has a significant impact on reducing segregation, as women with secondary



education exhibit lower segregation. Surprisingly, training leads to higher segregation, and working for long hours also strengthens it. Conclusively, a wider gender pay gap was linked with higher occupational segregation.

### 5.2. Policy Recommendation

The present study has highlighted several important factors policymakers must consider to address issues of women's labor force participation and occupational segregation. Since higher education reduces segregation, providing girls with access to education, along with grants, is crucial. Secondly, long working hours and mobility barriers prevent women from participating in the labor market, so ensuring reliable transport can make it easier for them to work. Beyond this, the link between wage disparity and segregation underscores the need for strict equal-pay laws and transparency measures in the workplace.

### 5.3. Limitations of Study

Every research has its own limitations. In this study, resource and time constraints are acknowledged. Furthermore, this study focuses on the province of Punjab in Pakistan, so the findings may differ in other provinces.

### References

- Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings *Handbook of labor economics* (Vol. 4, pp. 1043-1171): Elsevier.
- Adams-Prassl, A., Huttunen, K., Nix, E., & Zhang, N. (2024). Violence against women at work. *The Quarterly Journal of Economics*, 139(2), 937-991.
- Ahmed, A. M., & Hyder, A. (2008). Sticky floors and occupational segregation: Evidence from Pakistan. *The Pakistan Development Review*, 837-849.
- Ali, A. (2015). *The impact of macroeconomic instability on social progress: an empirical analysis of Pakistan*. (Doctoral dissertation, National College of Business Administration & Economics Lahore).
- Ali, A. (2018). Issue of Income Inequality Under the Perceptive of Macroeconomic Instability: An Empirical Analysis of Pakistan. *Pakistan Economic and Social Review*, 56(1), 121-155.
- Ali, A. and Bibi, C. (2017). Determinants of Social Progress and its Scenarios under the role of Macroeconomic Instability: Empirics from Pakistan. *Pakistan Economic and Social Review* 55 (2), 505-540.
- Ali, A., & Ahmad, K. (2014). The Impact of Socio-Economic Factors on Life Expectancy in Sultanate of Oman: An Empirical Analysis. *Middle-East Journal of Scientific Research*, 22(2), 218-224.
- Ali, A., & Audi, M. (2016). The Impact of Income Inequality, Environmental Degradation and Globalization on Life Expectancy in Pakistan: An Empirical Analysis. *International Journal of Economics and Empirical Research*, 4 (4), 182-193.
- Ali, A., & Audi, M. (2018). Macroeconomic Environment and Taxes Revenues in Pakistan: An Application of ARDL Approach. *Bulletin of Business and Economics* (BBE), 7(1), 30-39.
- Ali, A., Audi, M., & Roussel, Y. (2021). Economic Misery, Urbanization and Life Expectancy in MENA Nations: An Empirical Analysis. *International Journal of Economics and Financial Issues*, 11(5), 17.
- Ali, T. S., Ali, S. S., Nadeem, S., Memon, Z., Soofi, S., Madhani, F., . . . Bhutta, Z. A. (2022). Perpetuation of gender discrimination in Pakistani society: results from a scoping review and qualitative study conducted in three provinces of Pakistan. *BMC women's health*, 22(1), 540.
- Al-Masri, R., & Audi, M. (2026). Innovation, Trade Openness, and Green Finance: Drivers of Industrial Performance Across Countries. *Journal of Energy and Environmental Policy Options*, 9(1), 35-47.
- Alonso-Villar, O., & Del Río, C. (2017). The occupational segregation of African American women: Its evolution from 1940 to 2010. *Feminist Economics*, 23(1), 108-134.
- Amber, H., & Chichaibelu, B. B. (2023). Patterns and causes of female labor force participation: an age-period-cohort analysis for Pakistan. *Population Research and Policy Review*, 42(2), 20.
- Anees, M., & Yan, W. (2019). An overview about the challenges of urban expansion on environmental health in Pakistan. *Journal of Energy and Environmental Policy Options*, 2(3), 64-71.
- Anker, R. (1997). Theories of occupational segregation by sex: An overview. *Int'l Lab. Rev.*, 136, 315.



- Audi, M. (2024). The role of urbanization and trade in driving carbon emissions in Asia. *Journal of Energy and Environmental Policy Options*, 7(3), 23-34.
- Babic, A., & Hansez, I. (2021). The glass ceiling for women managers: Antecedents and consequences for work-family interface and well-being at work. *Frontiers in psychology*, 12, 618250.
- Bank, W. (2023). World Bank Annual Report 2023: A New Era in Development: World Bank Group Washington, DC.
- Becker, G. S. (1985). Human capital, effort, and the sexual division of labor. *Journal of labor economics*, 3(1, Part 2), S33-S58.
- Belitski, M., & Desai, S. (2021). Female ownership, firm age and firm growth: a study of South Asian firms. *Asia Pacific Journal of Management*, 38(3), 825-855.
- Beton Kalmaz, D., & Güven Lisaniler, F. (2019). Closing gender gap in education or elimination of male domination? Occupational gender segregation in north cyprus. *Hacettepe University Journal of Economics & Administrative Sciences/Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 37(1).
- Blau, F. D., Brummund, P., & Liu, A. Y.-H. (2013). Trends in occupational segregation by gender 1970–2009: Adjusting for the impact of changes in the occupational coding system. *Demography*, 50(2), 471-492.
- Borrowman, M., & Klasen, S. (2020). Drivers of gendered sectoral and occupational segregation in developing countries. *Feminist Economics*, 26(2), 62-94.
- Boudet, A. M. M. (2013). *On norms and agency: Conversations about gender equality with women and men in 20 countries*: World Bank Publications.
- Burchell, B. J. (1996). Gender segregation, size of workplace and the public sector. *Gender, Work & Organization*, 3(4), 227-235.
- Campos-Soria, J. A., & Roperó-García, M. A. (2016). Occupational segregation and the female–male wage differentials: evidence for Spain. *Gender Issues*, 33(3), 183-217.
- Chatterjee, E., Vanneman, R., & Desai, S. (2018). Indian paradox: Rising education, declining womens' employment. *Demographic Research*, 38(31), 855-878.
- Cotter, D. A., Hermsen, J. M., & Vanneman, R. (2003). The effects of occupational gender segregation across race. *The Sociological Quarterly*, 44(1), 17-36.
- Das, S., & Kotikula, A. (2019). Gender-Based Employment Segregation: Understanding Causes and Policy Interventions: The World Bank.
- Duncan, O. D., & Duncan, B. (1955). A methodological analysis of segregation indexes. *American sociological review*, 20(2), 210-217.
- Duncan, T. E., & Duncan, S. C. (1995). Modeling the processes of development via latent variable growth curve methodology. *Structural Equation Modeling: A Multidisciplinary Journal*, 2(3), 187-213.
- Ejaz, M. (2007). Determinants of female labor force participation in Pakistan an empirical analysis of PSLM (2004-05) micro data. *The Lahore Journal of Economics*, 12(Special Edition), 204-233.
- Fatima, M., Audi, M., & Ali, A. (2026). Nexus Among Financial Risks and Financial Performance: A Moderating Role of Corporate Governance. *Policy Journal of Social Science Review*, 4(1), 295-322.
- Ferrant, G., Pesando, L. M., & Nowacka, K. (2014). Unpaid Care Work: The missing link in the analysis of gender gaps in labour outcomes. *Boulogne Billancourt: OECD Development Center*, 20, 1-12.
- Horne, R. (2023). 2 Employment and social trends by region. *World Employment and Social Outlook*, 2023(1), 57-85.
- Hosney, S. H. (2016). Factors Influencing Female Labor Force Participation in Egypt and Germany: A Comparative Study. *Turkish Economic Review*, 3(3), 537-541.
- Ibrahim, J., & Simian, R. (2023). Investigating CO2 emissions drivers: Energy use, economic growth, urbanization, and trade openness. *Journal of Energy and Environmental Policy Options*, 6(1), 1-7.
- Irfan, M., Anwar, S., Akram, W., & Waqar, I. (2013). Occupational gender segregation and its determinants, an analysis of Pakistan labor force market. *American Journal of Educational Research*, 1(7), 221-224.
- Javed, M. F., Jadoon, A. K., Malik, A., Sarwar, A., Ahmed, M., & Liaqat, S. (2022). Gender wage disparity and economic prosperity in Pakistan. *Cogent Economics & Finance*, 10(1), 2067021.
- Jung, J., Kim, G., Kim, K., Paek, D., & Cho, S.-i. (2017). Association between working time quality and self-perceived health: analysis of the 3rd Korean working conditions survey (2011). *Annals of Occupational and Environmental Medicine*, 29(1), 55.
- Keane, C., Russell, H., & Smyth, E. (2017). Female participation increases and gender segregation: ESRI Working paper.



- Keats, A. (2018). Women's schooling, fertility, and child health outcomes: Evidence from Uganda's free primary education program. *Journal of Development Economics*, 135, 142-159.
- Kessey, K., & Nyarko, A. (2021). Towards Safe and Sustainable Urban Water Management: Lessons from Ghana. *Journal of Business and Economic Options*, 4(1), 10-15.
- Khalil, S., Audi, M., Ali, A. (2025). Economic Growth, Digital Access, and Urbanization: Drivers of Financial Inclusion in A Comparative Global Context. *Contemporary Journal of Social Science Review*, 3(2), 52-61.
- Khan, M. Z., Said, R., Mazlan, N. S., & Nor, N. M. (2023). Measuring the occupational segregation of males and females in Pakistan in a multigroup context. *Humanities and Social Sciences Communications*, 10(1), 1-11.
- Maqsood, F., Maqsood, S., & Raza, H. (2012). Getting higher education: Is it really a challenge for females in Pakistan? *Academic Research International*, 2(3), 352.
- Marc, A. (2024). The role of urbanization and trade in driving carbon emissions in Asia. *Journal of Energy and Environmental Policy Options*, 7(3), 23-34.
- Marc, A., Ali, A., & Poulin, M. (2026). Modelling Urban Expansion, Energy Consumption, and Environmental Sustainability: The Moderating Role of Environmental Taxes in Developing Countries. *Sustainability*, 18(9), 4473.
- Martin, C. (2025). Renewable Energy Interventions and Urban Emission Reduction: Evidence from Global Policy Instruments. *Journal of Energy and Environmental Policy Options*, 8(4), 1-13.
- Mohammadi, H. (2022). Exploring the Role of Investment, Economic Structure, and Urbanization on Energy Intensity in the MENA Nations. *Journal of Energy and Environmental Policy Options*, 5(4), 21-27.
- Naeem, A., Ali, A., Naveed, M., & Audi, M. (2026). Human Capital, Open Innovation, And Digital Engagement: Determinants Of Innovation Performance In Micro-Enterprises. *Journal of Business and Management Research*, 5(1), 1047-1069.
- Najeeb, F., Morales, M., & Lopez-Acevedo, G. (2020). Analyzing Female Employment Trends in South Asia. *World Bank Policy Research Working Paper*(9157).
- Naqvi, Z. F., & Shahnaz, L. (2002). How do women decide to work in Pakistan? *Pakistan Development Review*, 41(4), 495-515.
- Pacillo, G. (2022). Urbanization, economic growth, and equity in Sri Lanka: Trends, patterns, and policy implications. *Journal of Business and Economic Options*, 5(3), 20-25.
- Polachek, S. W. (2006). How the life-cycle human-capital model explains why the gender wage gap narrowed. *The declining significance of gender*, 1102, 102-124.
- Psacharopoulos, G., & Tzannatos, Z. (1989). Female labor force participation: An international perspective. *The World Bank Research Observer*, 4(2), 187-201.
- Sarfraz, M., Kamran, M., Khan, N. U., Khalique, M., & Andlib, Z. (2022). Targeting Women's vulnerable employment through social protection: A quasi-experimental regression discontinuity design. *Heliyon*, 8(2), e08964.
- Shauman, K. A. (2006). Occupational sex segregation and the earnings of occupations: What causes the link among college-educated workers? *Social Science Research*, 35(3), 577-619.
- Singh, S., Sharma, C., Bali, P., Sharma, S., & Shah, M. A. (2023). Making sense of glass ceiling: A bibliometric analysis of conceptual framework, intellectual structure and research publications. *Cogent Social Sciences*, 9(1), 2181508.
- Tahir, S., Audi, M., & Ali, A. (2026). Growth Dynamics of Green and Brown Foreign Direct Investment in Central and Eastern Europe: Evidence from ARDL and NARDL Models. *Policy Journal of Social Science Review*, 4(2), 810-832.
- Usui, E. (2015). Occupational gender segregation in an equilibrium search model. *IZA Journal of Labor Economics*, 4(1), 13.
- William, C. (2021). Enhancing urban transport environmental performance with technology and innovation. *Journal of Energy and Environmental Policy Options*, 4(3), 28-33.
- William, F. (2023). Sustainable Energy Solutions for Urban Residences in Australia through Hybrid Systems. *Journal of Energy and Environmental Policy Options*, 6(3), 1-7.
- Yan, S., & Sriboonchitta, S. (2024). Governance, renewable energy, and urbanization: Drivers of environmental outcomes in Asia. *Journal of Energy and Environmental Policy Options*, 7(4), 42-51.
- Zhengzheng, G. (2019). Microenterprise Activity and Poverty Reduction: A County-Level Analysis in Urban America. *Journal of Business and Economic Options*, 2(4), 179-188.