The Indian Journal of Labour Economics
https://doi.org/10.1007/s41027-025-00579-9

ARTICLE

# The Role of Socio-Demographic Characteristics on Occupational Outcomes: An Empirical Analysis of Pakistani Labour Market

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Received: 13 June 2023 / Accepted: 7 July 2025


**Abstract**
Socio-demographic characteristics play an important role in the occupational outcomes and influence the outlook of labour market. In general, studies are lacking to explore this phenomenon and particularly the context of Pakistan despite changing socio-demographic features of the country. Therefore, under the theoretical lens of demographic transition theory, the present study explores the role of socio-demographic characteristics on occupational outcomes in the labour market of Pakistan. Data of labour force survey for the year 2020–21, from Pakistan Bureau of Statistics (PBS), are analysed by using the multinomial logistic regression model. The study results show that education, training, age, gender, employment status, and living period in employed districts significantly affect the occupational choices in Pakistan. The participation of females in the labour market was found low as compared to males. In the case of marital status, unmarried have 0.68 times less probability relative to married to choose the manager's occupation as compared to the elementary occupation. Age is 0.04 times likely the factor to choose agriculture, fishery, and forestry than the occupation elementary. Education appeared to be an important determinant for occupational choice. Theoretically, the study contributes by exploring overlooked aspect of socio-demographic characteristics in occupational outcomes. Practically, under the changing socio-demographic characteristics of Pakistan, the study has important implications towards the role of the government by enhancing the opportunities for free education in the country for better occupational outcomes as well as to devise policies to encourage females for their participation in the labour market of Pakistan.

**Keywords** Socio-demographic characteristics · Occupational outcomes · Labour market · Labour force survey · Pakistan

**JEL Classification** J21 · J24 · J16 · O53 · C35

Extended author information available on the last page of the article

Published online: 20 August 2025

## 1 Introduction

Occupation is part and parcel of human life (Kielhofner 2002) and a key notion in social sciences (Haupt & Ebner 2020). Broadly, occupation is defined as "everything people do to occupy themselves, including looking after themselves (self-care), enjoying life (leisure), and contributing to the social and economic fabric of their communities (productivity)" (Law et al. 2002). Some denigrate the unproductive categories (Hammell 2004). However, in economics and business, occupation refers to the work or job, individuals do to earn their livelihood. According to the Statistics Canada (2010), occupations are the work performed in a job, which is carried out by a worker to complete the required duties.

Occupations as an indispensable part of labour supply, not only provide livelihoods to the individuals but also contribute towards the economic growth. However, socio-demographic and economic factors impact the choice of occupations. Individuals have dissimilarities in their education, strength, preferences, productivity, and skills, while such factors impact the choice of occupation. Herr and Cramer (1996) indicated that career choice is affected by certain factors, including age, gender, academic achievement, parental support, social status, and self-esteem (Ferreira et al. 2021; Herr & Cramer 1996). Therefore, it can be regarded that several socio-demographic factors impact occupational outcomes, and regarded as primary segment of the labour market (Winkelmann & Zimmermann 1998).

According to the human capital theory, education and experience affect occupational outcomes and choice (Becker & Becker 2009). In this vein, mismatch of education and occupation is the cause of unhappiness (Chen et al. 2020). Gender affects an individual's occupational choice according to their educational status. In addition to this, family characteristics and father's occupation strongly influence occupational choices (Tran et al. 2018). Additionally, Allison and Allen (1978) reported that males and females both adopt rational behaviour to select specific occupations with well-paid wages.

In this context, the essential socio-demographic determinants have crucial implications. However, the literature is fairly limited regarding the impacts of socio-demographic features. In addition, the context of the study also plays a role depending upon the socio-demographic characteristics of the society and region. The demographic dividend and transition in Pakistan over the years require to explore such factors on employment and occupations to adopt appropriate policies, which is somehow unexplored yet (Cho & Majoka 2020; Hafeez & Fasih 2018).

On parallel lines, it can be argued that in Pakistan, the labour force participation by females is significantly lower (International Labour Organization 2024). Only 50% of females participate significantly in the growth of the economy and the development of the country (Nasir 2005). As mentioned earlier, the women's labour force participation is low in Pakistan; however, it has increased to 24% in 2015 from 16% in 2002 (World Bank 2017). Similarly, it is interesting to mention that 64% of the population is below the age of 30 years (Ahmed 2018). Such demographic facts require to explore their role towards occupational outcomes.

Keeping in view the aforementioned arguments and research gap, this research considers the occupational outcomes under changing demography as the main subject of this study and attempts to explore the role of socio-demographic characteristics towards occupational outcomes in the context of Pakistan. Theoretically, based on the demographic transition theory, this study highlights the significance of such characteristics due to the demographic transition and contributes to the relevant literature by providing deeper insights. Practically, in light of the findings, this research recommends appropriate policy implications in light of the current demographic profile of the country and fills the contextual gap related to Pakistan.

This study is organised as follows. Section 2 explains relevant literature related to occupational choices to highlight and better understand the issue under investigation. Section 3 describes the data and methodology used in the study, while Section 4 provides details of the results and their discussion with appropriate interpretation. Finally, Section 5 gives a conclusion and policy recommendations to improve the socio-economic factors related to occupational choices in tandem.

## 2 Literature Review

### 2.1 Occupational Choices and Outcomes

The literature related to occupational choices provides insights to understand the related issues and current state. In this context, a study carried out by Irfan et al. (2013) gives social and economic determinants of occupational choices in Pakistan's labour market to check the seasonal disparities and found age, education, and training as significantly important determinants of occupational choice. Similarly, a few more studies found that education increases the selection chances of occupation managers over elementary occupations (Tran et al. 2018; Ferreira et al. 2021).

The characteristics and type of labour also affect such choices, as Roberts (2001) estimates determinants of choice for rural labour emigrants in Shanghai. Data of 54,372 migrants are taken from Shanghai in 1993. The results explain that 32,967 migrants are from agriculture and are about three-fifths of the abandoned population in Shanghai. It is estimated that these young workers are occupied in challenging and hard occupations like manual labour and construction. The results indicate that age, gender, education, marital status, and area of origin are the determinants of job choice. Married migrants choose any profession as compared to other workers. Faridi et al. (2009) study factors of self-employment in Bahawalpur district, Pakistan. The primary data of 494 workers are collected from the regional level. The logistic regression technique is used to find the factors of self-employment. Results explain that spouse contribution in monetary work, the dependents in the household are essential factors in decision-making for independent work. Age, experience, good health, and educational achievement have a positive and significant impact on the decision to self-employment.

On parallel lines, Sajid et al. (2011) explore the determinants in the case of married women to participate in the labour market of Pakistan. They use data of 301 married women from labour force survey 2009–10. Results show that female labour

force participation is 15.45%, and this participation is low compared to other Asian countries. Further, literacy, family system, family size, area of residence, and particularly the education of husband are the essential determinants of female labour force participation. Moreover, the family conditions due to income inflow in the form of remittances play role in the females' labour force participation (Javed et al. 2017).

An important takeaway of such findings is the assertion and the resulting impact on per capita income, productivity, and labour force participation. One recent evidence from the selected South Asian countries highlights the impact of changing demographic dividend on GDP growth rate (Jafrin et al. 2021). Likewise, Teignier and Cuberes (2014) found that gender disparity impacts per capita income, productivity, and labour force participation. Results show that the gender gaps in the enterprise and the payment of females affect aggregate productivity negatively. In addition, gender gaps reduce the share of per capita income in the labour market (Speer 2017). It is found that the differences in gender and their indirect income loss in different geographical regions have a total wage loss of 10% in North Africa, the Middle East, and Europe.

Such understanding and exploration help to adopt appropriate policy options, as Pandey (2009) finds the effect of health status on the labour participation of older Indians, with resulting impact on productivity. Hence, appropriate policies and investment in the health sector have substantial impacts. It is also worthwhile to mention that career choice is an action that includes testing, inquiry and error, decision-making, and especially judgement (Borchert 2002). The level of awareness about current occupations also plays an important role, and information provided by parents, friends, mass media are important sources, as highlighted by Petter and Suquo (2009) by taking the case of the Nigerian economy.

### 2.2 Theoretical Perspective: Demographic Transition Theory

Demographic transition theory examines the relationship between economic progress and the expansion of population. The theory postulates the evaluation of civilisations from an agricultural and illiterate society to a developed urban and literate society. The concept of demographic transition was initially introduced by W.S. Thompson in the year 1929 (Thompson 1929), while popularised by Frank W. Notestein and explained trends of deaths, births, and consequently impacts on population (Notestein 1945). In light of this theory, a country's demographic history can be described by explaining changing trends of deaths and births over time (Kirk 1996; Chesnais 2009). Importantly, the demographic transition theory is explained in five stages, while three stages are prominent to explain the demographic transition with significant relevance. The first stage is the stage of high birth rate and high death rate associated with a sluggish population growth rate. In the second stage, income begins to rise as expanded economic activity leads to a decreasing mortality rate due to improved health care and better nutrition. The third stage is the stage of declining birth rate and low death rate. In this phase, birth rate begins to decline sharply (see Fig. 1).

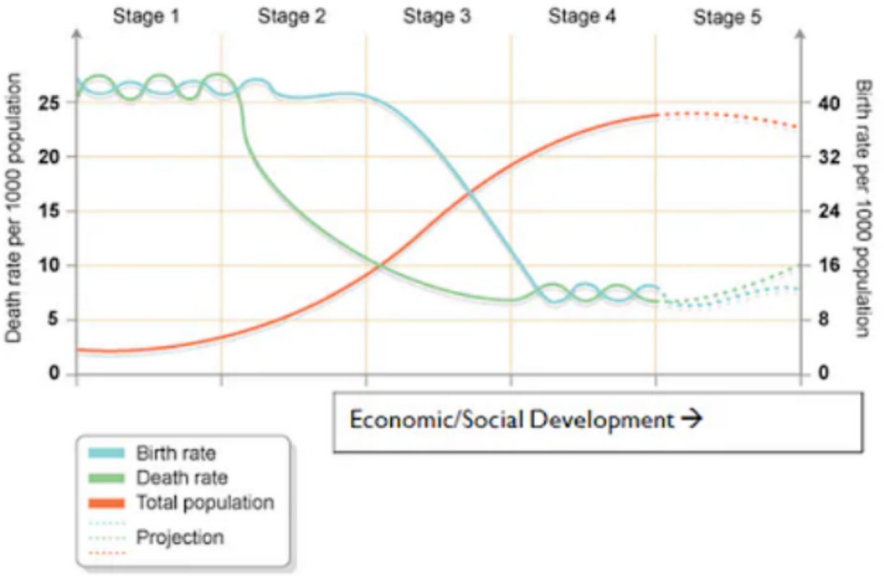


**Fig. 1** Demographic transition *Source*: Grover (2014)

This study draws on insights from the Demographic Transition Theory, which provides a foundational framework for analysing population dynamics (Chesnais 2009). The insights of this theory explain how changes in birth rates and mortality rates change the demographics of countries. Overall, the explained trends are true for most of the countries around the globe (Gagnon et al. 2021; Gu et al. 2021; Angeles 2010; Bloom et al. 2003; Kalemli-Ozcan 2003). Importantly, developing and emerging economies are also experiencing the changes of the third stage. Such a scenario impacts the demographics and labour market dynamics. These insights are the motivation for conducting this research to explore the impacts of such a demographic transition. Interestingly, many countries in South Asia are emerging economies and provide a worthwhile research context. Certain factors, such as the availability of data, dynamic nature of the landscape, and rapidly changing demographic characteristics, motivated us to investigate such impacts by considering the context of Pakistan.

## 3 Demography of Pakistan

Pakistan is a developing country, officially known as the Islamic Republic of Pakistan, located in South Asia. The neighbouring countries are China, India, Iran, and Afghanistan. According to the digital census of 2023, Pakistan is the fifth populous country globally (Pakistan Bureau of Statistics 2024). Since the first population census of 1951, the population of Pakistan has increased sixfold (see Fig. 2).

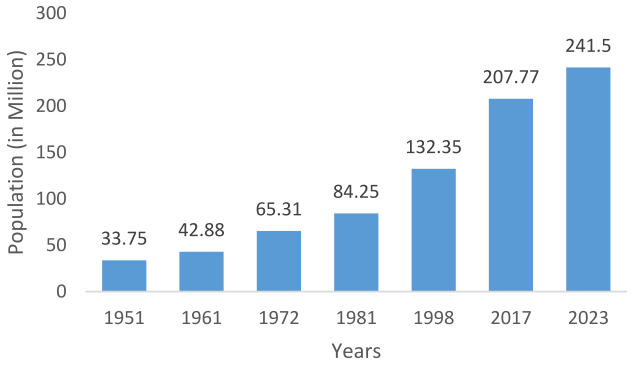


**Fig. 2** Population of Pakistan. *Source*: Pakistan Bureau of Statistics (2024)

Over the decades, Pakistan demography experienced a transition, which is based on key factors such as population growth based on decreased death rates, decreased fertility rate at the later stage, and life expectancy due to better health facilities, age classes of the population, and education levels. These changes are in line with the demographic transition theory. More precisely, such transition can be noticed in the total fertility rate (TFR). In Pakistan, TFR has reduced considerably from 6.6 births per woman in the year 1975 to 3.6 births per woman in the year 2020 (Fig. 3). Life expectancy has increased from 55 to 67 years (Fig. 4). Likewise, infant mortality rate was 204 in the year 1955, which declined to 56 in the year 2020 (Fig. 5). In light of such demographic transition, Pakistan provides a worthwhile case to explore the impacts of socio-demographic characteristics on occupational outcomes.

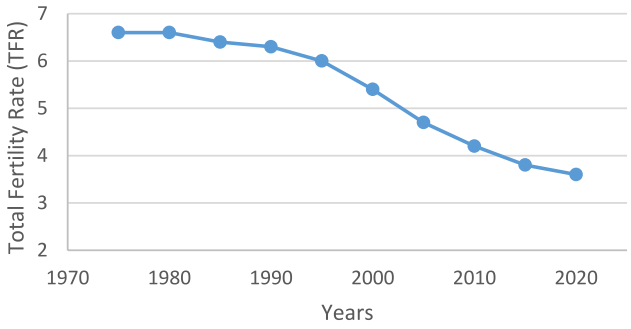


**Fig. 3** Total fertility rate of Pakistan. *Source*: United Nations Population Division (2020)

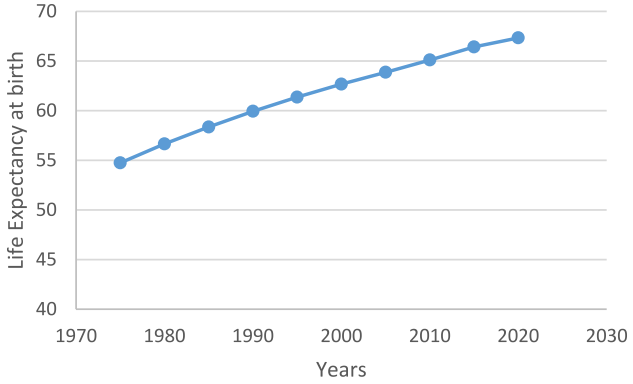


**Fig. 4** Life expectancy at birth. *Source*: World Bank (2020)

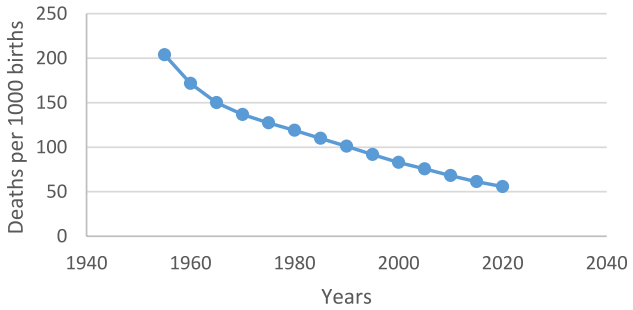


**Fig. 5** Infant mortality rate in Pakistan. *Source*: United Nations Population Division (2020)

## 4 Research Context and Methodology

The data for the empirical analysis of this study are taken from the labour force survey of Pakistan (LFSP), for the year 2020–21, conducted by the Pakistan Bureau of Statistics (PBS), Government of Pakistan (Pakistan Bureau of Statistics 2021). The PBS is a national statistical organisation of Pakistan and is mainly responsible for collecting, compiling, and disseminating statistical data. The PBS has 34 field offices located all over Pakistan with qualified staff deputed to collect primary data. The LFSP covers the four provinces of Pakistan (Punjab, Khyber Pakhtunkhwa, Sindh, and Balochistan), and enumerators collect data from both rural and urban populations.

### 4.1 Variables of the Study

In this study, the occupational choice is the dependent variable. Occupations are grouped into nine major categories. The micro-occupations are merged into a single occupation index based on the Pakistan Standard Classification of Occupations

(Pakistan Bureau of Statistics 2015). Nine dummy variables of these occupations were constructed and used in this study, as Table 1 briefly explains the classification of occupations.

The explanatory variables are; gender, age, education, training, marital status, employment status, and living period in employed districts of Pakistan. A brief explanation of these variables is given below.

#### 4.1.1 Gender

Gender plays an essential role in occupation selection. Female labour force participation is less as compared to male labour force participation in developing countries. However, the female participation rate is much better in developed countries. A small fraction of female labour force participation compared to males in the market may be due to culture, religion, or environmental reasons. Gabriel and Schmitz (2007) and Speer (2017) explained that by investigating gender gaps in occupations, American labourers indicate such type of differences. In this study, a dummy variable for gender is constructed as male = 1 and female = 2.

#### 4.1.2 Age

Age is also regarded as an important variable to influence the choice of occupations (Todd & Zhang 2020). The self-employment and entrepreneurial choices are

**Table 1** Micro- and merged occupations

| Merged occupations | Micro-occupations |
|---|---|
| 1 = Manager | The commercial and administrative managers, chief executives, legislators, specialised production services managers, senior officials, retail, hospitality, and other managers |
| 2 = Professional | Teaching professionals, health professionals, engineering professionals, communications and information technology professionals, business and administration professionals, social, cultural, and legal professionals |
| 3 = Technicians and Associate Professionals | Science and engineering associate professionals, business and administrative associate professionals, social, legal, and cultural associate professionals, communications, and information experts |
| 4 = Clerks | General clerks, recording, keyboard, material, numerical clerks, customer services clerks, personal service labours, and other clerical workers |
| 5 = Service | Personal services, sales workers, protective worker services |
| 6 = Skilled | Market-oriented agricultural skilled workers, fishery, forestry, and skilled workers |
| 7 = Craft | These are building interrelated, machinery-related, metal-related, printing handicraft, electronic, electrical craft workers, woodworking, food processing, garment related craft workers. However, electricians are excluded |
| 8 = Plant | Assemblers, Machine operators, drivers, mobile plant, and stationary operators |
| 9 = Elementary | These are assistants, labourers and helpers in agricultural, fishery and forestry, construction, mining, manufacturing, transport, food preparation, street service, and sales workers |

*Source*: Pakistan Bureau of Statistics 2015

independent of age and experience up to 40 years of age (Evans & Leighton 1990) or even 50 years of age (Evans & Jovanovic 1989). The present research has considered age as a continuous variable based on the data available through the LFSP 2020–21.

#### 4.1.3 Education

Education is a significant determinant of occupational choices. Educated people select more productive occupations, and the labour force participation rate increases with the literacy rate (Kainga 2020; Ferreira et al. 2021). Lucas (1978) explains that education reinforces the capacity of individuals to manage and increases the chance of self-employment.

#### 4.1.4 Marital Status

Marital status is also a determinant of occupational choice; particularly, it affects occupational choices in the case of women. The participation of married women in occupational choice is more general as compared to unmarried women. Rees and Shah (1986) explain that married persons are more likely to adopt an occupation than unmarried persons. Further, family background plays a role in employment. There are three categories of marital status exploited in this study, which are explained as: never married = 1, divorced and widower/widow = 2, and married = 3.

#### 4.1.5 Training

The selection of occupations is affected by training. The training also impacts the wage rate, income, employment, and working hours (Tran et al. 2018). Training significantly influences the lifetime income of the individuals based on their gained skills and expertise. Hence, training has been used as a dummy variable (i.e., Yes = 1; No = 2).

#### 4.1.6 Employment Status

Employment status can affect occupational choice directly and indirectly. It is justified that children's education is better if parents are employed. Employment status is a continuous variable in the LFSP and is used in line with this study.

#### 4.1.7 Living Period in Employed District

People move from one region to another for their livelihood, job transfer, and movement with their parents and spouse. Thus, the living period in the employed district may influence the choice of occupation because of certain implications. In this study, the living period in the employed district is a continuous variable, as mentioned in the LFSP.

### 4.2 Multinomial Logistic Model

A multinomial logistic model is used for the analysis of data. The multinomial logistic model is appropriate when dependent variable has more than two categories. It is extension of binary regression and allows to include more than two categories of dependent (Buya et al. 2020; Price et al. 2019; Lin et al. 2014).

The following econometric model is specified for the estimation of an occupational choice model in Pakistan. The functional form of this model is:

$$\mathrm{OC} = f(\mathrm{Gen}, \mathrm{Ag}, \mathrm{Ed}, \mathrm{Ms}, \mathrm{Tr}, \mathrm{Lv}, \mathrm{Es})$$

where OC = Occupational Choice, Gen = Gender, Ag = Age, Ed = Education, Ms = Marital Status, Tr = Training, Lv = Living Period in Employed District, Es = Employment Status.

The model produces the following selection probabilities

$$P_o(C_0 = 0) = \frac{1}{1 + \sum_{0=1} \exp(\propto + \beta 2\mathrm{gen} + \beta 3\mathrm{ag} + \beta 4\mathrm{ed} + \beta 5\mathrm{Ms} + \beta 6\mathrm{Tr} + \beta 7\mathrm{lv} + \beta 8\mathrm{Es})}$$

$$P_s(C_0 = 1) = \frac{\sum_{0=1} \exp(\propto + \beta 2\mathrm{gen} + \beta 3\mathrm{ag} + \beta 4\mathrm{ed} + \beta 5\mathrm{Ms} + \beta 6\mathrm{Tr} + \beta 7\mathrm{lv} + \beta 8\mathrm{Es})}{1 + \sum_{0=1} \exp(\propto + \beta 2\mathrm{gen} + \beta 3\mathrm{ag} + \beta 4\mathrm{ed} + \beta 5\mathrm{Ms} + \beta 6\mathrm{Tr} + \beta 7\mathrm{lv} + \beta 8\mathrm{Es})}$$

Here $P_o$ is the probability of an individual in the base category (occupation), and Ps is the individual's probability in an occupation other than the base. In our case, elementary occupation is a base category (occupation), whereas professionals, managers, clerks, and other occupations represent occupations other than base occupation.

## 5 Results and Discussion

### 5.1 Descriptive Analysis

Descriptive statistics of gender, training, marital status, and occupations of the respondents are important to highlight the characteristics of respondents, explained at this stage of the analysis. Gender is a dummy variable with two categories male and female. Table 2 shows the frequencies, percentage, and cumulative percentage

**Table 2** Gender

| Gender | Frequency | Percentage | Cumulative percentage |
|---|---|---|---|
| Male | 17,080 | 73.90 | 73.90 |
| Female | 6038 | 26.10 | 100 |
| Total | 23,118 | 100 | |

*Source*: Author's own calculation

of the male and female. It shows that 73.90% of the respondents are males and 26.10% are females.

Table 3 shows the training of the respondents. It shows that 6.70% of labours have formal or non-formal training. While 93.30% of labours do not have any type of formal or non-formal training.

Marital status is categorised into three groups: unmarried, widow/widower and divorced, and married. The marital status of the labours is given in Table 4. It shows that 28.90% are unmarried labours. Widow/widower and divorced constitute 2.40%. However, married labours are 68.70%. The maximum labourers who participate in labour force market are married.

Table 5 explains how many males and females are participating in different occupations, such as managers, clerks, and technical, among other occupations.

The maximum participation of males and females in the skilled occupation is 4404 and 4167, respectively. In occupation managers, 415 males and 20 females are participating.

Table 6 displays the occupational choice regarding their marital status. It can be observed that how many unmarried, widows/widower and divorced, and married labours are in occupations of managers, professionals, clerks, skilled, and in other occupation. In professional, 332 are unmarried, 983 are married, and 24 are widow/widower and divorced.

In the occupation technical and associate professionals, 114 participants are unmarried, 12 are divorced and widow/widower, and 536 are married.

Table 7 shows the training and non-training distribution of the labours by occupations. Mostly labours have no training. They have not any type of trainings like formal and non-formal. Maximum trained labours participated in craft occupation. In the occupation of managers, 14 participants are trained and 421 have no formal or non-formal training.

### 5.2 Results of Multinomial Logistic Model

The dependent variable (occupational choice) has more than two categories in our study. Therefore, the multinomial logistic model was more appropriate for analysis. The explanatory variables are both continuous and nominal. Gender, training, employment status, and marital status are categorical variables, whereas education, age, and living period in the employment district are the continuous variables in our study.

**Table 3** Training

| Training | Frequency | Percentage | Cumulative percentage |
|---|---|---|---|
| Training | 1546 | 6.70 | 6.70 |
| No training | 21,572 | 93.30 | 100 |
| Total | 23,118 | 100 | |

*Source:* Author's own calculation

**Table 4** Marital status

| | Frequency | Percentage | Cumulative percentage |
|---|---|---|---|
| Unmarried | 6677 | 28.90 | 28.90 |
| Widow/divorced | 548 | 2.40 | 31.30 |
| Married | 15,890 | 68.70 | 100 |
| Total | 23,118 | 100 | |

*Source*: Author's own calculation

**Table 5** Gender-wise distribution of occupational choice

| Occupations | Male | Female | Total |
|---|---|---|---|
| 1 = Managers | 415 | 20 | 435 |
| 2 = Professionals | 866 | 473 | 1339 |
| 3 = Technical | 579 | 83 | 662 |
| 4 = Clerks | 415 | 12 | 427 |
| 5 = Services | 3749 | 111 | 3860 |
| 6 = Skilled | 4404 | 4167 | 8571 |
| 7 = Crafts | 2710 | 595 | 3305 |
| 8 = Plant and operator | 1416 | 23 | 1429 |
| 9 = Elementary | 2526 | 554 | 3080 |
| Total | 17,080 | 6038 | 23,118 |

*Source*: Author's own calculation

**Table 6** Occupational choice distribution of marital status

| Occupations | Unmarried | Divorced and widow | Married | Total |
|---|---|---|---|---|
| 1 = Managers | 57 | 4 | 374 | 435 |
| 2 = Professionals | 332 | 24 | 983 | 1339 |
| 3 = Technical | 114 | 12 | 536 | 662 |
| 4 = Clerks | 92 | 2 | 333 | 427 |
| 5 = Services | 1068 | 48 | 2744 | 3860 |
| 6 = Skilled | 2290 | 261 | 6020 | 8571 |
| 7 = Crafts | 1208 | 72 | 2025 | 3305 |
| 8 = Plant and operator | 440 | 19 | 980 | 1439 |
| 9 = Elementary | 1077 | 106 | 1897 | 3080 |
| Total | 6678 | 548 | 15,892 | 23,118 |

*Source*: Author's own calculation

**Table 7** Occupational choice distribution of trained personnel

| Occupations | Training | No training | Total |
|---|---|---|---|
| 1 = Managers | 14 | 421 | 426 |
| 2 = Professionals | 323 | 1306 | 1339 |
| 3 = Technical | 63 | 599 | 662 |
| 4 = Clerks | 24 | 403 | 427 |
| 5 = Services | 94 | 3766 | 3860 |
| 6 = Skilled | 70 | 8501 | 8571 |
| 7 = Crafts | 863 | 2442 | 3305 |
| 8 = Plant and operator | 349 | 1090 | 1439 |
| 9 = Elementary | 36 | 3044 | 3012 |
| Total | 1546 | 21,572 | 23,118 |

*Source*: Author's own calculation

The multinomial logistic results for occupation managers compared to base category occupation, that is, elementary, are explained in Table 8. Males are likely to choose the occupation as manager that is 0.91 times more than female.

In line with the present study, Roberts (2001) found that females are likely to select white-collar jobs 0.43 more times than their counterpart males. Further, the results explain that unmarried persons prefer to select manager occupation with 0.68 times less probability than married persons. Education is also an essential factor in the occupational choice. The results explain that there are 0.80 times more chances for manager selection for educated persons than the base category. Similarly, some recent studies also found that age, education, as well as training are key factors influencing the choice of occupation (Ferreira et al. 2021; Kainga 2020; Tran et al. 2018).

The results for professionals as compared to the base category (elementary) are given in Table 9. Employment status has 0.02 times less probability of selecting professional occupation with comparison to elementary occupation.

Education is an important variable in the selection of occupation. Tamborini et al. (2015) show that education has a positive effect upon earnings and it is more valued in self-employment as compared to wage work. Results explain that education increases 0.86 times chances of choosing a professional occupation than elementary occupation. Training provides 0.90 times more chances when compared with no training. It indicates the importance of formal or non-formal training for occupational selection. The living period in the employed district significantly has no impact on choosing a professional occupation compared with elementary occupation as its probability is −0.00 showing that residence does not matter when comparing the occupations. Age has 0.05 more probability of selecting professional occupation as compared to elementary occupation. When comparing unmarried with married persons, unmarried have 0.13 times fewer chances to choose professional occupation than elementaryoccupation. When compared with married persons, divorced and widow/widower have 0.62 times less probability to choose professional occupation than the elementary occupation. Results reveal that gender is also a factor for

**Table 8** Results of the multinomial logistic model for managers

| Occupation managers | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −9.92 | 0.36 | 752.63 | 1 | 0.000 |
| Employment status | 0.37 | 0.19 | 367.15 | 1 | 0.000 |
| Lv | 0.11 | 0.02 | 26.28 | 1 | 0.000 |
| Age | 0.05 | 0.00 | 82.81 | 1 | 0.000 |
| Education | 0.80 | 0.01 | 1.72 | 1 | 0.000 |
| Unmarried | −0.68 | 0.18 | 14.55 | 1 | 0.000 |
| Divorced and Widow | −1.22 | 0.55 | 4.90 | 1 | 0.027 |
| Married is the reference category | | | | | |
| Training | 1.09 | 0.33 | 10.96 | 1 | 0.001 |
| No training is reference category | | | | | |
| Male | 0.91 | 0.24 | 13.61 | 1 | 0.000 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

**Table 9** Results of multinomial logistic model for professionals

| Occupation professionals | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −6.23 | 0.23 | 690.21 | 1 | 0.000 |
| Employment status | −0.02 | 0.02 | 1.63 | 1 | 0.201 |
| Lv | −0.00 | 0.02 | 0.10 | 1 | 0.750 |
| Age | 0.05 | 0.00 | 130.60 | 1 | 0.000 |
| Education | 0.86 | 0.01 | 2.54 | 1 | 0.000 |
| Unmarried | −0.13 | 0.12 | 1.25 | 1 | 0.263 |
| Divorced and Widow | −0.62 | 0.32 | 3.57 | 1 | 0.590 |
| Married is the reference category | | | | | |
| Training | 0.90 | 0.27 | 10.91 | 1 | 0.001 |
| No training is reference category | | | | | |
| Male | −1.41 | 0.12 | 138.93 | 1 | 0.000 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

occupational choice as males compared to females have 1.41 times less probability for professional occupation than elementary occupation.

The results of technical factor while comparing its base category (elementary) are displayed in Table 10. Interestingly, the living period in the employed district plays its role in the occupational choice of technical profession. It is found that living period in employed district is 0.04 times more likely to choose technical profession than an elementary profession. The age is 0.04 times likely to choose technical occupation as compared to elementary occupation. Employment status has 0.12 times more probability of choosing technical occupation as compared to elementary occupation.

**Table 10** Results of the multinomial logistic model for technical

| Occupation technical profession | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −6.33 | 0.25 | 620.21 | 1 | 0.000 |
| Employment status | 0.12 | 0.02 | 39.78 | 1 | 0.000 |
| Lv | 0.04 | 0.02 | 4.80 | 1 | 0.028 |
| Age | 0.04 | 0.00 | 88.89 | 1 | 0.000 |
| Education | 0.67 | 0.01 | 1.49 | 1 | 0.000 |
| Unmarried | −0.46 | 0.13 | 11.18 | 1 | 0.001 |
| Divorced and widow | −0.54 | 0.33 | 2.70 | 1 | 0.100 |
| Married is the reference category | | | | | |
| Training | 2.21 | 0.22 | 99.03 | 1 | 0.000 |
| No training is reference category | | | | | |
| Male | −0.20 | 0.14 | 2.08 | 1 | 0.148 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

Results depict that education is essential to adopt the occupation of technical field. Educated persons adopt technical profession and have 0.67 times more chances for technical occupation as compared to the elementary occupation. When we compare training with no training, trained persons are 2.21 times more likely to go in technical profession than elementary profession. Compared to married persons, unmarried are 0.46 times and divorced and widow/widower labours are 0.54 times less likely to choose the technical and associate professional occupation. Results explain that compared to females, male are 0.20 times less likely to choose the technical and associate profession than elementary occupation. Roberts (2001) finds that females are 0.43 times more likely than males chose white-collar jobs.

Table 11 illustrates the multinomial logistic estimation results for occupation clerical support workers compared to the base occupation (elementary).

Employment status has 0.48 times fewer chances in our case to select clerk occupation than elementary occupation. The living period factor in the employed district is found 0.03 times the probability to choose clerk occupation compared with elementary occupation. The age factor supports the clerk occupation, and it is 0.02 times the chances/probability for clerk occupation compared to elementary occupation. Education status is 0.71 times likely to support clerical occupation as compared to elementary occupation. Training factor is 1.64 times likely to choose the clerical support workers as compared to the elementary occupation. Unmarried are 0.33 times and divorced widow/widower are 1.24 times less likely to choose the clerical support worker occupation than the elementary occupation as compared to married persons.

Table 12 demonstrates the multinomial logistic estimation results for occupation services and sales workers compared to elementary occupation. The results explain that the chances of education is 0.42 times to select services and sales worker occupation as compared to elementary occupation. Age is 0.02 times more likely to choose the services and sales worker occupation than the elementary occupation. Training finds its role for services and sales workers, and it has 0.79 times

**Table 11** Results of multinomial logistic model for clerk

| Occupation clerk | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −6.95 | 0.42 | 266.80 | 1 | 0.000 |
| Employment status | −0.48 | 0.07 | 41.20 | 1 | 0.000 |
| Lv | 0.03 | 0.02 | 1.65 | 1 | 0.199 |
| Age | 0.02 | 0.00 | 20.34 | 1 | 0.000 |
| Education | 0.71 | 0.02 | 1.22 | 1 | 0.000 |
| Unmarried | −0.33 | 0.15 | 4.39 | 1 | 0.000 |
| Divorced and widow | −1.24 | 0.74 | 2.81 | 1 | 0.093 |
| Married is the reference category | | | | | |
| Training | 1.64 | 0.28 | 33.98 | 1 | 0.000 |
| No training is reference category | | | | | |
| Male | 1.46 | 0.30 | 22.50 | 1 | 0.000 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

**Table 12** Results of multinomial logistic model for service and sales worker

| Occupation service and sales worker | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −5.39 | 0.17 | 996.15 | 1 | 0.000 |
| Employment status | 0.43 | 0.01 | 1.470 | 1 | 0.000 |
| Lv | 0.05 | 0.01 | 19.68 | 1 | 0.000 |
| Age | 0.02 | 0.00 | 47.33 | 1 | 0.000 |
| Education | 0.42 | 0.01 | 1.06 | 1 | 0.000 |
| Unmarried | −0.12 | 0.07 | 0.58 | 1 | 0.108 |
| Divorced and widow | −0.67 | 0.20 | 10.80 | 1 | 0.001 |
| Married is the reference category | | | | | |
| Training | 0.79 | 0.20 | 15.41 | 1 | 0.000 |
| No training is reference category | | | | | |
| Male | 1.83 | 0.11 | 254.34 | 1 | 0.000 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

more chances to choose the services and sales worker occupation than the elementary occupation. It is 0.43 times more likely to choose the services and sales worker occupation when compared to base category (elementary) in case of employment status. The living period in the employed district does not play any role in selecting the services and sales worker and the elementary occupation. Married as compared to unmarried is 0.12 times more likely to choose the services and sales worker occupation than the elementary occupation. Divorced widow/widower, when compared with married, has 0.67 times fewer chances to choose the services and sales worker occupation than an elementary occupation.

Table 13 demonstrates the multinomial logistic estimation results of skilled (occupation) compared with base occupation (elementary). Males are 0.82 times less

**Table 13** Results of the multinomial logistic model for skilled

| Occupation skilled | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −5.47 | 0.16 | 1.10 | 1 | 0.000 |
| Employment status | 0.91 | 0.01 | 4.25 | 1 | 0.000 |
| Lv | −0.04 | 0.15 | 9.95 | 1 | 0.002 |
| Age | 0.04 | 0.00 | 205.20 | 1 | 0.000 |
| Education | 0.09 | 0.01 | 43.17 | 1 | 0.000 |
| Unmarried | −0.24 | 0.08 | 7.79 | 1 | 0.005 |
| Divorced and widow | −0.55 | 0.18 | 9.40 | 1 | 0.002 |
| Married is the reference category | | | | | |
| Training | 0.07 | 0.22 | 0.12 | 1 | 0.725 |
| No training is a reference category | | | | | |
| Male | −0.82 | 0.07 | 108.85 | 1 | 0.000 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

likely to select the skilled forestry, agricultural, and fishery occupation when compared with females. Unmarried are found to adopt skilled forestry, agricultural, and fishery occupations 0.24 times less likely when compared with married. We found the same results for divorced and widow/widower that they are less likely to select the skilled agricultural occupation than the elementary occupation when compared with married persons. Their probability is 0.55 times less than the married persons.

However, training and education increase the probability of choosing a skilled occupation compared with a base category occupation. Training and education increase the probabilities 0.07 and 0.09 times for skilled occupation, respectively. The age factor also increases the probability for skilled occupation, and it is 0.04 times. In contrast, the living period in the employed district decreases the probability for skilled occupation, and the value of probability is 0.04. Employment status increases the chances of selecting skilled occupations, and we found that it increases the chances 0.91 times when compared with elementary occupation.

Table 14 exhibits the multinomial logistic estimation results for craft and related workers as compared to elementary occupation. Employment status, education, and marriage have a significant impact on choosing occupations craft and related workers compared with elementary occupation. The probability values are 0.32, 0.24, and 0.28, respectively.

Table 15 expresses the multinomial logistic estimation results for the occupation plant and machine operator compared to elementary occupation. Again, employment status, education training, and marriage are significant factors in this model, and this factor increases the chances for these occupations compared with the base category.

Moreover, the study included variance inflation factor (VIF) and tolerance for multicollinearity.

These test widely used to measure the degree of multicollinearity of the ith independent variable with the other independent variables in a regression model. The value of VIF shows no correlation for all variables. The value of VIF

**Table 14** Results of the multinomial logistic model for craft and related worker

| Occupation craft and related worker | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −2.42 | 0.14 | 282.11 | 1 | 0.000 |
| Employment status | 0.32 | 0.01 | 812.34 | 1 | 0.000 |
| Lv | 0.03 | 0.01 | 6.81 | 1 | 0.009 |
| Age | 0.00 | 0.00 | 7.32 | 1 | 0.007 |
| Education | 0.24 | 0.01 | 360.57 | 1 | 0.000 |
| Unmarried | 0.15 | 0.07 | 4.33 | 1 | 0.037 |
| Divorced and widow | −0.28 | 0.17 | 2.62 | 1 | 0.105 |
| Married is the reference category | | | | | |
| Training | 3.44 | 0.17 | 390.34 | 1 | 0.000 |
| No training is reference category | | | | | |
| Male | −0.09 | 0.07 | 1.40 | 1 | 0.236 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

**Table 15** Results of logistic model for plant and machine operator

| Occupation plant and machine operator | B | Std. error | Wald | Df | *P*-value |
|---|---|---|---|---|---|
| Intercept | −5.14 | 0.26 | 378.81 | 1 | 0.000 |
| Employment status | 0.25 | 0.01 | 352.94 | 1 | 0.000 |
| Lv | 0.04 | 0.01 | 6.20 | 1 | 0.013 |
| Age | 0.00 | 0.00 | 2.82 | 1 | 0.93 |
| Education | 0.26 | 0.01 | 281.93 | 1 | 0.000 |
| Unmarried | −0.13 | 0.09 | 2.15 | 1 | 0.142 |
| Divorced and widow | −0.49 | 0.27 | 3.35 | 1 | 0.067 |
| Married is the reference category | | | | | |
| Training | 3.25 | 0.18 | 325.15 | 1 | 0.000 |
| No training is reference category | | | | | |
| Male | 2.43 | 0.21 | 123.44 | 1 | 0.000 |
| Female is the reference category | | | | | |

*Source*: Author's own calculation

indicates that there is no multicollinearity in the data if the values of VIF are less than 10. Value of VIF greater than 5 indicates that the variables are interrelated and collinear with each other. Tolerance is used as an indicator of multicollinearity. Tolerance is estimated by 1—$R^2$, where $R^2$ is calculated by estimating the independent variable of concern onto the remaining independent variables included in the multiple regression analysis (Tabachnick & Fidell 2001). The tolerance values of less than 0.20 indicate the issue of multicollinearity in the data (Menard 1995). In light of this, the tolerance values shown in Table 16 depict the absence of multicollinearity.

Similarly, the pseudo R-Square indicates the goodness of fit for the model. The estimated values of the pseudo R-Square (see Table 17) indicate the values of Cox and Snell, Nagelkerke, and McFadden are less than 1, which are required for goodness of model fit (Cox & Snell 1989; Nagelkerke 1991; McFadden 1974).

**Table 16** Multicollinearity among explanatory variables

| Model | Tolerance | VIF |
|---|---|---|
| Marital status | 0.63 | 1.58 |
| Living period in the employed district | 0.97 | 1.02 |
| Employment status | 0.80 | 1.24 |
| Training | 0.97 | 1.02 |
| Gender | 0.86 | 1.15 |
| Age | 0.62 | 1.61 |
| Education | 0.86 | 1.15 |

*Source*: Authors' own calculation

**Table 17** Estimated values of pseudo R-Square

| | |
|---|---|
| Cox and Snell | 0.723 |
| Nagelkerke | 0.743 |
| McFadden | 0.356 |

*Source*: Authors' own calculation

## 6 Conclusion

The study analyses the role of socio-demographic characteristics towards occupational outcomes in Pakistan, under the theoretical lens of demographic transition theory. The multinomial logistic regression model is used for estimation, and the data are taken from the LFSP, 2020–21. The occupational choice is the dependent variable with nine categories of occupations. The elementary occupation is placed as a base category, and other categories of occupations are compared with it while estimating the determinants of occupational choice. The occupational choice is the dependent variable, and it justifies using the multinomial logistic regression model. Education, age, gender, marital status, the living period in the employed district, and employment status are the independent variables.

Based on the results of this study, it is concluded that education increases the probability of adopting professions/occupations of high salaries and offering good well-being. Moreover, we conclude that females are inclined to choose agriculture, professional, craft, and skilled occupations compared with the base category (elementary). It is found that gender is a significant determinant of occupational choice as the results explain that job selection preferences vary across males and females. In addition, age is found to be positively related to all occupations other than plant operators. The living period in the employed district also increases the probability of choosing all occupations other than professional and skilled while comparing with the base category. In case of skilled, chance are decreased for living period in the employed district as comparison with base category. However, living period in the employed district has the same chances to choose professional as to choose the base category.

In the context of marital status, unmarried persons are more likely to choose the occupations manager, professionals, technical, clerk, skilled and services when compared with base category (elementary). The probability of widow/widower and divorced is found less to choose professional, services, craft, and plant operator when compared with base category. Married is the reference category in marital status. Employment status increases the probability to join as manager, technical, skilled, services, craft, and plant operator when compared with base category. However, it decreases the probability to join the profession related to the clerk. In light of this, we conclude that experience and employment status are also essential to get professional growth and better job positions.

The study provides important contributions. Based on the theoretical lens of demographic transition theory, the demographic dividend of countries changes. Such a changed demographic dividend, this study provides a deeper insight and enriches the

relevant body of knowledge by investigating the impact of such a demographic transition. Secondly, most South Asian countries consist of developing economies, such as India, Pakistan, Sri Lanka, and Bangladesh, among others. The same transition in such countries has impacted the economic growth rate (Jafrin et al. 2021). In light of such a changed socio-demographic scenario, how individuals choose occupations was an interesting avenue of investigation. The resulting exploration by considering the context of the Pakistani labour market also fills the contextual gap.

## 7 Policy Recommendations and Future Research Directions

The study comes up with important policy recommendations based on the results as the results show that education is a significant determinant of an occupational choice. Therefore, educational opportunities need to be enhanced by providing free education and giving essentials training to enhance the avenues related to occupational choices and increase opportunities based on the broader set of options. In addition, we found a lack of female technical institutions in Pakistan. Therefore, the government may establish more training institutes, especially female technical skills, to enhance the labour force participation. Moreover, the government may enhance the wage rate to enhance labour force participation in the country. Such policy options will positively affect the occupational choices and encourage the labour force participation of females that is low in the region.

This study uses secondary data for empirical analysis, and it is recommended for future researchers to verify the results based on primary data with robust findings. In addition, as the results indicate that labour force participation of females in low in the region makes quite relevant to explore the issue of gender discrimination, as some researchers highlighted the same phenomenon in the context of Spain (Cortina et al. 2021). Thus, provides an avenue of investigation for future researchers to see the impact of gender discrimination on occupational choices particularly in the developing countries context. Further, the study exploited cross-sectional data. Future studies can be carried out based on a set of South Asian Countries and conducting a comparative analysis. In this vein, the consideration of longitudinal data can provide deeper insights with lower bias.

**Funding** Open access publishing supported by the institutions participating in the CzechELib Transformative Agreement. This work was supported by the RVO project of the Faculty of Management and Economics, Tomas Bata University in Zlin under grant no. RO/FaME/2024/07.

### Declarations

**Conflict of interest** The authors declare that they do not have any conflict of interest with any person or organisation with regard to this research work.

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