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DEVELOPMENT ECONOMICS | RESEARCH ARTICLE

Gender wage disparity and economic prosperity in Pakistan

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Abstract: The present study is designed to examine the relationship between wage inequalities and economic prosperity in the case of Pakistan. Using provincial-level data for the years 2000 to 2020, the study estimated a multivariate regression model by employing Auto Regressive Distributive Lag (ARDL) pooled mean group (PMG) technique. The results reveal that wage inequality, government development spending, labor force participation, and human development significantly affect economic prosperity. It is concluded that gender disparity in the labor market is the main hurdle in the economic wellbeing of the masses in the country. Reducing the differences in wages will enhance overall economic prosperity. The government and private sector should take collaborative measures to reduce wage disparities between the male and female workforce. The study also suggests that government should increase development expenditure, especially on health, education, and social infrastructure, to increase economic prosperity.

Subjects: Gender & Development; Labour Economics; Development Economics

Keywords: Gender wage gap; economic prosperity; labor force participation rate; human development; development expenditure
JEL Classification: E24; J21; O15

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Atif Khan Jadoon is working as Assistant Professor at the School of Economics, University of the Punjab, Lahore, Pakistan. His areas of interest include International trade, Issues particularly related to globalization in developing countries.

PUBLIC INTEREST STATEMENT

The gender wage gap is the difference in earnings of male and female workers. In the case of Pakistan, this disparity is estimated to be 34 percent which is much higher than the global average of 23 percent. Many researchers have found that this wage gap hinders economic prosperity because it hampers women from exhibiting their full potential. It also slows down the process of human development because women, if economically sound, tend to spend more on their children's health care and education. The present research aims to empirically estimate the impact of the gender wage gap on economic prosperity in Pakistan. The results indicate that if the wage gap is decreased by 1 percent, economic prosperity can significantly increase by 4.2 percent. The research suggests some practical steps to reduce the existing wage gap like increasing the job quota for females, investing in their health and education to make them economically more productive, and stopping the discrimination in job markets.

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1. Introduction

It is the fundamental right of both men and women to have equal economic privileges, but women receive persistently lower wages as compared to men across the globe (Forum, 2020; Schieder & Gould, 2016). According to global average data released by World Economic Forum, a woman, on average, earns 77 cents compared to a dollar earned by a man. However, women's participation in the workforce has increased over the last few decades, but the wage gap continues to persist (Olsen et al., 2010). The gender wage gap (GWG) is significantly linked with the economic well-being of a country (Busse & Spielmann, 2006; Schober & Winter-Ebmer, 2011; Seguino, 2011). The present study attempts to estimate how wage inequality between male and female workers in the labor market affects the economic prosperity in Pakistan by using province-level data.

According to some researchers, the wage gap hinders economic growth as the pay gap hampers women from exhibiting their full potential (Wolszczak-Derlacz, 2013; Yasin et al., 2010). On the other hand, some researchers see this wage gap to promote economic performance in developing countries at the early stages of economic growth (Busse & Spielmann, 2006; Mitra-Kahn & Mitra-Kahn, 2008). The wage gap in export-oriented industries is considered as a booster of economic growth by many researchers, as it will improve the country's competitiveness and drop production costs, which in turn would increase exports and stimulate investment (Altuzarra et al., 2021; Antonczyk et al., 2010). However, if women operate at less than optimal potential in the economy, it will have ominous impacts on economic growth. In this case, the opportunity cost of having children goes down. The increase in the population of a country adversely affects economic growth (Bianchi et al., 2012; Horne et al., 2018; Milli et al., 2017). Furthermore, women tend to spend more on children's health and education than men. If women earn less, it hinders human capital development in a country and slows down the process of economic growth in the long run (Bryson et al., 2020; O'Neil & Hopkins, 2015; Palvia et al., 2015; Pervaiz et al., 2011).

As a developing country, Pakistan displayed a gender pay gap of 34 percent, which is more than double the global average and is one of the highest wage disparities in the world, identified by ILO's Global Wage Report (GWR) 2019. Women severely underrepresented in the labor force in Pakistan, face discrimination in the job market that eventually leads to a border of their potential (Hyder & Reilly, 2005; Mahajan & Ramaswami, 2017). According to the estimates, women constitute about 90 percent of the bottom 1 percent of the total labor force. Most women affiliate with the agricultural sector and a huge labor supply that contributes to their low level of wages.

Factors like demography and inequality on economic grounds also widen wage inequalities in developing economies such as Pakistan (H. Ali et al., 2021; L. Ali & Akhtar, 2014). The country must increase its female labor force participation to at least 45 percent of the total labor force to achieve growth targets set by the policymakers in Pakistan. (ILO, 2018). A recent study conducted by ILO predicted the economy of Pakistan to grow by almost 9 percent if it manages to narrow down the pay gap between males and females by 25 percent (M. Ali, 2015). However, the major hurdle is the lack of legislation regarding harassment and discrimination at the workplace and unequal pay.

The present situation of the trends in wages earned by male and female workers, labor force participation (LFPRT), and economic prosperity (as measured by Gross Provincial Income (GPI) per capita) in different provinces of Pakistan are presented in Table 1.

There is a fluctuating trend in provincial growth rates of income during the 2000–2020 periods. All the provinces experienced a sharp decline in growth rates of GPI during the years 2006–2010. Several factors like political instability and natural disasters such as earthquakes, floods, and terrorist attacks were at their peak in Pakistan. These events badly affected the economy. The damage that happened due to the earthquake of 2005 recovered by an estimated amount of

$3.5 billion for reconstruction and rehabilitation (Bank, 2006). In 2008, the flood ruined the crops that devastated the agriculture sector and agro-based industries.

Wages of both male and female workers increased over the 2000–2020 period due to changes in minimum wage laws. The minimum wage of workers in Pakistan rose from Rs. 4988 to Rs. 20,000 during 2000–2020 (Minister of Finance, 2006–07 & 2017–18). The difference in wages of male and female workers is still persistent over the years in all the provinces. The labor force participation rate exhibited a slight decrease during 2016–20 in all provinces except Sindh, mainly due to the outbreak of the COVID-19 pandemic. Sindh showed a minor increase in labor force participation during the pandemic mainly because the Sindh government prevented lay-offs of workers and ordered paid leaves during the situation of lockdowns.

The main objective of the present study is to assess the quantitative impact of wage disparity on the economic prosperity of Pakistan. The study is very important in the present context as Pakistan is the 3rd highest country regarding gender inequality among 153 countries. World Economic Forum's Global Gender Gap Report (2019) expressed that females in Pakistan suffer because of wage differences in many sectors. The study is novel as, to the best of researchers' knowledge; hardly any study in this area of research exists that has analyzed the association between gender wage differences and economic prosperity in the case of Pakistan. Furthermore, this study makes another contribution by employing provincial-level data to have a meaningful and thorough analysis of the issue.

2. Literature review

According to ILO (2018) women around the world are paid 20 percent less than men. This gap significantly differs across countries from as high as 45 percent to almost negligible. However, the gender pay gap has shown a declining trend in some regions compared to others. According to Gender pay gap statistics (2018), the wage gap is less in developed economies than in developing economies. The average wage gap of hourly earnings in the European Union in 2017 was 16 percent (of both male and female), which has shown an inclining trend since the industrial revolution of the 18th century, but the wage gap between males and females was always there (Arulampalam et al., 2007; Cassells et al., 2009; Sarwar & Jadoon, 2020). The GWG has narrowed over time in developed countries but at a gradual pace (Glynn, 2016; Jee et al., 2019; Kunze, 2018).

The GWG in developing economies demonstrates a further grim picture. Females are discriminated against men based on sex, color, and age, and such discrimination and ignoring their capabilities causes anger among them and affects productivity. (Fischer & Hayes, 2013; Semega et al., 2017). Religion and stereotypes also connect with wage differences, as women are perceived physically and mentally weaker than men, and men are considered as head and breadwinners of the family (Adelekan & Bussin, 2018; Glass & Cook, 2016; Horne et al., 2018). In many households, unpaid care work is considered a female's responsibility, which also determines the GWG (Luomaranta et al., 2018).

To examine the connection between economic growth and wage inequality, Pervaiz et al. (2011) constructed a composite inequality index by adding three variables namely; income, education, and gender wage inequality. Other control variables included investment and trade openness. Collecting the data from 1972 to 2009, the authors applied Vector error correction to estimate the results. The study results suggested that the composite inequality index had a statistically significant but negative impact on economic growth. Kennedy et al. (2017) tested the relationship between labor productivity and the wage gap in all regions and states of Australia. The basic contextual investigation showed that Australia's enlarging wage gap was much more significant than their created countries. A significant negative long-run relationship existed between per capita output and wage disparities. The study found that decreasing the gap by 10% could help per capita yield up to 3%. In case of ASEAN region, Bintoro (2021) found a strong negative association between GWG and economic growth of countries including Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand. It was evident from the findings that the wider the wage gap, the more

Table 1. Provincial trends

PUNJAB	2000–2005	2006–2010	2011–2015	2016–2020
GPI (growth)	2.85	2.53	2.84	2.89
LFPRT	33.37	34.12	34.67	34.55
Average Male Wages(in thousand Rupees)	5567	8520	12,385	18,563
Average Female Wages(in thousand Rupees)	4563	6899	10,490	13,437
SINDH				
GPI (growth)	2.88	2.54	2.62	2.69
LFPRT	26.54	28.37	30.28	30.58
Average Male Wages(in thousand Rupees)	7693	10,159	14,406	20,456
Average Female Wages(in thousand Rupees)	6537	9867	12,201	18,537
KPK				
GPI (growth)	2.82	2.47	2.73	2.77
LFPRT	24.6	26.57	25.43	24.72
Average Male Wages(in thousand Rupees)	5948	8319	13,665	18,367
Average Female Wages(in thousand Rupees)	5367	6899	10,490	13,437
BALUCHISTAN				
GPI (growth)	2.78	2.41	2.64	2.58
LFPRT	24.53	26.54	25.17	23.82
Average Male Wages(in thousand Rupees)	7545	11,897	16,754	21,853
Average Female Wages(in thousand Rupees)	6437	9772	13,542	19,675

Source: Labor Force Survey, State Bank of Pakistan and Global Data Lab

economic growth declined. Although most of the studies find a negative association between wage inequalities and economic growth (Anić & Krstić, 2019; McElhaney & Smith, 2017) but some studies propose that there is a positive link between the two (Schober & Winter-Ebmer, 2011). Those who claim a positive association between wage gap and economic performance make an argument that wage disparities in developing countries are better for economic growth because it reduces the labor cost of production and improves terms of trade (Mitra-Kahn & Mitra-Kahn, 2008). However, for developed countries, this gap exerts a negative influence on economic performance (Schober & Winter-Ebmer, 2011).

Wage inequalities affect the economic prosperity of a country through various channels. The most important one is its effects on the productivity of the labor force. In this regard, education is a significant factor. Wage disparity leads to a decline in the average level of educational attainment, which reduces the level of human capital (Ogundari & Awokuse, 2018). Baudino (2016) found a significant impact of human capital formation on family incomes and economic wellbeing

in China. In the case of Bangladesh, Hossain and Tisdell (2005) concluded that educational disparities are responsible for wage inequalities in the labor market. Low levels of human capital reduce economic well-being (Guarino & Borden, 2017; Van Miegroet, 2018).

Another way gender wage differences affect economic well-being is through their effects on household decision-making. Women usually spend more on children's well-being than men do. Inequality in earnings reduces the resources available for children's health, nutrition, and education (Goodman et al., 2017; Guendelman et al., 2014; Sinha et al., 2007). In the case of Brazil, Thomas (1997) used household survey data to investigate the impact of female wages on household wellbeing. The study results suggested that households where females earn a handsome amount, show better outcomes on child's health and education. On a macro level, it increases human capital formation and economic prosperity. Black et al. (2017) found that inequality in wages can also de-motivate female workers, and their participation in economic activity declines. Due to unequal wages, female share in labor force participation in developing economies is even far less than 50 percent of the total labor force and is further decreasing.

The literature review suggests that there are preliminary studies on the issue of gender wage differences and overall economic prosperity in the case of Pakistan. Some studies have measured the determinants of gender wage differences in Pakistan, but the connection between these wage differences and economic growth is missing in this regard. Furthermore, most of the studies used country-level data to conduct the analysis. The present study attempts to fill the existing gap in the literature by estimating the relation between gender wage inequalities and economic prosperity using provincial-level data for Pakistan. Based on the literature review, the following hypothesis is formulated:

Ho; gender wage inequality does not affect economic prosperity in Pakistan.

Panel data for all the four provinces of Pakistan is used to conduct the analysis, giving a more detailed and reliable account of the problem under investigation.

3. Data and model specification

3.1. Data source

A panel of four provinces (Balochistan, Khyber Pakhtunkhwa, Punjab, and Sindh) is constructed using data on all study variables for the years 2000 to 2020. The data used in the present study is taken from different sources, including State Bank of Pakistan (SBP) publications, Labor Force Survey (LFS), and Global Data Lab (GDL).

3.2. Variable description

The variables used in this study are presented in Table 2 along with indicators, the unit of variables, data sources, and references of the studies that have used these variables in their respective studies.

3.3. Model specification

The econometric model for the present study is based on the neoclassical growth theory that relates economic growth to labor, capital, and technology. This theory claims that varying labor and capital levels affect the production level and overall economic equilibrium. The neoclassical production function takes the following form:

$$Y = A\ f(K,L)$$

Where Y = level of output in the economy

K = Capital stock

L = Labor Force in the economy

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Table 2. Variable description

Variables	Indicator	Unit	Data source	References
Economic prosperity	Gross national income per capita (GNI) calculated as aggregated provincial per capita income of four provinces	US dollars	Global Data Lab (GDL). GDL collected the data from various surveys that are conducted in Pakistan like Household Income Expenditure Survey (HIES), Multiple Indicator Cluster Surveys (MICS), and Labor Force Survey (LFS)	Kennedy et al. (2017)
Wage Gap	Wage difference is measured by the ratio of female wages to male wages.	Ratio	Labor Force Survey of Pakistan. The study included data on wages in major occupational groups from agricultural, industrial, and services sectors for both male and female workers.[1]	Bintoro (2021), Kennedy et al. (2017) and Sabir and Aftab (2007)
Human capital	It is an index of education, health, and living standard	Percentage	GDL	Wang et al. (2018) and Smits and Permanyer (2019)
Labor force participation	Labor force participation measures the number of people (aged 15 and above) available for work, as a percentage of the total working age population.	Percentage	LFS	Yakubu et al. (2020)
Development expenditure	Total development expenditures of the government	Growth rate	State Bank of Pakistan (SBP) publications	Ejaz et al. (2017)

A = level of technology

Another theoretical concept of Kuznet hypothesis presented by Kuznets (1960) also connects income inequalities with economic growth. Kuznet hypothesis states that income inequalities are non-linearly related to economic growth. At the initial level of economic growth, an increase in income inequalities will boost the production of goods and services. At the later stages, the higher level of income inequalities adversely affects growth in the output. An inverted U-shaped Kuznets curve is obtained by measuring income per capita against the income inequalities. This hypothesis can be used to relate the gender income differences and income per capita (Haas & Rostgaard, 2013). On the basis of this theoretical framework, following econometric model is constructed:

$$\mathbf{lep_{it}} = \beta_0 + \beta_1\ \mathbf{gwg_{it}} + \beta_2\ \mathbf{lfprt_{it}} + \beta_3\ \mathbf{tde_{it}} + \beta_4\ \mathbf{hdi_{it}} + \mathbf{e_{it}}$$

"lep" represents the log of economic prosperity, "gwg" measures the gender wage inequalities, "lfprt" as labor force participation rate, "tde" as total development expenditure, and "hdi" as

human development index. This is a log-linear model as only dependent variable i.e. "ep" is in the log form.

4. Methodology

Pooled Mean Group (PMG) is applied based on the Hausman test. The decision regarding the choice of mean group or pooled mean group technique depends on the results of the Hausman test (Pesaran et al., 1999). If the p-value of the Hausman test is greater than 0.05, then pooled mean group method is preferred over the mean group technique. Many researchers argue that panel Auto Regressive Distributed Lag Model (ARDL) is a better technique for analysis than Generalized Methods of Moments (GMM) in the case of a larger panel (Pesaran et al., 2001, 1999). Arellano and Bond (1991) suggested using instrumental variables instead of Dynamic Fixed Effects (DFE) and Dynamic Random Effects (DRE) models because later provide inconsistent estimators of the average value of parameters except if the coefficients are indistinguishable across units. In this case, the PMG technique allows the parameters to vary across units. Pooled Mean Group permits intercepts to differ along with the group in the short-run while restricting intercepts to remain homogenous across the group in the long run. Furthermore, in the present study, N = 4 while T = 21, which means N is much less than T. In such a case, MG and GMM estimator are inappropriate, while PMG estimator gives efficient results (Asteriou et al., 2021; Erülgen et al., 2020; Yadav & Iqbal, 2021). This technique requires mixed order of integration, i.e., I (1) & I (0) of variables. The stationarity level of the variables is checked by using Panel Unit Root Tests.

4.1. Panel unit root tests

Panel unit root tests, including Levin, Lin & Chu unit root, ADF fisher unit root, and Shin &Smith unit root, are applied to check the stationarity level of the variables. Panel unit root test examines the stochastic procedure (y_{it}) for the panel of units $i = 1 \ldots . N$, and each unit carry $t = 1 \ldots .T$, time-series observations. Expression of different unit root models is as under:

Model 1: $\Delta y_{it} = \delta y_{it-1} + \varepsilon_{it}$

Model 2: $\Delta y_{it} = \alpha_{0i} + \delta y_{it-1} + \varepsilon_{it}$

Model 3: $\Delta y_{it} = \alpha_{0i} + \alpha_{1i} t + \delta y_{it-1} + \varepsilon_{it}$, Where $-2 < \delta \leq 0$ for $i = 1 \ldots N$.

Model 1 equation is without trend and without drift having a specific mean of individual units. With null hypothesis Ho: δ = 0, alternative H: δ < 0. The second model includes drift with the same null hypothesis and alternative hypothesis. The third model includes both drift and trend in the equation.

4.2. Pooled mean group estimation

PMG estimation gives consistent and efficient results as proposed by Pesaran et al. (1999). It removes the endogeneity problem by taking automatic lag selection and gives long-run and short-run results. The PMG model is as follows:

$$lep_{it} = \alpha_i + \sum_{i=1}^{p} \beta_0 lep_{i,t-l} + \sum_{i=0}^{q} \beta_1 gwg_{i,t-l} + \sum_{i=0}^{q} \beta_2 x_{i,t-l} + u_{it}$$

Reparametrizing the above equation

$$\Delta lep_{it} = \alpha_i + \Phi_i (lep_{i,t-l} - \theta_1 gwg_{i,t-l} - \theta_2 x_{i,t-l}) + \sum_{i=1}^{p-1} \lambda_{il} \Delta lep_{i,t-l} + \sum_{i=0}^{q=1} \lambda' il \Delta gwg_{i,t-l} + \sum_{i=0}^{q=1} \lambda'' il \Delta x_{i,t-l} + u_{it}$$

In the above equation "i" and "t" represent province and time respectively. "lep" represents economic prosperity proxied by log of real GDP per capita while "gwg" measures wage inequality. "x" is the set of control variables including human capital, labor force participation and

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Table 3. Unit root test

variables	levin, lin and chu		lm, pesaran and shin		adf-fisher	
	Level	First Difference	Level	First Difference	Level	First Difference
lep	0.4909	0.0094	0.2292	0.0000	0.0012	0.0000
gwg	0.0630	0.0000	0.0000	0.0000	0.0048	0.0000
tde	0.0025	0.0007	0.0001	0.0000	0.034	0.0000
hdi	0.0029	0.0000	0.0043	0.0000	0.0063	0.0001
lfprt	0.5799	0.0000	0.6358	0.0000	0.2745	0.0747

Source: Authors' calculations. Values in the table are p-values

Table 4. Lag selection

Model	Lag Specification	p-value
1	1,1	2.969
2	1,2	3.001
3	1,3	3.096
4	1,4	3.030

Authors' own calculations

government development expenditure. $\lambda_i, \lambda_i^{'}, \lambda_i^{''}$ are the short run coefficients of lagged dependent variables, while θ_1, θ_2 represent long run coefficients of GWG and control variables. Φ_i captures the speed of adjustment from short run to the long run.

4.3. Diagnostic tests

Different diagnostic tests are applied to detect the potential problems in the regression model and to check the validity of the assumptions of the model.

The presence of multicollinearity is tested by calculating the Variance Inflation Factor (VIF). If VIF is greater than 10, then the presence of multicollinearity problem is confirmed. The problem of heteroscedasticity arises if the error term is correlated with the independent variable. Error term of the estimated equation must be constant if it is not true, Heteroscedasticity is shown as:

$$E(u_i^2) = \sigma_i^2$$

The problem is tested by using Breusch-Pagan/Cook-Weisberg test. The null hypothesis of the test is that error variances are all equal. If the probability value of the test statistic is greater than 0.05, then the null hypothesis cannot be rejected. Autocorrelation is the degree of correlation among successive error terms in regression, i.e.

Table 5. Hausman test

Ho: Difference in coefficients not systematic	
Chi^2 (7)	9.02
p-value	0.0606
Decision	Reject Ho
Conclusion	PMG model is good

Source: Authors' own calculations

Table 6. Co integration results

Tests	Statistics	p-value
Modified dickey fuller	−3.4504	0.0003
Dickey fuller	−4.2181	0.0000
Augmented dickey fuller	−2.8083	0.0025
Unadjusted modified dickey fuller	−8.1924	0.0000
Unadjusted dickey fuller	−5.5498	0.0000

Source: Authors' calculations

Table 7. Empirical results

Variables	PMG	MG	DFE
Long Run			
Gwg	−0.042* (0.000)	−0.004 (.886)	−0.027** (0.037)
Lfprt	.092* (0.000)	−11.68 (0.402)	0.034 (0.327)
hdi	0.135* (0.004)	0.0817 (0.511)	0.054 (0.346)
Tde	.0185* (0.000)	.0022 (0.848)	0.132* (0.007)
Short Run			
Error Correction Term	−.71* (0.001)	−.99* (0.002)	−.89* (0.000)
d.gwg	.01174 (0.171)	.006 (0.685)	−0.157** (0.065)
d.lfprt	−.01269 (0.680)	.034 (0.179)	−0.030 (0.233)
d.hdi	−.05174 (0.675)	−.172*** (0.092)	−0.024 (0.73)
d.tde	−.00556* (0.003)	−.0019 (0.179)	−0.006*** (0.070)
Constant	−18.869 (0.001)	−0.6055 (0.445)	−0.997 (0.741)

Authors' own calculations

Table 8. Diagnostic test

Problems	Test	p-value
Heteroscedasticity	Breusch-Pagan/Cook-Weisberg test	0.9809
Multicollinearity	Variance inflation factor	1.22
Auto correlation	Breusch-Pagan LM test	0.1599

Source: Authors' calculations

$E(u_i u_i) \neq 0 i \neq j$

Breusch-Pagan LM test is applied to test for autocorrelation. The null hypothesis of the absence of serial correlation is rejected if the probability value of the test statistic is less than 0.05.

5. Empirical results

Before estimating the equations, it is important to test the presence of unit root in the variables. Results are presented in Table 3.

The Levin, Lin, and Chu unit root test checks the overall stationary level of the panel. All the variables are stationary at the level except "lep" and "lfprt", which are stationary at 1st difference. Lm, Pesaran and Shin, and ADF-Fisher tests check the separate unit root across the provinces. These tests also confirm that the variables have mix order of integration.

Based on Schwarz Information Criterion, the optimal lag length of the variables is selected to be ARDL (11,111), as shown in the Table 4.

Hausman test is applied to choose between MG and PMG techniques. Table 5 indicates that the p-value is 0.06, so the PMG model is selected.

The prerequisite for ARDL is the presence of cointegration among the variables. The null hypothesis of no cointegration is tested against the alternative hypothesis of the presence of cointegration in the panel. The null hypothesis is rejected if the p-value of the test is less than 0.05. The results of the cointegration test are presented in Table 6.

The results of different tests confirm the presence of co-integration among the variables in the model. In the next step, the long-run and short-run coefficients are estimated using the PMG method. Estimation results of the MG and DFE method are also incorporated to check the robustness of the results. The results are presented in Table 7 and diagnostic test results are presented in Table 8.

The short-run results indicate that the error correction term is negative and significant as measured by all three estimators. In each period, the convergence rate towards long-run equilibrium is 71 percent, 99 percent, and 89 percent, according to PMG, MG, and DFE, respectively. The coefficient of gender wage inequality is negative and significant only in the DFE method and insignificant in the other two methods. The human development index negatively and significantly affects economic growth only in the MG model, while its impact is insignificant in the other two models. Development spending by the government also has a negative and significant impact on PMG and DFE models. The negative impact of these variables in the short run can be because investment in human capital and government development spending is considered to be long term investments that bear fruits in the long run (Bintoro, 2021). In the long run, all the variables significantly affect economic prosperity according to the PMG estimates. As discussed in the methodology section, the PMG estimator is the best approach in the present analysis. However, MG and DFE estimates are included to strengthen the results.

The main objective of this research is to establish a link between gender wage differences and economic prosperity for Pakistan. Results of the estimated models confirm that gender wage inequality significantly reduces income per capita in Pakistan. If the coefficient of "gwg" measuring wage inequality increases by 1 unit, then economic prosperity decreases by 4.2 % in the long run. Results of the DFE model also suggest the negative and significant effect of wage inequalities on economic prosperity. The labor force participation rate significantly affects economic prosperity. An increase in labor force participation rate by 1% increases income per capita by 9.2% in the long run. The human development index also significantly relates to economic prosperity, with an increase in "hdi" of 1 percentage point resulting in a 13.50% increase in economic prosperity in the long run. Total development expenditure also contributes positively and significantly to the country's economic prosperity, as shown by the results of the PMG model. If development expenditure increases by 1%, then economic prosperity will increase by 1.8% in the long run. The DFE estimator also depicts this positive and significant relationship.

The p-value of the Breusch-Pagan test is greater than 0.05, which means Ho of no heteroscedasticity is not rejected. The P-value of LM test is greater than 0.05, indicating an absence of autocorrelation. The value of the VIF test is 1.22, which is less than 10, showing the absence of multicollinearity.

6. Discussion

The present analysis revealed that labor force participation significantly increases economic prosperity in Pakistan. A skilled labor force participation in economic activities is a beneficial factor for the development and growth of a country. It is considered to have a direct impact on the economy. It influences economic output by aggregate demand creation in the economy and thus increasing economic prosperity. These results are consistent with many research findings (Tsani et al., 2013; Yakubu et al., 2020). Pakistan has a labor force participation rate of 50.2 percent in which declined by 2.3 percentage points over the last year 2020. Pakistan is blessed with young population with tremendous talent and energy. This potential needs to be utilized by the government through providing proper training and skills enhancement opportunities in order to strengthen their role in achieving higher economic growth rates of the country.

Gender wage inequality and economic prosperity are negatively related in Pakistan. With decreases in wage inequality, economic prosperity increases, and vice versa. This result is similar to the findings of many researchers (Kennedy et al., 2017; Pervaiz et al., 2011). In the case of Pakistan, there are two reasons for gender wage differences. Firstly, the GWG is due to workers' efficiency. The wage differences mainly occur due to differences in educational status and productivity of labor. In another scenario, women work equal to men but receive less pay. It leads to discrimination based on gender and not on the ability or other professional factors (Sabir & Aftab, 2007). In such a case of discrimination in the provision of opportunities, an increase in the gender pay gap hinders economic growth (Terada-Hagiwara et al., 2018). A study by Cavalcanti and Tavares (2016) also confirmed this relation. If females get less pay than males for similar jobs, it will result in a 35% reduction in economic growth with a 50% rise in gender wage disparities.

The results indicate a strong influence of human development on economic prosperity in the country. Better status of human well-being acts as an important factor for economic prosperity, as it enhances capabilities and freedom. Better health and educational facilities for the people enhance their productivity and work efficiency. Efficient workers get higher wages and enjoy a better and more prosperous life (Afridi, 2016; Akar et al., 2021; Alataş & Çakir, 2016; Amusa & Oyinlola, 2019). Pakistan has shown a decline in human development level over the past few years, and Pakistan's position in human development declined from 147 in 2015 to 152 in 2019. The main reasons for the fall in the ranking are mainly attributed to income inequalities difficulty in access to basic facilities, including food, shelter, health, and education. To ensure economic prosperity and higher well-being, it is crucial to enhance human development in the country by providing easy access to basic facilities like health and education.

Another important factor contributing to increasing economic prosperity in the country is government development spending. The rise in government development expenditure in infrastructure development, including road networks, irrigation system developments, dams, power generation and distribution projects, education, and health sector, leads to a rise in social overhead capital. Improved social overhead capital increases output and living standards in the economy (Al-shatti, 2014; Chen et al., 2020; Dudzevičiūtė et al., 2018). In the case of Pakistan, many studies have found a strong positive association between government development spending and economic growth. Development spending by the government has played a significant role in creating basic infrastructure facilities, eminent for increased investment activities and human capital formation that leads to increased economic growth and prosperity in Pakistan (Raza et al., 2022; Zahra et al., 2021).

7. Conclusion

The present study aims to examine the relationship between the GWG and economic prosperity in Pakistan. The study uses provincial-level data on wages in major occupational groups in Pakistan for the years 2000–2020. The core variable wage inequality is measured by the ratio of female wages to male wages and the inverse of this value. An increase in this ratio tends to equalize earnings between female and male workers; therefore, inequality in earnings is captured by taking the inverse of this value. Economic prosperity, the other core variable, is measured by aggregate provincial income per capita. The study incorporates control variables like labor force participation rate, human development index, and development expenditure by the government. Pooled mean group estimation technique estimates the short-run and long-run coefficients. Estimates are generated using MG and DFE methods to check the robustness of the results. Short-run results confirmed that 71% of convergence towards equilibrium occurs in every period.

The results confirm that an increase in wage inequality significantly reduces economic prosperity in the case of Pakistan. Other factors that significantly contribute to economic prosperity, in the long run, are government development spending, labor force participation, and human development.

8. Policy implications

The results of the study have theoretical, practical, and societal implications. Results of the study are in line with the neoclassical growth model suggesting an important role of the labor force in determining the level of output per capita in the economy. Labor force participation has a strong positive influence on income per head and, hence, economic prosperity. This relation between the labor force and national income per capita is also affected by equality in earnings of female and male workers in the labor force. Discriminating attitudes and environment may discourage female labor force participation and hamper economic prosperity. The study results suggest that gender wage inequality must be reduced to promote economic prosperity. For this, government and private sector should take some practical steps. Female participation in the labor market should be encouraged by increasing their job quotas. There is a need to ensure a better quality of education and health facilities for the females to overcome the differences in productivities of both genders.

In light of the results, it is also concluded that development spending, including spending on education, health, and infrastructure, is eminent for increasing economic prosperity in the country. The government should allocate more funds towards such expenditures and ensure timely allocation of these funds. These funds will help obtain better outcomes and minimize the effects of lags associated with the implementation and effects of the fiscal policy.

9. Limitation of the study

Data unavailability for variables like personal freedom, social capital, entrepreneurship, and innovation was a major hindrance in constructing the economic prosperity index at the provincial level, which compelled the researchers to use provincial income levels to proxy for economic prosperity.

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Note

1. The study included the wage data of major occupational groups of both sexes (male and female). In the beginning, in LFS for both sexes' wages, legislators, senior officials, manager's professionals, technicians, associate

professionals, clerks service workers, shop, market sales workers skilled agricultural, fishery workers craft, related trades workers plant, machine operators and assemblers elementary (unskilled) occupations were included in major occupational sectors. Later on, sales workers were also included in major occupational sectors. In recent LFS's, the forestry sectors also merged in major occupational sectors for both gender while the remaining sector persist same in Labor Force Survey by wage group as major occupational groups and sex.

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