Macroeconomic Analysis of Women Empowerment in Pakistan

Bibi Aisha Sadiqa [1]
Imran Khan [2]

Abstract

The empowerment of women is a highly debated phenomenon in the world. Women's empowerment is not only linked with fundamental human rights but is also necessary for transitioning into developing human societies. This study examines the impact of various macroeconomic indicators namely the participation rate of females in the labor force, the Human development index, government spending on education, financial development, access to technology, and the impact trade of openness on women's empowerment by considering time series data for the period of 1990-2024. For estimation, Fully modified and Dynamic ordinary least square techniques are used. Results revealed that the Gender Inequality Index is negatively influenced by the Human Development Index, economic expansion, trade openness, financial development, and labor force participation rate of females. The findings also suggest that government spending on education and technology has a positive impact on the Gender Inequality index. However, women's empowerment in Pakistan has increased due to economic growth, trade openness, female labor force participation, Human Development Index, and financial development. On the other hand, the empowerment of women has decreased due to technology and government spending on education. It is suggested that government should increase its spending on women and girls' education and also their access to financial services. information and communication technology for reduction of gender inequality and improving the situation of women empowerment in Pakistan.

Keywords: *Women status, Financial Development, Human Development Index, Government Spending, Trade openness, Technology, Pakistan*

[1] PhD scholar, Department of Economics, The University of Haripur,
Corresponding Author's Email: aisha.eco@hu.edu.pk
[2] Assistant Professor, Department of Economics, The University of Haripur, Email: imran.eco@hu.edu.pk

Introduction

The sustainable development goals 5 and 10 stress gender equality as well as in the reduction of inequality. These cannot be achieved without the empowerment of women. Women constitute 52% population in Pakistan and almost 49% in South Asia. It is a predominantly populous region calling for more resources and women's empowerment can help in catering to the demand for goods and services (de Hann et al., 2021). In 1944's address of Muhammad Ali Jinnah shows how much he valued gender equality by quoting that a nation cannot progress until the women are side by side their men. Keeping women confined to their houses are as synonymous as prisoners and hence a crime against humanity. No sanction can be found that justify Pakistani women's deplorable condition (Nazir & Ali 2020).

Pakistani women are dominated by men in all spheres of life. Due to the patriarchal structure of Pakistani society, a distinct difference is found between women and in all sections of life such as education, health, income and employment, assets control and politics (Ashraf & Ali, 2018). The participation of women in economic activities is very limited in Pakistan. Not only there is less participation of women in labor force, but very few women possess managerial and legislative posts. In fact, according to (WEF, 2023), Pakistan remained on of the worst countries in terms of gender equality and ranked 145th out of 146 countries.

Pakistani population consists of more women (I.e. 52% as compared to 48% men). In gender parity index, Pakistan stood low and secured 153rd number among 156 countries. Pakistan ranked 143rd in health and survival, 135th in educational attainment, 145 in economic participation and 95th in political empowerment indices (WEF,2023). Pakistan ranked on 145thposition according to gender development index. Women are only permitted on reserved seats, according to all three Pakistani constitutions. Women have gained political influence ever since it became essential for them to 20% seats in the National Assembly. However, a lot of observers think that giving them a specific number of seats is improper. Women made up 4% of the National Assembly in 1997, 21% in 2002, and 22.2% in 2012–13, an increase from the 4% they made up in 1997. A third of all seats in local government are held by women, compared to 17% of seats in the Senate and National Assembly. According to 1973 constitution of Pakistan everyone is entitled to the same protection of the law and is equal before the law. There must be no distinction based on gender. Pakistan stood on 85th position in women economic empowerment, having around 200 women in parliament and the large number of women working at ministerial positions, and females serving as president for 23 years(Gul and Farooq 2020).Women were granted voting rights in Pakistan in all three of its constitutions (1956, 1962, and 1973). It was anticipated that women would have access to this right to voice their concerns. Additionally, it anticipated integrating women into current political systems. However, women still had difficulties exercising their right to vote. However, it is a frequent practice for political parties in some tribal and uneducated regions of Pakistan to jointly agree on not allowing their women to vote(Dahlum et.al 2022).Since the foundation of the state, the empowerment of women has been a part of Pakistan's national policies. The Pakistani Constitution prevents gender discrimination and gives women full rights to take part in state development.

Significance of the study

Several economics and social indicators show that women empowerment has been improved in the last 20 years around the globe. There is plenty of research that focuses on women empowerment and possible association to the development of the economy. This study is motivated by the contribution of women's empowerment in the well-being of Pakistani society. As, in Pakistan male dominancy and gender inequality is deep rooted. This study will help policy makers to set reasonable solution to women's problems in Pakistan and to improve women role

in development of Pakistan's economy. This study captures the existence problem of gender inequality and to find out factors that can affect the status of women at present. Gender inequality is a multidimensional problem. Previous studies in this context showed that higher education enable women to make better decisions, claim legal rights, economic independence, and better position in society. Education enables them to meet the challenges in the world (Agarwal, 2016). In addition to recent studies proved that financial development and credit facility would help in poverty reduction and improving the women status (Niaz & Iqbal, 2019).

Research Questions

This study asks the following research questions.

1. Whether financial development and globalization (trade openness) have significant effect on women empowerment in Pakistan?

Globalization and financial growth are essential for the empowerment of women since they increase their social position and financial prospects together (Grabe 2012; Pande 2017). Through increased availability of credit, savings accounts, insurance, financial development lead to economic empowerment of women to make investments in education, launch and expand companies, and enhance the well-being of their households (Manji 2010). In the meantime, globalization promotes cross-cultural relationships that challenge conventional gender standards, opens markets, and gives access to a variety of job options (Koggel 2003; Asghar et al., 2024). When combined, these factors make it easier for women to engage in the global marketplace, improve their financial literacy, and give them more influence over decisions made within their households and in community.

2. Whether government spending on education and access to advanced technology and education has changed the status of women empowerment in Pakistan?

Moreover, Technology and education are revolutionary tools for the empowerment of women, giving them the skills and information they need to participate effectively in the political, social, and economic realms (Shirazi 2012; Ekwughe 2020). Education improves a person's capacity for thinking critically, self-assurance, and taking decisions, which empowers women to take advantage of enhanced career possibilities, launch their own companies, and fight for their freedoms (Naz & Ashraf 2020; Shah et al., 2021; Asghar & Mumtaz, 2024). These advantages are increased by the use of computer technology (ICT), which removes geographical and socio-economic boundaries by providing digital access to international networks, monetary instruments, medical care, and education (Musingafi & Zebron 2014; Ishfaq et al., 2024). To advance greater growth in society and financial growth, technology and education interact to enhance economic independence, social standing, and active involvement in governance.

3. Whether human development and real GDP per capita are likely to affect the women's status in Pakistan?

Furthermore, Women are greatly empowered by economic progress and human development because they offer more job options, higher salary levels, good working conditions, improve financial independence and greater standard of living (Saqib 2016). Improvements in healthcare and schooling influence the full participation of women in the work force and have more decision-making power by improving their health and skill sets. Conventional gender norms change as women become more visible in business and the community, which promotes greater acceptance of women in society as well as increasing female participation in politics. But attaining equitable empowerment necessitates tackling enduring gender disparities, removing cultural obstacles, and making sure that laws efficiently assist and reach women in all spheres of society.

4. Whether working women have contributed to the economic development of Pakistan?

Playing as role models and defying conventional gender conventions, working women significantly strengthen women's contribution in economic development and reduce the gender inequality problem. Their involvement in the labor market raises their social standing overall, financial independence, and decision-making ability. This economic contribution stimulates economic expansion and development in addition to increasing income for households. Furthermore, working women frequently support improved workplace regulations that benefit all women, such as equal pay, maternity leave, and childcare assistance.

Women empowerment plays a crucial role in fostering economic growth by unlocking the potential of half the population. When women have access to education, healthcare, and equal opportunities in the workforce, they contribute significantly to productivity and innovation. Empowering women to participate in the labor market leads to an increase in household incomes, which improves overall consumption, poverty reduction, and standard of living. Moreover, women tend to reinvest their earnings into their families, particularly in health and education, creating a cycle of positive social and economic outcomes.

Research has shown that countries with higher levels of gender equality have experienced faster economic growth. For instance, when women are given access to leadership roles and entrepreneurship, the diversity of perspectives leads to better decision-making and more robust economic policies. Additionally, women's involvement in sectors like agriculture, technology, and manufacturing can diversify economies and make them more resilient.

Furthermore, addressing gender inequality can also reduce the economic costs associated with discrimination and inequality. In short, women empowerment is not just a matter of social justice; it is a key driver of sustainable and inclusive economic growth, with long-term benefits for society as a whole.

Study Objectives

This research project targets at fulfilling the following objectives:

1. Examining the relation of financial development, Real GDP pc, and globalization on women empowerment in Pakistan.
2. Determining the contribution of working women in the economic development of Pakistan.
3. To evaluate the impact of education, Human development index and access to technology on women status in Pakistan.

Review of Literature

This section describes the reviews of empirical research on the different social, economic and political aspects that affect empowerment of women in South Asian nations. In addition, the research investigated a wide range of factors in connection to women's empowerment, including government spending, HDI, trade openness, economic growth, financial resources, Labor force participation, and technology

Financial development and women empowerment

Women's empowerment depends on financial growth since it creates chances for entrepreneurship, economic independence, and better access to financial, medical, and educational resources. Financial development helps women create enterprises, manage their finances, make investments in their future, and participate more fully in decision-making, all of which promote greater gender equality and contribute to social and cultural change. In addition to helping individual women, this empowerment fosters economic growth, communal development, and shock resistance, all of which contribute to greater socioeconomic advancement and fairness. Details are the following.

Muhammad et al., (2011) accessed the impact of small loans and credits in relation to women empowerment in Pakistan by considering the data from WDI and Pakistan statistical yearbook. Co- Integration test by Johanson was used to analyze the long-term relationship among different variables like Poverty, growth, microfinance, and women empowerment. An index was used to analyze women empowerment. Results revealed that there is positive and significant relation to women empowerment and selected variables in case of Pakistan. Idrees et al., (2012) study assessed how micro finance can contribute in women' empowerment of some rural surrounding of Punjab, Pakistan. A sample of 54 women was taken through estimation and interview was tool of data collection. The result revealed that there is a positive association between microcredit and income generating activities. It was also observed that NGOs plays important contribution in improving women empowerment of female residing in rural areas by providing microcredit facility to them. Khan and Noreen (2012) also researched the likely effect of micro credit on the empowerment of women in district Bahawalpur, Pakistan. The study focused on assessing various factors that contributes to women empowerment especially the analyses of impact of microfinance. Women empowerment was measured by an index that considered child health, education, selection of spouse for their children, decision of the household savings and purchase of basic goods. It was suggested that women empowerment has influenced by husband's education, age, inherited received from father assets, micro credit facility, number of sons. It was recommended that education and family protection to women

along with provision of microfinance and its proper utilization by women must be necessary for improving their empowerment.

Rehman et al., (2015) worked on the role of Akhuwat in providing microfinance to empower women in Pakistan. Here, a qualitative approach was used to analyze the role of microfinance in improving women's socio-economic wellbeing. It was observed that microfinance has significant and positive contribution to women empowerment. It was also observed that female education their marital status, age and type of family are the factors that have significant effect on women empowerment. Siddik (2017) investigated how financial stability contributes to Bangladeshi empowerment of women. This study tried to close this gap. To accomplish the goal, 500 rural women in Bangladesh's Kurigram and Gaibandha districts participated in a study utilizing a structured questionnaire in January and February 2017. According to the study female's income, their purchasing power, improved standard of life and family standing all increased when they were financially included. Findings also showed that participation of women in financial inclusion programs, women were better equipped to cope with emergencies, give their kids good education, get opportunity for improved health facilities, and become less dependent to neighborhood moneylenders. These findings suggest that financial programs lead to economic empowerment of women.

Nanwude et al. (2018) determined the Nigeria microfinance model of financial inclusion. It was observed that financial facility significantly contributes to the empowerment of women. To achieve our goal, a descriptive survey design was used. A total of 200 questionnaires were given to the participants; of these, 190 were completed in full and utilized in the analysis. It was found that women's empowerment and microfinance banks' products like rent savings, child's education, savings account of birth and daily savings account have significant strong positive correlation. The microfinance approach was therefore viewed as a step in the right way toward increasing the financial independence of rural women. By moderating a few financial determinants in a panel of 24 chosen European nations throughout the time frame of 1990–2015, Nassani et al. (2019) observed influence of international tourist development in relation to women's empowerment. The findings demonstrated how financial intermediaries stimulated women's empowerment via foreign travel. More precisely, the promotion of (i) gender parity in university enrollment, (ii) gender parity in primary and secondary school enrollment, (iii) female employment, and (iv) women's share in non-agricultural wage work was facilitated by tourism and financial reasons. The findings provided more evidence in favor of the following theories: (i) growth-led tourism; (ii) finance-led growth; (iii) growth-stimulated women's empowerment; and (iv) tourist-induced women's empowerment beyond national borders.

Niaz and Iqbal (2019) worked on effect of microfinance on women empowerment in Pakistan. In this study Cross-sectional data from 670 respondents were taken. For analyses OLS and propensity score matching technique was used. The multidimensional poverty index has been developed to access multidimensional poverty levels of the respondents. Results revealed

that microfinance has significant positive effect on women empowerment and in poverty alleviation in case of Pakistan. Guvaju and Serpa (2020) studied the effect of micro credit on women empowerment in Nepal. Data were collected from women of Kathmandu region on different demographic and socioeconomic variables. Analysis was done through ANOVA, Correlation method and through multiple regression. It was found that microfinance facility had increased women confidence and improved their living standard. Aziz et al., (2022) looked for a relationship between financial inclusion and women's empowerment. For eight South Asian nations data spanning the years 2004 to 2017 were used. According to the study's findings, financial inclusion has positively impact on women's empowerment. Asaleya & Strydom's (2023) investigated the effects of the interaction between empowerment of women and financial development (FD) on economic growth and employment. The findings showed no appreciable long-term interaction between WE and FD on output and employment in LMIC and LIC. These interactions in UMIC are significant, but the coefficient > 1. Moreover, the causality relation between WE and economic growth was found in case of UMIC. Furthermore, FD directly influences growth in LMIC whereas WE directly affect employment in LIC.

Associated between women's political empowerment and financial development for forty-three African countries between 1995 and 2018 was experimentally studied by Ekoula et al., (2023). The results demonstrated that women's participation in politics fosters financial development on both fronts, though financial institutions are more strongly impacted. Additionally, transmission mechanisms reveal that women's political involvement influences financial development via channels related to democracy, control over corruption, and human capital. By working on panel data covering the time span for 2004–2019, Arshad (2023) sought to empirically investigate the relationship between financial inclusion and women's empowerment in developing nations. Results supported that financial inclusion typically had a favorable impact on women's empowerment. It was discovered that a nation's greater financial inclusion helped women by making them strong and financially independent. promote women's empowerment in developing nations, thus this study suggested that the countries thoroughly examine and reevaluate the best financial inclusion initiatives available. The relationship with worldwide tourism, economic expansion, financial growth, and monetary inclusion on women's empowerment considering panel data from 15 MIC Countries between 1995 and 2017 was experimentally studied in Ahmed et al., (2024) study. The findings demonstrated a robust correlation between these variables and women's empowerment, with evident ramifications for independent contractors and women who participate more in the manufacturing and service industries. These elements are especially crucial while considering women's employment situation generally. The analysis demonstrated how, in upper middle-class nations, financial development, economic expansion, overseas travel, and financial inclusion may all support women's empowerment.

H_1: Financial development may have significant impact on women empowerment in Pakistan.

Economic Growth and Trade Openness on Women Empowerment

Women empowerment is greatly impacted by economic growth and trade openness because they lower obstacles and create opportunities for women. Economic expansion can result in greater employment possibilities and earnings, enabling women to become financially independent and make investments in healthcare and education. Their social standing and ability to make decisions are improved by their financial security. Access to international markets is facilitated by trade openness, which in turn encourages women to engage in a range of economic activities, including entrepreneurship. Additionally, it may result in the enactment of labor laws and social norms that are more progressive and enhance the rights and working circumstances for women. When combined, these elements support an atmosphere in which women can prosper, advancing socioeconomic advancement and gender equality in general. In the detail provided below, prior research is discussed.

Bushra and Wajiha (2013) accessed the determinants of women in Pakistan. The data were taken from 200 females from two renowned colleges of Lahore in Pakistan. Results revealed that contents of education, poverty, economic participation, and economic opportunities available to them increase women empowerment. This study supports that economic opportunity play a vital role in raising the status of Pakistani women. Sohail (2014) investigated the following study question: Did the economy grow as a result of women's empowerment? Thirty female participants with positions of greater responsibility in the education, banking, and transportation industries filled out questionnaires. The participants were asked open-ended questions and provided with demographic information. One of the open-ended questions asked was, "Did you agree that women should have more authority?" "What do you believe to be the primary obstacles to women's empowerment?" Did you believe that the economy developed as a result of the empowerment of women? "What recommendations do you have for women's empowerment?" The results showed that men were unwilling to empower women and instead desired to hold onto their position of dominance. For prosperity to come to society, men and women had to cooperate. Women needed to be self-assured and speak up for their rights. It was believed that women's empowerment was crucial to the growth of the economy.

Mujahid et al., (2015) examined the dimensions of women empowerment in Pakistan. This study supports the contribution of social, economic, and political factors in empowering women in Pakistan. It was concluded that there is a dire need to developed social sector i.e. health and education. Government should develop gender sensitize policies and there is a need of coordination among different department like women division and ministries at local, provincial, and national level. Due to patriarchal system women representation in political system is negligible. Similarly, their ratio in jobs is also nominal. Using time series data covering the years 1999–2014, Saqib (2016) examined the long-term connection between women's empowerment and economic growth in Saudi Arabia. The findings demonstrated a strong, positive correlation over time between women's empowerment and economic expansion. The results thus validated

the central hypothesis that long-term economic progress in the nation was encouraged by women's empowerment. Employment of women used as a gauge of economic growth. Firmansyah & Sihaloho (2021) examined the ways in which Indonesia's economic development could be bolstered by a rise in women's economic engagement. The panel data regression analysis, which used information from 34 Indonesian provinces between 2014 and 2018, revealed a significant correlation between the number of women who were empowered and the gross regional product. The life expectancy of women has a favorable impact on the GDP of the region. The proportion of women in the population has a favorable impact on the gross regional product. All three of the independent variables that were employed in this model as predictors had a substantial impact on Indonesia's gross regional product.

Kumar et al., (2021) explored the impact of international remittances on household welfare and women empowerment in Bangladesh. Linear regression analysis was applied to obtain the results. Results showed that remittances have positive impact of economic welfare but no influence on women empowerment in the study area. The primary engine of long-term economic growth, technical advancement, was the subject of Dahlum et al.. (2022) investigation into the relationship between women's political empowerment and technology. In our argument, three dimensions of empowerment—descriptive representation, civil liberties protection, and civil society participation—promote technological change and, consequently, economic growth by (a) raising the quantity and variety of new ideas entered the economy and (b) enhancing the selection of more effective ideas. We explore some consequences from our thesis using data spanning 221 years and 182 nations. Following economic growth, women's political empowerment is positively correlated. Based on the World Bank income groups, Asaleye & Strydon (2023) examined the impacts of the interaction between women's empowerment (WE) and financial enhancement (FD) on employment and economic growth. The results demonstrated that, in LMIC and LIC, the combined effects of WE and FD on employment and output were not statistically significant over the long term. The coefficient was less than one even though these interacting effects were significant in UMIC. Furthermore, the UMIC causality result demonstrated a feedback relationship between economic growth and WE. Whereas WE directly impacted employment in LIC, FD directly impacted growth in LMIC.

Tetteh et al. (2024) looked at 45 African countries' experiences with economic globalization (EGLO) and women's economic empowerment (WEE) between 2005 and 2020. The EGLO variable was broken down into trade and financial globalizations for analytical purposes in order to look at each one's unique effects on WEE. The findings demonstrated that WEE was greatly aided by general EGLO, trade globalization, and financial globalization. The study also showed that WEE was accelerated by female labor force involvement and human development. The goal of Setyaningrum et al. (2023) was to elucidate the part that entrepreneurial skills and absorptive capacity play in bolstering women's leadership towards achievement. Three Indonesian provinces were the sites of this study, which involved 114 female

MSME (micro, small, and medium-sized firm) owners. A structural equation model and the SmartPLS software package were employed in this study. The study's findings demonstrated how women's leadership toward profitable business was enhanced by their capacity for absorption and their entrepreneurial skills. The impact of women's leadership on successful entrepreneurship was not mitigated by city or age.

H_2: Real GDP per capita and trade openness may have significant impact on women empowerment in Pakistan.

Labor Force and HDI Effect on Women Empowerment

Additionally, the labor force and HDI play a significant role in promoting women's empowerment. Khan (2016) analyzed cultural and political assessment of women's conditions in Pakistan. In this study the researcher has analyzed different poverty alleviation programs in empowering Pakistani women. The study found that poverty alleviation programs remain unsuccessful in empowering women in context of Pakistan. There is need to change social structure and mind change of men towards women at home and at workplace. Although, different NGOs are working for women empowerment, but they are facing efficacy due to cultural norms and socio and political structure in Pakistan.

Husain (2016) conducted an empirical investigation to validate a nonlinear quadratic U-shaped function that links Bangladesh's economic growth with female labor force participation rate between 1991 and 2012. When the increase in per capita energy consumption was considered as a stand-in measure of economic progress, the outcome held up well. The increasing share of the U-curve in Bangladesh can be attributed to the active involvement of women in the industrial and service sectors. Within the agricultural sector of the economy, women continued to be economically active. The discouraged worker impact was subordinated to the extra worker effect. Women of all marital statuses entered the labor force. The percentage of women in the labor force increased economic growth. Data from the 1991–2011 Census of India were utilized by Mahata et al. (2017). In addition to examining the advancement of women's empowerment in the state of Haryana, this article looked at regional differences in the sex ratio, female labor participation, and literacy rate. Incorporating people's engagement and a holistic approach, the report proposed focusing more intently on issues related to women's empowerment through improving education, workforce participation, and social participation. Using panel data analysis, Razmi et al. (2018) investigated the impact of women's proportion of parliamentary seats on the Human Development Index (HDI) in a subset of Organization of Islamic Cooperation (OIC) nations between 1999 and 2008. The findings showed that women's representation in parliament had a considerable positive impact on these countries' HDIs.

Ashraf & Ali (2018) analyzed the effect of socioeconomic wellbeing on women status in Pakistan by following the data for the period of 1980-2014.The dependent variable was gender inequality and explanatory variables were HDI, Globalization, financial development and

secondary school enrolment. ADF test, PP test and generalized least square test were used to check the stationarity of data. Auto regressive distributive lag model was used to check the Co integration among variables. VECM is used for short term results. The results proved the co-integration among variables. It was found that globalization and economic deprivation have significant and negative long run relationship with women status in Pakistan while HDI and secondary school enrolment have significant and positive relationship with women status in Pakistan. However, financial development proved significant and negative relationship with women status. Abbas et al., (2019) worked on women empowerment in south Asia and role of women in economic development of Pakistan. The study explored the condition of women in different countries of South Asia also in Pakistan. It was concluded that despite cultural barriers women and social norms South Asian countries are now securing women's rights in their constitution. In South Asian countries the opportunities for women participation have increased in social, economic, and political system. In Pakistan the women participation in all spheres of life has improved by the time. In the last decade majority of Pakistani women are performing in social, economic, and political sectors and their contribution is recognized by society. The study conducted by Hah and Riaz (2021) examined how education and labor force involvement impact women's empowerment in Pakistan. They used the Ordinary Least Squares (OLS) method for econometric analysis to gather primary data from 200 female respondents in the Khanewal district. These women supported their families financially by working side by side with the family members. The study concluded that women's empowerment was favorably influenced by the respondents' age, labor force involvement, education, and the education of the head of the family (father/husband). On the other hand, there were a lot of options for women to live in cities in terms of employment, education, and infrastructure.

H_3: Human development index and female labor force participation may have changed the gender inequality and role of women in economic development of Pakistan.

Government Spending and Technology Effect on Women Empowerment

Shoaib et al., (2012) worked on education and women empowerment at household level in Rural Chiniot in Pakistan. In this study 113 women were sampled from four villages of tehsil Chiniot from Punjab. The study found a positive relationship between education and women empowerment at household level Quereshi and Shaikh (2007) worked on women empowerment and health and the role of Institutions of power in Pakistan. The study discussed the women empowerment and health within the framework of four institution i.e. family, community, healthcare system and state in Pakistan. It was concluded that serious efforts are needed by all the institutions to empower women in our country. Ali and Ahmad (2009) identified factors hampering in women empowerment in agricultural decision making and extension work in District Okara, Punjab, Pakistan. It was found that majority of women were illiterate, having low income i.e. less than one lace and having small landholdings. Large proportions of women faced

constraints in accessing the extension worker services due to socioeconomic and political issues. It is needed that these constraints should be addressed on priority basis to empower women in rural areas of Pakistan.

Abrar-ul-Haq et al., (2017) worked on decision making ability as source of women empowerment among rural women in Pakistan. A cross-sectional survey conducted in 24 villages from three divisions of Southern Punjab i.e. Bahawalpur, D.G Khan and Multan was conducted. The results revealed that women have low decision-making ability in the studied area at the household level and the society at large. Jabeen and Jabeen (2013). Worked on women empowerment and socioeconomic development in case of Pakistan. They described that women are not given due importance and gender-based violence is deep rooted in Pakistani society. At the time ineffective implementation of law and legal support for women's rights is lacking in our environment. Abrar-ul-Haq et al., (2016) examined the relationship between women empowerment and education. Primary data were taken from women of southern by using multistage sampling technique. The results revealed that main determinants of women empowerment are education, socioeconomic condition, and structure of family. Ali and Akhtar (2012) discussed empowerment and political mobilization of women in Pakistan. They described that women in Pakistan have less role in politics due to low skill and education. Traditional norms and social and economic constraints restrict their role as active agent in society.

Khurshid (2017) analyzed how educated women have access to valuable opportunities in public domain. The data were collected from female teachers in rural areas from low-income communities of Pakistan. It was found that education empowered women universally and produce new gendered opportunities as well as regulations for women. Noor et al., (2021) described a comparison between women entrepreneur and full-time housewife in Pakistan. The data were collected from120 women from main cities of Pakistan, the target population were entrepreneur women and housewives. The results revealed that entrepreneur women are more empowered i.e. financial independence, strong decision-making ability and fewer mobility issues as compared to housewives. Although entrepreneur women were facing many obstacles like lack of government support, market awareness, less education of entrepreneurs and complicated credit procedure from banks. Naz and Ashraf (2020) analyzed the relationship between higher education and women empowerment in Pakistan. The study was conducted in central Punjab. Data were taken from 200 respondents of four renowned universities of Punjab i.e. University of Lahore, University of Gujrat, Minhaj University and University of Management and Technology Lahore.50 respondents were selected from each university by using stratified random sampling technique. Data was analyzed through descriptive and inferential statistics. It was found that there is strong correlation between higher education and women empowerment. Correlation was found between higher education and decision-making ability, economic independence, political participation, respect, and self-esteem.

Baig et al., (2018) described the impact of women empowerment on rural development in Southern Punjab, Pakistan.120 females were interviewed from district Muzzafgharh of Punjab region. The data were analyzed using Ordinary least square method. It was found that self-esteem, decision making ability and mobility of women were significant factor for rural development while control over resources was found insignificant. It was recommended that educational attainment and job opportunity play a significant contribution to women empowerment. Also access to media and information are also very important for women empowerment in Pakistan. Ali et al., (2010) examined cultural barriers in Women empowerment in Pakistan. The data were taken from married working women in Multan through purposive sampling technique. Results revealed that family environment and background, approaches towards cultural norms, enlightened attitude, and dissatisfaction with jobs and media violence are significant factors towards male dominance and discrimination towards women in Pakistan. It was found that biased attitude and stereotype of female subordination are main hindrance in women empowerment in Pakistan. Khan and Awan (2011) determined women empowerment and its determinant in Pakistan. They used PSLM data for the year 2005-2006 covering 15,453 households. Results suggested that socioeconomic status, level of education and employment status are factors that explain the varying degree of women empowerment in Pakistan. It was also found that different geographical region and socioeconomic conditions of the household may have effect on women status in Pakistan.

Chudary et al., (2012) studied women empowerment in Pakistan with special reference to Islamic viewpoint. A primary data was taken from females of southern Punjab. By using the regression analysis results were obtained that revealed that Islam as religion ensures maximum women's rights. Islamic concepts are more influenced by women's. education of their household members, access to media, health facilities and number of household members. Sohail (2014) explored women empowerment and economic development in Pakistan. For this purpose, primary data were taken from thirty females working at high position in banking, education, and transport sector. It was observed that women empowerment contributes to economic development of Pakistan. It was also observed that men want their dominancy and are not in favor of women empowerment. It was suggested that both men and women should work together to develop our economy. Chudary et al., (2012) analyzed different approaches to women empowerment in Pakistan. The study considered data from 1996-2009 in Pakistan. Empirical findings revealed that sensitization of women about their rights, economic empowerment of women and overall development of women have significant and positive impact on women empowerment goal as measured by gender empowerment measure. Ghoush et al., (2021) studied women empowerment through agriculture in Champainwabganj, Bangladesh. A pre-structured questionnaire was designed to collect data from 120 respondents from randomly selected four villages Babudying, Hossaindying, Ramjibonpur and Thakurjobon of district Champainwabganj. The findings revealed that majority respondents had positive attitude towards women empowerment (70%). Most respondents were low to medium empowered 96.7% with high

minimal empowered (3.30). It was suggested that the government should take proper steps to ensure women's rights.

H_4: Technology and government spending may have changed the gender inequality and role of women in economic development of Pakistan.

Research Gap

Gender inequality and women's empowerment have been extensively researched worldwide. Empirical studies on the impact of microfinance on women's empowerment in Pakistan were conducted by Muhammad et al. (2011), Khan and Noreen (2012), Idress et al. (2012), and Rehman et al. (2015). Siddik (2017) looked on Bangladeshi women's empowerment and financial stability. Furthermore, the relationship between financial inclusion and women's empowerment for Nigeria was empirically studied by Nanwude et al. (2018) and Ananwude et al. (2018). Another study that empirically examines Pakistan's economic productivity and women's empowerment is that conducted by Bushra and Wajiha (2013), Sohail (2014), and Mujahid et al. (2015). Further research has examined the effects of trade and economic porducitity on women's empowerment in various nations. Kumar et al. (2021) for Bangladesh, Saqib (2016) for Saudi Arabia, Firmansyah & Sihaloho (2021) for Indonesia, and Tetteh et al. (2024) for 45 African nations. Other studies, such as those by Shoaib et al. (2012), Quereshi and Shaikh (2007), Ali and Ahmad (2009) for Pakistan and Ghoush et al. (2021) for Bangladesh examined the impact of education on women's empowerment in various nations. All the past research done on women empowerment solely in the context of single nation using primacy data and micro data. However, few panel studies are also found on this topic using macroeconomic variables like globalization, technology advancement and human development index.

Contribution of Study

This study highlights the status of women in economy of Pakistan and their contribution to the region by considering macroeconomic variables like Human Development Index, financial development, Economic growth, government expenditure on education, female labor force, technology and trade openness of women empowerment. The study used time series data for the period of 1990-2024.

The study in hand is a pioneering effort to analyse the issue of women empowerment over the space and over the time in Pakistan. The key derivation would help to provide the glimpses of women deprivations across regional and country level that may help in decision making regarding the issue of gender inequality and to make favourable policies to raise the women status in Pakistan.

The SDG 5 for Pakistan, achieve gender equality and empower all women and girls, will also be the focus of the study. To empower women in Pakistan, the study considers variables

including trade, financial resources, growth, women's labor force participation, technology, and education.

Methodology and Data

This section provides an explanation of the study's theoretical framework, models, different econometric methodologies, and data collection sources.

Theoretical Framework

The study highlights the inherent complexity and consequents measuring limitations of these dimensions by outlining some of the popular theories of women's empowerment. In one of the first models of empowerment, Friedmann concentrated on three aspects: political power (access to decision-making processes), psychological power (personal growth), and social power (access to resources required to produce a living, information, skills, and involvement in social organizations) (Das et al., 2023; Kim &Standal 2019).

A wide range of tactics targeted at enhancing women's well-being and promoting gender equality are included in the welfare approach to women's empowerment. To address the socioeconomic needs of women, this approach highlights the significance of social policies and interventions. These include investments in healthcare and education to improve women's capabilities, gender-sensitive policies and programs to encourage women's participation in decision-making, and social protection measures to lessen vulnerabilities like poverty and violence. The welfare approach places emphasis on social justice and equality, with the aim of empowering women to fully engage in social, economic, and political life and challenging systemic inequities. This strategy contributes to the construction of a more inclusive and equitable society as well as sustainable development (Moser 1993; Razavi et al., 1995; Tasli 2007).

In the 1970s, the Women in Development (WID) approach to women's empowerment emerged due to the realization that development initiatives sometimes overlooked the contributions and role of women. To improve women's productivity, involvement, and access to resources, the WID approach places a strong emphasis on incorporating them into development processes as active agents as opposed to passive beneficiaries. This strategy recognizes that women's empowerment is crucial for accomplishing sustainable development goals and promotes gender mainstreaming in development policies and activities. The WID strategy aims to reduce gender inequities and contribute to more equitable and inclusive development outcomes by promoting women's access to economic opportunities, healthcare, education, and decision-making (Boserup 1970).

The equity approach to women's empowerment is centered on eliminating systemic injustices and gender-based discrimination to achieve justice and fairness. To guarantee that women, have equal access to healthcare, work, education, and decision-making, this strategy

places a strong emphasis on the redistribution of opportunities, resources, and power. The equity approach acknowledges that to empower women, social norms and institutional impediments that uphold gender-based inequality must be challenged and destroyed. It advocates for social justice, human rights, and gender equality in policies and actions, with the goal of building a more inclusive and equitable society for all (Sen 1999).

To support women's empowerment and gender equality, the anti-poverty approach to women's empowerment focuses on reducing poverty among women and their families. This strategy emphasizes that women are disproportionately affected by poverty because of inequities in resources, career prospects, and educational chances. The anti-poverty approach seeks to improve women's economic independence, social status, and general well-being by focusing poverty reduction techniques (i.e., microfinance projects, skills training programs, and social security schemes) specifically on women (Kabeer 2001).

The efficiency approach to women's empowerment is centered on increasing women's production and efficiency to foster development and economic growth. This strategy places a strong emphasis on granting women access to resources, education, and skill development to optimize their economic contribution. The efficiency method aims to unleash women's potential as agents of economic growth and poverty alleviation by lifting their productivity and labor force participation rates (Schullz 1995).

Model of Study

The following model will be used

$$lnGII_t = \alpha_0 + \alpha_1 lnY_t + \alpha_2 lnHDI_t + \alpha_3 lnFLFPR_t + \alpha_4 lnGS_t + \alpha_5 lnFD_t + \alpha_6 lnTO_t + \alpha_7 lnTech_t + \in_t$$

This study considers different socioeconomic indicators that can affect the women status and its role in economic development in the study area. Here Education is the main factor which does effect women empowerment therefore Human Development Index is focus which consider education, life expectancy and income. Gender equality is closely related to female labor force participation (Naqvi &Shahnaz,2002). Thus, Education and female labor force participation and overall women's development raises women empowerment (Chaudhary et.al,2012). This study considers Trade openness (TO), Human development index (HDI), financial development (FD), technology, female labor force participation rate (FLFPR), real GDP per capita (RGDPPC)and government spending (GS) to analyze the women empowerment and its role in economic development of the region.

Table 1: Variables of the Study

Variable	Measurement Unit	Expected Sign	Source	Data Source
Women Empowerment	Gender inequality Index			WDI 2023
HDI	Human Development Index	Positive link between HDI and women empowerment	Ashraf & Ali (2018)	
Trade	Trade (% of GDP)	Positive link between trade and women empowerment	Saqfalhait et al., (2023)	
Real GDP	GDP (constant 2015 US$)	Positive link between economic growth and women empowerment	Sohail (2014)	
Financial Development	Domestic credit to private sector (% of GDP)	Positive link between financial resource and women empowerment	Rehman et al., (2015); Guvaju and Serpa (2020)	
Female labor force	Labor force participation rate for ages 15-24, female (%) (modeled ILO estimate)	Positive link between female labor force and women employment	Khan and Awan (2011)	
Government spending	Government expenditure on education, total (% of GDP)	Positive link between education and women employment	Khan and Awan (2011); Naz and Ashraf (2020)	
Technology	Access to clean fuels and technologies for cooking (% of population)	Positive link between technology and women empowerment	Abbas & Muneer (2019)	

Econometrics Techniques

This section of the study will discuss the econometric methods that will be used, such as the Engle-Granger co-integration approach for estimating co-integration among variables, the Johansen co-integration analysis, and the Augmented Dickey-Fuller (ADF) test for unit root analysis. Lastly, the impact of explanatory variables on dependent variables will be estimated using the Fully Modified Ordinary Least Squares (FMOLS) technique in this work.

Unit Root Test

When a time series' statistical property is 1, it is said to be non-stationary and to be exhibiting a random walk behavior. This is known as the unit root of the series. The series may not mean reverting if there is a unit root present, indicating a long-term trend. When determining whether a time series has a unit root or is stationary, unit root tests—like the Augmented Dickey-Fuller (ADF) test—are utilized. The series is thought to be stationary and not show a unit root if the null hypothesis of a unit root is rejected, which means it is appropriate for additional econometric analysis (Dickey & Fuller, 1979).

A statistical test called the Augmented Dickey-Fuller (ADF) test is used to find out if a time series had a unit root, which would indicate that the series is non-stationary. The following is how the test is designed.

$$\Delta GII_t = \alpha + \beta_t + \gamma GII_{t-1} + \delta 1 \Delta GII_{t-1} + \delta 2 \Delta GII_{t-2} + \cdots + \delta p \Delta GII_{t-p} + \varepsilon_t$$

In this case, the time series variable at time t is represented by GII_t. ΔGII_t represents the differenced series, or GII_t first difference. Intercept word is α. βt stands for the trend element. On the lagged level of the series, γ represents the coefficient. The coefficients on the lagged differences of the series are 1, 2…,δ1,δ2,…,δp. The error term, εt, is presumed to be noise.

The series' unit root, which denotes non-stationarity, is the null hypothesis of the ADF test. The series could be stationary, which is the other possibility. The null hypothesis is rejected or not based on a comparison of the test statistics with crucial values derived from the Dickey-Fuller distribution.

Co-integration

The long-term equilibrium relationship between non-stationary time series variables is described statistically by the notion of co-integration. In econometrics, co-integration implies that a linear combination of time series is stationary, even though individual time series might not be. The idea is frequently used in the context of several time series that are long-term related, like quantity and pricing in economic models. According to co-integration, there is a chance that these variables will temporarily stray from their equilibrium relationship before eventually returning to it. The Engle & Granger test and the Johansen test were utilized in the study to estimate co-integration.

A statistical technique called the Johansen test for co-integration is used to assess if a group of time series variables move together over the long term even though they might occasionally show short-term volatility (Johansen 1988.). The absence of misleading or purely coincidental changes in the variables is suggested by co-integration, which denotes a long-term equilibrium relationship between them.

The previous Engle-Granger two-step process for assessing co-integration was expanded upon by the Johansen test. It makes it possible to estimate several co-integrating relationships between several variables at once. Because of this, evaluating systems with more than two variables benefits greatly from it.

Consider a system of k stationary time series variables represented by the vector Yt, where =1, 2…, t=1,2,…,T. The general form of a vector error correction model (VECM) for this system can be written as:

$$\Delta Y_t = \Pi Y_{t-1} + \Gamma 1 \Delta Y_{t-1} + \cdots + \Gamma_{p-1} \Delta Y_{t-p+1} + \varepsilon_t$$

Where:The first difference of Yt is ΔYt. The matrix of coefficients denoted by β represents the long-term associations between the variables. The matrices of coefficients that represent the short-run dynamics are n Γ1…, Γp−1. εt is the error term, and p is the model's lag duration.

A two-step process called the Engle-Granger co-integration test is used to determine whether two non-stationary time variables have a long-term relationship. It's imperative to first confirm that both variables are integrated of order one, or I (1), which indicates that although their levels are non-stationary, they become stationary after one differencing. Usually, unit root tests like the Augmented Dickey-Fuller (ADF) test are used for this (Engle & Granger 1987). Given stationarity, linear regression is used to estimate the co-integration equation, which has the following form:

$$GII_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 HDI_t + \alpha_3 FLFPR_t + \alpha_4 GS_t + \alpha_5 FD_t + \alpha_6 TO_t + \alpha_7 Tech_t + \in_t$$

where: $\in_t$ stands for the error term, α_0 and $\alpha_{1 \text{ to}} \alpha_7$ are the intercept and slope coefficients that need to be estimated, and GII_t and explanatory variables are the time series variables. Next, stationarity is checked in the residuals from this regression, typically with the use of the ADF test. The presence of a long-term link between the variables, or co-integration, is suggested if the residuals are found to be stationary.

FMOLS & DOLS

In time series contexts, econometricians utilize the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) techniques to estimate co-integrating relationships. When working with co-integrated non-stationary variables, these techniques are especially helpful.

Developed by Phillips and Hansen (1990), FMOLS is a technique designed to address the endogeneity and serial correlation that frequently occurs in cointegrating regressions. In order to handle potential issues with non-stationarity and autocorrelation in the data, it entails enhancing the model with lag levels and differences of the variables. By utilizing the enhanced model, FMOLS applies ordinary least squares (OLS) estimation to produce reliable and effective estimates of the co-integrating parameters. When structural fractures or other types of non-stationarity are suspected to be present in the co-integrating relationship, FMOLS is especially appropriate.

Pedroni (1999) proposed the following model for panel co-integration in the first approach,

$$GII_t = \alpha_0 + \alpha_1 Y_t + \in_t$$

The variables (GII, Y) are co-integrated. Furthermore, Pedroni (2001) employed an alternative formula for co-integrating regressions utilizing the regressor's lagged difference.

$$\alpha *_{FMOLS} = \frac{1}{N}\sum_{t=1}^{N}\left(\sum_{t=1}^{T}\delta_{it}\right)\left(\sum_{t=1}^{T}\delta_{it}\right)^{t}\left[\sum_{t=1}^{T}(Y_{it}-\bar{Y}_1)(GII_{it}-\overline{GII}_1)\right]$$

As an alternative to DOLS, Saikkonen (1991) and Stock and Watson (1993) proposed the DOLS approach. By adding lagged levels and differences of the variables to the model, DOLS, like FMOLS, overcomes the endogeneity and serial correlation problems in co-integrating regressions. But DOLS handles the lagged terms differently than FMOLS; instead of treating them as purely exogenous, it treats them as predetermined. This makes it possible for DOLS to produce reliable estimates even when endogeneity issues may arise. When there is a possibility that the co-integrating connection is influenced by short-run dynamics or when the sample size is tiny, DOLS is especially helpful.

Results and Discussion

The econometrics technique's findings and an explanation for Pakistan are the foundation of this section. Which make use of the co-integration test, correlation matrix, unit root test, and co-integration regressions.

Table 2: Descriptive Statistics

	GII	GEE	FLFP	FD	HDI	Y	Tech	TO
Mean	0.650380	2.347930	16.56585	19.50552	0.479818	26.08167	36.24735	30.74511
Median	0.658779	2.395510	17.00800	19.28544	0.493000	26.13274	35.10000	31.31897
Maximum	0.750000	3.022300	22.45400	25.47432	0.546000	26.71460	50.70000	38.49932
Minimum	0.530000	1.687461	10.36800	13.87767	0.400000	25.42783	23.80000	21.45997
Std. Dev.	0.075040	0.364756	3.561426	4.156659	0.051132	0.388197	7.282014	4.787236
Jarque-Bera	2.096267	1.090425	2.098714	3.886371	3.056166	2.158257	1.288943	1.644403
Probability	0.350591	0.579719	0.350163	0.143247	0.216951	0.339892	0.524940	0.439463
Sum	21.46255	77.48169	546.6730	643.6821	15.83400	860.6952	1196.163	1014.588
Sum Sq. Dev.	0.180192	4.257494	405.8801	552.8900	0.083663	4.822306	1696.887	733.3640
Observations	33	33	33	33	33	33	33	33

Table 2 above displays the data's descriptive statistics values. The average value of FD is 19.50, Y is 26.08, FLFP is 16.56, GEE is 2.34, and GII is 0.65. 33 years of observation were employed in the study. Based on the probability value, the Jarque Bera test results validate that the data is normal for the specified variables.

Correlation Matrix

To evaluate the multicollinearity or linear relationships between the explanatory variables, a correlation matrix was used. The outcomes of the Correlation Matrix reporting are shown in Table 3.

Table 3: Correlation matrix

Correlation	HDI	GII	GEE	FLFP	FD	Y	Tech	TO
HDI	1.00							
GII	-0.58*	1.00						
GEE	-0.35***	0.39**	1.00					
FLFP	0.93*	-0.56*	**-0.47****	1.00				
FD	-0.76*	0.41**	0.60*	-0.69*	1.00			
Y	0.99*	-0.54*	-0.36**	0.93*	-0.76*	1.00		
Tech	0.66*	0.68*	0.34***	0.70*	-0.45**	0.71*	1.00	
TO	-0.49*	0.34**	0.72*	-0.49**	0.71*	-0.47**	0.52*	1.00

*** 1 percent, ** 5 percent and *** 10 percent level of significance**

The results indicate an adverse correlation between government spending on education and the HDI as well as a negative correlation between gender disparity and the HDI.

Furthermore, there is a positive correlation between HDI and the female labor force and economic growth. For gender disparity have a negative link with the number of women in the work force and economic growth but a positive correlation with trade, government spending, financial development, and technology. Furthermore, government spending is positively correlated with commerce, the labor force participation rate of women, and technology. The comparable results show that multicollinearity is not a problem, in line with the conclusions of Parveen et al. (2023) and Abbasi (2023).

Unit Root Test

In the study conducted by Farooq et al. (2023), the ADF unit root test was employed to assess the stationary nature of variables. In this context, "stationary" indicates that the means and variances of the variables remain constant over time. The outcomes of the ADF unit root test are presented in Table 4.

Table 4 Unit Root Test

Variable	Integration Order	Augmented Dickey Fuller Unit Root Test				
		Critical Value			T Statistics	P-Value
		1 %	5 %	10 %		
HDI	I(0)	-3.66	-2.96	-2.61	-1.28	0.62
	I(1)	-3.68	-2.97	-2.62	-2.74***	0.07
Y	I(0)	-3.65	-2.95	-2.61	-0.47	0.88
	I(1)	-3.66	-2.96	-2.61	-4.46*	0.0013
Tech	I(0)	-3.65	-2.95	-2.61	0.0038	0.95
	I(1)	-3.66	-2.96	-2.61	-5.28*	0.0001
TO	I(0)	-3.65	-2.95	-2.61	-1.88	0.33
	I(1)	-3.66	-2.96	-2.61	-4.84*	0.0001
GEE	I(0)	-4.28	-3.56	-3.21	-3.04	0.13

	I(1)	-4.28	-3.56	-3.21	-4.01**	0.018
FLFP	I(0)	-3.65	-2.95	-2.61	-1.01	0.73
	I(1)	-3.66	-2.96	-2.61	-5.47*	0.0001
FD	I(0)	-3.65	-2.95	-2.61	-1.39	0.57
	I(1)	-3.66	-2.96	-2.61	-4.90*	0.0004

*** 1 percent, ** 5 percent and *** 10 percent level of significance**

In table 4 the results of the ADF unit root test show that the variables are stationary at first difference for the whole set. The subsequent stage involves utilizing the co-integration technique for estimation, which proves beneficial when all variables demonstrate stationarity at I(1 (Shahzadi et al., 2023).Similarly, the results of the unit root test confirm that all variables exhibit stationarity at I(1). The subsequent step involves estimating the co-integration technique, as outlined by (Jan et al. 2023; Dar et al., 2016 & Safdar 2014).

Co-integration

Co-integration tests were conducted to examine the long-run co-integration among variables. The study employed both the Johansen co-integration and Engle-Granger co-integration tests for this purpose. The findings of the co-integration techniques are presented in Table 4.3.

Table 4.3: Co- Integration Test

Johanson Co-integration				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.947217	264.0027	159.5297	0.0000
At most 1 *	0.798332	172.8140	125.6154	0.0000
At most 2 *	0.710219	123.1789	95.75366	0.0002
At most 3 *	0.641088	84.78130	69.81889	0.0020
At most 4 *	0.517029	53.01624	47.85613	0.0152
At most 5 *	0.425953	30.45449	29.79707	0.0420
At most 6	0.343037	13.24811	15.49471	0.1060
At most 7	0.007205	0.224160	3.841466	0.6359
Co-integration Test - Engle-Granger				
Null hypothesis: Series are not cointegrated				
		Value	Prob.*	
Engle-Granger tau-statistic		-7.155559	0.0620	
Engle-Granger z-statistic		-39.06044	0.0566	

*** 1 percent, ** 5 percent and *** 10 percent level of significance**

The results in the above table reject the null hypothesis, confirming the presence of co-integration among variables. Specifically, the findings of the Johansen co-integration test reveal that the trace statistic value exceeds the maximum Eigenvalue statistic value, indicating co-integration among almost all five equations at a 5 percent significance level. Additionally, the Engle-Granger test statistics, including Z and tau, further confirm the co-integration among variables at a significance level of 10 percent. The results of Safdar (2014) are comparable and

demonstrate that the co-integration among variables is confirmed by the Johanson co-integration finding. According to the findings of Gokmenoglu et al. (2015), the Johansen test suggests the presence of co-integration among the selected variables.

FMOLS and DOLS

To estimate the impact of explanatory variables on dependent variables, the study employs the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) regression techniques. finding are reported in table 4.4

Table 4.4: FMOLS And DOLS For Pakistan

	FMOLS			DOLS		
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Coefficient**	**Std. Error**	**t-Statistic**
HDI	-3.599548*	0.850055	-4.234489	-1.923721*	0.716067	-2.686509
GDPPC	-0.884703*	0.329625	-2.683971	-0.051550*	0.010521	-4.899640
T	0.010578*	0.002113	5.007209	0.011650*	0.002064	5.643896
TO	-0.011927*	0.001699	-7.020267	-0.006167	0.004628	-1.332311
GEE	0.062880*	0.014539	4.324800	0.076685**	0.035919	2.134960
FLFP	-0.000379	0.003460	-0.109503	-0.008118	0.008605	-0.943459
FD	-0.004241*	0.001637	-2.590319	-0.002758	0.004011	-0.687628
R^2	0.89	Adj R^2	0.86	R^2	0.90	Adj R^2 =0.85

*** 1 percent, ** 5 percent and *** 10 percent level of significance**

The results for Pakistan indicate that the Gender Inequality Index (GII) is negatively influenced by the Human Development Index (HDI), economic expansion, trade openness, female labor force participation, and financial development. The findings also suggest that government spending on education and technology has a positive impact on GII. However, women's empowerment in Pakistan has increased due to economic growth, trade openness, female labor force participation, HDI, and financial development. On the other hand, the empowerment of women has decreased due to technology and government spending on education.

Furthermore, the findings indicate that economic growth has a negative and significant impact on the Gender Inequality Index (GII). A 100 percent change in economic growth results in a -0.88 percent change in GII. Moreover, the findings suggest that in Pakistan, an increase in economic growth is associated with an enhancement in women empowerment. By increasing the work force, raising productivity, and encouraging creativity through a diversity of viewpoints, empowering women promotes economic prosperity. Better access to healthcare and education enhances human capital, and more women in elected office promote inclusive policies that lower inequality and promote sustainable development, which together lead to faster GDP growth rates. Ahmed & Hyder's (2006) study uncovered that several factors, including GDP per capita, the ratio of imports to exports, and variations in school enrollment between boys and girls, exert a substantial impact on gender inequality in Pakistan, encompassing the labor market. Furthermore, the comprehension of gender disparities in educational achievement is shaped by

elements such as GDP per capita, the proportion of schools catering to female students versus male students, and the number of female teachers per school. The findings of Sohail (2014) reveal a positive correlation between women's empowerment and economic growth in Pakistan. Maraj &Sadagat (2016) reveal a positive correlation between women's empowerment and economic growth in Pakistan. According to Siegmann & Majid (2021), Nazir & Ali (2020), Maraj &Sadagat (2016), Pakistan's economic growth and women's empowerment are positively correlated.

Likewise, the Human Development Index (HDI) has a negative and statistically significant impact on GII. The findings reveal that a one-unit change in HDI results in -1.92 units change in Gender Inequality Index (GII). Furthermore, the findings indicate that HDI is associated with an increase in women empowerment for Pakistan. Higher Human Development Index (HDI) values are associated with better access to healthcare and education, two important factors that support women's empowerment. Higher HDI scoring nations frequently enact laws supporting women's rights and gender equality, creating an atmosphere that encourages empowerment. As a result, improvements in the HDI typically correspond with more chances for women to participate in the economy, be represented in politics, and have an impact on society. Ali et al. (2021) empirically investigated the relationship between human well-being and gender inequality, and the findings indicate a negative impact of the Human Development Index (HDI) on gender inequality in Pakistan. Naveed et al. (2023) and Bibi et al., (2017) employed ARDL techniques, and the findings suggested a negative relationship between the Human Development Index (HDI) and gender inequality over the long term in Pakistan. Asghar et al. (2020) applied the ARDL technique, and the findings indicate that the Human Development Index (HDI), along with political and economic globalization, has a negative impact on the gender inequality index for Pakistan.

Furthermore, technology has a positive and statistically significant effect on the Gender Inequality Index (GII). The findings indicate that a one-unit change in technology results in -0.011 units change in Gender Inequality Index. Additionally, the findings suggest that technology has a decreasing impact on women empowerment for Pakistan. Access to online marketplaces, digital skills training, and remote work opportunities are just a few of the ways that technology improves women's economic participation. It also encourages entrepreneurship by offering platforms for business development and financial inclusion, which in turn helps to close the gender gap in income and economic empowerment. Finally, technological innovations help women gain access to information, networking, and finance, which helps them integrate into a variety of economic sectors. According to Abbas & Muneer (2019) research, economic growth and ICT have a positive impact on women's empowerment. According to Yasmin & Grundmann's (2020) research, technology, financial resources, and education all contribute to Pakistani women's empowerment.

Likewise, Government Expenditure on Education (GEE) has a positive effect on the Gender Inequality Index. The findings indicate that a one-unit increase in GEE results in 0.062 units change in Gender Inequality Index for Pakistan. A number of reasons, such as insensitive policies towards women's rights, misallocation of resources, and inadequate execution, may contribute to the detrimental impact of government spending on education on women's empowerment in Pakistan. Underfunding of secure and accessible educational facilities for girls, cultural hurdles, and a lack of attention to female-specific educational requirements could counteract the desired outcomes. The empowerment of women can also be hampered by corruption and inefficiency in the educational system, which can take money away from enhancing the educational outcomes for women. The research conducted by Haleem et al. (2021) and Malik & Courtney (2011) indicates that higher education yields a positive impact on women empowerment in Pakistan. Similarly, Shah & Riaz (2021) find that education and female labor force participation positively influence women empowerment in the Pakistani context.Mbodji (2023) finding suggested that public expenditure has positive effect on the women empowerment.

Furthermore, the Gender Inequality Index (GII) is adversely affected by Female Labor Force Participation (FLFP) and trade openness. The findings indicate that a change of -0.011 in trade openness (TO) is associated with a decrease in GII. Importantly, trade openness exhibits a significant positive effect on women's empowerment in Pakistan, while the impact of FLFP is considered insignificant. By encouraging investment in education, female labor force participation has a good impact on women's empowerment in Pakistan. Working women make education a priority for both themselves and their children, allocating a portion of their salary toward tuition and other related costs. Their own abilities and economic prospects are improved by this investment, but it also sets a strong example for wider social changes toward gender equality and higher educational aspirations for women and girls. According to Elveren& Moghadam (2019), their findings demonstrate a negative effect on gender inequality. Similarly, Angeles et al. (2021) reveal that female labor force participation is associated with gender inequality.

Conclusion and Recommendation

Pakistan needs women's empowerment because it promotes gender equality, social progress, and economic growth. Women's increased engagement in the workforce, increased household earnings, and encouraged entrepreneurship all contribute to the economic development of the country when they are empowered. Additionally, it increases access to healthcare and education, which boosts family well-being and lowers poverty rates. Women who are empowered can advocate for social changes and have an impact on community decision-making, which helps to create a society that is more egalitarian and inclusive. In general,

Pakistan's sustainable development and the accomplishment of its larger socioeconomic objectives depend on the empowerment of women.

The empirical study on the various socioeconomic and political aspects influencing women's empowerment carried out in Pakistan between 1990 and 2022. The study used the measurable Gender Inequality Index to measure women's empowerment. As additional explanatory factors, the HDI, trade openness, economic growth, financial resources, rate of women in the labor force, and technology were used. They used a range of econometrics methodologies, such as co-integration techniques (Engel granger test and Johanson test), unit root tests for stationarity, and FMOLS and DOLS methods for estimation.

The findings for Pakistan show that the Human Development Index (HDI), trade openness, economic growth, female labor force participation, and financial development all have a negative impact on the Gender Inequality Index (GII). The results also imply that government spending, technology and education have positive effect on GII. However, trade openness, economic expansion, female labor force participation, HDI, and financial development have all contributed to an increase in women's empowerment in Pakistan. On the other side, government spending on education and technology has led to a decline in women's empowerment.

Pakistan's female empowerment rate has increased due to financial prosperity. The report recommends that the Pakistani government immediately broaden its microfinance programs aimed at women, offering small loans with advantageous conditions to assist them in launching or expanding small enterprises. Additionally, encourage the use of mobile money services and digital banking to guarantee that women, particularly in rural regions, have easy access to financial services. Long-term institutional reforms should be implemented by the Pakistani government to guarantee gender equality in financial institutions and to encourage women to take on leadership and decision-making responsibilities. Moreover, strengthen the legislative and regulatory framework, which includes labor laws, property rights, and inheritance laws to safeguard women's economic rights.

In Pakistan, women's empowerment is positively impacted by their labor force involvement. The report suggested that, to encourage women's engagement in the labor field, Pakistan's government should, for a limited time, establish flexible work laws and offer skill development initiatives. Eventually, to assist working women, the government should make investments in accessible and reasonably priced childcare centers. This lessens the load of taking care of children, allowing more women to join and stay in the workforce, resulting in long-term economic growth and empowerment.

The study suggested that the government should improve women and girls' access to high-quality education at all educational levels, from primary to post-secondary. This involves making sure that all students have equitable access to education, lowering the dropout rate, and encouraging girls to pursue STEM (Science, Technology, Engineering, and Mathematics)

degrees. Women who have more education have greater knowledge, skills, and chances for social and economic advancement.

Also, government should increase women and girls' access to information and communication technologies (ICTs) to close the digital gender gap. To improve digital literacy and enable women to use technology for civic involvement, economic empowerment, and education, training and skill development programs should be made available.

The study recommended that non-discriminatory employment practices, gender-sensitive recruitment, and promotion policies be implemented by the government to support equitable opportunities for women in the labor market. Promote the use of flexible work arrangements by companies, such as part-time work, telecommuting, and parental leave, to meet the demands of working women.

The study recommended that the government should increase women access to financial services, such as digital payment systems, credit, insurance, and savings accounts. Put policies and programs in place to lessen obstacles to financial inclusion, such as facilitating women's access to identity documents, resolving legal and regulatory issues, and encouraging women's financial understanding and literacy.

To examine the status of women empowerment in Pakistan all important variables are included in this study. However, there may be some other factors which does affect the position of women in this region. This study is based on secondary data. The methodology to assess the women empowerment is simple however, there may be some other econometric techniques that can be applied to achieve the objectives of the study.

This study is done solely in the context of Female labor force participation rate, Human development index, real GDP per capita, Financial development ,Government expenditure on education and access to technology in relation to women empowerment and their role in economic development in case of Pakistan by using time series data for the period of 1990-2024.For analysis ARDL and FMOLS and DOLS techniques were applied However ,the study can be extended for more macroeconomic variables related to women empowerment and their role in economic development in the context of national and international level using tome series and panel data based on availability of data using other econometric techniques. Also, this study can be extended for comparative analysis among different regions around the world.

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