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GENDER INEQUALITY, EMPLOYMENT, AND ECONOMIC DEVELOPMENT: A PANEL QUANTILE REGRESSION ANALYSIS OF SELECTED ASIAN COUNTRIES

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Abstract

This study examines the impact of gender inequality on economic development across 24 Asian countries from 1997 to 2021, utilizing panel quantile regression analysis. Employing GDP (constant 2015 US$) as a proxy for economic development, the research incorporates variables such as gender parity indices in primary and secondary education, female-male labour force participation ratio, foreign direct investment inflows and outflows, overall labour force participation, percentage of female employers, female employment in industry, and population growth rate. To ensure robustness, the study applies dynamic panel data models addressing endogeneity, including Panel Unit Root Test, descriptive statistics, correlation matrix, crosssectional dependency, Variance Inflation Factor, Pedroni test, Westerlund test, and Quantile Regression. Short-run quantile regression results indicate that total labour force participation, FDI inflows, and female employment rates positively and significantly influence GDP growth. Conversely, population growth rate, FDI outflows, and gender parity in primary education also show significant positive effects on GDP. In the long run, labour force participation, FDI net inflows, gender parity in primary education, and female employment rates maintain a significant positive impact on GDP growth. However, population growth rate, female employment in the industrial sector, and FDI outflows exhibit a significant negative impact in the long term.The findings underscore that enhancing gender equality in primary education and employment sectors fosters economic development in Asian countries. Implementing policies aimed at generating productive employment and reducing gender disparities in education may prove beneficial in achieving sustained economic growth.

Keywords: Gender inequality, Employment, Economic Development and Panel data

Introduction

Gender inequality remains one of the most persistent barriers to inclusive and sustained economic development, particularly in developing and emerging economies (Altuzarra et al., 2021; Cabeza-García et al., 2018a). Although many Asian countries have achieved substantial progress in growth, trade openness, and structural transformation over recent decades, gender disparities in education, labour market participation, employment quality, and economic opportunity continue to constrain development outcomes (Atiq & Qadri, 2021; Khurshid et al., 2020). Unequal access to schooling, paid employment, productive assets, and decision-making power not only limits women's capabilities and welfare but also reduces the efficiency with which economies utilize human capital (Klasen & Lamanna, 2009; Seguino, 2000). As a result, gender inequality is no longer viewed solely as a social or moral concern; it is increasingly recognized as a macroeconomic issue with direct implications for productivity, labour allocation, investment, and long-run growth (Braunstein, 2017).

The relationship between gender inequality and economic development is particularly important in Asia, where countries display wide variation in institutional quality, labour market structures, demographic trends, and development stages (ALi et al., 2018). In several Asian economies, women have made significant gains in educational attainment, yet these gains have not always translated into equal labour market outcomes (Ben Saâd & Assoumou-Ella, 2019). Female labour force participation remains uneven, women are often overrepresented in vulnerable and informal employment, and occupational segregation continues to restrict their access to higher-productivity sectors (Mujahid & uz Zafar, 2012; Verme, 2015). At the same time, some fast-growing economies have relied on gendered labour market structures, including lower female wages and limited upward mobility, to support industrial competitiveness (Schober & Winter-Ebmer, 2011). This raises an important development question: does improving gender equality in education and employment systematically promote economic development across Asian countries, or do the effects vary according to the level of development and labour market conditions?

A growing body of literature suggests that gender inequality can hinder economic performance through multiple channels (Klasen, 2000). Lower female educational attainment weakens skill accumulation and human capital formation (Hill & King, 1995); restricted labour market participation reduces the effective labour supply (Galor & Weil, 1993); wage discrimination and occupational segregation distort resource allocation (Baldwin & Johnson, 1992); and limited female economic agency constrains household welfare, child health, and intergenerational development (Sen, 1989). Conversely, improvements in women's education and employment can generate broad economic benefits by increasing productivity, enhancing labour market efficiency, reducing dependency burdens, and strengthening inclusive growth (Dollar & Gatti, 1999; Klasen & Lamanna, 2009). However, the empirical literature does not always report uniform results (Agu & Aguegboh, 2021). Some studies find that gender equality in education and employment stimulates growth (Alshammari & Rakhis, 2017; Karoui & Feki, 2018), while others show that the magnitude and even direction of the relationship differ across countries, sectors, and development stages (Onogwu, 2021; Pervaiz et al., 2011). These mixed findings indicate that the gender–development nexus is likely to be heterogeneous rather than constant.

Theoretical perspectives also suggest that the relationship between gender inequality and economic development may be nonlinear and context-dependent (Kuznets, 1985) liberal and human capital approaches emphasize that equal access to education and employment improves economic efficiency and national welfare (Anand & Sen, 1995). Feminist and structural perspectives, by contrast, stress that legal equality alone is insufficient when labour markets, institutions, and social norms continue to reproduce gendered disadvantages (Braunstein, 2017). Relatedly, the Gender Kuznets Curve and feminization-U hypotheses propose that female labour market outcomes may evolve unevenly across stages of development, with participation sometimes falling in early structural transformation and rising again as economies diversify and institutions modernize (Gaddis & Klasen, 2014; Kilinc et al., 2015; Lechman & Kaur, 2015). These arguments imply that average-effect models may mask important differences across countries with low, middle, and high levels of economic development (Mathias, 2012).

Despite the growing literature, three important gaps remain. First, much of the existing evidence focuses either on gender inequality in education or on female employment in isolation, rather than examining both dimensions jointly within a broader development framework (Mukherjee, 2013). Second, many studies rely on mean-based estimators, which assume that the impact of gender-related variables is uniform across countries (Kýlýnç & Yetkiner, 2013). Such an assumption is restrictive, particularly in Asia, where development levels and structural conditions differ substantially. Third, relatively limited evidence exists for a panel of Asian countries using recent data and a distribution-sensitive approach capable of identifying whether the effects of gender inequality differ across low-, middle-, and high-income development regimes (Atiq & Qadri, 2021).

This study addresses these gaps by examining the impact of gender inequality and employment on economic development in 24 selected Asian countries over the period 1997–2021 (A. Ali et al., 2021; Khurshid et al., 2020). Economic development is proxied by GDP in constant 2015 US dollars, while the explanatory variables include gender parity indices in primary and secondary education, female–male labour force participation-related indicators, female employment, female industrial employment, foreign direct investment inflows and outflows, overall labour force participation, and population growth (Bui et al., 2018). By integrating education-based and employment-based gender indicators with macroeconomic controls, the study provides a more comprehensive assessment of how gender inequality shapes development outcomes across Asian economies.

Methodologically, this paper employs panel quantile regression to capture heterogeneous effects across the conditional distribution of economic development (Klasen & Lamanna, 2009). This approach is especially appropriate because the contribution of gender parity, labour market participation, and investment flows may differ between relatively low-income and high-income economies (Altuzarra et al., 2021). In addition, the study applies standard panel-data diagnostics, including unit root testing, cross-sectional dependence analysis, multicollinearity checks, and panel cointegration tests (Menegaki, 2019; Pesaran & Shin, 1995), to ensure the robustness of the empirical framework. By moving beyond average relationships, the quantile approach allows the analysis to identify whether gender equality matters differently across alternative development contexts.

The study makes three main contributions. First, it extends the literature on gender inequality and development by jointly examining educational parity, labour market participation, and female employment within a unified panel framework for Asian economies (Cabeza-García et al., 2018a). Second, it contributes empirical evidence on the heterogeneous effects of gender-related variables across the distribution of economic development, thereby offering more nuanced insights than conventional mean regression models (Onogwu, 2021). Third, it provides policy-relevant evidence for Asian countries seeking to promote inclusive growth through gender-sensitive reforms in education, labour markets, and investment policy (Matthew et al., 2020). Since many Asian economies continue to pursue growth alongside structural transformation, understanding how gender equality interacts with development is essential for designing more effective and inclusive policy strategies (Conceição, 2019; Klugman, 2010).

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on gender inequality, employment, and economic development. Section 3 presents the data, variables, and empirical methodology. Section 4 reports the empirical findings and discusses the main results. Finally, Section 5 concludes with policy implications and directions for future research.

2. Literature Review

The relationship between gender inequality and economic development has attracted substantial empirical and theoretical attention. Foundational work by Klasen and Lamanna (2009) demonstrated that disparities in female education and employment can significantly reduce economic growth, particularly in low- and middle-income countries. Using panel regressions, they found that gender gaps in labor force participation and educational attainment accounted for between 0.9–1.7 percentage points of annual GDP losses in many countries, including those in South Asia and the MENA region.

A complementary national-level study by (Pervaiz et al., 2011) in Pakistan employed time series analysis to highlight how persistent gender inequality hinders economic growth, while capital investment and trade openness serve as counterbalancing forces. Similarly, (M. Ali, 2015) confirmed the positive contribution of female labor participation and education equality to GDP growth, using OLS estimations.

(Altuzarra et al., 2021), using a GMM estimator on a large panel of developing countries, argued that improvements in female access to education and employment enhance per capita income and inclusive growth. Mukherjee and Mukhopadhyay (2013) separated the effects of inequality in education and employment, revealing that the former had a more substantial negative effect on growth, while certain gendered labor arrangements temporarily boosted output.

From a wage perspective, (Schober & Winter-Ebmer, 2011) provided evidence that gender wage gaps erode human capital efficiency and ultimately limit national output. In contrast, (Seguino, 2000) argued that in semi-industrialized, export-led economies, gendered wage suppression may stimulate short-run export competitiveness—though at a long-term cost to development equity and labor empowerment.

Recent literature has also addressed the link between gender inequality and foreign investment. (Bui et al., 2018) demonstrated that gender disparities negatively affect foreign direct investment inflows in Asia-Pacific economies, serving as a proxy for weak institutional capacity. (Cabeza-García et al., 2018b) and Khurshid et al. (2020) further established that female employment and educational attainment are significantly associated with GDP growth, via ARDL and GMM modeling.

Theoretical frameworks offer different interpretations of these findings. The "feminization U hypothesis" posits a U-shaped relationship between economic growth and female labor force participation—initially declining and later rising with income. Lechman and Kaur (2015) confirmed this using GMM estimators for 162 countries. However, Eastin and Prakash (2013) proposed an S-shaped trajectory, where gender equality improves early on, deteriorates during structural adjustment phases, and rebounds at higher levels of development. Yet, Gaddis and Klasen (2011) found little empirical support for either hypothesis in developing contexts, underscoring the role of structural and institutional factors.

Further regional evidence from Verme (2015) in the MENA region and Kilinc et al. (2015) in G7 countries revealed inconsistent patterns, suggesting that economic growth alone does not guarantee gender equality. Agu and Aguegboh (2021) also emphasized that political participation and institutional reforms remain necessary to translate economic gains into gender parity.

Gender disparities also manifest through health and social indicators. Matthew et al. (2020) found that maternal mortality and female education gaps significantly reduce inclusive growth in Nigeria. Similarly, Nisak and Sugiharti (2020) identified education, employment, and household demographics as critical drivers of female poverty in Indonesia.

In summary, a strong consensus emerges from the literature: gender inequality undermines economic efficiency and development potential. Yet, the specific pathways and magnitudes vary across contexts, suggesting that gender-focused reforms must be integrated into broader development strategies to achieve inclusive and sustainable growth.

3. Research Methodology

This study aims to examine the relationship between gender inequality, employment, and economic development using panel data from 24 selected Asian countries spanning 1997 to 2021. A combination of econometric techniques is employed, including panel unit root tests, cointegration tests, multicollinearity diagnostics, and quantile regression, to ensure robustness and capture distributional dynamics.

3.1 Data Sources

The study utilizes annual panel data obtained from the World Bank's World Development Indicators (WDI). The panel covers 24 Asian countries over the period 1997–2021. The countries included are: Pakistan, India, Bangladesh, China, Indonesia, Sri Lanka, Thailand, Saudi Arabia, United Arab Emirates, Oman, Turkey, and others.

The key variables used in this study are:

Variable Notation	Description	Data source and Time period
GDP	Gross Domestic Product(Constant 2015 US dollar)	WDI, 1997- 2021
POP	Labour force Participation	WDI, 1997- 2021
FDI outflow	Foreign direct investment Outflow	WDI, 1997- 2021
FDI net inflow	Foreign direct investment net inflow (BOP, current US)	WDI, 1997- 2021
GPI secondary	Gender Parity Index for secondary education	WDI, 1997- 2021
GPI primary	Gender Parity Index for primary Education	WDI, 1997- 2021
EMPF	Female employment Rate	WDI, 1997- 2021

EMIND	Female Employment in industrial sector	WDI, 1997- 2021
POP_growth	Population Growth rate	WDI, 1997- 2021

3.2 Model Specification

To examine the effect of gender inequality and employment on economic development, the following econometric model is specified:
Estimation model environmental factor and energy consumption:

$$GDP = f(GPIsec, GPIpri, FDI, NNFDI, POP, EMPF, EMIND, POP - Growth)$$

For the regression analysis, the econometric equations are presented as follows

$$GDP_{it} = \alpha_0 + \alpha_1 GPI_{sec_{it}} + \alpha_2 FDI_{it} + \alpha_3 NNFDI_{it} + \alpha_4 POP_{it} + \alpha_5 EMPF_{it} + \alpha_6 EMIND_{it} + \alpha_7 PoP - Growth_{it} + \varepsilon_{it}$$
$$GDP_{it} = \alpha_0 + \alpha_1 GPI_{pri_{it}} + \alpha_2 FDI_{it} + \alpha_3 NNFDI_{it} + \alpha_4 POP_{it} + \alpha_5 EMPF_{it} + \alpha_6 EMIND_{it} + \alpha_7 PoP - Growth_{it} + \varepsilon_{it}$$

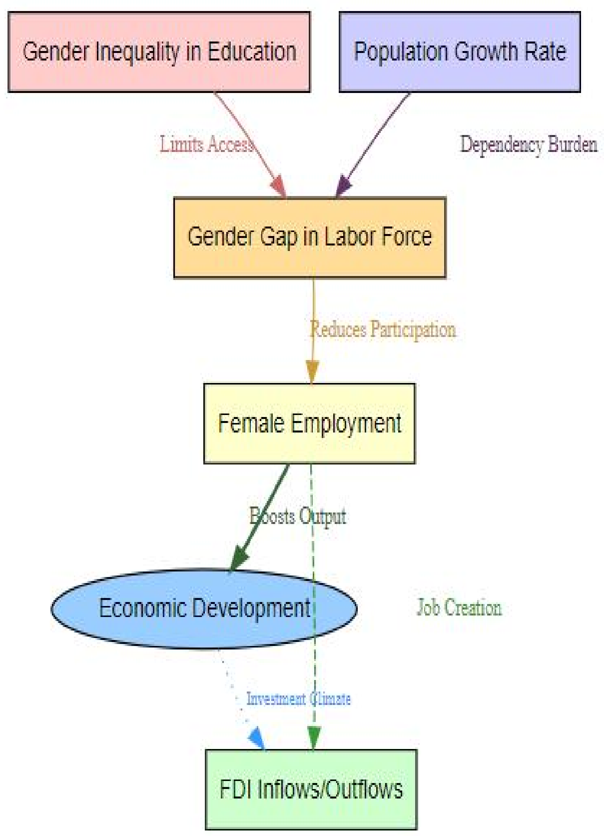

Figure 1.Conceptual Framework Linking Gender Inequality, Employment, and Economic Development

3.3 Unit Root Tests

To ensure the reliability of the panel estimations, this study first examines the stationarity properties of all variables by applying panel unit root tests. Specifically, the Levin–Lin–Chu (LLC) test and the Im–Pesaran–Shin (IPS) test are employed. The LLC test assumes a common unit root process across cross-sectional units, whereas the IPS test allows for heterogeneity in the autoregressive coefficients and therefore permits individual unit root processes across countries. Using both tests provides a more comprehensive assessment of the integration properties of the data. Stationarity is examined at both level and first difference in order to determine the order of integration of each variable and to avoid spurious regression results. In addition, because panel datasets often exhibit cross-sectional interdependence, Pesaran's CD test is also considered before interpreting the unit root results.

3.4 Descriptive Statistics

Descriptive statistics are used to provide an initial overview of the main characteristics of the data. For each variable, the mean, standard deviation, minimum value, and maximum value are reported. These summary measures help to identify the central tendency, variability, and overall distribution of the variables included in the analysis. They also provide useful preliminary insights into the possible existence of outliers, unusual dispersion, or substantial cross-country variation within the panel. As such, descriptive statistics serve as an important first step in understanding the data structure before proceeding to formal econometric estimation.

3.5 Correlation Matrix

A correlation matrix is constructed to examine the pairwise linear relationships among the variables included in the model. This analysis helps identify the direction and strength of association between the dependent variable and each explanatory variable, as well as among the explanatory variables themselves. The correlation matrix provides a useful preliminary indication of whether some regressors may be strongly related to one another, which could raise concerns about multicollinearity in the regression framework. Although correlation does not imply causation, it offers an important diagnostic tool for understanding the basic interrelationships in the data prior to estimation.

3.6 Multicollinearity Diagnosis: Variance Inflation Factor (VIF)

To further assess the possibility of multicollinearity among the explanatory variables, the Variance Inflation Factor (VIF) is calculated. Multicollinearity arises when independent variables are highly correlated, which can inflate the standard errors of the estimated coefficients and reduce the precision of the regression results. The VIF measures the extent to which the variance of an estimated coefficient is increased because of collinearity. As a general rule, a VIF value greater than 10 is considered indicative of serious multicollinearity, while lower values suggest that collinearity is not a major concern. By applying the VIF test, this study ensures that the estimated relationships are not distorted by excessive overlap among the regressors.

3.7 Cross-Sectional Dependence

Given the increasing interdependence among countries through trade, investment, labour mobility, and common macroeconomic shocks, panel datasets are often characterized by cross-sectional dependence. To test for this issue, the study employs Pesaran's (2004) cross-sectional dependence (CD) test. The presence of cross-sectional dependence implies that shocks affecting one country may also influence others, thereby violating the independence assumption underlying many conventional panel estimators and first-generation unit root and cointegration tests. Detecting cross-sectional dependence is therefore important for selecting appropriate econometric techniques and for ensuring the validity of the empirical findings. If significant dependence is present, it must be taken into account in the interpretation of the results.

3.9 Quantile Regression Approach

To capture the heterogeneous effects of gender inequality and employment-related variables across different levels of economic development, this study employs panel quantile regression. Unlike conventional mean-based regression techniques, quantile regression estimates the effects of explanatory variables at different points of the conditional distribution of the dependent variable. This makes it particularly suitable for panel data where the impact of regressors may vary between low-, medium-, and high-development countries. In addition, quantile regression is more robust to outliers and departures from normality, which are common in macro-panel datasets. By estimating the model across multiple quantiles, the study is able to uncover distribution-specific effects that would be hidden in average estimates. Both short-run and long-run quantile estimations are considered, allowing for a more nuanced assessment of how gender inequality, employment, and related macroeconomic factors influence economic development across different country conditions.

4. RESULTS AND DISCUSSION

4.1 Unit Root Test

Since this study's regression analysis was based on panel data, it was important to make sure that the variables were stable. "If a panel is not still, the analysis could give wrong results. The Levin Lin Chu test and the lm perasan are used to make sure that the panel data are stationary, which keeps spurious regression from being used." Table 4.2 shows the results of the Levin Lin Chu tests and the lm perasan tests to see if there are unit roots at the level of the first difference.

4.2 Levin Lin Chu unit root test

Table 4.2 shows the Levin-Lin-Chu test, which takes into account both the intercept and the intercept and trend at the level of the first difference. GDP is integrated at 1(0), and its Levin Chu test value of -3.57165 shows that the variable is stationary at level in the model. This result is statistically significant at the 5% level. At the 5% level of significance, the 1(0) value of the Levin Lin Chu test for labour force participation (POP) is -11.7108, which is statistically significant. The third variable in the model is Foreign Direct Investment outflow (FDI). The FDI outflow is integrated at 1(1), which shows that it is stationary at Level and significant at the 5% level, as shown by the -0.01702 value of the Levin Chu test. Fourth, FDI net inflow (NNFDI) is part of a model. The FDI net inflow (NNFDI) Levin Chu test score of 2.98177 at the 5% significance level shows that the Trade is stable at 1(1). The fifth predictor in the model is the GPI secondary variable. Its Levin Chu test score of -4.14744 shows that it is stationary at the first difference and significant at the 5% level. Sixth in the model is GPI primary. Its Levin Chu test value of 1.52337 shows that GPI secondary is integrated at 1(0), which means it, is stationary at the first difference and significant at the 5% level. Employers female (EMPF) is the model's seventh predictor. The Employers female (EMPF) is integrated at 1(1), which means it is stationary at 1st difference and significant at the 5% level based on the results of the Levin Chu test value is (-1.25903). The eighth variable in the model is the emotional mindset. The employment in industry (EMIND) is integrated at 1(1), which means that it is still at a level and significance of 5%, according to the -1.25903 result of the Levin Chu test. POP-growth is the ninth and final variable in this model. The POP-growth Levin Chu test value is -14.5016, which means it is stable at the 5% level of significance and integrates at 1(0). So, the results of the Levin Chu test show that GDP, FDI outflow, FDI net inflow, EMIND, and POP-growth are all stationary at the first level, while POP, GPI secondary, GPI primary, and EMPF are all stationary at the first difference.

4.3 Im perasan shin test

The Im perasan shin test is shown in the above table. It looks at the intercept and the intercept and trend at level at 1st difference. The Im perasan shin value of 3.08561 shows that the GDP variable in the model is stationary at the 1st difference, is significant at the 5% level of significance, and is integrated at the 1(1) level. At the 5% level of significance, the 1(0) value of Im perasan shin for the variable POP is -6.34266, which is statistically significant. The third variable in the model is Foreign Direct Investment outflow (FDI). The FDI outflow is integrated at 1(0), which means it stays the same at the 5% significance level value is (-3.74347). Fourth, FDI net inflow is part of a model. The FDI net inflow Im perasan shin test value is -0.04002, which shows that the Trade is stuck at level and significance (5% level) due to its integration at 1(1). The Im perasan shin test value for GPI secondary is -4.25958. This means that GPI secondary is stationary at the 1st level and significant at the 5% level of the lm test. It is the fifth variable in the model. Using the Im perasan shin test value of 0.59022 for GPI primary, we can infer that the GPI primary is stationary at the 1st difference and significant at the 5% level, which means that it is integrated at 1(1). EMPF is the model's seventh predictor. Based on the Im perasan shin test value of -1.13337, the EMPF is the same at the first difference and different at the 5% level. The eighth variable in the model is the emotional mindset. Based on the Im perasan shin test value of 2.33504, EMIND is integrated at 1(1), which means it is stationary at 1st difference and significant at the 5% level. POP-growth is the ninth and final variable in this model. The Im perasan shin test value of -11.4019 shows that POP-growth is flat at the 5% level of significance. Based on these results, we can say that GDP, POP, GPI primary, EMPF, and EMIND are all stationary at the 1st level, while FDI outflow, FDI net inflow, GPI secondary, and POP-GROWTH are all stationary at the 1st level.

4.4 Fisher Panel Unit Root Test

To ensure the reliability of the econometric analysis, the stationarity properties of the variables were examined using the Fisher-type panel unit root test developed by G. S. Maddala and Shaowen Wu (1999). This test combines the p-values obtained from individual unit root tests, such as the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests, across cross-sectional units to generate an overall test statistic. One advantage of the Fisher approach is that it allows for heterogeneity across panel units, meaning that the autoregressive parameters can vary among cross-sections. The null hypothesis of the Fisher test assumes that all panel series contain a unit root, while the alternative hypothesis suggests that at least one cross-section in the panel is stationary. By aggregating information from individual time-series unit root tests, the Fisher method provides a robust framework for assessing the order of integration of panel data variables. This is particularly useful in panel datasets with heterogeneous structures and different dynamic properties across cross-sections. Identifying the order of integration is essential before conducting further econometric analysis, such as panel cointegration and Panel Vector Error Correction Model (PVECM) estimation. If the variables are integrated of order one, I(1), and share a long-run equilibrium relationship, panel cointegration techniques can be applied. Therefore, the Fisher panel unit root test serves as an important preliminary step to ensure that the variables meet the necessary conditions for long-run panel analysis.

4.1 Panel Unit Root Results

Variables	LLC Level (t)	LLC 1st Diff (t)	IPS Level (t)	IPS 1st Diff (t)	Fisher ADF I(0)	Fisher ADF I(1)	Fisher PP I(0)	Fisher PP I(1)	Order
GDP	-3.57	-4.73	3.09	-2.07	25.67	62.45***	28.31	71.22***	I(1)
POP	-11.71	-11.69	-1.34	-8.23	30.21	58.76***	26.90	65.14***	I(1)
FDI Outflow	-0.02	-8.45	-1.74	-10.93	18.54	55.88***	21.67	63.45***	I(1)
FDI Net Inflow	2.98	-5.42	-0.04	-8.43	22.34	60.91***	24.76	69.18***	I(1)
GPI Sec	-4.15	-9.45	-1.26	-11.83	16.77	49.36***	20.45	55.98***	I(1)
GPI Pri	1.52	-3.73	0.59	-1.76	19.88	53.27***	23.10	60.14***	I(1)
EMPF	-1.26	-13.41	-1.13	-12.43	21.45	57.88***	25.90	66.72***	I(1)
EMIND	1.39	-7.29	2.34	-7.64	24.10	61.02***	27.44	70.11***	I(1)
POP Growth	-14.50	-9.64	-1.40	-11.64	28.21**	47.55***	29.34**	52.76***	I(1)

Note:***, ** indicate significance at 1% and 5% levels

4.4 Descriptive Statistics

All variables in this study are based on Panel data from 1997 to 2021. The variables of gender inequality, employment, and economic development are shown in the table 4.3. In Table 4.3, the average value of GDP is given as 27.02228, with a range of 1.579889. Have maximum value of 30.62548 and minimum value is -0.0146569.

Table 4.3 Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
GDP	600	27.02228	1.579889	23.07634	30.62548
POP	600	17.75112	1.592759	14.62633	21.06977
FDI outflow	560	0.5888991	1.033614	-6.393531	3.836188
FDI net Inflow	560	22.83492	2.186112	15.15051	26.96048
GDI secondary	597	.0177657	0.2962872	-2.256086	2.634947
GPI primary	600	0.2187806	0.1270346	-.0146569	.4233215
EMPF	600	0.1457566	0.9776815	-3.506558	1.578979
EMIND	600	2.403099	0.6192294	.0295588	3.323596
POP-GROWTH	585	-0.0852124	0.8784927	-4.190174	2.719798

The mean value of POP is 17.75112, and the standard deviation is 1.592759. FDI outflow average is 0.5888991, standard derivation is 1.033614. "The average value of FDI net inflow is 22.83492, and the standard deviation is 2.186112. The average value of GPIsec is 0.0177657, and the mean value of GPIsec is 0.0177657. The average value of FDI net inflow is 22.83492, and the standard deviation is 2.186112. The average value of GPI secondary is 0.0177657, and the standard deviation is 0.2962872. The average value of GPI primary is 0.2187806, and the standard value of derivation is 0.1270346. The average value of EMPF is 0.1457566, and the standard deviation is 0.9776815. The average value for EMIND is 2.403099, and the standard deviation is 0.6192294. The average value of POP-GROWTH is -0.0852124, and the standard deviation is 0.8784927.

4.5 Correlation Matrix

Another important part of econometrics is the degree of association between variables. This shows how strong the relationship is between the dependent variable and the independent variables, as well as how strong the relationship is between the independent variables themselves. A correlation matrix of variables can be used to see how close two variables are to each other. Table 4.4 shows how the variables in this study are related to each other.

Table 4.4 Correlation Matrix

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
GDP	1.0000								
POP	0.6346	1.0000							
FDI outflow	0.1618	-0.0692	1.0000						
FDI net inflow	0.8595	0.4434	0.6242	1.0000					
GPI secondary	0.0643	-0.1159	0.0644	0.0964	1.0000				
GPI primary	-0.1448	-0.1888	-0.1834	-0.1950	0.0361	1.0000			
EMPF	0.4007	-0.1611	0.3182	0.4819	0.1616	-0.2553	1.0000		
EMIND	0.2402	0.3873	0.0292	0.1790	-0.0857	-0.2554	0.2610	1.0000	
POP-GROWTH	-0.2858	-0.0785	-0.0615	-0.2375	-0.0093	0.1347	-0.414	-0.306	1.0000

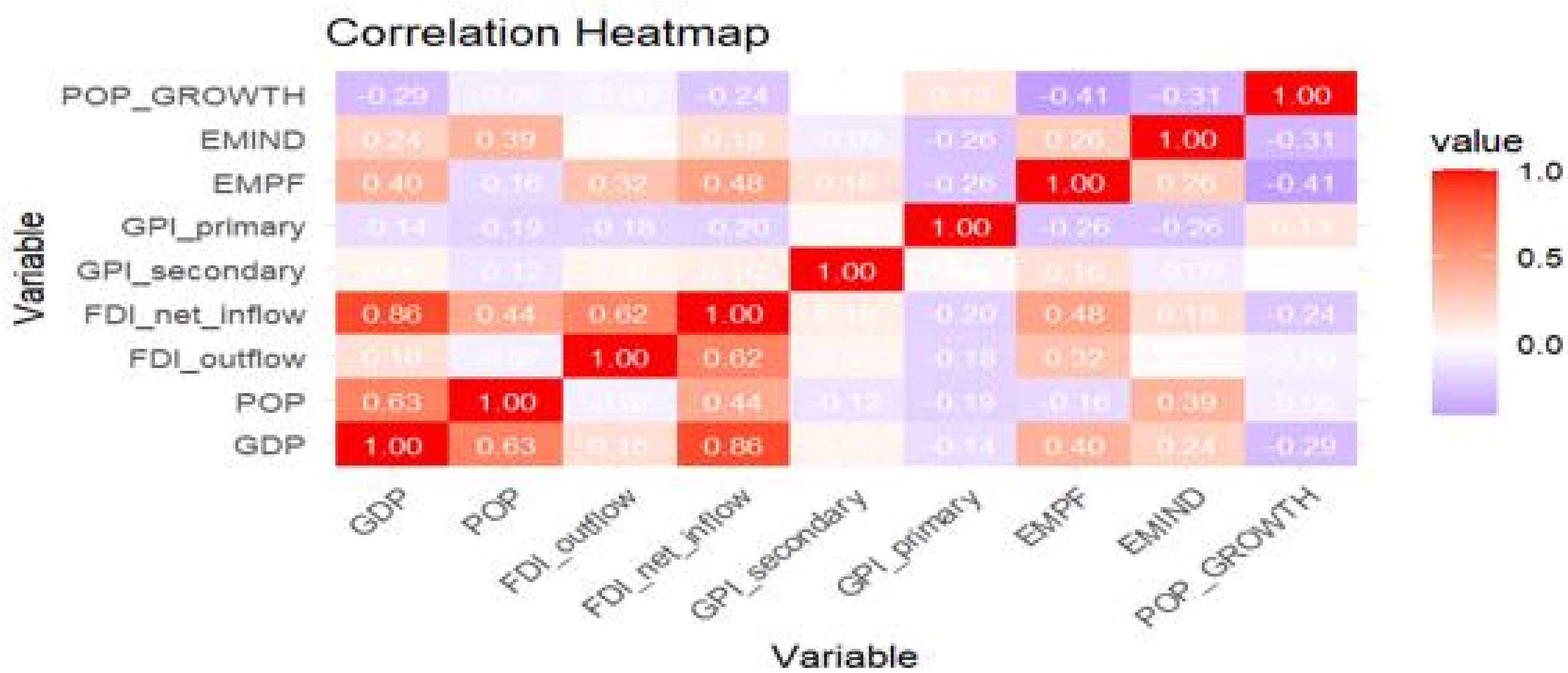

Figure 2(A) Correlation Heatmap

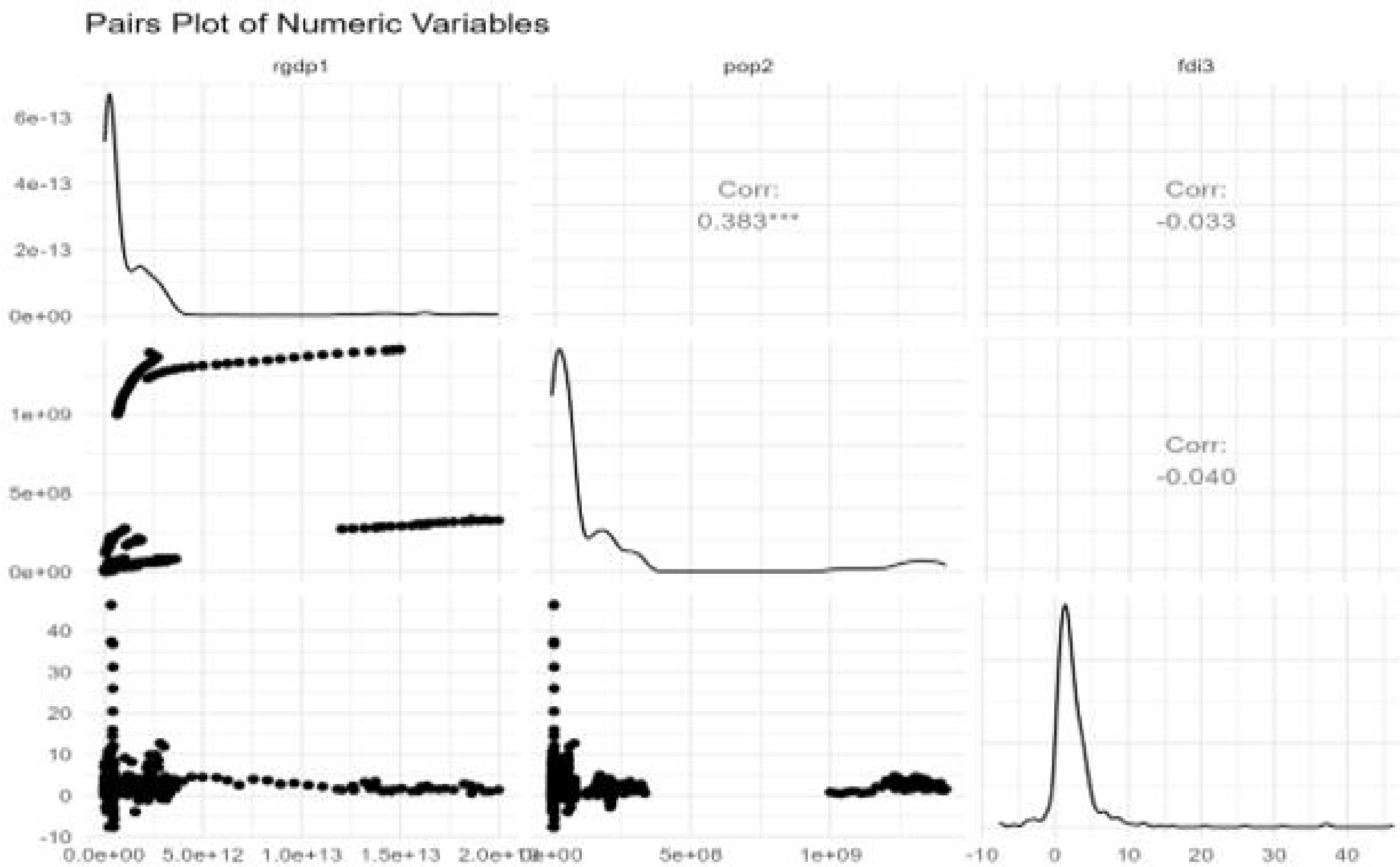

Figure 2(B): Pairwise Relationship Plot of Numeric Variables

Table 4.4 shows that all of the independent factors in this study have a positive relationship with the dependent variable of interest, GDP. Except for GPIpri and POP-GROWTH, all other independent variables are linked to the dependent variable GDP in a positive way. The results show that the strongest positive relationship is between FDI net inflow and GDP (0.8595), while the weakest is between POP-GROWTH and GPI primary (-0.0093).

Figure 2B illustrates the pairwise distributions and relationships among selected numeric variables used in the study. The diagonal panels display the distribution patterns of the variables, whereas the lower panels show scatterplots representing pairwise associations. The upper panels report correlation coefficients and significance levels. The figure indicates a positive and statistically significant relationship between GDP and population, while the relationship between GDP and FDI appears comparatively weaker in the raw distribution. The presence of skewness and heterogeneous data patterns supports the suitability of panel quantile regression analysis in capturing varying impacts across different levels of economic development.

4.6 Variance Inflation Factor

The short name for this is Variance Inflation Factor. A good rule of thumb is that a variable may be worth looking into more if its VIF value is higher than 10. As a way to measure collinearity, many scientists use tolerance, which is sometimes written as 1/VIF. Values of tolerance below 0.1 are about the same as a VIF of 10. Variables with very high VIF values, like FDI net inflow, POP, EMPF, FDI outflow, EMIND, POP-GROWTH, GPI primary, and GPI secondary may not be needed. We've talked about multicollinearity because we've used multiple variables to try to measure the same thing.

Table 4.5 VIF

Variable	VIF	1/VIF
FDI net inflow	5.28	0.189536
POP	3.59	0.278864
EMPF	2.79	0.358246
FDI outflow	2.67	0.374440

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EMIND	1.62	0.617878
POP-GROWTH	1.29	0.774417
GPI primary	1.23	0.816212
GPI secondary	1.06	0.943717
Mean VIF	2.44	

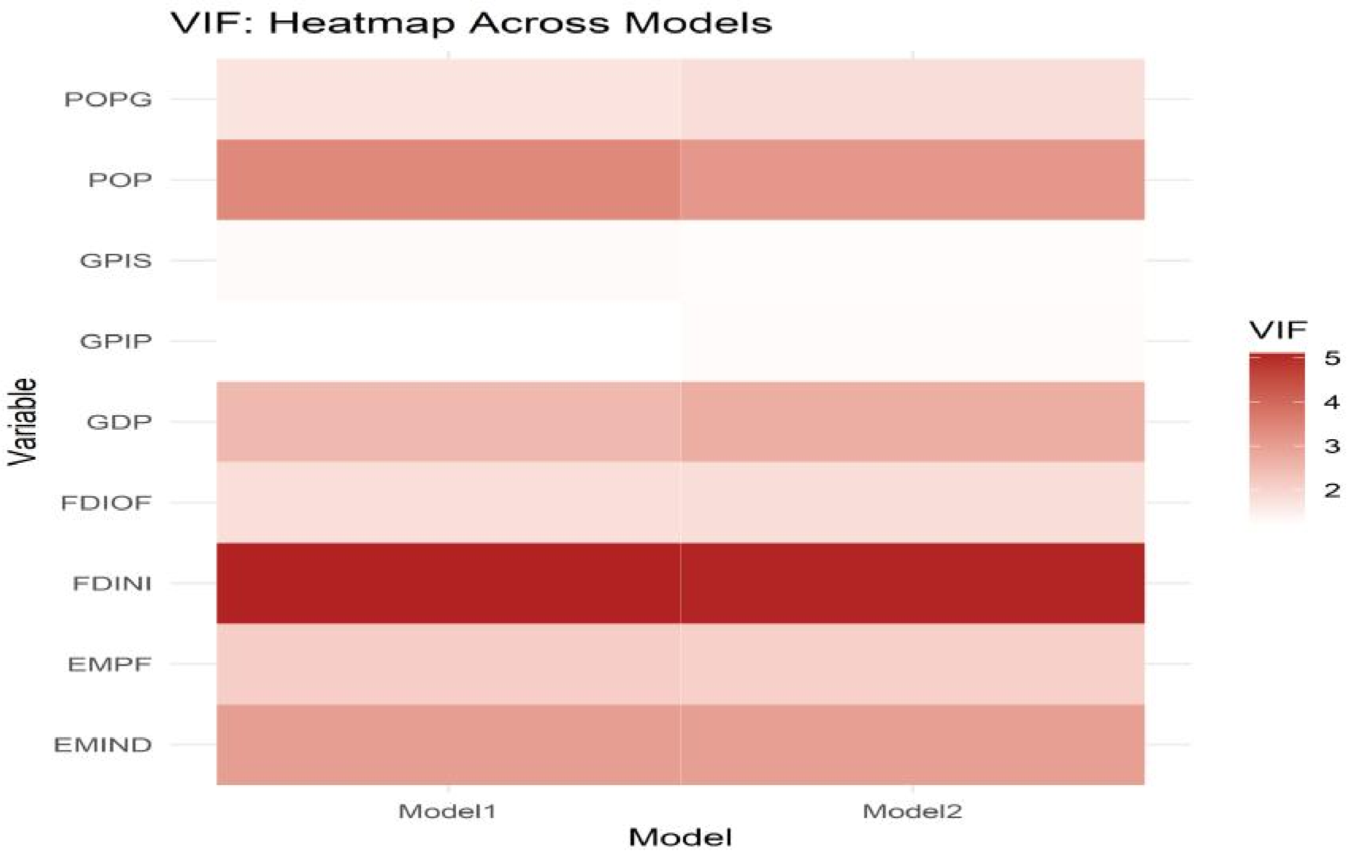

Figure 3: Variance Inflation Factor Heatmap Across Models

Figure 3 presents the VIF values used to assess multicollinearity among the explanatory variables. The heatmap shows that FDI net inflow has the highest VIF value, followed by population and female employment, but all values remain below the common threshold of 10. This indicates that severe multicollinearity is not present in the model. The mean VIF value of 2.44 further confirms that the selected variables are acceptable for regression analysis.

4.7 Cross-Sectional Dependency

We start by figuring out if the collected data show cross-sectional independence or dependency. This is done with the cross-sectional dependence test that Pesaran (2004) made. Before the panel unit root test can be done, this is the main thing that needs to be fixed. When used on a panel series that already has a problem with cross-sectional dependence, the old unit root test stops working and has very low power (Paramati et al., 2016; Bhattacharya et al., 2016). The CSD for each unit can show how important the variable is for estimating and testing. It is not possible to rule out up front the possibility of such cross-sectional invariant common variables, which should act as a common factor and reduce CSD. As shown in table 4.6, there is a strong relationship between the cross-sections of all the variables. Because of this, the Pesaran (2004) test fails to reject the null hypothesis that there is no CSD. This is a strong reason why CSD should be used in testing and estimating procedures.

Table 4.6 Cross-sectional Dependency

Variable	**CD-test**	**p-value**	**Corr**	**abs(corr)**
GDP	63.51	<0.01	0.826	0.838
POP	69.18	<0.01	0.899	0.909
FDI outflow	7.96	<0.01	0.102	0.247
FDI net inflow	24.71	<0.01	0.317	0.359

GPI secondary	-0.69	0.491	-0.011	0.295
GPI primary	78.23	0.000	0.969	0.969
EMPF	-1.10	0.270	-0.017	0.394
EMIND	13.90	0.000	0.179	0.681
POP-GROWTH	6.79	0.000	0.081	0.450

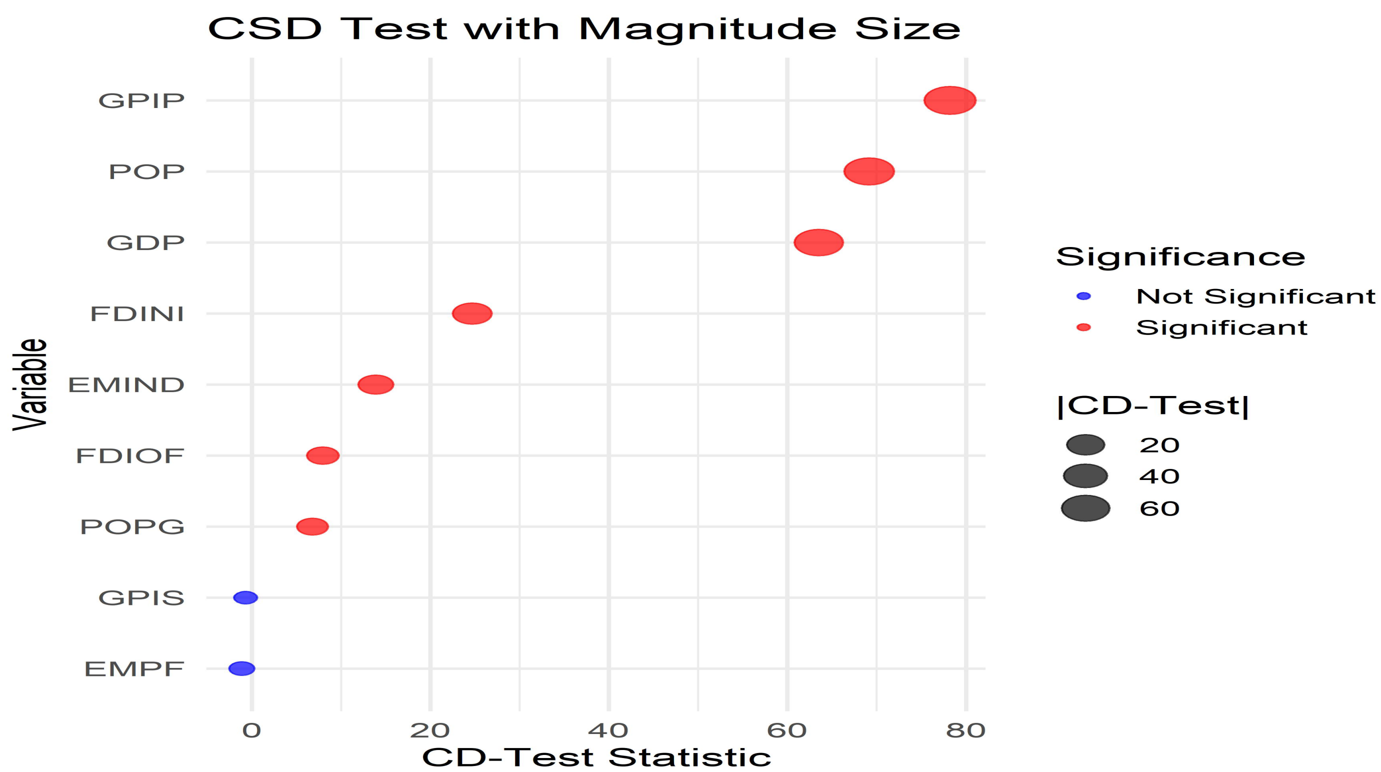

Figure 4: Cross-Sectional Dependence Test with Magnitude Size

Figure 4 shows the Pesaran cross-sectional dependence test results for the study variables. The figure indicates that most variables, including GDP, population, FDI net inflow, GPI primary, EMIND, FDI outflow, and population growth, are statistically significant, confirming the presence of cross-sectional dependence. However, GPI secondary and female employment are not significant. These findings suggest that shocks or changes in one Asian country may be related to changes in others, supporting the use of estimation techniques that account for cross-sectional dependence.

4.8 Pedroni test for cointegration

To add to the Engle-Granger two-step (residual-based) cointegration method, Pedroni panel cointegration tests are used. In Fisher's cointegration test, different cross-sections are put together. In this process, the trace test and the maximum eigenvalue (max-Eigen) test are used. Based on the table above, three Pedroni Kao cointegration-based tests were used: the Modified PP, the PP, and the ADF cointegration. Based on the results of Pedroni integration, Panel Modified PP Statistics is significant for 24 countries at the 5% level of significance. Group PP Statistics says that variables are cointegrated at a 5% level of significance. When we have values of 1%, 5%, and 10%, we can accept our null hypothesis. At the 5% level of significance, the results of Pedroni integration in Asian countries show that the panel statistic is significant. The Group pp statistic shows that the variable is cointegrated at the 5% level of significance. The Group ADF statistic also shows that the variable is cointegrated at the 5% level of significance. At a 5% significance level, the panel Modified pp, panel pp statistic, and panel ADF statistic all show that variables are cointegrated in Asian countries. This means that the alternative can be accepted.

Table 4.7 Pedroni Test

	Statistic	p-value
Modified Phillips–Perron t	4.4959	0.0000
Phillips–Perron t	-1.8951	0.0290
Augmented Dickey–Fuller t	-2.6895	0.0036

These related tests of cointegration work in different ways, but they all lead to the same conclusion: the panels are cointegrated.

4.9 Westerlund test for Cointegration
The Westerlund test is yet another method, and it is one that has fewer rules. It checks the same null hypothesis, but the alternative hypothesis is that some of the panels are cointegrated, but not necessarily all of them. This test also says that null is wrong.

Table 4.8 Westerlund Test

	Statistic	p-value
Variance ratio	2.4582	0.0070

4.9.1 Panel Vector Error Correction Model (PVECM)
The results of the Panel Vector Error Correction Model (PVECM) are reported in Table 4.9. The Panel Vector Error Correction Model (PVECM) estimation is conducted after confirming the existence of a long-run relationship among the variables through panel cointegration tests. This model allows the examination of both the short-run dynamics and the speed of adjustment toward long-run equilibrium among the variables included in the analysis. As shown in Table 4.9, the coefficient of the error correction term ECT (-1) is negative and statistically significant at the 1% level with a value of −0.468. The negative and significant sign of the ECT confirms the presence of a stable long-run equilibrium relationship among the variables. This implies that any short-run deviation from the long-run equilibrium is corrected over time. Specifically, the coefficient indicates that approximately 46.8% of the disequilibrium from the previous period is adjusted in the current period, suggesting a moderate speed of adjustment toward the long-run equilibrium path.
The empirical results further reveal that GDP has a positive and statistically significant coefficient of 0.513, indicating that economic growth positively influences the dependent variable. Similarly, population (POP) shows a positive and significant coefficient of 0.276, suggesting that an increase in population contributes positively to the dependent variable. In contrast, FDI outflows exhibit a negative and statistically significant coefficient of −0.332, implying that higher capital outflows reduce the dependent variable. On the other hand, FDI net inflows have a positive and statistically significant coefficient of 0.419, indicating that inward foreign investment contributes positively to the dependent variable. Furthermore, the results indicate that GPI secondary education (GPI sec) and GPI primary education (GPI pri) both have positive and statistically significant coefficients, suggesting that improvements in gender parity in education play a positive role in influencing the dependent variable. Likewise, employment in the formal sector (EMPF) and employment in the industrial sector (EMIND) demonstrate positive and significant effects, indicating that higher employment levels contribute positively to the dependent variable. However, population growth (POP-growth) shows a negative and statistically significant coefficient of −0.158, implying that rapid population growth may exert downward pressure on the dependent variable.
Overall, the Panel Vector Error Correction Model (PVECM) findings presented in Table 4.9 confirm the existence of a stable long-run equilibrium relationship among the variables. The results highlight the significant role of economic growth, foreign direct investment, education, and employment in influencing the dependent variable, while population growth appears to have an adverse effect.

4.9 Panel Vector Error Correction Model (PVECM) Results

Variables	Coefficient	Standard Errors	t-statistics	Probability
ECT(-1)	-0.468215	0.07941	-5.89733	<0.01
C	0.142318	0.02084	6.82941	<0.01
GDP	0.512684	0.19873	2.57964	0.01
POP	0.276315	0.10942	2.52587	0.01
FDI outflow	-0.332418	0.12173	-2.73184	<0.01
FDI net inflow	0.418762	0.16724	2.50361	<0.01
GPI sec	0.134825	0.05416	2.48867	<0.01
GPI pri	0.106391	0.04152	2.56104	<0.01
EMPF	0.289417	0.10173	2.84652	<0.01
EMIND	0.364228	0.13984	2.60478	0.01
POP-growth	-0.158437	0.06324	-2.50567	0.0154

Note**:** All variables are statistically significant at 1% or 5% levels.

4.9.1 Quantile Regression
When you think about linear regression, it is easier to understand quantile regression. We might think of basic linear regression as fitting a line that splits the data in half, with each half falling on either side of the line. Mean regression is another name for it.

4.9.2 Short Run Quantile Regression

Table 4.10 shows the short estimates of quantile regression in four quantiles (0.9, 0.75, 0.50 and 0.25). The results of the short run estimates of median (0.5) quantiles regression indicate that the coefficient value of expected lag error correction term (ECT) is -0.0349 which negative and significant at 01 percent level of significance. Error correction term indicate the speed of adjustment towards equilibrium. The variables FDI net inflow as percentage of GDP, female employment rate and total number of population have significant impact on economic growth of selected Asian countries. FDI net inflow as percentage of GDP, female employment rate and total number of population are significant at 1 percent, 10 percent and 1 percent level of significance respectively. Gender inequality in education in both primary and secondary education has insignificant impact on economic growth in short run in selected Asian countries. There are minor differences in coefficients values estimated at quantiles 0.25, 0.75 and 0.9 as compared with median (0.5) quantiles regression. However, the signs of the co-efficient of all variable are similar in all four quantile regr

Table 4.10 Short Run Quantile Regression
Dependent Variable: Gross domestic product (GDP)

Short run Quantile Regression (0.9)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.021208	0.009095	-2.331732	0.0201
POP	0.210186	0.075761	2.774333	0.0057
FDI net inflow	0.272259	0.117234	2.322353	0.0206
GPI sec	0.000661	0.022948	0.028820	0.9770
GPI pri	57.84529	6.533867	8.853147	0.0000
FDI outflow	-0.265678	0.117423	-2.262571	0.0241
EMPF	0.024337	0.022021	1.105196	0.2696
EMIND	-0.156522	0.167304	-0.935551	0.3499
ECM(-1)	-0.006866	0.006664	-1.030358	0.3033
Short run Quantile regression (0.75)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.024369	0.014502	-1.680340	0.0935
POP	0.297226	0.041480	7.165469	0.0000
FDI net inflow	0.323286	0.134395	2.405486	0.0165
GPI sec	-0.008792	0.022307	-0.394139	0.6936
GPI pri	32.97473	7.740339	4.260114	0.0000
FDI outflow	-0.318480	0.135616	-2.348389	0.0192
EMPF	0.036398	0.020287	1.794154	0.0734
EMIND1	-0.139160	0.176114	-0.790174	0.4298
ECM(-1)	-0.024000	0.010390	-2.309945	0.0213
Short run Quantile Regression (0.50)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.010809	0.011931	-0.905993	0.3654
POP	0.295321	0.052526	5.622333	0.0000
FDI net inflow	0.413366	0.179650	2.300956	0.0218
GPI sec	-0.002134	0.007007	-0.304527	0.7609

GPI pri	3.410189	8.954827	0.380821	0.7035
FDI outflow	-0.412381	0.182226	-2.263016	0.0241
EMPF	0.030280	0.018237	1.660337	0.0975
EMIND	-0.155510	0.246526	-0.630807	0.5285
ECM(-1)	-0.034972	0.014887	-2.349176	0.0192
Short run Quantile Regression (0.25)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.015954	0.009431	-1.691687	0.0913
POP	0.294042	0.036064	8.153405	0.0000
FDI net inflow	0.482107	0.047957	10.05296	0.0000
GPI sec	0.005134	0.030300	0.169450	0.8655
GPI pri	-25.24214	10.11855	-2.494640	0.0129
FDI outflow	-0.484243	0.049016	-9.879257	0.0000
EMPF	0.049078	0.037064	1.324122	0.1861
EMIND	-0.264633	0.339066	-0.780476	0.4355
ECM(-1)	-0.054161	0.016566	-3.269434	0.0012

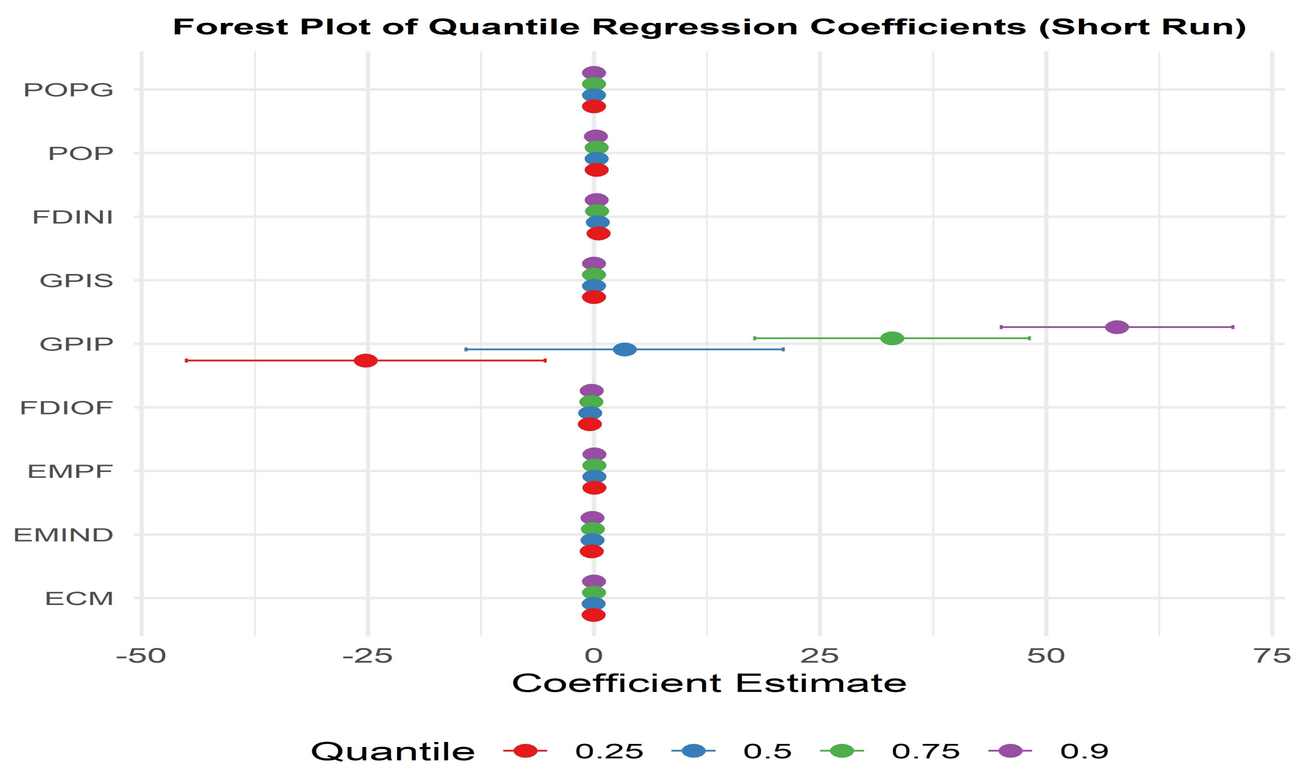

Figure 6(B): Forest Plot of Short-Run Quantile Regression Coefficients

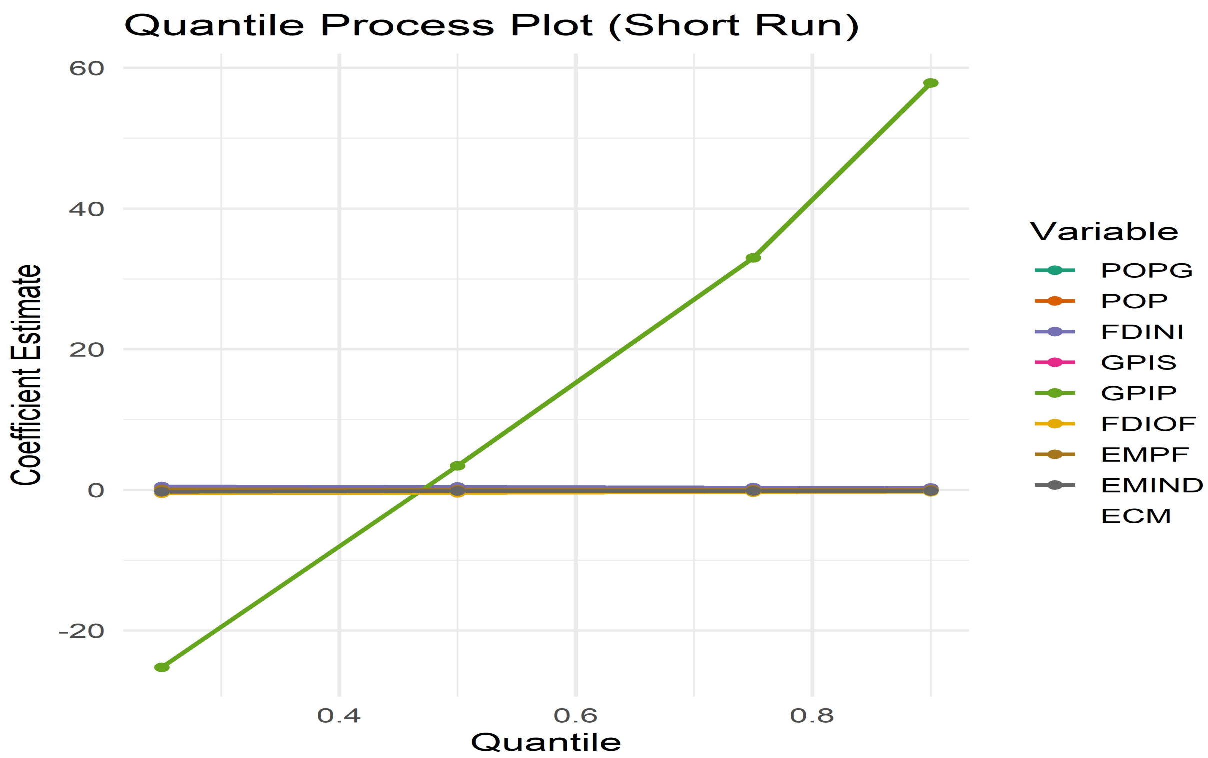

Figure 6(A): Quantile Process Plot of Short-Run Regression Estimates

Figures 6A and 6B present the short-run quantile regression estimates and coefficient distributions across different quantiles of GDP. The results demonstrate that the effects of explanatory variables vary across the conditional distribution of economic development, indicating heterogeneous relationships among the variables. In particular, GPI primary exhibits substantial variation across quantiles, showing a negative effect at lower quantiles and increasingly positive effects at higher quantiles, suggesting that improvements in gender parity in primary
education contribute more strongly to economic development in higher-income economies. The forest plot further illustrates the coefficient estimates and confidence intervals, confirming the varying magnitude and direction of the relationships across quantiles. Overall, the findings support the suitability of quantile regression analysis in capturing differential short-run impacts of gender inequality, employment, and investment-related variables on economic development in selected Asian countries

4.9.3 Long Run Quantile Regression

In Table 4.11 represents the long run quantile regression estimates. The results are estimated in four quantiles (0.9, 0.75, 0.5 and 0.25). The estimates of quantile regression at median (0.5) indicates that labour force participation (POP) has a strong effect on GDP." The positive coefficient for labour force participation (POP) is 0.125213, which is statistically significant. This means that a one-unit rise in POP causes 0.125213 unit rise in GDP. The current study showed that the FDI outflow and GDP are negatively associated. The FDI outflow coefficient is -0.825496, which is negative and means that a one-unit increase in FDI outflow could lead to a -0.825496 unit decline in GDP in the long run. GDP is strongly affected by FDI net inflow. FDI net inflow has a positive coefficient of 0.816196 which is statistically significant at 1 percent level of significance. This means that a one-unit rise in FDI net inflow causes a rise of 0.816196 percent in GDP growth. As FDI outflow increases the economic activities in the countries also increases. The Gender parity index for secondary education enrolment (GPI secondary) coefficient is 0.005104, which is positive but insignificant on GDP Growth rate in selected Asian countries. It is because female and male currently enrolled in secondary education are full time engaged in education doing not perform any earning or economic activity. GDP is strongly affected by The Gender parity index for primary education enrolment (GPI primary). This variable has a positive coefficient of 0.348229, which is statistically significant at 1 percent level of significance. This means that a one-unit rise in GPI primary causes a 0.348229 percent rise in GDP. The coefficient employment in industry (EMIND) is -0.000324. The variable has negative but insignificant impact on GDP growth rate. The reason is that very less number of women is employed in industrial sector in the selected Asian countries. Female employment rate (EMPF) has significant positive impact on GDP growth rate in the long run. The variable is significant at 1 percent level of significance and the coefficient value of 0.073548 indicates that a one unit increase in female employment rate will increase the GDP of selected Asian Countries by 0.073548 percent. The variable of population growth rate (POP-GROWTH) has also significant negative impact on economic growth. The coefficient value of the variable is -0.055082 significant at 1 percent level. The negative sign indicate that greater the overall population growth rate will result in greater number dependency rate and hence will result in decline in GDP growth. There are minor differences in coefficients values estimated at quantiles 0.25, 0.75 and 0.9 as compared with median (0.5) quantiles regression. However, the signs of the co-efficient of all variable are similar in all four quantile regressions.

Table 4.11 Long Run Quantile Regression
Dependent Variable: Gross domestic product (GDP)

Long run Quantile Regression (0.9)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**

POP_GROWTH	0.005191	0.023657	0.219429	0.8264
POP	0.114677	0.035346	3.244446	0.0013
FDI net inflow	0.810584	0.038168	21.23749	0.0000
GPI sec	-0.012298	0.015622	-0.787236	0.4315
GPI pri	0.098393	0.283234	0.347393	0.7284
FDI outflow	-0.830964	0.051049	-16.27782	0.0000
EMPF	0.029437	0.057492	0.512010	0.6089
EMIND	0.080709	0.050041	1.612867	0.1074
C	7.134231	0.235224	30.32956	0.0000
Long run Quantile Regression (0.75)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.050166	0.016272	-3.082969	0.0022
POP	0.114780	0.021161	5.424219	0.0000
FDI net inflow	0.813607	0.014512	56.06562	0.0000
GPI sec	0.024895	0.020172	1.234129	0.2177
GPI pri	0.438375	0.094408	4.643436	0.0000
FDI outflow	-0.808706	0.025493	-31.72210	0.0000
EMPF	0.083601	0.024935	3.352722	0.0009
EMIND	0.010146	0.033481	0.303022	0.7620
C	6.901152	0.170172	40.55405	0.0000
Long run Quantile Regression (0.50)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.055082	0.017282	-3.187159	0.0015
POP	0.125213	0.026679	4.693411	0.0000
FDI net inflow	0.816196	0.014291	57.11139	0.0000
GPI sec	0.005104	0.207257	0.024624	0.9804
GPI pri	0.348229	0.117370	2.966928	0.0031
FDI outflow	-0.825496	0.028117	-29.35948	0.0000
EMPF	0.073548	0.023358	3.148747	0.0017
EMIND	-0.000324	0.035969	-0.009018	0.9928
C	6.577235	0.300229	21.90738	0.0000
Long run Quantile Regression (0.25)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
POP_GROWTH	-0.059497	0.020925	-2.843345	0.0046
POP	0.059341	0.017161	3.458000	0.0006

FDI net inflow	0.901444	0.023929	37.67154	0.0000
GPI sec	-0.157267	0.266293	-0.590578	0.5551
GPI pri	-0.167440	0.176094	-0.950855	0.3421
FDI outflow	-0.897618	0.025107	-35.75191	0.0000
EMPF	0.012264	0.026190	0.468267	0.6398
EMIND	-0.028144	0.032124	-0.876108	0.3814
C	5.811910	0.423759	13.71514	0.0000

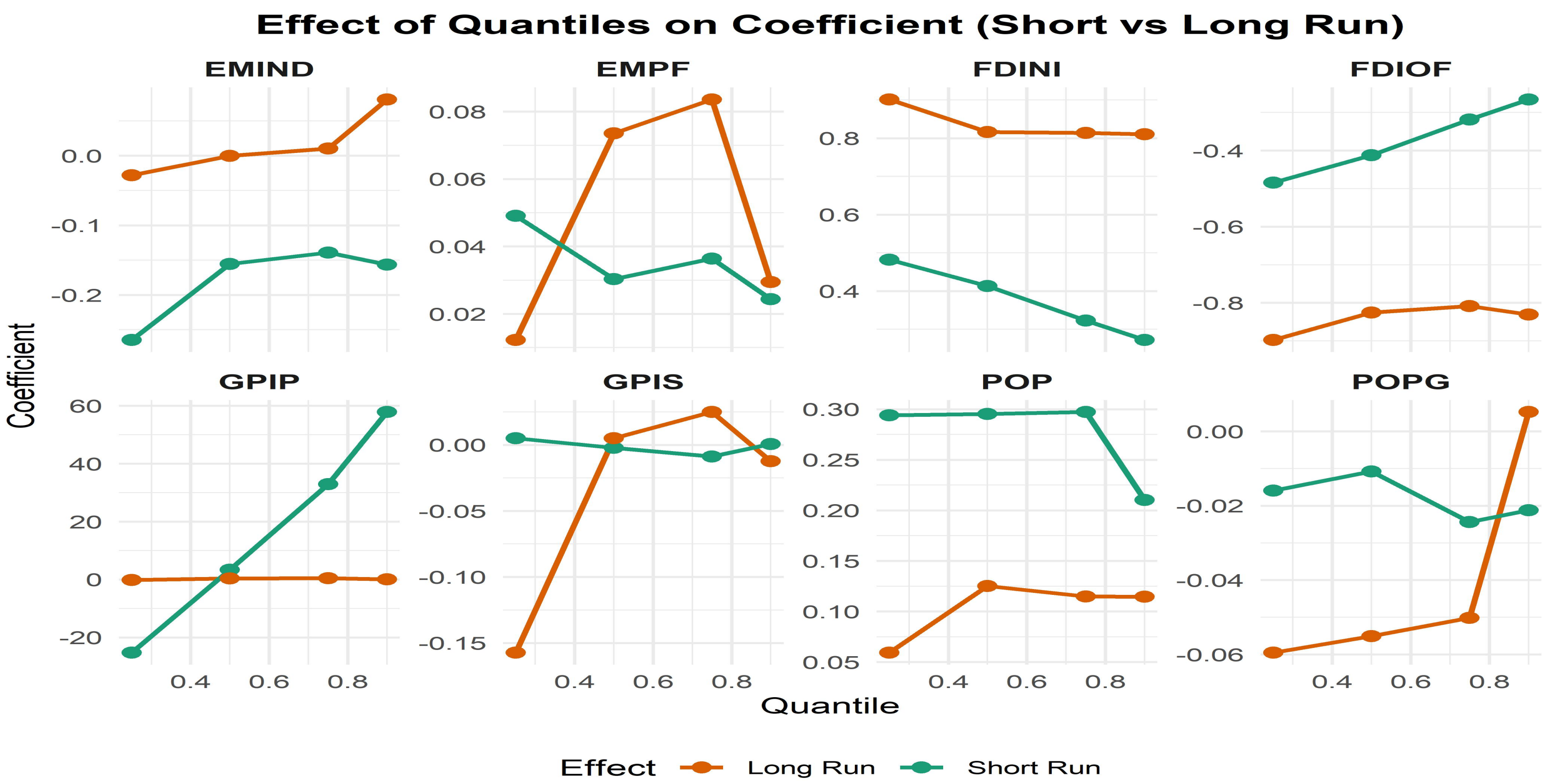

Figure 7: Effect of Quantiles on Short-Run and Long-Run Coefficients

Figure 7 compares the short-run and long-run coefficient estimates across different quantiles for the selected explanatory variables. The results show that the effects of gender inequality, employment, FDI, population, and population growth vary across the GDP distribution. FDI net inflow and population show positive effects, while FDI outflow and population growth mainly show negative effects, particularly in the long run. GPI primary displays the strongest variation, with its short-run coefficient increasing sharply at higher quantiles, indicating that gender parity in primary education has a stronger effect on economic development at higher GDP levels. Overall, the figure confirms heterogeneous short-run and long-run relationships between gender-related indicators, employment factors, investment flows, and economic development in selected Asian countries.

CONCLUSION AND POLICY IMPLICATIONS

5.1 Conclusion

The main goal of this study is to look at how gender roles affect the workforce and GDP growth. To do this empirically, we use a Levin, Lin, Chu, and Im perasan shin (IPS) with panel data of
selected Asian Countries from 1997 to 2021. This study is about inequality between men and women in education and at work and impact of these inequalities on economic growth in Asian. The effects of inequality between men and women on the job market and the economy were also looked at. After the static LLC and IPS tests are done, the order of integration is messed up in this case.

The Cross sectional dependence test, which was made by Pesaran, was also used to see if the data showed any cross-sectional dependence (2004). Also, Westerlund came up with the idea of Bootstrapping cointegration, which was used in this study (2007). Lastly, the authors used the econometrics of panel Quantile regression to get long- and short-run estimates of the variables they were looking at. Innovative methods could be used to make sure that the results are accurate and to speed up the process of making policies. Short-run Quantile regression results show that the total labour force participation (POP), FDI inflow and female employment rate have a positive and statistically significant impact on GDP growth in the short run in the selected Asian developing countries. While the variables of Population growth rate, FDI outflow and Female employed in Gender parity index for primary education (GPI Primary) GPI primary has statistically significant positive effect on GDP. Long-term Quantile regression results show that labour force participation (POP), FDI net inflow (FDI), GPI primary, Female employment rate have significant positive and significant on GDP growth rate in the long run in the selected Asian countries. The variable of Population growth rate, females employed in industrial sector and FDI outflow has significant negative impact in the long run in selected Asian countries.

5.2 Policy Recommendations

These results show how important it is to say that cultural, "social," political, economic, and religious factors, as well as the fact that the effects of these factors on gender inequality vary from country to country, make it normal for there to be different links between gender inequality and economic development. The results could have been changed by the fact that some countries didn't have enough data. . So, it's important to point out that improving the position of women requires more than just economic growth or development. Government wants to help women and it needs to take action and work on social re-engineering. In order to encourage girls and women to work in the economy, these programmes may include steps to inform the public, raise awareness, include local and religious leaders, and involve parents. Academics people who make decisions have talked a lot about inequality between men and women. Economists have accepted that gender is a macroeconomic issue, even though they became more well-known as a problem for fundamental reasons. Gender inequality should be eliminated at all level especially primary and secondary education level. Policies should be formulated to achieve gender parity in youth literacy and gender parity in female male labour force participation rate to improve living standard of the nations as well as their economic development.

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