Article

# Do Women's Advancement and Gender Parity Promote Economic Growth? Evidence from 30 Asian Countries

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## Abstract

Women's advancement and consequential gender equality have significant implications for human capital formation, increase in labour productivity, employment creation, poverty reduction, and overall socio-economic and human development. So, inclusive growth and sustainable development would not be possible without women's empowerment and gender equality. Thus, targeting women's empowerment is extensively relevant for Asian countries. In this context, this article explored the impact of the gender factors on the economic growth of 30 Asian economies over the period from 1997 to 2015 by using panel autoregressive distributive lag (ARDL) model. It provides the evidence of an overall positive impact of the gender parity index of health, education, employment and democratic representation on the economic growth of Asia in the long run. Therefore, gender equality is an important determinant of economic growth in Asian countries, and hence, should be on board while planning for the empowerment of women.

## Keywords

Women's advancement, gender parity, economic growth, Asia, ARDL

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## 1. Introduction

In recent decades, the world order has well recognized the importance of women's empowerment and gender equality for poverty reduction and economic development. The call of United Nations Development Programme (UNDP) for empowering women and achieving gender equality by 2030 through sustainable development goal-5 (SDG-5) corroborates it. Sen (1990) had made inequality and social exclusion responsible for gender bias and keeping women isolated from their participation in productive activities. Such discrimination is responsible for marginalization, morbidity, mortality, food shortage and family loss (Kumar & Mishra, 2018), which makes it difficult to achieve inclusive and sustainable socio-economic development (Bayeh, 2016). Therefore, investment for women's empowerment and advancement is not only the right thing to do but also the smart thing to do. Women's advancement can lead to socio-economic, political and cultural strength and stability of a nation. Thus, the development strategy should be engendered instead of endangered. Stotsky et al. (2016) aptly said 'although the world has moved closer to gender equality and narrowed gaps in education, health and economic and political opportunity; … substantial differences remain, especially in South Asia, the Middle East, and Sub-Saharan Africa' and this would undermine the growth prospects of these regions (Brummet, 2008). Thus, examining the case of 30 selected Asian countries concerning gender parity indices of primary school enrolment rate, life expectancy at birth, employment in agriculture, industry and services, and of democratic representation in national parliaments, the following observations have been made (see Table 1):

1. All the selected countries have attained gender parity in life expectancy at birth during 1997–2015.
2. Gender equality or near gender equality in primary school enrolment has been achieved by these nations except for Cambodia, Lao PDR, Lebanon, Nepal and Pakistan which reveal a medium level of gender inequality during 1997–2015.
3. Gender disparity in labour force participation is extremely high in India, Iran, Lebanon, Pakistan, Sri Lanka, Turkey and UAE; high in Indonesia, Japan, South Korea, Kuwait, Kyrgyzstan, Malaysia, Maldives, Philippines, Tajikistan and Uzbekistan; and medium in rest of the countries except in Lao PDR which has attained gender parity.
4. Extremely high level of gender imbalance in agricultural employment exists in Israel, Kuwait, Maldives and UAE; a high level of gender disparity exists in Cyprus, Malaysia and Philippines; medium level of inequality is observed in China, Kazakhstan, Mongolia and Thailand; and rest of the countries have achieved gender equality in agricultural employment during 1997–2015.
5. Gender parity in industrial employment has been achieved by Cambodia, China and the Maldives; the status of disparity is extreme and/or high in most of the Asian countries.

**Table 1.** Average Level of Gender Inequality in Asia, 1997–2015

| Extremely High (0.00–0.50) | High (0.50–0.75) | Medium (0.75–0.95) | Low (0.95–1.00) | Equality (≥1.00) |
|---|---|---|---|---|

| Countries in Asia | LFPR | PER | LEB | EMAG | EMID | EMSR |
|---|---|---|---|---|---|---|
| Armenia | 0.75 | 1.03 | 1.09 | 1.39 | 0.29 | 1.14 |
| Bhutan | 0.83 | 0.96 | 1.01 | 1.28 | 0.78 | 0.62 |
| Cambodia | 0.92 | 0.91 | 1.07 | 0.99 | 1.20 | 0.92 |
| China | 0.85 | 0.99 | 1.04 | 0.88 | 1.12 | 1.08 |
| Cyprus | 0.80 | 1.00 | 1.06 | 0.59 | 0.34 | 1.35 |
| Georgia | 0.77 | 1.00 | 1.11 | 1.10 | 0.30 | 1.17 |
| India | 0.35 | 0.97 | 1.03 | 1.39 | 0.69 | 0.56 |
| Indonesia | 0.60 | 0.98 | 1.06 | 1.00 | 0.72 | 1.15 |
| Iran | 0.22 | 0.98 | 1.03 | 1.31 | 0.90 | 0.95 |
| Israel | 0.84 | 1.00 | 1.05 | 0.32 | 0.34 | 1.33 |
| Japan | 0.73 | 1.00 | 1.09 | 1.02 | 0.50 | 1.30 |
| Kazakhstan | 0.90 | 1.00 | 1.17 | 0.93 | 0.44 | 1.37 |
| Korea | 0.71 | 1.01 | 1.09 | 1.19 | 0.49 | 1.26 |
| Kuwait | 0.63 | 1.01 | 1.03 | 0.02 | 0.11 | 1.48 |
| Kyrgyz Republic | 0.73 | 0.99 | 1.12 | 1.01 | 0.47 | 1.30 |
| Lao PDR | 1.00 | 0.89 | 1.05 | 1.08 | 0.66 | 0.82 |
| Lebanon | 0.32 | 0.93 | 1.05 | 1.40 | 0.41 | 1.18 |
| Malaysia | 0.60 | 1.00 | 1.06 | 0.61 | 0.73 | 1.31 |
| Maldives | 0.54 | 0.97 | 1.03 | 0.33 | 1.73 | 0.99 |
| Mongolia | 0.83 | 1.00 | 1.12 | 0.92 | 0.64 | 1.28 |
| Nepal | 0.93 | 0.94 | 1.04 | 1.29 | 0.35 | 0.56 |
| Pakistan | 0.23 | 0.76 | 1.03 | 1.90 | 0.61 | 0.41 |
| Philippines | 0.64 | 0.99 | 1.10 | 0.55 | 0.61 | 1.68 |
| Sri Lanka | 0.49 | 0.99 | 1.10 | 1.22 | 0.99 | 0.82 |
| Tajikistan | 0.53 | 0.96 | 1.09 | 1.65 | 0.20 | 0.67 |
| Thailand | 0.83 | 0.98 | 1.11 | 0.91 | 0.85 | 1.20 |
| Turkey | 0.39 | 0.96 | 1.10 | 2.28 | 0.49 | 0.74 |
| UAE | 0.43 | 1.00 | 1.03 | 0.02 | 0.29 | 1.44 |
| Uzbekistan | 0.71 | 0.99 | 1.09 | 1.20 | 0.51 | 1.39 |
| Vietnam | 0.92 | 0.96 | 1.14 | 1.07 | 0.67 | 1.14 |

**Source:** The authors.

**Notes:** LFPR: Gender parity index of labour force participation; PER: gender parity index of primary school enrolment; LEB: gender parity index of life expectancy at birth; EMAG: gender parity index of employment in agriculture; EMID: gender parity index of employment in industry; EMSR: gender parity index of employment in services.

6. Gender inequality in service sector employment is extremely high in Pakistan; high in Bhutan, India, Nepal, Tajikistan and Turkey; medium in Cambodia, Lao PDR and Sri Lanka; and rest of the countries have attained gender parity in this sector during 1997–2015.

Therefore, there is a dire urge to focus on this issue and identify the significant determinants required to chalk out appropriate policies to enhance women's capabilities for achieving gender equality thereby promoting economic growth. In line with this argument, this article purports women's advancement and consequential gender equality in health, education, economic and political dimensions as one of the significant determinants of economic growth in Asia. In this direction, this article contributes to the literature the impact of gender inequality in the agricultural, industrial and service sector employment on economic growth in 30 Asian countries. The findings of the study would, therefore, be important from the policy perspective. The article is organized into five sections. Apart from the introductory section, the review of literature is presented in Section II. Database and methodology are outlined in Section III. Analysis and interpretation of results from the econometric model is presented in Section IV. Summary and conclusions are described in the final section.

## II. Literature Review

In recent decades, Asian economies have been depicting a picture of rapid growth primarily driven by an increase in investments, improvement in technology and innovations, growth in productivity, and positive effects of globalization and liberalization. In this perspective, stimulating the contributions to sustaining and enhancing the growth of Asia and lifting more people out of poverty, to a great extent depends on women's advancement and gender equality (Woetzel et al., 2018). Woetzel et al. further state 'from an economic perspective, trying to grow without enabling the full potential of women is like fighting with one hand tied behind one's back'. Gender parity maximizes the presence and involvement of women in socio-economic and political decision making in both private and public domains and contributes to the growth process (Mehrotra & Sinha, 2019). Ensuring gender parity in health, education, economic and political dimensions can unleash the economic potential both at the micro and macro levels.

The extant literature supports the argument that larger the educated woman, higher is the economic growth of a country (Barro & Lee, 1994; Barro & Sala-i-Martin, 1995; Kabeer & Natali, 2013; Mishra & Mishra, 2016, 2017; Waseem, 2015; Wolfensohn, 1995). Gender inequality in education by restricting highly talented girls, promotes many less talented boys in the ladders of education. This results in a decrease in the productivity of human capital which inhibits economic growth (Knowles, Lorgelly, & Owen, 2002; World Bank, 2001). A lower share of girls in education obstructs the benefits of lower fertility and infant mortality, and future education that are accruable to society in contributing to higher economic growth (Galor & Weil, 1996; King, Klasen, & Porter, 2008; Lagerlöf, 2003; World

Bank, 2001). Gender inequality in education, by reducing the productivity of women in women-intensive export-oriented manufacturing industries, stands on the way of export-led growth (Seguino, 2000a, b). Educated women have the power to claim rights in socio-economic and political spheres, and can deal with family responsibilities, employment and bring economic development (Okorie, 2013). The average productivity of agriculture, manufacturing and service sectors can suffer because of less availability of women in these sectors thereby hampering the economic growth (Blackden, Canagarajah, Klasen, & Lawson, 2007; Esteve-Volart, 2004). Hence, achieving women's advancement and gender equality in education is critical for the economic growth of nations.

Life expectancy at birth is an indicator of women health status, which brings better human capital needed for economic growth and has a positive impact on the economy (Salatin & Shaaeri, 2015). In the literature, it has been claimed that better the gender parity in life expectancy, greater is the economic growth (Bloom & Sachs, 1998; Bloom, Canning, & Sevilla, 2003, 2004; Gallup, Sachs, & Mellinger, 1999; Lorentzen, Mc Millan, & Wacziarg, 2008; Mishra & Mishra, 2017).

Furthermore, the literature supports the argument that greater the access of women to employment, higher is the economic growth (Baliamoune-Lutz & McGillivray, 2007; Cabeza-Garcia, Brio, & Victorio, 2018; Elborgh-Woytek et al., 2013; Lechman, 2014; Mishra & Mishra, 2017; Moghadam, 2003; Pervaiz, Chani, Jan, & Chaudhary, 2011). It has been argued that less representation of women in employment vis-a-vis men increases fertility rate which in turn reduces economic growth (Cavalcanti & Tavares, 2007). The gender gap in employment also deprives the use of female labour which does not allow reaping the competitive advantage of export-led growth strategy and thus reduces the rate of economic growth (Seguino, 2000a, b). Sizeable literature demonstrates that women employment increases their bargaining power at the family level. Higher earnings by women lead to increased savings, more productive investment and promotion of next-generation human capital (through more investment in education and health of children) which increase economic growth (Aguirre, Hoteit, Rupp, & Sabbagh, 2012; Haddad, Hoddinott, & Alderman, 1997; King et al., 2008; Klasen & Wink, 2003; OECD, 2015; Thomas, 1997). Recently, it has been estimated that gender equality in the labour participation rate has a strong positive impact on GDP growth (Goldman Sachs, 2013; IMF, 2013; WEF, 2017, 2018).

Moreover, it is evident from the existing literature that higher democratic representation of women stimulates economic growth (Balaev, 2014; Cabeza-Garcia et al., 2018; Jayasuriya & Burke, 2013; Tong, 2003; Xu, 2015). It is argued that women are less prone to nepotism and corruption in comparison to their male counterparts which paves the way for inclusive growth (Swamy, Omar, Knack, & Lee, 2001; World Bank, 2001). It is also argued that women can better able to raise their voices against major issues like childcare, reproductive rights, equal pay, poverty alleviation and delivery of services once they get their representations in national parliaments (Mehrotra & Jolly, 1997). Thus, political empowerment can act as a catalyst in reinforcing other dimensions of women empowerment which ultimately can lead to increased per capita income.

Therefore, the gender factors such as female–male ratios of school enrolment, life expectancy, labour force participation and democratic representation have a positive impact on real economic growth when there is the evidence of women's advancement and gender equality. The empirical findings concerning the impact of gender factors on economic growth are summarized in Table 2.

Against this backdrop, this article explores the impact of the gender factors on economic growth in Asian countries. The results provide empirical support to the overall positive impact of women's advancement on economic growth in Asian countries which made us hypothesize about the importance of gender equality in the process of long-run economic growth of nations. The remaining of the study elaborates the empirical discussions of these findings while outlining the data and methodology used for this purpose.

## III. Data and Methodology

The key research question in this article is 'how do gender factors affect economic growth in Asia?' And, to address this research question, a sample of 30 Asian countries have been selected, i.e., Armenia, Bhutan, Cambodia, China, Cyprus, Georgia, India, Indonesia, Iran, Israel, Japan, Kazakhstan, Kuwait, Kyrgyz Republic, Lao PDR, Lebanon, Malaysia, Maldives, Mongolia, Nepal, Pakistan, Philippines, South Korea, Sri Lanka, Tajikistan, Thailand, Turkey, United Arab Emirate, Uzbekistan and Vietnam. The cross-section and time series data consisting of 30 countries, six variables and 19 years (from 1997 to 2015) have been pooled to examine the relationships between real economic growth and independent variables such as GDP per capita (GDPC), female–male ratio of primary school enrolment (PER), female–male ratio of life expectancy at birth (LEB), female–male ratio of employment in agricultural sector (EMAG), female–male ratio of employment in industrial sector (EMID), female–male ratio of employment in service sector (EMSR) and representation of women in the national parliament (PWNP). The balanced panel of annual data on these variables has been compiled and prepared from the World Development Indicators (WDI) database of the World Bank. Table 3 summarizes the theoretical construct as argued in this article along with the operational definitions of the variables considered. Based on this construct, the functional form of the relationship between real economic growth and gender factors is:

$$\mathrm{GDPC} = f(\mathrm{PER}, \mathrm{LEB}, \mathrm{EMAG}, \mathrm{EMID}, \mathrm{EMSR}, \mathrm{PWNP}) \tag{1}$$

And, the econometric specification of Equation (1) to evaluate the impact of gender factors on the real economic growth of Asia is:

$$\begin{aligned}\mathrm{Ln}(\mathrm{GDPC}_{it}) = \beta_{i0} + \beta_{i1}\,\mathrm{PER}_{it} + \beta_{i2}\,\mathrm{LEB}_{it} + \beta_{i3}\,\mathrm{EMAG}_{it} + \beta_{i4}\,\mathrm{EMID}_{it} \\ + \beta_{i5}\,\mathrm{EMSR}_{it} + \beta_{i6}\,\mathrm{PWNP}_{it} + u_{it}\end{aligned} \tag{2}$$

where, $\beta_0$ is the constant, all other $\beta$'s measure the degree and direction of each of the gender factor included in the model and $u_t$ is the error term.

**Table 2.** Review of Empirical Literature

| Author(s) | Period | Country(s) | Variables Considered | Method Used | Main Finding |
|---|---|---|---|---|---|
| Egbulonu and Eleonu (2018) | 1990–2016 | Nigeria | **Dependent**: GDP. **Independent**: Male and female LFPR, Male and female SSE. | ARDL bound test | Male SSE has a statistically significant positive impact on GDP, whereas female SSE and LFPR have a positive but statistically no significant impact on GDP. |
| Saqib, Aggarwal, and Rashid (2016) | 1999–2014 | Saudi Arabia | **Dependent**: Real GDP per capita. **Independent**: FER, female employed rate (Women empowerment). | Co-integration test amd OLS | Women empowerment has statistically significant positive impact on economic growth in the long run. |
| Chaudhary et al. (2012) | 1996–2009 | Pakistan | Gender empowerment, Gender development index, female SSE and female LFPR. | Granger causality test | Unidirectional causality between female SSE and women empowerment and a bidirectional causality between overall development of women and women empowerment. |
| Chaudhary and Rahman (2009) | 2008 | Pakistan | **Dependent**: Poverty. **Independent**: Female–male literacy ratio, female–male enrolment ratio, female–male ratio of total years of schooling, education of household head, age of household head, female–male ratio of earners, female–male ratio of members and household size. | Logit regression | Female–male enrolment ratio, female–male literacy ratio, female–male ratio of total years of schooling, female–male ratio of earners and education of household head have statistically significant negative impact on rural poverty. |
| Cabeza-Garcia et al. (2018) | 2000–2014 | 127 countries | **Dependent**: GDP. **Independent**: Female SSE, female LFPR and FER, representation of women in national parliament. | Generalized method of moments (GMM) | Female SSE, female LFPR, representation of women in the national parliament have statistically significant positive and FER has statistically significant negative effects on GDP. |

*(Table 2 continued)*

*(Table 2 continued)*

| Author(s) | Period | Country(s) | Variables Considered | Method Used | Main Finding |
|---|---|---|---|---|---|
| Mishra and Mishra (2017) | 1990–2014 | SAARC | **Dependent**: Real GDP per capita. **Independent**: Female–male ratio of gross PSE, female–male ratio of LEB, female–male ratio of LFPR, female–male ratio of unemployment, MMR and participation of women in national parliament. | Panel ARDL | Gender parity in gross PSE, LEB and LFPR have statistically significant positive impact on per capita real GDP in the long run. |
| Trondillo (2016) | 1960–2013 | 193 UN countries | **Dependent**: GDP per capita. **Independent**: IMR, under-5 mortality rate, proportion of child immunized against measles, MMR and skilled health personnel. | OLS | MMR has statistically significant negative effect on GDP per capita. |
| Salatin and Shaaeri (2015) | 1991–2011 | Middle-income countries | **Dependent**: Real GDP. **Independent**: Female gross SSE and female and male LEB. | GMM estimation | Female and male gross SSE and male LEB have statistically significant positive impact on real GDP. |
| Wyndow, Li, and Mattes (2013) | 1980–2005 | 97 countries | **Dependent**: Level of democracy. **Independent**: Female education, FER and female LFPR. | GMM estimation | Female education and female LFPR have statistically significant positive relationship with democratic development. |
| Kobeissi (2010) | 1999–2004 | 149 countries | **Dependent**: Female entrepreneurship start-up, female to male entrepreneurship start-up ratio. **Independent**: Female SSE, gender empowerment value-based composite index (Economic, political and power over economic resources), percentage of female employment in agriculture, industry and services to total, female to male earnings ratio, FER. | Mean, standard deviation and Pearson's correlation coefficient | Female SSE, gender empowerment, female economic activities and FER have statistically significant positive and female to male earnings ratio has statistically significant negative impacts on female entrepreneurship start-up and female to male entrepreneurship start-up ratio. |

| | | | | | |
|---|---|---|---|---|---|
| Spierings, Smits, and Verloo (2009) | 1996–2000 | 45 Muslim countries (Member of OIC) | **Dependent**: GDP per capita. **Independent**: Women's labour market participation. | Structural equation modelling | Female labour market participation has significant positive impact on economic development measured by GDP per capita. |
| Kirigia, Oluwole, Mwabu, Gatwiri, and Kainyu (2006) | – | 45 member states in the WHO African region | **Dependent**: Per capita GDP. **Independent**: Arable land, LFPR, gross domestic investment, combined primary, secondary and tertiary gross enrolment ratio, trade openness and MMR . | Double log model | MMR has statistically significant negative impact on per capita GDP. |

**Source:** The authors.

**Notes:** FER = Fertility rate, GDP = gross domestic product, IMR = infant mortality rate, LEB = life expectancy at birth, LFPR = labour force participation rate, MMR = maternal mortality rate, PSE = primary school enrolment, SSE = secondary school enrolment.

**Table 3.** Variable Descriptions and the Theoretical Construct

| Variables | Notation | Short Description | Data Source | Expected Sign in Regression |
|---|---|---|---|---|
| GDP per capita | Ln (GDPC) | It is per head gross domestic product measured in constant (2010) USD. It has been taken as a proxy of real economic growth of Asian countries. In our model, this indicator has been taken in the natural logarithmic form. | WDI, The World Bank | Dependent variable |
| Female–male ratio of primary school enrolment | PER | It is the gender parity index of gross primary school enrolment. Women's advancement relative to that of men is indicated by such ratio being greater than one. This gender factor is expected to have a positive impact on the economic growth in Asia. | WDI, The World Bank | + |
| Female–male ratio of life expectancy at birth | LEB | It is the gender parity index of life expectancy at birth. Women's advancement relative to that of men is indicated by such ratio being greater than one. This gender factor is expected to have a positive impact on the economic growth in Asia. | Authors' calculation from the life expectancy at birth data taken from WDI, The World Bank. | + |
| Female–male ratio of employment in agricultural sector | EMAG | It is the gender parity index of employment in the agricultural sector. Women's advancement relative to that of men is indicated by such ratio being greater than one. This gender factor is expected to have a positive impact on the economic growth in Asia. | Authors' calculation from data on employment in agricultural sector, taken from WDI, The World Bank. | + |
| Female–male ratio of employment in industrial sector | EMID | It is the gender parity index of employment in the industrial sector. Women's advancement relative to that of men is indicated by such ratio being greater than one. This gender factor is expected to have a positive impact on the economic growth in Asia. | Authors' calculation from data on employment in industrial sector, taken from WDI, World The Bank. | + |
| Female–male ratio of employment in service sector | EMSR | It is the gender parity index of employment in the service sector. Women's advancement relative to that of men is indicated by such ratio being greater than one. This gender factor is expected to have a positive impact on the economic growth in Asia. | Authors' calculation from data on employment in services sector, taken from WDI, The World Bank. | + |
| Representation of women in the national parliament | PWNP | It is the proportion of seats held by women in the national parliament. It is also an indicator of women's advancement. Higher the value of this indicator, better in the impact of economic growth of Asia. | WDI, The World Bank. | + |

**Source:** The authors.

In our panel data series, the cross-sectional dimension is larger (30) than the time period (19). Thus, it is essential to check whether the panel data series are cross-sectionally independent or not. Baltagi and Pesaran (2007) argued that cross-sectional dependence can arise due to spatial or spillover effects or could be due to unobserved common factors. For this purpose, we have used the Cross-Sectional Dependence (CD) test as proposed by Pesaran (2004) as no other test performs better than CD (Moscone & Tosetti, 2009). The CD test statistic is given by

$$\mathrm{CD} = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \widehat{\rho}_{ij} \tag{3}$$

where $\widehat{\rho}_{ij}$ is the average of the pair-wise correlation coefficients of OLS residuals regressions under fixed/random effect model. The null hypothesis under the CD test is cross-sectional independence (means errors in different cross-sectional units are not correlated).

The results present in Table 6 conclude the presence of cross-sectional dependence in our data set. Baltagi and Pesaran (2007) mentioned that the first-generation unit root tests, which assume cross-sectional independence, are inadequate and could lead to significant size distortions in the presence of neglected cross-sectional dependence. Therefore, we have used Cross-sectional Augmented Dickey–Fuller (CADF) unit root test as proposed by Pesaran (2007) that accommodates for cross-sectional dependence among the variables. The CADF equation as used by Pesaran (2007) is:

$$\Delta Y_{it} = \alpha_i + \beta_i Y_{i,t-1} + \gamma_i \bar{Y}_{t-1} + \varphi_i \Delta \bar{Y}_t + \varepsilon_{it} \tag{4}$$

Here, the hypothesis is tested based on the OLS results derived from the Equation (4) and the CADF test statistic is given by

$$\mathrm{CADF} = \frac{\Delta Y_i \bar{M}_W Y_{i-1}}{\widehat{\delta}(Y'_{i-1} \bar{M}_W Y_{i-1})^{1/2}} \tag{5}$$

It would be seen from Table 7 that all the variables of interest are non-stationary in their level except EMSR which is stationary. Thus, a mix of I(1) and I(0) variables constitute our panel data model. Therefore, the Equation (2) has been

**Table 4.** Descriptive Statistics

| | LnGDPC | PER | LEB | EMAG | EMID | EMSR | PWNP |
|---|---|---|---|---|---|---|---|
| Mean | 8.221 | 0.972 | 1.073 | 1.028 | 0.614 | 1.086 | 11.833 |
| Median | 8.029 | 0.988 | 1.063 | 1.049 | 0.545 | 1.164 | 10.200 |
| Maximum | 11.069 | 1.126 | 1.196 | 2.558 | 2.029 | 1.770 | 33.200 |
| Minimum | 5.872 | 0.570 | 1.004 | 0.006 | 0.085 | 0.313 | 0.000 |
| Std. Dev. | 1.382 | 0.064 | 0.039 | 0.494 | 0.342 | 0.318 | 7.711 |
| Observations | 570 | 570 | 570 | 570 | 570 | 570 | 570 |

**Source:** The authors.

**Table 5.** Correlation Matrix and Variance Inflation Factors (VIF)

| | Ln(GDPC) | PER | LEB | EMAG | EMID | EMSR | VIF |
|---|---|---|---|---|---|---|---|
| PER | 0.378 (0.000)* | | | | | | 1.447 |
| LEB | −0.158 (0.000)* | 0.221 (0.000)* | | | | | 1.114 |
| EMAG | −0.484 (0.000)* | −0.325 (0.000)* | 0.174 (0.000)* | | | | 1.382 |
| EMID | −0.227 (0.000)* | −0.143 (0.000)* | −0.166 (0.000)* | −0.057 (0.169) | | | 1.192 |
| EMSR | 0.540 (0.000)* | 0.518 (0.000)* | 0.322 (0.000)* | −0.669 (0.000)* | −0.239 (0.000)* | | 1.476 |
| PWNP | −0.276 (0.000)* | 0.013 (0.743) | 0.133 (0.001)* | 0.003 (0.925) | −0.022 (0.595) | 0.006 (0.887) | 1.417 |

**Source:** The authors.
**Notes:** *p*-Values are in brackets; *significance at 0.01 level ($H_0$: correlation between variables is zero).

estimated in the autoregressive distributive lag (ARDL) framework based on the pooled mean group (PMG) estimators (Pesaran, Shin, & Smith, 1999). This PMG based ARDL is preferred because the estimator combines both averaging and pooling the residuals, incorporates the intercept, short-run coefficients and different error variances across the groups, and holds the long-run coefficients that are equal across the groups (Mallick, Mallesh, & Behera, 2016; Pesaran, Shin, & Smith, 1997, 1999). The use of this technique is justified when variables are a mix of level and 1st difference integrated (Pesaran & Shin, 1999) and in no circumstances, any variable is integrated of order two. The Akaike information criterion (AIC) suggests the one lag both for the regress and regressors. So, both the long- and short-run relationships have been estimated using the following equation:

$$\begin{aligned}\Delta \mathrm{Ln}(\mathrm{GDPC})_{i.t} = {} & \phi_i \mathrm{ECT}_{i,t} + \sum_{j=1}^{p-1} \lambda_{i,j*} \Delta \mathrm{Ln}(\mathrm{GDPC})_{i,t-j} + \sum_{j=0}^{q-1} \beta_{1i,j} \Delta \mathrm{PER}_{i,t-j'} \\ & + \sum_{j=0}^{r-1} \beta_{2i,j} \Delta \mathrm{LEB}_{i,t-j''} + \sum_{j=0}^{s-1} \beta_{3i,j} \Delta \mathrm{EMAG}_{i,t-j'''} \\ & + \sum_{j=0}^{u-1} \beta_{4i,j} \Delta \mathrm{EMID}_{i,t-j^{iv}} + \sum_{j=0}^{v-1} \beta_{5i,j} \Delta \mathrm{EMSR}_{i,t-j^{v}} \\ & + \sum_{j=0}^{x-1} \beta_{6i,j} \Delta \mathrm{PWNP}_{i,t-j^{vi}} + \varepsilon_{i,t} \end{aligned} \tag{6}$$

In this framework, the error correction term (ECT) indicates the departures from the long-run relationship and thus, expected to have a negative coefficient which further reveals the rate of adjustments required in the short run to restore the equilibrium in the long run.

## IV. Analysis and Discussion

At the outset, we have examined the descriptive statistics and other important characteristics of the panel data set under consideration. Table 4 summarizes the descriptive statistics of variables. The average female–male ratio of primary school enrolment across cross-sections is 0.972 which is less than one. It means, on an average, there is gender disparity in the educational dimension of women's advancement in Asian countries. The average female–male ratio of life expectancy at birth is 1.073 which is more than one indicating thereby gender parity in the health dimension of women's advancement across the cross-sections. The average female–male ratios of employment in agriculture and service sectors are 1.028 and 1.086, respectively, implying thereby the gender parity across cross-sections. But the average female–male ratio of employment in the industrial sector is 0.614 which indicates gender disparity in this dimension in Asian economies. Furthermore, the average percentage of seats held by women in national parliaments is 11.83 per cent, which also indicates the presence of gender inequality in the political dimension of women's advancement in Asia.

Next, we have examined the correlation between variables and also estimated the variance inflation factors to ensure that these variables are not multicollinear. Table 5 summarizes the findings. The correlation coefficients are very small and also the VIF values are all less than 10. This means the variables under consideration are not multicollinear. Subsequently, we have examined the cross-sectional dependence in the panel dataset using CD test and results are presented in Table 6.

The presence of cross-sectional dependency has been noticed at the 0.01 level of significance. Thus, we have used the cross-sectional ADF unit root test to observe the stationary properties of the variables. The findings of CADF test are presented in Table 7, which indicates that all the variables are integrated of order one except EMSR which is integrated of order zero. This means only EMSR is stationary and all other variables are non-stationary at the level. In other words, all the variables are I(1) except EMSR which is I(0). And, it is ensured that none of the variables is integrated of order two.

Therefore, the impact of gender factors on economic growth in selected Asian economies can be estimated in the panel ARDL framework. This ARDL estimation included one lag of the dependent variable, and also one lag of each dynamic regressor as suggested by AIC. The estimation outcomes are presented in Table 8, which depicts that the gender factors, such as PER, LEB, EMSR and PWNP, have

**Table 6.** Pesaran's Cross-sectional Dependence Test

| Panel Data Model | CD Test Stat. | *p*-Value |
|---|---|---|
| Fixed effect | 14.384* | 0.000 |
| Random effect | 13.662* | 0.000 |

**Source:** The authors.

**Notes:** $H_0$: No cross-sectional dependence; * significance at 0.01 level.

**Table 7.** Pesaran (2007) Cross-Sectional ADF Unit Root Test

| | CADF at Level | | CADF at 1st Diff. | | |
|---|---|---|---|---|---|
| | Constant + Trend | | | | |
| Variables | *t*-Bar | *p*-Value | *t*-Bar | *p*-Value | Decision |
| LnGDPC | −1.783 | 0.997 | −2.588 | 0.053** | I(1) |
| PER | −2.229 | 0.629 | −2.941 | 0.000* | I(1) |
| LEB | −2.105 | 0.842 | −2.841 | 0.001* | I(1) |
| EMAG | −2.417 | 0.246 | −2.742 | 0.007* | I(1) |
| EMID | −1.990 | 0.948 | −3.062 | 0.000* | I(1) |
| EMSR | −2.704 | 0.012** | – | – | I(0) |
| PWNP | −1.973 | 0.957 | −2.779 | 0.004* | I(1) |

**Source:** The authors.
**Notes:** * and ** Significance at 0.01 and 0.05 levels, respectively.

**Table 8.** Results of Panel ARDL Model (PMG Estimates)

| Dependent Variable: Δ(LnGDPC) | | Dependent Lag: 1 | Dynamic Regressors Lag: 1 | |
|---|---|---|---|---|
| Regressors | Coefficient | Std. Error | *t*-Statistic | *p*-Value |
| *Long-run relationship* | | | | |
| PER | 1.8064* | 0.2745 | 6.5800 | 0.0000 |
| LEB | 20.4317* | 1.9594 | 10.4273 | 0.0000 |
| EMAG | −0.0626 | 0.1062 | −0.5897 | 0.5558 |
| EMID | −0.3876* | 0.0895 | −4.3268 | 0.0000 |
| EMSR | 1.9102* | 0.0958 | 19.9281 | 0.0000 |
| PWNP | 0.0048** | 0.0025 | 1.9215 | 0.0555 |
| *Error correction term* | | | | |
| $\phi$ | −0.1080* | 0.0351 | −3.0757 | 0.0023 |
| *Short-run relationship* | | | | |
| Δ(PER) | −0.8202 | 0.5525 | −1.4842 | 0.1387 |
| Δ(LEB) | 1.2176 | 5.0685 | 0.2402 | 0.8103 |
| Δ(EMAG) | −7.2849 | 4.8588 | −1.4993 | 0.1348 |
| Δ(EMID) | −1.1848 | 1.1399 | −1.0394 | 0.2994 |
| Δ(EMSR) | 2.3131 | 1.5639 | 1.4790 | 0.1401 |
| Δ(PWNP) | 0.0015 | 0.0010 | 1.4166 | 0.1576 |
| *C* | −1.7976* | 0.5869 | −3.0625 | 0.0024 |

**Source:** The authors.
**Notes:** *and ** Significance at 0.01 and 0.10 levels, respectively; lag order selection by AIC value of −4.473750.

a statistically significant positive impact on the GDP per capita of selected Asian countries in the long run. The variable EMID has a statistically significant negative impact on GDP per capita of these countries in the long run. However, no short-run relationship between them has been revealed. The coefficient of ECT is negative and statistically significant at 0.01 levels. This means that the short-run deviations from the long-run equilibrium relationship can subsequently be restored. In other words, the Asian countries would benefit from women's advancement and gender parity in the long run.

In this article, it is found that the female–male ratios of gross primary school enrolment, life expectancy at birth, employment in the service sector and democratic representation exert a positive impact on the economic growth of Asian countries. The female–male ratio of employment in the industrial sector and economic growth in Asia are inversely related. Thus, it can be aptly said that women's advancement leads to gender parity, which in turn favourably influences the economic growth of Asian economies. In other words, gender parity is a significant determinant of economic growth. However, the following is the detail discussion of the impact of gender factors on economic growth.

### *Primary School Enrolment*

The impact of the female–male ratio of primary school enrolment on the long-run economic growth of selected Asian economies is positive and statistically significant at 1 per cent level. Precisely, 1 percentage point increase in this gender factor is likely to increase the GDP per capita of Asian economies by 1.81 per cent in the long run, *ceteris paribus*. This ratio also indicates that the growth process can become faster only when society as a whole move towards women's advancement and gender parity in education. This finding corroborates the findings of Klasen and Lamanna (2009), Kabeer and Natali (2013), Waseem (2015) and Mishra and Mishra (2017). Now, the question arises why does an increase in female enrolment in primary education lead to a higher rate of economic growth. The reasons are many: an increase in women's education reduces fertility, reduces maternal mortality, enhances labour-force participation, improves the skill and capacity to take up better technology and increases the productivity and earnings (Mukherjee & Mukhopadhyay, 2013; Todaro & Smith, 2011).

### *Life Expectancy at Birth*

The impact of the female–male ratio of life expectancy at birth on the long-run economic growth of Asian economies is positive and statistically significant at 1 per cent level. Precisely, 1 percentage point increase in this gender factor is likely to increase the GDP per capita of Asian economies by 20.43 per cent in the long run, *ceteris paribus*. Since life expectancy at birth precisely describes the quality of human capital in an economy, it can create the highest impact on the long-run economic growth of Asian nations. The value of this female–male ratio increases when the female life expectancy at birth increases more rapidly than that of male. It means the growth process can become faster only when society as a whole move towards women's advancement and gender parity in terms of longer healthy lives. This finding corroborates the findings of Bloom et al. (2003, 2004), Lorentzen et al. (2008) and Mishra and Mishra (2017). It is quite pertinent to note that education is the necessary condition and health is the sufficient condition for a higher rate of economic growth. Higher the level of female education, better is the demand for female healthcare, and thus, greater is the productivity and labour-force participation. Hence, there is larger economic value added and higher economic growth (Brummet, 2008).

### *Employment in Industrial Sector*

The impact of the female–male ratio of employment in the industrial sector on the long-run economic growth of Asian economies is negative and statistically significant at 1 per cent level. This may be explained in terms of skill deficit and low productivity of female workers in the industrial sector (Hearle, 2016; Walby & Olsen, 2002). This contributes to the industry gender gap which forbids attaining the significant macroeconomic benefits of labour market potential. If women are better educated, then more skilled labour force will be generated having greater potential to add to the pace of economic growth. However, the success of women labour-force is dependent on the quality and quantity of education and better health (Aguirre et al. 2012; Barsh & Yee, 2012; Steinberg & Nakane, 2012), and removal of sociocultural rigidities associated with female workforce participation.

### *Service Sector Employment*

Statistically, the impact of the female–male ratio of employment in the service sector on the long-run economic growth of Asian economies is positive and significant at 1 per cent level. Precisely, 1 percentage point increase in this gender factor is likely to increase the GDP per capita of Asian economies by 1.91 per cent in the long run, *ceteris paribus*. This ratio shows an increased value when the female employment in the service sector increases more rapidly than that of the male in Asian countries. It means the growth process can become faster only when society as a whole move towards women's advancement and gender parity in employment opportunities in the service sector. In recent decades, female employment in the service sector has increased primarily due to less physical job types dominating this sector. The reports by World Bank (2012) and OECD (2012) visualize the concentration of female workforce in the service sector. The development of ICT, better access to education, and skill formation have all made it possible. It has solved to a greater extent the problems of female job insecurity and wage disparities, and thus, reduced the gender disparities in the labour market (Ghani, 2010).

### *Democratic Participation Rate*

Statistically, the impact of democratic representation of women in the national parliament on the long-run economic growth of Asian economies is positive and significant at 1 per cent level. Precisely, 1 percentage point increase in this gender factor is likely to increase the GDP per capita of Asian economies by 0.0048 per cent in the long run, *ceteris paribus*. It means the growth process can become faster only when society as a whole move towards women's advancement in terms of participation of women in the socio-economic and political decision-making process. This finding corroborates the findings of Jayasuriya and Burke (2013), Balaev (2014), Xu (2015) and Cabeza-Garcia et al. (2018). When the proportion of female participation in parliament increases, there exists every likelihood of coming out with new ideas and policies, such as increasing the levels of women education, addressing women health in a better way, eliminating discrimination against women, implementing women quota, etc. These policies are quite pertinent to the socio-economic development of a region, which further contributes to the goal of gender parity.

## V. Concluding Remarks

Although the absence of short-run impact of different indicators of women empowerment and gender parity on the economic growth of Asia is evidenced by this work, the long-run impact of these indicators except for female–male ratio of employment in agriculture has been found to be statistically significant along with the desired signs of their coefficients with the exception for the employment in industrial sector. Thus, gender parity can be considered as a crucial determinant of economic growth in Asia. Therefore, focussing on women's advancement would be an appropriate growth strategy in this continent. Precisely, increasing the budgetary allocations for empowering women in health, education, economic and political dimensions would certainly be productive and growth contributing. Hence, the policy circle needs to reorient the health, education and employment-related policies in the mainland of Asia in the appropriate direction. First, the education-related policies need to be reoriented to attract more girls into the primary level of education, and the necessary arrangements need to be made for proper and effective implementation of these policies. Second, the health-related policies need to be reoriented to make the women's life span long lasting, and necessary arrangements are required for fair and transparent governance of these policies. Third, the labour market policies, such as recruitment, promotion, wage and income, need to be reoriented to increase female labour-force participation in different productive avenues. Fourth, the employment specific policies in the industrial sector need to be carefully reviewed to promote women's participation. Lessons should be learnt from the best practices of Japan and China in promoting female work participation in manufacturing and industry. Fifth, the employment specific policies in services sector need to be reoriented to increase female employment and necessary safeguarding of these policies should be ensured.

Finally, the parliamentary electoral policies can be reoriented to increase female participation in the national parliament for better impact of gender parity on economic growth. All these are contingent upon the political will power, fair and transparent governance mechanism, and effective implementation and monitoring along with ample public awareness and participation in Asian countries. If attained, no doubt, achieving sustainable economic growth is not far away for Asia. Despite such novelties, this article does not examine the issue in a country-specific framework to take care of the inherent heterogeneity in the socio-economic profile of Asian countries; thus, lacks country-specific implications which can be considered as a direction for future research. Another direction can be dividing Asian economies on income criteria and examining for comparable policy implications.

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