https://doi.org/10.52131/joe.2022.0404.0101

*i*RASD Journal of Economics

Volume 4, Number 4, 2022, Pages 594 – 606

Journal Home Page:
https://journals.internationalrasd.org/index.php/joe

Impacts of Gender Inequality on Human Development Index in Asia: A Panel Data Fixed Effect Regression

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ARTICLE INFO

Article History:
Received: October 27, 2022
Revised: December 24, 2022
Accepted: December 25, 2022
Available Online: December 26, 2022

Keywords:
Gender inequality
Human development
Asian countries
Fixed effect model

JEL Classification Codes:
D63, O15

Funding:
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Gender inequality is a big issue in Asia. The objective of this study is to explain empirically how gender inequality affects the human enlargement index in Asian countries based on the panel data from 1990-2018. We utilized panel data Fixed Effect regression in this study to quantify the impacts of gender inequality on human development across Asian countries. The selection of the Fixed Effects Model has been made after the Hausman test results. The results of the study expose that gender inequality significantly contributed to both the human development index and the non-income human development index but their relationship is negative. As for as the control variables are concerned, working population and trade openness positively contributed towards human development while inflation and unemployment negatively contributed towards human development in Asia.

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Citation: Mansha, M., Manzoor, A., Sarwar, K., & Hussain, S. U. (2022). Impacts of Gender Inequality on Human Development Index in Asia: A Panel Data Fixed Effect Regression. *IRASD Journal of Economics*, *4*(4), 594–606. https://doi.org/10.52131/joe.2022.0404.0101

1. Introduction

According to Amartya Sen GDP and GNP in the reader were consider-known known indicators of economic progress but now indicators are shifting towards the well-being and freedoms actually enjoyed by people of Human development is a top priority policy makers and government as it is considered one of the most important fact factors the economic growth and enlargement of the country. Gender inequality on the other hand is an obstacle on the way of human development in Asian countries. The part of the woman in the labor force is very limited. Several factors of communal life including social security, economics, the law, and politics, are covered by the multidimensional idea of development. The continuous rise in real income per capita through the process of monetary development brings alterations and advancements to

the institutional framework and behavior of the people. Only discussing per capita GDP growth as an indicator of measuring economic progress is now not comprehensive to explain the mechanism of development. There are many other factors like institutional systems structure change, and societal behavior are that so very important for economic growth the and development of a country.

The disparity in outcomes might be the representation of the priority of government programs, but a question is arising how two countries by almost the equivalent level of Gross National Income may b have different human development results. In 1990, the human development index was the combination of the three-dimensional combination including education, health, and standard of living. The average number of years spent at school for adults aged 25 and older is used to quantify the standard of education. The measurement of health quality is based on the expected birth rate and life expectancy of the people. The standard of living is based on the level of gross national income per capita. According to Sarkar, Sadeka, and Sikdar (2012), human development is one of the most important factors for a country's economic growth. The fundamental focus of human improvement now a day is how people use common natural resources (Eren, Çelik, & Kubat, 2014). The HDI can be accelerated by a rise in per capita income. The degree of development may be impacted by GDP per capita, as demonstrated by Eren et al. (2014) and Hasan (2013). As a result, individuals have purchasing power, have a better standard of healthcare and education. However, not all residents of the region experience equal success in the high-growth industry. The distribution of profits among the population as a whole won't change despite the fast rate of economic development. The country's transition from a developing to a developed nation can be aided by the rising performances of human development indices.

UNDP also set a sustainable development goal for 2015-2030. Increasing women's participation in the labor force, empowering women, and reducing gender inequality are the central purposes of the Sustainable Development Goals 2030 (Girón, Kazemikhasragh, Cicchiello, & Panetti, 2021). Some of these goals are related to Human Development. According to United Nation (2016), by providing more and better health facilities life expectancy has increased significantly in recent decades. By 2030, the agenda is to control social and economic inequalities, fast urbanization, threats to climate change and the environment, and end the epidemics of HIV (human immunodeficiency virus) and more communicable diseases. Universal health coverage will end poverty and reduce inequalities. Thus, a lack of gender equality promotes unequal health outcomes based on gender.

When male and females have the same rights and opportunities in all sectors, like decision-making and economic participation. The main source of inequality is the deprivation towards girls and women. Overall, females are distinguished in the education, health, employment and governmental representation. In the human development report of 2010, United Nation introduced gender inequality index. This index of gender inequality checks two basic aspects. 1. Reproductive health is measured on the base of adolescent birth rate and maternal mortali. 2. The participation rate of male and female having age above 15 years will measure the economic situation (Human Development Report, 2014).

The presence of females in public actions, especially in the field of human development, removes the gender inequality in all fields. The theory of integration focuses on the positive role of cruelty in human development is near to the neoclassical theory. It is more optimistic about improving the status of females in development path (Shaditalab, 2001). The best method to determine if gender disparity has an impact on human development is just to look at how society reproduces when there is gender equality as together an input and an output. From this point, remove obstacles that limit females' capabilities, empowerment and opportunities has shown to make positive response between female's economic progress and human development (Cuberes & Teignier, 2014). The contribution of the study is that most of the previous literature is related with gender disparity and economic growth, but our work will

check the role of gender disparity in non-income human development and overall human growth specifically in Asian countries.

Gender inequality creates the distraction in human development as females get less opportunities. As compared to the males most of the females spend their income on the development of their children. When females are excluded from working, there are limited, and restricted economies and poverty continues its cycle. The purpose of this study is to determine how gender inequality affects the region of Asia's human development. The important research questions of the study are: To check the role of gender inequality on non-income human development of Asian countries and To check the role of gender disparity on overall human development of Asian countries.

2. Literature Review

Bertay, Dordevic, and Sever (2020) investigated that higher gender parity promotes economic development through enabling and well-resourced environment. Female dominant organizations gives more advantages and their overall workforces expand more quickly than those with lesser gender disparity. By using the relative marginal product of labor determined the contribution of gender inequality on industry development in value-added and labor productivity within a given industry. The results were statistically and economically significant, and it is doubtful that reverse causality, measurement error, omitted factors, or outliers were responsible for them. According to this study, gender disparity has a important impact on actual economic outcomes. Sectors with high and how feminine participation in total employment shows positive growth differentials of 1.7% in value added 1.3% compared to industries situated in countries with higher gender disparity.

Carlsen (2020) examined the viable Development Goals (SDG) of United Nations incorporated features of significance to minimize gender inequality while enhancing the gender development. Basing on existing data available in UNDP, The UN Development Program, indexes of gender inequality and gender development, linked to specific SDGs, were considered by using elaborate aggregation procedure. Partial order-based approach was used to analyze the gender inequality and development. The major focus of this study was on elucidating indicator importance, averaging rankings, and disclosing so-called unusual countries. The results showed that to provide inequality and promoting development, there was dire need to focus on education.

Khan, Ju, and Hassan (2019) examined that information and communication technology was found to be vital for the workable enlargement of people but there is a distinct disparity in Pakistan between the economic growth of ICT (evidence and communication technology) and human development. Data collected from 1990 to 2014 and autoregressive distributed lag and the Vector Error Correction Model was used to determine the results. Experimental outcomes showed that human development index was promoted by ICT and economic growth has significant and positive effect on human development. Human enlargement discouraged by the trade, FDI and urbanization in Pakistan, and bidirectional causality was found between the above-mentioned variables.

Arisman (2018) observed about the human quality and human development index in a state. The Human Development Index (HDI) was used to measure the development of human quality. The factors influencing the human development index in ASEAN member nations are used and regression utilizing panel data regression and a fixed effect model was rub to analyze the outcomes. The findings showed that in these nations, the growth rates in per capita income and population had an effect on the human enlargement index but the fluctuating rates of inflation and unemployment did not affect the human development index.

Sakariyau and Zakuan (2017) studied that all the international societies admit that for the human development, there should be equal opportunities both for men and women but gender inequality is a big hurdle in this environment. This study conducted in the countries like Nigeria and Malaysia, where contribution of women in the political, social and economic affairs is comparatively lower than that of men. This low-level representation in such important fields has adverse effects on human development. This study targeted the issue of gender disparity under the umbrella of human development owing to its effect on both countries. The technique of data collecting was secondary, with the acceptance and usage of pertinent items received from trustworthy publications.

Shah (2016) investigated that the Human Enlargement Index is a statistical instrument that may be used to measure a nation's overall economic and social progress. The health, income, and education indices were used to investigate the Human Development Index. The purpose of this study was to study the experimental results and trends in human development across countries, regression analysis of the elements was used to determine human development, and evaluate the human enlargement index at the area level.

Ferrant (2015) exposed that economic and human development were hampered by gender inequality. An illustration was given showing how changing the Gender Inequality Index (GII) by one standard deviation would raise the HDI (Human Development Index) by 4% and long-term income per capita by 9.1%. The multidimensional idea of gender inequality was measured with the aid of the Gender Disparity Index (GII). The indigeneity and simultaneity problems were addressed individually using the two-stage and three-stage least square approaches. Differences in gender inequality may be the cause of disparities in economic development, as they may account for 16% of the long-term income gap between Asia & the Pacific. The results showed the negative feedback loop between gender disparity and long-term income.

Singariya (2014) studied that in some big states of India, there were some basic disparities in trends and levels of human development index. This paper tried to discover many socioeconomic factors that were related with human development index in main Indian states. Quantitative secondary data from different databases and principal component were collected and regression analyzed as statistical methods. The results showed that poverty, infant mortality rate and marriage under age eighteen played a important role in dropping the value of human development index. The two-dimensional conspiracy of variables expressed that a variable group who didn’t have facility of washrooms snowed negative affiliation with human development index.

Permanyer (2013) evaluated the United Nations Improvement Program's (UNDP) 2010 gender inequality index severely. It was particularly difficult to understand the index's functional structure. Additionally, the inclusion of measures linked to women's performance in comparison to males and fully dedicated indicators for women further complicates the perception of an already challenging index and degrades the performance of the nations with low incomes. Another composite index of gender disparity that included the GII variables was described in this contribution, although it had a considerably simpler functional structure. The findings showed that extra care should be used when interpreting and applying GII readings.

Alkire (2010) examined the human development index and its effectiveness. The study was conducted by the United Nations, which mentions the scantiness of the indicators in displaying the standing of all peoples around the globe. The results showed that the HDI should have flexible apparatuses in terms of varying circumstances and situation of both male and female in different times and places. It means that these indicators should be valued on the basis of gender and along with indicators of human security happiness and human rights.

3. Data and Methodology

3.1 Model Specification

We used human development index and non-income human development index as dependent variables and independent variables are population, gender inequality, inflation rate, unemployment rate and trade openness.

The functional form of the model is:

$$NIHD_t = \beta_0 + \beta_1 POP_{it} + \beta_2 GI_{it} + \beta_3 INF_{it} + \beta_4 UNEMP_{it} + \beta_5 TRD_{it} + \epsilon_{it} \quad (1)$$

$$HDI_{it} = \beta_0 + \beta_1 POP_{it} + \beta_2 GI_{it} + \beta_3 INF_{it} + \beta_4 UNEMP_{it} + \beta_5 TRD_{it} + \epsilon_{it} \quad (2)$$

Where,

NIHD = Non-Income Human Development Index
HDI = Human Development Index
GI = Gender Inequality
INF = Inflation
UNEMP = Unemployment
TRD = Trade Opennes

3.2 Data Sources

The panel data is used in this study on the Asian countries over the period of 1990 to 2018. There are 48 Asian countries. But because the issue of data accessibility, some countries are not involved in the sample which are Afghanistan, UAE, Turkmenistan, Uzbekistan, Tavian, south Korea and North Korea. The data of variables of 41 countries has been collected from WDI database. and the data of HDI obtained from the UNDPS (united nations development programs) human development reports (HDR).

Table 1
Selected 41 Asian Countries

Armenia	Indonesia	Malaysia	Singapore
Azerbaijan	Iran	Maldives	Sri lanka
Bahrain	Iraq	Mongolia	Syria
Bangladesh	Israel	Myanmar	Tajikistan
Bhutan	Japan	Nepal	Thailand
Brunei	Jordan	Oman	Turkey
Cambodia	Kazakhstan	Pakistan	Vietnam
China	Kuwait	Philippine	Yemen
Cyprus	Kyrgyzstan	Qatar	
Georgia	Laos	Russia	
India	Lebanon	Saudi Arabia	

3.3 Research Methodology

In this study panel data techniques have been used for empirical analysis. We can take both time and space concepts in panel data (Gujarati & Porter, 2009).

The General form of the Panel model is as under:

$$y_{it} = \alpha + \beta x_{it} + \mu_{it} \quad (3)$$

In the above equation, the dependent variable human development index is donated as y_{it} and the x_{it} express as K-dimensional vector of explanatory variables and subscript i denotes the country and t represents the time period. Furthermore, the intercept is represented by α, the parameters which are needed to estimate are represented by β, the error term of this model is represented by μit.

Simple regression can be written as:

$$Y_{it} = \beta_\circ + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} \quad (4)$$

In this equation, the dependent or explained variable is Y_{it}, $\beta_\circ, \beta_1, \beta_2, and\ \beta_3,$ are the parameters that are needed to measure, independent or explanatory variables are $X_1, X_2, and\ X_3$, error term is ε_{it} and the i subscript represents the country and t denotes the time period.

Baltagi (2008) explained in his study, the usage of panel data has some benefits such as individual heterogeneity can be controlled. More flexible, there is less chance of collinearity between the variables, the dataset has more information. "Dynamics of adjustment" can study easily. It is easy to test and it can create further advanced models.

Panel models have been used to check the role of gender inequality in human development in Asian countries. Specifically, in this study fixed effect model (FEM) and the random effect model (REM) useful for estimations. If all observations are constant then both FE and RE models can be used. Then Hausman test will suggest that which model is suitable, weather fixed effect model or random effect model.

3.3.1 The Hausman Specification Test: Fixed Effects or Random Effects?

To select weather unobservable and undefined characteristics are distributed randomly with variables which are independent (RE model) or constant or fixed with the other independent variables (FE model), then we apply Hausman test. Hausman test depends on the basis of the transformation between the random effect and fixed effect ˆassessments. The null hypothesis of the Hausman test shows that there is no specific distinction ˆbetween the coefficient of fixed effect estimators and random effect estimators. Under the null hypothesis, the random effect estimators are more effective but unreliable and unpredictable under the alternative hypothesis. On the other side, under both alternative and null hypothesis, the estimators of fixed effect are consistent and reliable. If the null hypothesis rejected, it concluded that may be some explanatory variables have relation with the individual specific effects. The test statistics of Hausman are as follows which is represented by H.

$$H = (\beta\hat{}RE - \beta\hat{}FE)'[Var(\beta\hat{}FE - Var(\beta\hat{}RE] - 1(\beta\hat{}RE - \beta\hat{}FE) \quad (5)$$

Where "βˆRE" is coefficient estimate of REM (random effect model) and "βˆFE" is coefficient estimate of FEM (fixed effect model).

3.3.2 Estimated Model

The fixed effect model apply when we examine the effect of variables, after some time that can show the change. With fixed effect model in a country, the link between the outcome and predictor variable can found. Although, every country has individual characteristics that can or cannot have impact on the predictor variable (Torres-Reyna, 2007). When omitted variables exist, at that point these variables have link with the variables, which are in the model. At that time, fixed effect model provides a method to control the bias of omitted variables (Williams, 2015). The FEM (fixed effect model) suitable when omitted variables exist and these omitted variables are stable with time but vary between the individual. If the entities of cross section 59

are correlated with regressors then there are trust worthy estimators of fixed effect model (Gujarati & Porter, 2009). Fixed effect models are known as least square dummy variable models (LSDV). When using the FEM (fixed effect model), we assume that specific attributes inside the objects can bias or can have an impact on both the predictor and the predictand when the FEM is used to assess it (fixed effect model). Using FEM, we can quickly calculate the net impact of independent variables. FEM should be utilized whenever you are examining the impact of factors that change over time (Torres-Reyna, 2007). According to Brüderl and Ludwig (2015) the equation of fixed effect model can be shown as;

$$Y_{it} = \beta_1 x_{it} + v_i + \varepsilon_{it} \quad (6)$$

According to Torres-Reyna (2007) that equation can describe as;

- Y_{it} is dependent variable with entity i at time t
- β_1 is the coefficient of independent variable.
- x_{it} is independent variable entity i at time t
- v_i is the unknown intercept of each entity i
- ε_{it} *is the error term*

The fixed effect model can be inappropriate when the variables set of data don't change much at time, and shown as persistent variables. For persistent variables the better method is the random effect model as associate to the fixed effect model.

3.3.3 Random Effect Model

The random effect model appropriate when omitted variables not exist, and there is no correlation between the explanatory variables and the omitted variables (Williams, 2015). The random effect estimators unreliable and biased when cross section entities have connection with repressors. According to the Hsiao (2007) that the random effect 60 stable and reliable but the fixed effects not, when individual specific effect dispersed unconventionally and randomly from the predictor of the indicator. In the random effect model variance non-constant because random effect model shows individual effect as error term. In contrast to the fixed effect model, Torres-Reyna (2007) found that "the idea behind the random effect model is that the variation between entities is believed to be random and uncorrelated with the predictor or independent variables that are included in the model." According to this study the equation of REM random effect model can be;

$$Y_{it} = \beta_1 x_{it} + v_i + \mu_{it} + \varepsilon_{it} \quad (7)$$

Where,

- Y_{it} is dependent variable with entity I and time t
- β_1 is the coefficient of the independent variable
- x_{it} is an independent variable with identity I and time t
- v_i is the unknown intercept of each entity i
- μ_{it} is between entity error
- ε_{it} is within the entity error

If the (between entity error) "μit" not correlate with independent variables then we can use the random effect models.

4. Results and Discussion

The descriptive statistics for the model shown in Table 2. Each row of the table contains the means, medians, maximums, minimums, and standard deviation values for all dependent and independent variables. The result of the observation summation, when distributed by the total number of observations, is called the mean. It is the median value across the board. There is a mean for each variable. The Skewness value measures how asymmetrical the series is. If the skewness value is zero it shows that there are normally distributed variables. If the tail of distribution is towards left side it shows that the data is left skewed. While on the other side, if the tail of distribution is towards right side it means data shows the right skewed. The value of Kurtosis demonstrates the peak or smoothness of the distribution of the series. If the kurtosis value is 3 it means that data set has normal distribution which is called as mesokurtic. If the kurtosis score is more than 3, the distribution is leptokurtic, which suggests the data set has a heavier tail (positive kurtosis). if the kurtosis value is less than 3 that indicates a light tail in the data set, indicating a normal distribution and a platykurtic negative kurtosis (negative kurtosis).

Table 2
Descriptive Statistics

	HDI	Inf (change in CPI)	Work pop Age (15 to 64)	TRADE	UNEMP	GII
Mean	0.6916	0.1490	104.2256	91.95018	6.845849	2.033241
Maximum	0.930000	33.73759	1386.395	441.6038	41.87600	10.92991
Minimum	0.386000	-0.04860	0.266274	9.635124	0.140000	0.996674
Std. de	0.124661	1.344380	256.4918	66.88282	5.854695	1.280965
Skewness	-0.383432	23.09125	4.062809	2.441296	2.138933	2.067382
Kurtosis	2.399005	568.9344	18.62760	10.78737	9.792748	8.197481

Note: Values are adjusted to four decimal places

Table 3
Hausman Test for Model (HDI)

Test summary	Chi-sq. statistics	Chi sq. d.f	Prob.
Cross section random	145.317277	5	0.0000

According to above table, the null hypothesis is rejected, and the alternative hypothesis is accepted since the value of P is less than the 5% level of significance. The fixed effect model is therefore preferable to the random effect model. Therefore, we assess the fixed effect model and interpret the findings.

4.1 Fixed Effects Model (HDI)

After finding the results of Hausman test then we estimated fixed effect method, the results of Fixed Effect model shown in below table 4. Table 4 express that we found out the result on the basis of fixed effect model that the independent variables working age population (work pop) and trade has positive correlation with dependent variable while inflation, unemployment and gender inequality (GI) has negative correlation with the dependent variable of human development index (HDI).

When we measure working age population then the coefficient is 0.00116, which is positive and statistically important relationship with dependent variable of human development. The results express that working age population increase by one unit will increase the human development by 0.001164. The consequences of our study are consistent with the studies like Thurow (1992) which confirmed that working age population and human development has positive connection. The coefficient of trade is 0.00048, which is also positive and has significant association with dependent variable human development. The result of trade shows that trade

increase in one unit will increase the human development by 0.000488. The results of our study are consistent with the study Kaya (2009) which confirmed that there is positive relationship between trade and human development.

Table 4
Estimation Results of Fixed Effect Model

Dependent variable: HDI				
Variables	**Coefficient**	**St. Error**	**t-Statistic**	**Prob.**
POP	0.001164	7.80E-05	14.91860	0.0000
TRD	0.000488	9.34E-05	5.224953	0.0000
INF	-0.005031	0.001135	-4.431223	0.0000
UNEMP	-0.001539	0.000625	-2.462275	0.0141
GI	-0.027577	0.003859	-7.147028	0.0000
C	0.592816	0.014647	40.47440	0.0000
R square	0.9114385		F statistic	152.8448
Adj R square	0.9014385		Prob(F-statistics)	0.000000

Note: According to results, all independent variables are significant at level of 5%.

The coefficient of inflation is -0.00503 that shows that negative and significant relationship between inflation and human development. The result indicates that the inflation increase by one unit then human development will decrease by 0.00503. Inflation may affect health and education expenditure of the resident of an economy. Our results are consistent with the studies Khan et al. (2019) confirmed that there is negative relationship between inflation and human development. The coefficient of unemployment is -0.001539, which means that there is also negative and significant relationship between unemployment and human development. The findings of the study indicate that unemployment increase by one unit than human development will decrease by 0.001539. our results are related with the studies Al-Nasser (2012) and Machin and Manning (1999) Which confirmed that there is negative and significant relationship between unemployment and human development. The coefficient of gender disparity index is -0.027577. The coefficient of gender disparity index indicates that there is negative and significant relationship between gender inequality and human development. The results of the study show that gender inequality increase by one unit will decrease the human development by 0.027577. The results of this study are related with Bandiera and Natraj (2013); Naz, Chaudhry, Hussain, Daraz, and Khan (2012) which confirmed that there is negative and significant relationship between gender inequality and human development.

4.2 Empirical Results of Non-Income Human Development Index (NIHDI)

Examining the impact of gender inequality on the non-income human development index in Asian nations is another goal of the study.

The model's descriptive statistics are displayed in Table 5. All dependent and independent variables' means, medians, maximums, minimums, and standard deviations are displayed in each row of the table. The result of the observation summation, when divided by the total number of observations, is called the mean. It is the median value across the board. There is a mean for each variable. The Skewness value gauges how asymmetrical the series is. A zero-skewness value indicates that the variables are properly distributed. If the tail of distribution is towards left side, it shows that the data is left skewed. While on the other side, if the tail of distribution is towards right side it means data shows the right skewed. The series distribution's peak or flatness is shown by the degree of kurtosis. The data set has a normal distribution, known as mesokurtic, if the value of kurtosis is 3, which indicates. If the kurtosis score is more than 3, the distribution is leptokurtic, which suggests the data set has a heavier tail (positive kurtosis). If the value of kurtosis is less than 3. That means the data set has light tail which means that distribution is normal and there is negative kurtosis named platykurtic (negative kurtosis).

Table 5
Descriptive State (NIHDI)

	NIHDI	Inf (change in CPI)	GII	Work pop Age (15 to 65)	UNEMP	TRADE
Mean	0.687513	0.149004	2.033241	104.2256	6.845849	91.95018
Maximum	0.916945	33.73759	10.92991	1386.395	41.87600	441.6038
Minimum	0.361123	-0.048633	0.996674	0.266274	0.140000	9.635124
Std dev	0.117317	1.344380	1.280965	256.4918	5.854695	66.88282
Skewness	-0.563923	23.09125	2.067382	4.062809	2.138933	2.441296
Kurtosis	2.927349	568.9344	8.197481	18.62760	9.792748	10.78737

Note: Values are adjusted to four decimal places

4.3 Hausman test with NIHDI (Non-Income Human Development Index)

Table 6
Hausman Test for Model

Test summary	Chi sq. statistic	Chi sq. d.f	Prob.
Cross section random	130.834730	5	0.0000

According to above table, the null hypothesis is rejected and the alternative hypothesis is accepted since the value of P is less than the 5% level of significance. It demonstrates that fixed effect models are preferable than random effect models. So, we evaluate the fixed effect model and analyze its findings.

4.4 Fixed Effect Model

Table 7 results taken with the help of fixed effect model that the independent variables working age population (work pop) and trade has positive correlation with dependent variable of non-income human development index (NIHDI) while inflation, unemployment and gender inequality (GII) has negative correlation with the dependent variable of non-income human development index (HDI). When we measured working age population then the coefficient is 0.001126, which is positive and statistically significant relationship with dependent variable of non-income human development. The results express that working age population increase by one unit will increase the NIHDI by 0.0011264. The consequences of our study are consistent with the studies like Qasim and Chaudhary (2015), Which confirmed that working age population and non-income human development has positive relationship.

Table 7
Estimation Results of Fixed Effect Model

Dependent variable: NIHDI				
Variables	**Coefficient**	**Std error**	**t-Statistics**	**Prob.**
Pop	0.001126	9.04E-05	12.44948	0.0000
Trade	0.000579	0.000108	5.350047	0.0000
Inf	-0.004275	0.001315	-3.250656	0.0012
Unemp	-0.001571	0.000724	-2.170424	0.0303
Gi	-0.036013	0.004470	-8.056715	0.0000
C	0.601578	0.016967	35.45546	0.0000
R square	0.870274	F statistics		96.00673
Adj R square	0.861209	Prob (F statistics)		0.0000

Note: Values are adjusted to four decimal places

The coefficient of trade is 0.000579, which is also positive and has significant association with dependent variable non-income human development. The result of trade expresses that trade increase in one unit will increase the non-income human development by 0.000579. Our study's findings are in line with those of Davies and Quinlivan (2006) and Hamid and Amin

(2013), two other studies that found a strong link between commerce and non-income human development. The coefficient of inflation is -0.004275 that shows that negative and significant connection between inflation and human development. The result indicates that the inflation increases by one unit then non-income human development will decrease by 0.004275. Inflation may affect health and education expenditure of the resident of an economy. Our results are in line with research by Orphanides and Solow (1990), which found a link between inflation and human enlargement that is detrimental.

The coefficient of unemployment is -0.001571, which show that there is also negative and significant relationship between unemployment and non-income human development. The results of the study indicate that unemployment increase by one unit than human development will decrease by 0.001571. Our findings are consistent with those of Al-Nasser (2012) and Machin and Manning (1999) investigations, which found a strong negative correlation between unemployment and non-income human development. The coefficient of GII is -0.036013, which indicates that there is negative and significant relationship between gender inequality and non-income human development. The results of the study show that gender inequality increase by one unit will decrease the human development by 0.036013. The conclusions of this study are consistent with those of Bandiera and Natraj (2013) as well as Naz et al. (2012), who verified a negative and substantial association between gender disparity and non-income human development.

5. Conclusion

This study investigated the consequence of gender disparity on the human development index in Asian countries using data period from 1990 to 2018. The working age population, trade, inflation, unemployment, and gender inequality are independent variables whereas the human development index and the non-income human development index are dependent variables. The panel data used in this study to analyzed using the random effect method and fixed effect method, two econometric approaches. The results of the Hausman test support the fixed effect model's suitability and consistency for our study. The results of fixed effect method express that a positive link exists between working age population and human development and between trade and human development. As the working age population and trade increase it means that human development also increase.

The objective of the study was to investigate the impact of gender disparity in the context of unemployment and the negative and substantial association between inflation and human development. The findings indicate a negative and substantial association between inflation and human enlargement, as well as between unemployment and human development. When inflation increases then human development decrease. The results of gender inequality also show that there is negative and significant relationship between gender inequality and human development. It means, when gender inequality increases then human development decrease. This research also uses hypothesis that our null hypothesis is rejected which means that gender inequality does effect on human development index and gender inequality does effect on non-income human development index. Finally, this study determined that both working age population and trade have progressive and significant effect on human development and both have significant role in increasing the human development and rest of the variables inflation , unemployment and gender inequality have negative relationship with human development index and non-income human enlargement index.

Although this research covered the topic in a broaden way but there are some limitations to this research. First, a main restriction of this study is unavailability of the data of some Asian counties e.g. Afghanistan, South Korea, North Korea, Palestine, United Arab Emarat, Uzbekistan and Turkmenistan. The data of some variables like NIHDI (non-income human development index) was also not available. So, we generated the index and measure the values. Same the

data of GII (gender inequality index) was also not available. We calculated it by getting the data of male labor force over female labor force. We conducted this study as a panel data but further research can be country specific analysis. This could be fascinating to other researchers that they can explore in depth study on other regions and can introduce some other variables that may better define the association of gender inequality and human enlargement.

Finally, we concluded that high income countries could behave differently in the perspective of human development index as compared to low income countries. There is a suggestion on the basis of empirical results that for improving human development that there should be decrease in inflation, unemployment and gender inequality in a Asian region. The government should provide incentives for the betterment of human enlargement index.

Authors Contribution

Muhammad Mansha: conceptualization, data curation, supervision, original draft preparation
Asma Manzoor: methodology, results, and discussion
Kiran Sarwar: visualization, investigation, software
Saad Ullah Hussain: writing- reviewing, editing, and study design

Conflict of Interests/Disclosures

The authors declared no potential conflicts of interest w.r.t the research, authorship and/or publication of this article.

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