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Economic Growth in A Gender-Responsive Way: An Investigation for Country Groups Based on Human Development Index

Fatma YEŞİLKAYA[1]

ABSTRACT

The impact of gender norms on the national economy is an area that has been overlooked in extant literature. Since there has been a paucity of evaluation of gender and gender equality from an economic growth perspective, compared to the extensive literature on gender and gender equality, this study investigates gender-responsive economic growth within the regulation of the classification created within the scope of the human development index. The study analyses the linkage between human development and gender-related indices at four different levels of development. The relationship is analyzed using a panel data analysis method with data from 1995-2021. The study finds that the variables that increase economic growth in the four country groups are labor force participation rate and the gender-related development index. In contrast, the gender inequality index decreases economic growth in almost every country. The present study's findings indicate a relationship between gender-related index (i.e., independent variables) and economic growth. The extant research findings demonstrate that gender equality is a fundamental component of sustainable economic growth. The findings also provide evidence as to why gender issues are addressed in the literature under the heading of "smart economy." In this context, it is widely accepted that the pursuit of gender equality is a prerequisite for the attainment of sustainable economic growth.

Keywords: Economic Growth, Gender Development Index, Gender Inequality Index, Panel Data Analysis.

JEL Classification Codes: J16, O40, C23

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INTRODUCTION

Human development is a concept inextricably linked to the development field (McNeill, 2007). Human development is predicated on positioning humans as the fundamental development subject to provide resources to enhance people's functions and capabilities through various means. The human development approach underscores the importance of ensuring equitable access to literacy, nutrition, and health facilities despite the potential economic returns (Anand and Sen, 1994:2). The human developments' idea has evolved as part of the basic physiological needs as expanded by the UNDP (Anand and Sen, 1994:2). The UNDP has broadened the scope of human development to address new issues such as gender, human rights, security, consumption, technology, and the environment (McNeill, 2007).

The pursuit of development and the enhancement of human welfare are widely regarded as the primary objectives of democratic societies. In this context, the evaluation of policy implementations should not be confined to GDP calculations alone. Hence, it is necessary to utilize multidimensional indicators beyond GDP calculations (Herrero et al., 2012). In 1990, the United Nations Development Programme (UNDP) emphasized the distinction between human and economic development, contending that human development encompasses a broader dimension. Consequently, the Human Development Index (HDI) has been devised as a multidimensional yet straightforward approach to assess states' human development (Sagar & Najam, 1998). HDI, as proposed by the United Nations, is a protocol designed to measure the degree of development of states presented on Amartya Sen's concept of functions and capabilities. The HDI defines health, education, and material well-being as fundamental human functions (Herrero et al., 2012).

Human development expands people's choices (Ranis et al., 2006). The HDI, as developed in this particular context, may be regarded as a composite index that measures mean achievements across three major dimensions of human development. These dimensions are described as follows: first, the length and quality of life (defined in terms of health and mortality); second, knowledge (defined in terms of school enrolment and years of schooling); and third, a decent standard of

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living (expressed in terms of national gross income) (Noorbakhsh, 1998; Ranis et al., 2006). The United Nations (UN) is contemplating a comprehensive evaluation of the nation's average achievements in education, income levels and, health with a particular focus on the equitable distribution of these achievements across the population (Malik, 2018). Since 1990, the Human Development Report (HDR) released by the UNDP has emphasized the importance of other indicators of well-being that are not usually seen as directly related to income, such as life expectancy and education level, as opposed to reliance on income as the exclusive measure of economic progress (Bardhan & Klasen, 1999).

UNDP's social and human development measures include GEM (gender empowerment measure) and the HDI/GDI (gender development index). The HDI/GDI measure has attracted more attention than other measures within this scope. UNDP has calculated and presented the indices for more than 175 states worldwide every year since 1990. These states are ranked annually according to their human development performance. A second notable element is that, in contrast to previous concepts, HDI/GDI defines human development as a process (expansion of options) rather than a stock of achievements. Therefore, these criteria are dynamic concepts that impact the development process. Furthermore, the HDI/GDI proposes a human-centered development paradigm by defining human development as the ultimate goal of development rather than a by-product of economic growth, marking the conclusion of the era of development paradigms that emphasized solely economic growth (Hirway & Mahadevia, 1996).

Human development is an all-encompassing concept, and as such, it cannot be assessed solely from an income perspective. However, it is essential to acknowledge the role of income as a substitute factor. Earning a high level of income is crucial in expanding one's options. Individuals can trade a high-income level for other opportunities, such as purchasing a property in a rural location, accessing air quality and a lower risk of disease, or enrolling their children in private schools to ensure they have access to a higher quality of education. From this perspective, income can be regarded as a substitute for human development if it surpasses a certain threshold. Below this threshold, the primary focus of income is not on contributing to human development but on ensuring survival (Sagar & Najam, 1998).

Focusing exclusively on income as a metric for human development is inadequate for ensuring comprehensive progress, and the HDI is regarded as a more comprehensive indicator of human development than income-based measures. Nevertheless, the HDI is viewed as a reductionist measure, incorporation only a specific subset of potential human decisions (Ranis et al., 2006). It has been acknowledged that the utilization of income as a solitary welfare indicator is inadequate in itself. To enhance the reliability of welfare measurement, it is imperative to incorporate a range of social indicators. Even though the HDI is, a superior factor of economic welfare compared to GDP per capita, it does not indicate wealth distribution by region, between urban and rural populations, gender, and other social characteristics (Tisdell et al., 2001).

Gender equality is an important idea, not only today, but throughout history. Criticism based on gender, from a feminist perspective, seems reasonable in the context of human development. Mary Wollstonecraft, a pioneer of early feminist thought, was one of the first to question the relationship between human development and gender. Mary Wollstonecraft advanced the foundational tenets for the emancipation of women in 1792, encompassing the imperatives for the provision of equal educational opportunities for girls and the dissolution of prejudices against women. Wollstonecraft further advocated for evaluating women based on their own merits and achievements, as opposed to the accomplishments of their spouses (Dilli et al., 2019). Wollstonecraft's ideas attracted attention to issues that were later measured using gender-based indices such as GDI and GII at an early stage, thereby paving the way for steps to be taken towards women's empowerment and gender equality. Subsequent political measures were implemented to enhance the visibility of women in social life and to ensure equal access to opportunities. Subsequent to the International Population Conference (Cairo, 1994), measures such as these gained significant traction, gradually entering the agendas of national and international institutions and permeating everyday discourse (Permanyer, 2013). In recent years, policymakers and academics have regarded gender equality as a 'smart economy.' It is asserted that gender inequality is pivotal in various aspects of development. Enhancing women's access to resources and legal status leads to improved education for children, reduced corruption, and consequently increased economic growth (Dilli et al., 2019). For these reasons, the UNDP has concentrated on gender issues since 1995.

In 1995, the UNDP published an HDR that focused on gender and transformed its perspective entirely. This report presented the GDI and GEM, two significant

measures of gender (Permanyer, 2013). The 1995 HDR argued that human development would be at risk without the GDI and this index (Hirway & Mahadevia, 1996). It must be acknowledged that, whilst the HDR prepared by the UNDP addressed the economic situation of women from its inception, the earliest manifestation of this trend was observed in HDR 1995, with the introduction of the GDI. The GDI utilized the Gender Equality Sensitivity Indicator (GESI), a metric based on inequality or equality between women and men (Tisdell et al., 2001). The earliest composite indices formed to reflect global gender inequalities in basic skill levels were the GDI and GEM. These measures have enormously impacted academic and non-academic communities and have become widely used worldwide to assess inequalities between men and women. These indices have also been particularly useful for raising consciousness about gender relevant issues in human development (Permanyer, 2013).

GDI is specified as the proportion of females' HDI values (HDIf) to male HDI values (HDIm), thereby illustrating the disparity in developmental progress between female and male populations within a nation (Malik, 2018). The GDI is a metric that demonstrates the costs of gender inequality in human development. In this context, GDI measures the negative affect of gender inequality on states' human development levels. However, it is often misinterpreted as a measure of gender inequality itself. GDI is a valuable tool that can be used to determine the coupling between the level of averse to gender inequality and human development. It provides a comprehensive demonstration of the human development costs associated with gender inequalities in primary human development. However, The GDI does not adequately measure women's position in society compared to men (Gaye et al., 2010: 4-5).

The GDI is a composite index used to measure a state's overall economic and social development level. It is calculated using three core components: education, GDP per capita, and life expectancy. These components are disaggregated to account for gender inequality, with data for each indicator being assigned a single social value that assumes that gender equality is a very strong social preference (Bardhan & Klasen, 2000). The values for GDP per capita, life expectancy, and educational attainment are subsequently utilised to calculate a GDI for each state (Dijkstra & Hanmer, 2000).

As previously referenced, the initial global indices designed to reflect gender inequalities were GEM and the GDI, which were launched in the 1995 HDR. Since their inception, the UNDP and other development partners have utilized these two measures as advocacy and monitoring instruments for gender equality. GDI was elaborated to address gender inequalities in welfare assessments. HDI, a combined measure of well-being incorporating successes in education, income, and health includes penalization for gender inequality in these three dimensions. The overarching concept of the index, development is well measured and theorized in almost identical terms to the HDI developed by the UNDP. The more the GDI departs from the HDI, the greater the inequality measured. The composite structure of the GDI combines absolute and relative aspects, meaning that in states with low absolute income levels, gender equality cannot be achieved even in the case of full income equality. While the GDI strongly correlates with the GDP level, the difference in education and health indicators cannot be reflected. For this reason, GDI cannot be clearly distinguished from HDI. This close relationship between GDI and HDI implies that GDI cannot be interpreted as an independent indicator of gender differences in welfare, as it depends on HDI for interpretation (Gaye et al., 2010: 3-5). Within the scope of the study, a country classification is made based on HDI, and analyses are carried out.

The concept of a gender-adjusted HDI is favored; however, several practical and conceptual problems are identified in its calculation. The extent of the downward shift in the HDI is referred to as the gender inequality penalty. This is determined almost exclusively by gender differences in the component of earned income, while gender differences in education and life expectancy are largely neglected. It is also noted that the estimation of the earned income component limits its usefulness for international comparisons. The analysis of the component of labor income in the GDI is inconsistent, leading to the phenomenon that rich states are penalised more than poor states for equivalent levels of gender pay inequality. Consequently, high gender inequality penalties are imposed on Middle Eastern states, where high gender disparities in earned income are associated with relatively high-income levels, resulting in lower GDI rankings (Bardhan & Klasen, 2000).

While GDI does not essentially constitute a metric of women's accomplishments, it does integrate the concept of gender inequality into the comprehensive evaluation of a nation's overall welfare. In this sense, the GDI suggests that gender inequality is not only a problem for women, who are its victims but also equally damaging to overall development in a country (Bardhan & Klasen, 1999). The GDI and GEM have been the subject of considerable criticism because these measures do not sufficient

reflect the extent of gender inequality in developing and developed states (Schüler, 2006). It has been asserted that both measures are ineffective in reflecting women's rights, especially concerning non-market exchange, and are biased against market exchange measures. Despite this bias, a significant proportion of the exchange within the family was non-market. In less developed states, a substantial proportion of production is inaccessible to market exchange, and the subsistence and semi-subsistence sector is inadequately regulated (Tisdell et al., 2001). Within this context, women's labor can become invisible, thereby complicating the measurement of gender inequality.

In the context of research conducted on the GDI, a prevalent misinterpretation pertains to its utilization as a metric for gender inequality. It has been determined that the underlying calculation formulation of the GDI remains ambiguous for a considerable proportion of researchers. As previously mentioned, the GDI measures human development and adjusts it to gender inequality (Schüler, 2006). In the HDI published by the UNDP in 2010 (UNDP, 2010), the GDI was downgraded, and the GEM was dropped, with the gender inequality index (GII) being developed and measured for 137 states (Klasen & Schüler, 2011). The GII can be conceptualized as a evaluate of welfare loss, focusing on the differential levels of achievement between the sexes and the extent to which one sex is systematically differentiated from the other (Klasen & Schüler, 2011). The dimensions of the GII, which is also included in the scope of the study as an independent variable, are as follows:

Dimension 1: Reproductive health: The reproductive health status of states was captured by two indicators: the adolescent fertility rate and maternal mortality rate.

Dimension 2: Empowerment: The selected indicators for GII are education level (secondary education and above) and parliamentary representation.

Dimension 3: Economic activity: In this dimension, the GII utilizes gender-specific labor force participation (LFPR) rates as a metric, replacing the gender-specific earnings component employed in the GDI.

The average of the first of the three dimensions above, reproductive health, is adolescent fertility and maternal mortality. The average of the second dimension, empowerment, is representation in parliament and level of education. The average for economic activity is labor force participation. Since the indicators for reproductive health are gender-specific, data from men is only collected for the two other dimensions. Inequality aversion calculates the welfare losses related to inequalities between women and men. In this context, GII is utilized to measure the welfare loss due to these inequalities, compared to the gains that would be achieved in the case of perfect equality (Klasen & Schüler, 2011). When the dimensions are analyzed, the GII's inclusion of reproductive health indicators, such as MMR and AFR, in the calculation is considered the innovative aspect of this index. The objective of incorporating an issue of paramount importance to women's well-being into the evaluation of gender inequality is to ensure a comprehensive and nuanced assessment of the prevailing circumstances (Permanyer, 2013).

In contrast to GDI, the GII is a tool of inequality rather than gender-responsive development. Furthermore, it is consistent with the geometric mean and the use of labor force participation data instead of income (Klasen & Schüler, 2011). The GII, which has been the subject of both praise and criticism, is believed to give rise to conceptual and methodological challenges due to its integration of metrics calculated separately for women and men with indicators specific to women (Permanyer, 2013). Given the shortcomings and criticisms directed towards UNDP's gender-related indices, this study aims to ascertain their impact on economic growth by incorporating both gender-related indices.

Social institutions have been identified as a significant factor in the context of gender inequality. It is evident that norms, values, and attitudes embedded within the social structure are among the most critical determinants of gender equality. These norms, which have existed for centuries, determine women's position in economic and political terms. Gender roles, as defined by social institutions, are a determining factor in the participation of genders in economic and social life, based on biological and physiological characteristics. In this context, when women are subject to limited evaluations based on biological and physiological characteristics, it is evident that the perception of women is based on the idea that "motherhood" is a natural duty of women and that womanhood is defined through motherhood (De Beauvoir, 2019a: 227-228). The modification of social norms is an endeavour that is characterised by significant complexity and has the potential to supersede legal and regulatory frameworks in diverse domains (Jütting et al., 2008). In this context, it can be argued that social norms do not directly follow the development process (Dilli et al., 2019).

Women's status is primarily influenced by enduring norms and values that are embedded within long-standing social institutions. These social institutions are predicated on a duality that delineates men as "subjects" and women as "other." It is challenging to comprehend how women, who are themselves essential beings, accept being labelled as "other". However, the historical context in which men have granted themselves this privilege has been characterised by the majority imposing its own realities on the minority. However, from the perspective of the male-female dichotomy, there is no minority in this context. In this sense, a parallel may be drawn between women and the proletariat. Despite the fact that the proletariat does not constitute a numerical minority and does not comprise a distinct societal group, their class status is not contingent upon a particular occurrence. Rather, it is the outcome of historical evolution (De Beauvoir, 2019b: 27-28). For instance, long before the Industrial Revolution in Northwest Europe, while poverty persisted in the region, a significant proportion of women entered the labor market. However, contrary to the prevailing expectation that industrialisation would engender gender equality and enhance women's social status and standards, it has been argued that the Industrial Revolution resulted in the establishment of a gender-biased economy in England, predicated on the male breadwinner model (Dilli et al., 2019). This phenomenon underscores the resilience of social institutions in perpetuating women's secondary status, even in the context of economic advancements.

Education, widely regarded as a pivotal instrument for women's empowerment, has been observed to fall short in its potential to truly empower girls, mainly due to the pervasive influence of male-dominated social norms (Malik, 2018). This is evidenced by the challenges women face in carving out a meaningful place for themselves within the public sphere despite their educational attainments. These challenges are compounded by the entrenched gender norms within the prevailing patriarchal structure, often relegating women to a secondary position relative to their male counterparts in terms of employment participation across a multitude of nation-states worldwide, despite their educational qualifications. In the context of life expectancy, it is projected that, under conditions of equitable treatment, women will have an average life expectancy of five years greater than that of men. As a biological advantage, female life expectancy should be five years higher than male life expectancy. However, if this is not the case, it is accepted that a gender gap exists (Bardhan & Klasen, 1999). In this context, life expectancy, education, and labor force participation variables are included to the model constructed in the research within the scope of gender-related economic growth.

EMPIRICAL LITERATURE

Using gender-related indices facilitates the analysis of hypotheses that establish a correlation between cultural practices and human development, gender equality, and economic growth (Jütting et al., 2008). The publication of global indicators of gender inequality has the potential to stimulate governments' interest in gender inequality and the efforts to combat it (Dijkstra & Hanmer, 2000). These indices may also contribute to theoretical and empirical debates on the existence of a coupling between gender equality and macroeconomic growth. A literature review reveals a limitation in the number of studies that analyze the linkage between gender inequality and economic growth and development. In this context, studies that examinate the impact of gender equality on economic growth are important and contribute to literature.

Gender inequality in social institutions influences various domains, including economic growth and women's participation in the labor market (Jütting et al., 2008). The degree of development may give rise to variations in the linkage between economic growth and gender-related development across states. In this context, Jonsson (2011: 25) analyzed the relationship between GDI and GDP, concluding that the level of development of states is effective on the level of the relationship. Moreover, the study found a positive linkage between GDI and GDP in high, medium, and low states. In this context, although the direction of the linkage differs according to the level of development, the relationship remains similar. In contrast, Mandegar and Olsson (2023) examined the linkage between gender inequality and economic growth, finding a negative link between GII and GDP. The authors hypothesize that increased inequality in developed and underdeveloped states will reduce economic growth. Similarly, Khakimova (2024) analyzed the coupling between gender inequality and economic growth in Asian states, concluding that gender equality effectively increases economic growth. However, the study also found an inverse linkage between the gender equality index and economic growth in upper-middle and lower-middle-income states, suggesting that gender equality may impede economic growth in these regions.

It is acknowledged that the LFPR is a pivotal component of economic growth. Yet, it is imperative to recognize the necessity for a more profound examination of this phenomenon, particularly in the context of women,

who constitute a substantial segment of the labor force. In this regard, Akhtar et al. (2023) conducted a comprehensive analysis exploring the correlation between the gender equality index, women's LFPR, and economic growth in Malaysia. The study's findings suggest that enhancing women's attendance in the labor market and promoting gender equality can accelerate economic growth. Similarly, Tsani et al. (2013), in their study on women's labor force participation in Southern Mediterranean states, concluded that reducing barriers to women's participation positively impacts economic growth. Contrary to these findings, Thaddeus et al. (2022), in their study on the linkage between economic growth and female LFPR in Sub-Saharan Africa, found a negative coupling between female labor force participation and the growth. Therefore, in these states, female LFPR has a dampening effect on growth. Ruiters and Charteris (2020) studied the connection between gender equality, development, and economic growth in South Africa. Their findings indicated that development positively impacts gender equality in the long term, while women's participation in the labor market does not directly influence economic growth. In a research examining the linkage between economic growth and female LFPR in Bangladesh, Haque et al. (2019) found a positive link in the short run and a negative linkage in the long run (Haque et al., 2019). Urama et al. (2022) found a positive linkage between economic growth and female LFPR and a negative link between economic growth and fertility in Sub-Saharan African states.

The expected enrolment rate is widely regarded as a valuable metric for evaluating the resources allocated to girls during their educational attainment. In this regard, a compelling line of inquiry would be to examine the correlation between the expected enrolment rate of girls and economic growth. In this context, Gylfason (2001) conducted a study that revealed a direct positive linkage between the predicted enrolment rate of girls and economic growth. Fatima (2011) found a similar positive relationship between economic growth and female education in Pakistan. Oztunc et al. (2015) examined the link between economic growth and female LFPR, female primary school enrolment, fertility rate in Asia-Pacific states. The study found that birth rates and female LFPR, especially education, are essential for economic growth. Conversely, Barro and Lee (1994) found that economic growth is negatively related to female schooling in their comprehensive study on the factors of economic growth.

Birth rates are a contentious issue in the socio-economic field. The linkage between birth rates and the economy, particularly in economic growth, is a subject worthy of analysis, particularly in the context of the aging population. In this regard, Brander and Dowrick (1994) analyzed the connection between birth rates and economic growth, finding a negative relationship. The authors attribute this relationship to investment effects and capital dilution. Subsequent studies have sought to expand upon this research, with Li (2016) analyzing the linkage between economic growth and birth rates in developing states. This study revealed that economic growth occurs with declining fertility rates, suggesting a reciprocal relationship between the two factors. Furthermore, the study emphasized that societies with limited human capital exhibit high fertility rates and large families, often resulting in constrained investment in children within these families. Sah and Valeriani's (2024) examination of the link between economic growth and fertility rate in Indonesia concluded that birth rates negatively affect economic growth. This finding aligns with the conclusions of Urama et al. (2022).

Life expectancy has been demonstrated to influence economic growth; however, states' initial life expectancy periods may give rise to divergent outcomes (Desbordes, 2011). Zhang and Zhang's (2005) research found that life expectancy positively correlates with economic growth, but the correlation diminishes over time. Bowser (2010) analyzed the coupling between economic growth and life expectancy in the USA, preferring net earnings per capita as an indicator of economic growth. The study concluded that an increase in life expectancy leads to a rise in net earnings per capita at the county level, considering the initial life expectancy. Kunze (2014) analyzed the link between life expectancy and economic growth, finding that inheritance effects differentiate the increase in life expectancy. The study found that life expectancy decreases economic growth when inheritances are effective, while an inverted-U-shaped link exists in economies where inheritances are ineffective. Kasnauskiene and Michnevic (2017) concluded that increasing life expectancy in Central and Eastern Europe hurts economic growth, but the population aged 30-59 positively affects economic growth. Similarly, Azam et al. (2019) and Biyase and Malesa (2019) examined the relationship between life expectancy and economic growth, concluding that an increase in life expectancy increases economic growth in both developing states and Southern African Development Community member states.

METHODOLOGY

Since 1990, the UNDP has published the HDR, with states categorized according to human development levels. Within the scope of this classification, states are divided into four categories: very high, medium, high, and low human development. This study analyses the link between human development and gender-related indices at four different levels of development. Among the gender-related indexes developed by the UNDP, the GDI and GII variables are analyzed together within the scope of the study. The combined utilization of these indices, which exhibit deficiencies in various domains, is deemed significant in understanding the connection between gender-responsive economic growth. In this regard, the model developed within the study is presented below.

$$GDP_{it} = \propto_i + \beta_1 GDI_{it} + \beta_2 GII_{it} + \beta_3 LFPR_{it} + \beta_4 EYS_{it} + \beta_5 TFR_{it} + \beta_6 LE_{it} + u_{it} \quad (1)$$

The dependent variable is indicated by GDP_{it}, the constant term by α_{it}, the slope coefficient by β, and the independent variables by GDI_{it}, GII_{it}, $LFPR_{it}$, EYS_{it}, TFR_{it}, and LE_{it}. The error term is represented by u_{it}.

The table below shows the dependent and independent variables in the model created within the study's scope.

The data presented in Table 1, which pertains to the variables examined in this study, has been sourced from two primary databases: the OECD (GDP, LFPR, TFR) and the UNDP database. The analyses conducted encompass the period from 1995 to 2021. To create a standard data set, uninterrupted data of all states can be accessed until 1995 as the start date and 2021 as the end date, so the scope consists of years with data.

The present study analyses gender-responsive economic growth in four distinct groups within the scope of HDI by applying the panel data analysis method. Table 2 displays the descriptive statistics results for the dependent and independent variables.

A subsequent analysis of the descriptive statistics results in the table reveals that the probability values of the dependent and independent variables are lower than the critical value (0.05) according to the Jarque-Bera values of the variables in the very high states and do not fit the normal distribution. Similarly, in states classified as high, all variables do not fit the normal distribution. In medium states, GII and IMS among the independent variables were found to be normally distributed, while the remaining variables did not demonstrate a normal distribution. Finally, in low states, all variables except GII and TFR were found to be normally distributed.

Ascertaining the relationship between variables is paramount in panel data analysis. To this end, the study employs multicollinearity and endogeneity tests at the variable level. Table 3 delineates the outcomes of the multicollinearity issue, while Table 4 presents those relating to the endogeneity problem.

Examining the VIF value is a method of determining whether a multicollinearity problem exists among the variables. A VIF value greater than or equal to 10 indicates a multicollinearity problem in the relevant variables (Webster, 1995: 683-684; Topaloğlu, 2018). The centered VIF values in the above table indicate no multicollinearity problem exists since the values are all less than 10 in all four models.

Table 1. Variables ve Definitions

Variable	Definition	Notation
Gross Domestic Product	GDP growth (annual %)	GDP
Gender-related Development Index	Ratio of female to male HDI values	GDI
Gender Inequality Index	Overall average of reproductive health, empowerment, and labor market data (women and men) across genders	GII
Labor Force Participation Rate	Total female labor force/Total working age population	LFPR
Expected Years of Schooling	Number of years of schooling that a girl of school entrance age can expect to receive	EYS
Total Fertility Rate	Children per women	TFR
Life Expectancy at Birth	Number of years a newborn infant could expect to live (female)	LE

Table 2. Descriptive Statistics

VERY HIGH							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	2.7760	0.9793	0.1989	52.8027	16.1718	1.6887	80.9626
Medi.	2.8534	0.9810	0.1630	53.0450	16.2296	1.6100	81.2525
Maxi.	24.4753	1.0410	0.7660	85.5000	23.5853	3.2320	87.7310
Mini.	-23.5081	0.8330	0.0130	21.4500	8.5136	0.8080	70.6680
Std. Dev.	3.9807	0.0274	0.1319	9.4098	2.2448	0.4016	2.9367
Skewn.	-0.5724	-0.9942	1.3270	-0.1482	0.0375	1.3022	-0.4466
Kurto.	7.4625	7.0817	5.3163	3.9691	3.4669	4.8184	2.7920
JB	1126.697	1094.288	658.721	54.5167	11.8688	535.581	44.6555
Probl.	0.0000	0.0000	0.0000	0.0000	0.0026	0.0000	0.0000
HIGH							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	3.9151	0.9532	0.4046	46.4813	12.9558	2.2169	74.2710
Medi.	4.2932	0.9590	0.4155	48.5650	13.0304	2.1180	75.4510
Maxi.	37.6872	1.0340	0.6740	72.7000	16.3276	4.0140	81.6660
Mini.	-32.9088	0.7720	0.1170	10.6400	8.7330	1.0780	52.3880
Std. Dev.	5.3147	0.0450	0.1023	13.6338	1.4787	0.6372	5.1580
Skewn.	-0.4196	-1.0895	-0.3736	-0.6301	-0.2249	0.6057	-1.8854
Kurto.	13.7892	4.3194	2.7787	3.0147	2.4662	2.7849	7.5170
JB	3044.887	168.713	15.792	41.289	12.670	39.355	900.171
Probl.	0.0000	0.0000	0.0003	0.0000	0.0018	0.0000	0.0000
MEDIUM							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	4.0412	0.8829	0.5585	49.6377	10.2072	3.5905	65.8144
Medi.	4.3541	0.8850	0.5585	49.3650	10.4004	3.5770	66.8830
Maxi.	53.3818	1.0170	0.8380	94.4000	15.1332	6.1830	77.4940
Mini.	-36.6582	0.6450	0.3580	8.2600	5.8299	1.8030	42.4870
Std. Dev.	5.7716	0.0685	0.0757	21.0895	1.9938	0.9713	7.2883
Skewn.	-0.0108	-0.3455	0.0074	-0.1724	-0.1126	0.3418	-0.8156
Kurto.	24.1485	2.8260	3.0718	2.1161	2.5279	2.4821	3.3940
JB	8721.563	9.902	0.105	17.554	5.336	14.342	54.914
Probl.	0.0000	0.0071	0.9490	0.0002	0.0694	0.0008	0.0000
LOW							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	4.6110	0.8384	0.5811	58.9737	7.4577	5.2804	60.1820
Medi.	4.7084	0.8475	0.5755	70.8900	7.3363	5.3425	61.1785
Maxi.	18.3127	1.0120	0.7890	92.0200	11.4213	7.1230	69.0960
Mini.	-17.0047	0.3830	0.4000	13.8200	3.5719	3.4700	42.1530
Std. Dev.	4.1852	0.0856	0.0846	25.9382	2.4684	0.7988	6.3009
Skewn.	-0.8260	-1.5862	0.1243	-0.4731	0.0618	-0.320	-0.6920
Kurto.	7.5127	7.6830	2.9783	1.5796	1.5798	2.7545	2.9116
JB	150.107	207.970	0.405	18.934	13.209	0.418	12.502
Probl.	0.0000	0.0000	0.8167	0.0000	0.0014	0.8113	0.0019

Table 3. Multicollinearity

VERY HIGH	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	1.470	3.341	1.564	2.038	1.494	2.312
Tolerance Value	0.680	0.299	0.639	0.491	0.669	0.433
Mean VIF	2.036					
HIGH	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	3.414	2.266	2.865	1.967	2.086	1.603
Tolerance Value	0.293	0.441	0.349	0.508	0.479	0.624
Mean VIF	0.449					
MEDIUM	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	2.250	2.473	1.840	2.429	2.133	2.678
Tolerance Value	0.445	0.404	0.543	0.412	0.469	0.373
Mean VIF	0.441					
LOW	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	4.275	3.190	1.083	3.630	3.825	3.753
Tolerance Value	0.234	0.313	0.923	0.276	0.261	0.266
Mean VIF	0.379					

Another situation that should be fully considered is an endogeneity problem in variables. This can be examined through correlation values or detected with the help of the Block Exogeneity Wald Test. Within the scope of the study, the Wald Test was applied to the VEC (Vector Error Correction) model, and the test results are given in Table 4.

The probability values in the table are more significant than the critical value (0.05), indicating that the H_0 hypothesis cannot be rejected and, therefore, the variables are exogenous. In this context, the Block Exogeneity Wald Test method is employed to ascertain no endogeneity problem among the variables in all four models. When the multicollinearity and endogeneity results are evaluated together, it can be determined that there is no problem with using the model's variables within the study's scope.

It is imperative to examine cross-section dependency as a component of panel data analysis. Cross-section dependency signifies whether a shock in one of the states within the model's scope influences other states. Examining cross-section dependency before the stationarity test constitutes a pivotal step in selecting the unit root test. When cross-section dependency is identified in the variable, the second-generation unit root test should be given preference. Conversely, if no cross-section dependence is found, the first-generation unit root test should be selected. The results concerning cross-section dependency are outlined in Table 5.

In cross-section dependency tests, CD test results are considered if the cross-section dimension is larger than the time dimension (N>T), and LM test results are considered in the opposite case. Regarding the data sets of the study, N>T is only in very high states, while T>N is in the other three country groups. In this context, CD test results in very high states and LM test results in high, medium, and low states are considered. When the results in the table are assessed, it is evident that there is cross-section dependence in all four country groups. Cross-sectional dependence (CSD) is a crucial factor in determining the most appropriate test for the stationarity test. In instances where the series of variables does not contain CSD, first-generation unit root tests are to be preferred for the stationarity test. However, in instances where the series contains CSD, signifying that a shock experienced in one country has ramifications for others (Topaloğlu and Korkmaz, 2021), it is imperative to undertake the stationarity test employing second-generation tests that take CSD into consideration. In this context, the stationarity test is performed using the CIPS test, which is a second-generation unit root test. In this context, the stationarity test was performed with the CIPS

Table 4. Block Exogeneity Wald Test Results

	VERY HIGH					HIGH				
GDI	GII	LFPR	EYS	TFR	LE	GII	LFPR	EYS	TFR	LE
Chi-square	5.7256	0.0017	0.0038	0.5906	0.0011	1.7743	1.1850	1.2195	0.1076	1.2063
Prob.	0.1670	0.9673	0.951	0.4422	0.9736	0.4118	0.5529	0.5435	0.9476	0.5471
GII	GDI	LFPR	EYS	TFR	LE	GDI	LFPR	EYS	TFR	LE
Chi-square	1.1456	3.8143	4.3986	2.2970	0.3355	0.7753	1.9393	1.1108	2.0214	0.4141
Prob.	0.564	0.1485	0.1109	0.3171	0.8456	0.6787	0.6787	0.6787	0.6787	0.6787
LFPR	GDI	GII	EYS	TFR	LE	GDI	GII	EYS	TFR	LE
Chi-square	1.9942	0.8457	3.5055	2.6922	0.6353	0.0008	0.8414	0.0281	1.2713	0.5122
Prob.	0.369	0.6552	0.1733	0.2603	0.7278	0.9774	0.359	0.8668	0.2595	0.4742
EYS	GDI	GII	LFPR	TFR	LE	GDI	GII	LFPR	TFR	LE
Chi-square	3.8097	0.5139	4.2441	0.4491	0.5576	0.3791	0.1026	0.2343	2.7903	3.0856
Prob.	0.1488	0.7734	0.1198	0.7989	0.7567	0.8273	0.95	0.8895	0.2478	0.2138
TFR	GDI	GII	LFPR	EYS	LE	GDI	GII	LFPR	EYS	LE
Chi-square	0.0753	0.8178	0.4965	0.4965	2.1170	0.6938	2.3829	4.5262	2.7271	2.0695
Prob.	0.7837	0.3658	0.4811	0.4811	0.1457	0.7069	0.3038	0.104	0.2557	0.3553
LE	GDI	GII	LFPR	EYS	TFR	GDI	GII	LFPR	EYS	TFR
Chi-square	0.5526	1.2117	3.8124	0.2031	0.2572	2.4360	1.0869	2.4131	2.3111	1.8404
Prob.	0.4573	0.271	0.0509	0.6523	0.6121	0.2958	0.5807	0.2992	0.3149	0.3984
	MEDIUM					**LOW**				
GDI	GII	LFPR	EYS	TFR	LE	GII	LFPR	EYS	TFR	LE
Chi-square	4.1987	3.1099	1.5865	0.1720	1.1225	3.0751	0.3195	1.9464	0.2489	0.3881
Prob.	0.1225	0.2112	0.4524	0.9176	0.5705	0.2149	0.8524	0.3779	0.883	0.8236
GII	GDI	LFPR	EYS	TFR	LE	GDI	LFPR	EYS	TFR	LE
Chi-square	0.6698	1.5788	1.4240	2.3739	3.8455	1.8554	0.9253	0.7359	4.0025	0.8024
Prob.	0.7154	0.4541	0.4907	0.3051	0.1462	0.3955	0.6296	0.6922	0.1352	0.6695
LFPR	GDI	GII	EYS	TFR	LE	GDI	GII	EYS	TFR	LE
Chi-square	3.0707	0.2387	0.3628	3.4143	4.0271	0.8217	1.1625	0.3205	2.3490	2.1343
Prob.	0.2154	0.8875	0.8341	0.1814	0.1335	0.6631	0.5592	0.8519	0.309	0.344
EYS	GDI	GII	LFPR	TFR	LE	GDI	GII	LFPR	TFR	LE
Chi-square	2.1854	1.9145	0.2936	0.9188	4.4856	0.0009	2.4738	2.2974	0.4110	0.7565
Prob.	0.3353	0.384	0.8634	0.6317	0.1062	0.9996	0.2903	0.3171	0.8142	0.6851
TFR	GDI	GII	LFPR	EYS	LE	GDI	GII	LFPR	EYS	LE
Chi-square	0.1049	0.8969	0.1586	1.3569	0.3971	0.5230	0.1268	0.9861	0.4206	0.0762
Prob.	0.9489	0.6386	0.9238	0.5074	0.8199	0.7699	0.9385	0.6108	0.8103	0.9626
LE	GDI	GII	LFPR	EYS	TFR	GDI	GII	LFPR	EYS	TFR
Chi-square	1.3239	0.5567	0.7794	1.9689	2.6427	0.0101	1.9958	0.3567	0.9133	0.2381
Prob.	0.5158	0.757	0.6773	0.3736	0.2668	0.92	0.1577	0.5503	0.3392	0.6256

Table 5. Cross-section Dependency Test Results

VERY HIGH								
Test	Breusch-Pagan LM		Pesaran scaled LM		Bias-corrected scaled LM		Pesaran CD	
GDP	10858.25	0.0000	180.5843	0.0000	179.5243	0.0000	95.922	0.0000
GDI	12366.56	0.0000	209.3154	0.0000	208.2554	0.0000	60.7678	0.0000
GII	22566.06	0.0000	441.0556	0.0000	440.0756	0.0000	148.1606	0.0000
LFPR	2246.168	0.0000	16.5373	0.0000	15.4773	0.0000	6.6207	0.0000
EYS	21637.04	0.0000	385.9040	0.0000	384.8440	0.0000	136.9771	0.0000
TFR	11531.54	0.0000	193.4095	0.0000	192.3495	0.0000	20.7173	0.0000
LE	31143.91	0.0000	566.9954	0.0000	565.9354	0.0000	175.6686	0.0000
PANEL	9890.491	0.0000	162.1500	0.0000			90.0698	0.0000
HIGH								
GDP	1449.28	0.0000	46.9192	0.0000	46.4192	0.0000	32.2174	0.0000
GDI	3446.89	0.0000	128.4713	0.0000	127.9713	0.0000	51.8546	0.0000
GII	4304.395	0.0000	171.4599	0.0000	170.9799	0.0000	56.6415	0.0000
LFPR	1289.64	0.0000	40.4019	0.0000	39.9019	0.0000	9.7631	0.0000
EYS	5456.22	0.0000	210.5018	0.0000	210.0018	0.0000	72.3025	0.0000
TFR	3709.27	0.0000	139.1828	0.0000	138.6828	0.0000	41.4921	0.0000
LE	5151.72	0.0000	198.0706	0.0000	197.5706	0.0000	69.3891	0.0000
PANEL	1358.07	0.0000	43.1957	0.0000			30.0598	0.0000
MEDIUM								
GDP	517.2616	0.0000	20.8235	0.0000	20.4635	0.0000	17.4168	0.0000
GDI	2374.68	0.0000	127.0050	0.0000	126.6450	0.0000	47.4530	0.0000
GII	2401.206	0.0000	128.5214	0.0000	128.1614	0.0000	41.7253	0.0000
LFPR	623.97	0.0000	26.9236	0.0000	26.5636	0.0000	1.9829	0.0474
EYS	2563.93	0.0000	137.8236	0.0000	137.4636	0.0000	35.7066	0.0000
TFR	3325.80	0.0000	181.3769	0.0000	181.0169	0.0000	57.0593	0.0000
LE	2592.74	0.0000	139.4705	0.0000	139.1105	0.0000	47.4227	0.0000
PANEL	493.0645	0.0000	19.4402	0.0000			16.2311	0.0000
LOW								
GDP	34.9861	0.0283	2.1581	0.0309	2.0181	0.0436	2.8811	0.0040
GDI	254.0545	0.0000	35.9611	0.0000	35.8211	0.0000	14.0619	0.0000
GII	217.3058	0.0000	36.9358	0.0000	36.8158	0.0000	12.5449	0.0000
LFPR	122.5010	0.0000	15.6619	0.0000	15.5219	0.0000	0.6857	0.4929
EYS	472.3060	0.0000	69.6380	0.0000	69.4980	0.0000	21.6986	0.0000
TFR	485.4260	0.0000	71.6625	0.0000	71.5225	0.0000	22.0139	0.0000
LE	364.0965	0.0000	52.9409	0.0000	52.8009	0.0000	17.2495	0.0000
PANEL	37.5600	0.0145	2.5553	0.0106			2.2844	0.0223

H_0: No cross-section dependence

Table 6. CIPS Unit Root Test Results

Variable	Constant				Constant and Trend				Result
	Level		First Difference		Level		First Difference		
	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	
GDP	-2.0638	< 0.10	-5.7935	< 0.01	-2.5197	>= 0.10	-4.9085	< 0.01	I(1)
GDI	-2.0059	>= 0.10	-5.1132	< 0.01	-2.1060	>= 0.10	-5.1750	< 0.01	I(1)
GII	-1.8645	>= 0.10	-4.5012	< 0.01	-2.5049	>= 0.10	-2.9091	< 0.01	I(1)
LFPR	-1.7974	>= 0.10	-4.5741	< 0.01	-2.0345	>= 0.10	-4.4390	< 0.01	I(1)
EYS	-1.9049	>= 0.10	-3.2081	< 0.01	-2.3736	>= 0.10	-3.5549	< 0.01	I(1)
TFR	-1.9218	>= 0.10	-3.4837	< 0.01	-2.3477	>= 0.10	-3.4559	< 0.01	I(1)
LE	-1.9289	>= 0.10	-5.3645	< 0.01	-2.0862	>= 0.10	-5.4385	< 0.01	I(1)
HIGH									
GDP	-1.5748	>= 0.10	-5.9600	< 0.01	-2.2138	>= 0.10	-5.9545	< 0.01	I(1)
GDI	-1.5559	>= 0.10	-5.2496	< 0.01	-2.5339	>= 0.10	-5.3546	< 0.01	I(1)
GII	-1.9082	>= 0.10	-4.6589	< 0.01	-2.2086	>= 0.10	-4.9130	< 0.01	I(1)
LFPR	-2.0169	>= 0.10	-5.1193	< 0.01	-1.9776	>= 0.10	-5.2057	< 0.01	I(1)
EYS	-1.8204	>= 0.10	-3.8863	< 0.01	-1.4245	>= 0.10	-4.0517	< 0.01	I(1)
TFR	-2.1285	< 0.10	-3.4590	< 0.01	-1.9367	>= 0.10	-3.8567	< 0.01	I(1)
LE	-1.7332	>= 0.10	-3.9229	< 0.01	-1.5615	>= 0.10	-4.4598	< 0.01	I(1)
MEDIUM									
GDP	-2.1112	>= 0.10	-6.2603	< 0.01	-2.0376	>= 0.10	-6.4018	< 0.01	I(1)
GDI	-2.0658	>= 0.10	-5.2925	< 0.01	-1.8001	>= 0.10	-5.6312	< 0.01	I(1)
GII	-1.6839	>= 0.10	-4.8116	< 0.01	-2.4883	>= 0.10	-4.7785	< 0.01	I(1)
LFPR	-1.9585	>= 0.10	-4.5189	< 0.01	-2.1340	>= 0.10	-4.4897	< 0.01	I(1)
EYS	-2.3181	>= 0.10	-3.4055	< 0.01	-2.3419	>= 0.10	-3.5871	< 0.01	I(1)
TFR	-1.7904	>= 0.10	-2.7315	< 0.01	-2.3251	>= 0.10	-3.8033	< 0.01	I(1)
LE	-1.8054	>= 0.10	-3.2055	< 0.01	-2.3357	>= 0.10	-3.3309	< 0.01	I(1)
LOW									
GDP	-2.0360	>= 0.10	-6.2774	< 0.01	-1.7087	>= 0.10	-6.1397	< 0.01	I(1)
GDI	-2.0605	>= 0.10	-5.4816	< 0.01	-2.3470	>= 0.10	-5.8741	< 0.01	I(1)
GII	-1.3347	>= 0.10	-4.9886	< 0.01	-1.7830	>= 0.10	-4.9844	< 0.01	I(1)
LFPR	-1.8949	>= 0.10	-4.7460	< 0.01	-2.2974	>= 0.10	-4.8939	< 0.01	I(1)
EYS	-1.5279	>= 0.10	-3.2956	< 0.01	-2.4035	>= 0.10	-4.2060	< 0.01	I(1)
TFR	-2.3860	>= 0.10	-2.6292	< 0.01	-2.3860	>= 0.10	-3.6507	< 0.01	I(1)
LE	-1.9378	>= 0.10	-2.3985	< 0.05	-2.0067	>= 0.10	-2.9599	< 0.05	I(1)

H_0: Unit Root

Table 7. Heteroscedasticity and Autocorrelation Tests Results

Heteroscedasticity				
	VERY HIGH	**HIGH**	**MEDIUM**	**LOW**
Statistic	512.8720	474.7625	905.0608	38.3026
p-value	0.0000	0.0000	0.0000	0.0000
Autocorrelation				
LMp-stat	95.5184	2.2895	4.9497	4.9949
p-value	0.0000	0.1302	0.0261	0.0254
LMp*-stat	126.6908	6.3454	9.4896	7.6760
p-value	0.0000	0.0118	0.0021	0.0056

test, one of the second-generation unit root tests. The test results are shown in Table 6.

The analysis of the table containing the results of CIPS, a test that considers cross-section dependence, reveals that the probability values of the dependent and independent variables exceed the critical value in all four country groups. Consequently, all variables are hypothesized to contain a unit root at the level. After this finding, first-order differences of the variables were taken, and it was determined that the series of the variables became stationary after the differencing process. In this context, it is established that the variables within the model in all four country groups are I(1) in the fixed/fixed and trended cases.

In estimating panel data, it is imperative to first detect any variance and autocorrelation problems in the model. Ideally, estimators that are capable of resolving these issues should be preferred. As presented in Table 7, the test results for detecting heteroscedasticity indicate that the variance of the error terms is not constant. Similarly, the test results for detecting autocorrelation suggest that the error terms depend on each other.

Upon analysis of the table containing the results of heteroscedasticity and autocorrelation, it is evident that there is a heteroscedasticity problem, as the probability value is smaller than the critical value in the models for very high, high, medium, and low states. In autocorrelation detection, LMp-stat is acknowledged for providing consistent results for large samples, while LMp*-stat is recognized for its efficacy in smaller samples. Therefore, this study's findings indicate the presence of an autocorrelation problem in the models for the four country groups.

EMPIRICAL FINDINGS

Gender-responsive economic growth is analyzed using a panel data analysis method in four states classified under the Human Development Index. The relationship between economic growth, the gender development index, and the gender inequality index is investigated. The first cointegration test is employed to ascertain a long-run relationship between the dependent and independent variables, followed by estimating long-run coefficients. The Durbin-Hausman test results are presented in Table 8.

Table 8. Durbin Hausman Cointegration Tests Results

	Dh_g	p-value	Dh_p	p-value
VERY HIGH	3.052	0.001	2.505	0.006
HIGH	4.774	0.000	2.599	0.005
MEDIUM	8.357	0.000	9.876	0.000
LOW	4.980	0.000	14.482	0.000

Tablo 9. Equation Results

Dependent Variable: GDP		BA-OLS			CUP-FMOLS		
Group	Variables	Coef.	t-stat.	Prob.	Coef.	t-stat.	Prob.
VERY HIGH	GDI	1.083	6.690	0.000	1.057	6.529	0.000
	GII	0.929	4.822	0.000	0.837	4.342	0.000
	LFPR	2.373	7.189	0.000	2.363	7.158	0.000
	EYS	1.158	4.006	0.001	1.139	3.941	0.001
	TFR	2.165	6.713	0.000	2.650	8.218	0.000
	LE	-2.711	-5.017	0.000	-2.074	-3.838	0.001
HIGH	GDI	2.781	15.993	0.000	1.253	7.202	0.000
	GII	-0.909	-3.862	0.001	-0.511	-2.173	0.042
	LFPR	1.776	6.525	0.000	1.072	3.937	0.001
	EYS	-3.494	-17.416	0.000	-1.679	-8.372	0.000
	TFR	-1.585	-5.596	0.000	-0.877	-3.094	0.006
	LE	0.875	4.063	0.001	0.747	3.466	0.002
MEDIUM	GDI	6.767	18.154	0.000	5.050	13.547	0.000
	GII	-1.828	-7.059	0.000	-1.237	-4.778	0.000
	LFPR	3.824	8.527	0.000	3.051	6.804	0.000
	EYS	-1.182	-4.928	0.000	-1.003	-4.180	0.000
	TFR	0.972	4.829	0.000	0.740	3.676	0.001
	LE	-4.492	-11.354	0.000	-3.319	-8.387	0.000
LOW	GDI	2.851	6.321	0.000	2.784	6.172	0.000
	GII	-3.962	-3.763	0.001	-4.239	-4.026	0.001
	LFPR	8.182	4.588	0.000	8.129	4.559	0.000
	EYS	-3.867	-6.804	0.000	-3.837	-6.751	0.000
	TFR	-4.001	-3.428	0.003	-3.693	-3.164	0.005
	LE	1.999	4.817	0.000	1.937	4.667	0.000

Upon examination of the Durbin-Hausman cointegration test results presented in Table 8, it is evident that a cointegration relationship is observed in all four country groups. However, given that the probability values are lower than the critical value, it can be concluded that the utilization of more advanced long-run estimators, such as BA-OLS and CUP-FMOLS, is more reliable for coefficient estimation when compared to the use of FMOLS-DOLS estimators. In this context, the results of the BA-OLS and CUP-FMOLS tests, which are preferred for long-run coefficient estimation, are presented in Table 9.

The bias-adjusted OLS (BA-OLS) model has been developed to address the limitations of the standard OLS approach by correcting for bias and enhancing the results' reliability. This model functions as a long-run estimator, addressing the potential bias that may emerge in autocorrelation in OLS. The CUP-FMOLS (Continuously Updated Fully Modified OLS) method is a long-run coefficient estimation technique that employs correction for autocorrelation and heteroscedasticity problems to generate more reliable results. Continuous updating in CUP-FMOLS ensures the generation of more precise results than traditional long-run estimators.

The findings of the BA-OLS and CUP-FMOLS tests demonstrate a high degree of similarity within the very high-country group. The results from both tests indicate a positive correlation between GDP and the GDI, GII, LFPR, EYS, and TFR variables, while a negative correlation is observed between GDP and LE. In this context, it is evident that GDI and GII, which are gender-related indices, contribute to economic growth in this country group. A similar correlation is observed between labor force participation, education, and fertility rates, positively impacting economic growth. However, it is notable that life expectancy negatively affects economic growth in this group.

The BA-OLS and CUP-FMOLS results are consistent in high states, with the GDP positively correlated with the GDI, LFPR, and LE variables. In contrast, GII, EYS, and TFR are negatively correlated. However, only one gender-related index (GDI) has an increasing effect on economic growth in these states. In this group of states, the expected schooling level, the fertility rate, and the gender inequality index have a negative impact on economic growth. Therefore, it can be concluded that an increase in gender inequality has a negative effect on economic growth.

In the medium country group, as in the high states, GDI has been observed to affect economic growth positively. In this group, LFPR and TFR variables positively correlate with GDP, i.e., they have been shown to increase economic growth. Conversely, GII, EYS, and LE variables have been demonstrated to decrease economic growth in the selected years in both estimation results.

The findings for the low-country group demonstrate comparable outcomes to those of the high-country group. Both estimators yield consistent results within this country group, with GDP and GDI, LFPR, and LE variables exhibiting a positive relationship. In contrast, GII, EYS, and TFR variables demonstrate a negative relationship.

In summary, within the very high country group, GDP has been found to be positively correlated with GDI, GII, LFPR, EYS and TFR variables; LE is negatively correlated. In the high country group, GDP demonstrates a positive correlation with GDI, LFPR, and LE variables; conversely, GII, EYS, and TFR variables demonstrate a negative correlation. In medium countries, GDP has been found to be positively related to GDI, LFPR, and TFR variables; conversely, GII, EYS, and LE variables have been found to be negatively related. In the low country group, GDP is positively related to GDI, LFPR, and LE variables; GII, EYS, and TFR variables are negatively related.

A general evaluation of the estimation results indicates that GDI and LFPR are comparable to economic growth across all groups. In this context, GDI and LFPR, which positively impact economic growth, demonstrate consistency across all country groups. The observed positive relationship between GDI and economic growth aligns with the findings reported by Jonsson (2011). The findings reveal that the gender development index and women's labor force participation rate are significant factors in achieving gender-responsive economic growth. The analysis demonstrates that while the shifting socio-economic structure and level of democratization influence the impact of other variables in different states, GDI and LFPR exhibit an upward trend in economic growth, irrespective of these structural changes. Conversely, GII, which is indicative of gender inequality, has a negative effect on economic growth. This finding supports the conclusions of Mandegar and Olsson (2023) and Khakimova (2024) and indicates that reducing gender inequality is a crucial factor in achieving sustainable economic growth.

DISCUSSION

The present study investigated the hypothesis that gender-responsive economic growth is associated with different levels of human development in country groups. The study revealed several significant findings. The initial finding pertains to gender inequality indices and life expectancy within the very high country group. A matter of particular significance in this group of countries is the negative effect of life expectancy on economic growth. This phenomenon can be elucidated through the theoretical framework of the law of diminishing returns. It can be argued that the quality of social security and health services has reached a level where they are no longer able to positively impact life expectancy, due to the attainment of a state of saturation. A similar correlation has been identified in a study by Kunze (2014), who attributed this negative relationship to inheritance effects. This finding is also consistent with the findings of Zhang and Zhang (2005) regarding the declining marginal contribution of life expectancy to economic growth.

Another noteworthy situation is the positive relationship between gender inequality and economic growth in this group of countries. This relationship is not anticipated. In this context, it is hypothesised that economic growth in these countries with institutionalised market systems may be more sensitive to technological infrastructure or the development of the service sector than to gender equality.

A particularly salient finding of the study is the broadly negative correlation between GII and GDP. This indicates that in societies characterised by high levels of gender inequality, the potential contributions of women are constrained, which has a deleterious effect on economic growth. As demonstrated in the studies by Jütting et al. (2008) and Dijkstra & Hanmer (2000), gender-based discrimination in social institutions has the capacity to exert a detrimental effect on economic growth, via the inequalities women face in core areas such as education, health, and the labor force.

Research indicates a positive correlation between the LFPR and GDP, suggesting that enhancing women's participation in the labor force is a potential driver of economic growth. Research conducted by Akhtar et al. (2023), Tsani et al. (2013), and Urama et al. (2022) also demonstrates that an increase in the participation of women in the labor force has a positive effect on economic dynamism. However, certain regional studies (e.g., Thaddeus et al., 2022, in Sub-Saharan Africa) have identified a potential negative relationship between these variables. This occurrence can be attributed to various factors, including the sectors in which women are employed, the quality of the labor force, and the prevalence of informality.

It is evident that the relationship between EYS and economic growth is more complex and context responsive. The findings in the extant literature and in this study demonstrate positive relationships in some country groups and negative relationships in others. This finding indicates that the impact of education on economic growth is dependent not only on the quantity of educational resources available, but also on the quality of these resources and their alignment with the demands of the labor market. Research conducted by Khakimova (2024) and Barro & Lee (1994) emphasises that the impact of education on economic growth in the short term may be limited or occur through indirect channels. In particular, in economies with weak education infrastructure or where human capital investment does not correspond to productivity, education may not have an impact on economic growth.

The relationship between TFR and GDP, however, varies considerably and depends on the demographic transition processes of country groups. As demonstrated in the research conducted by Brander & Dowrick (1994) and Li (2016), elevated levels of fertility have been observed to enhance economic growth in specific nation groups. Conversely, in other instances, these high fertility rates have been shown to constrain growth, primarily by diminishing the level of investment allocated to each child. In this context, the relationship between fertility rates and economic growth should be evaluated in conjunction with population structure, human capital levels, and the social policy environment.

As demonstrated by the study, the relationships between gender equality, education, demographic structures, and economic growth are non-linear and context-sensitive. Consequently, when establishing development strategies, policymakers should take into consideration not only absolute indicators but also country-specific structural factors and social norms.

CONCLUSION AND POLICY RECOMMENDATIONS

Women's empowerment has become a prominent issue in policy-making and academic discourse, with gender inequality emerging as a significant area of concern. Recognizing gender equality as a fundamental development element has created a 'smart economy.' The UNDP has emphasized gender issues, acknowledging that ensuring equal opportunities between the sexes is crucial in driving economic growth. A notable shift in perspective has been observed in human development reports, transitioning from a focus on economic growth to a more gender-focused approach. This evolution is characterized by introducing two gender-related criteria, GDI and GEM, in the 1995 Human Development Report. After this, in 2010, following deliberations on the limitations of the GDI in identifying gender inequality, the GII was established, thereby effecting a shift in focus to the welfare losses caused by inequality.

The discussions surrounding the importance of women's empowerment and the dissolution of gender inequalities in economic growth and development have necessitated examining the relationship between gender-related indices and economic growth. In this study, the relationship between the gender development index and the gender inequality index, as well as both gender-related indices and economic growth in four country groups classified within the scope of human development, is analyzed. The analyses conducted within the scope of the study have yielded findings that are believed to contribute to the existing literature on the subject. The study's most significant finding is that the relationship between gender-related indices and economic growth has been established for all four country groups. The gender development index has been shown to exert an increasing effect on economic growth in high, medium, and low states, categorized according to human development levels. Conversely, the gender

inequality index has been demonstrated to decrease economic growth in other country groups, except in very high states. These findings provide robust evidence that gender plays a key role in economic growth and explain why it is considered within the scope of a 'smart economy' in the literature.

The hypothesis that practices and policies aimed at ensuring gender equality will adversely impact economic growth is contradicted by the research findings. The findings demonstrate that the gender development index is positively correlated with economic growth, irrespective of the socio-economic and democratic levels of states. Similarly, the findings indicate that an increase in the gender inequality index, that is, a more significant number of obstacles faced by women in accessing opportunities compared to men, is negatively correlated with economic growth. Consequently, it is recommended that the efficacy of gender-responsive policies be augmented to facilitate realizing the economic growth goal.

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