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## Nexus between Women Empowerment and Sustainable Development in Low-Income Countries: Insights from Panel ARDL Model

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### ABSTRACT

*This analysis investigates the impact of women's empowerment on sustainable development in low-income countries using a panel dataset from 2001 to 2020. For data estimation, panel unit root techniques, Pedroni cointegration test, panel ARDL and causality tests are used. Panel ARDL long-run outcomes point out that the variables women empowerment, human capital, life expectancy at birth, and trade openness are positively and significantly related to sustainable development, while the variable agriculture growth has a negative and significant impact on sustainable development in low-income countries. Keeping in view the study outcomes, it is concluded that women empowerment is playing an important role in influencing sustainable development in low-income countries, so policymakers of these countries need to improve the status of women by providing health, education and employment facilities for women to improve the sustainable development of a country.*

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### 1. Introduction

All countries strive for sustainable development and economic growth. Using resources wisely, advancing technology, and raising capital is crucial for each nation in maintaining sustainable development and economic progress. Furthermore, women are necessary for human progress since people are regarded as the primary source of productivity. One of the earlier goals should be to improve the status of women in cultures (Yidz, 2016; Ameer et al., 2024; Taqi et al., 2021 a,b). Promoting fundamental women's rights via equity and collaboration leads to sustainable development therefore, women's empowerment (WE) is essential for social justice, long-term economic prosperity, and environmental stability (Baker, 2006). In third-world countries, sustainable development (SD) depends on three pillars: social justice, economic success, and environmental preservation.

Regarding the environmental pillar, it is argued that because of their domestic, agricultural, and cultural duties as well as their acquaintance with the local environment, women are essential to promoting sustainable development patterns in the management of natural resources. According to the SD pillar of economic well-being, it is generally acknowledged that if one group is much less fortunate than another and if everyone in society is not using their abilities to the fullest extent possible, economic well-being cannot be achieved (Batool & Rehman, 2022; Shah et al., 2021; Sibte-e-Ali et al., 2018).

Women's political, social, and economic engagement is known as WE. The mutual understanding of both men and women is necessary for a life to be fruitful and fertile (Asghar & Mumtaz, 2024). It is typically challenging for women to enter the formal economy because most work for free or in the hard-to-measure informal sector. The fact that women are less likely than males to finish their education, to be illiterate, to have lower Job skills, and to encounter societal and cultural barriers that prevent them from entering the formal sector are just a few of the numerous potential reasons for this. Despite working in the formal sector, women continue to confront several challenges, including the gender wage gap and the childcare penalty. The gender pay gap describes a particular circumstance when women are paid less than males. This is primarily because women are still more likely than men to have primary careers and raise their children at home. This phenomenon, sometimes referred to as the childcare penalty, happens when women who are raising children pass up chances to advance in their careers, acquire more expertise, and earn more income (Ehrenberg & Smith, 2018; Firmansyah & Sihaloho, 2021; Asghar & Mumtaz, 2024).

Understanding women's rights, being confident in them, having control over their lives both within and outside the home, and being able to influence social change are all components of women's empowerment. Economic, social, political, and personal empowerment are among the various elements that interact and depend on one another. Economic empowerment is the process of ensuring that women are treated fairly in the marketplace. Inequity and unfairness must be eradicated if women are to have the same status in society as men. Women should be accepted for who they are in society. Women's voting rights and representation in national and provincial legislatures are essential to political empowerment. Personal empowerment for women should include personal independence (Sohail, 2014).

The empowerment of women and the provision of equitable representation in all government institutions, including those that make, enforce, and interpret laws, are critical to a country's political development in particular and its long-term viability in general. Alvarez (2013) advocates that policies should provide women with equal participation in decision-making, norms, and institutions. Furthermore, various stakeholders, not just the government, must share responsibility for sustainable development. As a result, academics strongly urge more governance participation to ensure sustainable development. In order to fulfil everyone's shared duty to attain sustainable development, the nation's political climate should be participatory, allowing participation from not only women but also from all other marginalized elements of society (Warth & Koparanova, 2012). Target 5 of the SDGs calls for gender equality and the empowerment of all women and girls, and one of its objectives is to eradicate all kinds of discrimination against women and girls globally (UN, 2016). Gender equality will reduce poverty and raise education levels, which will help the world's economy become more sustainable (OECD, 2008). Therefore, considering the above discussion, it is important to analyze the role of women's empowerment in influencing sustainable development in low-income countries.

### **1.1 Contribution of the Study**

This analysis used a panel dataset of fifteen low-income countries from 2001 to 2020. The low-income countries are selected for analysis based on data availability, such as Burkina Faso, Niger, Burundi, Rwanda, Congo, Dem. Republic, Sierra Leone, Gambia, Sudan, Guinea-Bissau, Syrian Arab Republic, Madagascar, Togo, Mali, Uganda, and Mozambique. The dependent variable used in a model is sustainable development, as

measured by adjusted savings as a percentage of GNI, while the independent variables are women empowerment, human capital, life expectancy at birth, trade openness and agriculture growth. For data estimation, correlation matrix, panel unit root techniques, Pedroni cointegration test, panel ARDL and causality tests are used.

## **2. Literature Review**

The definition of empowerment differs between countries, individuals, races, occupations, and life roles. There may also be differences in time and location. Also, men and women may have diverse perspectives about feminism and women's freedom in general (Saraswathy et al., 2008). Empowerment concerns how individuals and groups are given power, particularly in connection to one another. The empowerment process is described as questioning the prevailing power relationships and obtaining total authority over power sources. In many ways, domestic economic strength is also how power is characterized (Mason, 1998). Women's economic empowerment is the equitable use of their financial resources to enhance or control other aspects of their lives (Taylor & Perezniето, 2014). On a personal level, empowerment is described as strengthening self-control by collaborating with others to create initiatives and structures that have a direct impact (Bystydzienski, 1992). Scholars and students focus on women's ability to choose how to make use of the possibilities and resources that are accessible (Kabeer, 2005).

At the empirical level, different studies investigated the association between women empowerment (WE) and sustainable development, such as Nihangaza & Kwizera (2023), which examined the effect of WE on SD in Makamba Province. The findings show that WE is a crucial component of SD. Consequently, it is important to Stress WE to enhance SD in Makamba Province. The study by Abd Al Mola et al., (2023) explored the factors influencing sustainable development in Egypt using data for Egypt from 1977 to 2019. Their study shows a direct link between WE and SD. Second, population increase and the unemployment rate both have long-term negative effects on SD, whereas trade openness has an optimistic influence on economic growth (EG). Thaddeus et al., (2022) explored the effect of the female labor force participation rate (FLFPR) on EG in sub-Saharan African countries using data from 1991 to 2019. The results also show that FLFPR has a detrimental and significant long-term effect on GDP.

The study by Mariel (2022) analyzed the influence of women's education and LFPR on Afghan's EG using data from 2002 to 2019. The GDP and LFPR were shown to be significantly and negatively correlated. Batool & Rehman (2022) used data from 384 women in Punjab, Pakistan's Sargodha district, to assess the effects of WE on SD. Their study shows that WE is crucial to improving the SD. The study by Waheed & David (2021) analyzed the effects of trade, exchange rate, capital, rate of inflation, and governmental fiscal policies on Pakistan's EG from 1977 to 2019. The findings demonstrate that capital, inflation, exchange rates, and tax receipts have significant long- and short-term correlations with EG. On the other hand, government taxes, currency rates, and inflation rates have an adverse influence on the EG. This indicated that to have a less detrimental effect on Pakistan's economic pattern, authorities should concentrate more on improving these areas.

Thaddeus et al., (2021) examined the macroeconomic elements that fueled the EG of Cameroon from 1970 to 2018. The results displayed that in Cameroon, public spending, trade, GCF, and rate of exchange all had positive and significant long- and short-term relationships. Foreign aid, money availability, HC, inflation, and FDI was adversely connected with the EG. Similarly, Zahra et al., (2021) examined the influence of women's education on EG of Pakistan from 1991 to 2019. The results showed that Pakistan's education investment has little bearing on women's access to higher education. The findings discovered that women's education has a considerable, favorable impact on Pakistan's economic development. In addition, Ustabaş & Gülsoy (2020) explored the association between Turkey's EG and FLFPR from 1990 to 2015. The outcomes showed a significant correlation between EG and the percentage of women who are employed in the manufacturing and service industries. Also, it was shown that there was a positive and significant correlation between FLFPR and Turkey's EG. Furthermore,

Yakubu et al., (2020) analyzed the effect of LFPR on EG in Nigeria from 1990 to 2017. The study found that the LFPR and GFCF are causally related to EG. Lastly, Shah et al., (2020) explored different macroeconomic factors of EG in Pakistan. Their study shows that LFPR, capital and financial development are positive aspects of EG while the inflation rate negatively affects the economic growth in Pakistan.

### 3. Data and Methodology

This study used a panel dataset of fifteen low-income countries from 2001 to 2020. The data is gathered from World Development Indicators (WDI). The low-income countries are selected for analysis based on data availability, including Burkina Faso, Niger, Burundi, Rwanda, Congo, Dem. Rep., Sierra Leone Gambia, Sudan, Guinea-Bissau, Syrian Arab Republic, Madagascar, Togo, Mali, Uganda and Mozambique. To investigate the influence of women empowerment on sustainable development in low-income countries the following model is developed:

$$SD_{ij} = \beta_o + \beta_1 WE_{ij} + \beta_2 HC_{ij} + \beta_3 LE_{ij} + \beta_4 TR_{ij} + \beta_5 AG_{ij} + u_{ij}$$

SD indicates sustainable development, WE represents women empowerment, HC refers to human capital, LE indicates life expectancy at birth, TR means trade openness, AG indicates agriculture growth, and  $u_{ij}$  refers to error term.

**Table 1: Description of Variables**

Variables	Description of Variables	
<b>Dependent Variables</b>		
SD	Sustainable Development	Adjusted savings: gross savings (% of GNI)
<b>Independent Variables</b>		
WE	Women Empowerment	Labor force participation rate, female (% of female population ages 15+)
HC	Human Capital	Primary School Enrollment (Female)
LE	Life Expectancy at Birth	Years
TR	Trade Openness	Percentage of GDP
AG	Agriculture Value added	Percentage of GDP

#### 3.1 Data Estimation Techniques

Different data estimation techniques are used to analyze the impact of WE on SD in low-income countries. The explanation of these techniques is as follows:

##### 3.1.1 Unit Root Analysis

Unit root analysis evaluates the stationarity level of variables. This analysis is useful in knowing the integration order of variables and the section of the econometric technique used for long-run estimation of parameters. Different unit root tests, such as the IPS, LLS, ADF, and PP tests, are applied to check the integration level. With the help of this analysis, econometric technique for long-run estimation of parameters can be chosen.

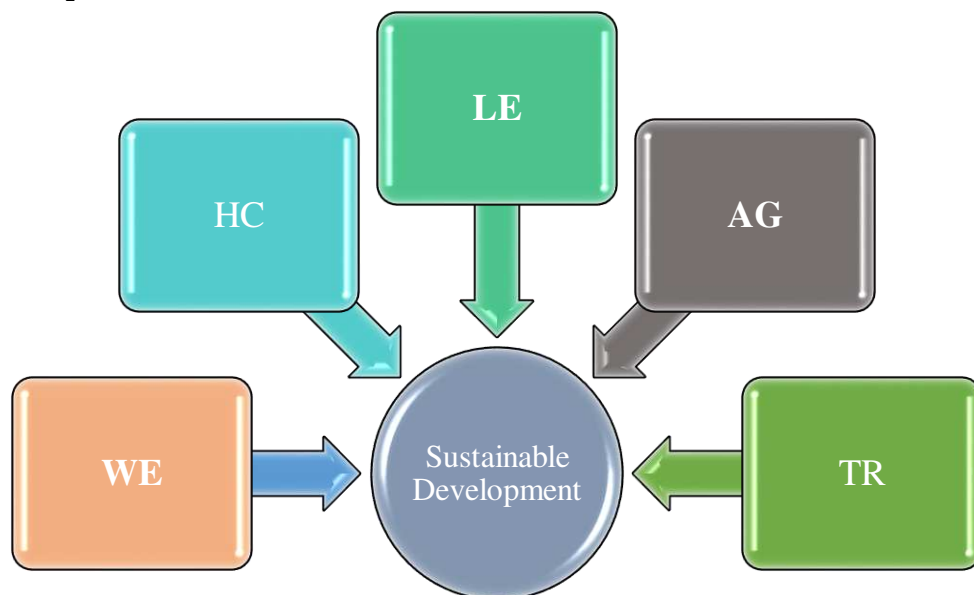
##### 3.1.2 Panel Cointegration Analysis

Pedroni cointegration test is applied to data to evaluate the long-run cointegration of variables. Pedroni performed several panel cointegration tests that consider the presence of different intercepts and trend coefficients across sections. The within-dimension test, also known as the panel statistics test, and the heterogeneous alternative were the two different sorts of alternative hypotheses that Pedroni proposed (between-dimension or group statistics test). The residuals serve as the building blocks for the Pedroni panel cointegration statistics.

3.1.3 Panel ARDL Analysis

The panel ARDL model evaluates the short- and long-run association between women’s empowerment and sustainable development. Pesaran et al., (1999) introduces the ARDL-PMG model. Detecting both short- and long-term associations is possible with the help of the ARDL model, an error correction model. This approach is useful because it allows for the examination of potential long-term correlations regardless of the integration order of the variables, whether they are mutually integrated I(0) and I(1) or integrated in I. (1). Nevertheless, this method is inapplicable when the series are integrated of order I(2). Additionally, this approach provides reliable and effective estimators since it takes care of endogeneity-related issues by accounting for lag duration for both endogenous and exogenous variables.

Figure 1: Conceptual Model



4. Data Analysis

4.1 Descriptive Analysis

Table 2 shows that the mean SD, WE, LE, TR and AG values in low-income countries are 2.4941, 3.9940, 4.0926, 3.8679 and 3.3651, respectively. The maximum SD, WE, LE, TR and AG values in low-income countries are 3.6725, 4.4462, 4.3396, 4.8856 and 4.1044, respectively. Low-income countries' minimum SD, WE, LE, TR and AG values are -1.1188, 2.5620, 3.8416, -0.2785 and 2.7462, respectively. The SD, WE and TR distributions are negatively skewed, whereas LE and AG have positively skewed distributions. Lastly, SD, WE, LE and TR have leptokurtic, while AG’s has platykurtic distribution as indicated by kurtosis value.

Table 2: Descriptive Analysis

Variables	SD	WE	LE	TR	AG
Mean	2.4941	3.9940	4.0926	3.8679	3.3651
Maximum	3.6725	4.4462	4.3396	4.8856	4.1044
Minimum	-1.1188	2.5620	3.8416	-0.2785	2.7462
Std. Dev.	0.6680	0.4069	0.0948	0.6485	0.2936
Skewness	-1.7948	-1.7963	0.3041	-3.7893	0.3316
Kurtosis	8.1257	6.0902	3.2851	22.4069	2.4843

4.2 Correlation Analysis

Correlation coefficient (r) estimates the degree of association between two variables. This analysis suggests a weak or strong correlation between the variables. The value of r is equal one means exact, while the value zero

means no correlation between variables. Table 3 displays the correlation matrix. It is found that sustainable development is positively correlated to the women's empowerment (0.157), and life expectancy (0.280), while negatively correlated to human capital (-0.088), trade openness (-0.203) and agriculture growth (-0.311).

**Table 3: Correlation Matrix**

Correlation	SD	WE	HC	LE	TR	AG
SD	1.000					
WE	0.157	1.000				
HC	-0.088	0.117	1.000			
LE	0.280	-0.531	0.338	1.000		
TR	-0.203	0.078	0.204	0.015	1.000	
AG	-0.311	0.006	-0.027	-0.278	-0.161	1.000

### 4.3 Unit Root Analysis

Table 4 shows the outcomes of panel unit root tests. The results show that the variables sustainable development, women empowerment, and HC are integrated at a level while the variables life expectancy, trade openness and agriculture growth are integrated at 1<sup>st</sup> order; this mixed order of integration of variables suggests that the panel ARDL technique is vital in estimating the long-run estimation of parameters

**Table 4: Unit Root Analysis**

Variable	Individual Intercept				Intercept and Trend				None			Results
	LLC	IPS	ADF	PP	LLC	IPS	ADF	PP	LLC	ADF	PP	
SD	-1.768	-1.366	44.103	72.017	-3.084	-3.032	66.119	116.235	-0.651	27.642	47.406	I(0)
	0.039	0.086	0.075	0.000	0.001	0.001	0.000	0.000	0.258	0.687	0.039	
WE	-2.340	0.755	40.757	48.544	-1.997	0.205	38.089	35.866	-2.793	62.839	99.825	I(0)
	0.010	0.775	0.138	0.031	0.023	0.581	0.212	0.292	0.003	0.001	0.000	
HC	-4.788	-2.057	62.690	130.269	-3.668	-2.374	66.780	87.153	1.420	13.963	16.649	I(0)
	0.000	0.020	0.001	0.000	0.000	0.009	0.000	0.000	0.922	0.998	0.988	
LE	-6.641	-1.621	66.747	111.817	-0.039	6.144	16.920	11.504	7.812	3.838	0.706	I(1)
	0.000	0.053	0.000	0.000	0.484	1.000	0.987	1.000	1.000	1.000	1.000	
TR	-0.857	-0.366	30.697	40.394	-0.259	-0.109	30.095	43.058	0.841	16.096	14.525	I(1)
	0.196	0.357	0.532	0.147	0.398	0.457	0.563	0.092	0.800	0.991	0.997	
AG	-0.153	1.163	19.274	41.902	0.537	0.945	23.810	53.224	-2.126	37.966	50.150	I(1)
	0.439	0.878	0.963	0.113	0.704	0.828	0.851	0.011	0.017	0.216	0.022	

### 4.4 Panel Cointegration Analysis

Pedroni cointegration test is applied to determine the long-run cointegration of variables in a model. Table 5 shows that the values of panel PP, and ADF, group PP and ADF-statistic are statistically significant; this suggests that long-run cointegration exists between the variables in a model.

**Table 5: Pedroni Residual Cointegration Test**

Null Hypothesis: No cointegration		
Within-Dimension		
Panel	Statistic	Prob.
v-Statistic	0.2082	0.4175
rho-Statistic	-0.0264	0.4894
PP-Statistic	-11.4832	0.0000
ADF-Statistic	-3.3276	0.0004
Between-Dimension		

Group	Statistic	Prob.
rho-Statistic	2.7577	0.9971
PP-Statistic	-11.3889	0.0000
ADF-Statistic	-3.4698	0.0003

#### 4.5 Panel ARDL Long-Run Analysis

Discussing first the relation between women empowerment and sustainable development, the study found that WE is positively and significantly related to the SD. The WE's coefficient exhibits that as WE augments by one unit, it improves sustainable development by 0.8739 units. It suggests that women make major contributions to society by working for a living, starting their businesses and caring for their families. Women's empowerment improves their household status and is important for increasing sustainable growth. These outcomes are also found by Bayeh (2016) and Adcock (2013). Furthermore, female education is imperative to influencing sustainable development in low-income countries. The outcomes show that HC, as measured by female primary school enrolment, is positively and significantly related to sustainable development. The HC's coefficient exhibits SD augments by 0.0639 units for a single unit increase in HC. It implies that human capital drives sustainable development by enhancing skills, education, and health, which improve productivity and innovation. A well-developed workforce fosters economic growth, reduces poverty, and supports long-term environmental and social sustainability (Slaus & Jacobs, 2011). The positive relationship between HC and SD was also found by Javed (2021) and Ishfaq et al., (2024). The study also found that female LE at birth is positively and significantly related to sustainable development in low-income countries. The LE's coefficient's value exhibits that as LE augments by a unit, it increases sustainable development by 0.1632 units. The ability of women to form a healthy society is enhanced by their financial empowerment, which raises life expectancy and hence sustainable development (Wang et al., 2020). Similar outcomes were also confirmed by Raza et al., (2013); Kunze (2014). On the other hand, trade openness is positively and significantly related to sustainable development in low-income countries. The TR coefficient shows that SD improved by 0.1626 units for a single unit increase in TR. It suggests that foreign trade can encourage innovation, create capital, increase productivity, and more effectively allocate resources to importing nations, improving sustainable development (Belloumi & Alshehry, 2020). The direct link between TR and SD was also confirmed by Asghar et al., (2024a) and Asghar et al., (2023). The results also show that agricultural growth is negatively and significantly related to sustainable development in low-income countries. The AG's coefficient exhibits that as AG increases by one unit, it leads to an increase in sustainable development by -0.6107 units. These results do not meet prior expectations. The negative relationship between agriculture and sustainable development might be because in low-income countries, traditional modes of production mostly occupy the agriculture sector, which does not help improve the living standard of the people, which is negatively related to sustainable development (Shah et al., 2021).

**Table 6: Panel ARDL Long-Run Estimates**

Dependent Variable: Sustainable Development				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
WE	0.8739	0.1034	8.4469	0.0000
HC	0.0639	0.0203	3.1460	0.0021
LE	0.1632	0.0425	3.8323	0.0002
TR	0.1626	0.0268	6.0631	0.0000
AG	-0.6107	0.0665	-9.1817	0.0000

#### 4.6 Panel ARDL Short-Run Analysis

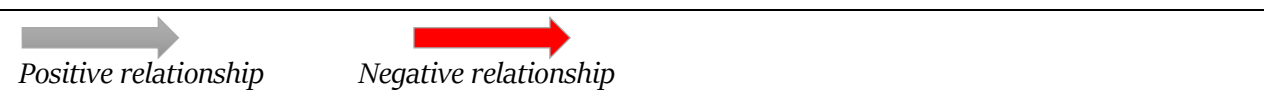
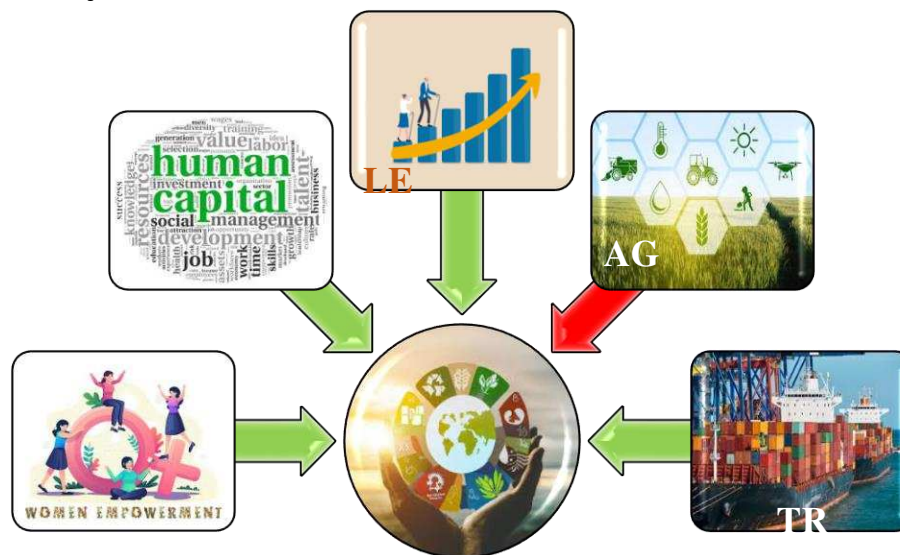
This part clarifies the panel ARDL short-run estimates of the impact of WE on SD in low-income countries. Table 7 displays the outcomes of short-run ECM model. This term should be negative and also

statistically significant. The negative term indicates convergence to the equilibrium in case of any disturbances. It is found that the error correction term is negative (*Coefficient* = -0.8245) and also statistically significant (*t-statistic* = -4.7866; *Prob.* = 0.0000), which exhibits that any disturbance happens in a short-run, 82.45 percent errors become corrected when moving towards long-run equilibrium.

**Table 7: Panel ARDL Short-Run Error Correction Model**

<b>Dependent Variable: Sustainable Development</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.*</b>
ECM(-1)	-0.8245	0.1722	-4.7866	0.0000
D(SD(-1))	0.1168	0.1155	1.0115	0.3140
D(WE)	6.3778	3.6894	1.7286	0.0868
D(HC)	-0.0388	0.2912	-0.1335	0.8940
D(LE)	1.4412	1.3198	1.0920	0.2773
D(TR)	-0.1438	0.0621	-2.3143	0.0226
D(AG)	0.3437	0.1742	1.9723	0.0511
C	-32.641	8.3070	-3.9294	0.0002

**Figure 2: Summary of ARDL Outcomes**



**4.7 Panel Causality Analysis**

Table 8 shows unidirectional causality between WE and SD, HC and SD, LE and SD, and AD and SD. In addition, no-causality is found between TR and SD in low-income countries.

**Table 8: Panel Dumitrescu Hurlin Panel Causality Test**

<b>H<sub>0</sub></b>	<b>W-Stat.</b>	<b>Zbar-Stat.</b>	<b>Prob.</b>	<b>Outcomes</b>
WE ≠ SD	4.51371	3.02748	0.0025	Unidirectional
SD ≠ WE	3.40914	1.47216	0.1410	
HC ≠ SD	5.99891	5.11877	0.0000	Unidirectional
SD ≠ HC	2.99369	0.88717	0.3750	
LE ≠ SD	5.17627	3.96042	0.0000	Unidirectional
SD ≠ LE	1.12101	-1.74973	0.0802	

TR ≠ SD	2.81425	0.63450	0.5258	No-Causality
SD ≠ TR	3.60621	1.74965	0.0802	
AG ≠ SD	2.30037	-0.08909	0.9290	Unidirectional
SD ≠ AG	3.98877	2.28832	0.0221	

## 5. Conclusions and Recommendations

This study investigates the impact of women's empowerment on SD in low-income countries. For this purpose, the panel dataset of fifteen low-income countries from 2001 to 2020 is used. For data estimation, correlation matrix, panel unit root techniques, Pedroni cointegration test, panel ARDL and causality tests are used. Unit root analysis found that the variables sustainable development, women empowerment, and human capital are integrated at a level while the variables life expectancy, trade openness and agriculture growth are integrated in 1<sup>st</sup> order. Furthermore, Pedroni cointegration analysis found the long-run cointegration between the variables in a model. Panel ARDL long-run outcomes point out that the variables women empowerment, HC, life expectancy at birth, and TR are positively and significantly related to sustainable development, while the variable agriculture growth has a negative and significant impact on sustainable development in low-income countries. Short-run ECM model is found that the ECM term is negative and also statistically significant, which exhibits that if any disturbance happens in the short-run, 82.45 percent of errors become corrected when moving towards long-run equilibrium. Causality analysis found a unidirectional causality between WE and SD, HC and SD, LE and SD, and AD and SD. In addition, no-causality is found between TR and SD in low-income countries. Considering the study outcomes, it is concluded that women's empowerment is important in influencing sustainable development in low-income countries. Empowering women leads to improved access to education, healthcare, and economic opportunities, boosting overall development. By addressing gender inequalities, women can contribute significantly to environmental sustainability and poverty reduction, creating a ripple effect throughout communities. Sustainable development relies on equitable participation, where women's voices are integral to decision-making. Ultimately, empowering women is a moral imperative and an economic and social necessity for achieving long-term prosperity and reducing poverty in low-income nations.

## 6. Policy Recommendations

The study also has some policy suggestions to improve women's empowerment and sustainable development in low-income countries. First, it is suggested that women's education should be promoted in low-income countries. Investment in educational infrastructure, especially in rural areas, should be encouraged to improve women's education level. Second, technical education for females should be encouraged and provided to enhance the empowerment level of women and sustainable development. Third, the health of women is also essential in empowering them. So, policymakers in low-income countries must provide health facilities for women to improve their health status. Fourth, policymakers should encourage openness to trade by promoting exports of a country. Lastly, to improve sustainable development, the agriculture sector should be enhanced by using modern modes of production. Quality seeds and pesticides should be provided to the farmers.

## References

- Abd Al Mola, S., Attia, G., & Essam Mohamed, H. (2023). Determinants of Sustainable Development in Egypt During the Period of (1977-2019). *المجلة العلمية للبحوث والدراسات التجارية*, 37(1), 179-236.
- Adcock, K. (2013). Globalization, Women's Empowerment and Sustainable Growth: Development Theory with a Vagina. *Global Societies Journal*, 1(1).
- Alvarez, M. L. (2013, October). From unheard screams to powerful voices: A case study of women's political empowerment in the philippines. In *12th National Convention on statistics* (pp. 1-73).
- Ameer, N., Bhutta, M. A., Nawaz, D., Asghar, M. M., & Jawad, F. (2024). Navigating the Role of Remittances in Attaining Sustainable Development Goals in Developing Countries: New Insights from Panel ARDL Model. *The Critical Review of Social Sciences Studies*, 2(2), 384-396.

- Asghar, M. M., & Mumtaz, S. (2024). Socioeconomic Determinants of Divorce in Pakistan: A Case Study of Bahawalpur. *Zakariya Journal of Social Science*, 3(1), 11-20.
- Asghar, M. M., Safdar, R., Zubair, M., & Hanif, M. (2024a). Exploring the Influence of Financial Development, Institutional Quality and Trade Openness on Inclusive Growth in SAARC Countries. *Pakistan Journal of Humanities and Social Sciences*, 12(2), 1450-1461.
- Asghar, M. M., Sultana, R., Ullah, S., & Arshad, M. (2023). Analyzing the External Debt and Exports-Led Growth Hypothesis in Selected Asian Countries. *Zakariya Journal of Social Science*, 2(2), 43-55.
- Asghar, M. M., Tanzeel, M., Ullah, S., & Hussain, S. (2024b). Analyzing the Economic Impact of Construction Sector in Pakistan. *Zakariya Journal of Social Science*, 3(1), 21-34.
- Baker, S. (2006). *Sustainable Development USA and Canada*: Routledge.
- Barin, N. E., Kundak, S., & Cenikli, V. S. (2020). The Effects of Female Employment on Economic Growth: An Application of Panel Data on the Member Countries of the Organisation of Islamic Cooperation. In *Contemporary Issues in Business Economics and Finance*. Emerald Publishing Limited. 29-44.
- Batool, M. I., & Rehman, A. (2022). The Impact Of Women's Empowerment On Sustainable Development In The District Of Sargodha. *Journal of Positive School Psychology*, 6(8), 5193-5211.
- Bayeh, E. (2016). The role of empowering women and achieving gender equality to the sustainable development of Ethiopia. *Pacific Science Review B: Humanities and Social Sciences*, 2(1), 37-42.
- Belloumi, M., & Alshehry, A. (2020). The impact of international trade on sustainable development in Saudi Arabia. *Sustainability*, 12(13), 5421.
- Bystydzienski, J. M. (1992). Women transforming politics: Worldwide strategies for empowerment.
- Ehrenberg, R. G., & Smith, R. S. (2018). *Modern Labor Economic: Theory and Public Policy*. Routledge (13th ed.). Routledge
- Firmansyah, C. A., & Sihaloho, E. D. (2021). The Effects of Women Empowerment on Indonesia's Regional Economic Growth. *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan*, 22(1), 12-21.
- Ishfaq, M., Rasool, A., Asghar, M. M., Karim, S., & Ahmad, R. (2024). Impact of Natural, Physical and Human Capital Formation on Economic Growth in Pakistan: An ARDL Analysis. *Journal of Asian Development Studies*, 13(3), 222-233.
- Javed, R. (2021). Nexus Between Economic Growth, Health, and Education in Pakistan: An ARDL Bound Testing Approach. *International Journal of Economics and Financial Issues*, 11(6), 56.
- Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & development*, 13(1), 13-24.
- Kunze, L. (2014). Life expectancy and economic growth. *Journal of Macroeconomics*, 39, 54-65.
- Mariel, E. O. C. (2022). Do Female Education and Labor Force Participation Contribute to Economic Growth in Afghanistan?. *Open Journal of Business and Management*, 10(3), 1148-1159.
- Mason, K. O. (1986, March). The status of women: Conceptual and methodological issues in demographic studies. In *Sociological forum* (Vol. 1, No. 2, pp. 284-300). Dordrecht: Kluwer Academic Publishers.
- Nihangaza, S., & Kwizera, E. (2023). Exploring the effect of Women empowerment on Sustainable development with Reference to Village Savings and Loans Associations (VSLA) Partners of FVS-Amie des Enfants in Makamba Province. *International Journal of Public Administration and Management Research*, 8(4), 1-6.
- OECD. (2008). *Gender and Sustainable Development: Maximising the Economic, Social and Environmental Role of Women*. Gender and Sustainable Development: Maximising The Economic, Social and Environmental Role of Women (Vol. 9789264049)
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American statistical Association*, 94(446), 621-634.
- Raza, K., Majeed, S., & Islam, M. (2013). The Impact of Health Indicators on Economic Growth in Pakistan. *Pakistan Journal of Humanities and Social Sciences*. 1(1), 11-27.
- Saraswathy Amma, K. P., Panicker, K. S. M., & Sumi, M. (2008). Micro credit and women empowerment: A study

- in India. *International Journal of Global Business*, 1(1), 184-213.
- Shah, S. Z. A., Asghar, M. M., & Riaz, U. (2020). Exploring the Factors Affecting Economic Growth in Pakistan, *Global Social Sciences Review*, 5(3), 400-409
- Shah, S. Z. A., Asghar, M. M., & Riaz, U. (2021). Does Urbanization Influence Agriculture Output in Pakistan?. *International Review of Basic and Applied Sciences*, 9(3), 368-376.
- Shah, S. Z. A., Riaz, U. & Asghar, M. A. U. (2021). Role of education and labor force participation in influencing women empowerment in Pakistan: A case study of District Khanewal. *Pakistan Social Sciences Review*, 5(4), 601-614.
- Sibt-e-Ali, M., Chaudhary, I. S., & Farooq, F. (2018). Impact of Human and Social Capital on Economic Development in Pakistan: Empirical Evidence from Primary Data Analysis. *Journal of Accounting and Finance in Emerging Economies*, 4(1), 39-46.
- Slaus, I., & Jacobs, G. (2011). Human capital and sustainability. *Sustainability*, 3(1), 97-154.
- Sohail, M. (2014). Women empowerment and economic development-an exploratory study in Pakistan. *Journal of Business Studies Quarterly*, 5(4), 210.
- Taqi, M., Abbas, M., e Ali, M. S., & Ashraf, M. R. (2021a). Foreign direct investment, trade performance, and sustainable development goals: An analysis of BRI selected countries. *International Research Journal of Management and Social Sciences*, 2(1), 50-62.
- Taqi, M., e Ali, M. S., Parveen, S., Babar, M., & Khan, I. M. (2021b). An analysis of Human Development Index and Economic Growth. A Case Study of Pakistan. *iRASD Journal of Economics*, 3(3), 261-271.
- Taylor, G., & Perezniето, P. (2014). Review of evaluation approaches and methods used by interventions on women and girls' economic empowerment. *Overseas Development Institute*, 14, 1-62.
- Thaddeus, K. J., Bih, D., Nebong, N. M., Ngong, C. A., Mongo, E. A., Akume, A. D., & Onwumere, J. U. J. (2022). Female labour force participation rate and economic growth in sub-Saharan Africa: "a liability or an asset". *Journal of Business and Socio-economic Development*.
- UN. (2016). Department of Economic and Social Affairs Disability.
- Ustabaş, A., & Gülsoy, T. Y. (2020). The Relationships Between the Female Labor Force Participation Rate and Economic Development: A Correlation Analysis for Turkey. In *Proceeding International Conference on Eurasian Economies* (pp. 104-113).
- Waheed, R., & David, F. (2021). Exploring the determinants of economic growth: Evidence from Pakistan. *Journal of Economics*, 2(2), 35-44.
- Warth, L., & Koparanova, M. S. (2012). *Empowering women for sustainable development* (pp. 1-26). Geneva, Switzerland: United Nations Economic Commission for Europe.
- Yakubu, M. M., Akanegbu, B. N., & Jelilov, G. (2020). Labour force participation and economic growth in Nigeria. *Advances in Management and Applied Economics*, 10(1), 1-14.
- Yidz, E. (2016). The Importance of Women in Sustainable Development. *Sosyal Bilimler Araştırma Dergisi*, 5(1), 1-10.
- Zahra, K., Yasin, M., Sultana, B., Haider, Z., & Khatoon, R. (2021). Impact of Women Education on Economic Growth: An Evidence from Pakistan. *Journal of Economic Impact*, 3(2), 113-120.