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Article

Measuring the impact of democracy on gender equality: does choice of index matter?

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Abstract. Using a variety of indicators, the study tries to analyze the impact of democracy on gender equality for a sample of 159 countries across the world. For this purpose, the study used static panel data models and applied various tests of robustness to estimate the impact of democracy on gender equality. It is found that the effect of democracy on gender equality is uncertain and sensitive to the interchangeability of various gender equality indices. However, the replacement of various democracy indices does not cause any substantial change in the results. The impact of democracy on gender equality is almost insignificant, but certain components of democracy like political participation and government functioning have positive impacts in improving the levels of gender equality. Among the control variables, economic growth and population size emerge as the positive determinants of gender equality.

Keywords: gender equality; democracy; index sensitiveness; static panel data models.
JEL classification: C23; D72; J16

1. Introduction

Does democracy cause gender equality? The question has attracted much scholarly attention in recent times. Theoretically, democracy may foster gender equality by expanding political rights, improving civil liberties, and enabling the representation of marginalized groups, including women. Democracy, having universal voting rights, is theoretically supposed to enhance gender equality as a bottom-up process driven by democratic participation of females, who constitute fifty percent of the total electorate (Franceschet and Piscopo, 2013). While democracy increases the likelihood of descriptive representation of women, it does not guarantee substantive representation[1] (Lovenduski, 1997; Mansbridge, 1999). Pitkin (1972) argues that substantive representation is more important than descriptive representation. A 'critical mass' (around 30-35 percent women in

[1] Descriptive representation refers to representatives who share characteristics with their group, while substantive representation focuses on advocating for the group's interests, regardless of shared identity.

parliament) is necessary for influencing policy and institutional culture in favor of gender equality (Dahlerup, 1988). However, institutional barriers, party dynamics, and cultural factors can limit women's influence even when they reach critical mass. Childs and Krooks (2006) argue that it is not 'critical mass' but the 'critical actors' who drive the gender equality reforms. Thus, it is not about numbers but about individual politicians who push for gender equality regardless of their gender (Phillips, 1995). Further, electoral accountability ensured by free and fair elections provides an opportunity for women to promote their interests and hold rulers accountable. Since women constitute a significant proportion of the majority, theoretically, they should be able to defend their interests through elections (Beer, 2009). In addition to bottom-up pressures, democracy may also enhance gender equality by implementing gender quotas through top-down state policies. Most democracies use gender quotas and other affirmative action policies to counter historical and systematic barriers that have kept women under-represented (O'Brien and Piscopo, 2018). However, many authoritarian and hybrid regimes also enhance gender equality by implementing top-down state policies. Rwanda, for example, has one of the highest proportions of women in parliament despite being classified as a hybrid regime. Similarly, many left-wing authoritarian regimes have more women in their parliaments and cabinets than other regimes (Reynolds, 1999).

Protection of civil rights is another mechanism that improves gender equality in democratic regimes. A democratic system provides a legal framework, an independent judicial system, and rule of law for protecting the rights of marginalized groups like women (Ghai and Cottrell, 2009). These protections are established through laws that promote equality, prevent discrimination, and support women's empowerment. Women can seek justice more effectively through courts, legal institutions, and human rights bodies. Democratic nations often comply with global treaties like CEDAW. Women can appeal to international bodies if their rights are violated and not being taken care of even after they report about the violation in their own countries. Moreover, democracy plays a crucial role in advancing gender equality by protecting the freedom of speech, protest, and advocacy. These rights allow women and their allies to challenge discriminatory policies, push for legal reforms, and raise awareness about gender issues. Freedom of expression allows discussion on gender norms, sexism, and traditional rules, leading to cultural transformation.

Against this background, the present study undertakes a thorough investigation of the impact of democracy on gender equality and differs from previous studies in the following ways: first, rather than relying on any single indicator, it uses widely accepted measures of gender equality—namely, the Gender Equality Index (GEI), Global Gender Gap Index (GGI), and Gender Development Index (GDI)—as dependent variables to test the sensitivity of democracy's impact to the interchangeability of these indices. Second, we also test how the impact of democracy on gender equality changes when various democracy indicators are substituted for one another. Third, the study takes into account country-specific fixed effects vis-à-vis other time-invariant factors such as political regime, economic status, religion, and region by dividing the sample into subsamples based on these characteristics. Fourth, we also test the impact of various components of democracy on gender equality to examine their relative importance. Finally, the study examines the impact of affirmative policies, such as the implementation of compulsory gender quotas in parliament. The major finding of this study is that democracy is not a robust predictor of gender equality, as its impact is uncertain and highly sensitive to the interchangeability among various gender equality indices.

However, gender quota in parliament, political participation, and government functioning play a positive role in this regard.

The rest of the paper is arranged in following sections: section 2 discusses the existing empirical literature and research gaps to be addressed by this study. Section 3 briefly outlines the methodology, data, and variables used in this paper. Section 4 presents a detailed analysis of the empirical findings. Finally section 5 concludes.

2. Review of literature

Despite its theoretical plausibility, empirical investigation of the link between gender equality and democracy has received insufficient scholarly attention, with only a few attempts made in this area. Inglehart, Norris, and Welzel (2003) were among the first to explore this link, using OLS regression with cross-sectional data from 46 countries. They used the Freedom House index of civil liberties and political rights as the measure of democracy and female representation in the lower house of parliament as the measure of gender equality. The authors concluded that the relation between these two variables is not direct; rather, they are linked through a third variable called cultural change. Their main argument is that economic development tends to bring a gradual shift from survival to self-expression values, and these values in turn are conducive to both democracy and gender equality. Thus, the authors discarded any causal link between these two variables. However, their analysis is based on cross-sectional data, which does not consider the role of time dynamics, which is very important to examine the nature of causation. Further, Rizzo et al. (2007) analyzed cross-sectional data from 22,729 individuals in Arab and non-Arab Muslim countries using the World Values Survey 2000. They estimated the relationship between support for gender equality and support for democracy using OLS. Their findings showed that non-Arab Muslim countries had higher levels of support for women's rights, and individuals who supported gender equality were more likely to support democracy. In contrast, the opposite was true for Arab Muslim countries. The authors argued that for a well-functioning democracy to emerge in the Arab Middle East, the rule of law protecting gender equality, minority rights, and citizen inclusion would need to be established. Like Inglehart et al., this research is not sufficient to establish causality between gender equality and democracy due to its cross-sectional nature and lack of time dynamics. Building upon the analysis of Inglehart et al., Beer (2009) examined the impact of democracy on gender equality by estimating GEE models for a variety of gender equality indicators related to health, education, nutrition, and employment based on data from 133 countries collected between 1960 and 2004. She found that countries with greater democracy and longer histories of women's suffrage exhibited higher levels of gender equality in health, education, and employment. Beer's analysis neglects critical country-specific fixed effects, rendering the estimated impact of democracy on gender equality vulnerable to endogeneity bias. However, she tries to capture these country-specific fixed effects by introducing dummies for regions.

Taking in view the impact of international conventions on gender equality, Cho (2014) investigated the effect of CEDAW on women's rights in conjunction with democracy. Using pooled OLS on data from 126 countries between 1981 and 2007, Cho found that the combined effect of

CEDAW and democracy significantly enhanced women's social rights. However, neither CEDAW nor democracy alone had a significant impact on gender equality. Similar to Beer (2009), Cho's study could not address the endogeneity issue arising from the presence of country-specific time-invariant heterogeneity in the panel data model. In a similar fashion, Hogstrom (2015) examined the link between gender equality and democracy. Using the share of female ministers in the cabinet as the dependent variable and the Freedom House democracy index as the independent variable, he analyzed data from 191 countries between 2000 and 2010 with pooled OLS. The results demonstrate that economic development and democracy only affect gender equality in cabinets positively in specific contexts. Development has a positive effect in developed democratic countries, but a negative effect in dictatorships, particularly military dictatorships. The level of democracy has a positive effect mainly in dictatorships, with the strongest effect in civilian dictatorships. Further, utilizing the same methodology, Blankenship and Kubicek (2018) investigated the causality between gender equality and democracy using data from 41 sub-Saharan African countries from 1990 to 2014. They constructed a composite gender equality index based on variables such as education, employment, and political representation and examined whether countries with stronger democratic records have better records with respect to gender equality. The authors found no such direct connection, as several non-democratic countries have also made significant progress on the variables in their gender equality index.

The most recent attempt in this area is by Andersen (2023). He uses V-DEM's women's political empowerment index, which combines indicators of women's freedom of movement, freedom from forced labor, property rights, and access to justice. To measure democracy, he uses the dichotomous democracy measure developed by Boix et al. (2013). Additionally, he employs the unexpected Second Vatican Council (1962-1965) as part of a shock-based identification strategy. Andersen (2023) finds a significant causal effect of democracy on gender equality. However, the model may suffer from endogeneity, as the dependent and independent variables share some common characteristics. To address this issue, the author replaces the democracy variable with an instrumental variable constructed by multiplying the dummy variable for Vatican II (which takes the value 1 if the observation belongs to the post-Vatican II period and zero otherwise) by the share of Catholics in a country. This instrument variable suffers from three limitations. First, the Catholic share is constant over time, making the instrument also time-invariant and unable to capture changes in democracy over time. This raises questions about its relevance for establishing causality between gender equality and democracy. Second, since the key explanatory variable in Andersen's model is time-invariant and all time-invariant variables are wiped out in the fixed effects panel data model, it is unclear how this study takes into account country-specific fixed effects. Finally, while Vatican II may have significantly promoted democratic values in Christian societies, its impact on non-Christian societies, which constitute a significant portion of the world population, remains uncertain.

Based on the above discussion, it is evident that majority of the studies use political participation of women—measured in terms of women's share in parliament (Inglehart et al. 2003), female ministers in the cabinet (Hogstrom, 2015), and women's political empowerment (Andersen, 2023)—as the indicator of gender equality, while ignoring other aspects like health, education, and employment. They assumed that increased political representation of females will automatically reduce gender inequality in other spheres of society. Therefore, rather than focusing solely on the

political dimension of gender inequality, the present study considers gender inequality in a broader sense. To this end, we use three widely accepted measures of gender (in)equality: GEI, GGI, and GDI to account for multiple aspects of biases against women. We utilize all three measures rather than choosing one over the others because each measure aggregates and averages many individual dimensions of gender equality and is subject to errors of aggregation and measurement due to differences in their methodologies (Vaccaro, 2021). It is also possible that one or more dimensions not included in one indicator may be considered by others. Therefore, to present a holistic picture of gender equality and to ensure the robustness of the results, we consider all three measures of gender equality as dependent variables in our study. Following the same reasoning, we use three democracy indices—EIU Democracy Index (EIUD), Freedom House Index for Civil Liberties and Political Rights (FHD), and V-DEM's Electoral Democracy Index (EDI)—as measures of political regimes.

Apart from this, our study makes following departures from the previous literature on this issue: first, we try to deal with the problem of endogeneity bias by estimating fixed and random effects models according to the nature of country-specific individual heterogeneity for a variety of indicators for gender equality and democracy. Second, the effects of time-invariant characteristics, such as region, religion, economic position, and political regime types, are taken into account without compromising the country-specific fixed effects by dividing the entire sample into sub-samples based on these characteristics and estimating a separate regression model for each sub-sample. Third, we also investigate the impact of various aspects of democracy, such as free and fair elections, government functioning, political participation, political culture, and civil liberties, to understand the role of these mechanisms through which democracy can affect gender equality.

3. Methodology

3.1 Data and sample

A sample of 159 countries worldwide was selected for the present study. The sample selection is based on the availability of data for the variables used in this study. The study covers a 14-year period, from 2006 to 2019, as data on key variables, such as the GGI and EIUD, is available only for 2006 and onwards. A brief description of the variables, along with their respective sources, is provided in Table 1.

A variety of indicators are available for measuring gender equality, and the selection of a particular index is challenging, as the relationship between gender equality and democracy can be sensitive to the choice of measurement. To ensure precision, we do not rely on a single measure of gender equality. Instead, we utilize three widely recognized indices: GEI, GGI, and GDI. The GEI is the inverse of UNDP's Gender Inequality Index (GII) which is calculated by deducing GII from 1. The GEI ranges from 0 (indicating perfect inequality) to 1 (indicating complete equality). It is a composite index assessing gender equality across three dimensions: reproductive health (i.e., maternal mortality rate and adolescent birth rate), empowerment (i.e., percentage of females in higher education and parliament), and labor market participation. The GGI, using a different methodology, evaluates gender equality across four primary areas: economic participation and opportunity (i.e., labor force participation, gender-based wage differences, women's income as a percentage of men's,

female representation in leadership roles, and share of females in high-skill jobs); educational attainment (i.e., literacy rate and enrolment in primary, secondary, and tertiary education); health and survival (i.e., life expectancy and sex ratio at birth); and political empowerment (i.e., percentage of females in parliament, women in ministerial positions, and years with a female head of state). A higher GGI value denotes greater gender equality. The GDI, another index in this context, measures gender equality in health (i.e., life expectancy), education (i.e., mean years of schooling), and income (i.e., per capita income), with higher scores indicating greater gender equality. All indices of gender equality differ significantly in terms of their composition. GGI is a broader index that takes almost all the components of GII and GDI, excluding reproductive rights, which are the essential component of GII. However, GGI takes more comprehensive measures of economic participation and political empowerment as compared to GII and GDI.

Table 1. Description of variables.

Variable	Indicator	Source
Gender equality	Gender equality index (GEI)	UNDP
	Global Gender Gap Index (GGI)	The World economic Forum
	Gender Development index (GDI)	UNDP
Democracy	EIU democracy index (EIUD)	The Economists Intelligence Unit
	Freedom House Index for civil liberties and political rights (FHD)	Freedom House
	V-DEM' electoral democracy index (EDI)	Varieties of Democracy (V-DEM)
Women's share in parliament	Women's share in parliament (WSP)	World Bank development indicators
Economic growth/Income	Log of GDP per capita (USD)	World Bank development indicators
Gender quota in parliament	Constitutionally mandatory gender quartos in lower house	International IDEA
Economic inequality	Gini-coefficient calculated from post tax net income	World Inequality Database
Good governance	Corruption perception index (CPI)	Transparency International
Population size	Log of population	World Bank development indicators

Furthermore, democracy serves as our primary independent variable, hypothesized to positively impact gender equality. Like gender equality, we use three popular indices of democracy: EIUD, FHD, and EDI. EIUD includes political culture, civil liberties, and government functioning as essential components of democracy. It measures overall democratic health of a country, including political culture. In contrast, FHD focuses only on political rights and civil liberties, making it best suited for assessing freedom and human rights, particularly in authoritarian regimes. Similarly, EDI primarily focuses on political rights in terms of free and fair elections along with universal voting rights, making it ideal for analyzing electoral fairness and suffrage rights. Therefore, EIUD is a broader index that roughly encompasses all the components of FHD and EDI. Higher values of EIUD and EDI indicate greater levels of democracy. However, the opposite is true for FHD. To ensure consistency, we invert the scale of FHD so that higher values indicate higher levels of democracy. After normalization, the value of FHD ranges between 0 and 1. For ease of comparison, EIUD and EDI are also taken on the same scale.

Among the list of control variables, we have included per capita income, income inequality, good governance, and population size. All of the control variables excluding income inequality are expected to have positive impact on gender equality.

3.2 Model

The studies discussed in section 2 either estimated cross-section regressions or pooled regressions to examine the impact of democracy on gender equality. The regression models based on cross-sectional data are not sufficient to establish causality between these two variables since they do not consider variations over time, which play an important role in examining the nature of causality. On the other hand, the pooled regression model considers the variations in the variables over time but does not control for the unit-specific heterogeneity present in panel data, which might cause the endogeneity bias and impair the efficiency of OLS estimates (Wooldridge, 2016). In this regard, fixed effects (FE) and random effects (RE) panel data regression models may be more suitable, as they capture not only cross-sectional variations in the data but also variations over time. Additionally, these models effectively handle the impact of unobserved individual heterogeneity that might affect the relationship between democracy and gender equality. The basic regression model estimated in this study may be stated as:

$$G_{it} = \beta_0 + \beta_1 X_{1i1-t} + \beta_2 X_{2i1-t} + \beta_3 X_{3i1-t} + \cdots + \delta_i + u_{i1-t} \quad [1]$$

where G_{it} is gender equality indicator for country *i* in year *t, Xs* are set of explanatory variables taken at one year lag, δ_i is time-invariant individual heterogeneity, and u_{it} is idiosyncratic error term.

The OLS estimation of equation (1) leads to biased estimates if δ_i is correlated with one or more of the *Xs*. Even if δ_i is uncorrelated with all of the *Xs,* OLS still produces inefficient estimates due to the positive serial correlation in the composite error term $(\delta_i + u_{it})$. Therefore, it would be appropriate to estimate equation (1) using fixed effects (FE) or random effects (RE) models, depending on the correlation between δ_i and the *Xs*. If they are correlated, FE estimation is appropriate as it effectively handles the problem of endogeneity. RE estimation produces consistent and efficient estimates when δ_i is uncorrelated with all the explanatory variables. The choice between FE and RE models is based on the Hausman test, which follows a chi-square distribution with k-1 degrees of freedom and is based on the Wald criterion.

$$W = \chi^2[\mathrm{k}-1] = [\beta_{\mathrm{FE}} - \beta_{\mathrm{RE}}]' \psi^{-1} [\beta_{\mathrm{FE}} - \beta_{\mathrm{RE}}] \quad [2]$$

where $\psi = var[\beta_{\mathrm{FE}} - \beta_{\mathrm{RE}}]$. Rejection of null hypothesis implies the selection of FE model suitable.

The above specification of the model implies a static panel data model, which does not account for changes in the behavior of the dependent variable over time, as it does not include the lagged dependent variable among the set of explanatory variables. We also attempted to estimate equation (1) within the framework of dynamic panel data models using difference GMM and system GMM. However, due to the problem of invalid instruments, as indicated by the Sargan test and Hansen J test, we did not proceed with these methods.

4. Results and discussion

4.1 Descriptive statistics

Table 2 presents the descriptive statistics of the dependent and independent variables used in this study. Among gender equality variables, GEI exhibits the highest variation (51.7 percent) compared to GGI (8.8 percent) and GDI (7.6 percent). Regarding democracy variables, FHD is reported with 59 percent variation, followed by EDI (48.9 percent) and EIUD (40.2 percent). Among the control variables, CPI displays the highest variation (66.3 percent), while the log of population shows the lowest (9.6 percent).

Table 2. Summary statistics.

Variable	Total obs.	Mean	Median	Min	Max	S.D.	CV
GEI	1997	0.376	0.396	0.0250	0.819	0.194	0.517
GGI	1933	0.685	0.690	0.450	0.880	0.0606	0.088
GDI	2128	0.936	0.959	0.464	1.04	0.0717	0.076
EIUD	2226	0.549	0.577	0.113	0.993	0.221	0.402
FHD	2226	0.562	0.583	0.00	1.00	0.332	0.590
EDI	2211	0.530	0.521	0.0140	0.922	0.259	0.489
Log (income per capita)	2189	8.54	8.54	5.12	11.7	1.49	0.174
Gini coefficient	2042	0.508	0.537	0.153	0.723	0.123	0.241
CPI	2192	4.21	3.50	0.200	75.0	2.79	0.663
Log (population)	2212	16.2	16.2	12.6	21.1	1.55	0.096

Source: Authors' calculation

Table 3 measures the correlation between gender equality and democracy variables. GEI is positively correlated with both GGI (0.555) and GDI (0.636), and these correlation coefficients are statistically significant at the one percent level. Furthermore, the correlation between GGI and GDI is 0.644, which is also statistically significant. The correlation coefficients among GEI, GGI, and GDI align with theoretical expectations that all gender equality indices should be positively correlated. However, their values are significantly less than one, indicating that these three measures of gender equality are not perfectly interchangeable. Selecting a single indicator over others could lead to substantial variations in results. Therefore, to enhance the robustness of our findings, we have considered all three gender equality indicators as dependent variables in this study.

Table 3. Correlation matrix between gender equality and democracy indices.

	GEI	GGI	GDI	EIU	FHD	EDI
GEI	1	0.555***	0.636***	0.606***	0.509***	0.514***
GGI		1	0.644***	0.592***	0.507***	0.487***
GDI			1	0.489***	0.428***	0.372***
EIUD				1	0.903***	0.901***
FHD					1	0.915***
EDI						1

Source: Authors' calculation. *Note*: ***, **, and * indicate level of significance at 1%, 5%, and 10%, respectively.

Furthermore, GEI, GGI, and GDI are significantly associated with the democracy indices (i.e., EIUD, FHD, and EDI). The values of correlation coefficients among these indices range between 0.555 and 0.644. All of the gender equality indicators are positively correlated with all of the democracy indices. It implies that countries with higher levels of democracy also have higher levels of gender

equality. Regarding correlations among the democracy indices, all are positively and significantly correlated with each other. The values of these correlation coefficients are substantially high and range from 0.901 to 0.915. This suggests that, unlike gender equality indices, substituting one democracy index for another is unlikely to substantially alter the results.

Table 4 compares various political regimes—full democracy, flawed democracy, hybrid regime, and authoritarian regime—using analysis of variance (ANOVA). The Economist Intelligence Unit defines full democracies as countries with substantial political freedom and civil liberties. These nations have robust political institutions, effective governance, independent judiciary, and free press. Free and fair elections and respect for the rule of law are common characteristics of these regimes. In contrast, flawed democracies hold free elections but exhibit weaknesses in governance, political culture, and participation. While basic civil liberties are respected, issues such as media restrictions and corruption may prevail. Hybrid regimes, a category following flawed democracies, display some democratic features but also significant authoritarian elements. Elections might not be entirely free or fair in these countries. Apart from this, they may also suffer from corruption, underdeveloped political culture, and weak rule of law. Authoritarian regimes, the fourth category, exhibit limited political pluralism, with many lacking meaningful elections. Civil liberties are restricted, and power is frequently concentrated in the hands of a single leader or party.

Table 4. Gender equality across political regimes: ANOVA.

Regime type	GEI	GGI	GDI
Full democracy	0.860	0.741	0.974
Flawed democracy	0.651	0.697	0.970
Hybrid democracy	0.520	0.668	0.916
Authoritarian regime	0.528	0.642	0.894
F	421.4***	278.6***	214.9***

Source: Authors' calculation. *Note*: ***, **, and * indicate level of significance at 1%, 5%, and 10%, respectively.

As clearly demonstrated by Table 4, full democracies have the highest level of gender equality across all three indicators. The average scores of GEI, GGI, and GDI for this category are 0.86, 0.741, and 0.974, respectively, over the period. Following full democracies, flawed democracies perform better compared to the remaining two categories of political regime. Authoritarian regimes are the worst performers across all three indicators of gender parity. The results of ANOVA indicate that the four categories of political regimes significantly differ in terms of GEI, GGI, and GDI. As the level of democratization increases, so does the level of gender equality. However, this does not confirm a causal connection between the two.

4.2 Empirical findings

This section presents a systematic analysis of democracy's impact on gender equality, which starts from unconditional cross-section regression models and ends with conditional panel data models. The regression models estimated in this section can be divided into two categories: cross-section and panel data regressions. In each category, two types of regression models have been estimated: unconditional and conditional regression models. Unconditional models do not account for control variables, whereas conditional models do. For this purpose, we have considered three dependent

variables, viz. GEI, GGI and GDI, as indicators of gender equality. For each dependent variable, we have estimated three equations: model 1, model 2 and model 3. And for each model, a different democracy indicator is used while keeping other variables the same.

The results of unconditional regression models demonstrate that all of the democracy variables have a significantly positive impact on all of the gender equality indicators. Like Inglehart et al. (2003) and Rizzo et al. (2007), it implies that gender equality is positively associated with democracy in the cross-sectional data.

Table 5. Conditional cross-section regression models.

Regression Model	Independent variables	Dependent variable		
		GEI	**GGI**	**GDI**
Model 1	Constant	0.950686	0.759991	0.782012***
	EIUD	**−0.0021385**	**0.0156806*** **	**0.011067*** **
	Income	0.02991***	−0.00474	0.019863***
	Inequality	−0.520292***	−0.107158**	0.028634
	CPI	0.0077567	0.00338	−0.006977
	Population	0.0063749	−0.003185	−0.008649**
	Adjusted R^2	0.837652	0.467599	0.385585
	N	134	124	136
Model 2	Constant	0.949696	0.770658***	0.775691***
	FHD	**−0.011099**	**0.0708587*** **	**0.055722*** **
	Income	0.029848***	−0.004954	0.019857***
	Inequality	−0.518189***	−0.128901***	0.0167632
	CPI	0.0075008	0.0062825*	−0.005372
	Population	−0.0065641	−0.0020433	−0.007603**
	Adjusted R^2	0.837571	0.397550	0.368229
	N	134	124	136
Model 3	Constant	0.930551***	0.765700***	0.780891***
	EDI	**−0.04317**	**0.075906*** **	**0.0448628**
	Income	0.030101***	−0.005412	0.0194056**
	Inequality	−0.537295***	−0.124458**	0.011281
	CPI	0.009246	0.007097*	−0.003469
	Population	0.006311	−0.002602	−0.00799**
	Adjusted R^2	0.839228	0.384012	0.350333
	N	134	124	136

Source: Authors' calculation. *Note*: ***, **, and * indicate level of significance at 1%, 5%, and 10% respectively.

Table 5 demonstrates the results of conditional cross-section regression models. For this purpose, economic growth, income inequality, good governance, and population size are included as additional control variables. All of these variables are expected to have significant impact on gender equality indicators. Table 5 reveals that when GEI is taken as the dependent variable, all of the democracy indices have a statistically insignificant impact on gender equality. However, when GGI is used as the dependent variable, all of the democracy indices have a significantly positive impact on gender equality. And when GDI is used as the proxy for gender equality, two democracy variables, EIUD and FHD, show a significantly positive impact, while the effect of EDI is found to be statistically insignificant. It indicates that democracy has either an insignificant or a positive impact on gender equality. These results also suggest that the expected impact of democracy is dependent on the choice of a particular gender equality index. Thus, it appears that the impact of democracy on gender equality is index-sensitive. However, replacing the democracy indicators with one another does not cause substantial variations in the impact of democracy on GEI, GGI and GDI.

Table 6. Conditional panel data regression models.

Regression model	Independent variables	Dependent variable		
		GEI	**GGI**	**GDI**
Model 1	Constant	−4.16577	−0.246593***	0.03406
	EIUD	**0.000232**	**−0.00116**	**0.00282*** **
	Income	0.013605**	0.010554***	0.00677***
	Inequality	−0.255653***	0.0009639	0.05943***
	CPI	8.955e-05	0.00016	0.000152**
	Population	0.21409***	0.036816***	0.03962***
	Hausman test	242.08***	279.42***	73.24***
	Estimated model	FE	FE	FE
Model 2	Constant	4.13987***	−0.23774***	−0.00129
	FHD	**−0.007389**	**−0.00277**	**0.01373***
	Income	0.01381***	0.010417***	0.00698**
	Inequality	−0.256917***	0.001743	0.05657***
	CPI	9.402e-05	0.00016	0.00015**
	Population	0.21287***	0.03592***	0.042351***
	Hausman test	217.77***	225***	72.26
	Estimated model	FE	FE	FE
Model 3	Constant	4.20929***	−0.2373**	0.0291
	EDI	**0.035817****	**−0.014145*****	**0.01134****
	Income	0.01302***	0.010697***	0.00703***
	Inequality	−0.244552***	−0.00186	0.05866**
	CPI	7.362e-05	0.000162	0.00015***
	Population	0.21545***	0.03629***	0.04054***
	Hausman test	220.35***	112.64	65.72***
	Estimated model	FE	FE	FE

Source: Authors' calculation. *Note*: ***, **, and * indicate level of significance at 1%, 5%, and 10%, respectively.

As far as the impact of control variables is concerned, it is important to mention that the regression coefficients of these variables, as well as their levels of significance, follow a similar pattern across the three regression models demonstrated in Table 5. This is because, as already mentioned, these three models differ only in terms of democracy variables. In terms of control variables, these models are the same. Thus, it is appropriate to interpret the results of any one regression model (e.g., Model 1) regarding the control variables. Model 1 in Table 5 shows that the economic growth has a profound impact on gender equality, as its regression coefficients are positive and highly significant in the case of GEI (0.0229) and GDI (0.0198). This implies that countries with higher levels of per capita income also have higher levels of gender parity. Like economic growth, income inequality also emerges as a robust predictor of gender equality, as its impact on two gender equality indicators, GEI (-0.518) and GGI (-0.129), is negative and highly significant. This suggests that countries with higher levels of economic inequality also have higher levels of gender inequality. Furthermore, population size is reported to have a significantly negative impact on GDI (-0.0086), indicating that countries with larger populations tend to have lower levels of gender equality.

The cross-sectional regressions indicate a roughly positive association between democracy and gender equality. However, merely relying on cross-sectional data is not sufficient to establish causality between these two variables. In this regard, panel data regression models may be more suitable, as they capture not only cross-sectional variations in the data but also variations over time. Additionally, these models effectively handle the impact of unobserved individual heterogeneity that might affect the relationship between democracy and gender equality. For this purpose, we have

estimated unconditional regression models taking the one-year lag[2] of the democracy variables. The regression coefficients of the democracy variables—EIUD, FHD, and EDI—are found to be statistically insignificant regarding their impact on gender equality variables (i.e., GII, GGI, and GDI). Thus, these results are not reported here.

Table 6 shows the results of conditional panel data regression models. Based on the Hausman test, it has been found that country-specific heterogeneity is significantly correlated with democracy in Model 1, Model 2, and Model 3, as the chi-square values under this test are highly significant for all three models. In this case, the FE model produces consistent and efficient estimates of the regression coefficients compared to the RE model. Thus, the results presented in Table 6 are estimated using the FE model. Like conditional cross-section regression models, the results of the conditional panel data regressions also indicate that the impact of democracy on gender equality is not certain and is highly sensitive to the replacement of various gender equality indicators with one another, which casts doubt on the causation between gender equality and democracy. For instance, if GEI is taken as a dependent variable, only EDI is reported with a statistically significant impact on gender equality (i.e., 0.0358). If GGI is taken as a dependent variable, EIUD and FHD again have an insignificant impact on gender equality; while EDI is reported with a significantly negative impact (-0.0141) on it. The negative effect of EDI on GGI may be attributed to its methodology of GGI, as it measures the relative gender gaps rather than the absolute levels of development. It implies that a country with a low level of democracy can rank high in terms of GGI if the gender gap between men and women is small even if both men and women have low levels of overall development. For example, countries (e.g., Rwanda, Nicaragua, and Bangladesh) with lower levels of democracy often rank higher in terms of gender equality than highly democratic nations like Japan and the USA. Interestingly, EIUD and FHD have a significantly positive impact on gender equality if GDI is taken as a proxy of it. In contrast, if GGI and EDI are taken as the proxy of gender equality and democracy, respectively, it might be concluded that democracy has a negative impact on gender equality. It implies that one may reach different conclusions depending on which indicator(s) is(are) used for gender equality and democracy. Thus, the impact of democracy is not robust across the various indicators used for measuring gender equality.

Among the control variables, economic growth and population size are found to have a substantially positive impact on gender equality, as the effect of these two variables on gender equality remains consistent when the gender equality indicators are interchanged. The positive impact of per capita income on gender equality implies that economic growth leads to modernization by weakening traditional values and attitudes, which increases gender equality in social, political, and economic spheres (Inglehart et al., 2003). Additionally, economic growth enhances gender equality by providing more opportunities for females to acquire qualifications that are needed to serve top political and professional posts, which affects gender equality positively (Högström, 2015).

[2] We have also estimated unconditional as well as conditional panel data regression models by taking three- and five-year lags of democracy variables, assuming that the effect of democracy on gender equality may take a longer period to appear. However, since the regression coefficients for democracy were not significant, we have not reported the results of these models.

Like economic growth, population size also has a positive impact on gender equality. In countries with larger populations, greater specialization and differentiation among the populace tend to lead to increased political diversity. This higher level of political diversity generates more demands for political equality, placing pressure on political parties and leaders to enhance political equality. In response to these demands, political parties and leaders strive to achieve greater political equality, which can result in outcomes such as increased representation of women in cabinets and consequently increased gender equality (Högström, 2015). Regarding income inequality, its impact on gender equality is uncertain because the sign of its regression coefficient changes depending on the gender equality indicator used. For instance, it reduces gender inequality when GEI is taken as the dependent variable. On the other hand, the opposite result is observed when GDI is the dependent variable. This inconsistency in the impact of income inequality across various gender equality indicators makes its overall effect uncertain.

Table 7. Impact of various components of democracy on gender equality.

Independent Variables	**Dependent variable**		
	GEI	**GGI**	**GDI**
Constant	3.5416***	−0.00698	0.10242
Electoral Process & Pluralism	0.00073	1.332e-05	0.00041
Government Functioning	0.00290**	−0.00211	0.00326***
Political Participation	0.01044***	0.00512***	0.00150***
Political Culture	−0.00696	−0.000457	−0.00244*
Civil Liberties	−0.01217	−0.00378	−0.00050
Income	0.01248**	0.01131***	0.00510
Inequality	−0.2333***	−6.424e-05	0.06365***
Population	0.1838***	0.02496***	0.03691***
Hausman test	211.53***	122.47***	65.83**
Estimated model	FE	FE	FE

Source: Authors' calculation. *Note*: ***, **, and * indicate level of significance at 1%, 5%, and 10% respectively.

In Table 7 we try to test the impacts of various components of democracy on gender equality indices since it is possible that some of the aspects of democracy may be more important than others as far as gender equality is concerned. While estimating the impacts of various aspects of democracy on gender equality, we continue to keep GEI, GGI, and GDI as dependent variables, since the replacement of these variables for one another causes significant variations in the magnitude and direction of the effect of democracy on gender equality. However, we prefer EIUD over FHD and EDI as the proxy of democracy for two reasons: first, EIUD includes electoral process and pluralism, functioning of government, political participation, civil liberties, and political culture as the essential components of democracy, whereas FHD includes the first four components of EIUD and excludes political culture. Similarly, EDI is more focused on electoral process, political participation, and freedom of expression. In this respect, EIUD is a broader index of democracy that covers almost all the aspects included in FHD and EDI. Second, EIUD is highly correlated with both FHD and EDI, and its substitution with them does not lead to substantial variations in the impact of democracy on gender equality indices.

Table 8. Impact of gender quota in parliament on gender equality.

Independent variables	Dependent variable		
	GEI	**GGI**	**GDI**
Constant	−4.90407***	−0.726759***	−0.234226***
D*EIUD	0.029004***	0.0107069***	−0.0073467
EIUD	−0.034911***	−0.0148846***	0.0110362***
Income	0.0217***	0.0183303***	0.0112911***
Urbanization	0.000495	0.0003743	9.103e-05
Inequality	−0.268646	−0.012332	0.045869***
CPI	0.0001797	0.000241	0.0001976***
Population	0.273450***	0.077355***	0.0630053***
Hausman test	463.9***	227.39***	184.56***
Estimated model	FE	FE	FE

Source: Authors' calculation. *Note*: ***, **, and * indicate level of significance at 1%, 5%, and 10% respectively. D = 1, if a country implemented quota for females and zero otherwise.

Table 7 shows that political participation has a significantly positive impact on all of the gender equality indices. Political participation measures how actively citizens and various social organizations engage in elections and form pressure groups or lobbies. It includes voter turnout rates, engagement in civic and political activities, and the role of civil society in shaping the policies. The positive regression coefficients for political participation imply that the active participation of voters, especially female voters, held leaders accountable through bottom-up pressures to form and implement the policies promoting gender equality. Further, the government's functioning has a significantly positive impact on GEI (0.0029) and GDI (0.0033)[3]. Its impact on GGI is reported to be statistically insignificant. Government functioning includes accountability of government to the people, lack of corruption, and balance of power between the executive, legislature, and judiciary. It indicates that the countries where democratic institutions are strong and accountable to the public are likely to have higher levels of gender equality. The other components of EIUD, like electoral process and pluralism, political culture, and civil liberties, have statistically insignificant impact on all of the gender equality indices. Thus, it can be said that merely having the free and fair election and protection of civil liberties are not enough for creating the bottom-up pressures for the policy formulation to promote gender equality without active participation of masses and strong democratic institutions.

The impact of democracy on gender equality is not as straightforward as it may seem theoretically. It is possible that democracy may require a longer time horizon to bring about positive changes in gender equality through bottom-up pressures. These changes cannot be tested effectively by the data of a time span of 14 years. However, we tried to test the impact of top-down state policies like the quota of women in parliament mandated directly by the national constitution. These quotas are harder to change since constitutional amendments require complex legal procedures. To include the gender quota in the regression model, we have created a dummy variable that takes the value of one if a particular country has implemented a gender quota in parliament and zero otherwise. Here, it is important to mention that while estimating the FE models, all the time-invariant variables like the presence or absence of quota will be eliminated due to time demeaning of the variables. Thus, the impact of the quota cannot be estimated directly by the FE specification of the model. For this purpose, we have interacted the dummy variable for quota with the democracy variable. The

[3] While estimating the regression model in Table 7, we do not include CPI (i.e., transparency) among the control variables since it is already accounted for in government functioning.

interaction coefficient measures the additional impact of democracy on gender equality when the quota for women in parliament is present. These results are presented in Table 8. The interaction coefficient is statistically significant and positive when GEI and GGI are taken as dependent variables. Interestingly, the impact of democracy on GEI and GGI turns significantly negative after the inclusion of gender quota among the list of control variables. The significantly positive values of the interaction coefficient imply that the implementation of gender quotas along with democracy will significantly improve gender equality in terms of GEI and GGI. This result also provides an explanation of the statistically insignificant impact of EIUD on GEI and GGI in Table 6. The gross impact of democracy on gender equality is split into two mutually exclusive components: the interaction coefficient and the coefficient of EIUD. When a significantly positive interaction coefficient is combined with a significantly negative net effect of EIUD, the gross impact of democracy is statistically insignificant, as shown in Table 6. Further, the interaction coefficient is reported as statistically insignificant while the coefficient of EIUD is found to be significantly positive in the case of GDI. However, the coefficients of the other control variables remain almost unchanged from those in Table 6.

4.3 Robustness tests

Many cultural, historical, and geographical factors may have a significant impact on the relationship between gender equality and democracy. These factors may weaken or strengthen the magnitude of this relationship and even change the direction of their association. We include political regime type, economic status, religion, and region among these factors. All of these factors are time invariant and cannot be included directly as explanatory variables in the FE model, because the time-demeaned FE model eliminates all the time-invariant variables along with unobserved country-specific heterogeneity. On the other hand, LSDV estimation of the FE model may encounter the problem of multicollinearity between country dummies and the dummies used for other time-invariant variables. Therefore, to take into account the impact of these time-invariant factors, we have divided the entire sample into subsamples based on the characteristics of these variables, and then estimated a separate regression equation for each subsample. As in Tables 7 and 8, while estimating these regression equations, we continue to use GEI, GGI, and GDI as dependent variables and EIUD as the proxy for democracy. The results calculated on the basis of sub-samples are presented below.

Type of political regime

Although we estimated the impact of political regime on gender equality in the previous section, where we measured the regime type on the ordinal or ratio scale using the entire sample, here we take it as a categorical variable. Based on the relative strength of democracy, The Economist Intelligence Unit divides the countries across the world into four categories: full democracy, flawed democracy, hybrid democracy, and authoritarian regime. As a country moves from full democracy to an authoritarian regime, its level of democracy declines. The difference among these political regimes is attributed to the strength and quality of democratic institutions, political culture, and good governance. Therefore, we try to take into account the impact of institutional quality on the

relationship between gender equality and democracy by estimating a separate regression equation for each political regime. The results are presented in Table 9.

Table 9. Impact of democracy on gender equality across political regimes.

Regime type	Independent Variable	Dependent variable		
		GEI	**GGI**	**GDI**
Full democracy	Constant	4.4870***	−0.8603	0.46150***
	EIUD	**0.0071**	**0.00953**	**0.00270**
	Income	0.00244	0.00822	0.00807***
	Inequality	-0.05533	−0.14258***	−0.00135
	CPI	1.22e-05	0.000322	1.292e-05
	Population	0.18025***	0.035474	0.011550
	Hausman Test	79.24***	21.42***	16.78***
	Estimated model	FE	FE	FE
Flawed Democracy	Constant	1.32161***	−0.9594***	−0.3221 ***
	EIUD	**0.000832**	**−0.0069***	**−0.00045**
	Income	0.04927***	0.00324	0.00335 **
	Inequality	0.000329	0.07496*	−0.01832
	CPI	-0.00026	−0.00017	6.769e-05
	Population	0.00378	0.08476***	0.07286***
	Hausman Test	49.29***	51.60***	101.78***
	Estimated model	FE	FE	FE
Hybrid Democracy	Constant	0.92742***	−0.15459***	0.6554***
	EIUD	**-0.00162**	**−0.00227**	**0.00178**
	Income	0.04843***	0.026522***	0.00445
	Inequality	-0.26561***	0.052354*	0.04963
	CPI	0.01045**	0.00553**	0.00433**
	Population	0.02268**	0.028452*	−0.00514
	Hausman Test	**13.07***	28.31***	11.92
	Estimated model	RE	FE	RE
Authoritarian regime	Constant	5.2846***	−0.2781***	−0.1375
	EIUD	**0.00402***	**0.00320****	**0.00399****
	Income	-0.004711	0.00512**	0.00551**
	Inequality	-0.580915***	0.07888	0.20015***
	CPI	0.00485*	0.001768	0.00289**
	Population	0.31307***	0.033784***	0.04358***
	Hausman Test	130.43***	60.47***	30.59***
	Estimated model	FE	FE	FE

Source: Authors' calculation. *Note*: ***, **, and * level of significance at 1%, 5%, and 10% respectively.

Most of the countries experiencing full democracies have a strong historical heritage of democratic values, developed democratic institutions, and political cultures conducive to democracy. Most of these countries are high-income European nations. Table 9 shows that democracy does not cause any significant improvement in gender equality in full democracies as well as in flawed democracies. However, this result may be interpreted in a different way: these countries already have achieved the highest peak of democracy as well as gender equality, and there is a lesser possibility of further improvement in these variables. This, as a consequence, can make the impact of democracy on gender equality insignificant. Similarly, the effect of democratization is not significant for any of the gender equality indices in hybrid regimes. On the other hand, democracy has a positive impact on GGI (0.0032) and GDI (0.004) at the 5 percent level of significance in authoritarian regimes. This implies that these countries are making significant progress toward higher levels of democracy and gender equality over time. Furthermore, economic growth and population size continue to have a positive impact on gender equality across all types of political regimes.

Economic status

Economic status, or the level of economic development, is an important factor that characterizes the modernization of society. The transformation of society from an agriculture-based traditional society to a modern industrialized society produces significant cultural changes like democratization and changes in the traditional roles of women. Industrialization leads to occupational specialization, rising educational levels, and increasing levels of income. Thus, modernization is an important factor that affects the level of gender equality in a society. For this purpose, we have divided the countries into four subsamples according to the level of per capita income as per the definition adopted by the World Bank in 2019 and extended this definition for the preceding years, since the income categories classified by the World Bank fairly remained constant over the time considered in the study. The World Bank classifies the countries into four categories on the basis of per capita income: high-, upper-, middle-, and low-income countries.

Table 10. Impact of democracy on gender equality across income categories.

Economic status	Independent Variables	Dependent variable		
		GEI	**GGI**	**GDI**
High income countries	Constant	7.0254***	−0.5346***	0.2352***
	EIUD	**0.00127**	**0.00162**	**−0.00153**
	Income	0.00184	0.01268**	0.00685**
	Inequality	−0.34573***	−0.04775	0.00369
	CPI	0.000124	0.00010	2.66e-05
	Population	0.35029	0.01313	0.04232***
	Hausman test	190.40***	51.98***	122.04***
	Estimated model	FE	FE	FE
Upper middle income countries	Constant	2.4822***	0.03975	0.1527***
	EIUD	**0.00156**	**0.00227**	**0.0043*** **
	Income	0.02705***	0.00131	0.0102***
	Inequality	0.05899	0.04350***	0.0690***
	CPI	0.00769	0.00657	0.0009
	Population	0.0787***	0.01809	0.0340***
	Hausman test	51.66***	64.19	27.91***
	Estimated model	FE	FE	FE
Lower middle income countries	Constant	2.9003***	−1.1819***	−0.6972***
	EIUD	**0.00505***	**−0.00174**	**−0.0010**
	Income	0.03753***	0.01124***	0.00784***
	Inequality	−0.38379**	0.04886	0.01177
	CPI	0.00078	−4.75e-05	0.00044
	Population	0.11920***	0.09613***	0.08626***
	Hausman test	18.07**	49.60***	53.82***
	Estimated model	FE	FE	FE
Low income countries	Constant	2.0537** *	−1.2127***	0.3035
	EIUD	**−0.00531*** **	**−0.00133**	**0.0048**
	Income	−0.00617***	0.01512***	−0.0092
	Inequality	0.09051	−0.04279	0.4510***
	CPI	0.00535**	0.00095	0.0259***
	Population	0.06719***	0.10861***	0.0060
	Hausman test	**14.69****	237.20***	**7.57**
	Estimated model	FE	FE	RE

Source: Authors' calculation. *Note*: ***, **, and * level of significance at 1%, 5%, and 10% respectively.

Table 10 shows that democracy has an insignificant impact on gender equality in high-income and lower-middle-income countries. In upper-middle-income countries, democracy has a positive impact only on GDI (0.0043), whereas its impact on GEI and GGI is statistically insignificant.

On the other hand, its impact on GEI is significantly negative in low-income countries. This implies that the relationship between democracy and gender equality is not robust across various income categories. Similar to political regimes, economic growth and population size consistently have significant and positive impacts on gender equality indicators across all income categories.

Religion

Religion also seems to be a major reason why many nations with a strict Islamic background have often ranked at the bottom of the list worldwide in terms of gender equality (Inglehart et al. 2003), including even the more affluent Arab societies like Kuwait and Saudi Arabia, as well as Egypt, Jordan, and Lebanon (Abu-Zayad, 1998 and Rizzo, 2007). Post-industrial societies with a historical prevalence of Catholicism are considered to represent more traditional attitudes towards women and families than protestant religions (Rule 1987). Thus, it is suspected by scholars that religion may have a significant impact on the democracy-gender equality relationship. In order to investigate the magnitude of this relationship across various religions, we have divided the sample into three subgroups: Christian countries, Muslim countries, and non-Christian-non-Muslim countries, based on the religion of the majority in a particular country.

Table 11. Impact of democracy on gender equality across religions.

Religion	**Independent variables**	**Dependent variable**		
		GEI	**GGI**	**GDI**
Christian countries	Constant	1.6533***	−0.74785***	−0.1957**
	EUID	**−0.01238***	**−0.00403**	**−0.0003**
	Income	0.02924***	0.01510**	0.00876***
	Inequality	−0.14595***	−0.02004	0.06319***
	CPI	−6.50e-05	0.000157	8.75e-05**
	Population	0.04907**	0.07449**	0.05843***
	Hausman test	113.51***	81.37**	138.29***
	Estimated model	FE	FE	FE
Muslim Countries	Constant	5.1017***	−0.09978	0.13459
	EUID	**0.00022**	**−0.00032**	**0.00626*** **
	Income	−0.01192	0.00575**	0.00223
	Inequality	−0.53631***	0.05229	0.10831***
	CPI	0.02385*	0.00314	0.01217***
	Population	−0.2894***	0.01154*	0.02149***
	Hausman test	32.64***	61.68***	34.41***
	Estimated model	FE	FE	FE
Non-Christian-Non-Muslim Countries	Constant	3.2999***	−0.7560*	0.8352***
	EUID	**0.0201*** **	**0.00218**	**−0.00065**
	Income	−0.0091	−0.01118*	0.00887***
	Inequality	0.08321	0.07448*	0.01540
	CPI	−0.00045	−0.00518*	−0.00052
	Population	0.08450**	0.05364**	−0.00499
	Hausman	59.04***	18.91**	**13.55***
	Estimated model	FE	FE	RE

Source: Authors' calculation. *Note*: ***, **, and * level of significance at 1%, 5%, and 10% respectively.

The results of the regression models for religion-specific groups of countries are demonstrated in Table 11. The table shows that the effect of democracy and gender equality is not robust across the subsamples based on religions. In Christian countries, democracy has an insignificant impact on GEI, GGI, and GDI. In Muslim countries, its impact is significant only on GDI (0.0063). Similarly, democracy's impact is significant only on GEI (0.0201) in non-Christian-non-

Muslim countries. Among the control variables, the effect of per capita income on gender equality is not homogeneous across all religions. The regression coefficients of per capita income are found to be statistically significant and positive only in Christian countries across all gender equality indices. It implies that economic growth leads to positive changes in gender equality in these countries. In the case of the remaining two categories, the impact of economic growth on gender equality is insignificant for at least two gender equality indicators.

Region

The region or geographical location of a country is a time-invariant characteristic that may have a significant impact on the gender equality-democracy conundrum. It is a fact that countries sharing boundaries also share history and cultural traditions. For example, the foundations of Asian societies rest on collectivism, whereas European societies are relatively more individualistic (Oyserman and Kemmelmeier, 2002). These common historical and cultural factors, along with geography, play a significant role in shaping this relationship. Therefore, to take into account these characteristics, we have divided the countries into four regions: Asia, Africa, Europe, and Latin America. It is important to mention that we have included the USA, Canada, Australia, and New Zealand in the subsample containing European countries, since these countries are culturally and historically more close to Europe than other regions.

Table 12 shows the impact of democracy on gender equality in these four regions. Democracy's impact is not homogeneous across all regions and is not robust across all gender equality indices. In Asia, democracy has a significantly positive impact on two out of three gender equality indicators (e.g., GEI and GDI). In Europe and North America, democracy has a significantly positive impact only on GGI, while its impact is insignificant on the other two indices. In Africa and Latin America, democracy's impact on all gender inequality indices is found to be statistically insignificant. Further, economic growth positively affects at least two gender equality indices in Asia and Africa. In Europe and North America, its impact is significantly positive only on GDI. In the case of Latin America, all the regression coefficients of per capita income are reported as statistically insignificant. As far as size of population is concerned, its impact on gender equality is almost positive on gender equality indices across all regions except Europe and North America. In this region, the level of significance as well as the sign of the coefficient of population size changes significantly as we replace one gender equality indicator with the other.

Thus, the empirical findings of this study suggest that the impact of democracy on gender equality is not certain. In most cases, this impact is reported as statistically insignificant. In some cases, the effect of democracy is reported as positive, while in others, it is negative. It suggests that the impact of democracy is highly sensitive to the interchangeability of various gender equality indices with one another, which may cause significant variations in effect of democracy. However, it also may be suspected that democracy may produce different effects on gender equality in different environments like type of political regime, economic status or level of modernization, and culture (which is highly affected by region and geographical location). Thus, to check the robustness of the effect of democracy on gender equality, we have estimated the regression equations for various gender equality indices in section 4.3 by dividing the sample into subsamples based on these

characteristics. Even after accounting for these characteristics, the results suggest that the effect of democracy on gender equality remains uncertain and highly sensitive to the selection of the dependent variable.

Table 12. Impact of democracy on gender equality across regions.

Region	Independent Variables	Dependent variable		
		GEI	**GGI**	**GDI**
Asia	Constant	5.8555***	−0.0923	0.23185***
	EIUD	**0.02022*** **	**0.00112**	**0.00388** **
	Income	0.02267***	0.00771***	0.00178
	Urbanization	−2.23e-05	0.00071*	0.00028
	Health	0.01792***	0.00464***	0.00299***
	Inequality	−0.18701**	0.02676	0.07302***
	CPI	0.00655*	−0.00192	0.00229**
	Population	0.25842***	0.01929***	0.02320***
	Hausman test	100.99***	35.88***	99.47***
	Estimated model	FE	FE	FE
Africa	Constant	3.7176***	−1.2931***	−0.32296*
	EIUD	**0.0038***	**−0.00042**	**0.00154**
	Income	0.0077	0.01007**	0.01265***
	Urbanization	0.0004	0.00162**	0.00133**
	Health	0.0016***	0.00023	0.00118***
	Inequality	−0.0308	0.02920	0.08458**
	CPI	−0.00138	0.00333	0.00687***
	Population	0.18337	0.11003***	0.05857***
	Hausman test	103.92***	64.66***	31.39***
	Estimated model	FE	FE	FE
Europe and North America	Constant	3.2191***	−0.8756	0.4677***
	EIUD	**−0.0049**	**0.01420*** **	**0.00059**
	Income	−0.0011	−0.00096	0.00748***
	Urbanization	0.00033	−9.13e-05	−0.00017
	Health	0.02192***	0.01211***	−0.00028
	Inequality	0.02355	−0.00629	0.01055
	CPI	7.55e-05	0.00011	1.86e-05
	Population	−0.08681***	0.03526	0.02844***
	Hausman test	53.84***	50.41***	48.72***
	Estimated model	FE	FE	FE
Latin America	Constant	8.6512***	−4.9365***	−0.36196**
	EIUD	**−0.00055**	**−0.00124**	**−0.00049**
	Income	−0.00207	−0.00287	0.004054
	Urbanization	−0.00258*	−0.00154	−0.00032
	Health	0.00858***	0.00124	0.00177*
	Inequality	−0.12699	0.11028	0.06285**
	CPI	−0.00622**	−0.00074	−0.00092
	Population	0.46378***	0.33056***	0.068324
	Hausman test	69.43***	80.71***	35.092***
	Estimated model	FE	FE	FE

Source: Authors' calculation. *Note*: ***, **, and * level of significance at 1%, 5%, and 10% respectively.

Our findings indicate that in the modern world, every society (whether democratic or undemocratic) recognizes the importance of human rights and, therefore, values women as equally important as men. Today, every country is an open society in the sense that there is a free flow of ideas from one society to another. In this scenario, any demand that is rational and logical on the grounds of human rights cannot be easily discarded by the government. Moreover, if the government of a country does not take the issue of human rights seriously, it may face criticism and pressure not only from its citizens but also from the international community. No rational government, irrespective of its regime type, wants to be seen as a villain in the eyes of its citizens and the

international community. Moreover, if the neighboring countries are democratic and have more gender-inclusive policies, an authoritarian state may have to adopt similar policies to establish its image as a liberal state in front of its citizens. Therefore, it may be argued that as the world democratizes as a whole and follows more humanitarian policies, authoritarian states will try to compete with democratic states on the basis of their policies. Thus, policies of democratic governments effectively shape the policies of non-democratic governments. In this respect, both types of governments promote the overall well-being of their citizens and pay equal attention to issues regarding gender equality.

5. Conclusion

The study presents a systematic analysis of democracy's impact on gender equality by estimating several cross-sectional and panel data regression models for various gender equality indicators, such as the GEI, GGI, and GDI. The study also applies several robustness tests by dividing the sample into subsamples based on political regimes, income categories, religions, and regions. The cross-sectional regressions indicate a roughly positive association between democracy and gender equality; however, the results of the conditional panel data regressions indicate that the impact of democracy on gender equality is not certain and is sensitive to the replacement of various gender equality indices with one another, which casts doubt on the causation between gender equality and democracy. However, replacing the democracy indicators with one another does not cause substantial variations in the impact of democracy on GEI, GGI, and GDI. The results also reveal that political participation, government functioning, and implementation of gender quotas in parliament positively affect the society's level of gender equality. Among the control variables, economic growth and size of population have a positive role in enhancing the level of gender equality. The positive impact of economic growth seems to support the importance of modernization in gender equality.

The scope of this study is limited to measuring the impact of democracy on gender equality rather than democratization. It is possible that the process of democratization is more important than the absolute levels of democracy in promoting gender equality. However, democratization is a long-term process that cannot be adequately measured using data spanning only fourteen years. Future research should focus on measuring the impact of democratization using data from a longer time period.

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