Submission Date: July 15, 2025
Acceptance Date October 13, 2025
DOI: 10.33708/ktc.1739033

KTC

Mediterranean Journal of Gender and Women's Studies
http://dergipark.gov.tr/ktc
Vol VIII (2) 690-718
Research Article

The Political Economy of Gender Inequality in BRICS: A Panel Data Analysis

BRICS Ülkelerinde Toplumsal Cinsiyet Eşitsizliğinin Politik Ekonomisi: Bir Panel Veri Analizi

Pınar Çuhadar* Reyhan Cafrı**

Highlights:

- The BRICS analysis presents a multidimensional lens on gender and institutions.
- Economic growth alone cannot eliminate gender gaps in labor participation.
- Religious and demographic forces sustain inequality despite economic growth.
- Democracy remains ineffective without deep cultural and social change.
- The study proposes an empirical framework for multidimensional equity reform.

Abstract: This study examines the political economy of gender inequality in BRICS countries—Brazil, Russia, India, China, and South Africa—between 1990 and 2018 using panel data analysis. Focusing on two key dimensions of gender inequality —women's educational attainment and labor force participation —the study explores how institutional (democracy), cultural (religion), economic (GDP per capita, trade openness), and demographic (fertility) factors shape gender disparities. Employing multiple estimation techniques, including Random Effects, Panel Weighted Regression (PWR), and Fixed Effects Vector Decomposition (FEVD), the analysis reveals contrasting dynamics across education and labor force outcomes. While GDP per capita significantly improves educational attainment, it does not translate into higher female labor participation. Religious affiliations and higher fertility rates consistently exert negative effects across both models, underscoring the role of cultural and demographic constraints. Trade openness is positively associated with women's labor market participation in some specifications, suggesting potential benefits from global integration. The findings highlight that economic growth and institutional development are insufficient in overcoming entrenched gender barriers without targeted social and cultural reforms. The study recommends multidimensional policy strategies that combine inclusive economic policies with social programs aimed at reducing fertility-related constraints and challenging restrictive gender norms.

Keywords: Gender Inequality, BRICS Countries, Panel Data Analysis

*Assoc. Prof., Mardin Artuklu University, Department of Economics, pinarozdemircukadar@artuklu.edu.tr **ORCID: 0000-0001-6302-7735.**
Assoc. Prof., İskenderun Technical University, Department of International Trade and Business, reyhan.cafri@iste.edu.tr, **ORCID: 0000-0002-6271-5330.

Öne Çıkanlar:

- BRICS analizi, kültürel ve kurumsal dinamikleri içeren çok boyutlu bir yaklaşım sunar.
- Ekonomik büyüme, kadın istihdamındaki eşitsizlikleri tek başına gideremez.
- Dini ve demografik dinamikler, ekonomik büyümeye rağmen eşitsizliği sürdürür.
- Demokrasi, kültürel dönüşüm olmadan kapsayıcı toplumsal eşitlik yaratamaz.
- Çalışma, çok boyutlu eşitlik politikaları için ampirik bir çerçeve geliştirir

Öz: Bu çalışma, toplumsal cinsiyet eşitsizliğinin politik iktisadını 1990–2018 dönemi için BRICS ülkeleri (Brezilya, Rusya, Hindistan, Çin ve Güney Afrika) özelinde panel veri analiziyle incelemektedir. Kadınların eğitim düzeyi ve iş gücüne katılımı olmak üzere iki temel gösterge üzerinden toplumsal cinsiyet eşitsizliği değerlendirilmiş; demokrasi (kurumsal), dinî aidiyet (kültürel), kişi başına düşen GSYH ve ticaret açıklığı (ekonomik) ile doğurganlık oranı (demografik) belirleyici değişkenler olarak modele dahil edilmiştir. Rastgele Etkiler, Ağırlıklı Panel Regresyonu (PWR) ve Sabit Etkiler Vektör Ayrıştırması (FEVD) gibi çeşitli tahmin yöntemleri kullanılarak farklı etki düzeyleri karşılaştırılmıştır. Bulgular, kişi başına düşen GSYH'nin eğitim düzeyini artırıcı etkisine karşın, kadınların iş gücüne katılımında benzer bir artışı sağlamadığını göstermektedir. Dinî aidiyetler ve yüksek doğurganlık oranları her iki modelde de kadınların katılımını istatistiksel olarak anlamlı ve olumsuz etkilemektedir. Ticaret açıklığı bazı modellerde pozitif etki göstermiştir. Sonuç olarak, ekonomik büyüme ve demokratikleşme tek başına toplumsal cinsiyet eşitliğini sağlamaya yetmemektedir. Kültürel normlara yönelik sosyal politikalarla desteklenen çok boyutlu stratejilere ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Toplumsal Cinsiyet Eşitsizliği, BRICS Ülkeleri, Panel Veri Analizi

Genişletilmiş Özet

Bu çalışma, 1990–2018 dönemi için yükselen ekonomiler olarak tanımlanan BRICS ülkelerinde (Brezilya, Rusya, Hindistan, Çin ve Güney Afrika) toplumsal cinsiyet eşitsizliğinin politik iktisadını incelemektedir. Söz konusu ülkeler kadınların eğitime erişimi konusunda belirli kazanımlar elde etmiş olsalar da, özellikle siyaset, iş gücüne katılım ve ekonomik fırsatlar bağlamında önemli eşitsizlikler devam etmektedir (Larionova vd. 2020). Bu bağlamda çalışmanın temel amacı, toplumsal cinsiyet eşitsizliğini belirleyen kurumsal, ekonomik, kültürel ve demografik faktörleri analiz etmektir. Analiz, bağımlı değişken olarak kadınların eğitim düzeyi ve iş gücüne katılım oranını esas alırken, panel veri analizine dayalı beş farklı tahmin yöntemi (Pooled OLS, Sabit Etkiler - FE, Rastgele Etkiler - RE, Ağırlıklı Panel Regresyonu - PWR ve Sabit Etkiler Vektör Ayrıştırması - FEVD) kullanılarak ampirik sağlamlık sağlanmıştır.

Bağımsız değişkenler arasında demokrasi düzeyi ve dinî aidiyet (kültürel etkilerin temsili) yer almakta; kişi başına düşen GSYH, ticaret açıklığı ve doğurganlık oranı ise kontrol değişkenleri olarak modele dahil edilmiştir. Toplumsal cinsiyet eşitsizliğini ölçmede alternatif göstergeler olan Toplumsal Cinsiyete Dayalı Gelişmişlik Endeksi (GDI) ve Kadının Güçlendirilmesi Ölçütü

(GEM) zaman serisi açısından yetersiz kapsama sahip olduğu için bu çalışmada kullanılabilirliği sınırlıdır. Bu nedenle uzun dönemli analizlerde eğitim ve iş gücüne katılım verileri daha uygun görülmüştür.

Kadınların eğitimi üzerine yapılan analizlerde, kişi başına düşen GSYH'nin kadınların eğitim düzeyini artırıcı etkisi olduğu tüm modellerde güçlü ve anlamlı bulunmuştur. Buna karşılık, doğurganlık oranı ve dinî aidiyet (özellikle Katoliklik ve Müslümanlık) kadınların eğitime erişimini istatistiksel olarak anlamlı biçimde olumsuz etkilemektedir. Demokrasi değişkeni ise negatif işaretli ancak istatistiksel olarak anlamlı değildir. Bu durum, kurumsal demokrasinin tek başına eğitimde eşitliği sağlayamayacağını, kültürel dönüşümle desteklenmesi gerektiğini göstermektedir.

Kadınların iş gücüne katılımına ilişkin model daha karmaşık dinamikler ortaya koymaktadır. Beklentilerin aksine, kişi başına düşen GSYH'nin kadın iş gücüne katılımı üzerinde negatif etkisi tespit edilmiştir. Bu bulgu, ekonomik büyümenin her zaman kadın istihdamını artırmadığını göstermektedir. Dinî aidiyetlerin tamamı iş gücüne katılımı olumsuz ve anlamlı düzeyde etkilerken, doğurganlık oranı da benzer şekilde katılımı azaltıcı etkide bulunmaktadır. Öte yandan, ticaret açıklığı bazı modellerde kadın istihdamı üzerinde olumlu ve anlamlı bir etki yaratmaktadır. Bu durum, küresel pazarlara entegrasyonun kadınlara yeni fırsatlar sunabileceğini göstermektedir.

Tahmin yöntemleri karşılaştırıldığında, hem zamanla değişen hem de sabit değişkenleri dikkate alan Rastgele Etkiler ve PWR modelleri daha güvenilir sonuçlar sunmaktadır. FEVD modeli sabit etkileri ayrıştırma açısından faydalı olsa da, normallik testleri açısından sınırlılıklar göstermiştir. Genel olarak bulgular, Küresel Toplumsal Cinsiyet Eşitsizliği Uçurumu Raporu (2020) ile uyumludur: BRICS ülkelerinde eğitimde cinsiyet eşitliği yolunda ilerleme sağlansa da, bu ilerleme ekonomik alana yansımamaktadır.

Politika önerileri bağlamında, makroekonomik büyüme tek başına cinsiyet eşitsizliklerini azaltmak için yeterli değildir. Kadınların doğurganlıkla ilişkili yüklerini azaltacak sosyal destek mekanizmaları (örneğin, çocuk bakım hizmetleri, üreme sağlığı hizmetleri, esnek çalışma imkânları) geliştirilmelidir. Ayrıca, geleneksel normları sorgulayan kültürel farkındalık programları kadınların iş gücündeki rolünü artırabilir.

İleriye dönük araştırmalarda, özellikle pandemi sonrası dönemi kapsayan güncel veri setlerinin kullanılması ve kültürel farkların mikro düzeyde analiz edilmesi, toplumsal cinsiyet eşitsizliğine ilişkin daha derinlemesine ve yerelleştirilmiş bir anlayış geliştirilmesini sağlayacaktır.

Introduction

In developing countries, structural inequalities persist across various domains, including the labor market, access to education, quality of life disparities between rural and urban areas, and the societal status of women. Gender inequality, in particular, remains a pervasive issue that transcends national boundaries and manifests across all BRICS nations—Brazil, Russia, India, China, and South Africa. Despite economic growth, advancements in gender parity in labour markets, political participation, education, and health indicators compared to past decades (especially in South Africa), these countries continue to struggle with deep-seated gender-based disparities (Larionova et al., 2020). BRICS Women Development Report, 2025; WEF Global Gender Gap Report, 2025). Barriers to accessing education and formal employment not only marginalize women economically but also reinforce their exclusion from decision-making processes, including within the household sphere.

Although public debate on domestic violence has gained visibility in BRICS countries, critical voices such as Chatterjee (2016) argue that the bloc's broader developmental trajectory reproduces rather than challenges global inequalities. BRICS, despite being presented as a counterbalance to the hegemonic global order, has historically neglected gender inequality within its cooperative agenda (Chatterjee, 2016). Until 2018, gender issues were conspicuously absent from BRICS' formal priorities. The establishment of the BRICS Gender and Women's Forum in 2018 marked a significant, albeit delayed, institutional response to this longstanding gap (SAIIA, 2025).

Gender-based discrimination in BRICS countries is rooted in historical, cultural, and institutional factors that continue to shape contemporary social structures. In the labor market, women face occupational segregation and wage disparities that often compel them to choose between professional life and family obligations. Moreover, women's educational attainment is closely linked to their reproductive choices, with higher education levels correlating with delayed or reduced fertility (Kizilova & Mosakova, 2019).

Despite formal legal guarantees of gender equality—such as those introduced in Russia after the Revolution—implementation gaps persist. In Russia, for instance, more than 600,000 women reportedly experience domestic violence annually, with approximately 14,000 deaths resulting from gender-based violence. In India, entrenched patriarchal norms reinforced by religion and the caste system continue to restrict women's social and economic roles. Women are often valued primarily in relation to their familial roles—as mothers, sisters, or wives—rather than as autonomous individuals. Educational and employment opportunities remain heavily gendered;

female literacy in India stands at 62.5%, significantly lower than the male literacy rate of 82.1% (UN Women, 2021).

China, similarly, faces persistent gender inequality in labor market participation and wage structures. In Brazil, historical influences such as Iberian cultural legacies and Catholic doctrines contribute to gender bias, with little improvement observed in women's labor force participation, income levels, and political representation over the past two decades. South Africa, once recognized for progressive gender policies, has recently seen a decline in efforts to empower women in decision-making roles. The gender wage gap remains significant, with women earning approximately 27% less than men (Coelho et al., 2019; Van Standen and Mpungose, 2018).

Comparative data from the WEF Global Gender Gap Report (2020, 2025) further illustrate these disparities. The rankings of BRICS countries across four dimensions—economic participation and opportunity, educational attainment, health and survival, and political empowerment—reveal mixed progress. While Brazil and Russia have narrowed gender gaps in education and health, they have regressed in terms of economic participation and political representation (WEF, 2020, 2025)[1]. China has experienced a decline in gender equality across all measured areas over the past twelve years. India mirrors this trend, of slight gains in political empowerment. South Africa has made notable strides in closing gender gaps in health and survival, in educational, economic, and political domains (WEF, 2025)

These findings underscore the critical importance of sustained, coordinated action through mechanisms such as the BRICS Gender and Women's Forum. Addressing gender disparities in a meaningful and comprehensive manner is not only a matter of social justice but also essential to the long-term development and cohesion of the BRICS nations.

Table 1.
Gender Gap in BRICS

	Economic participation and opportunity		Educational attainment		Health and Survival		Political Empoverment	
Countires	2008 Rank	2020 Rank	2008 Rank	2020 Rank	2008 Rank	2020 Rank	2008 Rank	2020 Rank
Brazil	63	89	74	35	1	1	86	104
China	53	91	78	100	114	153	52	95
India	110	149	102	112	103	150	20	18
Russian Federation	22	32	19	1	36	1	108	122
South Africa	79	92	42	67	59	1	8	10

Source: WEF, 2020.

[1] The Russian Federation has not been covered by the Global Gender Gap Report since 2022.

Table 1 reveals that gender inequality across BRICS countries remains multidimensional and persistent, with progress differing notably by domain and country. While Russia and Brazil showed improvements in educational attainment, economic participation, and political empowerment, rankings declined significantly, particularly in Brazil, China, and Russia. India and China experienced alarming regressions in health and survival indicators, positioning them among the lowest globally by 2020. Despite India's relatively strong ranking in political empowerment, it showed one of the steepest declines in economic participation. In contrast, South Africa maintained a comparatively strong position in political representation and achieved parity in health outcomes, though educational and economic disparities remain. Overall, the findings underscore the fragmented and uneven nature of gender equality efforts across BRICS, highlighting a need for more integrated and sustained policy interventions. Although the empirical analysis of this study covers the period 1990-2018, the comparitve data from the WEF Global Gender Gap Reports (2008-2020) are presented here to provide a broader contextual overview of recent gender equality trends in BRICS countries.

This study contributes to the understanding of gender inequality in BRICS countries by examining the multifaceted determinants of women's labor force participation through panel data analysis from 1990 to 2018. The study covers the period from 1990 to 2018. The year 2018 was chosen as the upper limit of the data set, as it marks the institutional recognition of gender issues within the BRICS cooperation framework through the establishment of the BRICS Gender and Women's Forum. By limiting the analysis to the pre-2018 period, the study aims to isolate the structural determinants of gender inequality before policy interventions at the multilateral level potentially altered the trajectory. The following sections review relevant literature, detail the methodological approach, present empirical results, and discuss their implications for future research and policy formulation.

Literature Review

The issue of gender inequality remains a structural and enduring challenge in the BRICS countries—Brazil, Russia, India, China, and South Africa—despite their increasing economic prominence on the global stage. These countries exhibit unique historical, cultural, and institutional dynamics that shape the lived experiences of women, particularly in the spheres of labor, education, political participation, and access to social protection.

Across the BRICS, institutional and cultural legacies continue to impede women's equitable access to opportunities. In Brazil, despite legal advancements, the intersection of Iberian patriarchy and Catholic doctrine continues to define gendered social roles, with women underrepresented in decision-making processes and consistently earning less than men for similar work (Stephen, 1993; Santos & Hilal, 2018). Oliveira (2025) highlights recent resistance to gender quotas and policies promoting women's political empowerment, showing the persistence of institutional pushback even amid formal commitments to equality.

In Russia, historical legacies of Soviet-era formal equality have not prevented the re-emergence of gendered labor market segmentation and fertility-related pressures. Women's participation in the labor force often coincides with traditional caregiving roles, contributing to wage gaps (Cook & Dong, 2011; Grogan, 2006, 2013). Kizilova and Mosakova (2019) emphasize higher educational levels and increased labor market aspirations. Participation in politics is also under pressure from patriarchal institutions inherited from traditions and the country's current ideological stance (Golosov, 2025).

South Africa presents a paradox of progressive constitutional frameworks and persistent outcomes, labor market inequality. Studies show that although gender-sensitive legislation exists, women continue to experience higher unemployment, occupational segregation, and wage disparities (Mosomi, 2019; Van Standen and Mpungose, 2018). Niymbanira and Sabela (2019) further note that gendered labor dynamics are compounded by racial inequalities, resulting in multidimensional exclusion for Black South African women.

India's entrenched caste system, coupled with patriarchal cultural norms, continues to restrict women’s mobility, economic agency, and access to education. Female labor force participation remains critically low, and women are often confined to unpaid domestic roles (Deshpande, 2020; Yi et al., 2024). Although the Indian constitution guarantees equality, customary practices and societal expectations often supersede legal protections in practice. In rural and urban areas, girls are still afforded limited academic opportunities; however, they are encouraged to pursue education if they believe in its benefits. Limiting educational opportunities for girls from low-educated families also limits their mobility, thus passing poverty from generation to generation. A similar situation exists in China (Emran, Jiang & Shilpi, 2020).

Cultural factors rooted in Confucianism and a preference for sons in traditional family systems continue to hinder gender equality, particularly in rural areas (Sychenko et al., 2022; Yi et al., 2024). In China, market reforms and the commodification of labor have exacerbated gender inequalities. While women's participation in low-wage manufacturing has increased, their representation in high-level decision-making roles remains minimal (Cook & Dong, 2011). Although the BRICS bloc was initially formed to challenge inequities in the global order, gender inequality was notably absent from its core agenda until recently (Chatterjee, 2016; Armijo &

Roberts, 2014). Scholars argue that the BRICS nations have historically prioritized economic development over social justice, reflecting a broader neglect of gender mainstreaming in their cooperative frameworks (Coelho et al., 2019; Pandey & Sergeeva, 2022). The establishment of the BRICS Gender and Women's Forum in 2018 signaled a policy shift, but critics contend that its impact remains symbolic and under-institutionalized (Pandey & Sergeeva, 2022).

Comparative research reveals significant gaps in the formulation, implementation, and enforcement of gender-related policies across BRICS. Sezgin (2023) and Sychenko et al. (2022) show that although legal frameworks for gender equality exist, enforcement is weak, and progress is uneven. For example, in South Africa and Brazil, anti-discrimination policies have not substantially altered labor market indicators over the past two decades.

Gender inequality in labor markets is a persistent issue across all BRICS nations. The gender wage gap remains substantial: in South Africa, women earn approximately 27% less than men (Van Standen and Mpungose, 2018), while in China and India, occupational segregation and informal labor further exacerbate earnings disparities (Yi et al., 2024). Weller (2023) points out that global trends such as automation and informalization disproportionately disadvantage women in emerging economies, leading to precarious employment and heightened economic vulnerability.

Furthermore, labor market inequality is closely tied to women's reproductive decisions. Research in post-communist contexts, such as Russia, shows that increasing educational attainment delays childbirth and reduces overall fertility, reflecting a trade-off between motherhood and career development (Grogan, 2013; Kizilova & Mosakova, 2019). These dynamics illustrate the interdependence between gender equality, human capital development, and economic sustainability.

Methodology

Panel data sets form both cross-sectional dimensions (N) by subscript i and time series dimensions (T) by subscript t. Hsio and Yanan(2006) summarized the advantages of panel data with three main titles: data availability providing a less biased model, explanatory power of human behaviors, and an easier way of using econometric modeling. These advantages make panel data applications popular, and it is preferred by scientists more than other methods.

One reason why panel data is less biased is related to the increase in time series dimensions' power of the unit root test. Cross-section dependency and heterogeneity are basic features for selecting an accurate unit root test for the panel data. Panel unit root test is divided into two generations associated with the assumption of allowing cross-correlation between residuals. While first-generation unit root tests have strict assumptions of non-cross-correlated residuals, second-generation unit root tests accept cross-sectional dependency of residuals (Hurlin and Mignon, 2007). Breusch-Pagan (1980) and Pesaran (2004) are cross-section dependency tests applied in the study of why T>N properties of the data set.

Breusch-Pagan (1980) LM Test uses cross-correlated residuals derived from ordinary least squares. CDLM1 test statistic is calculated by equation (1)

$$\text{CDLM1}=T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\rho_{ij}^{2} \tag{1}$$

where p_{ij} cross sectionally correlated residuals. The null hypothesis of CDLM1 is Cov(uit, ujt)= 0 for all t i$\neq j$. Breusch and Pagan (1980) are not suitable for large N and small T; therefore, Pesaran (2004) improves a cross-section test. Consequently, Pesaran (2004) develops an improved cross-section dependence test for large N. Pesaran (2004) obtained cross-correlated residuals means by ordinary least squares, too. Pesaran's (2004) test statistic is calculated from equation (2)

$$\text{CDLM2}=\sqrt{\frac{1}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}(Tp_{ij}^{2}\text{-1}) \tag{2}$$

Homogeneity of slopes is obtained from Pesaran and Yamagata(2008)'s $\tilde{\Delta}($delta. test. The homogeneity is tested related units weighted relative importance with the null hypothesis of the delta test says all slopes of the panel are homogeneous against the alternative hypothesis of heterogeneous slopes.

Seemingly unrelated regression augmented Dickey–Fuller (SURADF) of Breuer et al. (2002) and the Cross-Sectionally Augmented Dickey Fuller (CADF) of Pesaran (200)7 are second-generation unit root tests that have power T>N samples. SURADF has an alternative method with testing the unit root for every single member of the panel within the SUR framework. Pesaran (2007) modified Dickey Fuller (DF) and Augmented Dickey Fuller Test (ADF) by adding lag to and first difference of unit cross-section means. Moreover, CADF is valid both T>N and N>T. However, SURADF and CADF do not allow structural breaks. Carrion-i-Silvestre (2005) enable modified Hadri (2000) by using dummy variables in order to allow multiple structural breaks. The null hypothesis of stationarity is tested against a unit root with panel KPSS (Carrion-i-Silvestre, 2005).

Ordinary Least Squares (OLS) estimator has several restrictive assumptions for having unbiased and minimum variance parameters, such as independent and identically distributed errors.

It is a common problem that regression with time series data has autocorrelated error. Prais and Winsten (1954) proposed an approach correcting autocorrelation problems, which can be used for panel data estimation too (Dielman and Rose, 1994; Baltagi and Chang, 1992). Suppose a panel data equation (3):

$$y_{it}=x'\beta_{it}+u_{it} \quad i=1,\ldots\ldots\ldots N \qquad t=1,\ldots\ldots T \tag{3}$$

β denotes Kx1 coefficient vector, i denotes individuals, t denotes the time period of observation, u_{it} is the disturbances having an AR(1) process,

$$u_{it}=\rho u_{it-1}+\varepsilon_{it}, \qquad |\rho| <1 \tag{4}$$

where $\varepsilon_{it} \sim$ IIN(0, σ^2) and $u_{it}\sim$ IIN(0,σ^2/τ) and τ is arbitary positive number. Panel estimation provides ρ and τ values with transformation, make disturbances regardless of the AR(1) process; therefore equation (3) is rewritten as

$$y = X\beta + u \tag{5}$$

Where y'=($y_{11,\ldots,}y_{1T,\ldots\ldots,}y_{N1,\ldots\ldots,}y_{NT}$) observation is stacked, X is NTxK and u is NTx1. C is the TxT Prais and Winsten transformation with its first diagonal element $\sqrt{1-\rho^2}$ replaced to $\sqrt{\tau}$. Kronecker product of C and I_N gives transformed disturbances u into spherical disturbances (Baltagi and Chang, 1991). The advantage of using Prais-Winsten is transforming both sides of the equation in order to interpret the regression coefficients (Troeger, 2020:620) directly.

Even if panel data have many advantages related to an increase in the number of observations, omitted variable bias causes concern. Fixed effect modeling cannot solve unit effect problems, which is vital for time-invariant variables in political social sciences because the main interest of political science is institutional effects. Plümber and Troeger (2004) recommend a three-stage fixed effect vector decomposition procedure for estimating time-invariant variables in small sample panel-data analyses with unit effects. Fixed effect vector decomposition process's first stage is a fixed-effects model estimation of variables. In the second stage, the unit-effects vector is decomposed into a part explained by the time-invariant variables and an error term. The third stage is the first stage, including the time invariant variables and the error term obtained in the second step by pooled-OLS, is reestimated. Summary of these procedures with econometric terms is below (Plümber and Troeger, 2004:9).

Equation 4 shows that the within estimator procedure provides individual effect of u_{it}

$$y_{it-}\overline{y}_i = (x_{it} - \bar{x}_i)\beta + \varepsilon_{it} - \bar{\varepsilon}_i \equiv \bar{y}_{it} = \ddot{x}_{it}\beta + \ddot{\varepsilon}_{it} \quad (6)$$

Equation 7 shows fixed effects

$$\hat{u}_i = \overline{y}_i - \bar{x}_i\beta_{FE} \quad (7)$$

In the second stage $\hat{u}_i$, regress on z variables, $\omega is$the intercept of the second stage,η_i is the error

$$\hat{u}_i = \omega + z_i\gamma + \eta_i \quad (8)$$

Third stage fixed effect decomposition with second stage error η_i with uncorrelated z_i variables

$$y_{it} = \propto + x_{it}\beta + z_i\gamma + \eta_i + \varepsilon_{it} \quad (9)$$

Plümber and Troeger (2004) underline that the random effect is much more effective when the uncorrelated unit effect is associated with time variant variables, the correlated unit effect is associated with time invariant variables, and the extremely skewed distributed unit effect.

It is helpful to recall the main feature of random effects model. Random effect models' error term includes individual effects.

$y_{it=}x_{it}\beta + v_{it}$ where v_{it}=c_i+u_{it} and E=($v_{it}|x_i$)=0 t=1,2,….,T (10)

Its main assumption is exogeneity and orthogonality between individual effect c_i and independent variable x_{it} . Equation 8 shows the basic form of the random effect model (Wooldridge, 2001).

Data

This study examines the political economy of gender inequality in Brazil, China, India, Russia, and South Africa—a group of countries collectively referred to as the BRICS—using panel data analysis for the period 1990–2018. The end year, 2018, is intentionally selected as it marks a pivotal institutional milestone: the formal recognition of gender issues within the BRICS cooperation framework through the establishment of the BRICS Gender and Women's Forum.

This temporal boundary allows the analysis to focus on the structural drivers of gender inequality prior to potential shifts induced by multilateral policy interventions. Gender inequality is measured by the educational attainment and labor force participation of females. Democracy and religion are independent variables that are used for institutional and cultural determinants of gender inequality. The Gender Related Human Development Index or Gender Empowerment Measure are other alternative data sets for measuring gender inequality. However, their time dimensions are small. When the number of units is taken into account, the small time dimensions can cause a low level of observation, affecting the power of the unit root test, etc. Gross domestic product per capita, trade, and fertility are control variables in this specification openness (Davies and Quinlivan,2006; Cooray and Potrafke, 2011; Sajid, 2014; Neudorfer, 2016; Emara, 2016). In this context, all variables used in the model, along with their definitions, are presented in Table 2.

Table 2.
Short Description of Data Set

Variable	Definition of Variable	Data Source
education	Educational Attainment (15-24 years, Female). Average years of education.	Institute for Health Metrics and Evaluation
labour force	The proportion of the femalepopulation ages 15 and older that is economically active	World Bank Development Indicators
democracy	The egalitarian principle of democracy holds that material and immaterial inequalities inhibit the exercise of formal rights and liberties, and diminish the ability of citizens from all social groups to participate	Varieties of Democracy (V-Dem) Project
gdppercapita	GDP per capita (PPP Constant)	World Bank Development Indicators
fertility	Number of children that would be born to a woman	World Bank Development Indicators
tradeopeness	The sum of exports and imports of goods and services/gross domestic product.	World Bank Development Indicators
Muslim	Muslims as percentage of population in 1980.	La Porta, López-de-Silanes, Shleifer/Atlas Project*
No cmp	Percentage of population belonging to other denominations in 1980.	La Porta, López-de-Silanes, Shleifer/Atlas Project
Catholic	Catholics as percentage of population in 1980.	La Porta, López-de-Silanes, Shleifer/Atlas Project
Protestant	Protestant as percentage of population in 1980.	La Porta, López-de-Silanes, Shleifer/Atlas Project

Source: Teorell et al. 2020: Quality of Government Institute (https://qog.pol.gu.se/data/datadownloads
*Atlas Project is used for Russian population's share of religion, and it does not take from Quality of Goverment Institute

Table 3 shows descriptive statistics of variables. The variable "gdppercapita" has the highest mean and standard deviation. It is necessary to use the natural logarithm of GDP per capita to avoid measurement error by decreasing the scale of the variable. Democracy which have mean and standard deviation, is taken value between 0 and 1. Multiplying democracy by 10 can also solve the scale problem of the index in comparison to other variables.

Table 3.
Descriptive Statistics of Variables

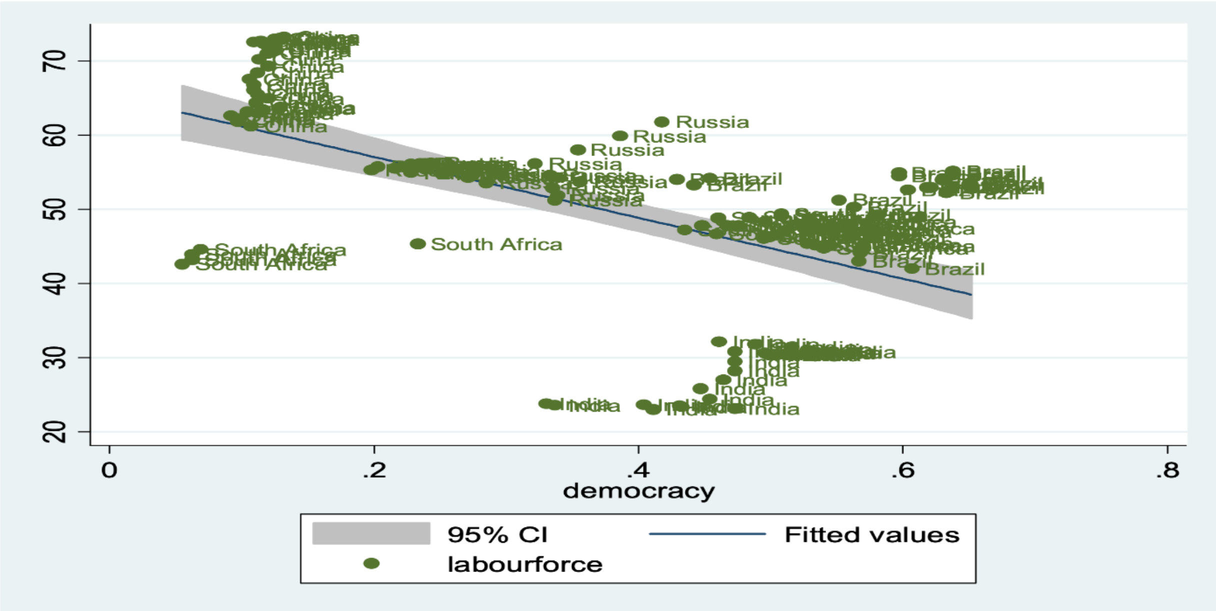
Variable	*Mean*	*Std.Dev.*	*Min*	*Max*
education	8.987	2.482	3.73	14.03
labour force	49.799	13.253	23.018	73.198
democracy	0.377	0.184	0.55	0.652
gdppercapita	10595.21	6212.098	1521.964	25551.09
fertility	2.235	0.719	1.157	4.04
tradeopeness	41.693	15.95	15.16	110.577
Muslim	4.38	4.218	0.1	11.6
No cmp	56.42	32.332	8.1	97.6
Catholic	19.92	34.279	0	87.8
Protestant	8.88	15.178	0	39

In this context, the model estimated by panel data regressions is as follows:

$$labourforce_{i,t} = \beta_0 + \beta_1 democracy_{i,t} + \beta_2 culture_{i,t} + \beta_3 Z_{i,t} + \varepsilon_{i,t} \quad (11)$$

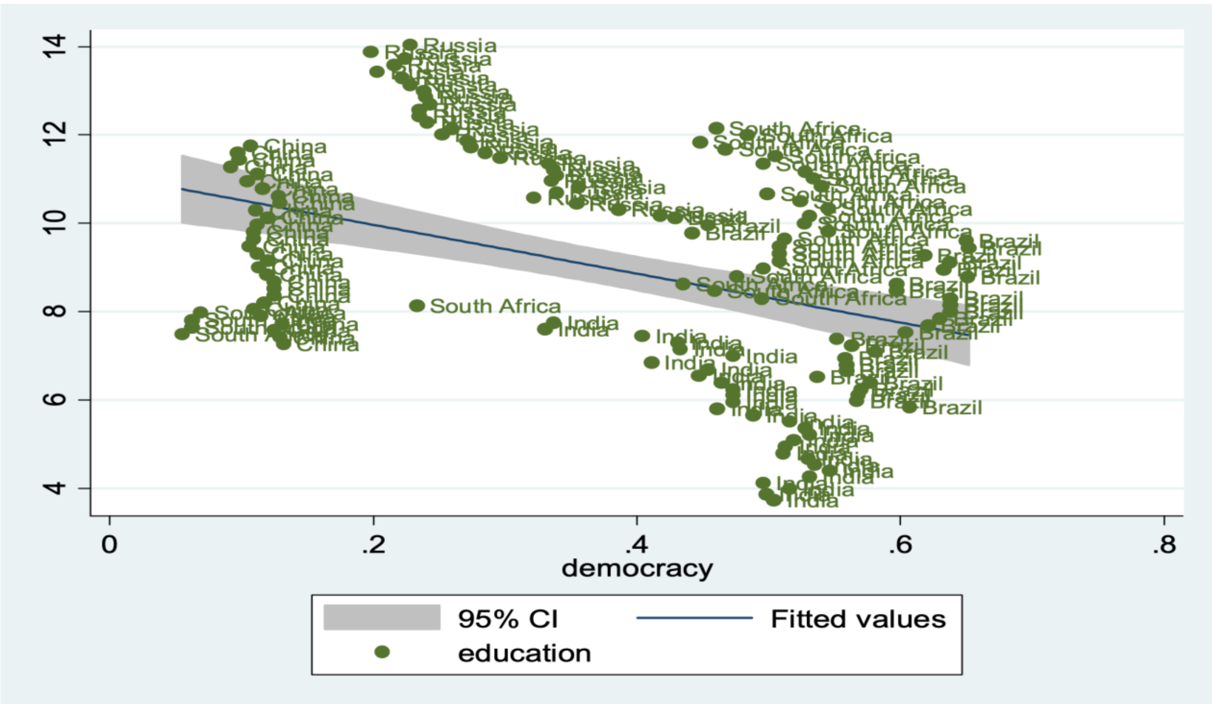
$$education_{i,t} = \beta_0 + \beta_1 democracy_{i,t} + \beta_2 culture_{i,t} + \beta_3 Z_{i,t} + \varepsilon_{i,t} \quad (12)$$

In the first model, it is analyzed how democracy and culture affect labor force participation as formal and informal institutions. $Z_{i,t}$ denotes a group of control variables matrix. In the second model it is analysed democracy and culture linkages with, it is analyzed how democracy and culture linkages relate to the education of women. Based on theoretical arguments, it is expected that democracy has a positive sign and culture represented by religion has a negative sign in regression models. Additionally, while a positive sign is awaited in GDP per capita, a negative sign is expected from fertility. At the same time, a positive sign is awaited in GDP per capita, a negative sign is expected from fertility.



Graph 1.
Labour force and Democracy

Graph 1 exhibits the fitted values of the dependent variable, labor force, and democracy relation for BRICS countries. The graph shows that there is a negative relationship between labor force and democracy in BRICS countries. Females' labor force participation was affected negatively mostly in India and the least in China.



Graph 2.
Education and Democracy

Graph 2 exhibits the fitted values of the dependent variable, showing the relationship between education and democracy for BRICS countries. The graph shows that there is a negative relationship between education and democracy as well as female labor force participation in

BRICS countries. Females' education affected negatively mostly in India and the least in China. However, the relationship between labor force/education and democracy, as shown in the graphs, is inconsistent with theoretical arguments and signs expected from regression results.

Findings

The first step of panel data analysis necessitates a cross-section dependency test for determining the appropriate unit root test. The CD_{LM1} and CD_{LM2} test results represented in Table 4. Time invariant variables (Catholic, Muslim, No cmp, Protestant) are stationary and they do not change over time. Hence, they do need to test for a unit root.

Table 4.
CD_{LM1} and CD_{LM2} Test for Cross-Section Dependency

Variables	*Prob. CDLM1*	*Prob. CDLM2*	*Result*
labourforce	*0.000*	*0.000*	*H0 is rejected*
education	*0.000*	*0.000*	*H0 is rejected*
democracy	*0.000*	*0.000*	*H0 is rejected*
gdppercapita	*0.000*	*0.000*	*H0 is rejected*
fertility	*0.000*	*0.000*	*H0 is rejected*
tradeopenness	*0.000*	*0.000*	*H0 is rejected*

Cross-section dependence test: the null hypothesis of no cross-sectional correlation is rejected, related to the Breusch-Pagan LM test and the Pesaran scaled test probabilities. The second-generation unit root test is needed in order to determine whether a series has a unit root or not. The number of cross-sections is smaller than the time dimension, so the SURADF and CADF unit root test is chosen for the BRICS countries.

Table 5.
Slope Homogeneity

	$\tilde{\Delta}$ Prob	$\tilde{\Delta}_{adj}$ Prob	labourforce	$\tilde{\Delta}$ Prob	$\tilde{\Delta}_{adj}$ Prob
democracy	0.932	0.942	democracy	0.128	0.116
gdppercapita	0.926	0.936	gdppercapita	0.161	0.148
fertility	0.789	0.801	fertility	0.022	0.017
tradeopeness	0.143	0.130	tradeopeness	0.180	0.167

The second step is the homogeneity test of variables. $\tilde{\Delta}$adj is a modified version of Swamy's (1970) statistics for small samples. The null hypothesis of homogeneity is rejected only for fertility (Table 5).

Table 6.
SURADF and CADF Unit Root Test Results

Country/Variables	p	SURADF	0.01	0.05	0.10	CADF	p
Brazil							
labourforce	2	-1.560	-5.659	-4.692	-4.183	-3.415	3
education	1	-1.825	-88.76	-74.04	-66.38	-1.862	2
democracy	1	-1.617	-5.584	-4.548	-4.084	-1.21	2
gdppercapita	2	-2.273	-5.881	-4.814	-4.370	-1.057	3
fertility	2	-0.9037	-30.43	-21.96	-18.73	-4.105**	3
tradeopeness	2	-3.881	-6.199	-5.196	-4.779	-2.159	3
China							
labourforce	2	-3.797 *	-5.241	-4.252	-3.674	-2.650	3
education	1	-2.994	-38.60	-32.80	-29.71	-0.201	2
democracy	1	-2.986	-5.584	-5.384	-5.010	-2.51	2
gdppercapita	4	-1.892	-6.571	-5.344	-4.816	-0.162	5
fertility	3	-2.666	-9.436	-8.125	-7.385	-3.891	4
tradeopeness	2	-1.969	-5.977	-5.005	-4.534	-2.551	3
India							
labourforce	3	-3.177	-5.833	-4.836	-4.357	-3.136	4
education	1	-0.4374	-18.24	-15.38	-13.93	-1.233	2
democracy	1	-1.430	-5.693	-4.761	-4.320	3.01	2
gdppercapita	4	-2.735	-6.209	-5.210	-4.714	1.085	5
fertility	3	-1.657	-13.58	-11.21	10.05	-2.033	4
tradeopeness	2	1.370	-6.107	-5.227	-4.643	-1.104	3
Russia							
labourforce	3	-3.747	-6.257	-5.160	-4.629	-3.229	4
education	1	-0.4240	-6.792	-5.881	-5.372	-3.785*	3
democracy	1	-2.387	-6.166	-5.284	-4.859	-1.53	2

gdppercapita	2	-4.150	-7.512	-6.288	-5.731	-2.541	3
fertility	4	-3.317	-8.864	-7.383	-6.741	-1.001	5
tradeopeness	1	-7.927 * **	-5.500	-6.118	-7.538	-5.024***	2
South Africa							
labourforce	2	-3.145	-6.045	-5.091	-4.601	-2.840	3
education	1	-0.7213	-24.60	-20.29	-18.53	-0.558	2
democracy	1	-2.422	-6.483	-5.450	-5.084	-1.56	2
gdppercapita	4	-3.211	-6.240	-5.013	-4.444	-1.495	5
fertility	3	-2.382	-7.594	-6.267	-5.665	-3.401	4
tradeopeness	1	3.206	-5.116	-4.189	-3.752	-4.177***	2

Notes: ***, **, and * stand for significance at 1, 5, and 10% levels.
The critical values for the SURADF test are calculated by Monte Carlo simulations with 10,000 replications.
The lag lengths (p) are selected according to the Schwarz information criterion.
The critical values for the CADF test are determined from Pesaran (2006). 1, 5, 10% significance level critical value is -4.67, -3.87, -3.49

Table 6 illustrates SURADF and CADF unit root results. SURADF unit root null hypothesis is rejected for a minority of series: labor force (China), trade openness (Russia). CADF unit root test result is rejected for only fertility (Brazil, 0.05 significance level), education (Russia, 0.10 significance level) and trade openess (Russia, 0.01 significance level; South Africa, 0.01 significance level). Therefore, it is confirmed by SURADF that series belong to BRICS countries have, it is confirmed by SURADF that series belonging to BRICS countries have a unit root, with a few exceptions. However, these tests do not take into account structural breaks. The KPSS test is used for testing the unit root with structural breaks.

Table 7.
Structural Break Years for Individuals and KPSS Unit Root Test Result (Constant)

Variables	KPSS	Brazil	China	Russia	India	South Africa	Critical Values (%)		
							90	95	99
labourforce	0.434	2000	2007	2010	2003	2002	15.14	17.57	21.83
education	2.59	1999 2004	1999 2004	1999 2004	1999 2004	1999 2004	15.34	24.39	49.56
democracy	-0.83	2001 2014	1993 2002	2003 2009	2000 2001	1994	9.95	11.31	14.31
gdppercapita	2.02	2003 2006	2006 2008	2004 2009	2002 2005	2001 2004	6.38	8.96	15.25

fertility	-0.54	1997 2001	1993	1998 2003	1993 2008	1993 1996	3.36	4.39	6.55
tradeopeness	4.34**	1999	2001 2002	2000 2003	1998 2006	1995 1999	2.55	3.63	6.25

Table 7 indicates the panel KPSS unit root test result with a structural break for the constant model. Related to these results, the null hypothesis of stationarity is rejected only for trade openness at a 5% significance level. The other variables do not have a unit root with a structural break, critical values are above the KPSS test statistics, so they are stationary.

Table 8.
Structural Break Years for Individuals and KPSS Unit Root Test Result (Constant and Trend)

Variables	KPSS	Brazil	China	Russia	India	South Africa	Critical Values (%)		
							90	95	99
labourforce	64.569	2010	2007	2011	2006	2009	74.68	88.45	122.53
education	17.89	1999 2003	1995 2000	2002 2003	2003 2005	1995 1998	29.69	37.01	56.01
democracy	13.27***	2001 2013	2009	2002 2003	1993 2007	1994	10.76	14.08	20.73
gdppercapita	22.86	2002 2009	2001 2003	2002 2006	1995 1996	1993 2004	54.80	68.76	110.137
fertility	9.29	2002 2007	1993 1995	2000 2013	1993 1997	1994 1998	13.12	16.80	27.27
tradeopeness	16.196***	1995 2000	2002 2003	2003 2013	1993	2003 2007	12.27	17.86	32.01

Table 8 indicates the panel KPSS unit root test result with a structural break for the constant and trend model. These results show that the null hypothesis of stationarity is rejected for trade openness and democracy at a 10% significance level. The critical values of the other variables are above the KPSS test statistics. Hence, the null hypothesis of stationarity cannot be rejected for labor force, education, GDP per capita, and fertility. The variables that have unit root is used with their first differences.

Table 9 presents diagnostic tests related to the fitted values of the independent variables regressed on education. The ρvalues confirm that the null hypothesis of heteroskedasticity and no first-order autocorrelation is rejected. Therefore, a robust standard error is needed to account for heteroscedasticity and autocorrelation.

Table 9.
Dependent: *Education*

Heterokesdasticity	H0	p valuse
Breusch-Pagan	Constant variance	0.000
Wald Test	Constant variance	0.000
Autocorrelation		
Wooldridge	No first order autocorrelation	0.000

Table 10 presents diagnostic tests related to the fitted values of the independent variables regressed on the labor force. ρ values confirm that the null hypothesis of heteroskedasticity and no first-order autocorrelation is rejected either.

Table 10.
Dependent: *Labourforce*

Heterokesdasticity	*H0*	*p valuse*
Breusch-Pagan	*Constant variance*	*0.286*
Wald Test	*Constant variance*	*0.000*
Autocorrelation		
Wooldridge	*No first order autocorrelation*	*0.000*

Related to these prior tests, variables are modified whether they have a unit root or not. Pooled Ordinary Least Square (POLS), Fixed Effect (FE), Random Effect (RE), Prais-Winsten Regression (PWR), Fixed Effect Vector Decomposition (FEVD) procedure is applied and estimation results are represented comparatively in Table 11.

Table 11.
Regression Results for Dependent Variable Education

Variables	POLS	FE	RE	PWR	FEVD
democracy	-0.228 (0.064)*	-0.228* (0.062	-0.228** (0.011)	0.002 (0.932)	-0.244* (0.088
lngdppercapita	2.116 (0.013)	2.118** (0.012)	2.118*** (0.000)	1.623*** (0.000)	2.169*** (0.000)
fertility	-1.251 (0.133)	-1.252 (0.129)	-1.251 (0.060)*	-1.319*** (0.000)	-1.479 (0.000)***
Δtradeopeness	-0.002 (0.297)	-0.002 (0.291)	-0.002 (0.231)	0.0003 (0.778)	-0.013 (0.042)**
Muslim	-0.123 (0.256)		-0.123 (0.186)	-0.173*** (0.000)	-0.145*** (0.000)
Catholic	-0.040 (0.047)**		-0.040 (0.004)**	-0.482 (0.000)	-0.146 (0.000)***
Protestant	0.0111 (0.711)		0.0111 (0.691)	0.006 (0.501)	

No cpm	-0.004 (0.770)		-0.004 (0.754)	-0.016 (0.082)*	-0.008 (0.282)
Constant	-5.912 (0.354)	-7.364 (0.232)	-5.912 (0.295)	-0.039 (0.986)	-4.709 (0.014)**
R2	0.942			0.8941	0.944
R2 within		0.7719			
R2 between		0.7202			
R2 overall		0.7334			
rho		0.807	0.000	0.9328	
Chi2 prop				0.000	
Hausman	1.000				
norm (u) Jarque& Bera					20.68*
norm (η) Jarque & Bera					13.1**
F prob		154.4**			94.72**

Table 11 presents findings from five different panel estimators that assess the determinants of women's access to education. The Hausman test indicates a systematic difference between fixed effects (FE) and random effects (RE) models, highlighting the importance of model selection variables. The FE model, while controlling for unobserved heterogeneity, cannot estimate the effect of time-invariant variables such as religion, which proxies cultural influences on female education access (Inglehart & Norris, 2003; World Bank, 2012). Thus, the RE model is more suitable for capturing these cultural effects.

Results from the RE model show a negative but statistically insignificant effect of democracy on women's educational access. This finding aligns with previous empirical studies a supportive institutional framework, it does not automatically translate into gender equality without targeted social reforms and policy interventions (Beer, 2009; Andersen, 2023). Catholic affiliation and fertility rates significantly and negatively impact women's access to education, consistent with literature emphasizing how traditional religious norms and high fertility constrain female educational attainment (Dodoo, 1998; Mensch et al., 2005). Conversely, GDP per capita consistently emerges as a positive and significant predictor across all models, reaffirming the strong linkage between economic development and expanded educational opportunities for women (Klasen, 2002; Barro & Lee, 2013).

The findings from the Panel Weighted Regression (PWR) model further substantiate the robustness of the previously identified relationships. In particular, the consistently positive and statistically significant coefficient of GDP per capita reaffirms the well-established association between economic development and women's educational attainment, in line with the arguments of Barro and Lee (2013) and Klasen (2002). Conversely, both fertility rates and religious affiliation exert a significant negative influence, suggesting that cultural and demographic constraints continue to hinder gender equality in education. The Fixed Effects Vector Decomposition (FEVD) estimator, which allows for the inclusion of time-invariant variables by decomposing fixed effects, confirms the statistical significance of nearly all variables except for "other religion" affiliation, implying that major religious traditions may play a more structured role in shaping educational access. Moreover, the Jarque-Bera normality test results support the statistical adequacy of the model, indicating that residuals are normally distributed, thus strengthening the validity of inference drawn from these estimators. As Baltagi (2008) notes, the use of alternative estimators like FEVD and PWR in the context of panel data improves the precision of estimates when traditional methods (e.g., FE or RE) face limitations due to unobserved heterogeneity or non-random effects. Overall, these findings underline that women’s educational access is shaped by an intricate combination of economic, cultural, and demographic factors. Effective policy interventions thus require integrated strategies addressing not only economic development but also fertility reduction and transformation of restrictive cultural norms to promote gender parity in education (Unterhalter, 2005; World Economic Forum, 2020).

Table 12.
Regression Results for Dependent Variable Labour force

Variables	POLS	FE	RE	PWR	FEVD
democracy	-0.321 (0.634)	-0.321 (0.629)	-0.321 (0.607)	-0.650 (0.707)	-0.367 (0.538)
lngdppercapita	-5.061)* (0.066)	-5.061 (0.063)*	-5.061** (0.012)	-3.894*** (0.000)	-4.950*** (0.000)
fertility	-1.848 (0.634)	-1.848 (0.629)	-1.848 (0.607)	-1.827* (0.069)	-2.580** (0.016)
∆tradeopeness	0.026** (0.042)	0.026** (0.040)	0.026** (0.003)	0.002 (0.771)	-0.441 (0.134)
Muslim	-4.384** (0.001)		-4.383*** (0.000)	-4.338*** (0.000)	-3.00 (0.002)**
Catholic	-0.424** (0.004)		-0.424*** (0.000)	-0.435*** (0.000)	-0.225 (0.178)
Protestant	-0.656** (0.012)		-0.656*** (0.000)	0.664*** (0.000)	
No cpm	-0.205**		-0.204***	-0.198***	--0.064

	(0.021)		(0.000)	(0.000)	(0.702)
Constant	144.74 (0.003)**	99.717 (0.012)**	144.74*** (0.000)	133.774 (0.000)	123.452*** (0.000)
R^2	0.965			0.949	0.965
R^2 within		0.0007	0.3530		
R^2 between		0.3530	1.000		
R^2 overall		0.0170	0.9652		
rho		0.972		0.8755	
Chi2 prop				0.000	
Hausman	0.000				
norm (u) Jarque& Bera					22.86
norm (η) Jarque & Bera					13.1**
F		3.51			10.52**

Table 12 presents the results from five different panel estimators examining factors that affect women's labor force participation in the BRICS countries. The Hausman test suggests no systematic difference between fixed effects (FE) and random effects (RE) models, indicating that either model could be appropriate, however given that the FE model cannot estimate the impact of time-invariant variables such as religion—which serves as a proxy for cultural influences—the RE model offers more comprehensive insights into cultural effects (Baltagi, 2008; Inglehart & Norris, 2003).

The RE estimates indicate that democracy exerts a negative but statistically insignificant effect on female labor participation, consistent with previous findings that democratic governance alone does not guarantee gender parity in economic participation without broader societal reforms promoting women's political participation (Waylen, 2014; Saha & Singh, 2025). Trade openness shows a positive and statistically significant effect, highlighting its role in expanding economic opportunities for women through increased market integration (Dollar & Gatti, 1999; Seguino, 2000; Onyeke & Ukwueze, 2022). Conversely, GDP per capita exhibits a significant negative association with women's labor force participation, consistent with the U-shaped hypothesis observed in middle-income countries, where early stages of economic growth may reduce female labor market involvement due to income effects and structural transitions (Novta & Wong, 2017).

Religious affiliations—including Muslim, Catholic, and Protestant traditions—appear to exert a negative influence on women's labor force participation, likely reflecting the embedded patriarchal gender norms shaped by religious and cultural institutions (McCleary & Barro, 2006;

Campante & Yanagizawa-Drott, 2015). Likewise, fertility remains a robust constraint on women's workforce engagement, as supported by cross-country demographic studies (Bloom et al., 2009; Ahn & Mira, 2002; Sunday et al., 2024).

Panel Weighted Regression (PWR) confirms the negative relationships between GDP per capita, fertility, and religion and labor participation. The Fixed Effects Vector Decomposition (FEVD) estimator identifies GDP per capita and fertility as negatively affecting female labor participation; however, the Jarque-Bera normality test results suggest lower statistical reliability for the FEVD compared to the RE models in this context.

These findings are consistent with the Global Gender Gap Report (2023), which documents significant improvements in women’s educational attainment in BRICS countries yet highlights the persistent exclusion of women from economic participation and leadership positions. This paradox reflects a deeper structural challenge: while education may open opportunities, it does not automatically translate into equitable labor market outcomes. As Kabeer (2016) emphasizes, women’s economic empowerment requires more than access to jobs—it demands the transformation of underlying social norms, unequal care burdens, and institutional barriers. Similarly, Duflo (2012) argues that although gender equality can promote development, development alone does not guarantee gender equality. Therefore, policy interventions must go beyond macroeconomic growth strategies and directly address the socio-cultural and demographic constraints—such as patriarchal norms and high fertility rates—that continue to limit women’s full economic inclusion in emerging economies.

Conclusion

This study guarantee gender-inclusive development. While some structural indicators, such as trade openness, show promise for expanding women’s employment opportunities, persistent barriers rooted in cultural norms, fertility dynamics, and religious affiliations continue to restrict full participation. The limited role of democracy in enhancing gender outcomes further suggests that institutional reforms must be accompanied by deliberate social transformation to produce meaningful change.

The findings point to the need for comprehensive policy strategies that integrate economic, social, and cultural dimensions. Strengthening support for women through affordable childcare, improved reproductive health services, and targeted employment initiatives can help mitigate the impact of fertility and domestic responsibilities on labor market access. Equally important are culturally sensitive awareness programs aimed at reshaping social attitudes and challenging traditional norms that undervalue women’s economic contributions.

Future research should extend beyond macro-level analysis to explore the heterogeneity of gender barriers within and across countries, incorporating qualitative perspectives to gain a deeper understanding of localized constraints. Additionally, updating datasets to reflect post-pandemic realities will be crucial in assessing how global disruptions have altered gender dynamics in labor markets.

In conclusion, achieving meaningful gender equality in labor force participation within BRICS countries requires more than institutional declarations or economic progress. It demands a multidimensional transformation—one that addresses structural inequalities, redefines gender roles, and empowers women as central actors in economic development.

References

Ahn, N. & Mira, P. (2002). A note on the changing relationship between fertility and female employment rates in developed countries. *Journal of Population Economics*, *15*(4), 667–682.

Andersen, T. B. (2023). Does democracy cause gender equality?. *Journal of Institutional Economics*, 19(2), 210-228.

Armijo, L. E. & Roberts, C. (2014). The emerging powers and global governance: Why the BRICS matter. *In Handbook of emerging economies* (pp. 503–524). Routledge.

Baltagi, H., B. & Chang Y. (1992). Monte Carlo Evidence on Panel Data Regressions with AR (1) Disturbances and an Arbitrary Variance on the Initial Observations. *Journal of Econometrics*, 52, 371-380.

Baltagi, B. H. (2008). Econometric analysis of panel data (4th ed.). Wiley Publishing.

Barro, R. J. & Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010. *Journal of development economics*, 104, 184-198.

Beer, C. (2009). Democracy and gender equality. *Studies in Comparative International Development*, 44, 212-227.

Bloom, D. E., Canning, D., Fink, G. & Finlay, J. E. (2009). Fertility, female labor force participation, and the demographic dividend. *Journal of Economic Growth*, 14(2), 79–101.

Breuer, B., McNown, R. & Wallace, M. (2002). Series Specific Unit Root Test with Panel Data. *Oxford Bulletin of Economics and Statistics*, 64 (5), 0305-9049.

Breusch, T. S. & Pagan, A. R. (1980). "The Langrange Multiplier Test and its Applications to Model Specification in Econometrics". *The Review of Economic Studies*, 47(1), Econometrics Issue, 239-253.

BRICS Women Development Report 2025. Accsess: https://bricswomen.com/wp-content/uploads/2025/07/Brics-Womens-Developmet-Report-2025_EN_v4-0616.pdf

Campante, F. R. & Yanagizawa-Drott, D. (2015). Does religion affect economic growth and happiness? Evidence from Ramadan. *Quarterly Journal of Economics*, 130(2), 615–658.

Carrion-i-Silvestre, J. L. (2005). Healthcare Expenditure and GDP: Are They Broken Stationary?. *Journal of Health Economics*, 24, 839–854.

Chatterjee, D. (2016). Gendering BRICS: Studying the Gendered Language of BRICS Declarations. ISA Asia-Pacific Conference, Hong Kong

Coelho, D. J. S. S., Diniz, R. S. & Coelho, S. D. O. P. (2019). The situation of women in BRIC countries: A comparative analysis of the (in) effectiveness of public policies for the protection of women and reduction of gender inequality in the four largest emerging economies in the world. *UNIO–EU Law Journal*, 5(1), 121–141.

Cook, S. & Dong, X. Y. (2011). Harsh choices: Chinese women's paid work and unpaid care responsibilities under economic reform. *Development and Change*, 42(4), 947–965.

Cooray, A. & Potrafke, N. (2011). Gender inequality in education: Political institutions or culture and religion? *European Journal of Political Economy*, 27, 268-280.

Davies, A. & Quinlivan, G. (2006). A Panel Data Analysis of the impact of trade on human development. *The Journal of Socioeconomics*, 35(5), 868-876.

Deshpande, A. (2020). The COVID-19 pandemic and lockdown: First effects on gender gaps in employment and domestic work in India (No. 607). GLO Discussion Paper.

Dielman, T. E. & Rose, E. L. (1994). Forecasting in Least Absolute Value Regression with Autocorrelated Errors: A Small-Sample Study. *International Journal of Forecasting*, 10,539-547.

Dodoo, F. N. A. (1998). Men matter: additive and interactive gendered preferences and reproductive behavior in Kenya. *Demography*, 35(2), 229-242.

Dollar, D. & Gatti, R. (1999). Gender inequality, income, and growth: Are good times good for women? *World Bank Policy Research Report on Gender and Development*, Working Paper No. 1.

Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic Literature, 50*(4), 1051–1079.

Emara, N. (2016). Fertility and Female Employment: A Panel Study on Developing Countries. *Applied Economics and Finance*, 3(2), 122-127.

Golosov, G. V. (2025). Women's Representation in Russia: The Public Sector Bias. Problems of Post-Communism, *Problems of Post-Communism*, 72 (5), 391-400

Grogan, L. (2006). An economic examination of the post-transition fertility decline in Russia. *Post-Communist Economies*, 18(4), 363–397.

Grogan, L. (2013). Household formation rules, fertility and female labor supply: Evidence from post-communist countries. *Journal of Comparative Economics*, 41(4), 1167–1183.

Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *The Econometrics Journal*, 3(2), 148-161.

Hsio, C., Yanan, W. (2006). Panel Data Analysis — Advantages and Challenges. *Wise Working Paper Series*, WISEWP0602.

Hurlin, C., Mignon. V. (2007). Second Generation Panel Unit Root Tests. 2007.Halshs-Archive, No: 00159842

Inglehart, R., & Norris, P. (2003). Rising tide: Gender equality and cultural change around the world. Cambridge University Press.

Ivıns, C. (2013). Inequality Matters: BRICS Inequalities Fact Sheet. OXFAM BRICS Policy Center.

Kabeer, N. (2016). Women's economic empowerment and inclusive growth: *Labor markets and enterprise development. SOAS, University of London.*

Kizilova, K. & Mosakova, E.A. (2019). The birth Rate in BRICS Countries under the Gender Inequality in the Labor Market. *RUDN Journal of Sociology*, 19(4), 630—638.

Klasen, S. (2002). Low schooling for girls, slower growth for all? Cross-country evidence on the effect of gender inequality in education on economic development. *The World Bank Economic Review*, 16(3), 345–373.

Larionova, M., Popova, I. Sakharov, A., Strigunova, N., Shelepov, A. (2020). Toolkit "Women Economic Empowerment in BRICS: Policies, Achievements, Challenges and Solutions" Access: https://bricsthinktankscouncil.org/wp-content/uploads/2020/02/Toolkit_Women_in_BRICS.pdf

McCleary, R. M. & Barro, R. J. (2006). Religion and economy. *Journal of Economic perspectives*, 20(2), 49-72.

Mensch, B. S., Clark, W. H., Lloyd, C. B. & Erulkar, A. S. (2001). Premarital sex, schoolgirl pregnancy, and school quality in rural Kenya. *Studies in family planning*, 285-301.

Mosomi, J. (2019). An empirical analysis of trends in female labor force participation and the gender wage gap in South Africa. *Agenda*, 33(4), 29–43.

Neudorfer, N., S. (2016). Gender and Graft: A Political Economy Argument about the Influence of Working Women on Political Corruption, *Journal of Women, Politics & Policy*, 37(2), 190-216.

Niymbanira, R. N. & Sabela, P. T. (2019). Gender dynamics in employment and labor force trends in South Africa. *International Journal of Economics and Finance Studies*, 11(2), 36–54.

Novta, N. & Wong, J. (2017). *Women at Work in Latin America and the Caribbean* (IMF Working Paper No. WP/17/34). International Monetary Fund. https://doi.org/10.5089/9781475578928.001

Oliveira, V. T. (2025). Power struggles over gender equality in politics: Recent patterns of resistance and change in Brazil. [In press]. https://uu.diva-portal.org/smash/record.jsf?pid=diva2%3A1965019&dswid=7935

Onyeke, Q. O. & Ukwueze, E. R. (2022). Trade openness and female labor force participation rate in Nigeria. Journal of Xi *'an Shiyou University, 18(3), 433-457.*

Pandey, M. K. & Sergeeva, I. G. (2022). A research on the role of women in economic development in the BRICS countries. *Journal of New Economy*, 23(1), 43–65.

Perasan, H. (2004) General diagnostic tests for cross-section dependence in panels. IZA Discussion Paper, No:1240.

Pesaran, H. (2007). "Simple Panel Unit Root Test in The Presence of Cross-Sectıon Dependence". *Journal of Applied Econometrıcs*, 22, 265–312.

Pesaran, M., Yamagata, T. (2008). Testing Slope Homogeneity in Large Panels. *Journal of Econometrics*, 2008, 42 (1), 50-93.

Plümper, T. & Troeger, V. E. (2004). The Estimation of Time-Invariant Variables in Panel Analyses with Unit Fixed Effects. Available at SSRN: https://ssrn.com/abstract=565904

Prais, S. & Winsten, C. (1954). Trend estimators and serial correlation. Cowles Commission Discussion Paper No. 383. Chicago, IL. PraisCowles Commission Discussion Paper.

Sajid, S. (2014). Political Economy of Gender Equality: Case Study of Pakistan. *International Journal of Gender and Women's Studies*, 2(2), 309-340.

Saha, T. & Singh, P. (2025). Political and institutional dynamics of global female labor force participation: Discovering the role of women political participation. *Sustainable Development*, 33(3), 3791-3817.

Saiia (2025). BRICS Gender Forum: Putting women at the centre of development. Access: https://saiia.org.za/research/brics-gender-forum-putting-women-at-the-centre-of-development/

Santos, C. & Hilal, A. V. G. D. (2018). Same, same but different? Women's experiences with gender inequality in Brazil. *Employee Relations*, 40(3), 486–499.

Seguino, S. (2000). Gender inequality and economic growth: A cross-country analysis. *World Development*, 28(7), 1211–1230.

Sezgin, F. H. (2023, April). The relationship between sustainability and gender inequality: Evidence from the BRICS countries. In *Proceedings of 16th SCF International Conference on Sustainable Development in a Global Perspective* (pp. 111–118).

Stephen, L. (1993). Challenging gender inequality: Grassroots organizing among women rural workers in Brazil and Chile. *Critique of Anthropology*, 13(1), 33–55.

Swamy, P. A. (1970). Efficient inference in a random coefficient regression model. *Econometrica: Journal of the Econometric Society*, 311-323.

Sychenko, E., Laruccia, M., Cusciano, D., Korde, R., Nagadia, K., Chikireva, I., Wang, J. & Carrim, N. (2022). Gender discrimination in employment: BRICS countries overview. *BRICS Law Journal*, 9(2), 30–71.

Teorell, J., Dahlberg, S. Holmberg, S., Rothstein, B. Alvarado P., Natalia & Axelsson, S. (2020)., The Quality of Government Standard Dataset, Version Jan20 (2020). *University of Gothenburg: The Quality of Government Institute*, doi:10.18157/qogstdjan20, Available at SSRN: https://ssrn.com/abstract=3549780

Troeger, V. (2020). Time Series Cross-section Analysis in the SAGE Handbook of Research Methods in Political Science and International Relations (Edited: Luigi Cuirini and Robert Franzese). Sage: London.

Unterhalter, E. (2005). Global inequality, capabilities, social justice: The Millennium Development Goal for gender equality in education. *International Journal of Educational Development*, 25(2), 111–122.

UN Women (2021). *Facts and figures: Ending violence against women*. https://www.unwomen.org/en/what-we-do/ending-violence-against-women/facts-and-figures

Van Standen, C., Mpungose, L. (2018). BRICS Should Adopt Inclusive Approach to Women. *South African Institute of International Affairs, Policy Insights*, 63.

Weller, J. (2023). Major global trends and their impact on labour inclusion. In Inequalities, labour inclusion and the future of work in Latin America Access. https://repositorio.cepal.org/server/api/core/bitstreams/9f669b43-d3be-49c1-a9b5-9004128030f9/content#page=24(p. 23).

World Bank. (2012). *World development report 2012: Gender equality and development*. The World Bank.

WEF (2020). *Global gender gap report 2020*. http://www3.weforum.org/docs/WEF_GGGR_2020.pdf

WEF (2023). *Global Gender Gap Report 2023*. https://www.weforum.org/reports/global-gender-gap-report-2023

WEF (2025). Global Gender Gap Report 2025. Acceess: https://www.weforum.org/publications/global-gender-gap-report-2025/

Wooldridge, J. (2001). Econometric Analysis of Cross Section and Panel Data. MIT Press: London

Yi, H., Wang, G., & Feng, J. (2024). Gender inequality: Policy responses to employment and education in BRICS countries. *African Journal of Reproductive Health*, 28(12), 88–96.