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RESEARCH PAPER

Income Disparities in BRICS Economies: Analyzing the Role of Capital Account Liberalization and Foreign Bank Ownership

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ABSTRACT

This study rigorously examines the impacts of capital account liberalization and foreign ba ownership on income inequality within BRICS economies from 1995 to 2017. Prior literatu presents divergent views on the effects of financial liberalization and foreign ba penetration on income distribution, prompting the need for a focused analysis in the BRI context. Employing panel data methodologies, including Baseline Panel Regression, Arellan Bond, and Arellano-Bover approaches, this research ensures robustness throu comprehensive sensitivity analyses and robustness checks. Empirical findings demonstra that capital account liberalization exerts a significant negative influence on income inequali suggesting its role in reducing income disparities. Conversely, the presence of foreign ba ownership is associated with a statistically significant increase in income inequality. The results highlight the complex effects of financial policies on income distributic Consequently, the study recommends that BRICS countries pursue sustainable capital accou liberalization and strategically regulate foreign bank ownership, underpinned by robu economic and political governance, to effectively address income inequality.

Keywords: BRICS, Capital Account Liberalization, Foreign Bank Ownership, Income Disparities, Political Governance

Introduction

Numerous countries worldwide have devised diverse strategies to mitigate the adverse repercussions associated with financial constraints resulting from capital account liberalization. Central banks play a pivotal role in these endeavors by working to harmonize and eliminate restrictions imposed on financial institutions, thereby facilitating the unimpeded flow of international finance (Vlados et al. 2022). The overarching objective of capital account liberalization is to establish the domestic financial sector as a substantial participant in global financial markets, with the ultimate goal of optimizing its operational efficiency in line with the principles of supply and demand. The impact of capital account liberalization on social welfare diverges, as indicated by the research of Von Hagen and Zhang (2008). Capital account liberalization remains a paramount concern for policymakers and continues to be a topic of extensive debate, as articulated by Liu et al. (2021) and Naveed and Mahmood (2019). Additionally, the consequential effects of capital liberalization have been measured by Furceri and Loungani (2018).

In recent decades, the phenomenon of capital account liberalization and its relationship with income inequality have garnered increasing attention (de Haan et al., 2017; Radhianshah and Kurnia, 2021). While a prevailing notion posits a positive correlation between capital account liberalization and income inequality trends, empirical studies yield varying results. Various episodes of global economic and financial crises have raised concerns regarding the heterogeneous impacts of financial liberalization on income levels across the globe. Nevertheless, the implications of capital account liberalization and foreign bank ownership on income inequality have received comparatively less scrutiny in

recent years (Cheng et al., 2023; Radhianshah and Kurnia, 2021), thereby stimulating scholarly interest in exploring the interplay between income inequality and capital liberalization, with limited attention to foreign bank ownership. Consequently, this study seeks to examine the influence of capital account openness and foreign bank ownership on income inequality and endeavors to elucidate how foreign bank ownership and capital account liberalization collectively shape income distribution within BRICS nations.

Foreign banks, as international financial institutions, bring innovative technologies that enhance operational efficiency and competition within the domestic financial sector (Bonin et al., 2005). Technological transfers contribute to the advancement of the domestic financial industry, offering cost-effective employment opportunities that can mitigate income inequalities. Simultaneously, foreign banks may exhibit a history of limited credit support for small and medium-sized enterprises, potentially constraining market competition (Detragiache et al., 2008). As posited by Stiglitz (2012), pronounced income inequality diminishes human and physical capital accumulation, impedes labor productivity, and elevates poverty levels, thereby exerting an adverse impact on the sustainability of economic growth.

This study extends the understanding of foreign bank ownership by updating its proxy through the year 2017. Employing a range of econometric techniques and proxies, we rigorously examine the effects of capital account liberalization and foreign bank ownership on income inequality. Our empirical findings reveal a statistically significant and negative relationship between capital account liberalization and income inequality, indicative of the mitigating effect of financial liberalization on income inequality stemming from capital account openness. In contrast, the second hypothesis positing a positive association between foreign bank ownership and income inequality is supported by the evidence. Both the Arellano-Bond and Arellano-Bover approaches demonstrate statistically significant positive coefficients for foreign bank ownership. Importantly, this pattern remains robust when controlling for additional variables. Furthermore, the presence of foreign banks emerges as a primary factor contributing to the escalation of income inequality within BRICS economies.

The subsequent sections of this paper are structured as follows: Section 2 provides a comprehensive review of previous empirical literature on financial account liberalization, foreign bank ownership, and income inequality. Section 3 presents the research methodology and econometric specifications employed in this study. Section 4 offers a thorough exposition of the empirical results, accompanied by a detailed discussion. Finally, Section 5 concludes the study, presenting practical policy implications derived from our findings.

Literature Review

This research study attempts to analyse and measure the impact of capital account liberalization on income inequalities in the presence of foreign bank ownership and by using some critical macroeconomic control variables. The term "income inequality" means how unevenly national income is distributed throughout a country's population. Higher-income inequality represents the less equal distribution of income. It defines the gap between lowest income earners and highest income earners, illustrated using a Lorenz Curve and measured using the Gini coefficient. The term "capital account liberalization" is the external feature of financial liberalization; it refers to reducing cross-border capital movement and investment restrictions from or into foreign countries. Capital account liberalization is a particular form of financial liberalization, and these terms are being used interchangeably by researchers (Bumann and Lensink, 2016). Likewise, the "foreign bank ownership" variable is used to define the presence of foreign banks in the domestic economy. It is defined as the natural log of the percent of foreign banks among total banks.

The considerable empirical literature is available which explores the different key determinants or contributing factors of income inequality from a variety of perspectives, for instance, institutional quality (Acemoglu *et al.*, 2015), technological changes (Acemoglu, 2002), and labor market (Dew-Becker and Gordon, 2008). But our research analysis on income inequality is limited to the two novels or comparatively less explored areas: first capital account liberalization and second foreign bank ownership.

Capital Account Liberalization and Income Inequality

The empirical literature on the impact of capital account liberalization on income inequality provides scare and mixed findings. Delis et al. (2014) mentioned that financial liberalization proxy by aggregate liberalization index squeezes the income distribution. Many scholars offer empirical evidence that was lowering barriers to entry, removing credit controls, and enhancing privatization laws reduce income inequality (Agnello *et al.*, 2012; Bumann and Lensink, 2016; Li and Yu, 2014). Ullah et al. (2022) empirical results showed a positive significant relationship between capital account liberalization and income inequality for low-quality financial institutions and least financial developed countries. Furceri et al. (2019) analyzed that capital account openness enhances income inequality in developed economies where industries are highly dependent on external finance, and capital and labor are highly elastic substitutes. The evidence of de Haan et al. (2017) depicted that financial liberalization increases the income inequality gap, particularly in high-level financially developed countries. Bumann & Lensink (2016) measured that capital account openness lowers income inequality in countries that achieved a certain level of financial development, i.e., if the level of financial depth, as measured by private credit over GDP, exceeds 25%.

Jayadev (2004) examined the impact of capital account liberalization on income inequality from a novel perspective of "labor share of income." Covering all economies in the IMF annual report for 1972-1996 reported a persistent negative impact of capital account liberalization on the labor share of income across economies. Similarly, Liu et al. (2021) and Shuja et al. (2024) investigated the consequences of capital account policy and bank capital flows for income distribution in a small open economy with heterogeneous agents and financial frictions. Panel data analysis for 87 emerging economies concluded that capital inflows exacerbate inequality and disproportionately raise entrepreneur income. Likewise, Li & Su (2020), Tian et al. (2024) adopted the identification strategy of difference-in-difference estimation combined with propensity score matching. Results provided robust empirical evidence that income inequality in developing economies significantly increases with the capital account opening. In the long run, with capital account liberalization, the income shares of the wealthiest half increase by almost 8.76%, and the poorest half decrease by almost 3.79%.

Furceri & Loungani, (2018) study indicated that reforms related to capital account liberalization have a statistically significant and persistent impact on income inequality. They conclude that the Gini coefficient typically increases by 0.8% in the short-run and 1.4% in the medium-run due to capital account liberalization reforms. These findings are based on a large panel dataset covering 149 economies from 1970 to 2010. Furceri et al. (2019) used cross-country industry-level data to obtain the same findings.

Agnello et al. (2012) concluded that the impact of liberalization on income inequality varies across policies. Specifically, removing high reserve requirements and directed credit have significant importance in lower down income inequality. On the other hand, financial liberalization policies like increase in foreign capital flows, reduction in entry barriers, and privatization have no significant impact on income distribution. A recent contribution by Radhianshah and Kurnia (2021) examined capital account liberalization's effects on income inequality in 28 European economies revealed that capital account liberalization has a significantly positive impact on income inequality. Moreover, they examine the role of

institutional quality in the baseline model and report that the policymakers should consider the institutional quality before implementing capital account liberalization policies.

Abiad, (2008), Agnello et al. (2012), Delis et al. (2014), Li and Yu (2014), and Tian and Tunio (2023) contend that capital account liberalization expands the dimensions of the financial system to efficiently allocate resources on an international level, such as free capital mobility boosts the efficiency gains. A different strand of empirical literature postulates that the financial opening of borders enables the more lucrative orientation of global savings both from the lender and borrower's point of view. In other words, capital availability assists the investors in investing in more money-making investment opportunities. At the same time, as compared to domestic markets, borrowers can find cheaper financing sources in foreign markets. These channels stimulate the financial sector and help policymakers cope with severe economic problems like poverty and income inequality (Ashraf, 2018; Bekaert *et al.*, 2011).

Foreign Bank Ownership and Income Inequality

The growing ratio of foreign banks attracts the attention of researchers and policymakers worldwide (Delis et al., 2021). The presence of foreign banks in the economy brings technological innovations, Simultaneously opponents contend that these foreign ownership based banks increase obstacles that prevent the majority of the population from using and accessing formal banking services (Bonin *et al.*, 2005; Delis *et al.*, 2019; Detragiache *et al.*, 2008). Empirical and theoretical literature has established strong causal linkages between financial developments, including capital account liberalization and foreign bank ownership with economic growth, which indirectly reduces poverty and income inequality (Beck and Levine, 2004; Bekaert *et al.*, 2005; Shuja and Tunio 2024). Some scholars postulated that the impact of financial developments on income inequality depends on whether these developments primarily benefit rich people only or help a large proportion of the population (Delis *et al.*, 2019). Similarly, Clarke et al. (2006) reported that these financial developments lower income inequality. Patrick (2004) concluded that a negative connection exists between financial depth and headcount poverty. Delis et al. (2019) used panel data for 1995 to 2013, find that foreign bank ownership has a statistically significant and positive association with income inequality. Quantitatively speaking, during the understudied period, a 62 percent increase in foreign bank participation led to a 5.8 percent increase in the income inequality measure, i.e., the Gini coefficient (Delis et al., 2019). (2009) mentioned that the presence of foreign banks boosts the banking competition in the domestic country, leading to more excellent aggregate supply of credit and lower borrowing costs, which can help eliminate income inequalities.

Many studies indicate that foreign bank ownership may exert contradictory impacts on income distribution through "credit availability." Berger et al. (2000) pointed out the "global advantage hypothesis" and postulate that, as compared to domestic counterparts, foreign banks are more skillfully managed and able to overcome any cross border disadvantages like cultural distance, geographical distance, institutional differences, and monitoring costs. (2012) analyzed the linkages between foreign bank ownership and income distribution, claiming that higher efficiency gains of the foreign banks enable them to charge lower lending rates, which help increase credit access for domestic borrowers. This transmission channel is also known as the "performance effect," which means banking performance boosts credit access, improving national income distribution. Brzoza-Brzezina et al. (2018), Clarke et al. (2006), and Wu et al. (2017) studies concluded that the foreign banks limited their lending to cloudy borrowers like small and medium firms, particularly in Latin America, Eastern Europe, Central Europe, and emerging Asia. This adverse impact of foreign banks' credit access can transform the perfect financial markets into imperfections that deter the effective allocation of capital and exaggerate income inequality. To sum up, in this section, we observe that foreign banks have both positive and negative

impacts on income inequality. Our analysis aims to identify on which side BRICS economies are standing.

Material and Methods

In this study, we use an unbalanced panel dataset covering 1995 to 201 from BRICS economies (Brazil, Russia, India, China, and South Africa). For capital account liberalization data measurement, we used the KAOPEN index, developed by (Chinn and Ito, 2008). While for the foreign bank ownership, we use the database of (Claessens and Van Horen, 2014).

Dependent variables / Income Inequality

Income inequality is a dependent variable commonly measured via the Gini coefficient. It takes the value of 0 for completely equal income distributions, i.e., the whole population has the same income level, and the importance of 1 if all income is concentrated in one person. Gini coefficients are taken from the Estimated Household Income Inequality (EHII) database compiled by the University of Texas Inequality Project (UTIP). We choose the EHII dataset over other Gini coefficient datasets such as the World Income Inequality Database (WIID) maintained and updated by (UNU-WIDER), the Standardized World Income Inequality Database (SWIID), and the World Bank's PovcalNet because the latter are flawed. The income inequality is measured by gross income Gini (Bumann and Lensink, 2016; de Haan and Sturm, 2017; Zhang and Ben Naceur, 2019). For robustness check, we rank all households by income, from lowest to highest, and then divide all households into five groups with equal numbers of people, known as quintiles. This calculation allows for measuring the income distribution among the five groups compared to the total. In simple words, our robustness analysis examines how a set of independent variables influences the national income proportion held by the poorest quantile, i.e., bottom 20% people.

Independent Variables

The primary objective of this study is to analyze the impact of capital account liberalization on income inequality in the presence of foreign banks ownership in the BRICS economies. KAOPEN index developed by (Chinn and Ito, 2008) is used as a proxy for capital account liberalization. While (Claessens and Van Horen, 2014) database is used to construct foreign banks ownership variable.

Control Variables

We use a set of control variables in our baseline to get more robust and consistent coefficients of capital account liberalization and foreign bank ownership. It includes government expenditures, per capita income, unemployment rate, inflation, population growth, economic growth, and trade openness. (Josifidis *et al.*, 2017; Law *et al.*, 2014) studied that institutional quality has a significantly important role in reducing the poverty rate and fair distribution of national income in an economy. In robustness analysis, a set of institutional quality variables such as investment profile rating, corruption rating, government stability rating, socioeconomic conditions rating, and ethnic tensions rating are included.

Empirical Mode

To examine the impact of capital account liberalization and foreign bank ownership on income inequality by using a set of control variables, we design the following econometrical model where *t* represents the time, and *i* represent the country:

$$Inequality_{it} = \alpha + \beta CAL_{it} + \gamma FBO_{it} + \delta X_{it} + \varepsilon_{it} \quad (1)$$

Where, $Inequality_{it}$ represents the income inequality as per Gini coefficient CAL_{it} denotes the first variable of interest, "capital account liberalization," while FBO_{it} is the second variable of interest, "foreign bank ownership." X_{it} represents the set of control variables. While ε_{it} is the error term of the model.

The following equation represents the static framework of our baseline income inequality model:

$$Inequality_{it} = \mu_i + \delta_t + \beta\,(X_{it}) + \varepsilon_{it} \qquad (2)$$

Where $Inequality_{it}$, same as equation 1, represents the income inequality of BRICS economies which is proxy by the Gini coefficient. X_{it} is the vector of explanatory variables including both main variables of interest, "capital account liberalization" and "foreign bank ownership" δ_t is the time-specific country invariant effect which captures the impact of shocks that influence inequality in several countries at the same time, while μ_i represents the country-specific time-invariant effect which captures stable differences in inequality between countries. In addition, β is the scalar vector of coefficients $\beta_1, \beta_2, , \ldots . \beta_5$, and ε_{it} is the disturbance term with $var\,(\varepsilon_{it}) = \sigma_\varepsilon^2$ and $E\,(\varepsilon_{it}) = 0$ and $\varepsilon_{it} \approx IID\,(0, \sigma_\varepsilon^2)$. According to introductory econometrics, the static panel model can be estimated in three ways; pooled OLS, random-effects model, and fixed effects model (Dimitrios Asteriou; Stephen G Hall, 2015). We apply 2-step difference GMM and 2-step system GMM because they are efficient and robust to auto-correlation and heteroscedasticity.

Results and Discussion

Gini index is a measure of income inequality that appreciates disparity among the values of the frequency distribution of income. The value of the Gini coefficient ranges between 0 and 1. A value closer to or equal to 1 denotes perfect income inequality, while a value of 0 expresses perfect income equality. It is a commonly used measure of inequality and has many practical applications in agriculture, health science, economics, sociology, etc. To make the numbers easily understandable, most scholars use this coefficient as an index by multiplying with 100. According to (Todaro and Smith, 2011), an economy will have highly unequal income distribution if the Gini index value falls between 50 and 70. As per table 1, the mean value of the Gini index of BRICS economies is 47.1, which relatively unequal distribution. Chinn and Ito (2008) and (2010) the first variable of interest Capital Account Liberalization (KAOPEN), is based on 4 binary nature dummy variables reported in the IMF Annual Report on Exchange Arrangements and Exchange Restriction (AREAER). It takes higher values for the more open financial regime. The second variable of interest is the foreign bank ownership dataset developed (Claessens and Van Horen 2014). Mean, standard deviation, maximum and minimum statistics of variables show a reasonable degree of variation in the panel data series. One should be confident that effective and sound estimated coefficients should emerge.

Table 1
Comparative Analysis of Gini Index

Country Name	Mean	Standard Deviation	Observations
Brazil	55.7042	2.8958	24
China	40.0379	2.5191	24
India	38.3708	4.4861	24
Russia	39.6375	2.6709	24
South Africa	61.5504	2.2615	24

Table 1 revolves around descriptive statistical analysis of the primary dependent variable only and provides a disaggregated picture of Gini Index values. It offers a comparative study of BRICS economies regarding income distribution. The mean value reported that, on average, South Africa has the highest Gini index value, followed by Brazil

and China. In other words, South Africa has the highest income inequality among BRICS economies, while Brazil stands second.

Figure 1 BRICS Income Inequality (1995-2018)

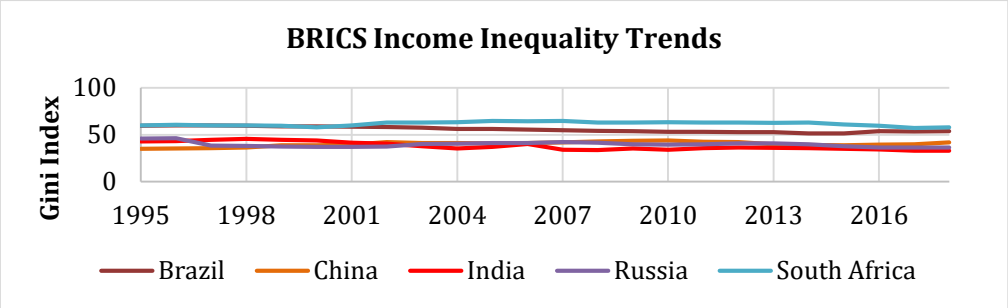

Figure 1 provides a visual display of the Gini Index values of all BRICS economies. In line with the descriptive statistical analysis table, the blue line in figure 2 indicates that South Africa has the highest income inequality level. India has the lowest income inequality level among BRICS economies in the understudied period.

Table 2
Pairwise Correlation Matrix

Variable Name	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Gini Index	1									
(2) Foreign Bank Ownership	0.513*	1								
(3) Capital A/C Liberalization	-0.120*	0.375*	1							
(4) Government Expenditure	-0.378*	0.306*	0.214*	1						
(5) Per Capita Income	-0.472*	-0.433*	-0.202*	0.272*	1					
(6) Unemployment Rate	0.771*	0.057	-0.262*	-0.710*	-0.397*	1				
(7) Inflation	-0.020	-0.128	-0.055	-0.166	-0.228*	-0.033	1			
(8) Population Growth	0.046	-0.324*	-0.626*	0.065	0.385*	0.017	-0.311*	1		
(9) Economic Growth	-0.393*	-0.415*	-0.135	0.134	0.699*	-0.290*	-0.111	0.139	1	
(10) Trade Openness	-0.134	-0.325*	0.030	-0.169	0.089	0.170	0.125	-0.179	0.158	1

Table 2 provides a correlation matrix detail. We apply the Pearson correlation coefficient to observe the direction and strength of the linear association between two variables. According to basic statistics, "The correlation coefficient can range in value from −1 to +1. The larger the absolute value of the coefficient, the stronger the relationship between the variables". The stars in the table represent a significant correlation between the two variables of the matrix. The correlation matrix reports that Foreign Bank Ownership has a statistically significant and positive correlation with income inequality, proxy by Gini Index. On the other hand, Capital Account liberalization has a statistically significant and negative correlation with income inequality.

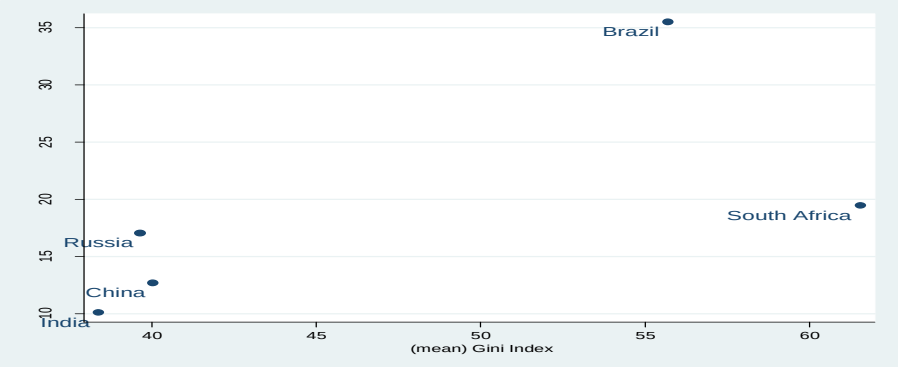

Figure 2: Foreign Bank Ownership and Income Inequality

Figure 2 provides the linkages between foreign banks ownership and income inequality in BRICS economies. The horizontal axis denotes the income inequality measure while the vertical axis represents the foreign bank ownership. Each dot on this graph represents the average values of income inequality and foreign banks' privilege. It is clear from the figure that the higher average value of the Gini index of a country has a higher average value of foreign bank ownership.

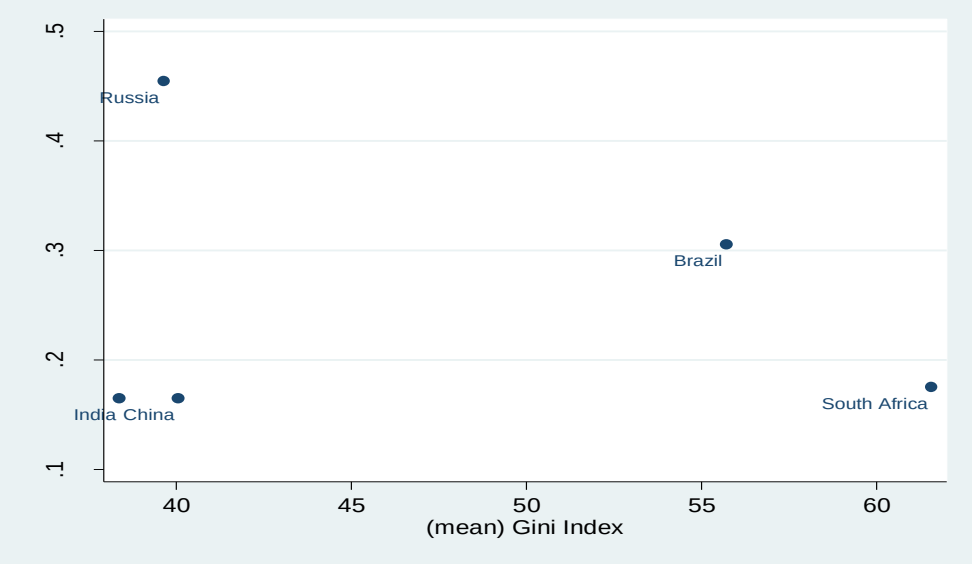

Figure 3: Capital Account Liberalization and Income Inequality

On the other end, Figure 3 examines the connection between capital account liberalization and income inequality in BRICS economies. The horizontal axis denotes the income inequality measure while the vertical axis represents the capital account liberalization. Like figure 3, each dot represents the average values of income inequality and capital account liberalization. However, this graph does not provide any clear picture of the association between the average values of both variables. We move the discussion towards regression analysis to empirically prove or disprove these graphical and correlation matrix findings

Table 3
Baseline Panel Regression (Fixed Effects Model)

Explanatory Variables	**Dependent Variable = Gini Coefficient**	
Variables of Interest	**Model 1**	**Model 2**
Foreign Bank Ownership	0.2048**	0.1441*
	(0.1206)	(0.1004)
Capital Account Liberalization	-3.7882*	-7.3166***
	(2.6904)	(2.0763)
Control Variables		
Government Expenditures		10.1651***
		(1.7788)
Per Capita Income		-0.3458***
		(0.1121)
Unemployment Rate		-0.0996
		(0.1469)
Inflation		0.0536**
		(0.0298)
Population Growth		2.4348***
		(0.7474)
Economic Growth		0.0983*
		(0.0586)

Trade Openness		-0.0303*
		(0.0189)
Constant	45.6677***	-67.9377***
	(2.1673)	(20.2997)
Time Effects	Yes	Yes
Prob>F	[0.0000]	[0.0000]
Number of Groups	5	5
Number of Observations	120	120
R-Squared (within)	0.250	0.674

Note: *** means significant at 1%, ** at 5%, and * at 10% level of significance. The robust standard errors are presented in parenthesis. P-values are in square brackets

Table 3 reports the estimated results of our baseline model with the Gini index as a dependent variable used as a proxy of income inequality. We employ robust standard errors throughout the empirical estimations to account for heteroscedasticity. Time dummies are significant in all specifications, indicating that they should be included in the models. The standard Hausman test results reject the applicability of the random-effect model, which supports our methodological choice of the fixed-effect model. However, we also run Pooled OLS and Random-Effect models for comparison purposes. Table 3 provides the estimated coefficients of our baseline model by using the distributional process (i.e., added one variable at a time to get a more robust picture) where model 1 includes only one explanatory variable and includes all variables containing independent and control variables. The focus of our study is to examine the impact of different financial developments on income inequality where foreign bank ownership and capital account liberalization are used as proxies of these financial developments.

Column 1 presents a parsimonious model that contains only main variables of interest, without additional control variables. Results reveal that the first financial development, "foreign bank ownership," has a statistically significant and positive impact on the income inequality. It implies that foreign bank ownership plays a vital role in increasing the income inequality among the BRICS economy. In column 1, the coefficient of foreign bank ownership is statistically significant and positive, indicating that the income inequality within the host economy increases when the foreign banks' participation rises in the domestic financial markets. Interestingly, the coefficient magnitude remains almost the same when we include control variables. These findings follow a strand of literature (Delis *et al.*, 2019). Overall results suggest that the presence of foreign banks is one of the main reasons for rising income inequality among BRICS economies. On the other hand, the second financial development, "capital account liberalization," has a statistically significant and negative impact on income inequality, implying that financial liberalization from capital openness perspectives alleviates income inequality. These findings are in line with the existing literature; for instance, similar results are reported by (Batuo and Asongu, 2015).

As far as control variables are concerned, the government expenditures have a significantly positive impact on the Gini index which means the government spending is a crucial determinant of income inequality in BRICS economies. (Li and Yu, 2014) also conclude that government spending has a positive impact on the Gini index. It suggests that the spending on public facilities may benefit the affluent investors more by lowering the transaction costs of private investment. It infers that the effectiveness of expansionary fiscal policy by the governments of BRICS economies to eradicate income inequalities is raising alarming flags. Similarly, some other control variables, including inflation, population growth, and economic growth, also have detrimental impacts on income distribution, increasing income inequality. On the other hand, per capita, income, and trade openness (Batuo and Asongu, 2015; Li and Yu, 2014) have negative impacts on the Gini index, which implies that these two control variables have favourable implications for the income distribution that leads to the reduction in income inequality.

Table 4
Alternative Panel Estimation Techniques (Pooled OLS and Random Effects)

Explanatory Variables	Dependent Variable = Gini Coefficient	
	Model 3	Model 4
Variables of Interest	**Pooled OLS**	**Random Effects**
Foreign Bank Ownership	0.5141***	0.5141***
	(0.0574)	(0.0574)
Capital Account Liberalization	-5.3718**	-5.3718**
	(3.1838)	(3.1838)
Control Variables		
Government Expenditures	0.2293	0.2293
	(1.9648)	(1.9648)
Per Capita Income	-0.4588**	-0.4588**
	(0.1787)	(0.1787)
Unemployment Rate	0.7409***	0.7409***
	(0.0844)	(0.0844)
Inflation	0.0444	0.0444
	(0.0455)	(0.0455)
Population Growth	2.0351***	2.0351***
	(0.4931)	(0.4931)
Economic Growth	-0.0043	-0.0043
	(0.0932)	(0.0932)
Trade Openness	-0.0365	-0.0365
	(0.0312)	(0.0312)
Constant	28.6682	28.6682
	(22.0707)	(22.0707)
Time Effects	Yes	Yes
Prob>F	[0.0000]	[0.0000]
Number of Groups	5	5
Number of Observations	120	120
R-Squared (within)	---	0.257
Adjusted R-Squared	0.8977	---
Hausman Test	---	124.64
P-Value	---	[0.0000]

Note: *** means significant at 1%, ** at 5%, and * at 10% level of significance. The robust standard errors are presented in parenthesis. P-values are in square brackets.

For sensitivity analysis and a more robust picture of our previous findings, we employ alternative panel estimation techniques on our baseline model. The results reported in indicate that foreign bank ownership has a significantly positive impact and capital account liberalization has a negative impact on income inequality. The coefficients of both variables of interest align with the results reported in Table 4 with the fixed effect estimation technique. However, some control variables had changed their signs and magnitudes when we applied these alternative panel estimation techniques.

Robustness Analysis

In this sub-section, we demonstrate the robustness of the baseline results by employing different checks. It reveals that the main findings do not change when we use alternative econometrical estimation techniques, alternative income inequality measurement, i.e., income distribution by quintiles, or more control variables measuring corruption and institutional quality.

Table 5
Arellano-Bond Approach vs. Arellano-Bover Approach

Explanatory Variables	Model 5		Model 6	
	Arellano-Bond Approach		Arellano-Bover Approach	
	Coefficient	S.E	Coefficient	S.E
Lagged Term				
Gini $(\mathbf{t-1})$	0.75821***	(0.05771)	0.73532***	(0.05034)

Variables of Interest				
Foreign Bank Ownership	0.09384***	(0.03141)	0.15342***	(0.04376)
Capital Account Liberalization	-1.63419***	(0.22640)	-2.53426**	(1.19061)
Control Variables				
Government Expenditures	1.20050***	(0.44335)	1.89801**	(0.92183)
Per Capita Income	0.02490	(0.02636)	-0.09018	(0.06955)
Unemployment Rate	0.08674	(0.09279)	0.07819	(0.05062)
Inflation	-0.01220*	(0.00675)	-0.03040*	(0.01774)
Population Growth	1.11039***	(0.18845)	0.74837***	(0.26506)
Economic Growth	0.07293***	(0.00659)	-1.89801	(0.92183)
Trade Openness	-0.00901***	(0.00288)	-0.00301	(0.01137)
Constant	168.84550**	(69.7428)	31.18245***	(10.5499)
Time Effects	Yes	---	Yes	---
Prob>F	---	[0.0000]	---	[0.0000]
Number of Groups	5	---	5	---
Number of Observations	120	---	120	---
Wald (Joint) Test	118.04	[0.0000]	1117.6	[0.0000]
AR2 Test (p-value)	---	[0.3981]	---	[0.9352]

Note: *** means significant at 1%, ** at 5%, and * at 10% level of significance. The robust standard errors are presented in parenthesis. P-values are in square brackets.

Firstly, we consider the problem of endogeneity in our robustness checking analysis because some researcher highlights that not only can income inequality be influenced by capital account liberalization or by foreign banks' ownership, but in turn, income inequality has an impact on capital account liberalization or foreign banks' ownership. We use Arellano-Bond GMM and Arellano-Bover GMM to control the possible endogeneity problem. We apply 2-step estimation techniques in both approaches because they are efficient and robust to autocorrelation and heteroscedasticity. Following Aviad et al. (2005), we allow for the likelihood of persistence by including lagged values of the dependent variable (i.e., lagged of Gini index) in the model.

Table 5 report the GMM based estimated coefficients when the dependent variable is the Gini index. Results suggest that income inequality is divergent across BRICS economies as we notice that the initial inequality level is statistically significant and positive. The first hypothesis of our study-whether capital account liberalization is associated with the reduction in income inequality- has large holds when we applied GMM estimations. We find that, on average, every unit of increase in capital account liberalization leads to a fall in the Gini coefficient of more than 100% with a 95% confidence level. This finding generally verifies the trends that we have observed in the understudied data; after attending success stories from all over the world, BRICS economies have liberalized their capital account to some extent. These findings are consistent with the existing studies on the same area as (Furceri and Loungani, 2015; Gallagher *et al.*, 2018)

The second hypothesis of our study-whether foreign banks' ownership is associated with income inequality- is also holds, but the coefficient is positive. In other words, both Arellano-Bond and Arellano-Bover approaches carry statistically significant and a positive sign for the foreign bank ownership coefficient, suggesting that the participation of foreign banks in an economy disturbs the distribution of income, i.e., increases the income inequality level of the domestic economy. Let's compare the coefficients of both variables of interest. The decreasing income inequality impact of capital account liberalization is stronger than the increasing income inequality impact of foreign banks ownership. So overall understudied financial developments have beneficial implications in lowering down the income inequality of BRICS economies. For control variables, following the Arellano-Bond approach, government expenditures and population growth significantly impact the Gini index, suggesting that these two macro variables contribute to increasing the income

inequality level. Inflation and trade openness can help reduce the growing inequalities of BRICS economies. If we follow the Arellano-Bover approach, government expenditures, inflation, and population growth also report signs identical to the Arellano-Bond method.

Table 6
Sensitivity Analysis: Alternative Definition of Income Inequality Variable

Explanatory Variables	Dependent Variable = National Income Proportion held by Richest Quantile							
Variables of Interest	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**
Foreign Bank Ownership	0.0596	0.0818	0.0812	0.0425	0.0051	0.0126	0.0293	0.0123
	(0.0902)	(0.0837)	(0.0822)	(0.0892)	(0.0960)	(0.0907)	(0.0915)	(0.0945)
Capital Account Liberalization	-3.1911**	-3.3674**	-3.6606**	-5.5272***	-4.8129**	-5.0095**	-5.0904**	-5.0853**
	(1.9052)	(1.7648)	(1.7395)	(1.9397)	(2.0551)	(1.9383)	(1.9323)	(1.9396)
Control Variables								
Government Expenditures		5.9810***	6.0795***	6.5529***	6.9533***	6.1227***	6.3121***	6.1200***
		(1.6394)	(1.6106)	(1.9079)	(1.9445)	(1.8548)	(1.8547)	(1.8790)
Per Capita Income			-0.1660**	-0.2372**	-0.2456**	-0.1980**	-0.2500**	-0.2414**
			(0.0862)	(0.0988)	(0.0991)	(0.0948)	(0.1039)	(0.1050)
Unemployment Rate				-0.2992**	-0.3480**	-0.1458	-0.1516	-0.1535
				(0.1263)	(0.1346)	(0.1445)	(0.1441)	(0.1447)
Inflation					0.0309	0.0341	0.0284	0.0292
					(0.0296)	(0.0279)	(0.0282)	(0.0283)
Population Growth						2.1908***	2.3872***	2.2988***
						(0.7500)	(0.7650)	(0.7767)
Economic Growth							0.0657	0.0647
							(0.0548)	(0.0551)
Trade Openness								-0.0135
								(0.0179)
Constant	38.4786***	-25.980	-26.219	-27.383	-33.009*	-32.127*	-34.896**	-31.884
	(1.7211)	(17.740)	(17.420)	(20.731)	(21.402)	(20.175)	(20.233)	(20.698)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prob>F	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Number of Groups	5	5	5	5	5	5	5	5
Number of Observations	120	120	120	120	120	120	120	120
R-Squared (within)	0.31	0.43	0.47	0.54	0.55	0.62	0.63	0.64

Note: *** means significant at 1%, ** at 5%, and * at 10% level of significance. The robust standard errors are presented in parenthesis. P-values are in square brackets.

The quintiles method of calculation enables the researchers to measure the income distribution among the five groups compared to the total. This sub-section attempts to examine how the estimated coefficients react if we use alternative ways of defining income inequality. Table 6 analyzes how under consideration variables influence the national income proportion held by the wealthiest quantile, i.e., top 20% people.

The parsimonious version of this robustness analysis that contains only main variables of interest, without additional control variables. Results indicate that foreign bank ownership has no significant impact or plays no role in defining the richest quantile of national income distribution in BRICS economies. However, capital account liberalization has a statistically significant and adverse effect on the wealthiest quantile of the national income distribution, suggesting that these kinds of financial developments can help to reduce the national proportion held by the top 20% of the economy. In simple words, it can help to eliminate income inequality. Observing the signs and significance of variable interests is consistent throughout the control variables' gradual increase or introduction. The control variables are also compatible with the baseline findings; for instance, the government expenditures and population growths have significantly positive impacts on the income inequality in terms of richest quantiles. However, the unemployment rate,

inflation, economic development, and trade openness significantly impact the understudied dependent variable. From this robustness check, we confirm again that capital account liberalization is a crucial determinant of income inequality. The efficient utilization of liberalization policies can help the BRICS economies eliminate these inequalities.

In addition, (Batuo & Asongu, 2015; Acemoglu et al., 2015; Li & Yu, 2014) research studies show that the quality of institutions is an essential factor for the determinant of income inequality. To evaluate the inclusion of institutional quality variables influences our baseline estimates. We did a robustness check; we included a series of institutional quality variables: investment profile, corruption, government stability, socioeconomic conditions, and ethnic tension.

Table 7
Role of Institutional Quality in Income Inequality (Fixed Effect Method)

Explanatory Variables	Dependent Variable = Gini Coefficient	
	Model 15	Model 16
Variables of Interest		
Foreign Bank Ownership	0.1441*	0.2089*
Capital Account Liberalization	-7.3166***	-8.983***
Control Variables		
Government Expenditures	10.1651***	12.510***
Per Capita Income	-0.3458***	-0.2481**
Unemployment Rate	-0.0996	-0.1429
Inflation	0.0536**	0.0284
Population Growth	2.4348***	4.2084***
Economic Growth	0.0983*	0.0911*
Trade Openness	-0.0303*	-0.0237*
Institutional Quality		
Investment Profile		-0.5462**
Corruption		0.0980
Government Stability		-0.4801*
Socioeconomic Condition		-0.3509
Ethnic Tensions		-1.4512
Constant	-67.9377***	-83.1371
Time Effects	Yes	Yes
Prob>F	[0.0000]	[0.0000]
Number of Groups	5	5
Number of Observations	120	120
R-Squared (within)	0.674	0.75
Hausman Test	---	137.8
P-Value	---	[0.0000]

Note: *** means significant at 1%, ** at 5%, and * at 10% level of significance. P-values are in square brackets.

Table 7 provides the estimated coefficients of this robustness check with the Gini index as a dependent variable. The Hausman test results supported using the fixed-effect model to estimate this robustness analysis. Foreign bank ownership and capital account liberalization, both variables of interest, are in line with the previously reported results of the baseline model. It reveals that the increase in foreign bank ownership has a significantly positive impact on income inequality, while capital account liberalization has a negative effect on income inequality. Alternatively, the presence of foreign banks increases income inequality in the domestic economy, while capital account liberalization helps lower the disparity in the domestic economy. Hence, this robustness check proves that the inclusion or exclusion of institutional quality variables has not disturbed the significance and signs of our variable of interest.

Additionally, some of our control variables are also in line with the baseline model estimation; for instance, government expenditures, population growth, and economic growth have positive and statistically significant coefficients. Similarly, per capita, income, and trade openness coefficients also align with the baseline findings. As far as institutional quality variables are concerned, corruption, ethnic tensions, and socioeconomic conditions have no significant impact on income inequality. At the same time, the country's government stability and sound investment profile have beneficial implications for reducing income inequality.

Conclusion

The impact of financial developments on income inequality has been gaining growing consideration for the last couple of decades. This research study examining capital account liberalization and foreign banks ownership can help reduce income inequality among BRICS economies, focusing on capital account liberalization and foreign banks requests. Overall estimation techniques such as pooled OLS, Fixed Effects, Random Effects, Arellano-Bond Approach, and Arellano-Bover Approach show that capital account liberalization has a statistically significant and negative impact on income inequality. It implies that financial liberalization from capital account openness perspectives alleviates income inequality. While the presence of foreign banks ownership in the BRICS domestic market significantly increases the income inequality. Other robust findings from the control variables per capita income and trade openness have positive impacts, while population growth has detrimental effects on income inequality. Interestingly, corruption, ethnic tensions, and socioeconomic conditions have no significant effect on income inequality in BRICS countries. Simultaneously, the government stability and sound investment profile have favorable influences on income inequality.

This research has some caveats that remain for future research. It would be excellent to access more balanced panel data over the broader period, allowing for unobserved effects in the model. Also, we recognize that the mechanism of foreign banks ownership and capital account liberalization affecting the distribution of national income. To examine these transmission channels, we need more comprehensive and detailed micro-level data on individual-level household income, such as wage rates and compensation of differently skilled employees. These datasets are unavailable at this stage, especially for BRICS economies. Also, it would be interesting to check that the findings proposed in this study are robust in other datasets from European and advanced economie.

Based on the findings, it is recommended that BRICS nations carefully manage the process of capital account liberalization to harness its potential in reducing income inequality. Policymakers should implement regulatory frameworks that ensure the benefits of financial liberalization are broadly shared across different income groups. Additionally, foreign bank ownership should be strategically regulated to prevent adverse effects on income distribution. To better understand the dynamics at play, future research should focus on obtaining more detailed and comprehensive micro-level data. Moreover, conducting similar studies in other regions, including European and advanced economies, can help validate and potentially generalize the results. Robust economic governance and policies that promote equitable growth are crucial for addressing income inequality effectively.

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