

# **Empirical Assessment of Business Competitiveness and Income Distribution: A Case of Selected Lower-Middle-Income Economies**

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## **Abstract**

The current study attempts to quantify the quadratic nexus between income distribution and business competitiveness. It also adds the interaction term of development expenditure with business competitiveness to examine their impact on income inequality. Yearly panel data from 2008 to 2018 for 27 lower-middle-income economies was used. The analysis was based on Quantile Regression for Panel Data (QRPD). The findings revealed a U-shaped pattern between business competitiveness and income inequality. Further, an insignificant negative impact of development expenditure on income inequality was observed. However, if lower-middle-income economies take into account development expenditure with business competitiveness, then their impact on income inequality becomes significant with the same sign. The variable 'urban population' is significant and decreases income inequality, while broad money, trade, and rule of law have a significant role in increasing income inequality. The study suggests that development expenditure and business competitiveness may increase simultaneously for a more equal distribution of income. Moreover, the standardization of the rule of law in lower-middle-income economies is also very important for an equal distribution of income.

**Keywords:** business competitiveness, income distribution, lower-middle-income economies, Quantile Regression for Panel Data (QRPD)

**JEL Codes:** D63, O57, F23

## **Introduction**

The issue of income distribution has continued to reemerge in the debate of both policymakers and academicians since the advent of classical political economy in the late 18<sup>th</sup> and 19<sup>th</sup> centuries. Professionally, the book of Thomas Piketty in [2014](#) and shocking inequality statistics (for instance, OXFAM, [2021](#); United Nations Development Program [UNDP], [2019](#); Donaldson, [2018](#); Alvaredo et al., [2017](#)) have worked as a catalyst to trigger

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this debate. Indeed, a “quantum leap” in the realm of inequality research has been observed. In the Internationally Agreed Development Goals, the (2030) Agenda gives considerable attention to reduce inequality based on income.

United Nations Department of Economic and Social Affairs (UNDESA, 2020) highlighted the difference between the average incomes of people. It noted that the incomes of people living in Sub-Saharan Africa are 11 and 16 times lower than those living in the European Union and North America, respectively. Although, the economic growth of low income countries is faster as compared to high income countries; still, the gap has increased from about \$27,600 in 1990 to over \$42,800 in 2018. Income level, size, and population diversity are the attributes of middle-income countries. As per The World Bank (2021), countries with Gini per capita between \$1,036 and \$4,045 are defined as lower-middle-income economies. A report (The World Bank, 2017) highlighted high income inequality in United States and Brazil, where the Gini index is 41.1 and 52.1, respectively. Income gap in Guinea, Nigeria, Mali, and Ethiopia varies from 13 to 15, while the same for India and Thailand is 22 and 17, respectively. Income gap for Argentina, Chile, and Brazil is 13, 29, and 29, respectively. Furthermore, Germany, UK, Denmark, and France have an income gap between 7 and 10. These figures are below the US income gap, that is, 17.

Alvaredo et al. (2017) examined the increase in income inequality for China, Russia, and India over a period of 40 years. Specifically for India, inequality showed a drastic increase since 1980s onwards due to economic reforms. As per their findings, almost 60% of the national income is owned by top 10% of the population. In the last few years, the importance of business competitiveness has increased worldwide, particularly after the financial crisis, highlighting the significance of novel strategies, innovative ideas, and dynamics in business and economic environment.

On the contrary, the concept of competitiveness is widely recognized as an indispensable factor to evaluate/that affects the welfare and prosperity of countries and regions. The question remains whether business competitiveness is useful in making income distribution more equal. The Global Competitiveness Index (2015) is defined by the World Economic Forum as a “set of institutions, policies and factors that determine the level of productivity of a country.” It argues that productivity “is the main long-run engine for growth, living standards and prosperity.”

Porter (1990) said that competitiveness is highly indispensable for both developed and developing countries and many policymakers and economists show serious concerns about it. On the national level, productivity is the most important concept/component of competitiveness. Porter (2004), in order to highlight its focus on firms and productivity, renamed it as Business Competitiveness Index (BCI). Further, Fendel and Frenkel (2005) argued about the importance of BCI, which shows the productivity situation and thus the economic performance of a country. BCI does not neglect the importance of macroeconomic factors in economic performance; rather, the performance of firms reflects best the current level of their productivity. The root source of the creation of wealth from the microeconomic level of the economy are the two pillars of BCI business sophistication and innovation capacity/The sophistication of BCI and innovation capacity are the root sources of the creation of wealth at the microeconomic level of an economy (Porter, 2003). In the same study by Porter (2003), 83% of variation in the level of GDP per capita across countries was reflected by BCI.

### **Purpose of the Current Study**

On the basis of the above discussion, this study strives to bridge the gap between income distribution and business competitiveness. So, it probes the quadratic relationship between business competitiveness and income distribution, while controlling for development expenditure, financial development, trade, rule of law, and urban population. Moreover, the interaction term of government expenditure with business competitiveness is introduced to witness how it affects income distribution in lower-middle-income economies.

### **Literature Review**

This section comprises an attempt to review the pertinent papers on business competitiveness, income distribution, and the controlled variables used in the proposed model. The purpose is to make the model robust by explicating the relationship between the explanatory variable and explained variables.

### **Income Inequality and Business Competitiveness**

Hartmann et al. (2017) proposed the relationship between income inequality, product sophistication, and structural constraints. Their study focused on Latin American, Caribbean, China, and other High-Performing Asian Economies (HPAEs). The results determined that there exists a wide

gap in the productive capabilities of LAC and HPAEs, which has been increasing since 1990. It was revealed that HPAEs are molded into manufacturing stylish industrial products associated with countries having less income inequality. However, in the case of LAC countries, the productive portfolio is dependent on products having/creating high income inequality, for instance, crude petroleum, copper, and coffee beans. Moreover, the results also focused on Xginis which has been very high for LAC countries, although for HPAEs it has declined significantly. One of the most important dimensions of business competitiveness is the ability of a country to produce commodities and services for the international market. For instance, Chan et al. (2018) endeavored to examine the impact of reforms bringing export sophistication on urban-rural income inequality in China. The results supported an inverse relationship between export sophistication and urban-rural per capita income ratio.

Technology, in general, and Information and Communication Technologies (ICT), in particular, have been important in bringing prosperity in many ways but only for a very few. Deskoska and Vlčková (2018) investigated the relationship between change in technology and the distribution of income in the United States of America from 1970 to 2010. The results of their study revealed that change in technology and globalization are the root causes of rising income inequality. Moreover, two other causes of inequality were determined to be the political and economic structure of the country. Similarly, Jing et al. (2019) scrutinized the effect of ICT on income inequality. They used the data from 2009 to 2017 for five ASEAN countries. The results revealed a robust effect of ICT on income inequality.

Guo (2019) probed the relationship between innovation and income inequality across Chinese city regions from 2004 to 2012. The results uncovered a nonlinear relationship between innovation and income inequality. The results indicated that firstly, innovation increases income inequality within city regions. Afterwards, it decreases it. Technology and Information and Communication technologies (ICT) have been an important source in bringing prosperity in many ways but for very few. According to Josifidis and Supic (2018), corporate attention to innovations inhibits the society's ability to eliminate inequality through "the incredible productivity" of technological advancement.

## Income Inequality and Development Expenditure

Saint-Paul and Verdier (1993) and Castelló and Doménech (2002) recommended education as the prime determinant of growth, while taxes are solely for the public. This finding strengthens the debate regarding the existence of a direct relationship between public expenditure and economic growth. Similarly, Mehlum et al. (2012) argued that public spending on health and education plays an indispensable role in achieving low levels of income inequality and high living standards. Further, Bhattacharjee et al. (2015) strived to build a relationship between the distribution of income and expenditure on health in both public and private regimes. Their findings confirmed that there is high income growth but less income inequality in rich countries under public regimes, although convergence to poor health and low income can be observed in poor countries. Moreover, the study revealed that the differences in income and health worsen over time under private regimes. Recently, a study by Artige and Cavenaile (2021) proposed a relationship between public expenditure on education, growth, and income inequality. Specifically for inequality, a U-shaped pattern between public expenditure on education and inequality exists in the United States.

Malla and Pathranarakul (2022) probed the role of fiscal policy and institutional capacity in determining income inequality for developed and developing nations. The data was collected for the period 2000-2019 and system Generalized Method of Moments (GMM) was applied to control the endogeneity problem. The results uncovered that both in developing and developed nations, the widening of income gap is persistent. The study further revealed the importance of progressive tax in reducing income inequality in developing countries but not in developed countries. Moreover, expenditure on health, expenditure on education, and government size were found to have a negative impact on income inequality in developed countries only. Mehlum et al. (2012) argued that public spending on health and education plays an indispensable role in achieving low levels of income inequality and high living standards. Further, Bhattacharjee et al. (2015) put an effort to build a relationship between distribution of income and expenditure on health in both public and private regime. Their findings confirm that there is high income growth but less income inequality in rich countries under public regimes, but convergence to poor health and low income is observed in poor countries. Moreover, the

study reveals that the differences in income and health get worst over time under the private regime.

### **Income Inequality, Urban Population, Trade, Financial System, and Rule of Law**

Wan et al. (2022) addressed the issues related with income inequality in developing and less developed countries. They argued that urban-rural gap explains inequality. Their study concluded that the desired outcome of simultaneous growth and equality can be achieved by well-managed urbanization. Wu and Rao (2017) focused and identified the main causes of income inequality in China. Provincial level data was used to examine the relationship between urbanization and income inequality. Panel data for the years 1998, 2000, 2002, 2005, and 2010 for 20 provinces was taken from China Statistical Yearbook. Empirical results of ordinary least squares, fixed effects, and random effects models revealed an inverted U-shaped pattern between income inequality and urbanization. Furthermore, the determined rate of urbanization in their study is 0.53, which indicates that income inequality can be reduced in provinces where urbanization is high. Zhang and Churchill (2020) examined income inequality at provincial level and between groups with life satisfaction. They found a negative association in both provincial level distribution of income and between groups with life satisfaction. Moreover, they also found that for rural Hukou residents, the effects of income inequality on life satisfaction are stronger as compared to urban Hukou residents. Xu et al. (2021) postulated that in Saharan Africa, Foreign Direct Investment (FDI), trade openness, and income inequality are mutually related. They used Generalized Method of Moment (GMM) for analysis covering the time period 2000-2015. The findings showed that FDI reduces unequal distribution of income. However, rule of law, corruption, trade openness, and political stability increase income inequality. Sonora (2019) put forth the relationship between rule of law, poverty, and income inequality for 20 Latin American countries using panel data for the period 1995-2014. The above study also compared the results with non-Latin American countries. The application of GLS panel method revealed that a better legal system reduces income inequality and poverty in Latin America in many cases. Similarly, a positive impact was also observed for the rest of the world.

Amountzias (2019) claimed that widening income inequality is systematically causing financial instability in developing economies.

Particularly, thirty-three OECD (Organization for Economic Cooperation and Development) countries were studied between 1995 and 2015. After controlling for certain variables, the results confirmed that income inequality and financial instability have a positive and significant relationship. Additional results also showed that the accumulation of private sector debt depends on credit expansion, private/public sector debt, and collective household relocation. Moreover, financial deregulation is a major contributor to financial instability. In the same stream, Destek et al. (2021) argued about the various dimensions of financial development with respect to income inequality for the period 1990-2015 for Turkey. Using Principal Component Analysis (PCA), four financial development indices were developed. The results of Autoregressive Distributed Lag (ARDL) model revealed that if there is an increase in real income and government spending, then income inequality reduces in the long-run. However, in the short-run this relationship remains negative. Moreover, financial development and income inequality depict an inverted U-shaped pattern. The study concluded that in Turkey income inequality and stock market development are monotonically declining. Rachmawati et al. (2021) proposed a relationship between financial deepening and income inequality for Indonesia. The study used quarterly time series data from 2000 to 2016. Vector Error Correction Model (VECM) was applied to determine short- and long-term relationships between independent and dependent variables. The results unveiled a positive association between money supply and income inequality in the long-run. They further revealed that the role of stock market in increasing income inequality is significant in the short-run, while the long-run results revealed that a better financial market causes income inequality to decrease. Furthermore, in the short-run, a negative impact of private sector to GDP on income inequality was observed.

The above literature review covers all the facets of the possible relationship between regressor and regressand variables. However, the authors were unable to detect any literature that used the quadratic impact of business competitiveness on income distribution. Further, the role of development expenditure as moderator with business competitiveness and its impact on income distribution is also missing in the literature.

## Theoretical Framework

The theoretical framework of this study is based on Simon Kuznets' efforts in 1955. Kuznets postulated an important hypothesis in modern

social sciences stating that inequality rises in the first stages of development but eventually declines as the country progresses. Policymakers worldwide use the "inverted- U curve" hypothesis when seeking endurance from citizens, whenever political or economic changes seem to produce social costs. According to Kuznets ([1955](#)), inequality grows throughout the initial stages of economic growth, becomes conspicuous at the middle stages of development, and then declines as the country becomes wealthy. In the Schumpeterian model, the introduction and clustering of innovations violates the existing economic and social conventions. With the passage of time, these are the main processes that drive a cycle of prosperity (characterized by massive investment in new production opportunities) and depression (characterized by the broader assimilation of innovative practices and elimination of old activities). Over the past several decades, Schumpeter's insights have influenced a number of economic growth prospects. For example, endogenous growth theory draws attention to the "virtuous cycle" (characterized by investing in human capital and R&D) that enhances the ability of rich countries to develop through technological innovation (for various formulations of such arguments).

There was a paradigm shift regarding income inequality because of Kuznets's hypothesis. Income inequality is considered a social problem to examine size distribution. This hypothesis has been the basis of hundreds of research studies in social sciences that assessed the relative weights of various regressor variables which explain the existence of an inverted U curve. For example, in Kuznets original contribution of changing the relative weights of modern and traditional sectors, as can be seen in the sectoral distribution of labor force, level of productivity and population growth (most notably Ahluwalia, [1976](#); Crenshaw, [1992](#); Weede & Tiefenbach, [1981](#)). Another view point is that differences in education caused by social and political variables instigate inequality.

Nevertheless, researchers like (Cutright, [1967](#); Lenski, [1966](#); Muller, [1988](#), [1989](#)) are of the view that non-democratic forms of political rule increase income inequality. Furthermore, some researchers believe that economic dependency is the main cause of income inequality (Chase-Dunn, [1975](#); Rubinson, [1976](#); Borschier & Ballmer-Cao, [1979](#); Evans & Timberlake, [1980](#); Borschier, [1983](#); Bollen & Jackman, [1985](#); Borschier & Chase-Dunn, [1985](#)). Hence, by revising or altering the original contribution of Kuznets, a more productive theoretical framework that

reflects the relationship between income inequality and business competitiveness can be developed. Such an interpretation can provide a productive picture of the differences that are used to reject the original hypothesis and help provide a more composite set of arguments about the impact of business competitiveness on trends in income inequality. In this regard, the current study is an attempt to replace economic growth with business competitiveness to examine its impact on income distribution.

### **Materials and Methods**

The current study used panel data which is suitable for minimizing collinearity among exogenous variables by explaining the spillover effect and cross-sectional heterogeneity. The study was restricted to 27 lower-middle-income economies (see Table 6 in appendix) because of the unavailability of data. Moreover, it endeavored to examine the impact of business competitiveness on income inequality for lower middle-income economies because of the shocking facts on inequality in studied countries (see for instance Chancel et al., [2022](#)). Annual yearly data was taken for the period 2008 to 2018. The analysis determined that in lower-middle-income economies, there is a simultaneous increase in both economic growth and income inequality. For example, Ghana showed immense growth in 2018 and appeared in the top 10 fastest growing economies of the world. However, this impressive growth was accompanied with an uneven distribution of income. A disturbing fact is that in Ghana, if the poorest women earn for 1000 years, still they cannot reach the income of the richest men earned in one month. According to a report by OXFAM ([2022](#)), the United States' economy witnessed the emergence of 1000 new millionaires during the period 2006-2016. Further, the report stated that the aggregated wealth of 100 richest people in India hit the record high of USD 775 billion by 2021. Meanwhile, the same year witnessed the share in national wealth of the bottom 50% of the population as 6%. Another report by The World Bank shares the fact/postulates that the consumption of top 10 richest people is on average three times more than the bottom 10%, followed by five times larger incomes. In Bangladesh, the top 10 richest people have a share of about 27% of the economy, while the share of the bottom 40% is only 21%. According to Chancel et al. ([2022](#)), the bottom half of the Bangladeshi population retained 17.1% of the national income in 2021, while the share of the top 1% of the population was 16.3%.

The current study has developed the below mentioned model/used the model mentioned below to empirically investigate the quadratic nexus between Business Competitiveness Index (BCI) and income inequality for lower-middle-income economies, while controlling for development expenditure, broad money, urban population, rule of law, and trade openness. The description of the indicators is given below in Table 1.

**Table 1**  
*Data Description*

Indicator	Symbol	Source	Description
Income inequality	GINI	SWIID	Estimate of household market (pre-tax, pre-transfer) income
Development expenditure	DEXP	WDI	health expenditure + education expenditure (% of GDP)
Business Competitiveness index	BC	World Economic Forum	Index of business sophistication and innovation capacity
Trade (% of GDP)	TRA	WDI	Exports + imports divided by the value of GDP
Rule of law	ROL	WGI	Property rights, police, quality of contract enforcement, courts and property come under the rule of law along with likelihood of crime and violence. -2.5 (weak) to 2.5 (strong)
Urban population (% of total population)	UPOP	WDI	People living in urban areas
Broad money (% of GDP)	BM	WDI	Residential sector deposits of foreign currency excluding central government and total of currency outside banks

$$GINI = \beta_0 + \beta_1 BC_{it} + \beta_2 BC_{it}^2 + \beta_3 DEV_{it} + \beta_4 (DEV * BC)_{it} + \beta_5 BM_{it} + \beta_6 UPOP_{it} + \beta_7 ROL_{it} + \beta_8 TRA_{it} + \varepsilon_{it} \quad (1)$$

In the above model,  $i$  represents country and time is represented by  $t$ . Income inequality is the dependent variable which is gauged by the Gini index. Several researchers have applied this index in their research work, for instance, (Aghion et al., 1999; Barro, 2000). The variable of interest is BCI, which is a proxy of business competitiveness. The novel index was developed by applying Principal Component Analysis (PCA), using business sophistication and innovation capacity. To check the quadratic relationship between income inequality and business competitiveness, the square form of BCI was selected. Furthermore, the role of government is given considerable attention in the model.

After calculating descriptive statistics, the current study applied Fisher-ADF panel unit root test. Skewness/Kurtosis and Shapiro-Wilk W normality tests were performed. Such tests are helpful to choose between the panel quantile regression and the mean regression method. The study chose panel quantile regression because it relaxes the assumption of the data to be normal, while the impact of independent variable can be observed on the dependent variable (Wang et al., 2021). Moreover, the results of panel quantile regression are more robust as compared to the conditional mean regression (Koenker & Bassett Jr. 1978). An important point is that conventional estimation approaches are not feasible to gauge the parameters for the panel quantile model. So, econometricians (Galvao Jr. 2011; Harding & Lamarche, 2009; Koenker, 2004) put forth similar methods by including additive fixed effects. However, the underlying model changes due to the inclusion of fixed effects. So, in order to cope with the above mentioned issue, Powell (2016) suggested non-additive fixed effects with Quantile Regression for Panel Data (QRPD) which estimates the distribution of  $Y_{it}|X_{it}$ .

Specifically, for general quantile regression, the equation is

$$P(Y_{it} \leq X'_{it}\alpha(\tau)|X_{it}) = \tau$$

The QRPD technique relaxes the assumptions in the current literature by allowing the base of the parameters on an unfamiliar fixed effect function and through an observation of the specific error term. As a result, QRPD has both a conditional and an unconditional constraint. They are described as follows:

$$P (Y_{it} \leq X'_{it}\alpha(\tau|)X_{it}) = P (Y_{is} \leq X'_{is}\alpha(\tau|)X_{it})$$

$$P (Y_{it} \leq X'_{it}\alpha(\tau|)X_{it})= \tau$$

where  $X_i = (X_{i1} \dots X_{it})$ .

According to Powell (2016), to estimate the model Markov Chain Monte Carlo (MCMC) optimization method is used.

### Results and Discussion

Descriptive statistics are of three major types namely measures of central tendency, measures of dispersion, and measures of frequency. The measures of central tendency include mean, median, and mode; the measures of frequency include frequency and percentage; and the measures of dispersion include standard error, quartile, range, interquartile, and percentile. For categorical data, the measure of frequency is preferred; however, for quantitative data the measure of dispersion and the measure of central tendency is used. The results of descriptive statistics are displayed in Table 2. The mean and p50 (median) of all the variables do not carry unusual values, that is, outliers. The values of standard deviation are low which indicate that data points are close to the mean. The values of skewness highlight that GINI, DEXP, UPOP, ROL, and TRADE are moderately skewed, whereas BC and trade are approximately and highly skewed, respectively. The value of kurtosis is greater than 1 for all the variables, which shows that the distribution is too peaked. According to Hair et al. (2017), non-normal distributions are those that exhibit skewness and/or kurtosis that exceed these guidelines. The second last and the last rows in Table 2 show the interquartile range. As the value of interquartile increases, the spread of the data also increases.

**Table 2**

*Descriptive Statistics*

Stats	GINI	BC	DEXP	BM	UPOP	ROL	TRADE
<i>N</i>	237	287	297	296	297	297	295
Mean	43.79	0.00	5.16	44.61	44.12	-0.62	73.21
<i>p</i> 50	43.80	-0.10	4.31	39.35	44.64	-0.64	68.62
<i>SD</i>	7.32	1.00	3.04	23.90	16.23	0.41	29.64
Skewness	-0.57	0.32	0.77	1.09	0.08	-0.25	0.63
Kurtosis	4.93	2.24	3.26	4.02	1.74	2.67	2.69

Stats	GINI	BC	DEXP	BM	UPOP	ROL	TRADE
$p_{25}$	40.40	-0.84	3.14	24.04	30.25	-0.92	49.02
$p_{75}$	48.00	0.74	7.36	58.59	56.92	-0.30	94.12

It is important to check the stationarity of the data before the empirical analysis. In the current study, the time span of the data is small and it can be assumed as stationary. Still, Fisher-ADF panel unit root test was performed for a robust check and the results are displayed in Table 3 (see appendix).

The results of panel unit root test confirmed the stationary of the data. The current study applied two different tests to check the normality of the data presented in Table 4. The hypothesis of Skewness/Kurtosis and Shapiro-Wilk  $W$  test was rejected since the  $p$ -value is below 5% level of significance. The table shows that all the  $p$ -values are less than 0.05. Hence, the data is not normal and constitutes using the quantile regression.

**Table 4**  
*Shapiro-Wilk  $W$  Test for Normal Data*

Variable	Obs	W	V	z	Prob>z
GINI	237	0.92	13.97	6.12	0.00
BC	287	0.97	5.58	4.03	0.00
BC <sup>2</sup>	287	0.82	36.43	8.42	0.00
DEXP	297	0.95	11.19	5.67	0.00
BC*DEXP	287	0.96	9.12	5.18	0.00
BM	296	0.90	21.30	7.18	0.00
UPOP	297	0.94	12.82	5.98	0.00
ROL	297	0.98	4.18	3.36	0.00
TRADE	295	0.95	10.10	5.43	0.00

**Table 5**  
*Results of Quantile Regression for Panel Data (QRPD)*

IEQ	Coef.	z	95% conf. interval	
BC	-.605***	-2.05	-1.18	-.02
BC <sup>2</sup>	.391***	4.27	.21	.57
DEXP	-.071	-1.05	-.20	.06
BC*DEXP	-.076***	-2.34	-.14	-.01
BM	.0255***	6.21	.07	.03
UPOP	-.173***	-27.41	-.18	-.16

IEQ	Coef.	z	95% conf. interval	
ROL	.572***	3.47	.24	.89
TRA	.066***	8.99	.05	.08

**Note.** MCMC Diagnostic: Mean acceptance rate: .351, Total draws: 1000, Burn in draws: 100, Draws retained: 900, Value of objective function: Mean: -5.7760, Min:-13.3570, Max: -4.0030.

\*\*\* Significant at 1%, \*\* significant at 5%, \* significant at 10% respectively.

Table 5 presents the results of Quantile Regression for Panel Data (QRPD). The results reveal a U-shaped relationship between business competitiveness and income inequality. The linear term of business competitiveness is significant and has a negative sign. It indicates that as business competitiveness increases, it decreases income inequality.

A similar research by Chan et al. (2018) probed export sophistication and its impact on urban-rural income inequality. The authors determined that export sophistication decreases urban-rural income inequality. This illusion of an inverse relationship between income inequality and business competitiveness is nullified after a certain threshold is reached, that is, when the squared term of business competitiveness shows a positive or direct relationship between business competitiveness and income inequality. A principle of economics is “people face tradeoff”. So, in order for businesses to be more competitive, one has to trade off an equal distribution of income.

In the above Table 5, the coefficient of development expenditure depicts a negative and insignificant impact on income inequality; however, after incorporating business competitiveness as an interaction term with development expenditure this relationship becomes significant with no change in sign. These results are surprising even for the policymakers. The coefficient of broad money (proxy for financial development) has a positive sign indicating that broad money increases income inequality in lower-middle-income economies. The results are in line with the findings of Jung and Cha (2021) that financial development has played a significant role in increasing income inequality in China (for positive impact see also, Sethi et al., 2021; Mehta & Bhattacharya, 2020).

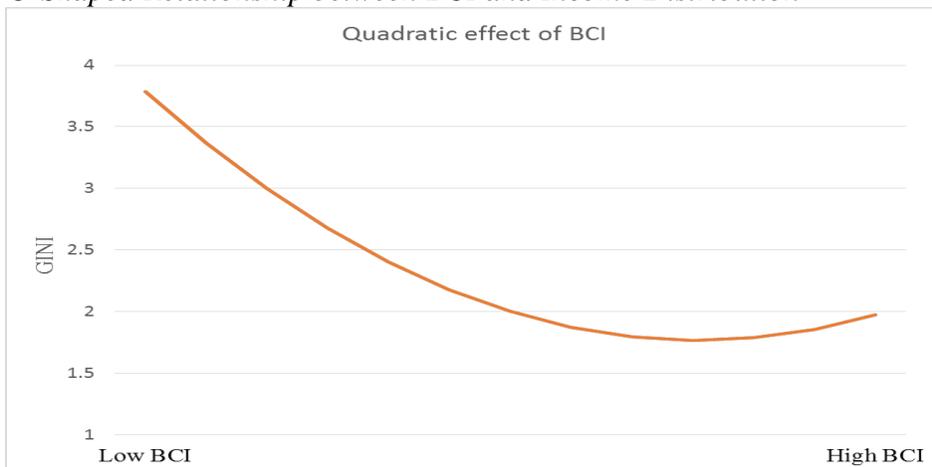
Another important independent variable used in the above model is ‘urban population’. An increase in income inequality can be observed in the short-run because competitive wages are offered to urban workers as

compared to rural workers. However, income inequality may decrease in the long-run because of highly developed urbanization. In the current study, the coefficient of urban population is negative and statistically significant, indicating that urban population decreases income inequality. Supportive arguments of an inverse relationship between urban population and income inequality are discussed by Wan et al. (2022).

The coefficient of the ‘rule of law’ in the current study enters the equation significantly with a positive sign. This indicates that developing countries are less likely to follow the rule of law which causes income inequality to increase. Bhagat (2020) found that countries with greater adherence to the rule of law confront a low level of inequality. Another study by Xu et al. (2021) supports the above finding. The relationship between trade and income inequality has been examined by many researchers. Meschi and Vivarelli (2009) found mixed empirical evidence for this relationship. However, in the current study, the coefficient of trade is statistically significant and shows a positive sign. This finding underpins a positive strand of literature on trade and income inequality. Markov Chain Monte-Carlo (MCMC) is efficient if the value lies between 0.23 and 0.45, along with a small autocorrelation. In case of multivariate posterior and distribution of proposal the optimal acceptance rate is 0.23, while in the case of univariate 0.45 is the optimal value (Gelman et al., 1997). The results of MCMC diagnostic show that the acceptance rate is .351, which is a reasonably optimal value.

### Figure 1

#### *U-Shaped Relationship between BCI and Income Distribution*



The above figure shows a U-shaped pattern between income inequality and BCI. As the latter increases, the former decreases. However, after business competitiveness reaches a certain threshold, income inequality starts to increase. Quadratic function was used because business competitiveness is reliant on the occurrence of competitiveness itself (see Arshed et al., [2019](#); Hayes, [2017](#)).

## Conclusion

A number of researchers have struggled to identify the reasons behind increasing income inequality (Zhang & Chen, [2015](#)). The current study empirically investigated the quadratic impact of business competitiveness on the distribution of income. In this regard, empirical findings of Quantile Regression for Panel Data (QRPD) imply the existence of a U-shaped pattern between business competitiveness and income inequality. Statistically, it was determined that a one-unit increase in the coefficient of business competitiveness decreases income inequality by 0.60 units in lower-middle-income economies. The results also revealed that a one-unit increase in the square term of the coefficient of business competitiveness increased income inequality by 0.39 units in lower-middle-income economies.

Furthermore, the current study found that development expenditure solely has no statistically significant effect on income inequality, unless used with the interaction term of business competitiveness. Once business competitiveness and development expenditure are used together, the impact on income inequality is negative and significant. These results are surprising and demand the attention of policymakers. Moreover, it was determined that broad money, trade, and rule of law have a positive and significant role in inequality. However, a negative and significant impact of urban population was observed. This indicates that urban population decreases income inequality.

## Policy Recommendations

This study suggests to policymakers that making businesses more competitive may bring prosperity in a country. However, it may also increase an unequal distribution of income. Policymakers must identify the threshold level and ensure that threshold level remains consistent, as more competitiveness in business brings more inequality. Hence, the study suggests that development expenditure (education and health) and business

competitiveness should be increased simultaneously to make income distribution more even. Further, policymakers must standardize the rule of law in lower-middle-income economies; otherwise, it might increase unequal distribution of income.

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**Appendix****Table 3***Fisher-ADF Unit Root Test*

Variables	I(0)	I(1)
GINI	-3.5855***	-
BC	-1.7312**	-
TRADE	-2.6462***	-
DEXP	-4.3940***	-
BM	-2.0659***	-
UPOP	-26.1418***	-
ROL	-1.7125**	-