

## **Financial Development, Economic Growth, and Income Inequality in South Asian Region: Does the Kuznets Inverted U-Shaped Curve Exist?**

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### **Abstract**

*Income inequality remains a major concern across time and nations as it affects and is affected by many other dimensions of inequality, which all affect social wellbeing negatively. Efforts for reducing inequality, therefore, have gained momentum around the globe. This study examines the financial Kuznets curve relation in six South Asian countries, using panel data over the period 1980-2018. The study explicitly accounts for interactions between GDP growth and financial development, as well as endogeneity issues. Empirical findings provide evidence for the Kuznets inverted U-shaped relationship between financial development and income inequality. Regarding the growth–inequality nexus, economic growth is found to negatively affect income inequality, hence the results do not lend support to the Kuznets inverted U-shaped hypothesis in South Asian countries. However, the interaction between economic growth and financial development in reducing income inequality is found to be significant for the sample countries. Further, the study finds that educational attainment plays a significant role in reducing income inequality, while greater trade openness intensifies inequality in these countries. The findings of the study provide insights to policymakers for framing suitable economic policies and undertaking necessary financial reforms to reduce income inequality in South Asian countries.*

**Keywords:** Economic growth, Financial development, Income inequality, Kuznets curve, South Asia

### **1. Introduction**

Sustained economic growth and development always remain vital for boosting economies and thus improving social wellbeing, which itself may be significantly restricted by inequality. Social wellbeing depends positively on the level of income per capita but negatively on the level of

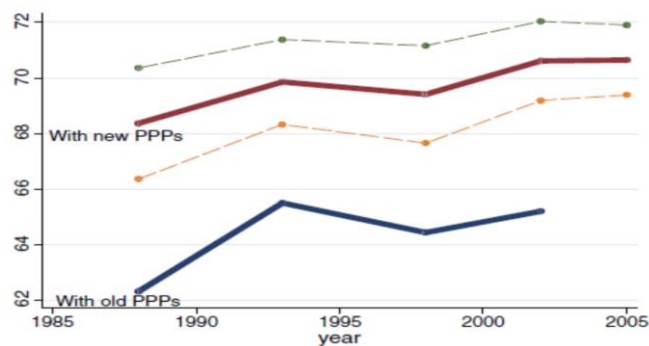
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inequality. Some might argue that there has always been a gap between rich and poor, and some level of inequality is essential to create incentives for entrepreneurs to take risks. However, it becomes a matter of great concern when the gap between rich and poor grows too wide and when economic growth delivers benefits only to the well-off (Brian, 2015). Evidence increasingly suggests that extreme income inequality not only leads to economic inefficiency, but also undermines social stability and solidarity. For example, increases in the rate of violent crime can be associated with high inequality, and numerous countries with extreme inequality, such as El Salvador and Iran, have undergone upheavals or extended civil strife that have cost countless lives and set back developmental progress by decades (Todaro & Smith, 2009).

Because of the catch-up effect, income inequality between countries around the world has been declining in recent decades, but inequality within countries reflects a mixed picture. Some nations have seen a decline in inequality, while others have seen a major rise, which may eventually affect all countries, irrespective of their level of development (see Figure 1). Hence, it is imperative to identify and describe ways that existing conditions of income distribution can be improved, or at least not deteriorate. This study examines how income distribution is affected by economic growth and financial development, focusing on the verification of the Kuznets inverted U-shaped hypothesis. The study also takes the interaction of economic growth and financial development into consideration to see how growth coupled with an advanced financial sector improves income inequality.

Figure 1: Global Inequalities with New and Old PPPs



Source: Vieira (2012)

[https://www.un.org/en/development/desa/policy/wess/wess\\_bg\\_papers/bp\\_wess2013\\_svieira1.pdf](https://www.un.org/en/development/desa/policy/wess/wess_bg_papers/bp_wess2013_svieira1.pdf)

Note: Dashed lines correspond to one-standard deviation confidence interval for the new Ginis.

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There is also an intense debate about the efficacy of financial sector development in fostering economic growth and reducing income inequality, as data from different sources show different levels and trends. Because they are assumed to help improve overall productivity and stimulate market-driven dynamics, many empirical studies focus on the important role of finance and a strong and effective financial system in promoting economic development and growth (Shaw 1973; Levine 1999; Levine et al. 2000; McKinnon 2010). In other words, a stable and well-developed financial system would undoubtedly raise the level of investment, which, in turn, would stimulate economic growth. Several studies have also explored the nexus between financial development and income inequality and suggest that strong financial sector development helps reduce income inequality (Li et al., 1998; Beck et al., 2007; Agnello & Sousa, 2012; Jalil & Feridun, 2011; Clarke et al., 2013; Hoi and Hoi, 2013; Nikoloski, 2013; Shahbaz et al., 2015; Satti et al., 2015; Zhang & Cheng, 2015).

Advocates of using financial sector development to reduce inequality argue that financial development provides individuals with cheaper credit and easier access to financial services, which helps to enhance entrepreneurial practices, thereby generating employment opportunities and enhancing society's wellbeing. Further, access to lower-cost loans provides financially vulnerable families with vital support by enabling them to invest in health and education, thus improving human capital formation in the economy and resulting in narrowing of the income gap and the alleviation of poverty (Younsi & Bechtini, 2020). However, access to the financial market requires an entry fee, which is affordable only to the people with sufficient initial financial resources and beyond the reach of the poor. Moreover, wider availability of credit allows richer people to increase their borrowing, allowing them to benefit more from investment opportunities than poorer people. In addition, since higher earners are more likely to hold shares than lower earners, they can benefit from the expansion of stock markets in terms of dividend and capital gains (Brian, 2015). Hence, a well-developed financial market will provide the rich with greater and more stable earnings, delivering a larger slice of the benefits of economic growth to a small number of high earners, which may result in widening the income gap over time. Recent evidence of rising inequality in various financially advanced economies lends support to this notion.

A sound financial system is a prerequisite for inclusive and sustainable economic development, and, in particular, it plays a key role in addressing the challenge of income inequality. An effective and potent

financial sector is also regarded as an indicator of any economy's healthy macroeconomic performance. Indeed, it plays a vital role in expanding trade and industry, thereby improving a country's overall economy. Several studies, however, indicate that if finance does not grow via bank lending but rather expands via market-based financing, income inequality may rise, because imperfection in the financial sector creates distortions in income distribution by supporting entrepreneurs and impairing lenders through its effect of reducing the rental rate of capital (Mookherjee & Ray, 2003; Adnan Hye & Islam, 2013; Daisaka et al., 2014; Satti et al., 2015; Brei et al., 2018). In addition, it has been argued that high inequality weakens an economy's resilience and increases economic uncertainty (Stiglitz 2015).

There are many strategies to combat income inequality, one of which is to foster the growth and development of the financial sector, as along with other benefits it plays a key role in channeling private savings into investment. This study investigates the effects of financial sector development and growth on the reduction of income inequality, and tests the Kuznets hypothesis, which suggests an inverted U-shaped correlation between economic growth and income inequality and between financial development and income inequality. Specifically, this paper seeks to identify whether economic growth leads to a more equitable redistributive system of social welfare or makes the polarization of income levels more acute. It also explores whether these impacts vary across countries based on their level of development. To this end, this research uses annual panel data for six countries in South Asia (SA) covering the period 1980-2018.

Every region has regional and country-specific characteristics that differ from other regions, and SA is no exception. Even in the face of many obstructions, such as conflict, ethnic tension, corruption, and high fiscal deficits, SA has achieved impressive economic growth and poverty reduction in the past decade, thanks mainly to economic and financial reforms in the 1990s (Devarajan, & Nabi, 2006). According to the World Bank press release on April 7, 2019

(<https://www.worldbank.org/en/news/press-release/2019/04/07/south-asia-needs-more-exports-to-maintain-growth>), this region holds the top position as the world's fastest growing region, with economic growth set to rise to 7.0% in 2019, then 7.1% in 2020 and 2021. Hence, this investigation is called for to examine if this economic performance follows Kuznets' proposition in affecting income distribution. The study contributes to the

literature by applying various novel techniques, time spans, and regressor portfolios compared to previous research.

The paper is organized as follows: section 2 reviews literature on the nexus among economic development, financial development, and income inequality; section 3 describes data sources and the methodology used in the paper; section 4 presents the empirical results; and section 5 offers conclusions and policy recommendations.

## **2. Literature Review**

The survey of literature conducted in this study is presented in two sub-sections. In sub-section 2.1, literature investigating the relationship between economic growth and income inequality through cross-country studies are reviewed, which is followed by sub-section 2.2, where studies assessing the impact of financial sector development on the reduction of income inequality are surveyed.

### ***2.1 Effect of Economic Growth on Income Inequality***

The connection between economic growth and income inequality has been widely discussed in the extant literature. According to the utilitarian view, income inequality and economic growth must coexist to increase social wellbeing. This contrasts sharply with the egalitarian view that all members of society should have equal access to economic resources in terms of economic power, wealth and contributions. The Kuznets inverted U-shaped hypothesis is the leading theory describing the relationship between economic growth and income inequality. Kuznets (1955) argued that during early stages of economic development, until reaching a threshold, economic growth aggravates income inequality, and then improves it in advanced stages of economic development. This hypothesis has been tested over the last few decades and it remains debated as a number of empirical studies have validated it (e.g., Ahluwalia, 1976; Papanek & Kyn, 1986; Deininger & Squire, 1996) while others have uncovered some inconsistencies. Piketty and Saez (2003), for instance, found that income inequality in the USA remained stable until the 1970s and then began to increase as earnings increased, which can be termed as the great U-turn. Moreover, the IMF (2007) found that income inequality is worsening in most economically advanced countries relative to less advanced countries.

The OECD (2015), however, identified a strong negative relationship between income inequality and economic growth in OECD countries. Shahbaz and Islam (2011) found that economic growth worsened

income distribution in Pakistan during 1971-2005, contrary to the Kuznets hypothesis. Herzer and Vollmer (2012) studied 46 developed and developing countries over 1970-1995 and observed a negative linear relationship between income inequality and economic growth. A study by Stewart and Moslares (2012) on Indian states lent similar support for a negative relationship between inequality and economic growth. Delbianco et al. (2014) studied the income inequality–economic growth nexus in Latin America and found that income inequality worsens economic growth, but that each country’s development dampens this effect. An inverted U-shaped relationship between per capita income and income inequality in Asian economies has been identified in the findings of Park and Shin (2017). Shahbaz et al. (2015) found that economic growth and development in Kazakhstan during 1991-2011 worsened income inequality. Furthermore, their results indicated that financial growth decreases inequality, whereas inflation and trade openness increase inequality in income distribution.

## ***2.2 Effect of Financial Development on Income Inequality***

The role of financial development on economic growth has been at the forefront of academic debate over the years, but its effect on income inequality still leaves much room for debate. There is a growing body of literature empirically examining how financial development influences the distribution of income, a number of which (e.g. Roine et al., 2009; Clarke et al., 2006; Jauch & Watzka, 2016; de Haan & Sturm, 2017; and Maldonado, 2017) have suggested a significant positive impact, while others (e.g. Beck et al., 2007 and Zhang & Naceur et al., 2019) reported opposing results. Focusing on the role of human capital accumulation, Galor and Zeira (1993) and Galor and Moav (2004) examined the financial development–inequality nexus and found that wider access to financial intermediaries allows vulnerable families to borrow money to invest in profitable ventures. According to Greenwood and Jovanovic (1990), on the other hand, the development of the formal financial sector may be more advantageous for the wealthy.

Over the period 1960-1995, Clarke et al. (2006) analyzed the effect of financial development on income inequality in 83 nations and found that financial development substantially reduces income inequality. Using private credit to GDP ratio as a proxy for financial development, Beck et al. (2007) suggested that income inequality and poverty decline more rapidly in countries with a well-developed financial system. Their findings further indicate that about 40 percent of the long-term influence of financial

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development on the poorest quintile's income growth is due to the decrease in income disparity, while 60 percent is due to the effect of financial development on overall economic growth. Rehman et al. (2008) surveyed 51 countries at different levels of economic growth and found that financial development decreases income inequality, and hence their empirical results do not support the Kuznets hypothesis. Ang (2010) found that, in India, a developed financial sector substantially reduces income inequality. Sehrawat and Giri (2014) found, on the other hand, that financial development worsens income distribution and widens the gap between rich and poor. Batuo et al. (2010) examined the inverted U-shaped hypothesis regarding the financial development–income inequality nexus in African countries and failed to find any evidence supporting it. Jalil and Feridun (2011) identified that in China, financial development substantially reduces income inequality. Shahbaz and Islam (2011) found that, in Pakistan, global and domestic financial development both lower income inequality, while economic growth in Pakistan worsens the distribution of income.

Hoi and Hoi (2013) tested the Kuznets hypothesis on the relationship between financial development and income inequality in Vietnam over the period 2002–2008 and did not find any evidence supporting it. For both developing and developed countries, Nikoloski (2013) investigated the relationships between financial development and income inequality and found clear evidence in favour of the inverted U-shaped hypothesis, which confirms the theoretical stipulations of Greenwood and Javanovic (1990). Baligh and Pirae (2012) and Shahbaz et al. (2015) have shown that financial development considerably improves income distribution in Iran; they also found evidence supporting the inverted U-shaped hypothesis of Greenwood and Javanovic (1990). However, for Malaysia, Law and Tan (2009) and Mansur and Azleen (2017) did not identify any significant impact of financial development on income inequality.

A growing body of theoretical and empirical research examines the nexus between economic growth and income inequality as well as between financial development and inequality, but findings regarding the nature and direction of causality are not consistent. To the best of the researcher's knowledge, to date there is a dearth of research exploring the causal relationship between economic growth, financial development, and income inequality in the SA region. This research aims to fill that gap. In addition, compared to other studies, this research also contributes to the literature by using an extended time period and a different portfolio of regressors.

### **3 Methodology**

#### ***3.1 Data and Methods***

The data set employed in this study is a balanced panel covering the period from 1980 to 2018 and consisting of six SA countries<sup>2</sup>, namely Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. The data used were obtained primarily from the World Bank database (WDI series). Data on the Gini coefficient, per capita GDP growth, domestic credit to private sector (DCPS), broad money to GDP ratio (M2), education, and trade openness were taken from the World Bank's World Development Indicators (WDI) online database (<http://data.worldbank.org/indicator>), while the financial development index was collected from IMF database (<https://data.imf.org/?sk=f8032e80-b36c-43b1-ac26-493c5b1cd33b>).

Where applicable (e.g., for national income accounts data), data were converted into 2010 constant dollars.

Regression analysis was conducted using standard panel data techniques. Panel data typically provide the researcher with a large number of data points, increasing the degrees of freedom and reducing the collinearity between explanatory variables, thereby improving the effectiveness of econometric estimates (Hsiao, 2014). According to Somayeh et al. (2014), working with panel data provides the researcher with more information, greater validity, less collinearity, and higher efficiency, and can better reflect dynamics of change (e.g., matching or correction). Panel data models also enable controlling for unobserved country-specific effects, thus reducing biases in estimation (Eggoh et al., 2015). The study also runs a panel Granger causality test with a view to investigating the pattern of causality among economic growth, financial development, and income inequality.

#### ***3.2 Description of Variables***

The outcome variable considered in this study is inequality in income distribution. There are many measures of inequality, and the most widely used measure of inequality is the Gini coefficient, which ranges from 0 (perfect equality) to 1 (perfect inequality, one individual has everything) but is typically in the range of 0.3 to 0.5 for per capita consumption expenditures (Haughton & Khandker, 2009). This study empirically examines the inverted U-shaped financial Kuznets curve relation, and the

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<sup>2</sup> Afghanistan and Maldives are excluded from the empirical analysis because of severe data deficiency.



variables of interest are GDP growth rate and financial development. To validate the Kuznets curve relation for this study, the researcher expects the coefficients of GDP growth and financial development to be positive and the coefficient of their squared terms to be negative. Following current economic theory and literature, the study incorporates three controls, namely education, trade openness, and an interaction term that shows how GDP growth and financial development reinforce each other in affecting income distribution. The study expects education and the economic growth–financial development nexus to decrease inequality, and trade openness to increase it.

Although financial development plays key roles in the performance of any economy, it is a qualitative attribute that needs to be quantified. In doing so, some researchers (e.g., Ahmed, 2007; Bittencourt, 2010; Hye, 2011) have used various proxies of financial development, such as domestic credit provided by financial sector (DCPF), domestic credit to private sector (DCPS), broad money (M2, a measure of financial deepening), and stock market capitalization (SMC), while others (e.g., Batuo et al., 2010; Adnan Hye & Islam 2013) have used a composite financial development (FD) index that is constructed by performing a principal component analysis (PCA) of the major measures of financial development. The novelty of this study is that it uses both approaches. However, because of a severe paucity of data on DCPF and SMC in the sample countries they were dropped from the analysis.

### ***3.3 Econometric Model***

In this paper, the researcher examines the presence of a Kuznets inverted U-shaped relation between economic growth and income inequality as well as financial development and income inequality in SA countries, while controlling for other relevant variables. In doing so, the panel data approach to the income inequality regression is applied, which can be written as follows:

$$y_{it} = X_{itj}\beta_j + (a_i + e_{it}) \quad (1)$$

Here  $y_{it}$  denotes the Gini coefficient, one of the most popular measures of income distribution (Clarke et al., 2006; Jauch & Watzka, 2016; Maldonado, 2017; de Haan & Sturm, 2017; and Zhang & Naceur, 2019).  $X_{it}$  refers to the time-variant  $1 \times j$  regressor vector, which includes GDP growth rate, GDP growth rate squared, financial development, financial development squared, and other controls, such as education, trade openness

and the interaction between GDP growth and financial development, as they might influence income inequality and help avoid omitted variable biases (Maldonado, 2017).  $(a_i + e_{it})$  is the composite error term, where  $a_i$  denotes time-invariant unobserved heterogeneity (country-specific effects) and  $e_{it}$  represents idiosyncratic error, or time-varying unobserved heterogeneity. Finally, the subscripts  $i$  and  $t$  index cross-sectional units and time periods respectively, while  $j$  indicates the number of variables.

The problem of endogeneity is one of the major difficulties in estimating growth-inequality relations. The researcher suspects endogeneity between income inequality and a subset of explanatory variables that might stem from a simultaneity problem. That is, a reverse causality from inequality to GDP growth may also be possible. For example, Zhang and Naceur (2019) argued that a smaller poverty gap or less income inequality could promote economic growth. A common remedy for this problem is to apply the ‘two stage least square’ (2SLS) regression. However, many researchers (e.g. Jauch & Watzka, 2016) consider this technique not ideal for dealing with simultaneity problems. Alternatively, lagged values for relevant regressors can be introduced, since their past values cannot be affected by the current level of income distribution. This study has adopted the latter approach.

Regarding appropriate model selection, the study ran the Hausman (1978) specification test to determine if the random effects (RE) model is more efficient than the fixed effects (FE) model, finding evidence in favour of the latter (see Table 2). In addition, if unobserved country-specific characteristics, such as culture, political system, ethnicity, or initial level of GDP (individual error component  $a_i$ ) are correlated with the observed characteristics of the model (one or more regressors), then the RE estimators are biased, whereas those obtained from the FE model are unbiased (Gujarati, 2009; p 650).

## **4 Empirical Findings**

### ***4.1 Descriptive Statistics***

Table 1 reports the key summary statistics of the main variables of interest for SA countries for the period 1980–2018. It is worth noting that the sample countries demonstrate wide variation in terms of their income disparity and financial development measures. Bhutan has the highest average Gini coefficient (40.33%) while Bangladesh has the lowest value (31.37%), with a standard deviation of 2.32. With regard to coefficient of variation (CV), Sri Lanka shows the highest value (0.08), indicating a higher degree of

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dispersion between income quantiles, whereas Pakistan shows the lowest value (0.03), indicating a more precise estimate. The highest average per capita GDP growth rate (5.72) is recorded in Bhutan and the lowest in Pakistan (2.19), with a standard deviation of 1.84. Nepal is the most volatile country in terms of GDP growth (CV = 0.98), while India shows the lowest volatility in this regard. For the financial development measures, India shows the highest means of FD (0.38), DCPS (34.24% of GDP), and M2 (56.41% of GDP), while the lowest FD (0.14), DCPS (19.91 % of GDP), and M2 (37.66% of GDP) are found in Nepal, Bhutan, and Bangladesh, respectively. Comparison among these countries shows that Bhutan is the most volatile country in terms of FD (0.29) and DCPS (0.88), and Nepal for M2 (0.48). Regarding trade openness, Bhutan has the highest measure (83.62) and Bangladesh the lowest (29.40), with a standard deviation of 9.86. Finally, with regard to education, Sri Lanka's secondary school enrollment is very high (85.53) compared to other SA nations, while the lowest figure (26.75) in this region is reported for Pakistan.

**Table 1 Descriptive Statistics**

| Country    | Statistics | Gini  | GDP growth | DCPS  | FD   | M2    | Education | Ttrade openness |
|------------|------------|-------|------------|-------|------|-------|-----------|-----------------|
| Bangladesh | Mean       | 31.37 | 3.12       | 25.00 | 0.19 | 37.66 | 39.08     | 29.40           |
|            | SD         | 2.32  | 2.03       | 12.82 | 0.04 | 17.70 | 18.21     | 9.86            |
|            | CV         | 0.07  | 0.65       | 0.51  | 0.21 | 0.47  | 0.47      | 0.34            |
| Bhutan     | Mean       | 40.33 | 5.72       | 19.91 | 0.14 | 43.81 | 36.74     | 83.62           |
|            | SD         | 1.52  | 4.53       | 17.45 | 0.04 | 20.30 | 26.81     | 18.75           |
|            | CV         | 0.04  | 0.79       | 0.88  | 0.29 | 0.46  | 0.73      | 0.22            |
| India      | Mean       | 33.67 | 4.31       | 34.24 | 0.38 | 56.41 | 49.89     | 29.69           |
|            | SD         | 1.34  | 2.04       | 11.61 | 0.06 | 15.99 | 13.91     | 14.75           |
|            | CV         | 0.04  | 0.47       | 0.34  | 0.16 | 0.28  | 0.28      | 0.50            |
| Sri Lanka  | Mean       | 36.18 | 3.96       | 27.35 | 0.22 | 37.97 | 85.53     | 67.32           |
|            | SD         | 3.01  | 2.07       | 10.02 | 0.05 | 8.18  | 14.40     | 12.15           |
|            | CV         | 0.08  | 0.52       | 0.37  | 0.23 | 0.22  | 0.17      | 0.18            |
| Nepal      | Mean       | 37.61 | 2.69       | 31.79 | 0.14 | 52.79 | 42.46     | 44.37           |
|            | SD         | 1.82  | 2.64       | 22.81 | 0.03 | 25.60 | 14.79     | 9.65            |
|            | CV         | 0.05  | 0.98       | 0.72  | 0.21 | 0.48  | 0.35      | 0.22            |
| Pakistan   | Mean       | 31.75 | 2.19       | 23.02 | 0.25 | 46.28 | 26.75     | 32.64           |
|            | SD         | 1.07  | 1.84       | 3.92  | 0.06 | 6.47  | 7.42      | 3.51            |
|            | CV         | 0.03  | 0.84       | 0.17  | 0.24 | 0.14  | 0.28      | 0.11            |

Source: Authors' calculation based on WDI and IMF database

Note: *SD* = standard deviation and *CV* = coefficient of variation

#### 4.2 Regression Results

Table 2 reports the regression results of FE models. Considering different proxies for financial development, such as M2, DCPS, and FD, three alternative models have been estimated that measure the static effects of economic growth and financial development on income inequality. Although GDP growth is not found significant in Model 1, it is found to significantly and positively affect income inequality in the other two specifications, where DCPS and M2 have been used. However, the coefficient of its squared term is not found to be significant in any of the three specifications, thus contradicting the Kuznets hypothesis regarding the growth–income nexus for SA economies.

**Table 2: Regression of Income Inequality**

| Regressors                    | Model 1                | Model 2                | Model 3                |
|-------------------------------|------------------------|------------------------|------------------------|
| Gr (lagged 1 year)            | -0.12145<br>(0.1147)   | 1.5487***<br>(0.3092)  | 2.1641***<br>(0.3894)  |
| Gr-squared                    | 0.0016<br>(0.0042)     | -0.0207<br>(0.0143)    | -0.0143<br>(0.0156)    |
| FDI                           | 0.8677***<br>(0.0427)  |                        |                        |
| FDI-Squared                   | -0.0022**<br>(0.0011)  |                        |                        |
| Gr×FDI                        | 0.9938**<br>(0.4352)   |                        |                        |
| DCPS                          |                        | 0.6718***<br>(0.0651)  |                        |
| DCPS-squared                  |                        | -0.0104***<br>(0.0021) |                        |
| Gr×DCPS                       |                        | -0.0851***<br>(0.0066) |                        |
| M2                            |                        |                        | -0.0480<br>(0.1640)    |
| M2-squared                    |                        |                        | 0.0006<br>(0.0021)     |
| Gr×M2                         |                        |                        | -0.0614***<br>(0.0062) |
| Education                     | -0.0536***<br>(0.0159) | -0.4271***<br>(0.0514) | -0.3073***<br>(0.0526) |
| Trade Openness                | -0.0261**<br>(0.0122)  | 0.1931***<br>(0.0353)  | 0.3761***<br>(0.0385)  |
| Constant                      | 35.3094***<br>(0.5627) | 22.6284***<br>(1.7285) | 17.7468***<br>(2.5303) |
| F(7,215)                      | 1212.28***             | 84.37***               | 64.79***               |
| Hausman: Chi <sup>2</sup> (7) | 295.80***              | 31.33***               | 177.15***              |

Note: Gr = GDP Growth, FDI = Financial Development Index, DCPS = Domestic credit to private sector by banks (% of GDP), M2 = Broad money (% of GDP)

Figures in the parentheses indicate standard errors.

\*, \*\*, and \*\*\* imply 10%, 5%, and 1% level of significance, respectively.

However, the study finds that financial development proxies in Models 1 and 2 (FD and DCPS) have a positive and significant impact on income inequality, while their squared terms exert a significant negative impact on income inequality, validating the relation suggested by the Kuznets' hypothesis. This indicates that, eventually, financial development can help to reduce income inequality for SA countries. The findings further indicate that a sound and well-developed financial system is critical for addressing income inequality and fostering growth by increasing the availability of financial services to the poor to fund their capital investments.

Further, education has a negative and statistically significant impact on income inequality in all specifications, indicating that the spread of literacy in SA countries leads to reducing income inequality. Similarly, trade openness is found to have a statistically significant positive impact on income inequality in Models 2 and 3, while it is negative in Model 1. The findings suggest that although the interplay between trade openness and technology transfer may comprise an important mechanism leading to an increase in income differentials in liberalizing developing countries (Meschi & Vivarelli, 2009), the larger trade openness, especially when it is due to imports exceeding exports (Mahesh, 2016), is not favourable for mitigating income inequality in less developed countries like the SA nations studied here. Finally, the results indicate that the interactions between GDP growth and financial development proxies have significant negative impacts on income inequality in all specifications, suggesting that economic growth, when accompanied by a well-developed financial system, helps reduce income inequality.

#### **4.3 Granger Causality Analysis**

This section uses the panel Granger causality test to investigate the pattern of causality among economic growth, financial development, and income inequality. This test, first proposed by Granger (1969), is a way to assess whether one time series is useful in predicting another. Following the *ad hoc* selection technique for lag length in Granger causality testing, which is argued to be preferable to other statistical approaches for selecting ideal lag length (Jones, 1989), the causality analysis of the income inequality equations is performed on lag one.

**Table 3: Panel Granger Causality Test Results**

| Null Hypothesis                                   | Z-bar tilde | Probability |
|---|-------------|-------------|
| Gini does not Granger-cause growth. (Rejected)    | 3.3074      | 0.0009      |
| Growth does not Granger-cause Gini.               | 0.3544      | 0.7230      |
| Gini does not Granger-cause FD. (Rejected)        | 1.9381      | 0.0526      |
| FD does not Granger-cause Gini.                   | 1.6572      | 0.0975      |
| Gini does not Granger-cause DCPS (Rejected)       | 8.8623      | 0.0000      |
| DCPS does not Granger-cause Gini.                 | -0.9037     | 0.3661      |
| Gini does not Granger-cause M2.                   | -0.9005     | 0.3679      |
| M2 does not Granger-cause Gini. (Rejected)        | 3.7742      | 0.0002      |
| Gini does not Granger-cause education. (Rejected) | 4.1750      | 0.0000      |
| Education does not Granger-cause Gini. (Rejected) | 2.5489      | 0.0108      |
| Gini does not Granger-cause openness.             | 0.3466      | 0.7289      |
| Openness does not Granger-cause Gini.             | 1.7974      | 0.0723      |

Source: Authors' estimation using STATA. The lag length of all variables is 1

The findings of the Granger causality test are presented in Table 3. The results confirm that there is a unidirectional causality running only from M2 (a proxy of financial deepening, used in this study as a proxy of financial development) to income inequality. On the other hand, bidirectional causality is observed running between education and income inequality, suggesting that education and income inequality both significantly affect each other. The findings also confirm that there is a unidirectional causal relationship between economic growth and income inequality as well as between DCPS (another proxy of financial development) and income inequality, with causality running from income inequality to economic growth and DCPS respectively, indicating that income inequality and DCPS negatively affect economic growth in SA countries.

### 5 Conclusions and Policy Implications

The occurrence of simultaneous increases in economic growth, financial development, and income inequality worldwide has motivated researchers to investigate the phenomenon more extensively. This paper reinforces the literature on income inequality by analyzing the relationships among economic growth, financial development, and income inequality in SA countries. To this end, the study used panel data on six SA countries over the period 1980-2018.

Although GDP growth is found to raise income inequality, the empirical findings of this study do not provide any evidence in favour of the Kuznets inverted U-shaped relationship between GDP growth and income inequality. In the case of the financial development–inequality nexus in SA countries, however, the results of this study support the

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Kuznets hypothesis. Findings also suggest an interconnection between economic development and financial development in affecting income inequality, implying that although growing incomes may not directly contribute to reducing inequality, in combination with financial development it does alleviate income inequality. Further, while increased trade openness worsens equitable income distribution, a rise in school enrollment improves it.

The Granger causality test found a unidirectional causality running from M2 to income inequality, which suggests that policymakers should pay attention to financial deepening to address the issue of income inequality. On the other hand, income inequality causes both economic growth and DCPS with no reverse causality, suggesting that without reducing income inequality growth in SA will not be sustainable. However, there is a bidirectional causality between education and income inequality in SA, suggesting that education and income inequality both significantly affect each other.

The key findings of the paper suggest several policy recommendations for fighting income inequality in SA countries. First, policymakers must formulate an appropriate mix of fiscal policies to ensure inclusive growth so that the fruits of economic growth do not concentrate. Fiscal redistribution is much weaker in developing economies, especially in SA countries; therefore, a truly progressive taxation structure can help reduce income inequality. Second, as a well-developed financial system facilitates increased access to economic resources, which in turn promotes inclusive growth, policymakers should focus on reforms necessary to speed the process of financial development. Third, efforts should be directed at altering the mix of trade so that increased trade openness encourages more export than import. Finally, more public spending should be channeled towards universal access to education.

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