ADBI Working Paper Series

IMPACT OF MACROECONOMIC FACTORS ON INCOME INEQUALITY AND INCOME DISTRIBUTION IN ASIAN COUNTRIES

N. P. Ravindra Deyshappriya

No. 696
March 2017

Asian Development Bank Institute

N.P.Ravindra Deyshappriya is research director at the Lakshman Kadirgamar Institute of International Relations and Strategic Studies, Sri Lanka.

Suggested citation:

Deyshappriya, N. P. R. 2017. Impact of Macroeconomic Factors on Income Inequality and Income Distribution in Asian Countries. ADBI Working Paper 696. Tokyo: Asian Development Bank Institute. Available: https://www.adb.org/publications/impact-macroeconomic-factors-income-inequality-distribution

Please contact the authors for information about this paper.

Email: ravipdn@yahoo.com, ravindra@lki.lk

This paper arises from research conducted at the Centre for Poverty Analysis during 2015–2016. The author acknowledges both institutions for their support and guidance. The views expressed in this paper are solely those of the author and do not necessarily reflect those of any of the institutions he is affiliated with.

Asian Development Bank Institute
Kasumigaseki Building, 8th Floor
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

Abstract

This study examines the macroeconomic determinants of income inequality using dynamic panel data analysis. Specifically, the study employs dynamic panel data analysis based on the generalized method of moments over 1990–2013 across 33 Asian countries. The World Bank data series was widely used as data for macroeconomic variables while the Gini index was collected from the World Income Inequality Database. In addition to the macroeconomic factors, the study incorporates a series of political economic and demographic factors to provide more realistic estimates. The study found an inverted U-shaped (parabolic) relationship between gross domestic product (GDP) and inequality, supporting the well-known concept, the Kuznets curve. Apart from that, official development assistance (ODA), education, and labor force participation reduce inequality while higher inflation, political risk, terms of trade, and unemployment increase inequality in Asian countries.

The study further observed that an initial increase in GDP redistributes income from the bottom 20% of people to the middle class and richest groups. However, further increases in GDP redistribute the income from the top 20% to middle-income and poor groups. Similarly, inflation, unemployment, terms of trade, and ODA are also significant factors of income distribution among Asian countries. This study recommends ensuring higher and steady long-term economic growth, and enhanced access to education and employment while maintaining price stability and political stability to sustain more equal income distribution followed by lower-income inequality in the region.

JEL Classification: D63, D33

Contents

1. INTRODUCTION

Income inequality, which adversely affects the living standard of people, is a multifaceted issue that is deeply rooted in most of the Asian countries. Consequently, countries such as the People's Republic of China (PRC) and India are still labeled "developing" countries, despite their significantly high economic growth. This scenario further heated the discussion on growth and equity, focusing more on the concepts of inclusive growth and shared prosperity. Apart from its dramatic growth process, the poverty reduction mechanism in Asia has achieved remarkable levels, more than any other region in the world. However, income disparity is considerably higher and the majority of people live in countries with relatively high inequality. Furthermore, as Alesina and Perotti (1996) and Persson and Tebellini (1994) indicated, inequality considerably slows down the overall economic growth as existence of inequality restricts utilizing available resources equally and efficiently. In turn, inequality reduces the pace at which growth translates into poverty reduction as well (Bourguignon 2004; Kakwani 1993). Thus, Asian countries would have achieved much progress in growth and poverty reduction than they have achieved now had inequality 'been lower.

According to empirical investigations, factors that drive Asia's accelerated economic growth have themselves caused inequality. According to Zhuang et al. (2014), technological improvements, market-oriented reforms, and globalization are the key forces that accelerated growth especially in developing Asia. However, Zhuang et al. (2014) further explained that these drivers increase inequality by widening the gap between owners of capital and laborers, skilled and unskilled workers, and urban and rural sectors. In fact, policy makers and government authorities cannot restrict these three drivers to reduce inequality, as they are the key determinants of higher productivity. Apart from that, weaknesses of fiscal policy, particularly in tax structure, also cause growing inequality in the region. The tax systems of most of the countries in the region depend highly on consumption taxes, which place large burdens on low- and middle-income groups. Similarly, the tax system is likely to concentrate the wealth of higher-income groups, as the taxes are highly partial to labor income rather than capital gain and properties. Additionally, unequal access to basic services—education, health and finance, institutional weaknesses, and social exclusion due to religion and cultural factors are also crucial in explaining regional inequality in Asia.

In fact, the available scholarly works that specifically address the link between macroeconomic factors and inequality are very limited in economic literature. Similarly, even existing studies have ended with mixed findings—therefore, there is no consensus on the relationship between macro factors and inequality. Specifically, Kuznets (1955) highlighted the parabolic relationship between income and inequality by introducing the well-known concept called the Kuznets Curve, which is argued by Bruno et al. (1996), Fishlow (1995), and Deininger and Squire (1997), and which highlights that there is no significant relationship between income and inequality. Similarly, some studies have considered the impacts of only very limited macroeconomic factors such as inflation, exchange rate (Bulir and Gulde 1995), and government debt (You and Dutt 1996). Apart from that, most studies are based on individual countries (Cole and Towe 1996; Razin and Sadka 1996) or a small group of countries by applying conventional time-series or cross-sectional methods. Hence, the mentioned weaknesses attached to existing literature highlight the gaps, which appropriate scholarly works should fill.

The main objective of the current study is to examine the determinants of income inequality in Asian countries, highlighting the impacts of macroeconomic factors.

Specifically, the study quantifies the impact of macroeconomic factors on income inequality and also on the income share of each income quantile. Apart from the macroeconomic factors, political economy variables and demographic variables are also considered to provide more realistic and appropriate policy recommendations. The current study analyzes the situation of 33 Asian countries over 1990–2013 in a dynamic panel data setting. The applied dynamic longitudinal method essentially overcomes econometric issues attached to time-series and cross-country analysis; in turn, the current study expects to provide more methodologically solid empirical findings. The next sections of the study expounds on trends of inequality in Asia, reviews of existing empirical studies, methodology and model specification, and results and discussion, followed by the conclusion and recommendations.

2. TRENDS IN INCOME INEQUALITY IN ASIA

This section describes the recent trends in inequality in Asia based on the Gini coefficient during the past 2 decades. Table 1 summarizes the average Gini coefficient, which was calculated using all available data points during 1980–2013 for 33 Asian countries. In the 1980s, the highest averaged Gini was recorded in Malaysia (48.1) followed by Turkey (46.6). Similarly, the Maldives (63.3) and Singapore (47.1) account for the highest inequality in the 1990s and 2000s, respectively. Apart from that, the average Gini coefficient in Asia increased from 34.5 in the 1980s to 38.8 by the 1990s, but it plunged slightly to 38.3 by the 2000s. In the 2000s, the inequality of 16 countries out of the selected 33 Asian countries is higher than the average inequality of the Asian region (38.3).

Table 1: Trend in Income Inequality of Asian Countries from 1980 to 2000

	Average Gini Index				Average Gini Index		
Country	**1980s**	**1990s**	**2000s**	**Country**	**1980s**	**1990s**	**2000s**
Asia (Avg)	**34.5**	**38.8**	**38.3**	**Asia (Avg)**	**34.5**	**38.8**	**38.3**
Armenia	26.7	42.1	41.3	Malaysia	48.1	46.9	44.2
Azerbaijan	29.1	42.5	41.3	Maldives	–	63.3	37.8
Bangladesh	32.1	36.1	40.6	Mongolia	–	31.9	34.0
Cambodia	–	40.3	40.0	Nepal	38.0	43.3	41.3
PRC	24.0	30.5	41.3	Pakistan	32.9	32.0	31.0
Cyprus	–	29.0	28.8	Philippines	43.1	45.5	45.6
Georgia	28.3	41.5	41.5	Russian Federation	26.0	40.8	42.3
India	32.1	32.2	39.2	Singapore	42.9	44.6	47.1
Indonesia	32.2	32.8	36.8	Sri Lanka	39.9	39.1	43.4
Iran	45.2	43.4	35.7	Tajikistan	28.5	36.9	32.6
Israel	39.5	39.5	41.6	Thailand	45.4	47.2	42.1
Japan	30.4	31.4	37.0	Turkey	46.6	46.4	40.7
Jordan	35.4	40.7	37.4	Turkmenistan	–	27.6	30.2
Kazakhstan	27.5	38.6	33.0	Uzbekistan	27.7	36.7	37.6
Korea, Republic of	35.4	33.7	32.4	Viet Nam	–	35.2	36.0
Latvia	25.0	31.9	35.6	Yemen	–	31.6	37.7
Lebanon	–	43.5	37.0				

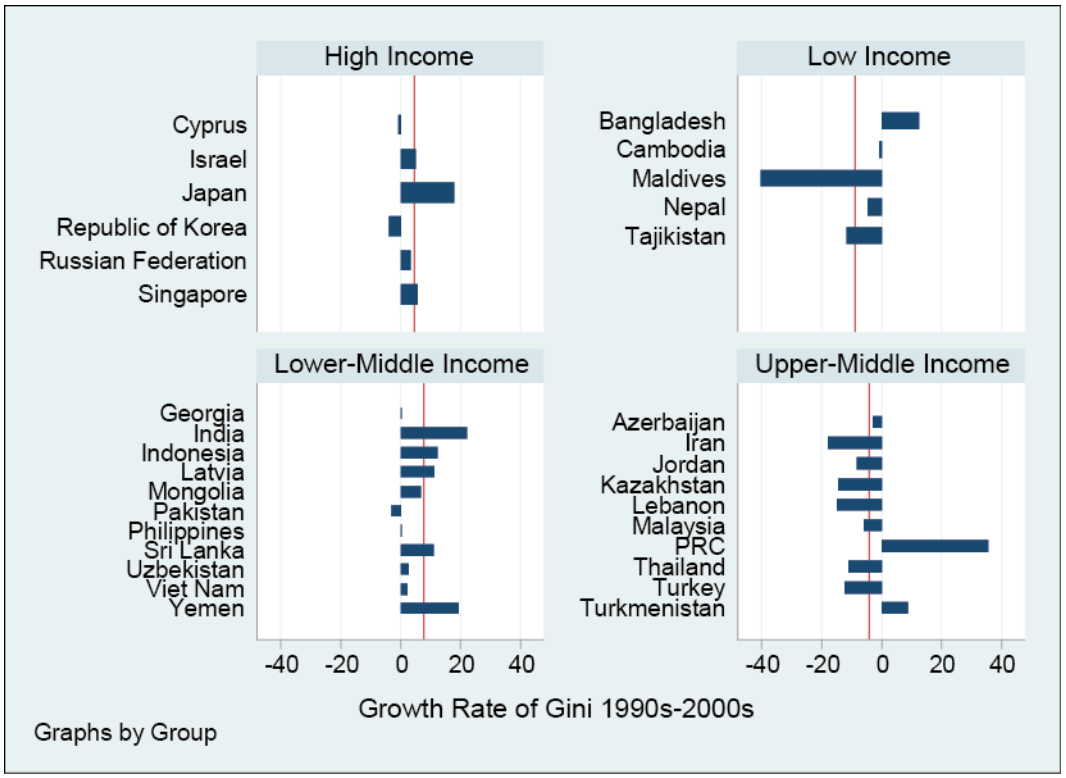
– = Not available, Avg = average, PRC = People's Republic of China.

Note: The average Gini index was calculated using all available data points during 1980–2013.

Source: Calculated by the author based on the United Nations University World Institute for Development Economics Research (UNU-WIDER), World Income Inequality Database.

There are three inequality patterns that can be identified in Table 1. First, there are some countries, such as Japan, the Russian Federation, Israel, Singapore, Sri Lanka, the PRC, India, Latvia, Bangladesh, and Indonesia, in which the level of inequality has been increasing over time. Specifically, most of the high-income countries in Asia, such as Japan, Singapore, the Russian Federation, and Israel also account for increasing income inequality. Second, the inequality level of some other countries—Iran, the Republic of Korea, Malaysia, Turkey, and Pakistan—has been declining continuously over the past 2 decades. Third, inequality in the rest of the countries in Table 1 reached a peak during the 1990s and has been declining since.

Figure 1: Average Growth Rate of Gini Index (1990s–2000s) of Asian Countries by per Capita GDP Classification



PRC = People's Republic of China, GDP = gross domestic product.

Source: Calculated by the author based on the United Nations University World Institute for Development Economics Research, The World Income Inequality Database.

Figure 1 depicts the rate of change of the Gini coefficient of Asian countries during 1990–2000 and the figure further categorizes these countries into four groups—high income, low income, lower-middle income, and upper-middle income—based on the per capita income of each country. The calculated average growth rates of the Gini index (shown by reference lines in each graph) for high-income, low-income, lower-middle income, and upper-middle-income countries are 4.6%, –8.9%, 7.7%, and –4.2%, respectively. Thus, it is apparent that lower-middle-income countries accounted for a relatively high inequality growth rate followed by high-income countries during 1990–2000. Particularly, within the group of lower-middle-income countries, India (23.0%), Yemen (19.4%), and Indonesia (12.4%) have the fastest growing Gini indexes, respectively. Furthermore, within the group of higher-income countries, Japan (17.9%) has the highest Gini growth rate, while the Republic of Korea (–3.9%) has the least. The majority of the upper-middle-income countries have a negative growth rate

of the Gini index, indicating the possibility of having a more equal income distribution in the future. However, the PRC (35.7%), which accounted for the highest Gini growth rate across the region, can be considered an outlier within and among the group(s). In contrast, inequality in the Maldives has dropped by 40% during 1990–2000, although inequality in the Maldives is considerably higher. Overall, inequality has become a critical issue that hinders the effectiveness of growth and poverty reduction policies of Asian countries, irrespective of their development status.

3. REVIEW OF EXISTING KNOWLEDGE

Lack of inequality-related data historically restricted conducting inequality-related research. The recent development of inequality data allows researchers to construct their analyses in a more flexible environment. However, existing empirical studies have used different inequality data sets, over different time periods, across different countries, and also applied different methodologies and in turn the existing knowledge is highly diverse and complex. Consequently, this section provides a comprehensive understanding on existing empirical work, and particularly focuses on inequality and its macroeconomic factors. In fact, growth is one of the most significant macroeconomic factors and, hence, many researchers have widely examined the inequality-growth nexus; however, there is no consensus yet. The well-known work by Kuznets (1955), which highlighted a parabolic relationship between income and inequality, has provided a historical approach for the discussion. The parabolic relationship indicates that an increase in income serves to widen inequality up to some extent and reduces inequality thereafter. However, this relationship is argued by researchers such as Persson and Tabellini (1994), Alesina and Rodrik (1994), and Alesina and Perotti (1996) who found a negative relationship between income and inequality. Conversely, Barro (2000) supported a nonlinear relationship between economic growth and inequality and stressed that economic growth negatively affects poor countries and positively affects rich countries. Apart from that, Bruno et al. (1996), Fishlow (1995), Ravallion (1995), and Deininger and Squire (1997) have stated that there is no significant relationship between income and inequality.

The impacts of government expenditure on inequity have been addressed by Calderon and Serven (2004) who observed that government expenditure on infrastructure stimulates economic growth and, in turn, the expenditure on infrastructure has a significant effect on reducing inequality. However, Calderon and Serven (2004) have examined this relationship based on a panel of Latin American countries, where inequality is highest. Thus, it is not rational to extend this finding for countries with a low or moderate level of inequality. Apart from that, Chatterjee and Turnovsky (2012) also confirmed that government expenditure may reduce inequality in the short run while increasing inequality in the long run. Furthermore, a study based on the Philippines by Blejer and Guerrero (1988) highlighted that government expenditure strongly increases inequality in the context of the Philippines. Similarly, Maestri and Roventini (2012) also discovered that a higher level of government expenditure is associated with higher income inequality, particularly in some European countries. Maestri and Roventini (2012) further found that government expenditure Granger causes earning inequality in countries such as the Netherlands, Canada, and the United Kingdom (UK). In contrast, Sarel (1997) proved cross-sectionally that government expenditure has no significant impact on income inequality.

The impacts of globalization and trade have also been discussed widely in literature. Dollar and Kraay (2004) emphasized that globalization and the openness of economies tend to benefit the poor and in turn reduce inequality. Conversely, Milanovic (2005)

argued that the poor in more open countries with higher trade liberalizations are more likely to be worse off as the benefits of trade are unevenly distributed. This notion is also supported by Barro (2000) and Bourguignon and Morrisson (1990), and indicates that richer groups in society absorb the benefits of international trade over lower-income groups and, hence, trade may cause higher income inequality. However, Marrewijk (2007) expressed that openness and international trade lower inequality in labor-abundant poor countries, while increasing inequality in rich countries with a higher level of capital stock. A time-series study by Maestri and Roventini (2012) examined the impact of inflation and unemployment on income inequality in a set of member countries of the Organisation for Economic Co-operation and Development (OECD), and found that inflation increases income inequality in countries such as Germany, Sweden, and the United States, while reducing inequality in Canada. Further, the current study found that unemployment in the UK and in the United States reduces consumption inequality. Similar results have been observed by Stiglitz (2011) and Kumhof and Ranciere (2010). Furthermore, Jantti and Jenkins (2001) in a time-series analysis based on the UK over the period 1961–1991 argued that unemployment may reduce the income share of the third income quantile to the richest quantile while increasing the income share of the poorest quantile and the second. Moreover, Jantti and Jenkins (2001) highlighted that both inflation and the real interest rate have negative impacts on the income share of the income quantiles from the poorest to the fourth, and a positive impact on the fourth and richest quantiles. However, Sarel (1997) concluded that inflation has no significant impact on the income distribution of many countries.

Not simply macroeconomic factors alone, but several demographic factors—such as education, employment structure, and population growth—have also been identified as crucial factors of income inequality. A cross-sectional analysis based on both developed and developing countries by Breen and Garcia-Penalosa (1999) stressed that higher educational attainment, particularly at least up to secondary level, greatly reduces income inequality. Similarly, Gunatilaka and Chotikapanich (2005), Barro (2000), Li et al. (1998), and De Gregorio and Lee (2002) also found that average years of schooling or any other educational attainment leads economies toward more equal income distribution. Apart from education, Garcia-Penalosa (1999) investigated the impact of employment in agriculture on income inequality in both developed and developing countries and found that a higher level of employment in the agriculture sector accounts for the lower level of income inequality, as lower-income groups are able to increase their income through agricultural output. Similar results were observed by Alderson and Nielsen (1995), who expressed that a higher rural population with more employed in the agriculture sector leads to lower income inequality. Apart from that, Alderson and Nielsen (1995) indicated that a relatively high population growth may increase income inequality. In addition to demographic factors, politically related factors such as democratization have been observed as important for income inequality (Rodrik 1999; Milanovic 2004; Dreher and Gaston 2008). In particular, Rodrik (1999) and Milanovic (2004) expressed that democratization reduced inequality through higher wages for labor and fair distribution, respectively. However, Dreher and Gaston (2008) indicated that inequality may increase with higher levels of democratization in some OECD countries. The impact of foreign aid on income inequality was also checked by Herzer and Nunnenkamp (2012) and Bjornskov (2010), who concluded that foreign aid may widen the income gap as the distribution process of foreign aid is highly politicalized, especially in developing countries.

The reviewed existing literature clearly highlights the unavailability of consensus on the linkages between inequality and its determinants. Similarly, most of the studies are purely based on conventional time series and cross-sectionals, which have significant

methodological issues as well. Consequently, the current study attempts to conduct a rigorous analysis that can overcome the weaknesses and contradictory ideas in the literature. The International Monetary Fund working paper by Sarel (1997) highlighted particularly two main modifications that need to be considered by future researchers. The first is to include fiscal policy variables and demographic variables such as tax and education, respectively. The second is to expand the empirical framework from cross-sectional analysis to panel data analysis. I strongly believe that the current study has adequately addressed the modifications highlighted by Sarel (1997).

4. METHODOLOGY AND MODEL SPECIFICATION

4.1 Data and Variables

The study is based on the longitudinal data set, which consists of 33 Asian countries over 1990–2013. These countries were selected based on the availability of the data for selected variables. Table 2 explains the variables and sources of the data used for the study.

Table 2: Description of Variables and Data Sources

Variable Name	Variable Used for the Study	Data Source
Inequality	Gini Index	UNU-WIDER The World Income Inequality Database (WIID)
Income Distribution	Income Shares owned by Quantiles	UNU-WIDER (WIID)
National Production	Gross Domestic Product	World Bank Data
Investment	Capital Formation	World Bank Data
Changes in Price Level	Inflation	World Bank Data
Unemployment	Unemployment	World Bank Data
Trade	Terms of Trade	World Bank Data
Debt Level	Government Debt as Percentage of GDP	World Bank Data
Corruption	Corruption Perception Index	Transparency International
Political Instability	Political Risk Index	The PRS Group (www.prsgroup.com)
Development Assistance	Official Development Assistance	World Bank Data
Education	Gross Enrollment Ratio Secondary Education	World Bank Data
	Labor Force Participation	World Bank Data
Population	Population Growth Rate	World Bank Data

GDP = gross domestic product, UNU-WIDER = United Nations University World Institute for Development Economics Research.

Source: Author.

In particular, the Gini index and income shares owned by quantiles were used as the dependent variables in Model 1 and Model 2, respectively, and data were collected by the World Income Inequality Database. Similarly, the Corruption Perception Index and Political Risk Index published by Transparency International and the PRS

Group (www.prsgroup.com) were employed to approximate the corruption and political instability. The Corruption Perception Index captures the domestic public sector corruption of countries and the index scores of countries on a scale of 0 to 10, with zero indicating high levels of corruption, and 10 for low levels. The Political Risk Index accounts for the overall risk of a country and the methodology of the index considers the risk attached to turmoil, financial transfers, direct investments, and export markets. The higher index values are attached to low risk countries while lower index values represent higher political risk. Data for the rest of the variables were collected from the World Bank data series.

4.2 Empirical Models

The current study applies panel data analysis in order to accomplish the study's objectives. Specifically, the empirical model, which is explained in Equation 1, was used to model the macroeconomic determinants of income inequality of selected Asian countries. The growth rate of the Gini index was used as the dependent variable of Model 1, along with the set of explanatory variables.

$$GRGini_{i,t} = \beta_1{}'X_{i,t} + \beta_2{}'Y_{i,t} + \beta_2{}'Z_{i,t} + \delta_{1,i} + \epsilon_{1i,t} \quad (1)$$

In order to have a clearer understanding of how the macroeconomic factors affect inequality, the second model was constructed. The main objective of the second model is to quantify the impact of macroeconomic variables on the income share of each income quantile. Thus, the income shares of each quantile were used as the dependent variable of Model 2.

$$(Q1)_{i,t} \ldots\ldots (Q5)_{i,t} = \beta_1{}'X_{i,t} + \beta_2{}'Y_{i,t} + \beta_2{}'Z_{i,t} + \delta_{1,i} + \epsilon_{1i,t} \quad (2)$$

Apart from the macroeconomic variables, political economy and demographic variables are also included in both models in order to obtain more accurate estimates by minimizing the residual part. In both models, $X_{i,t}$, $Y_{i,t}$ and $Z_{i,t}$ are vectors of macroeconomic variables, political economy variables, and demographic variables, respectively, while δ is the unobserved country-specific effect, and Ɛ explains the error term of both models. The vector of macroeconomic variables includes the log of gross domestic product (lnGDP), growth rate of capital formation (GRCF), inflation (INFL), unemployment (UNEMP), growth rate of terms of trade (GRToT), and growth rate of debt as a percentage of GDP (GRDEBT). The vector of political economy includes variables such as corruption, political risk, and the growth rate of official development assistance (GRODA). Similarly, education, labor force participation, and growth rate of population (GRPOP) are considered the vector of demographic variables.

4.3 Estimation Techniques

The process of model estimation considered all 33 countries as one set of data, although the selected 33 countries included high-income, low-income, lower-middle income, and upper-middle-income countries. In fact, any attempt to categorize the data set into the mentioned income criteria essentially restricts the sample size of high-income and low-income countries to 6 and 5, respectively. It absolutely affects the statistical significance and accuracy of estimated coefficients. As the current study applies dynamic panel data analysis based on the generalized method of moment (GMM), consideration of all 33 countries as a whole does not lead to misleading findings as in a time-series and cross-sectional analysis. In fact, the instruments

involved in GMM, and taking the first difference of the regression equation are the possible remedies, which overcome the issue of country-specific omitted variable bias.

The empirical models expressed in equation (1) and (2) were estimated using dynamic panel data, which specifically used the GMM estimation technique developed by Arellano and Bond (1991) and Arellano and Bover (1995). In fact, application of panel data analysis has a number of advantages over both cross-country and time-series analysis. On one hand, cross-country analysis treats countries with different characteristics as a homogeneous group and, on the other hand, it hinders the country-specific effects, which may lead to higher error terms. Similarly, results of a time-series analysis cannot be generalized and also have the issue of simultaneity. In particular, the GMM estimation technique overcomes econometric issues such as endogeneity and country-specific omitted variable bias by introducing appropriate instruments and first difference of the regression equation, respectively. Application of the GMM method to empirical models (1) and (2) can be detailed as follows:

$$GRGini_{i,t} - GRGini_{i,t-1} = \alpha_1 GRGini_{i,t-1} + \beta_1^{'X_{i,t}} + \beta_2^{'Y_{i,t}} + \beta_2^{'Z_{i,t}} + \delta_{1,i} + \epsilon_{1i,t} \quad (3)$$

$$(Q1_{i,t} - Q2_{i,t-1}) \ldots . (Q4_{i,t} - Q5_{i,t-1}) = \alpha_2 (Q1 \ldots . Q5)_{i,t-1} + \beta_1{}' \ X_{i,t} + \beta_2{}' \ Y_{i,t} + \beta_2{}^{'} \ ^{Z_{i,t}} + \delta_{1,i} \quad (4)$$

Rearranging the above equations (3) and (4),

$$g_{i,t} = \alpha_1 GRGini_{i,t-1} + \beta_1{}' \ X_{i,t} + \beta_2{}' \ Y_{i,t} + \beta_2{}' \ Z_{i,t} + \delta_{1,i} + \epsilon_{1i,t} \quad (5)$$

Where $GRGini_{i,t} - GRGini_{i,t-1} = g_{i,t}$

$$q_{i,t} = \alpha_2 (Q1 \ldots . Q5)_{i,t-1} + \beta_1{}' X_{i,t} + \beta_2{}' Y_{i,t} + \beta_2{}' Z_{i,t} + \delta_{1,i} + \epsilon_{1i,t} \quad (6)$$

Where $(Q1_{i,t} - Q2_{i,t-1}) \ldots . (Q4_{i,t} - Q5_{i,t-1}) = q_{i,t}$

The first difference of equations (5) and (6) were constructed to eliminate the unobserved country-specific effects.

$$g_{i,t} - g_{i,t-1} = \alpha_1 (GRGini_{i,t-1} - GRGini_{i,t-2}) + \beta_1{}' (X_{i,t} - X_{i,t-1}) + \beta_2{}' (Y_{i,t} - Y_{i,t-1}) + \beta_2{}' (Z_{i,t} - Z_{i,t-1}) + (\epsilon_{1i,t} - \epsilon_{1i,t-1}) \quad (7)$$

$$q_{i,t} - q_{i,t-1} = \alpha_2 ((Q1 \ldots . Q5)_{i,t-1} - (Q1 \ldots . Q5)_{i,t-2}) + \beta_1' (X_{i,t} - X_{i,t-1}) + \beta_2{}' \ (Y_{i,t} - Y_{i,t-1}) + \beta_2{}' \ (Z_{i,t} - Z_{i,t-1}) + (\epsilon_{1i,t} - \epsilon_{1i,t-1}) \quad (8)$$

In order to avoid endogeneity problems related to the regressors, instruments were used. In accordance with the GMM difference estimators, the lag values of the regressors were used as the instruments based on the following moment conditions.

$$E[GRGini_{i,t-s}(e_{1i,t} - e_{1i,t-1})] = 0 \ for \ s \geq 2; t = 3, \ldots . T \quad (9)$$

$$E[X_{i,t-s}(e_{2i,t} - e_{2i,t-1})] == 0 \ for \ s \geq 2; t = 3, \ldots . T \quad (10)$$

$$E[Y_{i,t-s}(e_{2i,t} - e_{2i,t-1})] = 0 \ for \ s \geq 2; t = 3, \ldots . T \quad (11)$$

$$E[Z_{i,t-s}(e_{2i,t} - e_{2i,t-1})] = 0 \; for \; s \geq 2; t = 3, \ldots . T \quad (12)$$

$$E[(Q1 \ldots Q5)_{i,t-s}(e_{2i,t} - e_{2i,t-1})] = 0 \; for \; s \geq 2; t = 3, \ldots . T \quad (13)$$

The Sargan test and Serial Correlation test were employed to test the validity of the instruments used and the existence of serial correlation in the estimated models.

5. RESULTS AND DISCUSSION

This section elaborates results that were empirically estimated based on dynamic panel data analysis, explained in the previous section. Initially, the impacts of macroeconomics, political economy, and demographic factors on income inequality are summarized in Table 3. Model 1 specified in Table 3, quantifies the link between income inequality and macroeconomic factors alone, while Model 2 and 3 take the impacts of macroeconomic factors on income inequality along with the political economy and demographic factors. In fact, variables were gradually added into the model and estimated for the expanded model in three steps in order to check the robustness of the estimated coefficient of macroeconomic factors.

According to the table, GDP is one of the crucial factors of income inequality in the Asian region. The lnGDP (log of GDP) in particular, positively affects income inequality, while the square of lnGDP has a negative effect on all three models with higher levels of statistical significance. This relationship clearly indicates the existence of a parabolic linkage between GDP and income inequality. In particular, income inequality initially increases with the increase of GDP, and reduces thereafter, with further increase of GDP. Thus, this finding is consistent with Kuznets (1955) and Barro (2000). In fact, most of economic activities are highly concentrated in the urban areas of many Asian countries at the early and middle stages of the economic expansion process, and therefore an initial increase in GDP widens the spatial income gap, followed by a higher overall income inequality as well. However, further increases in GDP in the long run allow the redistribution of economic activities fairly across the country and, as a result, income inequality may decrease.

Apart from that, the study found that inflation and unemployment increase the income inequality in Asian countries, and the result is statistically significant, even after the inclusion of political and demographic variables. In fact, higher inflation adversely affects the purchasing power of poor people than their rich counterparts and, in turn, widens the income gap between poorer and richer groups. Similarly, unemployment essentially restricts access to the income sources of lower-income groups who have no or lack accumulated wealth compared with higher-income groups. Consequently, inflation and unemployment increase income inequality, and the findings are aligned with those of Jantti and Jenkins (2001). Conversely, the growth rate of terms of trade increases the income gap of Asian countries. In fact, trade flows in many developing and emerging countries largely benefit higher-income groups rather than lower-income groups and, in turn, benefits from trade may increase the income gap among people. Nevertheless, macroeconomic factors, such as capital formation and debt, have not succeeded in explaining income inequality in Asia.

Table 3: Impacts of Macroeconomic, Political Economy, and Demographic Factors on Income Inequality

	Growth Rate of Gini Index		
Dependent Variable	**Model 1**	**Model 2**	**Model 3**
GRGINI(-1)	0.5309***	0.4625**	0.3761***
	(0.1440)	(0.2014)	(0.0948)
Macroeconomic Variables			
lnGDP	0.3492**	0.0432**	0.0674**
	(0.1647)	(0.0178)	(0.0295)
$(lnGDP)^2$	–0.0269**	–0.0172**	–0.0302***
	(0.0128)	(0.0077)	(0.0043)
GRCF	0.0032	0.4017	0.7302
	(0.0563)	(0.3050)	(0.5432)
INFL	0.0608**	0.2431**	0.2701**
	(0.0251)	(0.0942)	(0.1131)
UNEMP	0.0917**	0.4424*	0.0287**
	(0.0431)	(0.2570)	(0.0112)
GRToT	0.0198***	0.0573**	0.0201**
	(0.0051)	(0.0242)	(0.0098)
GRDEBT	0.0007	0.0010	0.0417
	(0.0033)	(0.0063)	(0.3526)
Political Economy Variables			
Corruption		–0.5218	–0.4023
		(1.0231)	(0.4271)
Political Risk		0.0243*	0.1732*
		(0.0123)	(0.0898)
GRODA		–0.8768*	–0.9076**
		(0.4588)	(0.3524)
Demographic Variables			
Education			–2.431**
			(0.9231)
LFP			–0.0290*
			(0.0148)
GRPOP			–0.7864
			(0.9843)
Diagnostic Statistics			
Observations	410	430	465
Instrument Rank	31.0000	27.0000	32.0000
J Statistics	15.9511	22.8710	25.0809
Sargan Test (P – value)[1]	0.8573	0.2230	0.4013
Serial Correlation (P – Value)[2]	0.0991	0.2999	0.6031

Note: * Significant at 10%, ** Significant at 5%, *** Significant at 1%.

GDP = gross domestic product, GRCF = Growth rate of capital formation, GRDEBT = Growth rate of debt, GRGINI = Growth rate of GINI Index, GRODA = Growth rate of official development assistance, GRPOP = Growth rate of population, GRToT = Growth rate of terms of trade, INFL = Inflation, LFP = Labor force participation, UNEMP = Unemployment.

[1] Sargan Test has the null hypothesis that the over-identified restrictions are valid.

[2] Serial Correlation Test has the null hypothesis of error terms are not serially correlated.

Source: Author.

In addition to the macroeconomic factors, political economic variables such as political risk and official development assistance also significantly affect income inequality. In particular, an increase in the political risk of economies tends to increase income inequality while decreasing official development assistance. Moreover, official development assistance plays a major role, especially in developing Asian countries, by promoting infrastructure and employment opportunities for spatially discriminated low-income groups. From a demographic point of view, the study empirically confirmed that education is the key factor that hinders income inequality. Higher educational attainments essentially create efficient and easy access to better employment opportunities, and also open new avenues for important networking that is especially crucial in the globalized world. Studies by De Gregorio and Lee (2000), Li et al. and Barro (2000) also discussed the importance of education on more equal income distribution. Apart from that, labor force participation also marginally reduces income inequality, as higher labor force participation ensures stable income, especially for vulnerable groups and, consequently, it is possible that it may decrease income inequality.

The goodness-of-fit of the model was evaluated using the Sargan test and the Serial Correlation test. These tests respectively verify the appropriateness of the instruments and nonexistence of the serial correlation among error terms. The higher p-values attached to these tests clearly indicate acceptance of the null hypotheses that explain that over-identified restrictions are valid, and error terms are not serially correlated, respectively.

Table 4 summarizes the results, which were estimated by taking the income shares of each income quantile into account. Thus, this analysis provides a better understanding of how macroeconomic factors affect the income distribution of Asian countries. Further, education as a demographic factor was also included in the model as it was highly significant in explaining income inequality. As the result indicates, an increase in GDP may initially redistribute income from poor people (first and second quantiles) to the middle class (third and fourth quantiles) or richest groups (fifth quantile). However, further increases in GDP (considering lnGDP) decrease the income share of the richest group and increase the income shares of all other quantiles. Education also has a similar impact on the income share of the quantiles and, hence, both education and further increases in GDP redistribute the income from the richest group to middle- and poor-income groups. The findings are consistent with the previous works by Breen and Garcia-Penalosa (1999) and Jantti and Jenkins (2001).

Apart from that, inflation negatively affects the income share of the bottom 20% of people while it benefits only the richest group. In particular, the lower-income groups who spend a higher percentage of their income on the consumption of essential items, such as foods, are adversely affected by price hikes due to inflation. At the same time, a price hike essentially transfers a significant percentage of the income of lower-income groups to higher-income groups, as the higher-income groups are the ultimate beneficiaries of increased prices (Jantti and Jenkins 2001). However, unlike inflation, unemployment causes a reduction in the income share of all quantiles except the richest group, and the impact of unemployment is relatively higher for the second, third, and first quantiles. Additionally, the benefits of trade and ODA marginally increase the income shares only for the richest and third quantiles, respectively. The goodness-of-fit of the model explained in Table 3 is also at a higher level than that verified by both Sargan and Serial Correlation tests.

Table 4: Impacts of Macroeconomic Factors on Income Share of Quantiles

	Q1 (Poorest)	Q2	Q3	Q4	Q5 (Richest)
Q1(-1)	0.5481*	0.0247	0.1620**	0.8920	1.9843***
	(0.2748)	(0.0733)	(0.0750)	(0.9190)	(0.6314)
lnGDP	–0.0254**	–0.0301**	0.1207**	0.1071**	0.0471*
	(0.0106)	(0.0141)	(0.0518)	(0.0481)	(0.0245)
$(lnGDP)^2$	0.1450***	0.2073***	0.1321**	0.0223**	–0.0195**
	(0.0301)	(0.0231)	(0.0621)	(0.0109)	(0.0095)
GRINFL	–0.0832*	–0.0635**	–0.0521	–0.0274	0.2072**
	(0.0427)	(0.0292)	(0.0348)	(0.0182)	(0.0804)
GRUNEMP	–0.1027**	–0.2387**	–0.1982*	–0.0787*	–0.0163
	(0.0448)	(0.1027)	(0.1021)	(0.0413)	(0.0975)
GRToT	–0.0089	–0.0367	–1.2035	0.2192	0.0412*
	(0.1024)	(0.0213)	(0.8321)	(0.1341)	(0.0207)
Education	0.1056**	0.0374	0.2014**	0.4082	–0.0242**
	(0.0457)	(0.0741)	(0.0924)	(0.5127)	(0.0098)
GRODA	0.4571	1.3071	0.6523*	–0.2103	–0.0625
	(0.5409)	(0.8231)	(0.3403)	(0.1321)	(0.0924)
Diagnostic Statistics					
Observations	321	321	321	321	321
Instrument Rank	18.3911	14.2618	22.2627	19.3101	23.2191
J Statistics	12.7612	10.3637	16.2721	14.2028	13.2781
Sargan Test (P-value)[1]	0.3523	0.3310	0.4561	0.3218	08321
Serial Correlation (P-Value)[2]	0.2031	0.1521	0.3407	0.0928	0.2312

Note: *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

Education = Gross Enrollment Ratio Secondary Education, GDP = gross domestic product, GRODA = Growth rate of official development assistance, GRINFL = Growth rate Inflation, GRToT = Growth rate of terms of trade, GRUNEMP = Growth rate of unemployment.

[1] Sargan Test has the null hypothesis that the over-identified restrictions are valid.

[2] Serial Correlation Test has the null hypothesis of error terms are not serially correlated.

Source: Author.

6. CONCLUSION AND POLICY RECOMMENDATION

This empirical study attempts to quantify the impacts of macroeconomic factors on income inequality and income distribution in Asian countries. Further, the study focuses on the impacts of the political economy and demographic factors as well. The study applies dynamic panel data analysis over 1990–2013 across 33 Asian countries, and the employed methodology essentially overcomes the major weaknesses attached to the literature. The descriptive analysis identified that the inequality of countries—such as Japan, the Russian Federation, Israel, Singapore, Sri Lanka, the PRC, India, Latvia, Bangladesh, and Indonesia—has been continuously increasing since the 1990s. In contrast, countries such as Iran, the Republic of Korea, Malaysia, Turkey, and Pakistan have been experiencing declining inequality.

The analysis focused on the impact of macroeconomic factors on income inequality and observed an inverted-U-shaped (parabolic) relationship between GDP and income inequality, which is similar to Kuznets (1955), leading to the formulation of the well-known Kuznets curve. Thus, the findings of this research in particular highlighted that income inequality in Asian countries increases with the expansion of GDP up to

some extent and reduces thereafter with a further increase of GDP. However, the study further highlighted that macroeconomic factors, such as higher inflation, terms of trade, and unemployment, increase the inequality in Asian countries. In addition to the macroeconomic factors, political economy and demographic factors—such as ODA, education, and labor force participation—reduce income equality significantly in Asian countries, while political risk may marginally increase the income inequality. Furthermore, the study highlighted that there is no statistically significant link between income inequality and factors such as the growth rate of capital formation, growth rate of debt, corruption, and growth rate of population.

The analysis based on the distribution of income among the different quantiles indicates that an initial increase in GDP may cause the redistribution of income from poor people to the middle class or the richest groups. However, further increases in GDP decrease the income share of the richest group, while increasing the income share for all other quantiles. Education also has a similar impact on the income share of quantiles and, hence, both education and further increases in GDP indicate redistribution of income from the wealthiest groups to middle-income and poor-income groups. Apart from that, inflation negatively affects the income share of the bottom 20% of people, while it benefits only the richest group. However, unlike inflation, unemployment reduces the income share of all quantiles except the richest group, whereas the benefits from trade and ODA marginally increase the income shares only for the richest and third quantiles, respectively. The study recommends ensuring that higher and steady long-term economic growth takes place together with efficient fiscal instruments that can fairly redistribute the growth and trade benefits among lower-income groups. Similarly, for more equal income distribution, it is crucial to enhance access to education, employment, and other income-generating activities, while maintaining price stability and political stability in economies.

REFERENCES

Alderson, A. S., and F. Nielsen. 1995. Income inequality, development and dualism: Results from an unbalanced cross-national panel. *American Sociological Review* 60: 674–701.

Alesina, A., and R. Perotti. 1994. The Political Economy of Budget Deficits (No. w4637). National Bureau of Economic Research.

Alesina, A., and R. Perotti. 1996. Income distribution, political instability, and investment. *European Economic Review* 40(6): 1203–1228.

Alesina, A., and R. Perotti. 1997. Fiscal adjustments in OECD countries: composition and macroeconomic effects. *Staff Papers* 44(2): 210-248.

Arellano, M., and S. Bond. 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies* 58: 277–297.

Arellano, M., and O. Bover. 1995. Another Look at the Instrumental-Variable Estimation of Error Components Models. *Journal of Econometrics* 68: 29–52.

Barro, R. J. 2000. Inequality and Growth in a Panel of Countries. *Journal of Economic Growth* 5(1): 5–32.

Bjornskov, C. 2010. Do Elites Benefit from Democracy and Foreign Aid in Developing Countries? *Journal of Development Economics* 92: 115–124.

Blejer, M., and I. Guerrero. 1988. Stabilization Policies and Income Distribution in the Philippines. *Finance and Development* 25(4): 6.

Bourguignon, F. 2004. The Poverty-Growth-Inequality Triangle. *Poverty, Inequality and Growth* 69.

Bourguignon, F., and C. Morrisson. 1990. Income Distribution, Development and Foreign Trade: A Cross-Sectional Analysis. *European Economic Review* 34(6): 1113–1132.

Breen, R., and C. Garcia-Peñalosa. 1999. *Income Inequality and Macroeconomic Volatility: An Empirical Investigation*. European University Institute.

Bruno, M., M. Ravallion, and L. Squire. 1996. Equity and Growth in Developing Countries: Old and New Perspectives on the Policy Issues. Vol. 1563. Washington DC: World Bank.

Bulìř, A., and A. M. Gulde. 1995. Inflation and Income Distribution: Further Evidence on Empirical Links.

Calderón, C., and L. Servén. 2004. The Effects of Infrastructure Development on Growth and Income Distribution. No. 270. Washington DC: World Bank.

Chatterjee, S., and S. J. Turnovsky. 2012. Infrastructure and Inequality. *European Economic Review* 56(8): 1730–1745.

Cole, J., and C. Towe. 1996. Income Distribution and Macroeconomic Performance in the United States.

De Gregorio, J., and J. W. Lee. 2000. Education and Income Inequality: New Evidence from Cross-Country Data. *Review of Income and Wealth* 48: 395–416.

Deininger, K., and L. Squire. 1997. Economic Growth and Income Inequality: Reexamining the Links. *Finance and Development* 34: 38–41.

Dollar, D., and A. Kraay. 2004. Trade, Growth, and Poverty. *The Economic Journal* 114(493): F22–F49.

Dreher, A., and N. Gaston. 2008. Has Globalization Increased Inequality? *Review of International Economics* 16: 516–536.

Fishlow, A. 1995. Inequality, Poverty and Growth, Where Do We Stand?. In *OPS Document Reproduction Series* 65. World Bank.

Breen, R., and C. García-Peñalosa. 2005. Income inequality and Macroeconomic Volatility: An Empirical Investigation. *Review of Development Economics* 9(3): 380–398.

Gunatilaka, R., and D. Chotikapanich. 2006. Inequality Trends and Determinants in Sri Lanka 1980–2002: A Shapley Approach to Decomposition. No. 6/06. Monash University, Department of Econometrics and Business Statistics.

Herzer, D., and P. Nunnenkamp. 2012. The Effect of Foreign Aid on Income Inequality: Evidence from Panel Cointegration. *Structural Change and Economic Dynamics* 23: 245–255.

Jantti, M., and S. P. Jenkins. 2001. Examining the Impact of Macro-Economic Conditions on Income Inequality.

Kakwani, N. 1993. Poverty and Economic Growth with Applications to Cote d'Ivoire. *Review of Income and Wealth* 39(2): 121–139.

Kumhof, M., and R. Ranciere. 2010. Inequality, Leverage and Crises. IMF Working Papers. 1–37.

Kuznets, S. 1955. Economic Growth and Income Inequality. *The American Economic Review* 45(1): 1–28.

Li, H., L. Squire, and H. Zou. 1998. Explaining International and Intertemporal Variations in Income Inequality. *The Economic Journal* 108: 26–43.

Maestri, V., and A. Roventini. 2012. Inequality and Macroeconomic Factors: A time-series analysis for a set of OECD countries. Available at SSRN 2181399.

Marrewijk, C. V. 2007. *International Economics: Theory, Application and Policy*. Oxford University Press.

Milanovic, B. 2004. Is Inequality in Africa Really Different? Second draft. World Bank.

———. 2005. Can We Discern the Effect of Globalization on Income Distribution? Evidence from Household Surveys. *The World Bank Economic Review* 19(1): 21–44.

Nielsen, F., and A. S. Alderson. 1995. Income Inequality, Development, and Dualism: Results from an Unbalanced Cross-National Panel. *American Sociological Review.* 674–701.

Persson, T., and G. Tabellini. 1994. Is Inequality Harmful for Growth?. *The American Economic Review*. 600–621.

Ravallion, M. 1995. Growth and Poverty: Evidence for Developing Countries in the 1980s. *Economics Letters* 48(3): 411–417.

Razin, A., and E. Sadka. 1996. A Pecking Order of Capital Inflows and International Tax Principles. *Journal of International Economics* 44(1): 45–68.

Rodrik, D. 1999. Democracies Pay Higher Wages. *The Quarterly Journal of Economics* 114: 707–738.

Sarel, M. M. 1997. How Macroeconomic Factors Affect Income Distribution: The Cross-Country Evidence. No. 97–152. International Monetary Fund.

Stiglitz, J. 2011. Of the 1%, By the 1%, For the 1%. *Vanity Fair* 11.

UNU-WIDER. 2015. World Income Inequality Database, Version 3.3. May 2008. http://www.wider.unu.edu/research/Database/en GB/database/

You, J., and A. K. Dutt. 1996. Government Debt, Income Distribution, and Growth. *Cambridge Journal of Economics* 20(3): 335–351.

Zhuang, J., R. Kanbur, and C. Rhee. 2014. Rising Inequality in Asia and Policy Implications. ADBI Working Paper. 463.