Journal of
Risk and Financial Management

MDPI

Article

What Factors Affect Income Inequality and Economic Growth in Middle-Income Countries?

Duc Hong Vo *, Thang Cong Nguyen, Ngoc Phu Tran and Anh The Vo

Business and Economics Research Group, Ho Chi Minh City Open University, Ho Chi Minh 700000, Vietnam; thang.ngc@ou.edu.vn (T.C.N.); tranphungoc91@gmail.com (N.P.T.); anh.vt@ou.edu.vn (A.T.V.)
* Correspondence: duc.vhong@ou.edu.vn

Received: 9 December 2018; Accepted: 19 February 2019; Published: 8 March 2019

Abstract: Income inequality in many middle-income countries has increased at an alarming level. While the time series relationship between income inequality and economic growth has been extensively investigated, the causal and dynamic link between them, particularly for the middle-income countries, has been largely ignored in the current literature. This study was conducted to fill in this gap on two different samples for the period from 1960 to 2014: (i) a full sample of 158 countries; and (ii) a sample of 86 middle-income countries. The Granger causality test and a system generalized method of moments (GMM) are utilized in this study. The findings from this study indicate that causality is found from economic growth to income inequality and vice versa in both samples of countries. In addition, this study also finds that income inequality contributes negatively to the economic growth in the middle-income countries in the research period.

Keywords: income inequality; economic growth; middle income countries; Granger causality test; system GMM

JEL Classification: O15; O47

1. Introduction

From the World Bank's classifications, middle-income countries (MICs) are nations with a per capita gross national income (GNI) between US$1005 and US$12,235. MICs, which are a very diverse group by region, size, population, and income level, can be broken up into lower-middle-income and upper-middle-income economies. Two MIC superpower economies—China and India—hold nearly one-third of humanity and continue to be increasingly influential players globally. The World Bank also considers that MICs are essential for continued global economic growth and stability. In addition, sustainable growth and development in MICs, including poverty reduction, international financial stability, and cross-border global issues including climate change, sustainable energy development, food and water security, and international trade, have positive spill-overs to the rest of the world[1].

Alvaredo et al. (2018) provided a comprehensive review of income inequality over the last 40 years and stressed a surge in income inequality in China, Russia, and India. Particularly, in China, it was found that in 2015 the top 10 percent of the population accounted for nearly 42 percent of the national income, but the bottom 50 percent only owned 15 percent of the national income; these groups both equally shared nearly one-third of the national income in 1978. During the same period, the urban–rural income gap has widened. Urban households earned twice as much as rural households in 1978. However, they earned a 3.5 times higher amount in 2015. Similarly, over the period from 1989 to

[1] See more at https://www.investopedia.com/terms/m/middle-income-countries.asp.

2015, the incomes of the top 1 percent and the bottom 50 percent have varied significantly in Russia. The share of the top 1 percent has increased from 25 percent to 45 percent of the national income compared to the share of the bottom 50 percent from 30 percent to 20 percent. In India, inequality has increased dramatically from the 1980s onwards, mostly due to economic reforms, leading to the share of the top 10 percent of the population accounting for nearly 60 percent of the national income.

It is widely noted that widening inequality has significant implications for growth and macroeconomic stability. Income inequality can lead to a suboptimal use of human resources, cause political and economic instability, and raise crisis risk[2].

The link between income inequality and economic growth and related issues has been extensively investigated in the literature. Typical studies are those by Forbes (2000) and Barro (2000), followed by various other studies (Fawaz et al. 2014; Wahiba and Weriemmi 2014; Huang et al. 2015; Madsen et al. 2018; Nguyen et al. 2019; Vo et al. 2019). The current study was conducted to provide additional empirical evidence on growth and income inequality for middle-income countries. To the best of our knowledge, most studies on income inequality and economic growth have utilized the Deininger and Squire (1996) "high-quality" data set, although this data set has recently been criticized for its accuracy, consistency, and comparability (Atkinson and Brandolini 2001; Galbraith and Kum 2005). As a result, using this data set might produce biased results (Malinen 2012). To address this issue, on the basis of Solt (2016) study, the data set was constructed to maximize comparability without losing the broadest coverage. In this paper, we contribute to the discussion by using the latest and most updated data set from World Development Indicator and Standardized World Income Inequality with a focus on middle-income countries, which have largely been ignored in previous studies.

The rest of the paper is structured as follows. Following the Introduction, Section 2 provides a comprehensive review of the relevant literature on the income inequality–economic growth nexus. The research methodology and data are presented in Section 3. Section 4 discusses empirical findings, followed by the Concluding Remarks in Section 5.

2. Literature Review

Although various studies have been conducted to investigate the relationship between income inequality and economic growth, thus far, modelling complexities have stood in the way of solid confirmation. The technical issues of endogeneity and of model specifications together with the diversified application of econometric techniques are considered to be the main factors (Fawaz et al. 2014).

The seminal study by Kuznets (1955) asserted that inequality was a consequence of economic growth. In this respect, inequality increases in the early stage of the economic development process before decreasing with further development. Since then, a large proportion of studies in the stock of documents relating inequality and economic growth have been conducted. Among them, various studies have supported a positive association (Rubin and Segal 2015; Wahiba and Weriemmi 2014; Lundberg and Squire 2003) while some analyses were in favor of a negative relationship (Majumdar and Partridge 2009; Nissim 2007). Some studies also offered a mixed result (Huang et al. 2015; Chambers 2010).

For example, Rubin and Segal (2015) presented that U.S. income inequality was positively related to economic growth in the period of 1953–2008. The data utilized in their study are income stream, which was defined as a total of wealth income and labor income; these were sensitive to economic growth and varied across income groups. Their empirical findings suggested that the sensitivity of income of the top 1 percent of the population was twice as much as that of the bottom 90 percent. In addition, empirical results also confirmed that the income of the top was more responsive to variation in market returns.

---

[2] See more at https://www.imf.org/external/pubs/ft/sdn/2015/sdn1513.pdf.

Another illustration of Kuznets' hypothesis was also found in a study by Kozminski and Baek (2017). Using a data set compounding income inequality, income, and the population of Alaska over the period of 1963–2012, together with an autoregressive distributed lag (ARDL) approach to cointegration—a widely used estimation tool (see Stock and Watson 1993; Saikkonen 1991; Narayan 2004; Masih and Masih 1996; Hendry 1995; Forest and Turner 2013; Hayakawa and Kurozumi 2008; Bewley 1979)—the authors argued that income inequality was enhanced by economic growth after a certain turning point. Notably, the findings were not sensitive regardless of income measures (e.g., Gini coefficient, Theil's Entropy Index).

On the other hand, with the data set from the Standardized World Income Inequality and World Bank, Yang and Greaney (2017) concluded that the relationship between income inequality and economic growth followed the S-shape curve hypothesis in the context of South Korea, Japan, the U.S., and China in the long run, suggesting that economic growth had a significant impact on income inequality. Nevertheless, in the short run, the authors found no association between income inequality and economic growth except in Japan.

The realization that income inequality influences economic growth has been taken into consideration, together with the findings of Kuznets (1955). Yang and Greaney (2017) argued that on the one hand, inequality induced low-income people to work more to meet their requirements, leading to an increase of growth, and on the other hand, inequality interfered with the accumulation of human capital, which, in turn, impeded growth. Various studies have investigated whether inequality contributes to economic growth and have revealed a positive relationship (Li and Zou 1998; Forbes 2000) or a negative relationship (Cingano 2014; Wahiba and Weriemmi 2014).

For instance, Fawaz et al. (2014) confirmed a negative impact of income inequality on economic growth in low-income developing countries. Their conclusions emerged from using difference generalized method of moments (GMM) for a sample of 55 low-income developing countries and 56 high-income developing countries, proposed by World Bank's classification. Furthermore, in order to demonstrate that the empirical results were not arbitrary, the authors continued to use the difference GMM on a refined sample in which countries were categorized endogenously using the threshold procedure. In conclusion, they found no difference in the relationship across the two classifications.

In other views, a negative effect of income inequality on economic growth was also stressed in the work of Madsen et al. (2018). Specifically, the authors argued that at low levels of financial development, proxied by the credit to the non-banking sector/nominal GDP ratio, income inequality hindered growth. Their conclusions emerged from the application of the two-stage least squares (2SLS) approach over a sample of 21 selected Organisation for Economic Co-operation and Development (OECD) countries from 1870 to 2011. To ensure the results were not biased by the issue of causality from growth to income inequality, external communist influence was identified as an instrument variable due to a negative association between it and income inequality being identified in the study.

Findings from Kim (2016) also contributed to this line of research. From empirical results, economic growth was negatively related to income inequality. The study employed cross-sectional data for 40 countries in the Organisation for Economic Co-operation and Development (OECD) and in the European Union observed in the period of 2004–2011, together with a fixed effect model and GMM. The results consistently indicated that income inequality truly retarded economic growth in various subsamples, which were established by income level by the ratio of nonperforming loans to bank loans.

Intricacy also stemmed from the use of qualitative tools and/or the underlying measurement of income inequality. For the former, it was stated that income inequality was found to be positively correlated with economic growth using the GMM technique (Biswas et al. 2017; Fawaz et al. 2014; Forbes 2000). Inversely, income inequality was shown to impede economic growth via the use of OLS-FE and/or OLS-RE (Alesina and Rodrik 1994; Castelló-Climent 2004; Persson and Tabellini 1994). For the latter, empirical studies have been adopting various measures of inequality such as the Gini coefficient of inequality, Generalized Entropy measures, Atkinson's inequality measures, and the

decile dispersion ratio[3]. Unfortunately, each measure by itself encounters some issues. Particularly, in relation to the Gini coefficient, the problem is the difference in the definition of welfare, together with the use of an equivalence scale among data sources.

3. Research Methodology and Data

3.1. Data

The data set was constructed from the Standardized World Income Inequality Database (SWIID), World Development Indicator (WDI), and Penn World Table (PWT). The PWT provides the latest observation at 2014. The data set is thus an unbalanced panel of data of 158 countries which were observed in the period of 1960–2014, or 2625 country–year observations. Moreover, this study also utilized country classifications by income level issued by World Bank to separate the original data set into subsamples. In total, there were four income groups including high income (47 countries), upper-middle income (45 countries), lower-middle income (41 countries), and low income (25 countries). That classification yielded 86 middle-income countries in the same time frame, or 1356 country–year observations. The variables used in the model are listed and explained in Table 1 in addition to a brief summary of statistics presented in Table 2. A list of countries included in the sample is reported in Tables A1 and A2 in the Appendix A.

Table 1. A brief summary of variables.

Variable	Definition	Source
$\dot{y}$	Annual growth of real GDP per capita.	WDI
$\dot{G}$	Percent change in the Gini coefficient.	SWIID
PPPI	Price level of investment.	PWT
%Agriculture	The proportion of employment in agriculture out of total employment.	WDI
%Industry	The proportion of employment in industry out of total employment.	WDI
%Service	The proportion of employment in service out of total employment.	WDI

Table 2. Descriptive statistics.

Variables	Observations	Mean	S.D.	Min	Max
Panel A: All countries (N = 158)					
$\dot{y}$	4046	2.05	4.78	−65.01	31.46
$\dot{G}$	4046	0.11	0.97	−6.50	8.74
PPPI	3917	45.86	28.30	0.15	165.16
%Agriculture	2672	30.49	26.10	0.12	92.84
%Industry	2672	20.82	8.88	1.97	49.55
%Service	2672	48.68	20.20	5.06	87.59
Panel B: Middle-income countries (N = 86)					
$\dot{y}$	1987	2.16	5.26	−60.37	28.54
$\dot{G}$	1987	0.02	0.78	−6.05	5.84
PPPI	1909	33.64	16.02	4.84	120.00
%Agriculture	1385	35.20	17.47	2.46	51.28
%Industry	1385	20.94	7.78	5.75	49.55
%Service	1385	43.85	13.84	12.01	78.34

In relation to the variable of interest—income inequality—this analysis employed data issued by SWIID among various sources such as the Luxembourg Income Study (LIS), the OECD Income Distribution Database, the Eurostat, and the World Bank. An explanation for the use of SWIID is its

[3] See more at http://siteresources.worldbank.org/PGLP/Resources/PMch6.pdf.

sample coverage which is highly linked to the others. For instance, the Eurostat, through its mission, only provides statistics in Europe. LIS is another example as it only considers 50 countries around the world. Similarly, the OECD Income Distribution Database contains the Gini coefficient of 38 countries where the first observation was introduced in 2013.

In this line of research, one of the most used indices of income inequality is Deininger and Squire (1996) "high-quality" data set since various criteria were applied to standardize the inputs. However, the data set created by Deininger and Squire (1996) has been criticized for its accuracy, consistency, and comparability (Atkinson and Brandolini 2001; Galbraith and Kum 2005). Thus, studies relying on this kind of data set would encounter mistakes (Malinen 2012).

In response to the issues of coverage and comparability, Solt (2016) offered a standardized data set on income inequality which is normally referred to as the Standardized World Income Inequality Database (SWIID). The advantage of the data set is to maximize comparability without losing the broadest coverage. Since its first introduction in 2008, a number of studies have employed the data set to discuss inequality-related issues (Yang and Greaney 2017; De Haan et al. 2018).

The outcome of SWIID offered both inequality in disposable income and inequality in market income. We consider that the indicator of inequality in market income is more suitable because different countries have different tax systems.

3.2. Research Methodology

The data set contains a large number of countries (158 countries) and the time frame is quite long (1960–2014), so it is reasonable to believe that omitted variables could bias our estimates of the variables of interest. This endogeneity problem is considered due to omitted variables in the fixed effect panel data setting, including country dummies and time dummies. The model can be written as follows:

$$\dot{y}_{i,t} = \theta_0 + \theta_1 \dot{G}_{i,t-1} + \sum_{i=1}^{n} \delta_i X_{i,t-1} + \gamma_t + \alpha_i + \varepsilon_{i,t} \quad (1)$$

where $\dot{y}_{i,t} = \Delta \ln(GDP_{i,t})$ is the annual growth of the real GDP per capita in country i at time t. θ_0 is the intercept. $\dot{G}_{i,t-1}$ is the logarithmic changes in the Gini coefficient. $X_{i,t-1}$ is the vector of explanatory variables, including *PPPI*, *%Agriculture*, *%Industry*, *and %Service*, and $\varepsilon_{i,t}$ is a stochastic error. Following Forbes (2000), we included the *PPPI* variable to account for the price level of investment, which is widely used in the open economy literature.

To account for the endogenous issue of economic growth and the reversed effect running from economic growth to income inequality, we used the dynamic panel data setting. The following model was considered:

$$\dot{y}_{i,t} = \theta_0 + \theta_1(\dot{y}_{i,t-1}) + \theta_2(\dot{G}_{i,t-1}) + \sum_{i=1}^{n} \delta_i X_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Given the presence of the first-order lagged dependent variable in the model, the assumption of strictly exogenous variable seems not to hold for the lagged dependent variable containing observations from 2 to T on y and the residual term is a collection of observations from 1 to T, leading to a correlation between the regressor and the error terms. Thus, the application of regression techniques based on ordinary least squares (OLS) would potentially lead to a bias in the estimate of the lagged dependent variable, even in the case of infinite individuals (Hsiao 2014). To rectify this, a typical approach, which was suggested by Arellano and Bond (1991) and is normally referred to as the difference generalized method of moments (GMM), is taking the first difference, and then using lagged levels of the dependent variable as instruments for endogenous variables in the first-difference equation.

However, several years later, Arellano and Bover (1995) and Blundell and Bond (1998) argued that those instruments were likely to be poor, so such an approach would be weak if the dependent variable was close to a random walk and the panel data was short. As such, Blundell and Bond (1998) developed another estimation technique which is known as system GMM. Technically, together with

the first-difference equation adopted in the difference GMM, the system GMM allows us to employ additional level equations and then uses first-difference lagged levels as instruments. In this paper, for the transformed equation, the lagged level dated at $t-2$ was used as an instrument variable. For the level equation, the first difference dated at $t-1$ was employed.

4. Result and Discussion

4.1. Granger Causality Test

According to the discussed studies in Section 2, it is worthy to note that there is a causal relationship between income inequality and economic growth. Nevertheless, this does not necessarily imply a causality running from income inequality to economic growth and from economic growth to income inequality in our sample. As such, we employed a procedure developed by Dumitrescu and Hurlin (2012) to test for Granger causality (see Granger 1969, 1980) in our panel data set. The following model was employed:

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \beta_{ik} y_{i,t-k} + \sum_{k=1}^{K} \varphi_{ik} x_{i,t-k} + \varepsilon_{i,t}$$

where $x_{i,t}$ and $y_{i,t}$ are considered variables (i.e., income inequality and economic growth in this case). The inclusion of lagged values of x implies that if past values of x significantly explain variation in the current values of y when accounting for its preceding ones, x will have a causal effect on y. In doing so, an F-test was considered with following null hypothesis:

$$H_0 : \varphi_{i1} = \varphi_{i2} = \ldots = \varphi_{ik} = 0$$

If H_0 is rejected at a given significant level, there is causality running from x to y. In other words, the alternative hypothesis is accepted that there is a causality running from x to y in at least one panel.

One of the assumptions of the Granger causality test, proposed by Dumitrescu and Hurlin (2012), is the stationarity of the considered variable. As such, to address the issue, we used the recently developed technique proposed by Pesaran (2007). Compared to a series of stationarity tests (Breitung 2000; Harris and Tzavalis 1999; Im et al. 2003), it takes the problem of cross-sectional dependence into account, which produces reliable results in the presence of both heterogeneity across panels and cross-sectional dependence. The findings are presented in Table 3. In the subsample of middle-income countries, all variables were stationary at their levels. Similarly, in the sample of all countries, except for the *%Industry* and *%Service* variables, all other variables were stationary. In summary, the stationarity, especially for the annual growth of GDP per capita and income inequality, allows us to examine the impact of income inequality on growth in the presence of feedback from the dependent variable using the GMM method.

Table 3. Unit root tests.

Sample	$\dot{y}$	$\dot{G}$	*PPPI*	*%Agriculture*	*%Industry*	*%Service*
All countries	−7.33 ***	−3.96 ***	−3.024 ***	−2.44 ***	0.81	−1.21
	(0.00)	(0.00)	(0.00)	(0.00)	(0.79)	(0.11)
Middle-income countries	−4.75 ***	−1.40 *	−3.07 ***	−2.57 ***	−3.24 ***	−1.87 **
	(0.00)	(0.08)	(0.00)	(0.00)	(0.00)	(0.03)

p-value in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In the next step, we examined the income inequality–economic growth causality nexus in the two samples. In the sample of all countries, the empirical findings in Panel A indicate the presence of unidirectional causality running from income inequality to economic growth. Similarly, in relation to the Panel B, the null hypothesis that economic growth does not Granger cause income inequality is

rejected, suggesting that a causality from economic growth to income inequality exists. Overall, there is a bidirectional causality between income inequality and economic growth. The same conclusions can be reached for the sample including the middle-income countries. Particularly, the $\widetilde{Z}$ statistics are significant at the level of 1 percent in both Panel A and Panel B, as presented in Table 4. To put it differently, a bidirectional causality between income inequality and economic growth was found in the sample. The optimal number of lags was selected using the Akaike's information criterion (AIC).

Table 4. Granger causality test.

Sample	All Countries	Middle-Income Countries
Panel A		
	H_0:$\dot{G} \nrightarrow \dot{y}$	
$\widetilde{Z}$	7.02 ***	4.79 ***
$p(\widetilde{Z})$	0.00	0.00
Number of lags (AIC)	4	4
Panel B		
	H_0:$\dot{y} \nrightarrow \dot{G}$	
$\widetilde{Z}$	6.01 ***	5.27 ***
$p(\widetilde{Z})$	0.00	0.00
Number of lags (AIC)	4	1

p-value in parentheses. *** $p < 0.01$.

4.2. Empirical Analysis

In this section, the empirical analysis on the impact of independent variables on the dependent variable is presented.

Table 5 presents the system GMM estimations[4]. The coefficient of income inequality, denoted by $\dot{G}_{i,t-1}$, is negative and significant at the level of 1 percent, suggesting that income inequality decreases economic growth. The magnitude is somewhat larger for the middle-income countries sample than for the full sample. This finding is also consistent with those of previous studies (Halter et al. 2014; Castelló-Climent 2004; Deininger and Olinto 1999).

Among the explanatory variables, firstly, the PPPI, measuring market distortion on the price of investment, is also significantly negatively correlated with economic growth for both samples. This finding was also found in other studies (Fawaz et al. 2014; Forbes 2000; Perotti 1996). Secondly, *Industry* is negatively correlated to economic growth. Although the result is unexpected and contradicts growth theory, this finding is consistent with a finding from Szirmai and Verspagen (2015). With a significant and negative estimate for the all countries sample and for the system GMM estimation, the size effect of *Industry* is small. Finally, in contrast to the negative contribution of the variables above, positive impacts from *Agriculture* and *Service* on economic growth were found, which implies a positive effect of labor force on growth (Yang and Greaney 2017).

Table 5 also reports some statistics related to the system GMM. They are in relation to the Arellano and Bond test of second-order autocorrelation of the first-differenced residuals and the Hansen test of being exogenous of instrument variables. The results suggest that the null hypothesis of no second-order correlation failed to be rejected and that instruments are exogenous, which supports the validity of the GMM model.

[4] In addition to the system GMM estimation, we also estimated the effect of inequality on growth specified in Equation (1) using the fixed effects model. The results reveal a significant negative relationship between income inequality and economic growth. The estimates using fixed effects are higher than the GMM estimation above. Various studies have documented fixed effects estimators systematically producing higher effects (Neves et al. 2016; De Dominicis et al. 2008). Results will be available on request.

Table 5. Estimation results.

Variable	All Countries	Middle-Income Countries
	GMM	GMM
$\dot{y}_{i,t-1}$	0.32 ***	0.47 ***
	(0.09)	(0.06)
$\dot{G}_{i,t-1}$	−0.45 *	−0.97 **
	(0.25)	(0.46)
$PPPI_{i,t-1}$	−0.04 ***	−0.04 **
	(0.00)	(0.02)
$\%Agriculture_{i,t-1}$	0.01 *	0.04 *
	(0.00)	(0.02)
$\%Industry_{i,t-1}$	−0.07 *	−0.06
	(0.04)	(0.05)
$\%Service_{i,t-1}$	0.10 ***	0.06 *
	(0.02)	(0.03)
Observations	2625	1356
Arellano-Bond test for AR (1)	$Z = -3.02$	$Z = -4.08$
	$p > Z = 0.00$	$p > Z = 0.00$
Arellano-Bond test for AR (2)	$Z = 1.30$	$Z = 1.39$
	$p > Z = 0.19$	$p > Z = 0.16$
Hansen test	$H\chi^2$ (211) = 134.69	$H\chi^2$ (211) = 68.12
	$p > \chi^2 = 1.00$	$p > \chi^2 = 1.00$

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5. Concluding Remarks

Over the last 50 years, the impact of income inequality on economic growth has been extensively investigated. However, findings are mixed. It is argued that previous studies utilized suboptimal econometric techniques and imperfect data on income inequality. As such, this study was conducted to provide additional empirical findings on the inequality–growth nexus puzzle using a sample including only middle-income countries, which have largely been ignored in the literature. While previous studies utilized data on income inequality proposed by Deininger and Squire (1996) which have since then been considered imperfect and incomplete, this study employed a highly regarded data set on income inequality developed by Solt (2016).

Considering both cross-sectional and time dimensions, our empirical findings confirm a negative impact of income inequality on economic growth, implying that an increase in income inequality leads to a decrease in economic growth. These findings hold for both fixed effects panel model and dynamic panel model settings and for two samples—the full sample and the sample including only middle-income countries.

In addition, findings from this study confirm a positive contribution of labor force participation in agricultural and service sectors to economic growth, which is implied in the economic growth theories.

The findings of this empirical study also offer additional empirical evidence for governments in middle-income countries to formulate and implement their economic and social policies. Economic growth is generally associated with income inequality; thus, a disparity in income will, in turn, decrease the national output, leading to a reduction in economic growth. As such, policies which focus on a redistribution of economic achievement to the people, especially to those at the bottom of the income distribution, are required. Economic achievements will allow them to invest in human capital or physical capital, which offers a high rate of return. Also, policies to alleviate—though not necessarily eliminate—the capital–market imperfection through the development of financial intermediaries should be implemented. In addition, efficiency of capital allocation is required. In addition, policies to

increase minimum wage or to support accumulating assets for working families can also narrow the income gap. Further, it is recommended for policy-makers to take into consideration friendly working environment-related regulations, so that low-paid workers can make their best effort to work and earn.

Author Contributions: Conceptualization, D.H.V.; Methodology, D.H.V.; T.C.N.; Software, T.C.N.; N.P.T.; Validation, D.H.V.; Formal Analysis, T.C.N., A.T.V.; Investigation, D.H.V.; Resources, D.H.V.; Data Curation, D.H.V.; Writing-Original Draft Preparation, D.H.V.; Writing-Review & Editing, D.H.V.; Visualization, T.C.N.; Supervision, D.H.V.; Project Administration, D.H.V.; Funding Acquisition, D.H.V.

Funding: This research is funded by Vietnam's National Foundation for Science and Technology Development (NAFOSTED) under grant number 502.01-2018.38.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. All countries in the study.

Countries				
Afghanistan	Costa Rica	Italy	Namibia	St. Kitts and Nevis
Albania	Croatia	Jamaica	Nepal	St. Lucia
Algeria	Cyprus	Japan	Netherlands	Sudan
Angola	Czech Republic	Jordan	New Zealand	Suriname
Argentina	Denmark	Kazakhstan	Nicaragua	Swaziland
Armenia	Dominica	Kenya	Niger	Sweden
Australia	Dominican Republic	Korea	Nigeria	Switzerland
Austria	Ecuador	Kosovo	Norway	Tajikistan
Azerbaijan	El Salvador	Laos	Pakistan	Tanzania
Bangladesh	Estonia	Latvia	Panama	Thailand
Barbados	Ethiopia	Lebanon	Papua New Guinea	Timor-Leste
Belarus	Fiji	Lesotho	Paraguay	Togo
Belgium	Finland	Liberia	Peru	Tonga
Belize	France	Lithuania	Philippines	Trinidad and Tobago
Benin	Georgia	Luxembourg	Poland	Tunisia
Bhutan	Germany	Macedonia	Portugal	Turkey
Bolivia	Ghana	Madagascar	Puerto Rico	Turkmenistan
Bosnia and Herzegovina	Greece	Malawi	Qatar	Tuvalu
Botswana	Grenada	Malaysia	Romania	Uganda
Brazil	Guatemala	Maldives	Russia	Ukraine
Bulgaria	Guinea	Mali	Rwanda	United Kingdom
Burkina Faso	Guinea-Bissau	Malta	Samoa	United States
Burundi	Guyana	Mauritania	Senegal	Uruguay
Cambodia	Haiti	Mauritius	Serbia	Uzbekistan
Cameroon	Honduras	Mexico	Seychelles	Vanuatu
Canada	Hungary	Micronesia	Sierra Leone	Venezuela
Central African Republic	Iceland	Moldova	Singapore	Vietnam
Chad	India	Mongolia	Slovenia	Yemen
Chile	Indonesia	Montenegro	Solomon Islands	Zambia
China	Iraq	Morocco	South Africa	Zimbabwe
Colombia	Ireland	Mozambique	Spain	
Comoros	Israel	Myanmar	Sri Lanka	

Source: World Bank.

Table A2. Middle-income countries with GNI per capita > 1045 US$ in the study.

Countries		
Albania	India	Paraguay
Algeria	Indonesia	Peru
Angola	Iraq	Philippines
Armenia	Jamaica	Romania
Azerbaijan	Jordan	Samoa
Bangladesh	Kazakhstan	Senegal
Belarus	Kenya	Serbia
Belize	Kosovo	Solomon Islands
Bhutan	Laos	South Africa
Bolivia	Lebanon	Sri Lanka
Bosnia and Herzegovina	Lesotho	St. Lucia
Botswana	Macedonia	Sudan
Brazil	Malaysia	Suriname
Bulgaria	Maldives	Swaziland
Cameroon	Mauritania	Tajikistan
China	Mauritius	Thailand
Colombia	Mexico	Timor-Leste
Costa Rica	Micronesia	Tonga
Dominica	Moldova	Tunisia
Dominican Republic	Mongolia	Turkey
Ecuador	Montenegro	Turkmenistan
El Salvador	Morocco	Tuvalu
Fiji	Myanmar	Ukraine
Georgia	Namibia	Uzbekistan
Ghana	Nicaragua	Vanuatu
Grenada	Nigeria	Vietnam
Guatemala	Pakistan	Yemen
Guyana	Panama	Zambia
Honduras	Papua New Guinea	

Source: World Bank.

References

Alesina, Alberto, and Dani Rodrik. 1994. Distributive politics and economic growth. *The Quarerly Journal of Economics* 109: 465–90. [CrossRef]

Alvaredo, Facundo, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, eds. 2018. *World Inequality Report 2018*. Cambridge: Belknap Press of Harvard University Press.

Arellano, Manuel, and Stephen Bond. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies* 58: 277–97. [CrossRef]

Arellano, Manuel, and Olympia Bover. 1995. Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics* 68: 29–51. [CrossRef]

Atkinson, Anthony B., and Andrea Brandolini. 2001. Promise and pitfalls in the use of "secondary" data-sets: Income inequality in OECD countries as a case study. *Journal of Economic Literature* 39: 771–99. [CrossRef]

Barro, Robert Joseph. 2000. Inequality and Growth in a Panel of Countries. *Journal of Economic Growth* 5: 5–32. [CrossRef]

Bewley, Ronald A. 1979. The direct estimation of the equilibrium response in a linear dynamic model. *Economics Letters* 3: 357–61. [CrossRef]

Biswas, Siddhartha, Indraneel Chakraborty, and Rong Hai. 2017. Income Inequality, Tax Policy, and Economic Growth. *The Economic Journal* 127: 688–727. [CrossRef]

Blundell, Richard, and Stephen Bond. 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87: 115–43. [CrossRef]

Breitung, Jörg. 2000. The local power of some unit root tests for panel data. In *Advances in Econometrics, Volume 15: Nonstationary Panels, Panel Cointegration, and Dynamic Panels*. Edited by Badi H. Baltagi, Thomas B. Fomby and R. Carter Hill. Bingley: Emerald Group Publishing Limited, pp. 161–77.

Castelló-Climent, Amparo. 2004. *A Reassessment of the Relationship between Inequality and Growth: What Human Capital Inequality Data Say?* València: Instituto Valenciano de Investigaciones Económicas.

Chambers, Dustin. 2010. Chambers, Dustin. 2010. Does a rising tide raise all ships? The impact of growth on inequality. *Applied Economics Letters* 17: 581–86. [CrossRef]

Cingano, Federico. 2014. *Trends in Income Inequality and Its Impact on Economic Growth*. OECD Social, Employment and Migration Working Papers. Paris: OECD Publishing. [CrossRef]

De Dominicis, Laura, R. J. Florax, and H. L. De Groot. 2008. A meta-analysis on the relationship between income inequality and economic growth. *Scottish Journal of Political Economy* 55: 654–82. [CrossRef]

De Haan, Jakob, Regina Pleninger, and Jan Egbert Sturm. 2018. Does the impact of financial liberalization on income inequality depend on financial development? Some new evidence. *Applied Economics Letters* 25: 313–16. [CrossRef]

Deininger, Klaus, and Pedro Olinto. 1999. *Asset Distribution, Inequality, and Growth*. World Bank Policy Research Paper 2375. Washington, DC: World Bank.

Deininger, Klaus, and Lyn Squire. 1996. A New Data Set Measuring Income Inequality. *World Bank Economic Review* 10: 565–91. [CrossRef]

Dumitrescu, Elena Ivona, and Christophe Hurlin. 2012. Testing for Granger non-causality in heterogeneous panels. *Economic Modelling* 29: 1450–60. [CrossRef]

Fawaz, Fadi, Masha Rahnama, and Victor J. Valcarcel. 2014. A refinement of the relationship between economic growth and income inequality. *Applied Economics* 46: 3351–61. [CrossRef]

Forbes, Kristin J. 2000. A Reassessment of the Relationship between Inequality and Growth. *American Economic Review* 90: 869–87. [CrossRef]

Forest, J. James, and Paul Turner. 2013. Alternative estimators of cointegrating parameters in models with nonstationary data: An application to US export demand. *Applied Economics* 45: 629–36. [CrossRef]

Galbraith, James K., and Hyunsub Kum. 2005. Estimating the inequality of household incomes: A statistical approach to the creation of a dense and consistent global data set. *Review of Income and Wealth* 51: 115–43. [CrossRef]

Granger, Clive W. J. 1969. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica* 37: 424–38. [CrossRef]

Granger, Clive W. J. 1980. Testing for causality: a personal viewpoint. *Journal of Economic Dynamics and Control* 2: 329–52. [CrossRef]

Halter, Daniel, Manuel Oechslin, and Josef Zweimüller. 2014. Inequality and growth: the neglected time dimension. *Journal of Economic Growth* 19: 81–104. [CrossRef]

Harris, Richard D. F., and Elias Tzavalis. 1999. Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics* 91: 201–26. [CrossRef]

Hayakawa, Kazuhiko, and Eiji Kurozumi. 2008. The role of "leads" in the dynamic OLS estimation of cointegrating regression models. *Mathematics and Computers in Simulation* 79: 555–60. [CrossRef]

Hendry, David Forbes. 1995. *Dynamic Econometrics*. Oxford: Oxford University Press on Demand.

Hsiao, Cheng. 2014. *Analysis of Panel Data*, 3rd ed. Cambridge: Cambridge University Press.

Huang, Ho Chuan, WenShwo Fang, Stephen M. Miller, and Chih-Chuan Yeh. 2015. The effect of growth volatility on income inequality. *Economic Modelling* 45: 212–22. [CrossRef]

Im, Kyung So, Mohammad Hashem Pesaran, and Yongcheol Shin. 2003. Testing for unit roots in heterogeneous panels. *Journal of Econometrics* 115: 53–74. [CrossRef]

Kim, Jong-Hee. 2016. A Study on the Effect of Financial Inclusion on the Relationship Between Income Inequality and Economic Growth. *Emerging Markets Finance and Trade* 52: 498–512. [CrossRef]

Kozminski, Kate, and Jungho Baek. 2017. Can an oil-rich economy reduce its income inequality? Empirical evidence from Alaska's Permanent Fund Dividend. *Energy Economics* 65: 98–104. [CrossRef]

Kuznets, Simon. 1955. Economic Growth and Income Inequality. *American Economic Review* 45: 1–28.

Li, Hongyi, and Heng-fu Zou. 1998. Income inequality is not harmful for growth: Theory and evidence. *Review of Development Economics* 2: 318–34. [CrossRef]

Lundberg, Mattias, and Lyn Squire. 2003. The simultaneous evolution of growth and inequality. *The Economic Journal* 113: 326–44. [CrossRef]

Madsen, Jakob Brochner, M. Rabiul Islam, and Hristos Doucouliagos. 2018. Inequality, financial development and economic growth in the OECD, 1870–2011. *European Economic Review* 101: 605–24. [CrossRef]

Majumdar, Shibalee, and Mark D. Partridge. 2009. Impact of economic growth on income inequality: A regional perspective. Paper presented at the Agricultural and Applied Economics Association, Milwaukee, WI, USA, July 26.

Malinen, Tuomas. 2012. Inequality and growth: Another look with a new measure and method. *Journal of International Development* 25: 122–38. [CrossRef]

Masih, Rumi, and Abul Mansur Masih. 1996. Stock-Watson dynamic OLS (DOLS) and error-correction modelling approaches to estimating long-and short-run elasticities in a demand function: New evidence and methodological implications from an application to the demand for coal in mainland China. *Energy Economics* 18: 315–34. [CrossRef]

Narayan, Paresh Kumar. 2004. Do public investments crowd out private investments? Fresh evidence from Fiji. *Journal of Policy Modeling* 26: 747–53. [CrossRef]

Neves, Pedro Cunha, Óscar Afonso, and Sandra Silva. 2016. A Meta-Analytic Reassessment of the Effects of Inequality on Growth. *World Development* 78: 386–400. [CrossRef]

Nguyen, Cong Thang, Vo The Anh, Pham Ngoc Thach, Do Thanh Trung, and Vo Hong Duc. 2019. Gender-Based Attitudes toward Income Inequality in the Asia-Pacific Region. *Emerging Markets Finance and Trade*. [CrossRef]

Nissim, Ben-David. 2007. Economic growth and its effect on income distribution. *Journal of Economic Studies* 34: 42–58. [CrossRef]

Perotti, Roberto. 1996. Growth, income distribution, and democracy: What the data say. *Journal of Economic Growth* 1: 149–87. [CrossRef]

Persson, Torsten, and Guido Tabellini. 1994. Is Inequality Harmful for Growth? *The American Economic Review* 84: 600–621.

Pesaran, M. Hashem. 2007. A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics* 22: 265–312. [CrossRef]

Rubin, Amir, and Dan Segal. 2015. The effects of economic growth on income inequality in the US. *Journal of Macroeconomics* 45: 258–73. [CrossRef]

Saikkonen, Pentti. 1991. Asymptotically efficient estimation of cointegration regressions. *Econometric Theory* 7: 1–21. [CrossRef]

Solt, Frederick. 2016. The Standardized World Income Inequality Database. *Social Science Quarterly* 97: 1267–81. [CrossRef]

Stock, James H., and Mark W. Watson. 1993. A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica: Journal of the Econometric Society* 61: 783–820. [CrossRef]

Szirmai, Adam, and Bart Verspagen. 2015. Manufacturing and economic growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics* 34: 46–59. [CrossRef]

Vo, Hong Duc, Nguyen Van Phuc, Nguyen Minh Ha, Vo The Anh, and Nguyen Cong Thang. 2019. Derivatives market and economic growth nexus: Policy implications for emerging markets. *North American Journal of Economics and Finance*. [CrossRef]

Wahiba, Nasfi Fkili, and Malek El Weriemmi. 2014. The Relationship Between Economic Growth and Income Inequality. *International Journal of Economics and Financial Issues* 4: 135–43.

Yang, Yiwen, and Theresa M. Greaney. 2017. Economic growth and income inequality in the Asia-Pacific region: A comparative study of China, Japan, South Korea, and the United States. *Journal of Asian Economics* 48: 6–22. [CrossRef]