An Examination of the Relationship between Income Inequality, Demographic Inequality and Economic Growth Considering the level of Financial Development

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ABSTRACT

Consumption and savings patterns change with extensive results for commodities and financial markets when older people become more consumers and savers. Hence, population inequality could affect economic growth. Furthermore, there is an extensive literature concerning the relationship between financial development and growth. Overall, it is expected that with the possibility of efficient capital allocation and reduction of borrowing and financing restrictions, economic development accelerates growth with.

Given the points stated regarding the effect of income inequality, population inequality and financial development on economic growth, the study examined the effect of income inequality and population inequality on economic growth by considering the level of financial development in developing Asian countries. Developing Asian countries, including Afghanistan, Bangladesh, India, Pakistan, Indonesia, Iran, Saudi Arabia, Malaysia, UAE and Turkey formed the population of the study, and their annual financial and economic data from 2000 to 2020 were examined in a regression study using panel approach. The findings indicated that population inequality results in increased economic growth, income inequality has no significant effect on economic growth, financial development has no significant effects on the relationship between income inequality and population inequality with economic growth..

Keywords: Income inequality, demographic inequality, economic growth, financial development
JEL Classification: C23, O12, G23.

1. Introduction

Income inequality that is increasing wealth for limited number of people (Buttrick & Oishi, 2016), has been considered as a major challenge of the present time (Saez & Zucman, 2016). The increase in income inequality has many negative economic aftermaths. Researchers' examinations indicate that the countries

with higher income inequality experience slower growth (Banerjee & Duflo, 2003). Furthermore, growth in countries with higher income inequality is less stable over time (Berg & Ostry, 2011). In the countries with higher income inequality, fewer people have a role in increasing GDP (Piketty & Saez, 2014). The residents of countries with higher income inequality have lower levels of health (Pickett & Wilkinson, 2015), and this affects not only the poor but also the rich (Subramanian & Kawachi, 2006). Higher income inequality is connected to lower welfare, meaning that the level of mental illness (Burns et al., 2014), depression (Messias et al., 2011), crime, especially murder and assault (Hsieh & Pugh, 1993), obesity and death from obesity (Pickett, 2005) as well as drug abuse, early marriage, racism and imprisonment (Wilkinson & Pickett, 2009) are high in these countries.

On the other hand, various examinations indicate that demographic inequalities affect economic growth. The dynamics of the age structure positively affect economic growth and general standard of living (Uddin et al., 2016). The growth effect of age structure changes is obtained by various ways. Firstly, increasing the share of the working age population means that more people are able to work. In other words, the working-age population produces more than they consume, so per capita production increases. The second path is to increase savings. The working-age population saves more, resulting in higher levels of investment and increased production. The third way, which is the most significant one, is the increase of human capital because of the change in the age structure (Bawazir et al., 2020). Kögel (2005) proved that the ratio of youth dependence has a negative effect on total factor productivity. Experimental analysis by Choudhry and Elhorst (2010) stated that GDP per capita has a significant relationship with working age population yet little correlation with children and aging dependency ratios. They figured out that population dynamics accounted for 46% of economic growth per capita GDP in China, 39% in India, and 25% in Pakistan for the period 1961–2003. Moreover, they found that reducing dependence on children was a major factor in per capita GDP growth. According to Lee and Mason (2010), slower population growth and low fertility increase capital density and higher per capita income. Moreover, Bloom and Canning (2011) figured out that population growth and age structure have a significant effect on economic growth. They report that children aged 15-20 are at working age, thus enabling countries to have the opportunity to grow rapidly. In China, Wei and Hao (2010) indicated that a significant contribution to population structure in economic growth is mainly because of low reliance on young people as a result of reduced fertility. In India, Aiyar and Mody (2013) concluded that population growth rate significantly affects working age economic growth.

Besides the points stated, an extensive literature exists on the relationship between financial development and growth. Overall, economic development is expected to accelerate growth with the possibility of allocating efficient capital and reducing borrowing and financing constraints. Growth due to financial development might benefit the poor more by creating better job opportunities, yet it may benefit entrepreneurs and their profit margins too. Additionally, financial development enables former poor immigrants to select the education they want and create the jobs they want. This is the basic reason why economic theories predict the negative effects of financial development on income inequality. Financial development promotes free choice of education and job creation. As both of them lead to growth and this in turn is related to more jobs, the average income increases and inequality decreases (Jauch & Watzka, 2012).

Given the points stated regarding the effects of income inequality, population inequality and financial development on economic growth, the study intends to examine the effect of income inequality and population inequality on economic growth by considering the level of financial development in developing Asian countries.

2. Theoretical framework

The relationship between income distribution and economic development was first examined by Kuznets (1955), who delineated the inverted U-shaped path of income along economic development - the famous Kuznets curve. Kuznets stated that rural areas were more equal and had lower average incomes

than urban areas at the beginning of industrialization, and thus, society became more unequal through urbanization. When a new generation of former poor villagers moving to cities is born, they can take advantage of urban facilities. Wage of low-income groups increases and income inequality is limited overall (Jauch & Watzka, 2012). Some others stated the opposite perspective, arguing the existence of different political and economic channels by which income inequality could be diminished economic growth. One of these channels is taxes that might reduce the motivation of the rich to produce. Another channel is socio-political instability that is because of the feeling of relative deprivation in the poor and increased fertility among the poor, resulting in a decrease in the ability to support their children, and human capital, and a decrease in growth finally. The common view in many of these conceptual frameworks that expect the negative effects of wealth inequality on growth is that the extreme concentration of wealth distorts economic policies resulting in poor economic performance (Bagchi& Svejnar, 2013).

The effect of the development of age-related changes as a demographic feature could be seen as the primary or secondary demographic benefit (Lee & Mason, 2006). Primary profits are the first direct and immediate result of an increase in the share of the working age population. If a larger share of the population is employed, the average standard of living will be higher. The potential benefits of poverty reduction are twofold. Firstly, in low-income households that have fewer children, the standard of living increases as the number of effective producers per household member increases. Secondly, the advances in public finances because of the increase in the number of workers in the economy will result in more resources being allocated to low-income households. The second profit is created when faster population growth at working age leads to more savings in the short term and higher investment in human capital and investment per worker in the long run. The first demographic benefit can last for decades but is ultimately transient. With fertility rates decline, child dependency ratios decrease both in families and in a population, whereas the share of the population in working age increases and remains high for several generations. If the working age population is increasingly used productively, there is a possibility of increasing living standards throughout the economy. The first profit is often the result of a certain (growing) labor looking for fewer children (Mason & Kinugasa, 2008). The second benefit comes from changing the age structure to save more and increase investment in human and physical capital. The increase in the share of workers in the economy according to the total population results in higher production and more resources in the economy, which can facilitate increased savings, investment and the accumulation of physical and human capital too. These decisions subsequently affect labor productivity. Funding for a growing labor is costly, and as labor force growth slows, a certain level of investment will lead to more capital for each worker. Demographic change drives the countries towards raising more capital and further increase in labor productivity (Birdsall et al., 2003). The per capita household capital increases as the population ages since personal assets accumulate throughout a person's life (Cruz & Ahmed, 2018).

3. Research hypotheses

The study tries to examine the following hypotheses:

1. Income inequality affects economic growth.

2. Demographic inequality affects economic growth.

3. Financial development moderates the relationship between income inequality and economic growth.

4. Financial development moderates the relationship between population inequality and economic growth.

4. Literature review

In a study entitled "Demographic Change and Economic Growth: Empirical Evidence from the Middle East" using a fixed linear panel data model for ten Middle Eastern countries for a period of 5 years from 1996 to 2016, Bawazir (2020) revealed that young workers, workers Middle-aged, senior workers,

population growth rates and old dependency ratios have a positive effect on economic growth; however, youth dependency ratios have a negative effect on economic growth. Gender-based analysis indicates that men of working age are more involved in economic growth than women of working age.

In a study entitled "Opportunity inequality, income inequality and economic growth," Aiyar & Ebeke (2020) assumed that the relationship between income inequality and economic growth is a function of the level of equality of opportunity. They identified equality of opportunity with intergenerational mobility, the degree of correlation between parental achievement (income and education) and children's achievement. The findings indicated that the elimination of intergenerational mobility results in misdiagnosis, and it is clarified why the empirical literature on inequality and income growth has been so contradictory.

In a study entitled "On the effect of demographic change on economic growth and poverty," Cruz and Ahmed (2018) describe the main mechanisms through which demographic change may affect economic outcomes and estimates the relationship between changes in population share working age per capita growth and poverty rate. It has been indicated that the increase in the share of the population in working age and reducing the child dependency ratio, related to increase per capita GDP growth, and this has positive effects on reducing poverty.

In a study entitled "The effects of income inequality on evidence of economic growth of MENA countries," Lahouij (2017) studied the effects of income inequality and other factors determining economic growth on economic growth of some selected MENA oil importing countries using panel data for 1980-2007. The results indicated that income inequality slows down the pace of change in economic development.

In a study entitled "The link between economic complexity, institutions and income inequality," Hartmann (2016) introduced a scale correlating a product with a level of income inequality equal to the average GINI of the exporting countries (with the share of the product Shows in that country's export basket). They used this criterion together with the network of related products - or product space - to show how the production of new products relates to changes in income inequality. These results indicate that economic complexity gets information about the level of economic development that is related to the methods of production and distribution of economic income.

In a study entitled "Growth (Unequal): Fiscal policy and income inequality in China and BRIC+," Cevik and Correa-Caro (2015) focused on the share of fiscal redistribution, empirical features of income inequality in China and group BRIC + countries from 1980 to 2013. They found evidence to support the Kuznets curve hypothesis, an inverted U-shaped relationship between income inequality and economic development - in China and the BRIC + panel using variable instrumental techniques to counter potential endogeneity. In case of China, empirical findings indicated that government spending and taxes have opposite effects on income inequality. However, government spending appears to have a worse effect, taxes improve income distribution.

In a study entitled "Demographic Change and Economic Growth: Empirical Evidence from Asia," Song (2013) uses a model of economic growth to examine most of the demographic effects on the economic growth of thirteen Asian countries from 1965 to 2009. The results indicate the negative effects of total population growth and young population on economic growth. However, it indicates the positive effects of growth in the working age population and the proportion of the working age population.

In a study entitled "Examining the interaction effects of income inequality, employment and economic growth" using the information of Iran in the period 2007 to 2016, Radfar et al. (2020) studied the interaction effects of income inequality, employment and economic growth. The findings indicated positive effects between income inequality and economic growth. This means that with economic growth, it is not evenly distributed in the country's economy and its effects have not led to an improvement in household income.

Furthermore, there are no significant relationships between the interaction effects of employment and economic growth, which could be associated with the phenomenon of stagflation in the economy.

In a study entitled "The effect of income inequality thresholds on economic growth in selected developing countries: Gentle Panel Transition (PSTR) Approach" using data from selected countries for 2000-2012, Barghi Osgoui et al. (2017) examined the effect of income inequality thresholds on economic growth. The linearity test results strongly confirm the existence of a nonlinear relationship between the studied variables. Income inequality variable has a positive effect in the first regime and a negative effect on economic growth in the second regime. Additionally, human capital in both regimes has had a symmetrical and consistent effect on economic growth. Other findings indicate that population growth and the degree of trade openness have disproportionate effects on economic growth in the regimes.

In a study entitled "The relationship between income inequality and economic growth in Iran" using the nonlinear regression model of STR and Iranian data for 1969-2012, Heidari and Hassanzadeh (2016) examined the effect of income inequality on Iran's GDP per capita. The findings indicated that the relationship between income inequality and economic growth in Iran is nonlinear with a two-regime structure so that the effect of income inequality on GDP per capita is negative in the first regime, and is positive in the second. Hence, the net positive or negative effect of inequality on economic growth obtained through empirical studies cannot be accepted.

In a study entitled "The relationship between economic growth and income inequality between the provinces of Iran" based on seasonal time series data for 2000-2010, and vector autoregression model, Khalesi and Piraei (2016) indicated income inequality in the short-run, reduces economic growth in the short term, which only part of this reduction is eliminated in the long-run.

5. Methodology

Asian developing countries including Afghanistan, Bangladesh, India, Pakistan, Indonesia, Iran, Saudi Arabia, Malaysia, UAE and Turkey were the population of the study. The annual financial and economic data of the stated countries will be reviewed during the years 2000 to 2020.

A regression model as model (1) was used to examine the relationships between variables.

$$EG_{i,t} = \alpha_0\, IUE_{i,t} + \alpha_1\, GUE_{i,t} + \alpha_3 FD_{i,t} + \alpha_4\, FD_{i,t} \times IUE_{i,t} + \alpha_4\, FD_{i,t} \times GUE_{i,t} + \alpha_4 INF_{i,t} + OP_{i,t} + \epsilon_{i,t}; \ (1)$$

In model (1), the dependent variable is economic growth (EG), defined as the growth of GDP in two consecutive years. Income inequality (IUE) is estimated using the Gini coefficient. Demographic inequality (GUE) is defined using the ratio of people of working age to the total population. Financial development (FD) is equal to the index of stock market growth and banking development, which is defined based on the average ratio of stock market transactions and bank credit to the private sector divided by GDP. Inflation (INF) rate is defined based on price growth in terms of consumer price index. The trade openness index (OP) is estimated based on the average import and export of the sector based on GDP.

To fit the model, the normal panel regression model and Eviews software were used. Data was collected using documentary method and referring to the global database.

6. Results

The value of descriptive statistics of the variables for 2000-2020 is given in Table 1.

Table (1): Descriptive statistics of the variables

Variable	Total	Mean	SD	Min.	Max.	Skewness	Kurtosis
EG	4.980	5.032	21.391	-7.445	3.327	0.102	7.127
FG	35.807	30.338	202.992	1.318	27.354	2.233	12.381
IUE	19.913	11.813	46.100	11.813	12.262	0.934	2.041
GUE	48.710	45.791	99.831	15.270	18.409	0.953	4.116
OP	34.852	25.915	110.203	12.653	22.758	1.638	4.670
INF	7.552	6.427	54.915	-6.811	7.977	3.224	17.080
Economic Growth (EG), Income Inequality (IUE), Demographic Inequality (GUE), Financial Development (FD), Inflation Rate (INF), Openness Index (OP)							

Studies indicate that the lowest value of EG index was associated with Iran and the highest value to Afghanistan. The lowest value of FG index is for Iran and the highest for Saudi Arabia. The lowest value of the IUE variable is for Indonesia and the highest for Malaysia. The lowest value of GUE variable is for the UAE and the highest for Afghanistan. Malaysia has the highest OP and Pakistan the lowest. The lowest INF is in Afghanistan and the highest in Turkey.

Levin–Lin–Chu test was used to measure the reliability of the variables, the results of which can be seen in Table 2.

Table (2): Levin–Lin–Chu reliability test

Variables	Test statistic	Sig.
EG	-2.874	0.002
FG	-3.435	0.000
IUE	-2.631	0.004
GUE	-2.879	0.002
OP	-2.846	0.002
INF	-4.229	0.000

In the reliability test, the significance of the test is less than 0.05, showing the reliability of the studied variables.

The model will be fitted based on the observations made to examine the correctness of the research hypotheses. Firstly, to select one of the methods of panel data or composite (cross-sectional) data, F-Limer statistic was used. Because of the suitability of the panel model, the Hausman test was used to choose between fixed and random effects methods. The findings from fitting model (1) to the observations are given in Table 3.

Table (3): The summary of the results of fitting the model to the observations

Variables	Regression coefficient	SD	T statistic	Sig.
IUE	0.251	0.275	0.914	0.362
GUE	0.643	0.155	4.152	0.000***
FG	-0.022	0.383	-0.058	0.954
IUE*FG	0.001	0.006	0.114	0.910
GUE*FG	0.003	0.007	0.492	0.623
INF	-0.782	0.320	-2.441	0.016**

OP	0.070	0.167	0.418	0.676
y-intercept	12.369	9.247	1.338	0.183
(***) Significance at 99% confidence level, (**) Significance at 95% confidence level				
Fisher (significance)	5.308(0.000)		Limer (significance)	-2.874(0.002)
Durbin-Watson statistic	1.881		Hausman (significance)	6.778(0.452)

The findings stated in Table 3 reveal that the significance of t-test in examining the effect of income inequality on economic growth (0.362) is more than 0.05, showing the effect of income inequality on economic growth not significant. The significance value of t-test in the study of the effect of population inequality variable on economic growth (0.000) is less than 0.05 and the value of regression coefficient (0.643) is positive, suggesting a positive and significant effect of population inequality on economic growth. In examining the role of financial development in the relationship between income inequality and economic growth, the significant value of t-statistic (0.935) is more than 0.05, suggesting the effect of financial development insignificant in the relationship between income inequality and economic growth. In studying the role of financial development in the relationship between population inequality and economic growth, the significance value of t-statistic (0.905) is more than 0.05, showing that the effect of financial development in the relationship between population inequality and economic growth is insignificant.

Table (4): The summary of the results of hypotheses testing

Hypothesis	Results	Effect type
Income inequality affects economic growth.	Not confirmed	-----
Demographic inequality affects economic growth.	Confirmed	Positive
Financial development moderates the relationship between income inequality and economic growth.	Not confirmed	-----
Financial development moderates the relationship between population inequality and economic growth.	Not confirmed	-----

7. Conclusion

One of the most important issues for economists, policymakers, and even the press since the 1950s has been the relationship between total production and income distribution. Numerous studies have been carried out using various methods to help understand the critical relationship between these two variables such a pioneering study was carried out by Kuznets. Kuznets's study relied on the process of change from agricultural economies to industrial economies of three European countries: Britain, Germany and the United Kingdom. In the author's findings, when people migrate from agricultural areas to the industrial ones, the process of economic development ends in income concentration. By weakening the migration process, the process of economic development will be reversed (Araujo and Cabral, 2014). In other words, his study reveals that the relationship between GNP per capita and income inequality is an inverse U-shaped relationship. With per capita income increase in underdeveloped countries, income inequality increases until it reaches a maximum, then decreases with further increase in per capita income. One of the interesting points that researchers and economists states and raise the question that there may be a relationship between income inequality and total production is the riddle posed by Lucas (1993). As Benabou (1996) showed that in spite of all the major macroeconomic factors such as per capita GDP, population, urbanization, and enrollment in similar primary and secondary schools South Korea and the Philippines differed in terms of income distribution in the early 1960s. The correlation between income inequality and economic growth is open to discussion. In fact, a modern perspective has emerged to emphasize the potential adverse effects of income inequality on economic growth, whereas classical theory has emphasized the usefulness of income inequality for economic development. On the other hand, modern development economists (e.g., Alesina and Rodrik, 1996) have challenged the idea of the positive effects of income inequality on economic growth

and have conducted many cross-sectional studies to prove the negative correlation between the two variables.

On the other hand, the predicted change in the age structure is somehow outstanding in all developed and developing countries and will result in a significantly higher proportion of older people in the world. This may increase even in the face of current large migration flows and increasing fertility. The aging trend will have a deep effect on labor, financial and commodity markets. At the macroeconomic level, labor in aging countries will be relatively low whereas capital will be relatively abundant. This accelerates changes in the relative price of labor, results in capital accumulation, and might result in large international flows of labor, capital, and goods from younger to older countries. At the microeconomic level, the age composition of the workforce will change, probably affecting labor productivity. Consumption and savings patterns change as older people become more consumers and savers, with far-reaching consequences for commodities and financial markets. Hence, population inequality can have significant effects on economic growth (Börsch-Supan et al., 2020).

The effect of income inequality and population inequality on economic growth and the role of financial development in this regard in developing Asian countries was examined in the present study considering the conflicting views on the effects of inequality on economic growth. The findings indicated that population inequality results in increased economic growth, income inequality has no significant effect on economic growth, financial development have no significant effects on the relationship between income inequality and population inequality with economic growth.

The study results are in line with those of Cruz and Ahmed (2018) and Song (2013) who revealed that increasing the youth age at working age results in economic growth. The findings are inconsistent with those of Lahouj (2017) that indicated that income inequality affects economic growth.

Considering the study results, population inequality has a positive effect on economic growth and inflation has a negative effect on economic growth, so government policies have to reduce inflation to increase the tendency to have children and increase the youth population and thus increase economic growth. Moreover, public policies must take care of the existing population to offset the residual effect of population aging on economic growth. This could have an effect on these slow changes in efficiency, demographics, created in the labor, product and capital markets, mostly at the microeconomic level. Additionally, policies need to focus on using labor resources, pensions, education and childcare policies to increase labor force participation in old age, youth and women.

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