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Urbanization And Inequality in Urbanizing Countries: Testing the Shape of Kuznets Curve

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Abstract: *The objective of my paper is to investigate the effect of urban growth on inequality. Focusing on the data of countries urbanizing at rate more than 70 percent; the paper looks into the determinants of inequality and that to what extent the changes in the past inequality can be explained by urbanization and GDP per capita. Furthermore, it looks into the mere factors of increased inequality linked to the inflation deflator, education and trade and that what will be the shape of Kuznets curve of inequality and urbanization holding GDP per capita constant and vice versa. The study used Pooled data for the period of 1980-2017 to test the hypothesis of these countries. The pooled ordinary least square (POLS) estimation technique is used to estimate the pooled data model for a dataset of 53 urbanizing countries. Data used in the study have been collected from various sources i.e. World Bank Indicators, World Inequality data. Gini coefficient has been used as a proxy variable of inequality, higher the value Gini coefficient shows higher the inequality in relation to urbanization at first phase and vice versa. Empirical findings shows that Gini coefficient is increasing by 4.05 with 1 unit increase in urban growth. Further, that the Kuznets inverted U shaped curve holds. The sign between Gini coefficient and urban growth is positive and it is significant. The other variables also have the same expected signs as supported by the theory.*

Keywords: *Urban growth, Gini coefficient, GDP per capita, Pooled data, Kuznets curve*

1. INTRODUCTION

This paper is motivated by four stylized parts of the urbanizing countries over the years. The first part discusses how the level of inequality, urbanization and GDP per capita has changed considerably over the years relative to the previous trends. For which the study includes 53 countries whose urbanization rate is more than 70 percent. Since the level of world urbanization has crossed more than "50% mark, and 80% of the Asian's lives in the countries where inequality has been increasing over the years" (ADB, 2012) which is creating wealth disproportionately (Liddle, 2017). Second, what will be the turning point of these countries, as we all know that the progress towards greater equality did not last long thus will there be any reversal of inequality trend in future? Therefore, the research will examine the turning points of urbanization, GDP per capita and inequality. Third, as the changing economic managers and structure in countries are in dominance in very large part.

Moreover, the fourth part of the paper discusses how much of the increased inequality can be linked to the inflation deflator, trade and education. Fourthly, as the urbanization has fastened quickly, thus I want to scrutinize how the change in urbanization and GDP per capita may affect the future of inequality in these countries.

As in Public Republic of China (PRC) rural urban divide accounts for 45% and 20% in Indonesia which is has been sizably increasing over the years (Kanbur and Zhuang 2013). "Asia's share of urban population has increased from 40% to 46.2% in the last 2 decades" (ADB, 2012). In the Public Republic of China, "the share of urban population increased from 27% in 1990 to 52% in 2012" (World Bank, 2012).

Urbanization is happening and will continue to

happen. As urban development is a very essential part of the economic development. Therefore, when the urbanization increases huge flux of people move to cities to take advantage of agglomerating economies, higher paid employments and better prices etc. Simultaneously on the other side urbanization costs quality of life, environment, increases poverty etc.

Thus, with this alarming rise in the rate of urbanization, we might move towards an urban hell? Or what will happen if the urbanization increases to 100 percent. Therefore this study will discuss the problem of high level of urbanization.

With the increased level of urbanization there is a rise in the level if inequality. As they both are linked together according to the Kuznets curve. The inequalities exist in many levels, as in the case of Western Europe and North America the production was concentrated to only few cities leaving the other regions behind.

The World Development Report 2009 argues that "urban-rural living standards diverge as countries develop and become more urbanized, converging only once they reach a relatively high development threshold". Therefore, I want to explore the relationship between urbanization and inequality, discuss its mechanism that how urbanization is effecting inequality at a country level.

On the role of urbanization, Kuznets (1955) argues that "Income tends to be more unevenly distributed in urban areas, and that the income gap between urban and rural residents does not necessarily narrow with economic development". As this is objective of our study to explore the liaison between urban areas, GDP per capita and inequality.

It is true that we are experiencing a historical transition, which is resulting in a dual economic structure. As Plato wrote that "any city however small, is divided into two, one the city of the poor, the other of the rich" (Glaeser and Resseger, 2009). Thus, with the huge flux of people moving into cities there has been a rise in the inequality ratio. Therefore, more specifically the goals of this paper are as follows:

• To investigate the effect of urbanization on inequality.

• To examine the determinants of inequality in urbanizing countries.

• To test the shape of Kuznets curve between urbanization and inequality.

The study has been organized as follows. Chapter 2 provides literature review in regard to the link between the urbanization and inequality. Chapter 3 discusses the theoretical background, data, understanding the variables and methodology which will be used to test the hypothesis. Further in chapter 4 interpretation of the results and discussion limitations. Lastly in chapter 5 we will conclude the study and recommend the policies.

2. BACKGROUND

In 1955 Kuznets recognized many forces that results in an inverted U-shaped Kuznets curve, as at the initial development stage inequality increases at first and declines when reached to certain average income level. When savings among the rich households increases it lead to increase inequality, further political changes, demographic developments, new industries development, increase in importance of income from services and urbanization as indicated by Kuznets (1955), will in general help diminish inequality as a country in on track on development.

Many researchers have tested Kuznets theory empirically; the results have not been consistently same. To prove how at country level urbanization affects inequality, numerical examples has been used that shows while we hold the rural urban income distributions and ratios constant, that a population shift from rural to urban area results in a higher inequality and in a higher income in urban population initially which results in an inverted U-shaped Kuznets curve as later it declines after it reaches a maturity level.

Following Kuznets articles, Anand and Kanbaur (1992), Kanbaur and Zhuang (2013), Zhang (2016) and Chen M et al (2016) have tested the relationship between the urbanization and inequality, as these studies depicted an inverted

U-shaped Kuznets curve. The results of these studies show that each country is at different phase of Kuznets curve, as the findings are not uniformly supportive

Whereas Angel (2010) contradicted Kuznets curve as his results showed that there is U-shaped curve in contrast to the inverted U-shaped curve. Though the results were not statistically significant, therefore the Kuznets curve did not hold in his studies.

Later, Oyyat (2009) also in his paper examined the two stages of Kuznets curve in the developing countries, as in his study he tried to prove the Kuznets argument might not hold keeping in view the case of Turkey as it did not explain the real changes in the income distribution. As the study revealed that the relationship between inequality and income may be negative or marginally positive in many developing countries in the first phase of industrialization.

Additionally, he also tried to explain that how the structure of inequality changes with the level of development. He also showed that due to the countries socioeconomic structure inequality in rural areas is greater.

A lot of work has been done in regard to India too as; Kundu and Gupta (1996), Cali (2007), Tripathi (2013), Colmer (2015) and Maiti (2017) have tested the Kuznets U-shapedcurve for India and the results found that the urbanization has increased inequality by 15%, further that the India has not reached its turning point and thus the income inequality is rising. Whereas Colmer, in his study found that the increased urbanization results in reduction of poverty and inequality in India.

Further on the pattern of inequality in China; Cai et al (2010) Chen and Lu (2014), Zhang and Bao (2015) and Wu and Rao (2016) the studies reveal that the China has managed to reduce inequality and that it has reached its turning point and that now its income inequalities will decrease. As this mirrors the path of the expected Kuznets curve.

Moreover, if we look at the other studies of Neilson and Anderson (1997) and Behrens and Nicoud (2013) of USA also supports the Kuznets curve. Whereas the Barel and Schwartz (2003) of Brazil, Sagala et al (2013) Indonesia and Arouri et al (2016) of Vietnam they all support the patterns of Kuznets curve.

Now moving further to the urbanization and GDP per capita literature as many studies have found different findings by testing the hypothesis empirically. Bahamani Osokooe, Hegrety and Wilmeth (2008) have a sample size of 16 countries and results showed that in short run income inequality is affected by economic development in Iran, Kenya, Colombia, India, US, and Venezuela. However, in long run the effects remained same in, Colombia, Ecuador, Indonesia, Kenya, Mauritius, Panama, and the United States. Whereas, the economic development decreased the income inequality in long run in the first four countries.

Later Bahmani-Oskooee and Gelan (2012) used another time-series study who included 18 countries in their sample. They found that while economic growth lowered income inequality in Ethiopia, Indonesia, Iran, Kenya, Malaysia, and Mauritius in the long run, it worsened it in Bolivia, Chile, Egypt, the Philippine, and Turkey.

Other studies like Ahluwalia (1976), Barro (1999), Chen (2002), Castello and DomeAnech (2002), Chambers and Krause (2009) and Naguib (2015) also shows the same mixed results in regard to their respective countries and that they have confirmed the relationship between income inequality and development.

In regard to the studies in USA; Ram (1991) and Costantini and Paradiso (2018), were not in support to the Kuznets curve theory as they showed that the economic growth has worsen the inequality in USA.

In relation to urbanization and inequality it has also been very closely related with another variable poverty, as poverty also signifies inequality therefore, Liddle (2017), Tripathi (2013), Zhang (2016), Deininger and Squire (1996), Barel and Schwartz (2003) and Ravillion et al (2007) results showed that as the gross domestic product per capita increased there was a definite decrease in poverty and rural urban

gaps were narrowed. Moreover, the results showed that at higher levels of urbanization the increased urbanization aggravated the poverty and rural-urban gaps.

Now that the urbanization and inequality studies and the urbanization and GDP per capita results has been discussed now we will move further to the combined studies done. Adam and Klobodu (2018), Liddle (2017), Quintana and Royale (2015), and Hofmann and Wan (2013) there results showed that the inverted U-shaped Kuznets curve exists. Same are the results for urbanization and inequality. Further it showed that higher levels of urbanization might lead to higher inequality.

Further, it was found that the association between inequality and urbanization was positive for developing countries whereas it was negative developed ones. Though the results are not uniquely uniformed and supportive as each country is at different phase of Kuznets curve as Kanbaur and Zhuang (2013) empirically showed in his paper.

2.1 CONTROLLED VARIABLES

The relationship of inequality with the controlled variables; inflation GDP deflator, education and trade will be discussed. The first variable inflation, as inflation shows the rate of price change in the economy as a whole. The redistribution effect of inflation can be traced by to Cantillon (1755), who has linked the increased money supply with inflation. He complies that with the increased supply of money, the new money enters the economy at a particular point, which results in few people get the new money first which further leads too inflation. Monnin (2014) explored the relationship between income inequality and inflation during 1971 to 2010 for ten OECD countries. The results found a long run association between inflation and income inequality.

As the theories do not give us a clear estimate about the net effects of inflation on inequality, as literature suggests the inflation caused by money supply expansion have greater amount of impact on the privileged class as compared to the poor people, as it did not create much job opportunities. Therefore we conclude that the inflation have a net effect of enlarging the inequality and thus we expect it to be positive.

The second variable education, as mixed views are given about the effect of education on income inequality. As education at various levels is a factor in the dispersion of income to the extent that it is unevenly distributed over a certain range of development, diffusion of education may increase inequality by widening the gap between the educated elite and the rest, producing a curvilinear relationship between inequality and the spread of education in the same way that labor force shifts from the traditional sector produce the inequality patter. Whereas Zhang et al. (2012) in contrast found that education has worsened the rural urban inequality in Eastern China due to the brain drain issues in rural areas.

Rauch (1993) shows that, a higher average level of education in USA has resulted into a higher level of earnings individually. This can be related to a similar argument of labor market pooling economies of scale that it is stronger in the case when the workforce is more skilled and specialized. To conclude we can say that education can be one of the drivers of urbanization as if it changes its preferences towards urban environments.

The third variable is trade, as trade has been thought to increased urbanization. As the results of Meschi and Vivarelli (2009) investigated data on 65 developing countries from 1980 to 1999 period to see the liaison between trade and income inequality. The study found that the trade has worsen the income distribution in the developing countries both through imports and exports. The results showed that the reason behind the negative association between trade and economic growth is high inequality in developing countries. Moreover there is a significantly negative liaison between trade and growth in unequal groups whereas for less unequal groups it's highly positive.

In regard to China Jalil (2011) results show that in the case of China the Kuznets curve fits the relationship between openness and income equality. As the results are in line to the

hypothesis of Kuznets that with the increase in trade openness the income inequality increases and then falls after a critical point.

2.3 ECONOMETERIC ISSUES

There are a few issues found in the studies. Firstly, as the individual countries lack adequate long time series data, therefore, most of the empirical tests of the Kuznets inverted U hypothesis have used cross country or pooled data. Which results in ignoring the country specific characteristics as the cross sectional data usually generalize the results.

Secondly, "As in a time-series model, the Inverted-U shape could be captured by lag structure that is imposed on income in an error-correction model. Positive coefficients at lower lags followed by negative coefficients at higher lags will support Kuznets hypothesis" (Hoffman and Wan, 2013). Thus there is difference of result when the time series is used.

Further, there might be third factor causation, reverse causality and omitted variable. For example due to other factors a correlation could be caused between urbanization and inequality.

3. METHODOLOGY

The Kuznets 1955 model is the main theoretical framework for explaining urbanization and income inequality. Kuznets argues that the main factor to cause inequality is urbanization lead by industrialization. As he argued that the income inequality rises in the early stages of development and later it decreases, as he assumed: (a) the urban average per capita is usually higher than that of the rural population; (b) urban population's inequality in the percentage shares within the distribution is expansive than the rural population.

In 1955, Simon Kuznets made the attempt to link between urbanization and inequality against reality. To illustrate how urbanization effects inequality, where he identifies the two stages of Kuznets inverted U-shaped curve. At the first stage he claims, there is an increase in inequality with the rising urbanization, whereas at the second stage he claims that the inequality decreases when a certain average income level reached. As according to Kuznets (1955) "The increasing urban population means increasing the share of the more unequal component of income". He looks into the mere factors of how urbanization develops inequality.

In his original work, Kuznets (1955) focused on the two main drivers behind this process: urbanization and the concentration of savings. As the upper class earns more and saves more

relative to the poor class therefore over time, they have a larger portion of total assets in the society which results in a greater share of total income.

In this regard to Kuznets theory this research will test the Kuznets hypothesis using the data from 1980 to 2017 for the countries with 70 percent urbanization rate. Further, whether urbanization increases with the inequality and what is the shape of Kuznets curve.

4. MODEL

In this section of the study which are being used to link the dependent and independent variables. As a brief discussion of model will be held with its specification. The model shows the relationship between dependent and independent variables:

$$IN\,it = \alpha + \beta\,1Uit + \beta\,2\,U\;it2 + \beta\,3\,ln\,Y\,it + \beta\,4\,ln\,Y2it + \beta 5\,ln\,(U * Y)it + \beta\,6\,ED\,it$$

$$+ \beta 7\,ln\,TR\,it + \beta 8\;\; ln\,INFit + \mu\,it \quad (3\text{-}1)$$

Where INit measures the inequality measured by Gini coefficient for time t and i countries, Uit is the urban growth measured by people living in urban areas, U2it is the square of urban growth, Yit is the income measured by GDP per capita , Y2it is the square of income, (U*Y)it measures the cross products of urban growth and income, EDit measures the education level proxy by secondary school enrollment percentage, INFit is the proxy for the inflation GDP deflator, and TRit is the proxy of trade, whereas as μ it is the error term. Where urban growth, urban growth square, income, income square and cross products of urbanization and income are main variables. Whereas education, trade and inflation deflator are controlled variables.

Further in this section description of the variables will be discussed:

4.1 DATA AND VARIABLES

4.1.1 INEQUALITY

As inequality is measured by the Gini coefficient index, as gini coefficient index is normally used to condense the income distribution of the entire country into a single number from 0 to 1: as higher the number higher the level of inequality is. Where 0 shows that the inequality does not exists, as all the households have the same amount of income and 1 shows that the inequality is at its extreme. As gini coefficient is a statistical measure to show the level of dispersion as it represents the income distribution of nation's inequality level.

As most of the previous studies Kanbur and Zhuang (2013), Quintana and Royale (2015) and Anand and Kanbur (1992) took the Gini coefficient to see how it is affected the urbanization and other variables.

4.1.2 URBAN GROWTH AND URBAN GROWTH SQUARE

According to the World Bank definition urban population growth refers to people living in urban areas measured in annual percentage. The calculation of this indicator is done using the World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects.

The urban population growth is dependent on the increase in the number of the urban population and on the net rural urban migration in the urban areas, as the percentage of urban population growth is taken. Whereas as urbanization square shows the square of the urban growth. When the urban population grows faster than the total population than the urbanization rate is positive.

4.1.3 INCOME AND INCOME SQUARE

GDP per capita is gross domestic product divided by midyear population. Data used is in constant U.S. dollars. As it is also a real GDP per capita. Whereas the income square shows the square of GDP per capita (World Bank, 2012).

The income is measured by the Gross Domestic Product per capita, where Per capita GDP is a measure of the total output of a country that takes the gross domestic product (GDP) and divides it by the number of people in that country. An increase in the GDP shows that there is an increase in the level of productivity.

4.1.4 EDUCATION

The education is measured by the secondary school admission percentage gross, the ratio of total enrollment is the gross enrollment ratio. As regardless of the age, to the population of the age group that officially corresponds to the level of education shown. The secondary school gives the provision of the basic education which began at the primary level. As it offers more skill oriented instruction from specialized teachers (World Bank, 2012).

As the school enrollment indicates the capacity of the education system at each level, as a high ratio presents a higher number of average children enrollment in each grade.

4.1.5 INFLATION

Inflation shows the change in the rate of price in the economy as a whole. It is measured by the annual growth rate of the GDP implicit deflator. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency (World Bank, 2012).

4.1.6 TRADE

Trade is measured by exports sum of imports divided by the gross domestic product into 100. It is also called the trade openness ratio, as it is a measure of the openness of a country to the international trade. It represents a country's degree of globalization of an economy (World Bank, 2012).

4.1. Below is the detailed table of each variable with its definition and sources provided at table

TABLE 4.1: DEFINITION OF VARIABLES

VARIABLES	MEASURED BY	DEFINITION	SOURCE
IN_{it}	Income Inequality measured by Gini Index	Income inequality is measured by the Gini coefficient index, as Gini coefficient index is normally used to condense the income distribution of the entire country into a single number from 0 to 1: as higher the number higher the level of inequality is. Where 0 shows that the inequality does not exists, as all the households have the same amount of income and 1 shows that the inequality is at its extreme.	www.worldbank.org
U_{it}	Urban Growth	Urban growth refers to people living in urban areas.	www.worldbank.org
U^2_{it}	Square of Urban Growth	Where the urban growth square shows the square of the urban growth.	www.worldbank.org
ED_{it}	Secondary School Enrollment	Education is measured by the secondary school enrollment percentage.	www.unesco.org
Y_{it}	GDP per capita	GDP per capita is gross domestic product divided by midyear population. It is calculated without depreciation. Data are in constant 2010 U.S. dollars. As it is also a real GDP per capita.	www.worldbank.org
Y^2_{it}	Square of GDP per capita	Where the income square shows the square of real GDP per capita	www.worldbank.org
$U*Y_{it}$	Cross product of urban growth and income	It measures the cross products of urban growth and income	www.worldbank.org

INF_{it}	Inflation GDP Deflator	Inflation shows the change in the rate of price in the economy as a whole. It is measured by the annual growth rate of the GDP implicit deflator. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. It is taken in annual percentage.	www.worldbank.org
T_{it}	Trade	Trade is measured by exports sum of imports divided by the gross domestic product into 100.	www.worldbank.org
U_{it}	Error term of countries	Where U_{it} is the error term	

Table 4.2: Expected Sign of each Variables

VARIABLES	EXPECTED SIGNS	ECONOMETRIC REASON
Urban Growth	Expect the coefficient of urban growth to be positive (+)	A non-linear relationship, as with the increased level of development, people move to urban areas to earn a higher level of income share. Thus this movement first leads to an initial increase and later a subsequent fall in the inequality level, which shows the turning point.
Square of Urban Growth	Expect the coefficient of square of urban growth to be negative (-)	As the estimation suggests a parabolic relationship as one coefficient is positive and the other is negative.
GDP per capita	Expect the coefficient of GDP per capita to be positive (+)	A non-linear relationship, as inequality primarily increases when a country develops and later it decreases after a certain average income is reached. Which shows the turning point.
Square of GDP per capita	Expect the coefficient of square of GDP per capita to be negative (-)	As the estimation suggests a parabolic relationship as one coefficient is positive and the other is negative.

Cross product of urbanization and income	Expect the coefficient of cross product to be positive (+) or negative (-)	As the estimation suggests that the parabolic results of cross product of urbanization and inequality might be positive or negative.
Secondary School Enrollment	Expect the coefficient of secondary school enrollment to be negative (-)	As with the improvement of education, the income of those receiving education increases. Therefore education has an inequality narrowing effect.
Inflation Deflator	Expect the coefficient of inflation to be positive (+)	Inflation increases income inequality as it effects poor more comparatively, as the wages lag behind inflation.
Trade	Expect the coefficient of trade to be negative (-)	The relationship between income inequality and trade is controversial as per the literature. But as the countries with higher trade has better living standards and less income inequality therefore the expected sign is negative.

5. EMPIRICAL RESULTS AND INTERPRETATION

For the empirical analysis we carried out a regression analysis across countries of 53 urbanizing countries and used pooled ordinary least square regression analysis to investigate and determine the relationship between Gini coefficient and the other independent variables, for this purpose we used a pooled data set from 1980 to 2017. In the below table 5.1 the results have been shown by using the Pooled Ordinary Least Square (POLS).

Table 5.1: Pooled Ordinary Least Square Regression

INDEPENDENT VARIABLES	*COEFFICIENTS*	*T -STATS*
URBAN GROWTH	4.0735**	4.52
URBAN GROWTH SQUARE	-0.7422**	-6.46
GDP PER CAPITA	41.3698**	14.85
GDP PER CAPITA SQUARE	-2.4383**	-17.05
CROSS PRODUCT OF URBAN GROWTH AND GDP PER CAPITA	1.3020**	2.58
SECONDARY SCHOOL ENROLLMENT	-0.0453**	-3.78
INFLATION DEFLATOR	0.0012	0.35
TRADE	-1.2955**	-4.00
R SQUARE	0.55	
ADJUSTED R SQUARE	0.55	
F TEST	173.91**	

Source: P-values are in parentheses. *, **, *** denote significance level 1%, 5% and 10% level, respectively

According to the results in the above table, the variables and the coefficients shows the same expected signs and are significant. Except inflation deflator's its sign is now in line to the econometric reasoning but it is still insignificant. According to the model, 1 percent increase in the urban growth will increase Gini coefficient by 4.073567. Likewise, the 1 unit increase in urban growth square will decrease the Gini coefficient by -0.7422892.

The study shows the same expected signs of urban growth and urban growth square and both are significant. As in line too many researchers; Anand and Kanbaur (1992), Kanbaur and Zhuang (2013), Zhang (2016) and Chen et al (2016) have empirically tested the relationship between the urbanization and inequality, as these studies depicted an inverted U-shaped Kuznets curve. The results of these studies show that each country is at different phase of Kuznets curve.

Further the 1 percent increase in GDP per capita and GDP per capita square will increase it by 41.36987 percent and decrease by –2.438358 percent respectively. Both the variables are found significant with the expected signs. Simultaneously 1 percent rise in the cross product of urban growth and GDP per capita will increase by 1.30207, the sign is as expected and is found significant. As supported by the literature from Ahluwalia (1976), Barro (1999), Chen (2002), Castello and Dome Anech (2002), Chambers and Krause (2009) and Naguib (2015) also shows the same results in regard to their respective countries and that they have confirmed the relationship between income inequality and development.

Furthermore, the controlled variables, education (proxy of secondary school enrollment) and trade are found significant and shows the expected signs. As the 1-unit change in secondary school enrollment will decrease the Gini coefficient by -0.453555. Whereas 1 percent increase in the trade will decrease the Gini coefficient by -1.295555 percent. In the case of inflation deflator now 1-unit increase brings 0.0012208 unit rise in Gini coefficient. The expected sign is found but it is still insignificant.

Now turning back to the main question whether there was a Kuznets curve, as in line to our study and the literature the results supports the theory. There is an inverted U-shaped Kuznets curve as shown below. Whereas for the Gini coefficient and GDP per capita it's the same.

Figure 5.1: Relationship between Gini Coefficient and Urban Growth

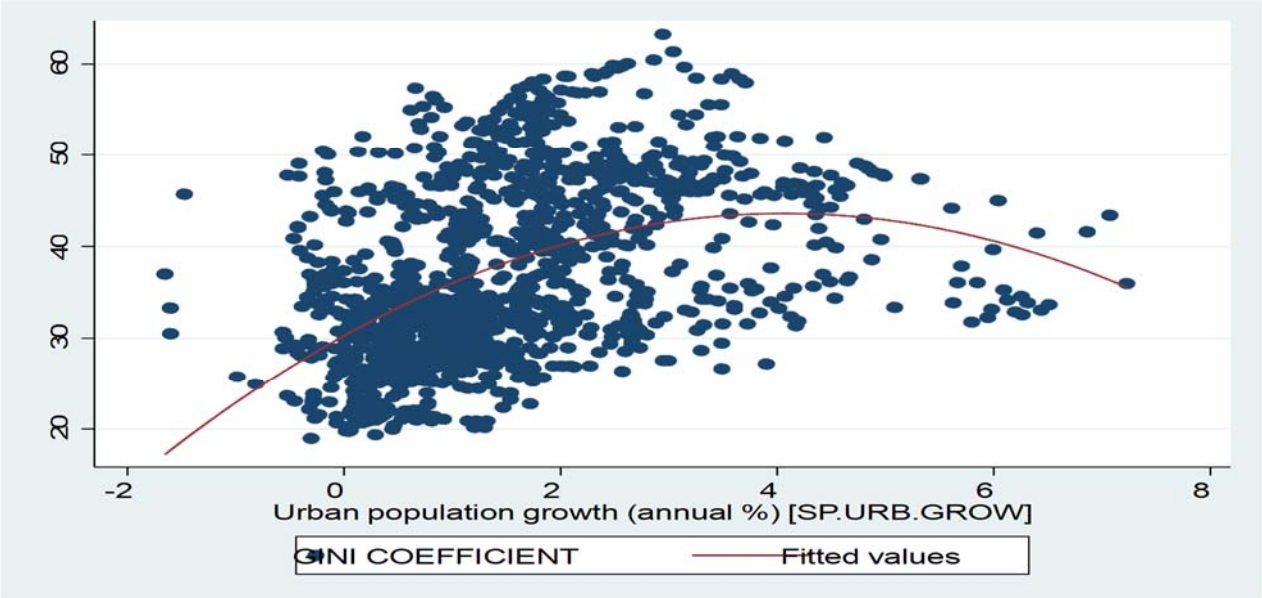
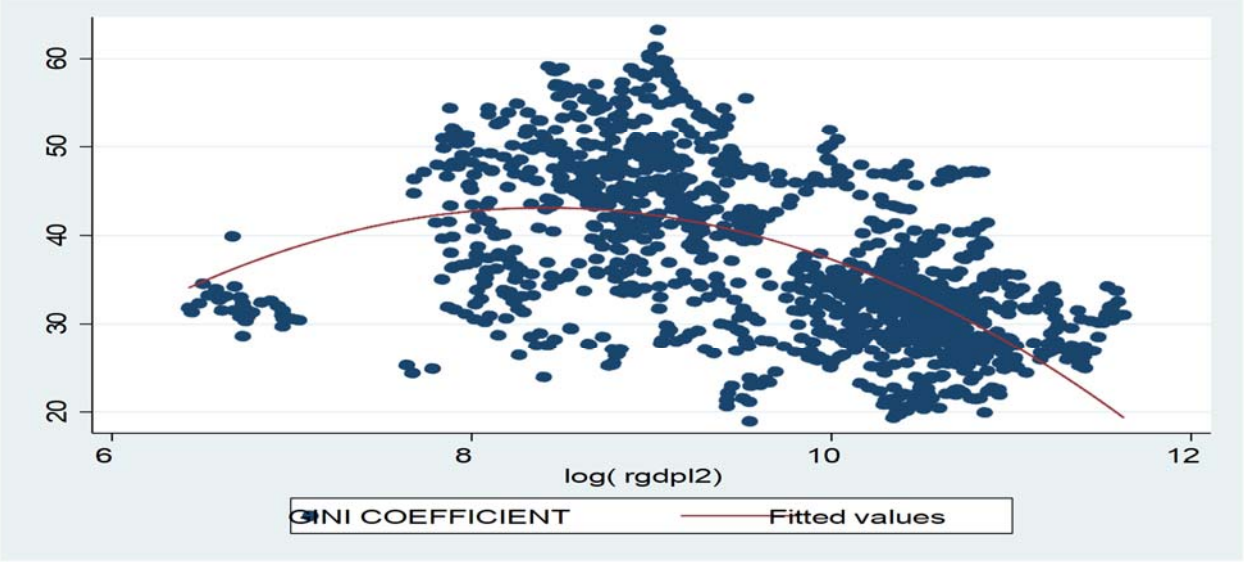


Figure 5.2: Relationship between Gini Coefficient and GDP per capita



Further, to determine the stability of the model for empirical analysis, there are certain diagnostic tests which are done for more stable estimation of the model. The study has used Breusch-Pagan Langrage Multiplier (LM) test, Wooldridge's test, Variance Inflation Factor and Newey West Standard Error test.

The study first check for the heteroscedasticity in the model. According to the test, the null hypothesis is rejected and there is significant evidence that there is heteroscedasticity. As the p- value is less than 0.05 thus we have heteroscedasticity present in our model. Moreover, the Woolridge's test is also taken to check whether there is autocorrelation in our data. The results show that there is autocorrelation present too.

Further the Variance Inflation Factor test showed that there is collinearity in the data. GDP per capita and GDP per capita square are highly correlated according to the results. Therefore, in order to correct multicollinearity and autocorrelation the Newey West Standard Error test is applied to make the model more stable. The regression with the Newey West tests results are showed that now the problem of the autocorrelation and multicollinearity are no more in the model. Now the results are consistent with the same signs.

6. CONCLUSION

Empirical support of the hypothesis that urban growth causes income inequality is strong. As an increases in the urban growth is found to result in a significant increases income inequality level. Furthermore the results of the model indicated that the study shows the same expected signs of urban growth (positive) and urban growth square (negative) and that both are significant. Further the GDP per capita (positive) and GDP per capita square (negative) both the variables are found significant with the expected signs and so is the sign of cross product of urban growth and GDP per capita, trade and education which is the proxy of secondary school enrollment is as expected and is found significant. Thus all the variables are as expected and significant, only the inflation deflator is insignificant but the sign is positive as to what the literature suggests. Therefore, the study fulfill its objectives as discussed in the introduction, that inequality and urbanization has a relationship and that the inverted U shaped Kuznets cure exists.

6.1 POLICY IMPLICATION

The growing concern over inequality should be

addressed, as with the increase in inequality, there should be a devised policy through which inequality in those urban areas could be reduced. The policies should be made to progress, educate and facilitate to decrease inequality. A better and improved services should be provided to reduce urban inequality such as funds, social security system. Further movement between urban and rural areas should be freer for better labor mobility.

REFERENCES

Adams Samuel & Edem Kwame Mensah Klobodu, 2018. "Urbanization, Economic Structure, Political Regime, and Income Inequality," Social Indicators Research: An International and Interdisciplinary Journal for Quality-of-Life Measurement, Springer, vol. 142(3), pages 971-995, April.

Ahluwalia, M. (1976). Income Distribution and Development: Some Stylized Facts. The American Economic Review, 66(2), 128-135.

Anand, S. Kanbur, S.M.R, (1992) The Kuznets process and the inequality-development relationship*. Journal of Development Economics 40 (1993) 25552. North-Holland.

Angeles, L., (2010) An alternative test of Kuznets' hypothesis. J Econ Unequal (2010) 8:463–473.

Angotti, T. (1996). Latin American Urbanization and Planning: Inequality and Unsustainability in North and South. Latin American Perspectives, 23(4), 12-34.

Arouri, M., Youssef, A.D., Nguyen, C., (2016) Does urbanization reduce rural poverty? Evidence from Vietnam.

Asian Development Bank 2012. Asian Development Outlook.

Azzoni, C.R., (2013) Economic Growth and Regional Income Inequality in Brazil.

Babu et al. (2016) Does inequality hamper long run growth? Evidence from Emerging Economies. Bahmani-Oskooee, M. and Gelan, A. (2012) 'On the relation between income distribution and economic growth', Global Business and Economics Review, Vol. 14, No. 4, pp.249–273.

Bahmani-Oskooee, M., Hegerty, S., & Wilmeth, H. (2008). Short-Run and Long-Run Determinants of Income Inequality: Evidence from 16 Countries. Journal of Post Keynesian Economics, 30(3), 463-484.

Barrel, R., Schwartz, D. (2003) Economic Growth, Inequality, and Spatial Demographic Distribution: A Brazilian Case.

Barro, R. (1999) Inequality and Growth in a Panel of Countries. Journal of Economic Growth, 5(1), 5-32.

Beaton, K., Cebotari, A., Komaromi, A. (2017) Revisiting the Link between Trade, Growth and Inequality: Lessons for Latin America and the Caribbean. IMF Working Paper, WP/17/46.

Behrens, K, Nicoud, F.R, (2013) Survival of the Fittest in Cities: Urbanization and Inequality. The Economic Journal.

Behrens, K. (2014). Do cities widen the gap between rich and poor? World Economic Forum.

Black, D., & Henderson, V. (1999). A Theory of Urban Growth. Journal of Political Economy, 107(2), 252-284.

Bosker, M., Deichmann, U., Roberts, M., Hukou and highways the impact of China's spatial development policies on urbanization and regional inequality, Regional Science and Urban Economics (2018).

Bourguignon, F., Morrisson, C., (1997) Inequality and development: the role of dualism, Journal of Development Economics Vol. 57 1998 233–257.

Cai, H., Chen, Y., & Zhou, L. (2010). Income and Consumption Inequality in Urban China: 1992–

2003. Economic Development and Cultural Change, 58(3), 385-413.

Cali, M. (2007). Urbanization, inequality and economic growth: Evidence from Indian states.

Cao, S., LV, Y., Zheng, H., Wang, Z., (2013) Challenges facing China's unbalanced urbanization strategy.

Cantillon, Richard, Essai sur la Nature du Com- merce en General, London, 1755 (Henry Higgs, ed., London: Macmillan, 1931)

Castelló, A., & Doménech, R. (2002). Human Capital Inequality and Economic Growth: Some New Evidence. The Economic Journal, 112(478), C187-C200.

Castello, A., Domenech, R., (2002) Human Capital Inequality and Economic Growth: Some New Evidence. The Economic Journal, 112.

Cerdeiro, D., Komaromi, A., (2017) The Effect of Trade on Income and Inequality: A Cross Sectional Approach.

Chambers, D., Krause, A., (2010) Is the relationship between inequality and growth affected by physical and human capital accumulation?

Cheng Wenli & Yongzheng Wu, 2017. "Understanding the Kuznets Process—An Empirical Investigation of Income Inequality in China: 1978–2011," Social Indicators Research: An International and Interdisciplinary Journal for Quality-of-Life Measurement, Springer, vol. 134(2), pages 631-650, November.

Chen G, Glasmeier AK, Zhang M, Shao Y (2012) Urbanization and Income Inequality in Post Reform China.

Chen M, Zhang H, Liu W, Zhang W (2014) The Global Pattern of Urbanization and Economic Growth: Evidence from the Last Three Decades. PLoS ONE 9(8): e103799.

Chen, BL., (2002) An Inverted-U relationship between inequality and long-run growth.

Chen, M., Lu, W., Tao, X., (2014) Evolution and assessment on China's urbanization 1960e2010: Under-urbanization or over-urbanization?

Colmer, J. (2014). Urbanization, Growth, and Development: Evidence from India.

Costantini M., Paradiso A., What do panel data say on inequality and GDP? New evidence at US state-level. Economics Letters (2018),

De Kruijk, H., & Kemal, A. (1987). Sources of Income Inequality in Pakistan [with Comments].

The Pakistan Development Review,26(4), 659-672.

De Kruijk, H., Van Leeuwen, M., & Kemal, A. (1985). Changes in Poverty and Income Inequality in Pakistan during the 1970s [with Comments]. The Pakistan Development Review, 24(3/4), 407-422.

Deininger, K., & Squire, L. (1996). A New Data Set Measuring Income Inequality. The World Bank Economic Review, 10(3), 565-591.

Deininger, K., & Squire, L. (1998). New Ways of Looking at Old Issues: Inequality and Growth.

Journal of Development Economics Vol. 57 1998 259–287. Dudwick, K. S. (n.d.). Urbanization and Rural-Urban Welfare Inequalities.

Elizondo- Livas and R Krugman, P. (1996) Trade Police and Third World metropolis. Journal of Development Economics, 49, 137-150.

Frank, W. (2005). Income Inequality and Economic Growth in the U.S: A Panel Co-Integration Approach. SHSU Economics & Intl. Business Working Paper No. SHSU_ECO_WP05-03.

Ge, T., Wu, T. (2016). Urbanization, inequality and property prices: Equilibrium pricing and transaction in the Chinese housing market.

Glaeser, Edward L. and Resseger, Matthew and Tobio, Kristina, Urban Inequality (November 10, 2008). Harvard Institute of Economic Research Discussion Paper No. 2168.

Greene D, et al. (2008) Ensemble non-negative matrix factorization methods for clustering protein interactions. *Bioinformatics* 24(15):1722-8.

Henderson, V. (2002). Urbanization in Developing Countries. The World Bank Research Observer, 17(1), 89-112.

Hofmann, A. Wan,G. (2013) Determinants of Urbanization. Asian Development Bank No. 355 July 2013

Jalil, A. (2012). Modeling income inequality and openness in the framework of Kuznets curve: New evidence from China.

Jedwab, R., Christiaensen, L., Gindlelsky, M. (2017). Demography, Urbanization and Development: Rural Push, Urban Pull and … Urban Push?

Kanbur, R. (2011). Does Kuznets Still Matter?

Kanbur, R., & Zhuang, J. (2013). Urbanization and Inequality in Asia. Asian Development Review. Vol. 30(1), pp. 131–147

Kundu, A., & Gupta, S. (1996). Migration, Urbanization and Regional Inequality. Economic and Political Weekly, 31(52), 3391-3398.

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

Lewis, W.A. (1954) Economic Development with Unlimited Supplies of Labour. The Manchester School of Economic and Social, 22, 139-191.

Li Hongyi & Heng-fu Zou, 2002. "Inflation, Growth, and Inco me Distribution: A Cross-Country Study," CEMA Working Papers 85, China Economics and Management Academy, Central University of Finance and Economics.

Liddle, B. (2017). Urbanization and Inequality/Poverty. Urban Science, 7.

Lundberg, M., & Squire, L. (2003). The Simultaneous Evolution of Growth and Inequality. The Economic Journal, 113(487), 326-344.

Maiti, M. (2017) Urbanization and inequalities in China and India. Overview and comparative study. Theoretical and Applied Economics Volume XXIV (2017), No. 4(613), Winter, pp. 121-136.

Majeed, Muhammad Tariq (2016) "Economic growth, inequality and trade in developing countries", International Journal of Development Issues, Vol. 15 Issue: 3, pp.240-253.

Meschi, Elena and Vivarelli, Marco (2009*) Trade and income inequality in developing countries.* World Development, Vol.37 (No.2). pp. 287-302

Ming Lu & Zhao Chen (2006) Urbanization, Urban-Biased Policies, and Urban-Rural Inequality in China, 1987-2001, The Chinese Economy, 39:3, 42-63

Mohsen Bahmani-Oskooee, Scott W. Hegerty & Harvey Wilmeth (2008) Short-run and long-run determinants of income inequality: evidence from 16 countries, Journal of Post Keynesian Economics, 30:3, 463-484

Mohsen-Ardakani, A. B.-Oskooee. (2017). Inequality and growth in the United States: is there asymmetric response at the state level?

Monnin, Pierre, Inflation and Income Inequality in Developed Economies (June 2, 2014). CEP Working Paper Series.

Naguib, Costanza (2015): The relationship between inequality and GDP growth: An empirical approach, LIS Working Paper Series, No. 631, Luxembourg Income Study (LIS), Luxembourg

NBS (2005). China 2005 1 % population census data. National Bureau of Statistics of China.

NBS (2012). The provincial statistical yearbook from 1990 to 2012. National Bureau of Statistics of China.

NBS (2013). China Statistical Yearbook 1996–2012. National Bureau of Statistics of China

Nielsen, F. (1994). Income Inequality and Industrial Development: Dualism Revisited. American Sociological Review, 59(5), 654-677.

Nielsen, F., & Alderson, A. (1997). The Kuznets Curve and the Great U-Turn: Income Inequality in U.S. Counties, 1970 to 1990. American Sociological Review, 62(1), 12-33.

N'YilimonNantob, (2015) ''Income Inequality and inflation in Developing Countries: An Empirical Investigation'', Economics Bulletin, Volume 35, Issue 4, pages 2888-2902

Oyvat, C. (2008). How Urbanization Affects the Inequality in Developing Countries: A Critique of Kuznets Curve, 31.

Oyvat, C. (2016) Agrarian Structures, Urbanization, and Inequality. World Development.

Perdamen Sagala, T. A. (2013). Urbanization and expenditure inequality in Indonesia: testing the Kuznets hypothesis with provincial panel data.

Piketty, T., & Saez, E. (2003). Income Inequality in the United States, 1913-1998. The Quarterly Journal of Economics, 118(1), 1-39.

Quintana, D., Royuela, V., (2014) Agglomeration, Inequality and Economic Growth.

Ram, R. (1991). Level of Economic Development and Income Inequality: Evidence from the Postwar Developed World. Southern Economic Journal, 64(2), 576-583

Rao, D. W. (2017). Urbanization and Income Inequality in China: An Empirical Invest igation at Provincial Level. 26.

Rauch, J., 1993, Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities, Journal of Urban Economics, 34, pp.380- 400.

Ravallion, M., Chen, S., & Sangraula, P. (2007). New Evidence on the Urbanization of Global Poverty. Population and Development Review, 33(4), 667-701.

Royuela, D. C.-Q. (2015). Are Increasing Urbanization and Inequalities Symptoms of Growth?

Runder, D. (2015, Feb 24). Urbanization Will Change The Developing World. Retrieved from Forbes: https://www.forbes.com/sites/danielrunde/2015/02/24/urbanization-development-opportunity

Sagala, P., Akita, T. & Yusuf, A.A. Lett Spat Resour Sci (2014) 7: 133.

Samuel Adams, E. K. (2018). Urbanization, Economic Structure, Political, and Income Inequality. Shahbaz, M. (2009). Income Inequality Economic Growth and Non-Linearity: A Case of Pakistan. Sicular et al. (2007). The Urban Rural Income Gap and Inequality In China.

Terima, K. (2017). Fighting Inequality for better Growth. Indonesia Development Forum.

Tripathi, S. (2013). An overview of India's Urbanization, Urban Economic Growth and Urban Equity. United Nations International Children's Emergency Funds. 2017. https://www.unicef.com.

Vecernik, Jiri (2014) Earnings Disparities and Income Inequality in CEE Countries, Eastern European Economics, 50:3, 27-48

World Bank. 2012. World Development Indicators Online Database. World Bank. 2009. World Development Report.

World Bank. 2018. World Development Report.

World Inequality Database. 2017 Gini Index Online Database.

Wu, W. C. (2016). Cross Mark. Understanding the

Kuznets Process An Empirical Investigation of Income Inequality in China: 1978–2011, 20.

Wu, Xiaogang., & Li, Jun., Income Inequality, Economic Growth, and Subjective Well-being: Evidence from China. Research in Social Stratification and Mobility.

Zhang et al. (2012). Regional Inequality in Contemporary China.

Zhang, W., Bao, S. (2015). Created unequal: China's Regional Pay Inequality and its Relationship with Mega-Trend Urbanization.

Zhang, Y. 2016. Urbanization, Inequality, and Poverty in the People's Republic of China. ADBI Working Paper 584. Tokyo: Asian Development Bank Institute.

Zhou, J., Zhang, X., Shen, L. (2015). Urbanization Bubble: Four Quadrants Measurement Model.

APPENDIX

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Gini coefficient	1440	36.78362	9.335721	19	63.3
Urban growth	2014	1.6255244	1.400491	-2.119233	7.918333
Urban square	2014	4.601817	7.389095	1.05e-06	62.69999
Inflation deflator	1905	30.43522	218.5968	-27.52259	6261.24
GDP per capita	1910	22930.74	20687.27	556.3106	111968.4
GDP per capita square	1910	9.52e+08	1.60e+09	309481.5	1.25e+10
Cross product	1910	27501.33	36374.92	-84169.52	350165.2
Trade	1887	83.06474	70.49869	0.209992	442.62
Education	1644	88.6286	24.9885	7.94344	163.9304

A.1: Summary of descriptive statistics

Gini coefficient	Coefficient	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Urban growth	4.054127	.89927	4.51	0.000	2.289663	5.818591
Urban square	-.7388837	.114697	-6.44	0.000	-.9639314	-.5138359
GDP per capita	41.07254	2.77894	14.78	0.000	35.61997	46.52512
GDP per capita square	-2.423091	.1427576	-16.97	0.000	-2.703197	-2.142985
Cross product	1.27577	.5010828	2.55	0.011	.292592	2.258948
Trade	-1.187376	.3191525	-3.72	0.000	-1.813588	-.5611651
Inflation deflator	-.0003201	.0020926	-0.15	0.878	-.0044259	.0037858
Education	-.043822	.0119693	-3.66	0.000	-.0673071	-.0203369
Constant	-137.881	13.13578	-10.50	0.000	-163.6548	-112.1071

Source	SS	DF	MS
Model	49431.2109	8	6178.90137
Residual	39049.4847	1108	35.2432173
Total	88480.6957	1116	79.2837775
Observations	1117	Adjusted R square	0.5555
F(8,1108)	175.32	Root MSE	5.9366
Prob > f	0.0000	R- square	0.5587

A.2: Pooled Ordinary Least Square Regression

Source	SS	df	MS	Number of obs	1,108
Model	49113.4697	8	6139.18371	Prob > F	0.0000
Residual	38794.81	1,099	35.3001001	R-squared	0.5587
Total	87908.2797	1,107	79.4112734	Root MSE	5.9414
F(8, 1099)	173.91			Adj R-squared	0.5555

Gini coefficient	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Urban growth	4.073567	.9017296	4.52	0.000	2.304261	5.842874
Urban square	-.7422892	.1149777	-6.46	0.000	-.9678897	-.5166886
GDP per capita	41.36987	2.784931	14.85	0.000	35.90549	46.83425
GDP per capita square	-2.438358	.1430407	-17.05	0.000	-2.719022	-2.157694
Cross product	1.30207	.5045017	2.58	0.010	.3121746	2.291965
Trade	-1.295555	.3237314	-4.00	0.000	-1.930756	-.6603533
Inflation deflator	.0012208	.0034892	0.35	0.726	-.0056254	.008067
Education	-.0453555	.0119975	-3.78	0.000	-.0688962	-.0218149
Constant	-138.9776	13.15425	-10.57	0.000	-164.7879	-113.1673

A.3: Regression without outliers

Ho: Constant variance

Variables: fitted values of Gini coefficient

chi2(1) = 27.93

Prob > chi2 = 0.0000

A.4: Breusch pagan LM test

H0: no first-order autocorrelation

F(1, 44) = 7.851

Prob > F = 0.0075

A.5: Woolridge test

Variable	VIF	1/VIF
GDP per capita	264.04	0.003787
GDP per capita square	249.39	0.004010
Urban growth	39.22	0.025499
Urban growth square	18.32	0.054596

Cross product	9.27	0.107833
Education	2.33	0.428506
Trade	1.17	0.856561
Inflation deflator	1.05	0.949803
Mean VIF	73.10	

A.6: Variance inflation factor

Regression with Newey-West standard errors Number of obs = 1,108 maximum lag: 7 F (8, 1099) = 52.84 Prob > F = 0.0000

Gini coefficient	Coefficient	Std. Err.	t	P>|t	[95% Conf. Interval]	
Urban growth	4.073567	1.821884	2.24	0.026	.4988034	7.648331
Urban square	-.7422892	.2175512	-3.41	0.001	-1.169152	-.3154265
GDP per capita	41.36987	6.749322	6.13	0.000	28.12686	54.61288
GDP per capita square	-2.438358	.352947	-6.91	0.000	-3.130884	-1.745832
Cross product	1.30207	.9102779	1.43	0.153	-.4840089	3.088149
Trade	-1.295555	.8217659	-1.58	0.115	-2.907962	.3168524
Inflation deflator	.0012208	.0054898	0.22	0.824	-.0095509	.0119925
Education	-.0453555	.0237947	-1.91	0.057	-.0920437	.0013326
Constant	-138.9776	32.70132	-4.25	0.000	-203.1416	-74.81351

A.7: Regression with Newey west standard errors

Algeria	Andorra	Argentina
Australia	Belarus	Belgium
Brazail	Bulgaria	Canada
Chile	Colombia	Costa Rica
Cuba	Czech Republic	Denmark
Dijibouti	Dominica	Dominican Republic

El Salvador	Finland	France
Germany	Greece	Hong Kong
Hungary	Iceland	Iran
Iraq	Israel	Italy
Japan	Jordon	Korea Republic
Lebanon	Luxembourg	Malaysia
Malta	Mexico	Netherlands
New Zealand	Norway	Pakistan
Peru	Russia Federation	Singapore
Spain	Sweden	Switzerland
Turkey	United Kingdom	United States
Uruguay	Venezuela	

A.8: List of countries in the dataset