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Economic Growth, Poverty and Inequality Revisited

Sultan Hafeez Rahman
Hiranya Mukhopadhyay



BRAC Institute of Governance and Development
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By

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Abstract

The paper inspects the dynamics of economic growth, poverty and income inequality in different countries over the time. The experience with economic growth and inequality show that both absolute and relative inequalities in expenditure/income have increased in several Asian countries over the last decade with the growth of economy. Even though some level of poverty reduction was gained from the economic growth, the growth is more advantageous for the rich in terms of education, occupation, nutrition, health and other public policies. This inequality has increased due – to the uneven growth in some sectors and some locations; rapid increase in returns to higher education, skilled workers and employment; and the shift from a dominant socialist ideology to a more market oriented economy. Inequality not only slows down the pace of poverty reduction for a given economic growth but also is a probable threat to sustainable economic growth. However there are debates regarding the relationship between growth and inequality, especially on the form of functional relationship between them. This paper tries to estimate this relationship without imposing any a-priori restriction on the functional relationship, and so the local polynomial (nonparametric) regression is employed. World Bank's data on Gini index concerned with average index from 2003-2007 and annual percentage of growth rate of GDP from 2008-2010 for 96 countries from Asia, Latin America, Africa and Europe were used to for this purpose. The nonparametric regression determines an inverted U-shaped relationship between inequality and growth, and the result is later confirmed by a cross-country parametric regression. So, the countries on the left side of the inverted-U curve, such as South Asian countries, have a positive relationship between inequality and growth, and vice-versa.

1. Introduction

Over the last two decades, developing Asia's economic performance has been spectacular. Per capita GDP increased almost three-fold over 1990 and 2008 (5.7% per annum), which resulted in a significant reduction in the level of poverty. For the region as a whole, headcount poverty ratio (at \$1.25 in 2005 PPP) came down from 52.3% to 27%. Despite these achievements, the region still remains home to two-thirds of the world's poor. An estimated 1.8 billion people live on less than \$2 a day and 900 million survive on less than \$1.25 a day. The region's social indicators also remain low. Malnutrition among children under five years old is worse than in sub-Saharan Africa. More than half of Asians live without basic sanitation and the region is still home to the largest number of people infected with tuberculosis. Women and children are at a clear disadvantage as 41% of all deaths of children under five years, 44% of maternal deaths, and 56% of newborn baby deaths occur in Asia. Vulnerability of the poor to economic and other shocks remains a major challenge as witnessed during the recent energy and food crises and downturn in the global economy and financial market.

An important emerging concern in Asia is that the region's poverty reduction has been blunted by rising inequality in several countries, in both income and non-income dimensions. A number of developing Asian economies experienced increase in income inequality over the last two decades. For the region as a whole, the Gini coefficient (measure of relative inequality) increased from 46.8 to 52.4 over 1993 to 2003¹. Absolute inequality has also increased in virtually all countries, measured by the share of income of the top quintile (top 20%) compared to the lowest quintile (bottom 20%). Along with rising income inequality, a significant proportion of the population in many countries also suffered inequality in access to basic social services such as education and health. The problems could worsen over time unless public policy is geared towards promoting a more broad-based distribution of the benefits of economic growth, as rising inequalities tend to breed social tensions, which would ultimately affect economic growth.

It needs to be, however, highlighted that while inequality in Asia has increased over the last decade, the trends do not depict a situation in which the rich are becoming richer and the poor are becoming poorer – rather a situation is that the rich are becoming richer faster². Rising income inequality is a concern to policy makers since it is diluting the poverty reduction impact of economic growth. Research shows that the poverty reduction impact of economic growth can vary depending on the prevailing inequality and its change over time. In general, the higher the level of initial inequality, the lower will be the poverty reduction impact of economic growth, and, if inequality increases over time, the impact will be further reduced³. The benefits of economic growth to the chronic poor are severely eroded if income distribution is progressively worsening.

¹ Key Indicators for Asia and the Pacific, Asian Development Bank, 2007

² Given the importance of this topic, the Asian Development Bank recently undertook a study on inclusive growth (*Poverty, Inequality and Inclusive Growth in Asia: Measurement, Policy Issues and Country Studies*) which was published in May 2010. ADB's Independent Evaluation Department also published a report *Growth and Inclusive Development: A Review and Synthesis of Asian Development Bank Literature*, December 2009. Numerous other studies have been published on this important topic.

³ Ravillion, M. 2004. *Pro-Poor Growth: A Primer*. Policy Research Working Paper No 3242 World Bank

This paper examines the dynamics of economic growth, poverty, and income inequality, citing examples of individual countries. Section 2 examines Asia's experience with economic growth, poverty reduction and growing inequality. Section 3 looks at some of the key causes underlying increases in inequality. Section 4 examines why rising inequalities should be a cause of concern to policymakers. Section 5 revisits the growth-inequality relationship without imposing any a-priori restriction on the functional form. Section 6 explores further the growth-inequality relationship using a parametric regression controlling for other variables and finally, Section 7 concludes with proposing a set of policies that could promote a better distribution of benefits of growth.

2. Economic Growth, Poverty and Inequality in Asia

2.1 Economic Growth and Poverty Reduction

The trends in economic growth and incidence of poverty over 1990 and 2008 are presented in Tables 1 and 2.

For the Asian region as a whole, the annual average growth rate was 5.7% over 1990-2008, with the GDP per capita (2005 PPP \$) increasing from \$1,631 to \$4,430 (close to a three-fold increase). The incidence of poverty (Headcount ratio at \$1.25 a day in 2005 PPP) dropped from 52.3% in 1990 to 27.1% in 2005- a 25% decrease in poverty over a 15 year period (decline of 1.7% per annum). Both the growth rates and poverty reduction impact are unprecedented in history. Close to 750 million came out of abject poverty.

Amongst the sub-regions, East Asia (mainly PRC) had both the highest rate of growth (8.1% per annum) and the largest decline in poverty. Poverty at \$1.25 a day declined from 60% in 1990 to 15.9% in 2005 (absolute decline of 44.3% or 2.95% per annum) and at \$2 per day from 84.6% to 36.3% (48.3% decline or 3.22% per annum). Per capita income of East Asian countries as a group increased from \$1,582 to \$6,385 – a four-fold increase in a matter of two decades.

Other sub-regions also experienced healthy growth rates and poverty reduction, though not as dramatic as East Asia. Southeast Asia grew by 3.4% per annum and its poverty incidence declined from 39.1% to 18.8% at \$1.25 PPP poverty line and from 66.0% to 44.6% at \$2 PPP poverty line. In South Asia, though annual GDP growth rate was a respectable 4.5% per annum, poverty reduction was less impressive at a mere 8.5% over the 15 year period (about 0.55% per annum).

Some countries have made significant progress in poverty reduction over 1990-2005: PRC 44.3%, Pakistan 35.9%, Cambodia 37.1%, Indonesia 32.8%, Lao PDR 30.2%, Bhutan 24.2% Nepal 22.3%, and Tajikistan 20%. India's poverty reduction outcome was less impressive at 9.6%. A surprising finding is that Bangladesh did not achieve any poverty reduction over 1990-2005 despite a 3.4% growth rate.

Table 1: Growth and poverty incidence in Asia

| Economy | GDP per capita (2005 PPP \$) | | Average annual growth rate (%) | Poverty Headcount Ratio (%) \$1.25 a day (in 2005 PPP) | | |
|-----------------------|------------------------------|-------|--------------------------------|--|------|--------|
| | 1990 | 2008 | | 1990 | 2008 | Change |
| Central and West Asia | 2,598 | 3,292 | 1.3 | 38.6 | 21.5 | -17.1 |
| East Asia | 1,582 | 6,385 | 8.1 | 60.1 | 15.9 | -44.2 |
| Pacific | 2,062 | 2,192 | 0.3 | ... | ... | ... |
| South Asia | 1,151 | 2,555 | 4.5 | 51.0 | 42.5 | -8.5 |
| Southeast Asia | 2,575 | 4,661 | 3.4 | 39.1 | 18.8 | -20.3 |
| Total Asia | 1,631 | 4,430 | 5.7 | 52.3 | 27.1 | -25.2 |

... = data not available

Source: World Development Indicators Online and reported in Poverty, Inequality and Inclusive Growth in Asia.

2.2 Trends in Income Inequality

Table 2 shows the most recent estimates of inequality and changes in inequality over the ten year period 1991-2005. Some broad observations are as follow.

For the region as a whole, despite robust growth and major success in poverty reduction, inequality has increased significantly – the Gini coefficient (pooling data across countries) increased from 46.8 in 1993 to 52.4 in 2003⁴. Most of the increase in inequality is due to growing within-country inequality. Gini coefficients range from a low of 30.3 (Kyrgyz Republic) to a high of 47.3 (Nepal). The median value of the Gini coefficient for Asia is about 34.5.

On the absolute measure of inequality (i.e. the ratio of expenditure/income of top 20% to bottom 20%) these range from 4.31 (Kyrgyz Republic) to a high of over 11 in PRC. The median value of the ratio for the region is 5.8. As is to be expected, the Gini coefficient and ratio of the top income/expenditure of the top 20% to bottom 20% are highly correlated, implying that societies that have high relative inequality also tend to high absolute inequality.

Of the 21 Asian countries for which comparable data on income equality is available, seven countries have high inequality with the Gini Coefficient exceeding 40 – PRC (47.3), Malaysia (40.3), Nepal (47.3), Philippines (44), Sri Lanka (40.2), Turkmenistan (43.0), and Thailand (42). These countries also have high absolute inequality. Of these, only PRC experienced sustained rapid growth over the last 20 years at 9.4% per annum; others had relatively sluggish growth. Other Asian countries have moderate inequality with Gini coefficients in the range of 30-38.

To put issues in perspective, it should be noted that inequalities in Asia are not as high as in some Latin American (Argentina, Brazil, Chile, Ecuador all have Gini coefficients in excess of 50) and African countries. They are however higher than the developed countries. United States of America has the highest inequality amongst the developed countries (Gini around 40) and the ratio of top to bottom 20% of over 8.

⁴ Estimates from *Key Indicators of Developing Asian and Pacific Countries*, Asian Development Bank 2007.

Table 2: Trends in Growth, Poverty Reduction and Inequality

| Economy | Annual GDP Growth Rate (1990-2008) | Poverty Headcount Ratio (%)\$1.25 a day (in 2005 PPP) | | Inequality Measures | | | | |
|-------------------------|------------------------------------|---|------|---------------------|--------------|------------|--------------------|------------|
| | | 1990 | 2005 | Gini Coefficient | | | Top 20%/Bottom 20% | |
| | | | | Period | Initial Year | Final Year | Initial Year | Final Year |
| Armenia | 3.7 | 6.3 | 4.7 | 1998–2003 | 36.01 | 33.80 | 5.87 | 5.08 |
| Azerbaijan | 3.0 | 16.1 | 0.0 | 1995–2001 | 34.96 | 36.50 | 6.09 | 5.96 |
| Bangladesh | 3.4 | 49.9 | 50.5 | 1991–2005 | 28.27 | 34.08 | 4.06 | 5.03 |
| Cambodia | ... | 77.3 | 40.2 | 1993–2004 | 31.80 | 38.05 | 5.24 | 7.04 |
| China, People's Rep. of | 9.4 | 60.2 | 15.9 | 1993–2004 | 40.74 | 47.25 | 7.57 | 11.37 |
| India | 4.7 | 51.3 | 41.6 | 1993–2004 | 32.89 | 36.22 | 4.85 | 5.52 |
| Indonesia | 3.2 | 54.3 | 21.4 | 1993–2002 | 34.37 | 34.30 | 5.20 | 5.13 |
| Kazakhstan | 2.2 | 0.5 | 1.2 | 1996–2003 | 35.32 | 33.85 | 6.20 | 5.61 |
| Korea, Rep. of | 4.6 | - | - | 1993–2004 | 28.68 | 31.55 | 4.38 | 5.47 |
| Lao PDR | 4.2 | 65.9 | 35.7 | 1992–2002 | 30.40 | 34.68 | 4.27 | 5.40 |
| Malaysia | 3.9 | 1.9 | 0.5 | 1993–2004 | 41.22 | 40.33 | 7.72 | 7.70 |
| Mongolia | 1.9 | 34.9 | 22.4 | 1995–2002 | 33.20 | 32.84 | 5.53 | 5.44 |
| Nepal | 2.1 | 77.0 | 54.7 | 1995–2003 | 37.65 | 47.30 | 6.19 | 9.47 |
| Pakistan | 2.1 | 58.5 | 22.6 | 1992–2004 | 30.31 | 31.18 | 4.22 | 4.46 |
| Philippines | 1.7 | 29.7 | 22.6 | 1994–2003 | 42.89 | 43.97 | 8.34 | 9.11 |
| Sri Lanka | 4.2 | 15.0 | 10.3 | 1995–2002 | 34.36 | 40.18 | 5.34 | 6.83 |
| Tajikistan | -3.0 | 1.5 | 21.5 | 1999–2003 | 31.52 | 32.63 | 4.97 | 5.14 |
| Thailand | 3.6 | 9.4 | 0.4 | 1992–2002 | 46.22 | 41.96 | 9.41 | 7.72 |
| Turkmenistan | 2.8 | ... | ... | 1998–2003 | 41.08 | 43.02 | 7.88 | 8.33 |
| Viet Nam | 6.0 | 34.2 | 22.8 | 1993–2004 | 34.91 | 37.08 | 5.40 | 6.24 |

... = data not available, - = data not available and poverty likely negligible.

Source: ADB. 2010. *Poverty, Inequality, and Inclusive Growth in Asia. Measurement, Policy Issues, and Country Studies*. Manila. p.3 and 47

Reflecting the region-wide trend, inequality increased in a majority of countries over the period 1993-2003. Countries that have experienced the largest increase in inequality are Bangladesh, Cambodia, PRC, Lao PDR, Nepal and Sri Lanka. What is interesting is that none of these economies, with the exception of PRC, witnessed rapid economic growth over the last two decades – Bangladesh (3.4% per annum), Lao PDR (4.2% per annum), Nepal (2.1% per annum) and Sri Lanka (4.2% per annum). Furthermore, these countries, with the exception of Bangladesh, also managed to reduce poverty significantly over the last fifteen years – Cambodia from 77.3% to 40.2%, Lao PDR from 65.9% to 35.7%, Nepal from 77% to 54.7% and Sri Lanka from 15% to 10.3%.

Inequality decreased in some countries over 1991-2005 – in Thailand the Gini coefficient decreased from 46.2 to 42.0, and Malaysia from 41.2 to 40.3. Inequality was constant in Indonesia (Gini at 34.3). Headcount poverty (measured at \$1.25 poverty line) was virtually eliminated in Thailand and Malaysia by 2005, and was sharply reduced in Indonesia from 54.3% to 21.4%. As noted earlier, these economies also grew rapidly over the last two decades.

Another indicator of increasing inequality is the growth of expenditure/income over different quintiles of income distribution.

Table 3 presents this data. In a majority of the countries, consumption/income grew the fastest in the top quintile, which included Bangladesh; Cambodia; PRC; India; Republic of Korea; Lao PDR; Nepal; Sri Lanka; and Vietnam. In two Southeast Asian economies (Indonesia and Thailand) the lowest quintile had the fastest growth of consumption.

Table 3: Annualised Growth Rates of Per Capita Expenditure/Income by Quintile

| Developing Member Country | Annualised Growth Rates of Per Capita Expenditure/Income (%) | | | | | |
|---------------------------|--|-------------------------|------------|------------|------------|----------------------|
| | Time Period | Quintile 1 (bottom 20%) | Quintile 2 | Quintile 3 | Quintile 4 | Quintile 5 (top 20%) |
| Armenia | 1998–2003 | 5.05 | 3.61 | 2.8 | 2.19 | 2.15 |
| Azerbaijan | 1995–2001 | 5.43 | 3.42 | 3.16 | 3.34 | 5.07 |
| Bangladesh | 1991–2005 | 0.07 | -0.24 | -0.08 | 0.27 | 1.6 |
| Cambodia | 1993–2004 | 0.69 | 1.27 | 1.84 | 2.39 | 3.38 |
| China, People’s Rep. of | 1993–2004 | 3.4 | 4.46 | 5.42 | 6.19 | 7.1 |
| India | 1993–2004 | 0.85 | 0.77 | 0.82 | 1.04 | 2.03 |
| Indonesia | 1993–2002 | 2.09 | 1.97 | 1.86 | 1.77 | 1.93 |
| Kazakhstan | 1996–2003 | 0.81 | 0.19 | -0.2 | -0.51 | -0.63 |
| Korea, Rep. of | 1993–2004 | 2 | 3.32 | 3.69 | 3.91 | 4.02 |
| Lao PDR | 1992–2002 | 1.47 | 2.22 | 2.85 | 3.4 | 3.82 |
| Malaysia | 1993–2004 | 2.26 | 2.65 | 2.72 | 2.68 | 2.23 |
| Mongolia | 1995–2002 | 0.95 | 0.94 | 0.86 | 0.77 | 0.69 |
| Nepal | 1995–2003 | 1.92 | 2.04 | 2.56 | 3.32 | 7.23 |
| Pakistan | 1992–2004 | -0.07 | 0.19 | 0.31 | 0.38 | 0.39 |
| Philippines | 1994–2003 | 1.28 | 1.7 | 2 | 2.25 | 2.27 |
| Sri Lanka | 1995–2002 | 0.64 | 0.59 | 1.08 | 1.83 | 4.14 |
| Taipei, China | 1993–2003 | 1.42 | 1.37 | 1.6 | 1.86 | 2.55 |
| Tajikistan | 1999–2003 | 5.87 | 4.85 | 5.36 | 6.19 | 6.69 |
| Thailand | 1992–2002 | 2.35 | 2.27 | 1.96 | 1.51 | 0.38 |
| Turkmenistan | 1998–2003 | 6.79 | 6.21 | 5.91 | 5.91 | 7.9 |
| Viet Nam | 1993–2004 | 3.37 | 3.92 | 4.29 | 4.61 | 4.69 |

Source: ADB. 2010. *Poverty, Inequality, and Inclusive Growth in Asia. Measurement, Policy Issues, and Country Studies*. Manila. p. 49 and 50.

This pattern is indicative of the fact that while growth is necessary for poverty reduction, and there are many empirical studies which have established a close relationship between growth and poverty reduction, other factors, such as the pattern of growth, play an important role in poverty reduction. Equally, rapid growth and increasing inequality does not appear to have as close a correlation as theoretical models suggest. Other factors (whether growth is broad based across sectors, equality of opportunities, and public policy) can influence inequality and poverty reduction efforts. And more importantly, public policy can be used to contain the rise in inequality.

2.3 Non-Income Inequality

The Asian experience also shows that income inequality is highly correlated with indicators of non-income poverty – mainly in health, nutrition, and education. The causality between poverty, ill health and low level of educational attainment contributes to inequality in income and non-income indicators. Persistence of non-income inequality makes it difficult for the poor to break the cycle of poverty, especially for the population in the lowest quintile of income distribution.

There is wide diversity in health indicators across Asian countries. Bangladesh, Cambodia, India, Pakistan, and Papua New Guinea have less than the average attainment of life expectancy and infant mortality rates, while PRC, Indonesia, Philippines, Sri Lanka and Vietnam have above average attainments. The data for Asian countries also shows that higher life expectancy is correlated with lower infant mortality. Considerable inequalities in under-five mortality have been reported amongst the highest and lowest quintiles and between rural and urban areas in several Asian countries. It is noteworthy that wealth related inequality exceed those between rural and urban areas.

Inequalities in non-income poverty remain large in the Asian countries and appear to be increasing. There is considerable evidence of health, education, and access to infrastructure inequality within countries (Table 4). This relates to availability of clean water, health facilities, sanitation, electricity and access to school. In the sample of countries, regions with higher incomes fair better than lagging regions, suggesting that non-income inequalities have a strong geographic dimension.

Table 4: Access to Public Goods Across Sub-National Regions of Selected Developing Member Countries

| Country | % Population with Access to | | | | | | | | | | | | | | | |
|-------------------------|-----------------------------|-------------|----------------|---------------|-------------------|------------------|------------------|------------|----------------|---------------|-------------|----------------|---------------|--------------------------------|----------------|---------------|
| | Year | Clean Water | | | Health Facilities | | | Sanitation | | | Electricity | | | Access to Schools ^a | | |
| | | Overall | Highest Region | Lowest Region | Overall | Highest Region | Lowest Region | Overall | Highest Region | Lowest Region | Overall | Highest Region | Lowest Region | Overall | Highest Region | Lowest Region |
| China, People's Rep. of | 1999 | 96.3 | 100.0 | 74.7 | ... | 99.5 | 61.1 | ... | ... | ... | ... | ... | ... | ... | 100.6 | 57.79 |
| India ^b | 2001 | 33.7 | 99.8 | 2.0 | 3.2 | 61.0 | 0.0 | ... | ... | ... | 76.0 | 100.0 | 36.0 | 78.0 | 98.0 | 39.0 |
| Indonesia | 2002 | 55.2 | 72.2 | 21.5 | 75.9 | 97.1 | 49.9 | 75.0 | 100.0 | 43.7 | ... | ... | ... | 96.1 | 99.0 | 83.5 |
| Nepal | 2001 | 44.8 | 82.0 | 12.0 | 0.3 ^c | 2.2 ^c | 0.0 ^c | 43.7 | 93.2 | 11.2 | 32.2 | 97.4 | 5.9 | 1.4 | 4.8 | 0.4 |
| Pakistan | 1998 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 71.0 | 75.0 | 64.0 |
| Thailand | 2001 | 98.9 | 99.8 | 97.1 | ... | ... | ... | 98.9 | 100.0 | 96.6 | 98.3 | 99.9 | 97.2 | 73.8 | 63.4 | 88.6 |
| Viet Nam | 2001 | ... | ... | ... | 99.0 | 100.0 | 96.6 | ... | ... | ... | 79.3 | 98.9 | 50.5 | 99.9 | 100 | 99.3 |

^a Access to schools is measured by primary school enrolment rates for Indonesia and Pakistan; combined primary, secondary, and high school enrolment for the People's Republic of China; percentage of villages having any educational institution in India; number of schools per 1,000 population in Nepal; lower secondary enrolment in Thailand; and percentage of communes with access to a primary school in Viet Nam. ^bAll numbers for India refer to the percentage of villages with access to specified public goods. ^cNumber of health centres per 1,000 population. Note: The relevant sub national regions are provinces for People's Republic of China, Indonesia, Pakistan, and Viet Nam; states for India; regions for Thailand; and districts for Nepal. Highest (lowest) refers to the highest (lowest) figure that was recorded for a sub national region.

Source: Table 1 from A. Banerjee, L. Iyer and R. Somanathan. 2006. *Public Action for Public Goods*. <http://econ-www.mit.edu/files/531>.

Similarly in education, countries such as Azerbaijan, Indonesia, Kazakhstan, and Philippines attained above average performance in both primary enrolment and education expectancy (higher secondary and tertiary education). Pakistan is particularly low in enrolment and education expectancy. Bangladesh and Cambodia have relatively high primary enrolment rates but lag in education expectancy. Countries also have considerable variation in male to female adult literacy pattern. As another indicator of inequality on education, Table 5 shows that the percentage of children out of primary school in the poorest quintile exceeds the children in the highest quintile by a wide margin.

Table 5: Out-of-School primary school-age children (%), 1999-2003

| Region/Country | Total | Poorest quintile | Richest quintile |
|------------------------------|-------|------------------|------------------|
| Central and West Asia | | | |
| Armenia | 3.0 | 2.7 | 3.9 |
| Azerbaijan | 9.1 | 11.3 | 6.4 |
| Kazakhstan | 1.5 | 3.0 | 0.6 |
| Pakistan | 19.7 | 23.0 | 14.6 |
| Tajikistan | 19.3 | 20.1 | 17.7 |
| East Asia | | | |
| Mongolia | 20.8 | 29.4 | 9.8 |
| South Asia | | | |
| Bangladesh | 20.7 | 35.9 | 13.6 |
| India | 23.1 | 33.2 | 9.8 |
| Nepal | 33.8 | 41.4 | 25.4 |
| Southeast Asia | | | |
| Cambodia | 34.7 | 52.4 | 14.3 |
| Indonesia | 5.6 | 11.2 | 2.0 |
| Lao PDR | 37.9 | 60.0 | 12.7 |
| Myanmar | 20.5 | 35.8 | 10.1 |
| Philippines | 18.1 | 30.0 | 10.6 |
| Sri Lanka | 12.4 | 21.3 | 7.0 |

Source:

3. Causes of Rising Inequality

In this section we explore the various factors that have contributed to growing inequality in Asia. Although we do not attempt to establish empirical causality, the discussion focuses on some key factors that could explain increasing inequality.

ADB's research⁵ and other assessments on Asia's experience with growth and inequality show that (a) measures of relative inequality in expenditure/income (as measured by the Gini coefficient) have increased in several Asian countries over the last decade; (b) despite increase in relative inequality, in most countries, expenditure/incomes have increased at all points along the distribution, implying that

⁵ Inequality in Asia: Key Indicators for Asia and the Pacific, Asian Development Bank, 2007 and Juzhong Zhuang (ed) Poverty, Inequality, and Inclusive Growth in Asia – Measurement, Policy Issues and Country Studies (ADB, 2010)

the poor have gained from economic growth but less than the rich; (c) growing inequality is a public policy concern because economic growth is biased in favour of the rich; (d) factors such as education, occupation, and location (rural-urban) account for a large part of the inequality and its increase overtime, and (e) there are wide inequalities in non-income dimensions such as nutrition, health, and education.

The proximate driver of rising inequality is uneven growth across sectors (particularly agricultural vis-à-vis non agricultural sectors) and regions (rural versus urban)⁶. Growth in the agriculture sector has been limited compared to manufacturing and services. Rarely has agriculture accounted for more than 20% of growth in any Asian country over the last two decades. In virtually all countries (exception being Bangladesh), growth in the agriculture sector slowed over 1991-2005 compared to 1980-1990, while it has risen sharply in the industry and services sector (Table 6). This is despite the fact that agriculture, directly or indirectly, provides bulk of the employment (on an average 40% or more in developing Asia), often in activities with low productivity. The slow-down in agriculture was particularly pronounced in South Asian countries, which have a large proportion of the population dependent on agriculture – India from 4.4% to 2.7% (share of agriculture employment in total employment of 61%), Pakistan from 4.3% to 3.8% (agriculture employment 42%), Nepal from 3.8% to 2.8% (agriculture employment 76%) and Sri Lanka from 2.9% to 1.4% (agriculture employment 34%).

Table 6: Growth Rates of Gross Value Added by Sector, 1980-1990 and 1991-2005, and Share of Agricultural Employment (%)

| Developing Member Country | Agriculture | | Industry | | Services | | Share of Agricultural Employment |
|---------------------------|-------------|-----------|-----------|-----------|-----------|-----------|----------------------------------|
| | 1980-1990 | 1991-2005 | 1980-1990 | 1991-2005 | 1980-1990 | 1991-2005 | |
| Bangladesh | 2.32 | 2.98 | 4.79 | 7.11 | 3.74 | 4.88 | 51.7 (2003) |
| People's Rep .of China | 5.54 | 3.85 | 10.00 | 12.67 | 11.78 | 10.11 | 44.1 (2002) |
| India | 4.40 | 2.74 | 6.89 | 6.20 | 6.39 | 7.93 | 60.8 (1999) |
| Indonesia | 3.98 | 2.42 | 7.77 | 5.11 | 7.28 | 5.08 | 44.0 (2004) |
| Malaysia | 3.07 | 1.63 | 7.12 | 7.26 | 6.81 | 6.79 | 14.8 (2004) |
| Nepal | 3.79 | 2.77 | 7.40 | 5.68 | 3.46 | 5.35 | 76.1 (1998) |
| Pakistan | 4.30 | 3.81 | 8.03 | 5.01 | 6.56 | 4.79 | 42.1 (2002) |
| Philippines | 1.44 | 2.48 | 1.03 | 3.08 | 3.66 | 4.41 | 37.0 (2004) |
| Sri Lanka | 2.93 | 1.43 | 4.53 | 5.55 | 5.23 | 5.62 | 34.3 (2003) |
| Thailand | 3.70 | 1.75 | 9.82 | 6.43 | 7.60 | 4.06 | 42.6 (2004) |

Source: ADB. 2010. *Poverty, Inequality, and Inclusive Growth in Asia. Measurement, Policy Issues, and Country Studies*. Manila. p.66 and 67.

Slowing agriculture sector growth along with increase in the growth rates of the manufacturing and services sectors has also widened the rural-urban income gap (Cambodia, PRC, Nepal and Vietnam). This is also corroborated by empirical studies on PRC. In the case of Cambodia, the large increase in Gini coefficient over 1993-2004 was due to uneven growth between agriculture and non-agriculture sector and sluggish growth in the rural areas. Rural areas experienced low growth because of lack of physical infrastructure such as irrigation and transportation network, and increasing landlessness and accessibility to common property resources.

⁶ Chaudhuri, S. and M. Ravallion "Partially Awakened Giants: Uneven Growth in China and India" in L.A. Winters and S. Yusuf (eds), *Dancing with Giants: China, India and the Global Economy*. World Bank

In Nepal too, rising inequality was due to similar factors, mainly unequal growth in rural and urban areas. Per-capita expenditure in urban areas increased by 42% over 1995-2004, while rural areas experienced only 27% growth. Inequality was exacerbated by the fact that rural areas had lower expenditure/income initially⁷.

Relative neglect of agriculture, and especially of infrastructure development in rural areas, appears to be a key factor across countries that experienced increasing inequality. Public investment in agriculture has been sluggish and the situation was made worse by the fact that the policy environment did not encourage private investment either. There were also inadequate resources devoted to developing and spreading new agricultural technologies, and to arrest the depletion of natural resources.

Pattern of land holding has also exacerbated inequalities within the rural areas. The distribution of land holdings is particularly skewed in India, Malaysia, Nepal, Pakistan, Philippines, and Sri Lanka (Table 7). In these countries the Gini coefficient of distribution of land holdings exceeds 50. Skewed distribution of land holdings in conjunction with slowing growth in agriculture and inadequate expansion of job opportunities in the non-farm sector, due to sluggish public investment, was an important factor in increasing inequalities within the rural sector and between rural and urban sector.

Table 7: Distribution of Landholdings

| (Gini coefficients) | | |
|----------------------------|-------------|--------------------------|
| Economy | Year | Gini Coefficients |
| Bangladesh | 1977 | 41.7 |
| China, People's Rep. of | 1997 | 43.8 |
| India | 1986 | 57.9 |
| Indonesia | 1993 | 45.4 |
| Korea, Rep. of | 1990 | 37.2 |
| Lao PDR | 1998 | 38.7 |
| Malaysia | 1960 | 68.0 |
| Nepal | 1971 | 54.2 |
| Pakistan | 1989 | 55.0 |
| Philippines | 1991 | 54.7 |
| Sri Lanka | 1961 | 62.3 |
| Taipei, China | 1960 | 39.0 |
| Thailand | 1993 | 44.7 |
| Viet Nam | 1994 | 47.4 |

Source: ADB. 2007. *Key Indicators for Asia and the Pacific*

⁷ In Kathmandu and the rural Western Hills and Eastern Terai region, per capita expenditure rose by 30% but only by 5% in the rural Eastern Hills region.

Inequality has also increased due to rapid increase in returns to higher education, skilled workers, as well as employment in professional occupations. Since these attributes are generally concentrated in the highest quintile of income distribution, opportunities for gaining from the growth in the manufacturing and services sector were limited for the poor. These are important factors in explaining increasing income inequality in India. This was also the case in PRC, where returns to college education relative to high school increased sharply from 12% in 1988 to 37% in 2001⁸.

Another contributing factor which could have worsened inequality is that over the last two-three decades, several Asian countries made a transition from a dominant socialist ideology to a more market oriented economy. Several areas of the economy were deregulated, trade was liberalised, partial privatisation of public enterprises was adopted, and most administered prices were dismantled. Some increase in inequality can be expected in the transition phase, especially when, to start with, assets were unequally divided and human resources endowments unequally distributed. For example, in the pre-reform phase in PRC, wages were administratively determined, with a relatively small differential between different categories of workers. Following economic reforms, the economy experienced rapid growth, and with the creation of special economic zones, new type of enterprises and wage determination mechanism evolved. A similar pattern was observed in India after liberalisation began in 1991. Furthermore, private investment tends to be attracted to areas/states which have better infrastructure, policy regimes, and favourable trade logistics. Private investment tends to be concentrated in certain areas (like Gujarat and Tamil Nadu in India), unlike public investments which are often driven by considerations of balanced regional development. Spatial inequality is bound to increase as private investment becomes dominant compared to public investment. Greater openness to trade, specialisation in production, introduction of new technology have also increased the demand for skilled worker and hence raised their wages relative to the non-skilled workers.

4. Why is Rising Inequalities a Cause for Concern?

Almost all Asian countries have expressed concern at rising inequalities- primarily for two reasons. First, rising inequalities slows the pace of poverty reduction for a given rate of economic growth. While rapid economic growth has been mainly responsible for poverty reduction in Asia, its poverty reduction impact has been blunted by rising inequalities. Second, rising inequalities could also represent a potential threat to the sustainability of high economic growth. It is also socially unacceptable that a country which is becoming progressively prosperous, a significant proportion of the population does not gain from the benefits of growth. Rising inequalities can lead to social divisions, which can also adversely affect the quality of policies and institutions, necessary to sustain economic growth. The latter can happen if governments are forced into adopting costly populist policies to placate the population that has been bypassed by economic growth, which compromises long term growth prospects. Worse still, in an unequal society, local elite can have a disproportionate influence over economic policy in their favour.

⁸ Zhang. J., Y. Zhao, and X. Song Economic Returns to Schooling in Urban China, 1988-2001 Journal of Comparative Economics (2005)

On the other hand, there is a set of papers that argue that low inequality is not conducive for high growth. Consequently, the relationship between growth and inequality has remained a highly debated topic without any consensus. The empirical debate is primarily dominated by the form of functional relationship between growth and inequality and the quality of data on the measurement of inequality (Banerjee and Duflo, 2003).⁹ They also pointed out that most compelling evidence on the effect of high inequality on growth has to come from micro data within countries. At the macro level, however, it will be an enormous challenge, if not impossible, to disentangle empirically the effect of inequality on growth from other drivers of growth within countries. Perhaps, we have to depend on cross-country analysis to establish the nature of the impact of high inequalities on growth, of course, supported by micro evidence within countries. In what follows, we make an attempt to estimate the relationship between inequality and growth - using very recent data on inequality and growth from the World Bank data set - without imposing any a-priori restriction on the functional relationship.¹⁰

5. Inequality-growth Relationship: A Nonparametric Estimation

The empirical evidence on the effect of inequality on growth had been mixed. A large number of studies in the 1980s and 1990s found negative and significant relationship (Table 8). The negative relationship primarily stems from four sources: (1) credit market imperfections that argues that inequality in the presence of credit market imperfections has a lasting influence on productivity and growth (Gaylor and Zeira, 1993; and World Bank 2005); (2) the political economy approach developed by Alesina and Rodrik (1994) and Persson and Tabellini (1994) that argues that inequality triggers redistributive policies, and which, in turn, could be bad for investment and growth; (3) high inequality could lead to erosion of democratic political institutions, and good democratic political institutions are important prerequisites for larger investment on public goods and infrastructure (Engerman and Sokoloff, 2002); and (4) high degree of inequality pushes people to engage in socially disruptive activities such as crime and riots. Such instability and distrust in the system will therefore discourage investment and ultimately lower the overall productivity of the economy.

⁹ "In the end, our paper is probably best seen as a cautionary tale: Imposing a linear structure where there is no theoretical support for it can lead to serious misinterpretations" (Banerjee and Duflo, 2003). They also explained why the inverted-U curve could also reflect the nature of measurement error.

¹⁰ Both Forbes (2000) and Banerjee and Duflo (2003) used the Deininger and Squire (1996) dataset where inequality data available up to 1990.

Table 8: Inequality on Growth: Regression Results

| | |
|-----------------------------|---|
| Alesina and Rodrik, 1994 | Negative and significant |
| Banerjee and Duflo, 2003 | Non-linear and significant |
| Barro, 2000 | Negative for developing countries and positive for developed countries. |
| Barro, 2008 | Confirms the results of Barro 2000 with a new set of control variables. |
| Benhabib and Spiegel, 1996 | Negative but not significant |
| Bourguignon, 1994 | Negative and significant |
| Clarke, 1992 | Negative and significant |
| Deininger and Squire, 1995 | Negative but not significant |
| Forbes, 2000 | Positive and significant |
| Keefer and Knack, 1995 | Negative and significant |
| Perotti, 1992 | Negative and significant |
| Perotti, 1994 | Negative and significant |
| Perotti, 1996 | Negative and significant |
| Persson and Tabellini, 1992 | Negative and significant |
| Persson and Tabellini, 1996 | Negative and significant |
| Venieris and Gupta, 1986 | Negative and significant |

Source: Benabou, 1996 and Author's own review

Three studies reported positive relationship between inequality and growth. Barro (2000, 2008) reported that the effect of inequality on growth differed across developing and industrial countries. While inequality and growth were positively associated in the sample of developed countries, the relationship was reported to negative in developing countries. Forbes (2000) based on panel data estimation, also reported positive influence of inequality on growth. Panel-data estimations differ from cross-section analysis in that they control for country effects that are fixed over time, and study within-country variations.

One mechanism linking inequality to growth positively is the higher propensity to save among the rich. In a closed economy framework this could be an important mechanism at work. However, this also implies that lower contribution of private consumption to growth because the rich has a lower propensity to consume. In other words, it is not clear how higher inequality will lead to higher growth in a country where growth is primarily driven by domestic demand. A second reason that could explain the positive relationship is the role of incentives. In a situation where entrepreneurship is not adequately rewarded, low income inequality could be associated with low growth.

Arguably, Banerjee and Duflo's paper in 2003 have pushed the controversy even further by showing that without a linear restriction on the data, which has been normally assumed in previous researches, it becomes apparent that a linear structure does not exist. More importantly, they found that increases or decreases in inequality are associated with lower subsequent growth rates.

Motivated by the results of Banerjee-Duflo (2003) regarding the presence of nonlinearities in the relationship between inequality and growth, we employ a nonparametric regression due to its appeal of not making any assumptions regarding the functional form but instead allowing the data to “speak for itself.”¹¹ For our purposes we estimate the following equation,

$$GDP\ growth_t = f(Gini_{t-i}) + \epsilon$$

where f is some unknown and smooth function. In nonparametric regression the shape of f will be driven by the data.

However, not making prior distributional assumptions comes with a price. Nonparametric regression requires large sample sizes since the data creates the model structure and the model estimates. Furthermore, extending nonparametric regression to include several predictors proves to be problematic in practice. The curse of dimensionality in a nonparametric multivariate regression implies that since “multidimensional spaces grow exponentially sparser with the number of dimensions,” it will require very large samples to estimate nonparametric regression models with many predictors¹². Moreover, it would be very difficult to visualise a regression surface in more than three dimensions, that is, for more than two predictors. Taking all of these considerations into account, we employ the method of local polynomial regression which addresses the boundary problem present in kernel regression.

A central issue in nonparametric regression, local polynomial regression in particular, is the choice of smoothing parameter or bandwidth. In our model, we use the default data dependent bandwidth selected by the statistical software, Stata (see Box 1).

Box 1: Stata’s Data Dependent Bandwidth Selection¹³

It can be shown from asymptotic theory that the bandwidth,

$$h_{opt} = \left[\frac{R(K)}{[\sigma_K^2]^2 R(f'')n} \right]^{\frac{1}{5}}$$

where:

$$\sigma_K^2 = \int z^2 K(z) dz \quad R(K) = \int \{K(z)\}^2 dz$$

is “optimal” in the sense that it minimises the asymptotic mean integrated squared error (AMISE). Note that σ_K^2 , the kernel variance, and $R(K)$, the kernel “roughness”, are known properties of the chosen kernel function. However, $R(f'')$, where f'' denotes the second derivative of f , is unknown.

Based on simulations studies, Silverman (1986) suggested using

$$\hat{h}_{5\sigma} = 0.9\hat{\sigma} n^{-\frac{1}{5}}$$

for the gaussian kernel, which translates to

$$\hat{h}_5 = 1.159\hat{\sigma}_K n^{-\frac{1}{5}}$$

in the general case. Stata uses $\hat{h}_{5\sigma}$.

¹¹ Gutierrez et al (2003)

¹² Fox (2004)

¹³ Jann, B. (2007)

Our sample includes a total of 96 countries from Asia, Latin America, Africa and Europe (for a complete list of countries included in the sample see Appendix Table A-1). The variable GDP refers to the average annual percentage growth rate of GDP from 2008-2010 while Gini index pertains to average index from 2003-2007—data for both variables are sourced from World Bank Databank (variable definition found in Appendix Table A-2). We include in our sample only the countries with complete data on these two variables.

Descriptive statistics about the data used in our nonparametric regression are presented in Table 9.

Table 9: Descriptive Statistics

| | Gini Index | GDP Growth |
|--------------------|---------------------|--------------------|
| Mean | 41.50 | 3.83 |
| Standard Deviation | 9.04 | 3.43 |
| Maximum (Country) | 67.4 (South Africa) | 17.06 (Qatar) |
| Minimum (Country) | 16.83 (Azerbaijan) | -7.514017 (Latvia) |

Source: Author's estimates based on data from <http://data.worldbank.org/>

Figure 1 shows the result of the local polynomial regression using the full dataset of 96 countries. From the figure, we can recognise an inverted U-shaped relationship between inequality and growth; however the shape and the relationship are not as clear-cut as we would like it to be. Investigating further, we discover that there are outliers in our sample specifically Azerbaijan, Qatar, Latvia and Estonia (see Figure 2). We dropped these outliers in Figure 3 and got a clearer inverted U-shaped relationship between inequality and growth.

Figure 1. Relationship between inequality and growth using the full dataset: Local Polynomial Smoothing

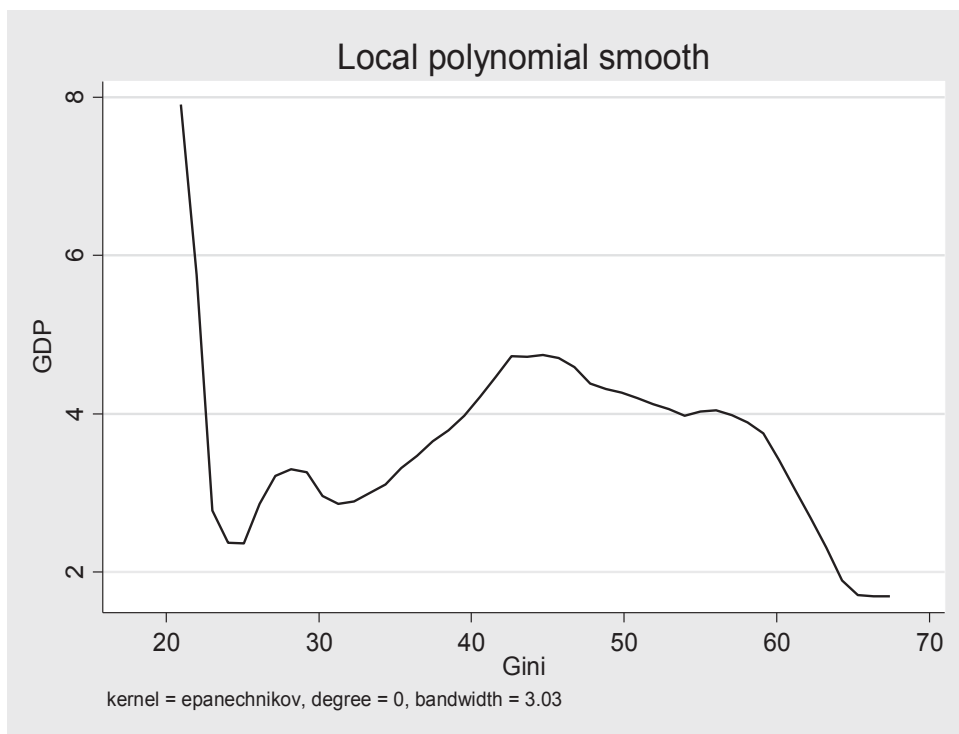


Figure 2. Relationship between inequality and growth using the full dataset (with country labels)

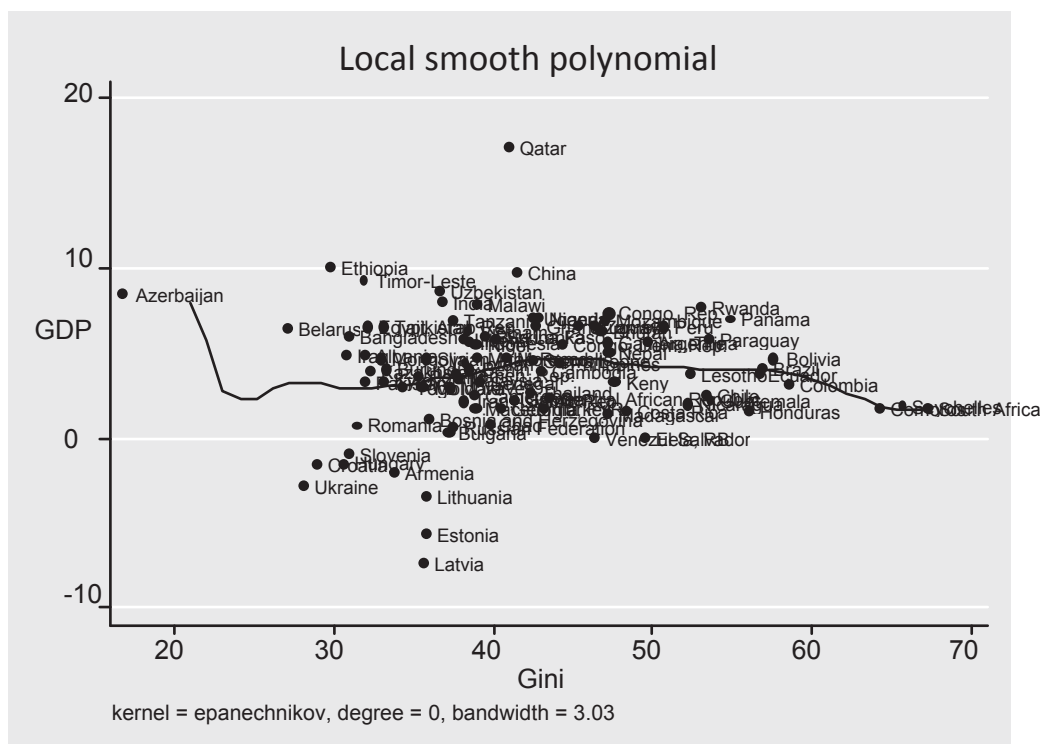
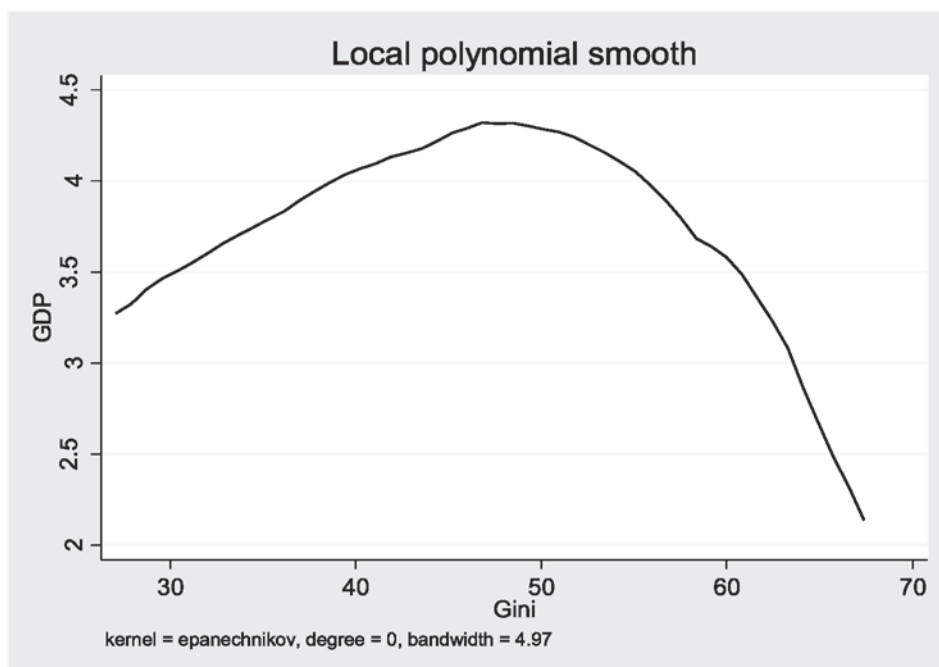
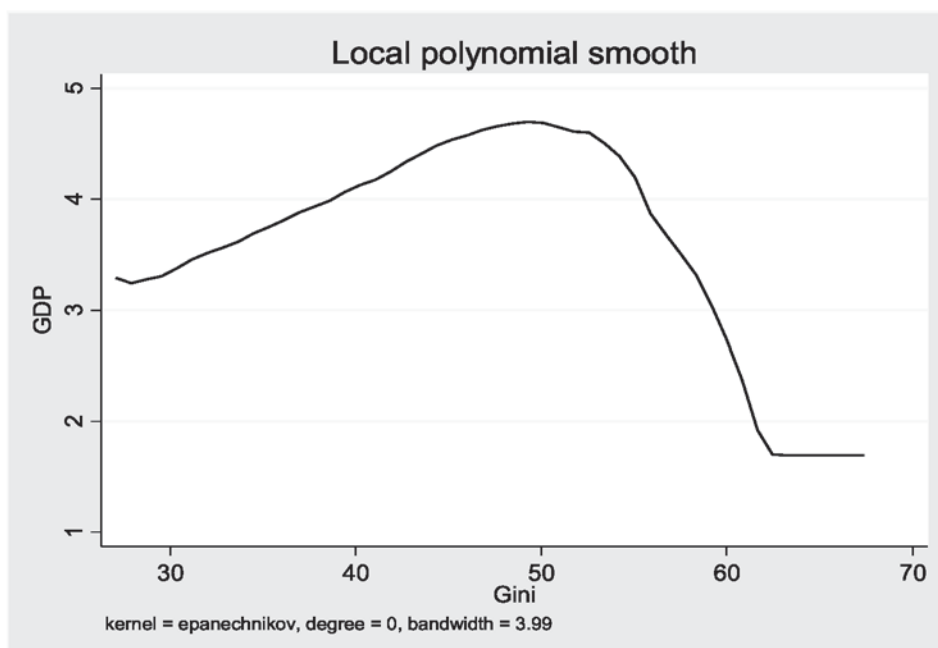


Figure 3. Relationship between inequality and growth without country outliers, (default settings)



Finally, we have dropped 14 countries from the Latin America where the Gini Coefficient was based on income surveys unlike 82 countries where the Gini coefficient was based on expenditure surveys. The inverted-U shape was retained in the truncated data set (Figure 4).

Figure 4. Local polynomial Smooth: without countries where Gini index was constructed from income



6. Parametric Regression

The main purpose of this section is to re-estimate the relationship between economic growth and inequality controlling for some other important variables in a cross-country parametric regression framework.¹⁴ Since our nonparametric regression suggests an inverted U-shaped relationship between inequality and growth, therefore, we have included Gini index and the square of Gini with a priori expectation of positive and negative coefficient respectively.

Table 10 reports the results of the regression where the variables Gini (*Gini*) and square of Gini (*Ginisq*) have positive and negative coefficients respectively, confirming the parabolic shape that have been derived from the nonparametric estimation. This result holds in all five models using different combinations of variables in the full dataset and the Asia only dataset. Controlling for initial per capita income (*income*), we find a negative and significant effect consistent with the conditional convergence theory of economic growth which posits that holding all other factors constant, poor countries tend to grow faster than richer ones (Model 2,3,5 and 6). The education variable in the full dataset proxied by average years of secondary schooling (*Ave. yr. of secondary schooling*) is insignificant and negative (Models 1 and 2), however when fertility rate is controlled for, as in Model 3, we get a positive but still an insignificant effect. This variable remains negative and insignificant in the dataset composed of Asian countries only. *Fertility rate* is also insignificant and positive in the full and Asia only dataset (Model 3 and 6).

Table 10: Regression Results

Dependent Variable: GDP growth
Model: OLS

| Independent Variables | Coefficient | | | | | |
|--|--------------------|---------------------|---------------------|-------------------|---------------------|---------------------|
| | Full dataset | | | Asia only | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| <i>Gini</i> | 0.87*** (2.89) | 0.82*** (2.97) | 0.79*** (2.81) | 0.04 (0.03) | 2.80* (1.84) | 3.18* (1.90) |
| <i>Ginisq</i> | -0.01*** (-2.9) | -0.01*** (-2.82) | -0.01*** (-2.67) | -0.001 (-0.06) | -0.04* (-1.9) | -0.04* (-1.95) |
| <i>Ave. yr. of secondary schooling</i> | -0.44 (-1.55) | -0.01 (-0.04) | 0.04 (0.15) | -0.43 (-1.09) | -0.32 (-0.93) | -0.25 (-0.86) |
| <i>Income</i> | | -0.94*** (-3.43) | -0.77* (-1.91) | | -1.62*** (-3.35) | -1.52*** (-3.06) |
| <i>Fertility Rate</i> | | | 0.19 (0.60) | | | 0.44 (0.59) |
| <i>Constant</i> | -14.88 (-2.11) | -8.87 | -10.08 (-1.39) | 5.22 (0.22) | -36.92 (-1.36) | -46.51 (-1.48) |
| <i>R-sq</i> | 0.22 | 0.34 | 0.34 | 0.07 | 0.27 | 0.29 |

Note: The figures in parenthesis are t-values.

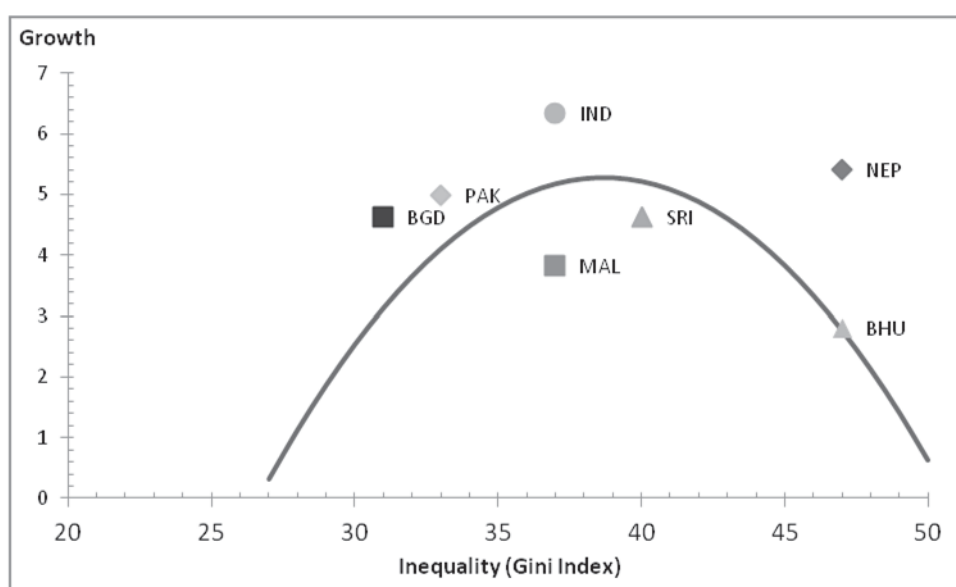
***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Source: Staff estimates based on data from WDI, Barro & Lee, Heston & Summers.

¹⁴ Appendix Table 1 gives the list of additional control variables and variable description.

We graph the result of the regression obtained in Model 5, and plot the most recent values of Gini index for South Asian countries as shown in Figure 5. This exercise shows us where the South Asian countries are on the parabola, their placement giving rise to a corresponding inequality-growth relationship. Thus, for countries on the left side of the inverted-U curve, there exists a positive relationship between inequality and growth and vice versa. However, to understand exactly how inequality affects growth in these South Asian countries we need to rely on more micro data because such answers could not be had from the results of cross-country regressions.

Figure 5. Inequality-Growth Relationship: Asia



Note: The years in parenthesis refer to the most recent values of Gini index as follows: BGD (2005), BHU (2003), IND (2009), MAL (2004), NEP (2004), PAK (2006) and SRI (2007).

Source: POVCALnet

7. Conclusion and Policy Response to Inequality

Our results show that rising income inequality in many Asian countries could be counterproductive for sustaining high growth. Higher income inequality reflects a combination of differences in the *efforts* (set of actions that are under the control of the individual), and differences in the circumstances (those that are outside the control such as economic, social, gender etc). Income inequalities arising on account of 'effort' are inevitable and perhaps necessary in a competitive system. While it is difficult to differentiate inequalities on account of effort (referred to *good* inequality) and circumstances (referred to as bad inequality), public policy tends to focus on tackling circumstances related inequalities, specifically those which arise due to *inequalities of opportunities*. It is relatively easy to identify major cause of circumstance induced inequality where public policy can be utilised to reduce them. There is overwhelming evidence that factors that induce and perpetuate circumstance related inequalities are: social exclusion, non-availability of good quality education, inadequate health facilities, social protection, and lagging regions where there is lack of income enhancing employment opportunities. Unless these issues are addressed, not only will inequalities increase over time, but the poverty reduction and social cohesion objectives can also be severely compromised. Over the long run, economic growth itself will be adversely affected.

A key issue in tackling inequality is that public policy should promote initiatives that promote enhanced opportunities for the poor. Policies that improve productivity and incomes in the rural areas, and urban informal sector, are vital for promoting employment opportunities for the poor. As emphasised in the inclusive growth literature, these policies should broaden employment opportunities not just for the poor (the bottom 20%) but also for the middle class too – i.e. the policies should promote broad based growth.¹⁵ Access to finance to the poor is another area where policy needs to focus. Well organised micro-finance schemes have successfully provided access to employment opportunities to the most disadvantaged, especially women.

Redistribute policies also have an important role in arresting income inequalities from increasing. These policies can take various forms depending on the distribution of assets. Land reforms are often cited as important for poverty reduction and better distribution of income. If ownership of land is highly skewed, increase in agriculture productivity will have only a minor impact on incomes of the poor. But it must be emphasised that land reforms have often faced political resistance in many countries.

Another set of redistributive policies relate to refocusing public investment and expenditure that enhance employment opportunities for the poor. Switching public expenditure from tertiary education to primary and secondary education, and promoting vocational training and skills development have a direct impact on the employability of the poor. These initiatives can be reinforced by redirecting public investment to infrastructure development in the rural (lagging regions) from the urban and more prosperous areas. Providing the rural poor with improved access to irrigation, roads, transport services, agriculture extension services, and financial services would contribute towards improving the productivity of agriculture and avenues for non-farm employment. Improved agricultural productivity and expansion of non-farm employment tend to have mutually reinforcing beneficial effects.

In general, redistributive policies are likely to work effectively only if they are properly designed and targeted, and they do not hurt the growth and efficiency. Financing redistributive policies can often be high, requiring imposition of taxes that reduces the incentive to invest and innovate. Governments need to carefully design tax policies that increase mobilisation of resources in ways that minimise efficiency costs without compromising the equity considerations – and this may not always be easy. Similarly, attempts at reducing social inclusion through affirmative action by setting targets for reservations in educational institutions and jobs can go against efficiency considerations. The choices and trade-offs can often be formidable for policymakers. Nevertheless, redistribution will remain an important plank of public policy aimed at reducing poverty and inequality.

Finally, the quality of service provision by the state is a critical determinant of the failure and success of public policy aimed at reducing poverty and inequality. In many Asian countries, only a fraction of the allocated resources reach the intended beneficiaries. What is particularly disturbing is that not only is the policy objective not achieved, resources are often squandered away through leakages and corruption. It is therefore important that Governments realistically assess the capacity of the service providing agencies, and take measures to improve their effectiveness before casting the net too wide.

¹⁵ World Development Report 2006 *Equity and Development*, World Bank

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Appendix

Table A-1: List of Countries Included in the Sample

| Asia | | Latin America | | Sub-Saharan Africa | | Europe | |
|--------------|--------------------|---------------|---------------|--------------------|--------------------------|--------------|------------------------|
| Country Code | Country | Country Code | Country | Country Code | Country | Country Code | Country |
| 1 | Armenia | 33 | Argentina | 49 | Benin | 81 | Albania |
| 2 | Azerbaijan | 34 | Bolivia | 50 | Burkina Faso | 82 | Belarus |
| 3 | Bangladesh | 35 | Brazil | 51 | Burundi | 83 | Bosnia and Herzegovina |
| 4 | Bhutan | 36 | Chile | 52 | Cameroon | 84 | Bulgaria |
| 5 | Cambodia | 37 | Colombia | 53 | Central African Republic | 85 | Croatia |
| 6 | China | 38 | Costa Rica | 54 | Chad | 86 | Estonia |
| 7 | Egypt | 39 | Ecuador | 55 | Comoros | 87 | Hungary |
| 8 | Georgia | 40 | El Salvador | 56 | Congo, Dem. Rep. | 88 | Latvia |
| 9 | India | 41 | Guatemala | 57 | Congo, Rep. | 89 | Lithuania |
| 10 | Indonesia | 42 | Honduras | 58 | Ethiopia | 90 | Macedonia, FYR |
| 11 | Iran, Islamic Rep. | 43 | Nicaragua | 59 | Gabon | 91 | Moldova |
| 12 | Iraq | 44 | Panama | 60 | Gambia, The | 92 | Morocco |
| 13 | Jordan | 45 | Paraguay | 61 | Ghana | 93 | Poland |
| 14 | Kazakhstan | 46 | Peru | 62 | Guinea | 94 | Romania |
| 15 | Kyrgyz Republic | 47 | Uruguay | 63 | Kenya | 95 | Slovenia |
| 16 | Malaysia | 48 | Venezuela, RB | 64 | Lesotho | 96 | Ukraine |
| 17 | Maldives | | | 65 | Liberia | | |
| 18 | Mongolia | | | 66 | Madagascar | | |
| 19 | Nepal | | | 67 | Malawi | | |
| 20 | Pakistan | | | 68 | Mali | | |
| 21 | Philippines | | | 69 | Mozambique | | |
| 22 | Qatar | | | 70 | Niger | | |
| 23 | Russian Federation | | | 71 | Nigeria | | |
| 24 | Sri Lanka | | | 72 | Rwanda | | |
| 25 | Syrian Arab Rep. | | | 73 | Senegal | | |
| 26 | Tajikistan | | | 74 | Seychelles | | |
| 27 | Thailand | | | 75 | Sierra Leone | | |
| 28 | Timor-Leste | | | 76 | South Africa | | |
| 29 | Turkey | | | 77 | Tanzania | | |
| 30 | Uzbekistan | | | 78 | Togo | | |
| 31 | Vietnam | | | 79 | Uganda | | |
| 32 | Yemen, Rep. | | | 80 | Zambia | | |

Table A-2: Variable Description (Nonparametric Regression)

| Variable | Description | Source |
|-------------|--|--|
| <i>GDP</i> | Average of annual percentage growth rate of GDP at market prices based on constant local currency from 2008-2010. Aggregates are based on constant 2000 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. | World Bank Databank http://data.worldbank.org/ |
| <i>Gini</i> | Average Gini index from 2003-2007. Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. | World Bank Databank http://data.worldbank.org/ |

Table A-3: Summary Statistics (Parametric Regression)

| Variable | Definition | Source | No. of Observation | Mean | Std. Deviation | Minimum | Maximum |
|---|---|------------------------------------|--------------------|---------|----------------|---------|----------|
| <i>GDP</i> | Average annual GDP growth from 2008-2010. | World Development Indicators (WDI) | 92 | 3.86 | 2.78 | -3.49 | 9.91 |
| <i>Gini</i> | Average Gini Index from 2003-2007. | WDI | 92 | 41.89 | 8.81 | 27.07 | 67.40 |
| <i>Ginisq</i> | Square of Gini. | WDI | 92 | 1831.75 | 802.71 | 732.78 | 4542.76 |
| <i>Income</i> | Log of average GDP per capita from 2003-2007. | WDI | 92 | 1821.13 | 2165.36 | 90.84 | 12040.66 |
| <i>Ave. year of Secondary Schooling</i> | Average years of secondary schooling in the population aged over 15 from 2003-2007. | Barro & Lee | 67 | 2.56 | 1.35 | 0.26 | 5.78 |
| <i>Fertility Rate</i> | Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates. It is the average of fertility rates from 2003-2007. | WDI | 92 | 3.44 | 1.70 | 1.22 | 7.30 |

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