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**Pro-poor growth**

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# Pro-poor growth

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# Pro-poor growth

## Abstract

This paper reviews how pro-poor growth evolved, providing its intuitive interpretations and policy implications. It provides a critical assessment of alternative definitions of pro-poor growth proposed in the literature. It also outlines how to make pro-poor growth operational utilizing household surveys.

China has achieved an unprecedented poverty reduction. It has succeeded in lifting almost one billion people out of poverty in three decades. This paper tells the Chinese story of how it achieved unprecedented poverty reduction. The poverty equivalent growth rate (PEGR) proposed by Kakwani and Son, published in the Review of Income and Wealth, is the primary vehicle to tell this story. The analysis presented in this paper covers the period 1988-2018

## 1. Introduction

The term pro-poor growth is relatively new, and it emerged in the late 1990s. Many development practitioners began talking about it, but they did not have a precise concept of pro-poor growth. International agencies such as the United Nations (2000) and OECD (2001) defined pro-poor growth that benefits to the poor and providing them with opportunities to improve their economic situation. The Asian Development Bank developed in 1999 its *Poverty Reduction Strategy*, according to which "growth is pro-poor when it is labor absorbing and accompanied by policies and programs that mitigate inequalities and facilitate income and employment generation for the poor, particularly women and other traditionally excluded groups. These definitions were vague and provided little guidance to the measurement of pro-poor growth.

This chapter reviews how pro-poor growth evolved, providing its intuitive interpretations and policy implications. It provides a critical assessment of alternative definitions of pro-poor growth proposed in the literature.<sup>1</sup>

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<sup>1</sup> World Bank has proposed a new development model that focuses on the bottom 40% of the population, called shared prosperity [Rosenblatt and McGavock (2013)]. It relates to the notion of inclusive growth, ensuring that a sizable bottom part of the population benefit from growth. The pro-poor growth concerns with the absolute poverty determined by a poverty line. The two models differ in a significant way.

(2008) is the primary vehicle to tell this story. The analysis presented in this chapter covers the period 1988-2018.

## **2. Trickle-down development**

In the 1950s and 1960s, the dominant development thinking was that economic growth was the dominant factor in poverty reduction. The rich can invest in the economy to enhance economic growth through an increase in productivity. The rich initially reap higher benefits of growth through their investments, but then in the second round, the poor begin to benefit when the rich start spending their riches. Eventually, the benefits of economic growth will lead to a reduction in poverty. Thus, the view held in development economics was that the governments' strategy for poverty reduction should promote investments, increase production capabilities, and enhance economic growth. The governments need not be concerned with how economic growth distributes benefits among the people. That was known as the trickle-down strategy. It implies a vertical flow from the rich to the poor that happens automatically.

By the early 1970s, the trickle-down theory lost some of its shine. In a pioneering paper, Ahluwalia, Carter, and Chenery (1979) observed that although the world's output expanded at an unprecedented rate in the past quarter of a century, the benefits of growth reached the world's poor to a minimal degree. This failure happened because the distributional pattern left behind the poor.

Bhagwati (1988) developed the notion of "immiserizing growth," implying that positive economic growth can increase poverty. He gave a scenario where affluent farmers adopt new seeds and

technology, raising grain production and lowering prices. The marginal farmers cannot afford to adopt the latest technology; their production remains stagnant, yielding even lower income. Thus, the green revolution may immiserate the poor. Bhagwat's immiserizing growth shows that economic growth is insufficient to reduce poverty, meaning that the trickle-down may not be a good poverty reduction policy.

The beginning of the basic idea of pro-poor growth may be traced to the World Bank's book, *Redistribution with Growth*, published in 1974 by Ahluwalia and Chenery. This book was a milestone, with the vital message that the redistribution of income from the rich to the poor, in conjunction with economic growth, was essential to reduce poverty in developing countries. Pro-poor growth was also implicit in broad-based growth, indicated in the 1990 World Development Report. The term pro-poor growth came into existence in the late 1990s.

It seemed that in the 1990s, the consensus developed among development practitioners that pro-poor growth represented a significant departure from the trickle-down phenomenon. Despite this consensus, the trickle-down development strategy continued until the new millennium. Dollar and Kraay (2002) published a controversial paper, "Growth is Good for the Poor," concluding that the poor's income rises one-for-one with overall growth. The study showed that this general relationship between the incomes of the poor and average growth holds in a sample of 80 countries over four decades. This research implied that growth is good for the poor, irrespective of the pattern of growth. It also meant that economic growth over four decades had not changed inequality in eighty countries; the proportional benefits of growth going to the poor remained the same as those enjoyed by the non-poor.



The clear message of the Dollar-Kraay study was that governments need not follow pro-poor growth policies. They should maximize economic growth provided they avoid inflation and maintain fiscal discipline. This development strategy came under fire from Oxfam (2000). It pointed out that the World Bank's new development policy reflects an ideological desire to return to the golden age of free-market economics in the 1980s. That is terrible news for poverty reduction.

Although Oxfam's criticism of the World Bank study is emotional, the fact remains that the World Bank's research was not convincing. It derived its conclusions from the cross-country regression models. It is well-known that concepts and measurement of income and poverty are not consistent across countries; their findings were not robust. Furthermore, cross-country regressions only indicate average trends; individual country experiences can be significantly different. <sup>2</sup> Foster and Sze'kely (2000), employing a social welfare approach to measuring poverty, concluded that the poor gain proportionally significantly less than the average individual. Their conclusions are at odds with the conclusions drawn by Dollar and Kraay. Recently, Dollar, Klienebrg, and Kraay (2016) revisited the same question with more data and arrived at the same conclusions. This study also suffered from the same conceptual issues of cross-country regression models.

### **3. Four alternative definitions of pro-poor growth**

McCulloch and Baulch (1999), researchers at the Institute of Development Studies of the University of Sussex, U.K, proposed a simple operational measure of pro-poor growth, called the

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<sup>2</sup> See Kakwani, Prakash and Son (2000) for a detailed evaluation of Dollar and Kraay's paper.

"poverty bias of growth." They derived it by subtracting changes in the poverty-head count between any two periods under actual circumstances from the change in poverty that would have occurred if all had gained equally. They derived their measure without giving a precise definition of pro-poor growth.

Kakwani and Pernia (2000) proposed a precise definition of pro-poor growth. According to them, pro-poor growth is a strategy that is deliberately biased in favor of the poor. Thus, their precise definition was that growth is pro-poor if it benefits the poor proportionally more than the rich, i.e., growth results in a redistribution of income in favor of the poor. When there is a negative growth rate, the pro-poor growth implies that the loss of income from growth is proportionally less for the poor than the non-poor. That is a relative definition of pro-poor growth because it contributes to a reduction in relative inequality.

Kolm (1976) proposed the idea of absolute inequality. Following this idea, Grosse, Harttgen, and Klasen (2008) defined growth as absolute pro-poor if the poor enjoy greater absolute benefits from growth than the non-poor. When growth is negative, the pro-poor growth entails a smaller loss of income for the poor than the non-poor. The absolute pro-poor growth reduces the absolute inequality; therefore, it is a stronger requirement than the relative pro-poor growth.

The third definition of pro-poor growth is by Ravallion and Chen (2003), who defined growth as pro-poor if it reduces poverty. Kakwani and Son (2008) demonstrated that this is the weakest definition of pro-poor growth when growth is positive and the strongest definition if growth is negative.

The linkage between growth and poverty is complex and also determined by changes in inequality. Thus, the concept of pro-

poor growth provides the interrelationship between three factors: poverty, inequality, and growth, known in the literature as the (PIG) axis [Sumner (2003)]. Kakwani and Son's (2008) growth rate, called "poverty equivalent growth rate" (PEGR), takes into account both the growth rate in mean incomes and how the benefits of growth are distributed among the poor and non-poor. It encompasses the three definitions of pro-poor growth rate discussed in this section. This paper demonstrates that the PEGR satisfies an essential requirement that the magnitude of poverty reduction is a monotonically increasing function of the PEGR. Thus, the PEGR is an effective tool to reduce or alleviate poverty; maximization of the PEGR implies a maximum reduction in poverty. The governments' social objective should be to maximize the PEGR.

#### 4. Poverty measures

Society needs to decide on a poverty measure to estimate the pro-poor growth rate. To derive the pro-poor growth rate, we use the class of additively decomposable poverty measures that are presented in Chapter 8 (e.g., the Foster, Greer, and Thorbecke (1984) FGT class of poverty measures, the Watts (1968) poverty measure (1968) and Chakravarty's (1983) indices).

The framework is general and can encompass any poverty measure, including non-additive poverty measures such as Sen's (1976).

Suppose income  $x$  of an individual is a random variable with a density function  $f(x)$ , and  $z$  is the poverty line, a general class of additively decomposable poverty measures can be characterized by

$$\theta = \int_0^z P(z, x) f(x) dx , \quad (4.1)$$

where  $P(z, x)$  is a homogenous function of degree zero in  $z$  and  $x$  such that

$$P(z, z) = 0, \quad \frac{\partial P(z, x)}{\partial x} < 0, \quad \text{and} \quad \frac{\partial^2 P(z, x)}{\partial x^2} > 0 \quad (4.2)$$

The particular poverty measures of this general class mentioned previously are derived by specifying the function  $P(z, x)$ . For example, for Atkinson's class  $A_\beta$  of poverty measures (1987), we may write that

$$A_\beta = \frac{1}{\beta} \int_0^z \left[ \frac{z^\beta - x^\beta}{z^\beta} \right] f(x) dx \quad (4.3)$$

where  $0 < \beta < 1$ . As  $\beta$  approaches zero,  $A_\beta$  approaches Watts' poverty measure.

### 5. A general framework for pro-poor growth index<sup>3</sup>

Kakwani and Pernia (2000) were the first to propose a pro-poor index that measured how growth can be considered pro-poor. In 2008, Kakwani and Son (2008) developed a general framework for measuring the degree of pro-poorness. The essential contribution of this framework is the poverty decomposition:

$$\delta = \gamma\eta + \zeta \quad (5.1)$$

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<sup>3</sup> The pro-poor growth literature has also developed the partial approach that informs under what conditions growth can be said to be pro-poor or anti-poor without specifying a poverty line and a poverty measure. Ravallion, and Chen's (2003) poverty incidence curve, and Son's (2004) poverty growth curve fall into this category. This approach has a limitation that it does not always provide conclusive results, and also does not measure the degree of pro-poorness. This paper is focussed only on the full approach that does not have these limitations.

Equation (5.1) shows that growth in poverty  $\delta$  is the sum of the two components. The first term on the RHS captures two sources of growth in poverty given by  $\gamma\eta$ . It consists of the growth rate in average incomes  $\gamma$  multiplied by the growth elasticity of poverty  $\eta$ . Kakwani defined the growth elasticity of poverty as the growth in poverty if inequality did not change.  $\gamma\eta$  is the inequality-neutral growth of poverty contributed by the growth in mean income  $\gamma$ . The second term in the righthand side  $\zeta$  is the poverty growth when inequality changes, but the growth in mean income remains the same. This may be called the inequality effect of poverty.

The growth effect of poverty denoted by  $\gamma\eta$  is always negative, implying that it always reduces poverty. The growth process can redistribute income either in favor of the poor or non-poor. The inequality effect captures the redistributive impact on poverty. If growth redistributes income favoring the poor, poverty reduction will be more rapid with the same economic growth. Thus, one can define growth as pro-poor (anti-poor) if the inequality effect reduces (increases) poverty. That leads to the pro-poor growth index proposed by Kakwani and Pernia (2000):

$$\varphi = \frac{\delta}{\gamma\eta} \quad (5.2)$$

If the growth rate of mean income  $\gamma$  is positive, growth is pro-poor (anti-poor) in the relative sense if  $\varphi$  is greater (less) than one. Intuitively, the denominator in (5.2) is the proportional poverty reduction under the counter-factual that everyone in society receives the same proportional benefits of growth. The numerator in the equation is the actual proportional reduction in poverty. Suppose  $\varphi$  is greater than one, then the actual poverty reduction is higher than the poverty reduction occurring when

the growth process provides the same proportional benefits to everyone. Thus, growth distributes benefits to the poor proportionally more than to the non-poor; growth is pro-poor. If the growth rate  $\gamma$  is negative, and  $\varphi$  is greater than one, the denominator in (5.2) is the proportional increase in poverty when everyone suffers the same proportional loss of income. The numerator is the actual increase in poverty, and if it is higher than the denominator, the poor suffer greater hardship than the non-poor. Thus, the recession is anti-poor. If  $\varphi$  is less than one, the poor suffer less hardship than the non-poor, so the recession is pro-poor. It is a relative pro-poor index implying that pro-poor (anti-poor) growth reduces (increases) relative inequality.

Kakwani and Son (2008) also developed absolute pro-poor growth when the poor receive more absolute benefits than the non-poor. The poverty decomposition in (5.1) is the relative poverty decomposition; the absolute poverty decomposition is given by

$$\delta = \gamma\eta^* + \zeta^* \quad (5.3)$$

where

$$\eta^* = \frac{\mu}{\theta} \int_0^z \frac{\partial P}{\partial x} f(x) dx \quad (5.4)$$

is the absolute elasticity of poverty, interpreted as the proportional change in poverty when the mean income grows by 1 percent, provided that the growth process does not change the absolute inequality ( $\mu$  refers to the mean income) The second term on the RHS of (5.3),  $\zeta^*$  is the poverty growth when absolute inequality changes, but the growth in mean income remains the same. This may be called the absolute inequality effect of poverty.

Similar to the relative pro-poor growth index in (5.2), the absolute pro-poor growth index is obtained as

$$\varphi^* = \frac{\delta}{\gamma\eta^*} \quad (5.5)$$

Positive growth will be absolute pro-poor (anti-poor) if  $\varphi^*$  is greater (less) than 1, in which case, the poor, will receive greater (smaller) absolute growth benefits than the non-poor. Similarly, a negative growth will be pro-poor (anti-poor) if  $\varphi^*$  is smaller (larger) than 1, in which case, the poor, will suffer the smaller (larger) loss of income due to the recession.

According to Ravallion and Chen (2003), growth will be pro-poor (anti-poor) if  $\delta$  is negative (positive). Kakwani and Son (2008) have identified this situation as poverty-reducing (increasing) growth.

## 6. Poverty equivalent growth rate explained

Both relative and absolute pro-poor growth indices  $\varphi$ , and  $\varphi^*$  measure how economic growth distributes the benefits from growth across the population. However, these indices do not inform how effective economic growth is in reducing poverty or, in other words, how much economic growth has contributed to growth in poverty. The growth impact on poverty depends on two factors: (i) growth rate in mean income and (ii) the distribution of growth benefits among the poor and non-poor. Kakwani and Son (2008) developed the poverty-equivalent growth rate (PEGR), a composite index of the two factors impacting poverty.

The PEGR is the growth rate that would result in the same growth in poverty as the actual growth rate if the growth process

had not accompanied any change in inequality. It would be the counter-factual growth rate if everyone in society received the same proportional benefits. The actual economic growth is  $\gamma$  that results in the poverty growth rate of  $\delta$  from a given income distribution. Suppose  $\gamma_R$  is the distributionally neutral growth rate when inequality does not change, which leads to the growth of poverty equal to  $\gamma_R \eta$ . This growth rate in poverty must equal  $\delta$ . Thus, solving this equation yields

$$\gamma_R = \frac{\delta}{\eta} = \varphi \gamma \quad (6.1)$$

which is the relative PEGR. It can also be written as

$$\gamma_R = \frac{\int_0^H \frac{\partial P}{\partial x} x(p) g(p) dp}{\int_0^H \frac{\partial P}{\partial x} x(p) dp}$$

which shows that the relative PEGR is the weighted average of the relative growth rates of income at each percentile point with the weight depending on the poverty measure used.

Similarly, the absolute PEGR will be given by

$$\gamma_A = \frac{\delta}{\eta^*} = \varphi^* \gamma \quad (6.2)$$

which can also be written as

$$\gamma_A = \frac{\int_0^{H\partial P} \frac{\partial P}{\partial x} g_A(p) dp}{\int_0^{H\partial P} \frac{\partial P}{\partial x} dp} \quad (6.3)$$

where  $g_A(p) = d\mu$  is the absolute growth rate. This equation demonstrates that the absolute PEGR is also the weighted



average of the absolute growth rates, depending on the poverty measure used.

It will be helpful to explain the idea of PEGR by a hypothetical example. Suppose an economic growth of 7% has reduced poverty by 10%, meaning that  $\delta = -0.10$  and  $\gamma = 0.07$ . Suppose the growth elasticity of poverty is  $\eta = -1.2$ , interpreted as a 1% increase in mean income reduces poverty by 1.2%, provided the relative inequality had not changed. The growth in poverty under the counter-factual that inequality had not changed would be  $-1.2 \times 0.07 = -0.084 \approx -8.4\%$ . The actual poverty reduction is 10%, meaning that the actual poverty reduction is higher than the reduction that would have occurred if growth were inequality neutral, which gives pro-poor index  $\varphi = \frac{(-0.10)}{(-0.084)} = 1.19$ . Hence the poor enjoy 19% higher benefits than the non-poor, so growth is pro-poor. The  $PEGR = 0.07 \times 1.19 = 0.08 \approx 8\%$ , which is higher than the actual economic growth rate of 7%. Thus, there is a gain of 1 percent in the growth rate because growth is pro-poor.

Suppose that the economy suffered a recession, so the economic growth rate decreased by 5%, implying  $\gamma = -0.05$ , which led to an increase in poverty by 7%, giving  $\delta = 0.07$ . If the recession were inequality neutral, poverty would have increased by  $-1.2 \times (-0.05) = 0.06 \approx 6\%$ . The actual increase in poverty is 7%, which yields the pro-poor index  $\varphi = \frac{7}{6} = 1.17$ . It means that the poor suffer a 17% higher loss of income than the non-poor; therefore, the recession is anti-poor. Thus, the  $PEGR = -0.05 \times 1.17 = -0.059 \approx -5.9\%$ , which is lower than the actual growth rate of -5%. Thus, the society suffers a loss of growth rate equal to 0.9 percent. A similar interpretation applies to the absolute PEGR.

## 7. Interpretations of PEGR

Since  $\eta < 0$ , it implies that  $\gamma^*$  in (3.6) is positive (negative) if  $\delta$  is negative (positive), meaning that there is a one-to-one negative relationship between the PEGR and poverty; hence, the PEGR is consistent with the direction of the change in poverty; a positive (negative) value of the PEGR implies a reduction (increase) in poverty. Thus, the PEGR will satisfy Ravallion, and Chen's (2003) Axiom 1, which is the essential requirement of any pro-poor growth rate.

The following equation can capture the pattern of growth:

$$\gamma_R = \gamma + (\varphi - 1)\gamma \quad (7.1)$$

As noted earlier, growth is pro-poor (the poor receiving proportionally higher benefits) when  $\gamma > 0$  and  $\varphi > 1$ . It implies that the second term on the right-hand side of (7.1) is positive. Thus, growth will be pro-poor if  $\gamma_R > \gamma$ . If the growth in mean income is negative, then growth is pro-poor if the poor suffer a proportionally smaller income loss than the non-poor, in which case  $\varphi < 1$ . It follows that the growth will be pro-poor if  $\gamma_R > \gamma$ , whether the growth rate of mean income is positive or negative. The magnitude of gain in growth rate measures the degree of pro-poorness of growth. Similarly, anti-poor growth will always result in a loss of growth rate.

If  $\gamma_R > \gamma$ , and  $\gamma > 0$ , the positive growth reduces poverty and is pro-poor. If

$0 < \gamma_R < \gamma$ , and  $\gamma > 0$ , the positive growth reduces poverty but is not pro-poor. This scenario refers to trickle-down development, meaning that growth reduces poverty, but the poor

receive only a tiny share of growth benefits. If  $\gamma_R < 0$  and  $\gamma > 0$ , the positive growth increases poverty and is also anti-poor. This scenario relates to the immiserizing growth [Bhagwati (1988)].

If  $\gamma_R < 0$ , and  $\gamma < 0$ , the negative growth increases poverty but is pro-poor, meaning that recession hurts the poor proportionally less than the non-poor. If  $\gamma_R < \gamma$ , and  $\gamma < 0$ , the negative growth increases poverty and is also not pro-poor. If  $\gamma_R > 0$ , and  $\gamma < 0$ , the negative growth reduces poverty and is also pro-poor. Similar interpretations apply to the absolute PEGR. Kakwani and Son (2008) have shown that absolute pro-poor growth is a stronger requirement than relative pro-poor growth.

Ravallion and Chen (2003) defined growth as poor growth if it reduces poverty, howsoever small. This requirement is satisfied if  $\gamma_R > 0$ . If the growth rate  $\gamma > 0$ , then  $\gamma_R > \gamma$  will always imply  $\gamma_R > 0$ , and thus the pro-poor considered here always implies a poverty reduction. That demonstrates that Ravallion and Chen's (2003) definition of pro-poor is weaker than the one adopted in this paper when the mean-income growth is positive. On the other hand,  $\gamma_R > 0$  implies that  $\gamma_R - \gamma > -\gamma$ , which further implies that  $\gamma^* > \gamma$  when  $\gamma < 0$ . That demonstrates that Ravallion and Chen's definition of pro-poor growth is stronger than that considered here when the mean-income growth rate is negative. This result is intuitive, meaning that the negative growth rate of mean income reduces poverty.

What are the practical implications of the Ravallion-Chen definition of pro-poor growth? The cross-country study conducted by Kakwani and Son (2008) throws light on it. They studied the growth patterns in 80 countries in 237 growth episodes covering the period 1984-2001. They found that 106

episodes had negative growth rates and 131 episodes had positive growth rates. According to the Ravallion-Chen definition, the incidence of poverty fell in 86 percent of all positive growth spells, meaning that growth will be pro-poor in 86 percent of cases. Thus, a government can achieve pro-poor outcomes by ensuring that the growth rate is positive. The negative growth episodes increased poverty in 87 percent of the cases, meaning that the negative growth decreases poverty only in 13 percent of the cases. Thus, these results indicate that most growth episodes will be classified as pro-poor (anti-poor) when positive (negative) growth. Such outcomes may not guarantee a rapid poverty reduction. Government policies should enhance the PEGR to rapidly decrease poverty, becoming an agenda for poverty reduction in developing countries.

## 8. Calculations of (PEGR)

The calculation of the PEGR requires the estimates of growth and inequality components of the poverty growth rate. The household surveys are the sources for calculating them, but the main requirement is that at least two-period household surveys must be available. Kakwani's (2000) discrete-time decomposition estimates the two components between any two periods. The two-period estimates are likely to be volatile, hence essential to analyze the trend of pro-poor growth rates over an extended period. We propose to use Kakwani's method of calculating the trend growth rates derived from the two-period growth rates.

A general poverty measure is characterized by the function  $\theta = \theta[z, \mu, L(p)]$ , where  $z$  is the fixed poverty line,  $\mu$  is the mean and  $L(p)$  is the Lorenz curve. The growth component  $\gamma\eta$  is the poverty growth rate when the mean income changes between the two periods, but the Lorenz curve does not change

in the base and terminal year. Similarly, inequality component  $\zeta$  is the poverty growth rate when the Lorenz curve shifts between the two periods, but the mean income does not change. This section presents an intuitive idea of calculating the two components, but Kakwani and Son (2008) give details

## 9. A Case study of China

The sustained economic growth in China over three decades has achieved an unprecedented poverty reduction. This case study tells the Chinese story of how it achieved remarkable poverty reduction. The PEGR is the primary vehicle used to tell this story. This chapter analyzes the pro-poorness of economic growth in China during the period 1988 to 2018.

The case study utilizes the *Chinese Household Income Project (CHIP)*. The per capita household incomes are measured at the 2013 Beijing prices and are comparable across the country and over time. China's official poverty line of Yuan 2736 per person per month at Beijing's prices in 2013 is used to calculate poverty measures.

The average standard of living measured by real per capita mean income had been growing at an annual rate of 7.08 percent over the entire period of three decades. The rising average standard of living has accompanied a monotonic increase in the Gini index at an annual rate of 0.87 percent in 1988-2018. All poverty measures show that poverty in China had been declining at unprecedented rates of more than 10 percent in the entire 30 years<sup>4</sup>.

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<sup>4</sup> The values of the mean income, Gini index and various poverty measures for the years 1988, 1995, 2002, 2007, 2013 and 2018 are available upon request from the author.

The (PEGR) estimates presented in Table 1 are all positive with two exceptions. In 2013-2018, the severity of poverty and the Watts measure showed negative values (PEGR). It means that poverty has declined in all periods and by all poverty measures except in the two cases mentioned previously.

Table 2 also presents the gains and losses of growth; gains implying pro-poor growth and losses anti-poor growth. All poverty measures show the losses of growth in all periods, suggesting that economic growth in China had not been pro-poor. For example, the trend PEGR for the severity of poverty is 4.88%, which is less than the trend mean income growth rate of 7.08%, resulting in the loss of trend growth rate of 2.20%.

The trend growth rates for the (PEGR) for the entire period of 1988-2018 are positive and significantly high, varying from 4.88% for the severity of poverty to 5.84 percent for the headcount ratio. These high values signify that China has achieved an outstanding reduction in poverty as measured by the three main poverty measures. The overall conclusion emerging from these results is that China has achieved spectacular poverty reduction over three decades, but growth has not been pro-poor. If the growth process had been pro-poor, China would have achieved even higher poverty reduction.

**Table 1:** Poverty Equivalent Growth Rates and Gains or Loss of Growth Rates

| Period                         | 1988-1995 | 1995-2002 | 2002-2007 | 2007-2013 | 2013-2018 | Trend Growth |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|--------------|
| Poverty Equivalent Growth Rate |           |           |           |           |           |              |
| Percentage of poor             | 5.74      | 2.48      | 12.41     | 4.38      | 3.05      | 5.84         |
| Poverty gap ratio              | 5.15      | 2.11      | 12.58     | 2.96      | 1.34      | 5.28         |
| Severity of poverty            | 4.68      | 1.89      | 12.99     | 1.79      | -0.37     | 4.88         |
| Watts measure                  | 4.87      | 2.00      | 12.93     | 2.17      | -0.08     | 5.03         |
| Chakravarty $e=.5$             | 5.03      | 2.06      | 12.70     | 2.66      | 0.85      | 5.18         |
| Atkinson Beta=.5               | 5.03      | 2.06      | 12.70     | 2.66      | 0.85      | 5.18         |
| Gains or Losses of Growth      |           |           |           |           |           |              |
| Percentage of poor             | -0.75     | -0.97     | -1.66     | -2.91     | -0.14     | -1.24        |
| Poverty gap ratio              | -1.35     | -1.34     | -1.49     | -4.33     | -1.85     | -1.80        |
| Severity of poverty            | -1.82     | -1.56     | -1.08     | -5.50     | -3.56     | -2.20        |
| Watts measure                  | -1.63     | -1.45     | -1.14     | -5.12     | -3.27     | -2.06        |
| Chakravarty $e=.5$             | -1.47     | -1.39     | -1.36     | -4.62     | -2.33     | -1.91        |
| Atkinson Beta=.5               | -1.47     | -1.39     | -1.36     | -4.62     | -2.33     | -1.91        |

## **10. Concluding remarks**

Poverty reduction depends on two factors, growth rate and distribution of benefits from growth. The PEGR is a composite index of the two factors, satisfying the essential requirement that it is a monotonically increasing function poverty reduction; it is a valuable metric to achieve poverty reduction. Its message is that governments can follow a mixture of growth and income distribution policies. Since poverty reduction can be decomposed into growth and redistribution effects, the governments can empirically determine how much importance they give to each policy.



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