Income elasticity of poverty:
Estimates for the ASEAN countries

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ABSTRACT

Responsiveness of poverty to growth of income in developing countries is of obvious importance. The responsiveness is usually stated in terms of the magnitude of the so-called growth elasticity of poverty. Noting that in the vast literature on the topic, very few studies provide estimates of the elasticity for individual countries, this short paper reports the elasticity for the ASEAN countries over the period 1990-2005. Even in this well-integrated and small group, the elasticity shows a huge variability from 0.47 for Vietnam to 7.92 for Thailand, and indicates that income growth can translate into poverty reduction at vastly different rates, that, therefore, primary reliance on income growth for poverty reduction does not seem appropriate, and that poverty-reducing public policy measures may matter at least as much as income growth.

Keywords: Poverty reduction; growth elasticity of poverty; ASEAN countries

JEL Classification: 132, O15, H10

1. Introduction

Poverty reduction is a predominant theme in the current scholarship and policy discussion on economic development. The very first Goal in the U.N. Millennium Declaration of 2000 is eradication of extreme poverty and hunger, and the first target is to halve, between 1990 and 2015, the proportion of people whose income is below $1 per day. In that context, responsiveness of poverty rate to increase in income is of obvious importance. The responsiveness is often judged in terms of income (growth) elasticity of poverty rate, which is the percent decline in poverty rate when real per-capita income increases by one percent. Numerous scholars and organizations have provided estimates of the elasticity or used it in their discussions of poverty. Some of these were summarized by Ram (2006, p.604). The more recent studies include those by Kalwij and Verschoor (2007), Chambers and Dhongde (2011) and Ram (2013). One notable feature of the extensive scholarship on the topic is that almost the entire literature considers average elasticities for various groups of countries, and there is very little work that reports the elasticities for individual countries.[1] Taking advantage of the comparable country-level "headcount" poverty rates for 1990 and 2005 reported in United Nations (2009), this paper constructs income elasticity of poverty for members of the well-integrated ASEAN group, and supplements Ram (2014) who did a similar study for six South Asian countries. It thus makes a significant contribution to the literature by revealing how income growth translates into poverty reduction at enormously different rates even in the well-integrated and relatively small ASEAN group.

2. Methodology, data, and the main results

Following Ram (2006, 2013) and some other scholars, a simple procedure is followed, and income elasticity of poverty is calculated directly and definitionally as the percent change in the poverty rate as real per-capita income changes by one percent during the period. One can thus obtain the elasticity from the following expression

$$E_{it}=[d(POV)_{it}]/[d(RY)_{it}] \tag{1}$$

where E_{it} is the income elasticity of poverty in country i during the period t, $d(POV)_{it}$ is the percent decline in poverty rate in country i during the period t, and $d(RY)_{it}$ is the percent increase in real GDP per capita in country i over the period.

United Nations (2009, p. 25) directly provides, for most ASEAN countries, annual rate of change in poverty rate in terms of the population living on less than $1.25 per day during the period 1990-2005, which is the focus of the study. These are the values of the numerator in equation (1). The annual rate of increase of real GDP per capita is calculated by

estimating an exponential regression of the following form

$$Ln(Y_t)= a + b(t) + u_t \tag{2}$$

where Y_t denotes real GDP per capita in year t, b is an approximation to the rate of increase of per-capita GDP during the period, u is the stochastic error term, and t goes from 1990 to 2005.

Data on real GDP per capita are taken from World Bank (2012b), and are in constant-price local-currency units, which is the most appropriate variable for the purpose.

By way of some background information, Table 1 provides GNI per capita, Gini coefficient, population, and area for the ASEAN countries. It indicates that despite the diversity along several dimensions, there is considerable similarity among the economies of Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, and Vietnam in terms of income. The geographical contiguity and membership of the cohesive ASEAN group are among the defining characteristics of the countries.

Table 2 contains the core information in terms of annual rates of decline in the poverty rates and rates of increase in real GDP per capita during the period 1990-2005, and absolute value of the income elasticity of poverty over the period. The Table suggests four points.

First, variability in the elasticity is huge. It varies from 0.47 for Vietnam to 7.92 for Thailand. The elasticities range from 0.78 to 2.81 for the other countries. The main contribution of the work lies in revealing the huge variability in the rates at which income growth translates into reduction in poverty even in this small, cohesive and well-integrated group.

Second, huge variability in the values of the elasticity in this small group reinforces Ram's (2014) point about the likely magnitude of misspecification in the numerous studies that have estimated the elasticity for country-groups of varying size from several types of parametric and non-parametric models and procedures. Almost all those studies are premised on parametric constancy and thus postulate a common value of the elasticity for the sample countries.

Third, as Ram (2014) noted, the foregoing critique also applies to the research that assumed a common value of the elasticity for a large number of diverse countries. For instance, Collier and Dollar (2002, p.1487) assumed an elasticity of 2.00 for each of the 59 aid-receiving developing countries studied by them, which included Indonesia, Malaysia, Philippines, Thailand, and Vietnam. Given the variability in the elasticity reflected in Table 2, the assumption could have introduced a serious error in their calculations of the additional number of persons who might be lifted out of poverty with what they called a "poverty-efficient" reallocation of aid.

Fourth, it might be of interest to note the broad similarity between the ranking of countries in terms of the poverty-elasticity in Table 2 and income-elasticity of human development reported by Fruin, Peneva and Ram (2013, p.17). Although poverty rate and human development are very different variables, and the elasticities of human development are much smaller in magnitude, the rank-correlation coefficient between the poverty-elasticity and the income elasticity of Non-income HDI (NHDI) is sizable at 0.64, which just misses the 10% significance level despite the sample size being very small at seven. There is also some qualitative similarity between the two sets of elasticities. For example, both elasticities are the smallest for Vietnam, and Indonesia has the largest HDI elasticity while having the second largest poverty elasticity. The comparison is, however, somewhat heuristic since poverty and human development are different variables, and the periods are similar but not identical.

3. Some methodological and other reflections

The study focuses on the period 1990-2005 because United Nations (2009) provides annual rates of decline in poverty for that period and also because the first reference year in the Millennium Development target for poverty is 1990. The poverty line of $1.25 is considered because that is the current yardstick for tracking progress in poverty reduction, and $1.25 in 2005 prices is the equivalent of $1 at 1990 prices which is stated in the Millennium Development target.

As noted in the preceding section, most estimates of income (growth) elasticity of poverty are based on regression models. However, regression is not an appropriate procedure for the present study because the intent is to get the elasticity estimate for each country while regression models usually yield a common estimate for the entire sample. Also, since there are only two observations for each country, a regression model cannot be estimated.

Perhaps the most important message from the reported estimates is a reaffirmation of Ram's (2014) point that it is not appropriate to rely entirely on growth of income for poverty amelioration. As Table 2 shows rather dramatically, growth of income can translate into poverty reduction at vastly different rates. For a long time, the highly influential World Bank publications and reports have focused almost entirely on income growth for poverty reduction. For instance, a fairly recent publication (World Bank 2012a, p.2) stated that further progress in poverty reduction is possible if developing countries maintain "robust growth rates". In a welcome change, however, the Bank will now monitor the growth in the average real income of bottom 40 percent of the population (World Bank 2014, p.1), and would probably not focus too heavily on the average rate of income growth for the entire population.

It is obviously of interest to ask why the elasticities show such large differences or why income growth translates into poverty reduction at such vastly different rates. It is not possible to give an adequate consideration to that aspect within the limits of this note. However, four thoughts are relevant.

First, the elasticities reported in Table 2 are what Son (2007) and some other scholars call the "total" elasticity of poverty with respect to income, and address the important policy and analytical question about how poverty rate has responded to increase in per-capita income and the associated (actual) changes in distribution.[2] Reduction in poverty obviously depends on change in both income and its distribution. Growth of income may be associated with increased, reduced or constant income inequality, and increased inequality lowers the effect of growth on poverty while reduction in inequality raises the effect.   Bourguignon (2003) has also shown that, if income distribution is log-normal, absolute value of the poverty elasticity is higher if initial per-capita income is higher or initial income inequality is lower. These three factors should be of help in shedding light on the observed variations in the poverty elasticities. For example, the low elasticities for Cambodia, Lao PDR and Vietnam are likely to be partly due to the sizable increases in income inequality and the low level of development (GNI per capita). The relatively low elasticity for Philippines is perhaps partly due to the high initial Gini and low GNI per capita. The moderate elasticity for Malaysia might be partly due to reduced inequality and a relatively high level of development. The high elasticity for Thailand could be partly due to the reduced inequality and a reasonable level of development, although these factors are unlikely to be the whole story behind the high elasticity, and further exploration of the phenomenon would be an appropriate topic for future research.[3] The elasticity for Indonesia seems sizable despite a low level of development and increased inequality, and one can only

refer to the low level of initial income inequality as possibly relevant to the size of the elasticity. At any rate, factors other than change in income inequality, level of development, and initial degree of income inequality are also likely to affect the elasticity, and departures from Bourguignon's predictions may occur if the underlying income distribution is not log-normal.

Second, government policies have an important role in poverty reduction, and the observed variability in the elasticities would partly reflect such policies. For instance, a recent World Bank report (Inchauste et al., 2014) indicates that increased labor income accounts for a large fraction of the reduction in poverty headcount. It is possible that public policies in countries with low elasticities have not been oriented toward increasing labor incomes substantially while countries with high elasticities have been more successful in raising labor incomes.

Third, the study by Techanan and Suriya (2012) has some bearing on the present work although their methodology is very different and they work with panel data for 70 countries covering the period 2001-2010. One relevant point is their finding that while better income distribution is effective for poverty reduction in Southeast Asia, it does not significantly affect the growth elasticity of poverty. The present study provides some hint that, as predicted by Bourguignon's (2003) framework, lower initial inequality as well as reduction in income inequality might contribute toward a larger magnitude of the income elasticity of poverty.

Last, although World Bank data on GDP per capita seem good and United Nations (2009) numbers for poverty rates are taken from World Bank sources, which are expected to be reliable, and Solt's (2014) compilation is perhaps the best available source for intracountry inequality, there is a possibility of some weaknesses in the data. It may, however, be noted again that the ranking of countries in terms of income elasticity of human development reported by Fruin, Peneva and Ram (2013), for which data are likely to be good, corresponds fairly well with the ranking for income elasticity of poverty shown in Table 2.[4]

4. Concluding observations

In the context of the paramount theme of poverty reduction in the current scholarship and policy discussion on economic development, this paper provides simple calculations of the responsiveness of poverty rate to increase in per-capita income for seven ASEAN countries. Five points, which follow and support Ram's (2014) study, summarize the main content of the work. First, the major contribution of the study lies in revealing the huge variation in the income elasticity of poverty in the small and well-integrated ASEAN group, implying that income growth translates into poverty reduction at vastly different rates in different countries. Second, it follows that an exclusive or heavy focus on growth of (average) income, along the lines historically emphasized by World Bank and some other organizations, is not appropriate since the same income growth can be associated with dramatically different rates of poverty reduction. Third, methodologically, the practice of obtaining estimates of growth elasticity of poverty through constant-parameter regression models might entail a significant misspecification. Fourth, similarly, assumption of a common value of elasticity for a large number of diverse developing countries, as done in some well-known studies, may have introduced a serious error in the poverty-reduction results claimed in such research. Fifth, the study brings out once again the important point that direct public policies for poverty alleviation, including measures for increased labor income, may matter at least as much as growth of income. Two additional thoughts are also relevant. First, due to possible data deficiencies, caution is appropriate in interpreting the reported elasticities which may perhaps be treated as illustrative. Second, it

should be useful to obtain similar elasticity estimates for other developing countries and other poverty measures.

Table 1. Some basic economic characteristics of countries in the ASEAN group

Country	PPI GNI per capita	Gini coefficient (0-100)		population (millions)	area '000 sq. km
	2012, $	1990	2005	2012	
Brunei D.	70,883	.	.	0.4	5.8
Cambodia	2,330	40.9	44.1	14.9	181.0
Indonesia	4,730	34.4	37.9	246.9	1904.6
Lao PDR	2,690	32.2	37.6	6.6	236.8
Malaysia	16,270	46.5	43.5	29.2	330.0
Myanmar	3,998	.	.	52.8	676.6
Philippines	4,380	47.2	47.1	96.7	300.0
Singapore	60,110	41.1	45.2	5.3	0.7
Thailand	9,280	48.1	44.9	66.8	513.1
Vietnam	3,620	37.3	41.1	88.8	331.0

Notes. 1. These are based on World Bank (2014, pp.12-16) and Solt

(2014). A period (.) indicates missing data.

    2. GNI per capita for Brunei and Myanmar are for 2011 and are

taken from *Human Development Report 2014* (pp. 160, 162).

    3. The first Gini for Cambodia is for the year 1994.

    4. The first Gini's for Lao PDR and Vietnam are for 1992.

Table 2. Growth elasticities of poverty in ASEAN countries, 1990-2005

Country	$1.25 poverty rate, 1990 (%)	$1.25 poverty rate, 2005, (%)	annual rate of poverty, decline, (DP),%	annual rate of growth of GDP per capita(GY),%	elasticity (DP/GY) (-)
Brunei D.	.	.	.	.	.
Cambodia	77.3	40.2	-4.4	5.67	0.78
Indonesia	52.4	21.3	-5.9	2.10	2.81
Lao PDR	65.9	35.7	-4.1	3.98	1.03
Malaysia	1.9	0.5	-8.9	3.26	2.73
Myanmar	.	.	.	.	.
Philippines	29.7	22.6	1.8	1.31	1.37
Singapore	.	.	.	.	.
Thailand	9.4	0.4	21.0	2.65	7.92
Vietnam	34.2	22.8	2.7	5.74	0.47

Notes. 1. Poverty rates, and the annual rates of change in these, are taken from United Nations (2009, p. 25). Annual rate of growth of GDP per capita (G) is calculated by taking constant-price GDP per capita in local currency from World Development Indicators CD-ROM for 2012, and estimating the following expression:

$$Ln (Y_t)= a +G(t) + u_t$$, where t takes values from 1 to 15.

2. Because of low poverty rates, Brunei Darussalam and Singapore are not included in the United Nations (2009, p. 25) tables on poverty rates and the annual rate of change in poverty. Data for Myanmar are also missing.

3. The poverty rates for Indonesia are the averages for rural and urban areas.

FOOTNOTES

[1] Besides Ram (2014), the only exceptions seem to be China and India for which World Bank had been publishing poverty rates at international poverty lines. Elasticity for Thailand is indicated somewhat incidentally in the empirical illustration provided by Son (2007) to identify pro-poor growth.

[2] In the terminology of Son (2007) and some other scholars, "growth" elasticity of poverty reflects the change in poverty rate due to distribution-neutral growth of income, and is derived by decomposing the total change in poverty into the "growth" and "distribution" components. It is perhaps obvious that "growth elasticity" in that sense will be larger (smaller) than the "total" elasticity reported in Table 2 if income inequality worsens (improves) during the period. Although possibly relevant for judging whether

growth is "pro-poor", such decomposition seems to have limited usefulness in the context of most policy and even analytical questions about the observed or anticipated effect of income growth on poverty rate.

[3] The numbers in Son (2007) for Thailand covering the period 1988-2000 are different from those shown in Tables 1 and 2 for 1990-2005. The large differences are unlikely to be due to different periods covered. The present work uses World Bank's (2012b) data on real GDP per capita, United Nations (2009) numbers on poverty rates, and Solt's (2014) compilation of Gini coefficients (of market incomes), all of which look good. This indicates the data problems inherent in such studies, the need for caution in interpreting the results, and usefulness of further exploration of the case of Thailand. The numbers shown in Table 1 and Table 2 have been rechecked for accuracy.

[4] However, notwithstanding the close correspondence in the ranks, data difficulties inherent in such research suggest need for caution in interpreting the reported results which are perhaps best treated as illustrative.

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