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Poverty Incidence and Sectoral Growth

Evidence from Southeast Asia

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Abstract

In recent decades, absolute poverty incidence declined in most countries of Southeast Asia, even though in some of these countries inequality increased at the same time. This paper examines the relationship between these outcomes and the rate of economic growth in the agricultural, industrial and services sectors. It develops a time series of available data on the headcount measure of poverty incidence for Thailand, Indonesia, Malaysia and the Philippines over the period from the 1960s to 1999, in aggregate and in both rural and urban areas. It then uses this pooled data set to analyze the economic determinants of changes in poverty incidence.

Keywords: poverty incidence, economic growth, rural poverty, urban poverty

JEL classification: O15, D31

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1. Introduction

Most of the countries of Southeast Asia enjoyed economic booms from the late 1980s until 1996. In all the countries which experienced this rapid growth, considerable progress was made in reducing poverty. But by the late 1990s these same countries were now experiencing deep recessions. Economic hardship was being felt at all levels of the income distribution but the implications for the poorest people has rightly been a concern in popular discussion and in the planning of international aid community. The present paper attempts to contribute to this discussion. It focuses on four large countries of Southeast Asia, all of which have been badly affected by the economic crisis: Thailand, the first to succumb; Indonesia, which has proven to be the most severely affected; Malaysia, where the crisis had produced the most radical macroeconomic policy responses; and the Philippines, where the pre-crisis boom had been least significant but where the crisis itself was nevertheless a serious event.

In each of these countries, the restoration of economic growth is a policy priority, but not just *any* growth. Reflection on the boom period and the crisis which followed has convinced policy makers and independent observers alike that the quality of growth is important and not just the rate. But what is 'quality' growth? One criterion for determining the quality of growth, though certainly not the only one, is its effects on the poor. What kinds of growth are most (and least) beneficial for the poor? Much of the development economics literature has dealt with the manner in which the distribution of income is affected by the rate and composition of economic growth. How do relative inequality, on the one hand, and absolute poverty, on the other, change with economic growth and how do these effects depend on the characteristics of that growth, such as its sectoral composition? This paper attempts to explore these issues in the context of Southeast Asia. Part 2 of the paper summarizes available data on poverty incidence in Southeast Asia. Part 3 sets out the analytical framework for the study and Part 4 describes the statistical method and the results and Part 5 concludes.

2. Poverty incidence in Southeast Asia

Available data on poverty incidence in the four Southeast Asian countries listed above are summarized in Tables 1a to 1d. The data are presented as aggregate poverty incidence and its rural and urban components. Poverty incidence obviously depends on many factors, of which economic variables are only one part, and among the economic variables many issues aside from simply the overall rate of growth will be relevant. Changes in commodity prices will play a role, along with tax and public expenditure policies. The sectoral composition of growth may also be important. Whether it is or not is important information.

Economic policies, including trade policies and industrial policies, influence the sectoral composition of growth. If poverty reduction is a priority, as the rhetoric of most governments clearly suggests, then the way in which economic policies may indirectly affect poverty incidence is important. The sectoral composition of growth may play a role, but casual perusal of the data suggests that the overall rate of growth may be an important part of the story. Large reductions in poverty have been achieved in each of the four countries but the rate of reduction was lowest in the Philippines, where the average rate of growth was also lowest. To what extent does the overall rate of growth matter, and to what extent is its sectoral composition important in determining its effect on poverty incidence?

The economic development literature has emphasized the sectoral composition of growth as a possible determinant of its distributional implications, although this emphasis has been based primarily on *a priori* theorising, rather than empirical analysis. The obvious argument is that in most poor countries a majority of the poor live in rural areas and are employed in agriculture. From this it has seemed probable that growth of agriculture is more important for poverty reduction than growth of industry or services. Many authors in the development economics field have taken this view, but the conclusion does not necessarily follow. People are potentially mobile; given sufficient time, even poor people can presumably move to whichever sector is generating the growth and thereby offering new income earning opportunities. Rural poverty may therefore be reduced by urban-based growth, drawing the poor away from rural areas at a rate which depends on the degree of labour mobility (Fields 1980). When intersectoral factor mobility is taken into account, it is not obvious that the sectoral composition of growth is important for poverty reduction.

On the other hand, even if labour was fully and instantaneously mobile, poverty incidence could still be affected by the sectoral composition of growth. To a first order of approximation, the level of absolute poverty presumably depends on the demand for the factors of production owned by the poor—especially unskilled labour and, to a lesser extent, agricultural land. Growth in different sectors has differential effects on the demands for these factors, depending on these sectors' factor intensities, and may therefore have different effects on poverty, inequality or both. Finally, we should note that the distinction rural/urban is not synonymous with the distinction agriculture/non-agriculture. Much agricultural production may occur in full or part-time farming on the fringes of urban areas and much industrial and services activity may actually occur in rural areas.

The limited availability of data which may support statistical analysis has been an impediment to the systematic study of poverty incidence. Some recent studies have attempted to explore the relationships involved by analyzing cross sectional data sets across countries, or across regions or households for individual countries, while others have attempted to assemble long term time series data sets on poverty incidence for individual countries. The time series approach is generally preferable, in that it makes possible a direct study of the determinants of changes in poverty at an aggregate level.

Unfortunately, in most developing countries the consumer expenditure surveys on which studies of poverty incidence must be based are conducted only intermittently. Data are thus available at most only with intervals of several years between observations. This is true of all of the countries of Southeast Asia. Even when all time series observations on poverty incidence at a national level are assembled for Thailand, the number of observations is only 12. For Indonesia the number is 10, for the Philippines 8 and for Malaysia 6. The number of observations is insufficient to sustain formal statistical analysis for any one of these countries, but when all four countries are pooled, the total number of observations is 36. The present study thus attempts to pool the data for these four countries, while still recognizing the possible differences between them.

Table 1a
Thailand: poverty incidence, 1962 to 1999 (percent)

	Aggregate poverty (P)	Rural poverty (P^R)	Urban poverty (P^U)
1962	57	61	38
1969	40.7	44	26
1975	31.4	36.2	12.5
1981	22.9	27.3	7.5
1986	29.0	35.8	5.9
1988	21.1	25.5	6.1
1990	16.9	20.5	5.3
1992	12.4	15.5	2.4
1994	8.8	11.0	1.9
1996	6.1	7.7	1.4
1999	8.6	11.16	1.8

Source: national statistical data from government sources.

Note: aggregate poverty is the percentage of the total population whose incomes fall below a poverty line held constant over time in real terms; rural poverty is the percentage of the rural population whose incomes fall below a poverty line held constant over time in real terms, and so forth.

Table 1b
Indonesia: poverty incidence, 1970 to 1998 (percent)

	Aggregate poverty (P)	Rural poverty (P^R)	Urban poverty (P^U)
1970	57.2	58.5	50.7
1976	50.2	54.5	31.5
1978	48.5	54.0	25.7
1980	39.2	44.6	19.7
1984	33.0	39.4	12.8
1987	21.6	26.8	7.3
1990	19.3	23.3	10.6
1993	17.3	21.3	9.0
1996	13.5	19.0	6.5
1998	20.7	29.0	10.1

Sources and notes: as in Table 1a.

Table 1c
Malaysia: poverty incidence, 1970 to 1995 (percent)

Malaysia	Aggregate poverty (P)	Rural poverty (P^R)	Urban poverty (P^U)
1970	49.3	58.6	25.5
1976	39.6	47.8	17.9
1984	18.4	24.7	8.2
1990	17.1	21.08	7.5
1993	13.5	18.6	5.3
1995	9.6	16.1	4.1

Sources and notes: as in Table 1a.

Table 1d
The Philippines: poverty incidence, 1961 to 1997 (percent)

	Aggregate poverty (P)	Rural poverty (P^R)	Urban poverty (P^U)
1961	75.02	80.19	65
1965	67.08	71.15	57.43
1971	61.63	66.08	51.32
1985	59.65	63.3	51.18
1988	54.16	61.0	43.01
1991	55.77	64.5	47.08
1994	49.06	56.74	42.28
1997	42.1	43.15	32.6

Sources and notes: as in Table 1a.

Since the meaning of the poverty lines is different in each of the countries and also since the structure of the economies is different, we should not expect that the same relationship between poverty incidence and aggregate growth will obtain in all four countries. In the statistical analysis, intercept dummy variables and then slope dummy variables were tried. The method is to use dummy variables for three of the four countries. The coefficients on the dummy variables for these three countries amend the intercept or slope coefficients estimated for the fourth country. The results are the same whichever country is selected as the 'fourth'. Data were assembled for the dependent variables $d\ln P$, $s^R d\ln P^R$ and $s^U d\ln P^U$. Each interval between the data points indicated in Table 1 is used to construct the values of these dependent variables, with the calculated value divided by the number of years corresponding to that time interval, giving an annual rate of change for the variable concerned. These annualized rates of change then become the variables used in the regression analysis described below. In the regression results shown here, these individual observations were weighted by the number of years in the interval concerned.

3. Theoretical framework

3.1 Aggregate, rural and urban poverty incidence

We shall review first the relationship between aggregate, rural and urban poverty incidence and then turn to the manner in which each of these measures is affected by economic growth. Changes in aggregate poverty incidence may be decomposed into rural and urban components, as follows. We shall write N, N^R and N^U for the total, rural and urban populations, respectively, where $N = N^R + N^U$. We write $\alpha^R = N^R / N$ and $\alpha^U = N^U / N$ for the rural and urban shares of the total population, respectively, where $\alpha^R + \alpha^U = 1$. The total number of people in poverty is given by $N_P = N_P^R + N_P^U$, where N_P^R and N_P^U denote the number in poverty in rural and urban areas, respectively. Aggregate poverty incidence is given by:

$$P = N_P / N = (N_P^R + N_P^U) / N = \alpha^R P^R + \alpha^U P^U, \quad (1)$$

where $P^R = N_P^R / N^R$ denotes the proportion of the rural population that is in poverty and $P^U = N_P^U / N^U$ the corresponding incidence of poverty in urban areas.
Now, differentiating (1) totally, we obtain a key relationship:

$$dP = \alpha^R dP^R + \alpha^U dP^U + (P^R - P^U) d\alpha^R . \tag{2}$$

From (2), the change in poverty incidence may be decomposed into three parts:
(i) the change in rural poverty incidence, weighted by the rural population share,
(ii) the change in urban poverty incidence weighted by the urban population share, and
(iii) the movement of populations from rural to urban areas weighted by the difference in poverty incidence between these two areas.

The last of these terms is described by Anand and Kanbur (1985) and by Ravallion and Datt (1996) as the 'Kuznets effect'. As the population moves from rural to urban areas, a change in aggregate poverty incidence will occur even at constant levels of rural and urban poverty incidence, provided that the levels of poverty incidence in these two sectors is different. In growing economies, we expect to find that the rural population share is falling ($d\alpha^R < 0$) and that the incidence of poverty in rural areas typically exceeds that in urban areas ($(P^R - P^U) > 0$). Thus, the expected sign of $(P^R - P^U)d\alpha^R$ is negative. How important the Kuznets effect is as a determinant of overall poverty reduction is, of course, an empirical matter.

3.2 Poverty and aggregate growth

We now turn to the manner in which poverty incidence is affected by economic growth and, for simplicity, we hypothesize initially that the total number of households in poverty, N_P, depends on the aggregate level of real income, *Y*, and the size of the population, *N*. Thus

$$N_P = \varphi(Y, N) . \tag{3}$$

The incidence of poverty is defined as:

$$P = N_P / N = \varphi(Y, N) / N . \tag{4}$$

Totally differentiating this equation:

$$dP = (\varphi_Y Y / N) y + (\varphi_N - \varphi / N) n , \tag{5}$$

where lower case Roman letters represent the proportional changes of variables represented in levels by upper case Roman letters. Thus $y = dY / Y$ and $n = dN / N$ are the growth rates of aggregate real income and of population, respectively. In the special case where the function $\varphi(.)$ is homogeneous of degree one in *Y* and *N*, equation (3) may be written $N_P = \varphi_Y Y + \varphi_N N$ and (5) reduces to:

$$dP = (\varphi_Y Y / N)(y - n) . \tag{6}$$

In this case the change in poverty incidence depends on the growth of per capita income. We shall not be imposing this assumption of linear homogeneity, but shall instead estimate relationships of the kind:

$$dP = a^1 + b^1 y + c^1 n, \tag{7}$$

and test whether the coefficient b^1 is significantly greater than zero. We shall also test whether $b^1 = -c^1$, that is, whether the growth of per capita income is the determinant of the change in poverty incidence, as in (6), or whether population growth affects the reduction in poverty incidence in some other way.

We wish to study the way economic growth affects each of the components of the change in aggregate poverty incidence, as given by (2). Ravallion and Datt apply an ingenious method for estimating decomposed equations systems of this kind. We have a four equation system, consisting of (7) and:

$$\alpha^R dP^R = a^2 + b^2 y + c^2 n \tag{8}$$

$$\alpha^U dP^U = a^3 + b^3 y + c^3 n \tag{9}$$

$$(P^R - P^U) d\alpha^R = a^4 + b^4 y + c^4 n . \tag{10}$$

But from the identity given by (2), these equations are linearly dependent. Equation (7) is identically the sum of equations (8), (9) and (10). Of these four equations, only three need to be estimated. The parameters of the fourth can be computed from (2). We shall estimate equations (7), (8) and (9) and infer the parameters of (10) from the identities $a^4 = a^1 - a^2 - a^3$, $b^4 = b^1 - b^2 - b^3$ and $c^4 = c^1 - c^2 - c^3$.

3.3 Poverty and sectoral growth

Whether the sectoral composition of economic growth affects poverty reduction can be investigated as follows. The level of real GDP is given by $Y = Y_a + Y_i + Y_s$, where Y_a, Y_i, and Y_s denote value-added (contribution to GDP) at constant prices in agriculture, industry and services, respectively. The overall rate of growth can be decomposed into its sectoral components from

$$y = H_a y_a + H_i y_i + H_s y_s , \tag{11}$$

where $H_k = Y_k / Y$, $k = (a, i, s)$, denotes the share of sector k in GDP. By estimating the equation

$$dP = a^1 + b_a^1 H_a y_a + b_i^1 H_i y_i + b_s^1 H_s y_s \tag{12}$$

and testing whether $b_a^1 = b_i^1 = b_s^1$, we may test directly whether the sectoral composition of growth affects the rate of poverty reduction. An alternative way of viewing this relationship is to decompose equation (12) into a component depending on the aggregate rate of growth and a component depending on changes in its composition. Noting that $Y_a = (Y_a / Y)Y = H_a Y$,

$$y_a = y + h_a , \tag{13}$$

where $h_a = dH_a / H_a$ denotes the proportional change in agriculture's sectoral share of GDP.

It follows that

$$b_a^1 H_a y_a + b_i^1 H_i y_i + b_s^1 H_s y_s = (b_a^1 H_a + b_i^1 H_i + b_s^1 H_s) y + b_a^1 H_a h_a + b_i^1 H_i h_i + b_s^1 H_s h_s \quad (14)$$

This equation says that the reduction in poverty can be decomposed into two components: one involving the rate of aggregate growth of output (the coefficient in parentheses) and the second involving changes in the sectoral composition of output (the final three terms). Clearly, this expression reduces to a term in y alone if and only if the final three terms sum to zero. Now, by differentiating the identity $H_a + H_i + H_s = 1$, we see that

$$H_a h_a + H_i h_i + H_s h_s = 0. \quad (15)$$

Therefore, a sufficient condition for the final three terms of (14) to vanish is that $b_1 = b_2 = b_3$, as discussed in relation to equation (12), above. Fortunately, to apply this decomposition, no additional econometrics is necessary beyond the estimation of equations like (12). Estimation of the parameters of (12) is sufficient to support the decomposition represented by (14).

Applying the method of equations (7), (8) and (9) above, we estimate the system

$$dP = a^1 + b_a^1 H_a y_a + b_i^1 H_i y_i + b_s^1 H_s y_s + c^1 n \quad (16)$$

$$\alpha^R dP^R = a^2 + b_a^2 H_a y_a + b_i^2 H_i y_i + b_s^2 H_s y_s + c^2 n \quad (17)$$

$$\alpha^U dP^U = a^3 + b_a^3 H_a y_a + b_i^3 H_i y_i + b_s^3 H_s y_s + c^3 n \quad (18)$$

The parameters of the fourth equation of the system

$$(P^R - P^U) d\alpha^R = a^4 + b_a^4 H_a y_a + b_i^4 H_i y_i + b_s^4 H_s y_s + c^4 n \quad (19)$$

are then computed using identities derived from (2), as before: $a^4 = a^1 - a^2 - a^3$, $b_a^4 = b_a^1 - b_a^2 - b_a^3$, and so forth.

4. Results

The theoretical discussion above supports the use of the absolute change of poverty incidence as the dependent variable, whereas some earlier studies have used the proportional change. Arguments can be mounted in support of either version. To see whether this issue was important, the analysis was conducted for both. The statistical results proved to be far superior for the absolute change version and the discussion will therefore concentrate on it.

4.1 Decomposition of changes in poverty incidence

First, we discuss the decomposition of the data on poverty incidence themselves. Table 2 shows the results of this decomposition. All results shown in this table are evaluated at the mean values of the data set. For example, the mean annual change in the aggregate level of poverty incidence for Thailand was -1.97 percentage points per year (i.e. an annual reduction, on average, in the nation-wide headcount incidence of poverty from numbers like 20 per cent to numbers like 18 per cent of the total population). Equation (2), above, is an identity and must apply at all points in the data set. It must therefore apply at the means of the data. The equation shows that this mean aggregate change in poverty incidence can be decomposed into three components: average poverty reduction in urban areas, average poverty reduction in rural areas, and the average movement of population between these two areas.

Table 2
Data decomposition: mean annual changes in poverty incidence

	Actual			
	Thailand	Indonesia	Malaysia	Philippines
Aggregate	-1.97	-1.11	-1.48	-1.29
Urban	-0.32	-0.19	-0.70	-0.55
Rural	-1.68	-0.42	-0.50	-0.58
Migration	0.03	-0.50	-0.27	-0.16
	Normalized (aggregate=100)			
Aggregate	100	100	100	100
Urban	16	17	48	43
Rural	85	38	34	45
Migration	-2	45	19	12

Sources and notes: as in Table 1a. The decomposition of the change in aggregate poverty incidence into changes in rural poverty incidence, urban poverty incidence and a migration component follows equation (2) in the text.

The second half of the table normalises the decomposition by dividing all values by this mean change in aggregate poverty (-1.97 for Thailand, for example) and multiplying by 100. For Thailand reductions in rural poverty accounted for 85 per cent of the overall reduction in poverty, reduced urban poverty for 16 per cent and migration accounted for virtually none of the reduction. Migration effects were more important for Malaysia and Indonesia, but for all four countries except Indonesia reductions in rural poverty account for the largest component of the total reduction in poverty. The above calculations are, of course, merely descriptions of the data. We now turn to the question of what caused these observed changes in poverty incidence to occur.

4.2 Effects of sectoral growth on poverty incidence

All regression results are summarized in Tables 3a , 3b and 3c. If sectoral economic growth and population growth affect poverty reduction jointly through their effects on *per capita* sectoral growth, equation (16) can be re-written

$$dP = a^1 + b_a^1 H_a (y_a - n) + b_i^1 H_i (y_i - n) + b_s^1 H_s (y_s - n)\,, \tag{20}$$

and similarly for equations (17) to (19). That is, (16) to (19) would each satisfy the restriction that $b_a^j H_a + b_i^j H_i + b_s^j H_s = c^j,\ \ j = (1,\ldots,4)$. When this restriction was imposed on the estimates of equations (16) to (18) it was rejected at the 95 per cent level of

Table 3a
Regression results: sectoral growth per capita

	Change in total poverty		Change in rural poverty		Change in urban poverty	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	-0.3770	-1.674 *	0.0635	0.307	-0.2861	0.307
Agriculture growth per capita	-0.1188	-0.328	-0.3613	-1.084	-0.086	-0.679
Industry growth per capita	0.2931	1.959 **	0.2776	2.02 **	-0.0377	-0.722
Services growth per capita	-1.334	-7.591 ***	-1.2825	-7.937 ***	-0.1144	-1.86 *
Intercept dummy Thailand	0.4422	1.319	0.3511	1.140	0.1629	1.390
Intercept dummy Indonesia	0.7147	1.942 **	0.9633	2.847 ***	0.3134	2.435 **
Intercept dummy Malaysia	0.3992	1.047	0.4683	1.336 *	0.2952	2.214 **
R-squared	0.514		0.5593		0.161	
Adjusted R-squared	0.489		0.5371		0.119	
F-statistic	20.97 ***		25.18 ***		3.80 **	

Source: author's calculations based on data in Tables 1a, 1b, 1c, 1d and GDP growth and population data from government statistical agencies of the countries concerned.

Table 3b
Regression results: sectoral growth with population growth as a separate variable

	Change in total poverty		Change in rural poverty		Change in urban poverty	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	1.5894	4.226	2.0058	5.860 ***	0.1502	0.996
Agriculture growth	-0.5430	-2.283 **	-0.7295	-3.369 ***	-0.1742	-1.826 *
Industry growth	0.0578	0.476	0.0064	0.057	-0.0525	-1.078
Services growth	-1.1863	-8.621 ***	-1.0941	-8.376 ***	-0.1196	-2.167 **
Population growth	-0.071	-0.631	-0.0361	-0.353	-0.03672	-0.815
Intercept dummy Thailand	1.050	3.627 ***	0.8851	2.408 **	0.2317	1.997 ***
Intercept dummy Indonesia	0.4119	1.355	0.6663	2.408 ***	0.2398	1.968
Intercept dummy Malaysia	0.6291	1.956 **	0.7117	2.431 **	0.3376	2.618 ***
R-squared	0.672		0.708		0.2554	
Adjusted R-squared	0.652		0.691		0.2112	
F-statistic	34.50 ***		40.9 ***		5.78 ***	
Test: *haya=hiyi=hsys* (F-statistic)	13.71 ***		14.38 ***			
Test: *haya+hiyi+hsys=-n* (F-statistic)	57.59 ***		78.64 ***			

Source: author's calculations based on data in Tables 1a, 1b, 1c, 1d and GDP growth and population data from government statistical agencies of the countries concerned.

significance in the case of equations (16) and (17) (total and rural poverty) but not in the case of equation (18) (urban poverty) which performed poorly in general. Table 3c shows that when the population growth variable is dropped altogether, results are obtained which are qualititatively similar to those in Table 3b. All subsequent discussion below is based on the results presented in Table 3b.

Table 3c
Regression results: sectoral growth without population growth variable

	Change in total poverty		Change in rural poverty		Change in urban poverty	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	1.107	4.27	1.288	5.39 ***	0.125	0.75
Agriculture growth	-0.476	-2.08 **	-0.539	-2.55 **	0.050	0.57
Industry growth	0.161	1.42	0.176	1.58	-0.101	-1.87 *
Services growth	-1.148	-8.95 ***	-0.973	-8.21 ***	-0.091	-1.50
Intercept dummy Thailand	0.843	2.95 ***	0.449	1.70	-0.224	1.75 *
Intercept dummy Indonesia	0.133	0.45	0.011	0.04	0.199	1.47
Intercept dummy Malaysia	0.379	1.19	0.215	0.73	0.593	4.15 ***
R-squared	0.523		0.594		0.244	
Adjusted R-squared	0.504		0.573		0.199	
F-statistic	32.79 ***		29.0 ***		5.44 ***	

Source: author's calculations based on data in Tables 1a, 1b, 1c, 1d and GDP growth and population data from government statistical agencies of the countries concerned.

In the equation for aggregate poverty incidence, the estimated coefficients for agricultural growth and services growth were negative (growth of each of these sectors was associated with poverty reduction) and significantly different from zero, at the 95 percent confidence level for agriculture and at the 99 percent level for services. Growth of agriculture and services was associated with reductions in poverty. The absolute value of the estimated coefficient for agriculture was substantially smaller than the coefficients for services. The coefficient for industry was not significantly different from zero. The hypothesis that the true coefficients on agriculture, industry and services were equal to one another was rejected for the equations for total and rural poverty but could not be rejected for urban poverty. The equations for total and rural poverty produced high R-squared values and the F-test for the significance of the regressions is highly satisfactory in both cases. The regression results for urban poverty were less satisfactory.

Tables 4a to 4d show the implications of the coefficients reported in Table 3b for the respective contributions of growth in agriculture, industry and services to the overall rate of poverty reduction which was achieved. For example, in Thailand, of the annual rate of poverty reduction which occurred (almost 2 percentage points per year) most was due to a reduction in rural poverty, rather than reductions in urban poverty or migration. However, the results indicate that it would be a serious mistake to attribute this reduction in rural poverty to growth of agriculture. Growth of services was far more important to the reduction in rural poverty and the reduction in overall poverty incidence. This pattern was

Table 4a
Thailand: poverty reduction and sectoral growth—decomposition
(percent points change per year)

	Actual	Estimated				
		Constant	Agriculture	Industry	Service	Pop.
Aggregate	-1.97	2.43	-0.36	0.19	-4.06	-0.17
Urban	-0.32	0.46	-0.12	-0.17	-0.41	-0.09
Rural	-1.68	2.62	-0.49	0.02	-3.75	-0.08
Migration	0.03	-0.65	0.24	0.34	0.09	0.00
	Normalized (aggregate=100)					
Aggregate	100	-124	18	-10	206	8
Urban	16	-23	6	9	21	4
Rural	85	-133	25	-1	190	4
Migration	-2	33	-12	-17	-5	0

Source: author's calculations based on Tables 1a, 3b and GDP growth data from the Thai government statistical agency.

repeated in each of the four countries. The growth of services has been more important for poverty reduction than the growth of agriculture. Remarkably, this conclusion applies even to the reduction of rural poverty. Growth of services output has been a more important contributor to reductions of rural poverty than the growth of agricultural output.

Table 4b
Indonesia: Poverty reduction and sectoral growth—decomposition
(percent points change per year)

	Actual	Estimated				
		Constant	Agriculture	Industry	Service	Pop.
Aggregate	-1.11	2.01	-0.46	0.14	-2.65	-0.14
Urban	-0.19	0.43	-0.15	-0.13	-0.27	-0.07
Rural	-0.42	2.71	-0.62	0.02	-2.45	-0.07
Migration	-0.50	-1.13	0.31	0.26	0.06	0.00
		Normalized (aggregate=100)				
Aggregate	100	-182	42	-13	240	13
Urban	17	-39	13	12	24	7
Rural	38	-245	56	-1	221	7
Migration	45	102	-28	-23	-6	0

Source: author's calculations based on Tables 1b, 3b and GDP growth data from the Indonesian government statistical agency.

Table 4c
Malaysia: Poverty reduction and sectoral growth—decomposition
(percent points change per year)

	Actual	Estimated				
		Constant	Agriculture	Industry	Service	Pop.
Aggregate	-1.48	-0.25	-0.62	1.95	-2.56	-0.02
Urban	-0.70	-0.02	-0.17	-0.45	-0.06	-0.01
Rural	-0.50	-0.19	-0.59	2.34	-2.06	-0.01
Migration	-0.27	-0.26	0.20	0.00	-0.18	0.00
		Normalized (aggregate=100)				
Aggregate	100	17	42	-132	173	1
Urban	48	2	12	30	4	1
Rural	34	13	40	-158	139	1
Migration	19	18	-13	0	12	-0.03

Source: author's calculations based on Tables 1c, 3b and GDP growth data from the Malaysian government statistical agency.

Table 4d
Philippines: poverty reduction and sectoral growth—decomposition
(percent points change per year)

	Actual	Estimated				
		Constant	Agriculture	Industry	Service	Pop
Aggregate	-1.29	1.36	-0.39	0.09	-2.16	-0.19
Urban	-0.55	-0.03	-0.13	-0.08	-0.22	-0.10
Rural	-0.58	2.02	-0.53	0.01	-1.99	-0.10
Migration	-0.16	-0.63	0.26	0.16	0.05	0.005
		Normalized (aggregate=100)				
Aggregate	100	-105	30	-7	167	15
Urban	43	2	10	6	17	8
Rural	45	-156	41	-1	154	8
Migration	12	49	-20	-12	-4	-0.4

Source: author's calculations based on Tables 1d, 3b and GDP growth data from the Philippine government statistical agency.

Finally, Tables 5a to 5d decompose the reductions in poverty incidence which occurred into two components: a 'growth effect'—the reduction in poverty that would have occurred if all sectors had grown at the rate of growth of GDP; and a 'compositional effect'—the reduction in poverty that resulted from deviations from uniform sectoral growth rates. In all countries, the growth effect dominates. According to these results, the sectoral composition of growth matters for poverty reduction, but the aggregate rate of growth is far more important.

Table 5a
Thailand: Decomposition of poverty reduction into aggregate growth effect and composition effect
(percent points change per year)

	Actual	Estimated		
		Constant	Growth	Composition
Aggregate	-1.97	2.43	-4.24	-0.17
Urban	-0.32	0.46	-0.70	-0.09
Rural	-1.68	2.62	-4.21	-0.08
Migration	0.03	-0.65	0.67	0.00
		Normalized (aggregate=100)		
Aggregate	100	-124	215	8
Urban	16	-23	35	4
Rural	85	-133	214	4
Migration	-2	37	-38	0

Source: author's calculations based on Tables 1a, 3b and GDP growth data from the Thai government statistical agency.

Table 5b
Indonesia: Decomposition of poverty reduction into aggregate growth effect and composition effect
(percent points change per year)

	Actual	Estimated		
		Constant	Growth	Composition
Aggregate	-1.11	2.010	-2.973	-0.143
Urban	-0.19	0.432	-0.547	-0.074
Rural	-0.42	2.710	-3.054	-0.072
Migration	-0.50	-1.133	0.627	0.004
		Normalized (aggregate=100)		
Aggregate	100	-182	269	13
Urban	17	-39	49	7
Rural	38	-245	276	7
Migration	45	102	-57	0

Source: author's calculations based on Tables 1b, 3b and GDP growth data from the Indonesian government statistical agency.

Table 5c
Malaysia: Decomposition of poverty reduction into aggregate growth effect and composition effect
(percent points change per year)

	Actual	Estimated		
		Constant	Growth	Composition
Aggregate	-1.48	-0.25	-3.11	1.88
Urban	-0.70	-0.02	-0.60	-0.08
Rural	-0.50	-0.19	-2.12	1.82
Migration	-0.27	-0.03	-0.39	0.14
		Normalized (aggregate=100)		
Aggregate	100	17	210	-127
Urban	48	2	41	5
Rural	34	13	143	-123
Migration	19	2	26	-10

Source: author's calculations based on Tables 1c, 3b and GDP growth data from the Malaysian government statistical agency.

Table 5d
Philippines: Decomposition of poverty reduction into aggregate growth effect and composition effect
(percent points change per year)

	Actual	Estimated		
		Constant	Growth	Composition
Aggregate	-1.29	1.36	-2.46	-0.19
Urban	-0.55	-0.03	-0.42	-0.10
Rural	-0.58	2.02	-2.51	-0.10
Migration	-0.16	-0.63	0.47	0.00
		Normalized (aggregate=100)		
Aggregate	100	-105	190	15
Urban	43	2	33	8
Rural	45	-156	194	8
Migration	12	49	-36	0

Source: author's calculations based on Tables 1d, 3b and GDP growth data from the Philippine government statistical agency.

5. Conclusions

The four Southeast Asian countries studied in this paper—Thailand, Indonesia, Malaysia and the Philippines—have each achieved significant reductions in poverty incidence in recent decades. The achievement of poverty reduction was overwhelmingly attributable to the aggregate rate of growth; changes in the sectoral composition of the growth had little impact. The results confirm that the poverty reduction outcome was strongly related to growth of agriculture and services, especially the latter, but *not* to the growth of industry. Similar results have been obtained using data for India (Ravallion and Datt 1996), except that in the case of India the negative effects of industrial growth were stronger. On the other hand, earlier results for Taiwan (Warr and Wang 1999) showed that the growth of industry was strongly associated with poverty reduction.

These differences may be due to the role of industry policy. Taiwan's more outward-oriented trade policy apparently induced a pattern of industrialization which was labour-intensive and was conducive to a massive reduction of poverty incidence, occurring in both rural and urban areas. In India, heavy protection of industry led to a capital intensive, import substitution-led pattern of industrial development which did not serve the interests of the poorest groups. The four countries of Southeast Asia studied here are intermediate between these two extreme cases in so far as industry policy is concerned and the results on the impact of industry growth are intermediate as well. The results support the hypothesis that an import substitution based industry policy promotes a pattern of industrialization which does not advance the welfare of poor people because it contributes insufficiently to expanding the demand for the principal resource which they own—unskilled labour.

References

Anand, S. and S.M.R. Kanbur (1985) 'Poverty Under the Kuznets Process', *Economic Journal* 95:42-50.

Fields, G.S. (1980) *Poverty, Inequality and Development*, Cambridge University Press: Cambridge.

Krongkaew, M. (1993) 'Income Distribution and Poverty' in Peter G. Warr (ed.), *The Thai Economy in Transition*, Cambridge University Press: Cambridge.

Lewis, W.A. (1954). 'Economic Development with Unlimited Supplies of Labour', *Manchester School* 2:139-91.

Moll, T. (1996) 'Mickey Mouse Numbers and Inequality Research in Developing Countries', *Journal of Development Studies* 28:689-704.

Ravallion, M. and G. Datt (1996), 'How Important to India's Poor Is the Sectoral Composition of Economic Growth?', *World Bank Economic Review* 10:1-25.

Warr, P.G. (1993) 'The Thai economy', in P.G. Warr (ed.), *The Thai Economy in Transition*, Cambridge University Press: Cambridge.

Warr, P.G. and B. Nidhiprabha (1996) *Thailand's Macroeconomic Miracle: Stable Adjustment and Sustained Growth, 1970-1990*, World Bank and Oxford University Press: Washington DC, and Kuala Lumpur.

Warr, P.G. and Wang W.-T. (1999). 'Poverty, Inequality and Economic Growth in Taiwan', in G. Ranis and Hu S.-C. (eds) *The Political Economy of Development in Taiwan: Essays in Memory of John C. H. Fei*, Edward Elgar: London.

World Bank (1993) *East Asia's Economic Miracle*, Oxford University Press: New York.

World Bank (1996) *Poverty Reduction and the World Bank: Progress and Challenges in the 1990s*, World Bank: Washington DC.