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Changes in Spatial Income Inequality in the Philippines

An Exploratory Analysis

Arsenio M. Balisacan[1]
and Nobuhiko Fuwa[2]

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Abstract

The purpose of this paper is to establish some basic facts about income inequality in the Philippines, with a special focus on the importance of spatial income inequality. Despite major fluctuations in macroeconomic performances, income inequality remained relatively stable during the years 1985-2000. Spatial inequality accounts for a sizable but not overwhelming portion of the national-level income inequality, and the relative importance of spatial inequality was declining over time. We also find that mean income levels across provinces were converging at a much faster rate than those observed in currently developed countries.

Keywords: income inequality, spatial inequality, inequality decomposition, convergence, neoclassical growth model, Philippines
JEL classification: E13, O10, O15, O53

[1]South East Asian Regional Center for Graduate Study and Research in Agriculture, and University of the Philippines-Diliman; [2]International Rice Research Institute, University of the Philippines-Diliman, and Chiba University.

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1 Introduction

The Philippines has been long known for its high level of inequality in income and wealth distribution. A widely held view on inequality in the Philippines is that development policy has favored the island of Luzon and discriminated against the peripheral islands (provinces) of Visayas and (especially) Mindanao. Moreover, the poor performances of the Philippine economy over the last three decades have been attributed partly to the relatively large variations in the access to infrastructure and social services between major urban centers and rural areas (e.g., Ranis and Stewart 1993; Balisacan 1993a; Bautista 1997). Spatial variations in certain summary measures of human development are also evident (UNDP 1996).

If spatial income disparities are indeed at the core of the poverty and inequality problems in the Philippines, then policy reforms aimed at reducing these disparities would have to be central elements in the country's poverty reduction program. This may also promote efficiency goals; important dynamic externalities can arise from targeting by area or sector-specific characteristics (Bardhan 1996; Ravallion and Jalan 1996). Investments in physical infrastructure (e.g., roads, communications and irrigation) in backward areas, or in the rural sector in general, may improve the productivity of private investments, influence fertility through their effects on labor allocation and educational investment decisions, promote the development of intangible 'social capital' (in the form of social networks, peer group effects, role models, etc.), and mitigate the erosion in the quality of life in urban areas through their effects on rural-urban migration decisions.

However, if the disparity in incomes and human achievements *within* each of the regions or areas of the country is the major problem, then a different approach to poverty reduction will have to be found. It is possible, for example, that systematic differences in the levels of human capital between low- and high-income groups within a geographic area translate into considerable differences in earning opportunities between these groups. In this case, policy prescriptions to reduce overall income inequality and poverty would have to involve expanding the access of low-income groups to basic social services, technology, and infrastructure. Important policy priorities thus depend crucially on some of the basic factual information on inequality such as whether or not inequality is increasing, and what the main sources of inequality are. The primary purpose of this paper is to establish some basic facts for the Philippines about spatial income inequality. We focus on income inequality (and, thus, ignore other important dimensions of inequality) in the Philippines and address the following three questions:

- How much of the national-level income inequality in the Philippines is due to spatial inequality?
- Was spatial income inequality increasing in the Philippines during the period 1988-2000?

- What were the major sources of differential income growth across provinces in the Philippines?

The paper is organized as follows. Section 2 provides a general overview of income inequality in the Philippines such as trends in nationwide income inequality and international comparisons. Section 3 focuses on the sources of the nationwide income inequality and examines how much of the national-level income inequality is attributable to spatial inequality. Section 4 addresses the question of whether spatial income inequality is increasing over time in the Philippines, by examining the patterns of mean income growth across provinces, and examines the sources of the differential mean income growth rates across provinces. The final section concludes the paper.

2 Growth and inequality in the Philippines: a nationwide overview

An almost regular pattern of boom and bust growth has characterized the Philippine economy during the last three decades. Bust and stagnation soon followed each episode of boom, fueled largely by massive foreign borrowing and capital-intensive import-substituting industrialization. The period also saw heavy government regulation of the market economy, as well as political instability, natural disasters, and major shocks in global trade and finance. For these reasons, during most of the 1980s and early 1990s, the country acquired an unenviable image as 'sick man of Asia'. However, the growth episodes in the 1990s, notwithstanding the interruption in 1998 by the combined impact of the Asian economic crisis and the El Niño phenomenon, appear to have a fundamentally different character from previous ones. The growth took place in an environment of political stability, economic deregulation, and institutional reforms. While policy coordination problems (e.g., in public investments) persisted, the country at the end of the first millennium was closer to a market economy than it ever was in the past (see also Bautista and Tecson 2003).

Four distinct phases characterize the growth episodes from the mid 1980s.[1] The first is the brief period of economic growth (1986-89) following the sharp contraction in 1984 and 1985 when per capita GDP shrank by an average of 10 percent a year (Figure 1). Based on the Family Income and Expenditure Survey (FIES) household consumption data, the real mean living standard in 1988 was 10 percent higher than that in 1985, although still much lower than the level prevailing at the turn of the 1980s.

Political instability, natural disasters, and macroeconomic mismanagement caused overall economic growth to falter in the succeeding four years (1990-93). Nonetheless, the mean living standard in 1991 managed to rise by approximately six percent of that in 1988. Very

[1] No household data for poverty comparison are available from 1972 to 1984. While summary tables of nationwide household surveys are available for 1961, 1965, and 1971, these are not strictly comparable with those for the 1980s and 1990s.

modest per capita GDP growth resumed in 1994, but the combined impact of the contraction in the previous two years could have offset the effect of this growth on mean living standards. Indeed, by 1994, average living standard dipped two percent below that in 1991. Following restoration of political stability and deepening of policy and institutional reforms, GDP growth accelerated in the following three years (1995-97). The mean living standard in 1997 was approximately 21 percent higher than that in 1994, the highest three-year growth achieved since the mid 1980s. However, owing to the combined impact of the Asian economic crisis, and of the El Niño phenomenon in 1998, as well as of the slow recovery in the following year, the mean per capita expenditures (and possibly mean living standard) at the turn of the new millennium was just at the level reached at the beginning of the 1980s.

Figure 1: Per capita GDP and living standards, 1980s and 1990s

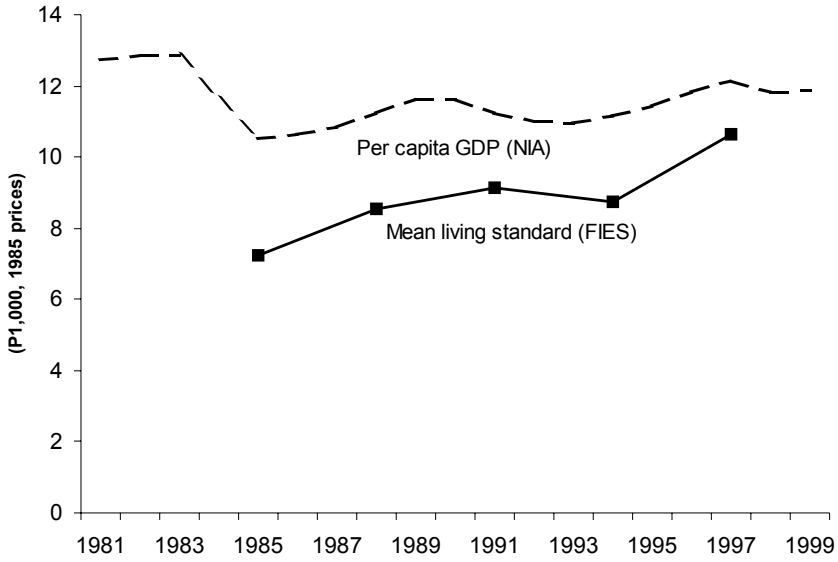


Table 1 also provides the summary measures of inequality in per capita consumption expenditures in the 1980s and 1990s. Despite the large fluctuations in macroeconomic performances as discussed above, the level of expenditure inequality, as measured by these summary indexes, remained remarkably stable. The level of inequality measured by the expenditure Gini ratio in the mid 1980s was 41.2 percent. After falling slightly to 40.0 percent in 1988, it rose to 42.8 percent in 1991 but then fell back again to the 1988 level in 1994. It then rose to 42.7 percent in 1997. The level of inequality in 2000 (Gini ratio of 42.9 percent) was roughly at the same level as it was in 1997. Essentially the same pattern emerges for Theil T which is more sensitive than the Gini index to changes in the tails of the distribution. Given the relatively small changes in the summary measures of inequality over the twelve year period, it is indeed difficult to draw definitive conclusions about the direction of the changes in expenditures inequality in the Philippines. For example, Balisacan (1999) shows that the observed intertemporal changes in the summary measures of inequality (especially the Gini coefficient and the mean logarithmic deviation) are quite sensitive to the assumption about the existence of the scale economy in household

consumption, which can even reverse the direction of the changes in the time trend in inequality.[2]

Table 1: Living standard and inequality, 1985-2000

	1985	1988	1991	1994	1997	2000
Mean living standard (at 1997 prices)	17,197	18,926	20,049	19,600	23,694	22,865
Inequality						
Gini	0.412	0.400	0.428	0.397	0.427	0.429
Theil T	0.330	0.298	0.363	0.302	0.376	0.368

Note: Living standards are defined as household consumption expenditures adjusted for family size and provincial cost-of-living differences.(see Balisacan 1999 for details).

Source: Authors' estimates, based on Family Income and Expenditures Survey data.

Many observers of the Philippine economy have long pointed out its high level of inequality in income and asset distribution. Based on the income distribution data compiled by Deininger and Squire (1996), Balisacan (1999) observes that the Gini ratios of income inequality in the Philippines was indeed higher than those of other Asian countries, except for Malaysia during the 1970s and the early 1980s and Thailand after the mid 1980s. He also notes, however, that while inequality was rising in Thailand, China, and Hong Kong in the 1980s and 1990s inequality in the Philippines tended to be either remaining constant or slightly falling. On the other hand, the oft-heard remark in reference to economic inequality, that the Philippines is a Latin American country misplanted in East Asia, appears to be a bit of an exaggeration. A comparison of the Gini ratios of per capita income indicates that the level of income inequality in the Philippines was lower than that of most of the Latin American countries and roughly equal to that of the Latin American economies with the lowest inequality levels. Admittedly, however, the same comparison also shows that the inequality levels of most of the other Asian countries (except for Malaysia and Thailand as mentioned above) were *much lower* than that of *any* Latin American country (Balisacan 1999: Figure 8-11).

3 Spatial and sectoral sources of income inequality in the Philippines

3.1 Sources of inequality levels

In this section we examine the sources of national-level income inequality. More specifically, we address the issue of how much of nationwide inequality can be accounted for by spatial inequality. To start with, one useful disaggregation of inequality data is the

[2] According to Balisacan (1999: Figure 4), the mean logarithmic deviation increased slightly between 1985 and 1994 when no economies of scale is assumed (i.e., the 'scale elasticity' of value one, which means that simple per capita expenditure is used) while the trend reverses once the scale elastivity of values smaller than around 0.8 is assumed.

urban-rural divide. Poverty in the Philippines is often described as a largely rural phenomenon (Balisacan 1993a). Progress in reducing rural poverty will thus go a long way in advancing the overall poverty reduction goal.[3] Table 2 shows the mean living standards for the urban and rural sectors. The high mean consumption disparity between urban and rural areas is apparent. The mean consumption level in urban areas is nearly twice that in rural areas. The mean living standard rose significantly during the high growth periods of 1985-88 and 1994-97 for both sectors. The direction of inequality for both sectors also generally followed the overall pattern reported in Table 1.

Table 2: Living standards and inequality by locality, 1985-2000

	1985	1988	1991	1994	1997	2000
Urban						
Mean living standard (at 1997 prices)	24,099	26,283	26,213	25,093	31,657	30,219
Inequality						
Gini	0.410	0.390	0.421	0.392	0.425	0.423
Theil T	0.327	0.286	0.355	0.295	0.379	0.359
Rural						
Mean living standard (at 1997 prices)	12,838	14,414	13,864	14,154	16,475	15,794
Inequality						
Gini	0.352	0.350	0.359	0.336	0.352	0.360
Theil T	0.226	0.217	0.238	0.205	0.230	0.242

Notes: Inequality estimates are based on per capita consumption expenditures adjusted for provincial cost-of-living differences.

Source: Authors' estimates, based on Family Income and Expenditure Survey data.

Table 3 and Figure 2 show the population shares and the mean living standards, respectively, for selected characteristics (i.e., locality, region, and employment sector of household head). Clearly, the average living standards vary substantially between urban and rural areas, as well as across regions. Metro Manila, which accounts for about 14

[3] Tracking progress in the living standard in rural areas is not as straightforward as it seems, however. For example, rural poverty indicators constructed from the FIES for the 1980s are not comparable with those for the 1990s owing to the urban-rural reclassification problem. Balisacan (1993b) demonstrated that the failure to take account of the 'shifting of physical areas' arising from reclassification of villages would distort the overall picture on the actual performance of rural areas from the late 1980s to the early 1990s. The sampling frame for the 1985 and 1988 FIES was based on the 1980 population census, while that for the 1991 FIES was based on the 1990 census. Both censuses applied the same set of criteria in classifying villages into 'urban' and 'rural' areas. Nevertheless, interyear comparison within a decade is valid since the sampling frame and the rural-urban classification of geographic areas are common for these years.

percent of the population, has the highest mean living standard. In 2000, its mean living

Table 3: Population shares by locality, region and sector, 1985, 2000

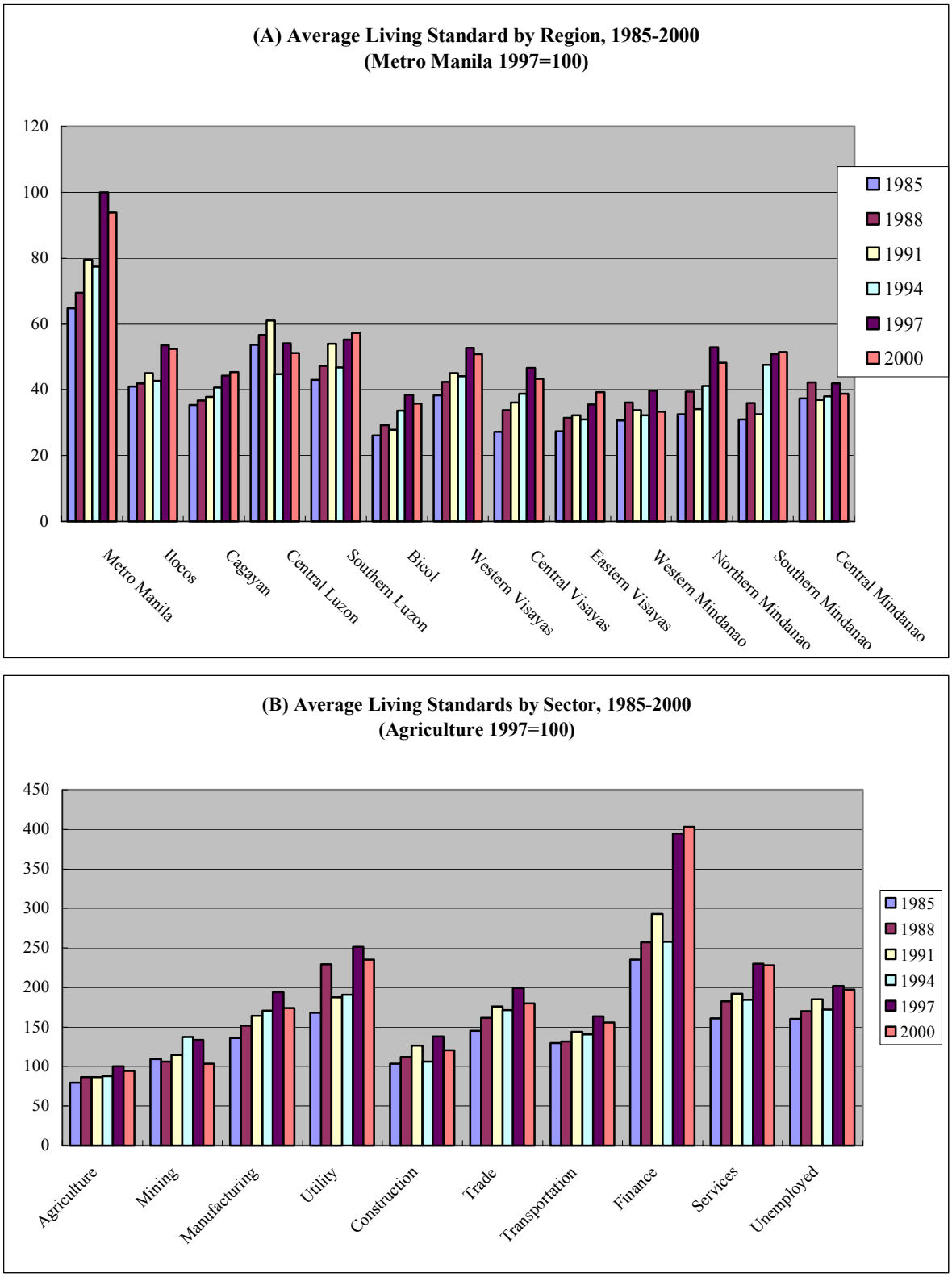
	Population share	
	1985	2000
Philippines	100.0	100.0
A. Locality		
Urban	38.7	49.0
Rural	61.3	51.0
B. Region		
Metro Manila	14.0	14.2
Ilocos	7.2	6.5
Cagayan	4.6	4.0
Central Luzon	9.9	9.9
Southern Luzon	12.5	14.5
Bicol	6.8	7.5
Western Visayas	8.9	8.0
Central Visayas	7.6	7.1
Eastern Visayas	5.4	4.7
Western Mindanao	5.1	5.2
Northern Mindanao	6.1	5.7
Southern Mindanao	7.3	7.4
Central Mindanao	4.5	5.3
C. Sector		
Agriculture	47.3	36.8
Mining	0.8	1.1
Manufacturing	7.0	7.2
Utility	0.5	0.5
Construction	4.9	7.1
Trade	8.0	10.4
Transportation	6.1	9.2
Finance	1.8	2.1
Services	12.1	11.1
Unemployed	11.4	14.4

Source: Authors' estimates, based on Family Income and Expenditure Survey data.

standard was roughly 1.7 times the national average or about three times the mean living standard for Western Mindanao, the poorest region of the country. Except for Bicol and Cagayan, the mean living standards for the Luzon regions are higher than for most of the regions in Visayas and Mindanao. Note, however, that the ranking of most regions changed between 1985 and 2000. Eastern Visayas, for example, was the second poorest region in 1985, but it ranked the fourth poorest in 2000 while Western Mindanao, the fifth poorest in 1985, became the poorest region in 2000. Only Metro Manila maintained its relative positions during the period. An even greater disparity in living standard exists, however,

among employment sectors. As expected, agriculture, which employed 37 percent of the labor force in 2000, has consistently had the lowest mean living standard among all sectors. Manufacturing and trade have an income level of almost twice that of agriculture's

Figure 2 Average living standard by region and sector, 1985-2000



Note: Per capita consumption expenditure adjusted for provincial cost-of-living differences. Average welfare in

1997 for urban areas, Metro Manila, and agriculture are 31,657 pesos, 42,367 pesos, and 14,886 pesos, respectively.

Source: Family Income and Expenditure Survey.

mean living standard. Utility and services have more than twice agriculture's mean expenditure. Finance, the richest sector, has more than four times agriculture's level.

The large income disparity between Luzon and the rest of the country, as well as between urban and rural areas, has attracted much attention in policy discussions. A common theme emerging from these discussions is that the spatial income disparity is largely responsible for the high income inequality in the country, implying that much of the inequality would be reduced by policy reforms aimed at closing the income gaps among regions and between rural and urban areas. Table 4 suggests, however, that this claim is not quite accurate. While regional differences in the mean living standards are substantial, the contribution of the between-group (region) component to overall inequality is rather small (15 percent). This implies that removing between-group inequality by equalizing all the regional mean expenditures (but keeping within-group inequality constant by equiproportionately changing the expenditures of all members of that region) will reduce overall inequality by 15 percent. Conversely, removing within-region inequality by making everyone's expenditure within a region equal to the mean for that region will reduce overall inequality by 85 percent.

Table 4: Decomposition of expenditure inequality indices

	1985	1988	1991	1994	1997	2000
National inequality						
Theil T	0.330	0.298	0.363	0.302	0.376	0.368
Within-group contribution to aggregate inequality (%)*						
A. Locality (urban/rural)						
Theil T	85.1	85.0	86.7	86.9	86.3	86.3
	(14.9)	(15.0)	(13.3)	(13.1)	(13.7)	(13.7)
B. Region						
Theil T	86.5	88.1	84.8	87.5	86.7	86.9
	(13.5)	(11.9)	(15.2)	(12.5)	(13.3)	(13.1)
C. Sector						
Theil T	83.7	81.6	82.4	81.5	82.1	80.4
	(16.3)	(18.4)	(17.6)	(18.5)	(17.9)	(19.6)

Note: *Figures in parentheses are between-group contributions to aggregate inequality.

Source: Authors' estimates, based on Family Income and Expenditure Survey data.

Sources of inequality changes

As observed in Table 3, the changes in the living standards are accompanied by population shifts (i.e., relative changes in population shares), as well as changes in inequality within

population subgroups. Thus, the change over time in the relative importance of between-group and within-group components cannot be ascertained directly from the results given in these tables. Based on Tsakloglou's methodology (1993), which is a dynamic analogue of the (static) inequality decomposition approach, the change in Theil T can be decomposed into three components: (a) the effects of intertemporal changes in within-group inequality, holding population shares and relative mean expenditures of the subpopulation groups constant; (b) the effects of changes in population shares on within-group inequality and on the relative mean expenditures; and (c) the effects of changes in the relative group means on overall inequality.

Table 5: Decomposition of inequality change (Theil T index)

Period		Change in inequality due to change in*			Total change
		Within-group inequality	Population share	Mean group expenditure	
1985-88	Locality	-2.60	-0.07	-0.51	-3.18
		(81.97)	(2.09)	(15.95)	
	Region	-2.30	-0.01	-0.86	-3.18
		(72.56)	(0.45)	(27.00)	
	Sector	-3.38	-0.11	0.27	-3.18
		(104.99)	(3.43)	(-8.42)	
1988-91	Region	4.33	-0.02	2.17	6.48
		(66.83)	(-0.37)	(33.54)	
	Sector	5.26	0.06	1.18	6.48
		(80.96)	(0.95)	(18.09)	
1991-94	Locality	-5.02	-0.02	-1.04	-6.08
		(82.58)	(0.30)	(17.13)	
	Region	-4.43	-0.02	-1.64	-6.08
		(72.76)	(0.37)	(26.87)	
	Sector	-5.11	-0.06	-0.91	-6.08
		(84.04)	(1.04)	(14.92)	
1994-97	Locality	6.23	-0.18	1.35	7.40
		(84.12)	(-2.37)	(18.26)	
	Region	5.99	0.08	1.34	7.40
		(80.74)	(1.14)	(18.12)	
	Sector	5.71	0.11	1.60	7.40
		(76.93)	(1.55)	(21.52)	

Note: *Absolute changes in inequality indices are multiplied by 100. Figures in parentheses are percentage contributions to total change.

Source: Authors' estimates, based on Family Income and Expenditure Survey data.

Table 5 shows the results of the decomposition for Theil T index using three sub-population groupings: (1) locality (i.e., urban or rural); (2) region; and (3) sector of

employment.[4] When disaggregation is based on the location of residence, the change in within-group inequality contributes about three-fourths of the total change in overall inequality during the entire period. Note, however, that during the 1988-91 period, the estimate may have been biased by the reclassification of geographical areas.

A disaggregation by region tells almost the same thing, with the change in within-group inequality still contributing the largest share (although less than three-fourths) in the total inequality change. When disaggregated by sector, the change in within-group inequality contributes from three-fourths (1994-97) to the entire (1985-88) total change in overall inequality. We thus observe that the changes in overall inequality from 1985 to 1997 came mainly from changes *within* geographic boundaries and not from changes in relative mean group expenditures, in relative population shares, or both.

3.2 Relative importance of spatial inequality: a regression-based inequality decomposition approach

While the above decomposition approach provides (at best) an indication of the contribution of a set of factors—location and household-specific attributes—to inequality, the approach is rather cumbersome in the cases where many of these factors have to be treated jointly rather than individually. In the next step in our inquiry, therefore, we follow a regression-based inequality decomposition approach to systematically explore the contributions of each of these factors to the observed variation in household welfare (or living standards). Following Fields (2002),[5] we estimate a standard set of regressions of the Mincerian form and use the parameter estimates to calculate the relative contribution of each factor to the differences in living standards. The regression is of the form:

$$\ln y_{it} = \alpha_t + \beta_t X_{it} + \varepsilon_{it} \qquad (1)$$

where the subscript i refers to the household, t refers to year, y is living standard (defined as per capita household expenditure adjusted for provincial cost-of-living differences), and X_{it} is a vector of explanatory variables.[6] This form is a standard formulation of earnings function in the human capital literature (see Mincer 1974; Atkinson 1983). In this specification, the relative contribution of each factor (jth covariate) to the inequality in household living standards (as measured by the variance of the logarithm of per capita

4 Decomposition analysis based on Theil L index was also conducted but the results were very similar.

5 Additional applications of the same approach include Heltberg (2003) and Ravallion and Chen (1999).

6 The explanatory variables included are: age and age squared of household head (HH), sex of HH, marital status dummy of HH, educational dummies of HH (elementary, high school, college), family size, child dependency, number of household members employed, access to electricity and dummy variables representing sector of employment (9 sectors), class of worker (10 classes), region of residence (13 regions) and urban residence.

household consumption expenditures)[7] can then be estimated as (with time subscript *t* omitted):

$$Sj = \mathrm{cov}[ajZj, Y] / \sigma^2(Y) = aj * \sigma(Zj) * cor[Zj, Y] / \sigma(Y) \qquad (2)$$

where s_j is the relative contribution of the *j*th covariate, a_j is the *j*th element of the coefficient vector (α, β_j), Z_j is the *j*th element of the vector of explanatory variables plus a constant (1, X), and Y is log y.[8]

Table 6 shows the shares accounted for by the location and household-specific attributes in the total variance explained by the model, for the period between 1985 and 2000 FIES.[9] Location (both rural-urban disparity and regional disparities taken together) accounted for 19 percent of the total variations in the per capita consumption expenditure in 1985, of which 5 percent of the variation was explained by urban-rural disparity and 14 percent by the regional dummies. Eighty percent of the nationwide variations in the mean expenditure was explained by the combination of intraregional factors such as education of the household head, household composition, sector of economic activities and access to electricity. Household composition and the household head's attributes, taken together, explain one half of the variance explained by the model. Among those, educational attainment of the household head explains by far the largest share of the variations. Infrastructure, represented by access to electricity, is another major contributor to the variance explained by the regression model.[10] This variable accounts for 15-20 percent of the variance explained. On the other hand, employment sector contributes only a relatively small proportion (less than 10 percent) of the variance explained by the model although its share increased rapidly in the 1990.[11] This suggests that it is differences in the welfare levels within a sector, rather than differences in the mean welfare levels between sectors, that accounts for a significant proportion of the variation in household welfare nationally. The relatively low level of spatial inequality as a share of total inequality appears to be

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[7] It is well known, however, that the variance of the logarithm ('varlog') has an undesirable property as an inequality measure of violating the 'Pigou-Dalton transfer axiom' at high income levels (e.g., Sen 1993).

[8] Fields (2002), as well as Ravallion and Chen (1999), invokes the axiomatic results of Shorrocks (1982) in arguing that the *same* relative shares as obtained by the inequality decomposition above are applicable not only to the 'varlog' measure but also to a broad class of inequality measures satisfying the conditions specified by Shorrocks (1982) as well. This 'generality result' by Fields (2002), however, has been disputed by Morduch and Sicular (2002) and Wan (2002). Our use of Fields' (2002) approach in this paper is based on its practical appeal and addressing the methodological controversy is beyond the scope of this paper. A potentially promising approach could be to apply the 'Shapley Value decomposition' recently developed by Shorrocks (1999), which will be pursued in our future work.

[9] The estimation takes into account sample design effects, i.e., stratification and weights assigned to each observation.

[10] The relatively large effect of the electricity variable cannot be interpreted literary as the effect of electricity access per se; since the availability of electricity is likely to be highly correlated with other infrastructure development (such as road) and other infrastructure variables are not available, we should perhaps interpret this vaguely as the effect of better infrastructure (leading to better economic opportunities).

[11] As seen in Table 3, the sectoral income disparities increased in the 1990s; especially notable is the rapid increase in the income of the finance sector.

roughly in line with the findings from other countries such as (rural) Ecuador, Madagascar and Mozambique (Elbers et al. 2003), while a similar study from Vietnam recently found a much higher share of total inequality, as high as 42 percent, being explained by spatial inequality (Heltberg 2003).

Table 6: Relative contribution of spatial and household attributes to variance of living standards

	1985	1988	1991	1994	1997	2000
Household attributes						
family size	10.8	11.3	10.4	12.3	14.2	15.9
household type	0.4	0.4	0.5	0.5	0.5	0.3
child dependency ratio	10.2	10.8	9.7	10.8	9.7	10.3
employment ratio	1.3	2.0	1.5	2.3	3.3	2.4
spouse employed	0.0	0.1	0.3	0.3	0.7	0.4
skill and experience of household head	0.8	0.4	0.4	0.7	0.4	0.1
gender of household head	0.7	0.6	0.6	0.7	0.7	0.6
marital status of household head	-0.4	-0.5	-0.2	-0.3	-0.4	-0.4
educational level of household head	33.4	33.6	30.5	33.7	34.1	33.6
Economic sector						
labour class of household head	3.5	4.3	5.4	4.5	6.5	5.5
employment sector of household head	0.8	3.4	3.2	3.8	2.7	4.9
Infrastructure						
electricity	19.7	16.9	18.7	18.2	17.2	15.3
Location						
urban	5.1	6.2	4.4	4.0	3.2	3.8
region	13.6	10.4	14.8	8.5	7.1	7.4

Note: Estimation takes into account sampling design effects, i.e., stratification and weights. For brevity, details of regression results are not shown (but are available from the author upon request). The relative contribution of 'class of worker (household head)', of 'sector of employment' and of 'region' are each the sums of the contribution of a set of dummy variables representing 9 sectors of employment, 10 classes of worker, and 13 regions of residence respectively.

Source: Authors' estimates, based on Family Income and Expenditure Survey data.

In addition, the relative contribution of the regional disparity to the nationwide inequality declined between 1985 and 2000; the variation in the living standard attributed to regional disparities declined from 14 percent in 1985 to 7 percent in 2000. What was behind such a decline in the relative contribution of regional income disparity, however, is not immediately clear. On one hand, some village-level studies in the 1990s suggest that the spread of non-agricultural growth toward lower income regions may have been a factor (see, for example, Hayami and Kikuchi 2000). Manasan and Chatterjee (2002), on the other hand, argue that high growth in the agricultural sector reduced regional income disparities since lower-income regions are mainly agricultural-based economies. In the next section we will focus directly on the process of the changes in regional income disparities based on the neoclassical growth convergence analysis.

4 Is provincial income disparity increasing in the Philippines?: income convergence analysis[12]

In the previous section, we observed that spatial income inequality is a sizable but *not* overwhelming source of nationwide income inequality in the Philippines, accounting for at most 20 percent of the total variation. Nevertheless, if spatial inequality is on the rise, then such inequality could become an increasingly important source of income inequality at the national-level. In this section we examine whether spatial income inequality was increasing during the period between the late 1980s and the late 1990s. We address this question by asking whether mean income (as measured by consumption expenditures) across provinces in the Philippines was converging.

4.1 Absolute convergence among provinces

How does regional income inequality tend to evolve? According to the (simple) neoclassical growth model, (due to its assumption of diminishing returns to capital) the lower the starting level of real per capita income, the higher is the predicted growth rate (the convergence property). While such convergence can occur only in a conditional sense across countries because national economies differ considerably—in terms of the propensities to save, to have children, willingness to work, access to technology, and government policies—'absolute convergence' is more likely to be observed within an economy since those factors are relatively similar among different parts of the country. Indeed, empirical studies on the historical experiences in currently developed countries suggest that such absolute convergence within countries is in fact common (Barro and Sala-i-Martin 1992, 1995).

Does the pattern of spatial income disparity in the Philippines follow such a prediction of the neoclassical growth theory? Figure 3 shows the relationship between the per capita expenditure in 1988 and the average annual growth rate of per capita expenditure between 1988 and 1997 in the Philippines.[13] The unit of observation here is each of the 72 provinces (excluding Metro Manila, which, as we can see from Figure 2, is a clear outlier). We can observe a clear pattern of absolute convergence during the period. Following Barro and Sala-i-Martin (1995: Chapter 11) we estimated the following equation by non-linear least square (NLLS) estimation:

$$(1/T)\log(PCEXP97_i/PCEXP88_i)=a - [(1 - e^{-\beta T})/T]\log(PCEXP88_i) + u_i, \qquad (3)$$

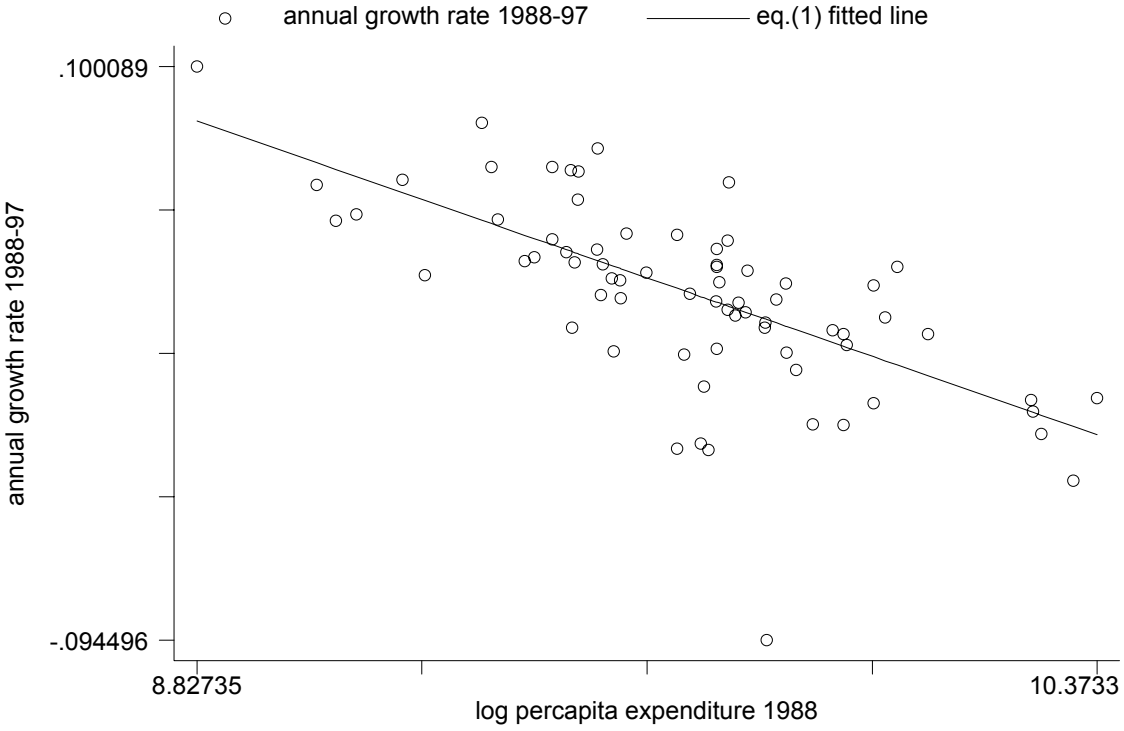
where T is the number of years between the two data points (in our case T = 9), $PCEXP88_i$ is the level of per capita expenditure (as a proxy for the per capita income) for province i in the initial year (1988), $PCEXP97_i$ is the level of per capita expenditure for province i in the

[12] This section draw heavily on Balisacan and Fuwa (2003).

[13] While we have 2000 FIES data on per capita consumption expenditures, some of the right-hand side variables in the regression analysis discussed in the next section are not yet available as of our writing. As a result, we restrict our analysis of provincial income convergence to the 1988-97 period.

end year (1997), and u_i is the error term.[14] The β is the 'beta convergence' coefficient indicating the annual rate of convergence.[15] Our estimated beta convergence coefficient for the Philippines during the period 1988-97 is 0.107.[16]

Figure 3: Absolute convergence among provincial income growth



Note: *The outlier observation at the middle bottom is that of the province of Sulu.

Source: Family Income and Expenditure Survey.

Table 7 compares our estimate from the Philippines with the estimated rates of convergence from historical data in the US, Japan and Europe as reported in Barro and Sala-i-Martin (1995: Chapter 11). As we can see from the table, compared to these historical beta convergence coefficient estimates in currently developed countries, the comparable estimates from the Philippines appear to be quite high; the only historical episode where the rate of convergence comes close to our Philippine case is that of Japan in the period 1970-75. The magnitude of the difference in the rate of convergence between

[14] The potential bias due to the possible correlation between the initial income and the unobserved provincial-specific effects here is likely to be less serious than in cross-country estimates, since the main sources of such heterogeneity (technologies, tastes, etc.) tend to be similar within a country. Furthermore, Caselli et al. (1996) show such bias to be unambiguously downward. Thus, our main qualitative finding of a high convergence rate would not be affected (but rather enhanced).

[15] $\beta>0$ would mean that provinces with low initial incomes grow faster (i.e., provincial income convergence) while $\beta=0$ would mean no convergence.

[16] In estimating equation (3) we excluded the province of Sulu, which appears to be an outlier (see Figure 3). If we include Sulu, the estimated beta convergence coefficient is 0.114.

Table 7: Estimated beta-convergence coefficients of regional income growth convergence

Country and period	Estimated beta coefficient
Philippines	
1988-97	**0.107[*] (0.114[**])**
United States	
1880-1990	0.0174
1880-1900	0.0101
1900-1920	0.0218
1920-1930	-0.0149
1930-1940	0.0141
1940-1950	0.0431
1950-1960	0.0190
1960-1970	0.0246
1970-1980	0.0198
1980-1990	0.0011
Japan	
1930-1990	0.0279
1930-1955	0.0358
1955-1990	0.0191
1955-1960	-0.0152
1960-1965	0.0296
1965-1970	-0.0010
1970-1975	0.0967
1975-1980	0.0338
1980-1985	-0.0115
1985-1990	0.0007
European regions	
1950-1960	0.018
1960-1970	0.023
1970-1980	0.020
1980-1990	0.010

Note: [*]estimate based on all provinces except Metro Manila and Sulu; [**]estimate based on the full sample of all provinces.

Source: Philippines, authors' estimates; United States, Japan and European regions, Barro and Sala-i-Martin (1995).

our estimate from the Philippines and those from the historical experiences of the US, Japan and Europe is quite striking. With the annual rate of convergence (β) of 2 percent, the number of years required to close the gap between the initial income and the steady-state income up to a half is 35 years; with a β value of 10.7 percent, the corresponding number of years is only 6 years. It remains to be seen without similar estimates from other time periods, however, whether such a high rate of convergence is a longer term trend or it was an exceptional episode within the history of the Philippine economic development like the Japanese episode of the 1970-75 period, since historical experiences from currently

developed countries indicate that the rates of convergence fluctuate quite substantially over time. In addition to the very high rate of β convergence, we also find that the standard deviation of the log of per capita expenditures across provinces also fell from 0.303 in 1988 to 0.239 in 1994 (σ-convergence).[17]

In sum, we find that the mean income growth tended to grow faster (slower) in the provinces where the initial level of mean income was lower (higher) thereby exhibiting a pattern of provincial income convergence, and that the rate of such convergence was indeed quite high. Thus, the dynamic patterns of special income inequality (in the sense of the disparity in the mean income levels across provinces) in the Philippines were operating in the direction of *reducing* the overall income inequality at the national-level during the period between the late 1980s and the late 1990s.

4.2 Conditional convergence: provincial growth regression results

While we have observed a general pattern of absolute income convergence across provinces, as predicted by the neoclassical growth theory, the same theory also predicts that income disparity could persist to the extent that the steady-state level of income differs across provinces. If we could identify the determinants of such steady-state income levels, then appropriate policies could potentially be formulated that would reduce special inequality in income. In this subsection, we seek to identify such sources of the differential steady-state income levels by applying the familiar growth regression framework. Following Barro's exposition (1997:8), the basic model is:

$$Dy = f(y, y^*) \tag{4}$$

where Dy is the annual growth rate of per capita income, y is the initial level of per capita income (as measured by per capita consumption expenditure) in 1988, and y^* represents the long-run or steady-state level of per capita income. The convergence property based on neoclassical growth models predicts that the relationship between y and Dy be negative.[18] The 'target value' y^* presumably depends on an array of variables representing the initial conditions (economic and political/institutional) and policy choices. Here we discuss the growth regression results reported earlier (Balisacan and Fuwa 2003) explaining the differential rates of consumption expenditure growth across provinces by estimating the following equation:

$$\text{GRPCEXP}_i = a + b \log(\text{PCEXP88}_i) + \Sigma c_k X_{ik} + u_i \tag{5}$$

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[17] Nor do we find an indication of twin-peakedness by inspecting the kernel density of the per capita expenditures between 1988 and 1994, in contrast with Quah's (1996) observations based on cross-country data.

[18] As is often the case in this type of regression analysis, the initial per capita expenditures and the dependent variable come from the same set of variables and thus there is a potential that the common measurement errors contained in the both dependent and the independent variables could lead to spurious correlation. In order to address this potential problem, we used instrumental variable estimation with the household income per capita as the instrument for the initial per capita expenditure variable.

where GRPCEXP is the annual average growth rate of per capita expenditures between 1988 and 1997, X_k is a set of additional explanatory variables consisting of initial conditions and policy variables,[19] and u_i is the error term. The descriptive statistics are shown in Table 8 and the estimation results are shown in Table 9. Among the initial economic conditions, the estimated coefficients on only morality rate and land distribution inequality were found to be significantly different from zero. Among the policy variables only the change in the CARP accomplishments was found to have coefficients significantly different from zero. In the final model reported in columns (2), all the variables whose estimated coefficients are not significantly different from zero are dropped.

As we saw earlier, there is a strong convergence property among provincial expenditure growth; controlling for the factors affecting the steady-state level of per capita expenditure, the estimated conditional rate of convergence is 8.5 percent per year (while the unconditional rate of convergence was 10.7 percent). This suggests that not only is the conditional convergence occurring given the steady-state level of expenditure for each province but the steady-state expenditure levels also were converging. While the neoclassical convergence effects (presumably due to the diminishing returns to capital) accounts for the 8.5 percentage-points of the 10.7 percent rate of annual absolute expenditure convergence, the rest (2.2 percentage points) is accounted for by the change in the steady-state expenditure levels, which in turn is determined by the human capital stock, political competitiveness, land distribution inequality, and land reform implementation.

Among the initial economic conditions, the initial level of human capital stock as measured by the child mortality rate (but not by literacy rate) has significant effects in raising the 'target' income level y^*; on average, a one standard deviation reduction in mortality rate raises the annual per capita growth rate by 0.9 percentage point. Furthermore, we find significantly *positive* effects of the initial inequality in farm distribution; on average, one standard deviation increase in the Gini coefficient in land distribution is associated with a 0.7 percentage point increase in growth rates.[20] Our finding, thus, suggests that there may

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[19] We initial included as initial economic conditions: child mortality rate, simple adult literacy rate, proportion of irrigated farm area, Gini ratio of farm distribution, political 'dynasty' (proportion of key provincial officials related to each other by blood or affinity. Our (time-varying) policy variables: agricultural terms of trade, electricity access, road density, and Comprehensive Agrarian Reform Program (CARP) implementation.

[20] Since this result runs directly counter to the recent conventional wisdom that 'initial inequality hurts subsequent economic growth' (e.g., Persson and Tabellini 1994), we examined the robustness of this relationship. It turns out that the significantly positive coefficient on the 'land Gini' variable tends to be quite stable among various specifications with various combinations of explanatory variables. In addition, we experimented with alternative measures of land distribution, such as the ratio of large to small land holdings, but we tend to find that an initially higher share of small or medium size farm holdings is negatively related to subsequent growth, and an initially higher share of large farm holdings positively related to subsequent growth (results are not reported here, but available from the authors upon request). We find no evidence of the conventional wisdom and a rather robust positive relationship between high inequality in farm distribution and subsequent income growth.

Table 8: Descriptive statistics for provincial income growth regression

Variable name	Description	mean	Standard deviation	min	max	No. of obs.
GRPCEXP[1]	Average annual growth rate of per capita expenditures	0.023	0.032	-0.090	0.105	71
Initial conditions:						
PCEXP[1]	Per capita expenditures	16598.38	5133.67	6818.22	31993.09	71
Land Gini[2]	Gini coefficient of farm distribution	54.16	6.55	36.49	75.77	72
Mortality rate[3]	Mortality rate per 1000 of children age 0-5	84.99	14.71	55.92	121.12	72
Literacy rate[4]	Simple adult literacy rate	87.57	7.37	56.7	96.6	72
Irrigation area[5]	Share of irrigated farm area	0.27	0.22	0.015	0.95	66
Dynasty[6]	Proportion of the provincial officials related by blood or affinity	0.815	0.199	0	1	72
Time varying variables:						
Chg. CARP[7]	Change in CARP accomplishment	1.340	1.089	0.4730	4.6851	72
Chg. road density[8]	Change in road density	0.0820	0.0839	-0.2141	0.4047	72
Chg. ag. terms of trade[9]	Change in agricultural terms of trade	0.4481	0.0784	0.24	0.58	72
Chg. electricity[10]	Change in the share of households with electricity	11.3789	12.9160	-21	61.8	72

Sources: [1]Family Income and Expenditure Survey (National Statistical Office). [2]Census of Agriculture (National Statistical Office). [3]1990 Women & Child Health Indicators (National Statistical Coordination Board). [4]FLEMMS (National Statistical Office). [5]Census of Agriculture (National Statistical Office). [6]Collected by the authors in interviews. [7]Department of Agrarian Reform. [8]Department of Public Works and Highway. [9]Regional Accounts of the Philippines (NSCB). [10]Family Income and Expenditure Survey (National Statistical Office).

be a disturbing trade-off between social equity and growth.[21] The 'dynasty' variable (measuring the proportion of provincial officials related by blood or affinity) has significantly negative effects on subsequent growth. The lack of competitive political system is one of the major themes in much of the literature on the Philippine politics, and such a political characteristic has generally been seen among the observers as one of the major factors leading to suboptimal policy choices in the Philippine government and, thus,

[21] See Balisacan and Fuwa (2003) for further discussions on this disturbing finding.

to the relatively poor economic performances compared to those of its Asian neighbors (e.g., Balisacan et al. 2001).

Table 9: Determinants of provincial growth regression results: instrumental variable estimation results (t-ratios in parentheses)

Independent variables:	(1)[2]	(2)[2]
Log (per capita expenditure 1988)[1]	**-0.088(10.24)****	**-0.085 (11.51)****
Mortality rate	**-0.001 (3.04)****	**-0.0007 (-4.37)****
Literacy rate	0.0001 (0.16)	
Dynasty	**-0.026 (2.24)****	**-0.022 (2.17)****
Irrigation area	0.002 (0.14)	
Land Gini	**0.001 (3.05)****	**0.001 (3.41)****
Chg. CARP	**0.006 (2.11)****	**0.006 (3.15)****
Chg. electricity	-0.00003 (0.13)	
Chg. ag. terms of trade	0.016 (0.52)	
Chg. road density	0.018 (0.64)	
Constant	**0.849 (8.52)****	**0.833 (10.59)****
Adj. R-squared	0.6799	0.6967
Sample size[3]	65	70

Notes: *Dependent variable* = annual growth rate of mean consumption per capita. [1]Per capita income used as instrument. (see footnote 9 in text). [2]Outlier observation (Province of Sulu), as well as Metro Manila, excluded. [3]The sample size in column (1) is smaller since 5 provinces had to be dropped because one or more of the right hand side variables were missing for those provinces. *statistically significant at 10% level; **statistically significant at 5% level.

Sources: [1]Family Income and Expenditures Survey, National Statistics Office (NSO); [2]1990 Women & Child Health Indicators; [3]Functional Literacy, Education, and Mass Media Survey, NSO; [4]Commission on Elections and interviews by authors; [5]Census of Agriculture, NSO; [6]Department of Agrarian Reform; [7]Regional Accounts of the Philippines, National Statistical Co-ordination Board; [8]Department of Public Works and Highway.

Among what we regard as policy variables, only one, the increment of the agrarian reform accomplishments under the Comprehensive Agrarian Reform Program (CARP), is found to have estimated coefficients significantly different from zero (Table 9, column 1); on average, one standard deviation increase in the 'accomplishment' of land redistribution is associated with 0.7 percentage point increase in annual growth in per capita expenditures.[22] The positive correlation between land reform implementations and growth seems to contradict our finding above that inequality in farm distribution is positively related to growth. One possible interpretation of such results, however, is that land reform could affect growth through non-agricultural routes; land reform redistributed income from landowners to former tenants, who subsequently invested in education and non-agricultural activities, which, in turn, emerged as the main source of the income growth in rural Philippines (e.g., Estudillo and Otsuka 1999; Hayami and Kikuchi 2000). Alternatively, the CARP implementation could be seen as endogenous; the implementation of CARP was not

[22] We must note here, however, that this variable is defined only at the level of the 'region', which is a higher level aggregation of provinces (due to the absence of the provincial level observations of the land reform accomplishment), while our basic unit of observations is at the provincial level; thus, our results show that provinces within the regions of larger land reform implementation tend to grow faster.

random across regions but rather its implementation progressed faster in the areas with greater growth potentials. Indeed, Otsuka (1991) found that a higher yield increase in agriculture was a major determinant of the implementation of agrarian reform program in the period between 1970 and 1986.

4.2 Was non-agricultural sector growth a source of convergence?

The high rate of convergence across provincial incomes raises a question: what are the processes behind provincial income convergence? While a full investigation of this question would be beyond the scope of this paper, we made a few initial attempts to explore this question. Village-level studies in Luzon Island (mainly in the outskirts of the Metro Manila region), for example, document the spread of rural industries after the late 1980s (e.g., Hayami and Kikuchi 2000), suggesting a possibility that gradual spread of (rural) industrialization toward lower income provinces might have been a part of the process behind the regional catching-up. We find that the growth convergence pattern of non-agricultural incomes only is quite similar to the convergence pattern of the total income—with the estimated β-coefficient (based on equation (1)) of 0.106 (s.e. 0.0189)—while the relationship is much less clear in the case of the agricultural income growth—with the estimated β-coefficient of 0.0211 (s.e. 0.0098).[23] Furthermore, we find a moderate but statistically significant negative relationship between the initial *total* income level and the *growth* of non-agricultural income *share* (as measured by the ratio of the share of the non-agricultural income in 1997 to the share of the non-agricultural income in 1988), possibly indicating the gradual spread of industrialization toward lower income provinces in the 1990s.

In order to further examine how the growth in the share of the non-agricultural income affects the rate of provincial income convergence, we also re-estimated equation (3) by including an interaction term between the log initial income and the growth in the non-agricultural income share.[24] Surprisingly, the coefficient on the interaction term is positive and significant, indicating that the growth in the non-agricultural income share reduces (rather than increases) the rate of convergence, although the quantitative magnitude of such an impact is quite small. Thus, while we can observe the gradual spread of industrialization toward lower income provinces and also the positive (though modest) effects of the growth in the non-agricultural income share on the total income growth, such a process of the spreading industrialization does not appear to account for the high rate of provincial income convergence.[25] We will further investigate the processes behind the provincial income convergence in our future work.

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[23] Here, the agricultural income includes agricultural self-employment and wage incomes, while the non-agricultural income similarly includes self-employment and wage incomes from industrial and service sector activities. Included in neither of these two categories are rental, transfer (including remittances) and capital incomes.

[24] The detailed results are not reported here, but available from the authors upon request.

[25] We also re-estimated equation (3) with an additional interaction term between the initial income and one of the other initial conditions (i.e. mortality rate, literacy, land inequality, political dynasty, and irrigation),

5 Conclusions

The primary purpose of this paper has been to establish some basic facts about income inequality in the Philippines, with a special focus on the importance of spatial income inequality. Despite major fluctuations in macroeconomic performances the nationwide income inequality remained quite stable during the period between 1985 and 2000. As of 2000, the disparity in the mean income between the highest (Metro Manila) and the lowest (Western Mindanao) of the 13 regions was roughly three-to-one. Our findings suggest that spatial inequality accounts for a sizable but not overwhelming portion of the national-level income inequality, and that the relative importance of spatial inequality was declining over time. Our regression analysis finds, for example, that spatial inequality (the urban-rural disparity and mean income disparity across 13 regions) accounted for roughly 20 percent of the overall variations (explained by the model) in per capita incomes as of 1985, but the share declined to 11 percent in 2000. The rest of the variation was explained by such factors as the education of the household head, household composition, the economic sector of income sources and access to infrastructure (electricity). We further examined whether spatial income inequality has been increasing or decreasing in the Philippines. We find that the mean income levels across provinces were converging at a much faster rate than those observed in currently developed countries. Provincial income disparity in the Philippines has been on decline possibly due to the neoclassical convergence effects (diminishing returns to capital) and also due to some convergence in the steady-state income levels which are affected by human capital stock, political competition and land distribution, among others.

Based on our findings, it is tempting to immediately conclude that spatial inequality should not be high in policy agenda. However, Kanbur (2002) cautions, for example, that such policy conclusion should not be drawn before careful comparisons of policy instruments for addressing spatial (between-group) inequality and those addressing within-group inequality are made to examine which policy instruments could have a larger impact on inequality per dollar of public expenditure.[26] Apart from such a caveat, a major focus of attacking high inequality in the Philippines should perhaps be on the sources of within region inequality; we find that human capital stock and demographic composition and infrastructure access are major factors affecting within region income disparity.

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one at a time in separate regressions. None of these additional terms, however, is found to be statistically significant.

[26] See Elbers et al. (2003) for an additional cautionary note.

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