IS SPATIAL INCOME INEQUALITY INCREASING IN THE PHILIPPINES?

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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 the inequality in the Philippines is that development policy has favored the island of Luzon and discriminated against peripheral islands (provinces) of Visayas and (especially) Mindanao. Moreover, the poor performance of the Philippine economy over the last three decades has been attributed partly to the relatively large variation in access to infrastructure and social services between the major urban centers and rural areas (e.g., Ranis and Stewart 1993; Balisacan 1993a; Bautista 1997). Spatial variation in certain summary measures of human development is also evident (UNDP 1996, 2000).

If indeed spatial income disparities are at the core of the poverty and inequality problem in the Philippines, then policy reforms aimed at reducing these disparities have to be central elements of 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). Investment in physical infrastructure (like roads, communications and irrigation) in backward areas, or in the rural sector in general, may improve the productivity of private investment, influence fertility through its effect 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 erosion in the quality of life in urban areas through its effect on rural-urban migration decisions.

However, if disparity in incomes and human achievements *within* each of the regions or areas of the country were itself the major problem, a different approach to poverty reduction would have to be found. It is possible, for example, that systematic difference in 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, the policy prescription to reduce overall income inequality and poverty would have to involve expanding the access of the 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 (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?
- Is spatial inequality increasing in the Philippines during the period 1988-1997?
- What are the major sources of differential income growth across provinces in the Philippines?

The paper is organized as follows. The next section provides a general overview of income inequality in the Philippines such as trends in nationwide income inequality and some 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 inequality in the income is increasing over time in the Philippines, by examining the patterns of mean income growth across provinces. Section 5 further 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-bust growth characterizes 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, for most of the 1980s and early 1990s, the country acquired the unenviable image as Asia's "sick man." However, the growth episodes in the 1990s, notwithstanding the interruption in 1998 owing to 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, it could not be denied that 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, forthcoming).

Four distinct phases characterize the growth process since the mid-1980s.[1] The first is a brief period of economic growth (1986-89) following a 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, real mean living standard in 1988 was 10 percent higher than that in 1985, although arguably 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, mean living standard in 1991 managed to rise by approximately six percent of that in 1988. Very 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). Mean living standard in 1997 was

[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.

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 the slow recovery in the following year, mean per capita income (and possibly mean living standard) at the turn of the new millennium was just at the level reached at the beginning of the 1980s.

Table 1 also provides estimates of the summary measures of inequality in per capita consumption expenditure for the 1980s and 1990s. Despite the large fluctuations in the macroeconomic performances as discussed above, the level of income inequality, as measured by these summary indexes, remained remarkably stable. The level of inequality measured by the expenditure Gini ratio at the mid-1980s was 41.2%. After falling slightly to 40.0% in 1988, it rose to 42.8% in 1991 but then fell back again to the 1988-level in 1994. It then rose to 42.7% in 1997. Essentially the same pattern emerged for two other standard inequality indicators – Theil T and L – which are 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 income inequality in the Philippines. For example, Balisacan (1999b) shows that the observed changes in the 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 could even reverse the direction of the changes in the time trend in inequality.[2]

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 (1999b) observes that the Gini ratios of income inequality in the Philippines have indeed been 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

[2] According to Balisacan (1999b: 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.

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 is 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) are *much lower* than that of *any* Latin American country (Balisacan 1999b: 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 the national-level income inequality. More specifically, we address the issue of how much of the nationwide inequality can be accounted for by spatial inequality. To start with, one useful disaggregation of inequality data is the 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 overall poverty reduction goal.[3] Table 2 shows the mean living standard for the urban and rural sectors. High mean consumption disparity between urban and rural areas is apparent. Mean consumption in urban areas is nearly twice that in rural areas. 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.

[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, inter-year comparison within a decade is valid since the sampling frame and the rural-urban classification of geographic areas are common for these years.

Table 3 shows population shares and mean living standards for selected spatial characteristics (i.e., locality, region, and employment sector of household head). Clearly, average living standards vary substantially between urban and rural areas, as well as across regions. Metro Manila, which accounts for about 14 percent of the population, has the highest mean living standard. In 1997, its mean living standard was nearly twice the national average or about three times the mean living standard for Bicol and Eastern Visayas, the poorest regions of the country. Except for Bicol and Cagayan, 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 from 1985 to 1997. Central Visayas, for example, was the second poorest region in 1985, but it ranked the sixth poorest in 1997. Only Metro Manila maintained its relative positions during the period. An even greater disparity in living standard exists, however, among the various employment sectors. As can be expected, agriculture, which employs more than 40% of the labor force, has consistently had the lowest mean living standard among all sectors. Manufacturing and trade have almost twice agriculture's mean living standard. Utility and services have more than twice agriculture's mean expenditure. Finance, the richest sector, has 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. The common theme emerging from these discussions is that the 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 grossly inaccurate. While regional differences in mean living standards are substantial, the contribution of the between-group component to overall inequality is rather small (no more than 18 percent). This implies that removing between-group inequality by equalizing all regional mean incomes (but keeping within-group inequality constant by equi-proportionately changing the incomes of all members of that region) will reduce overall inequality by at most 18 percent. Conversely, removing within-region inequality by making everyone's income within a region equal to the mean for that region will reduce overall inequality by at least 82 percent.

Sources of Inequality Changes

As observed in Tables 3, the changes in living standards are accompanied by population shifts (i.e., relative changes in population shares), as well as changes in inequality within sub-population groups. 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. Following Tsakloglou (1993), the change in Theil *T* and Theil *L* can be decomposed into three components: (a) effects of intertemporal changes in within-group inequality, holding population shares and relative mean expenditures of the subpopulation groups constant; (b) effects of changes in population shares on within-group inequality and relative mean expenditures; and (c) effects of changes in relative group means on overall inequality.

Table 5 show the results of the decomposition for the two inequality indices using three sub-population groupings: (1) locality, i.e. whether urban or rural; (2) region; and (3) sector of employment. When disaggregation is based on 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 to 1991 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 biggest share (although less than three-fourths) in the total inequality change, except for the Theil *L* index from 1985 to 1988 where the bulk of the change was accounted for by the change in mean regional living standard. When disaggregating by sector, the change in within-group inequality contributes from three-fourths (1994 to 1997) to the entire (1985 to 1988) 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 incomes, in relative population shares, or both.

3.2. Relative Importance of Spatial Inequality: a regression analysis

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 cases where many of these factors have to be treated jointly rather than individually. More importantly, the *relative* contribution of each of the factors in

explaining the level of inequality is sensitive to the inequality measure employed (Fields 1997). In the next step in our inquiry, therefore, we follow a parametric procedure to systematically explore the contributions of each of these factors to the observed variation in household welfare (or living standards). Specifically, 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 standard.[4] Table 6 shows the regression results, including the shares accounted for by the location and household-specific attributes in the total variance explained by the model, for 1985 and 1997 FIES.[5]

The regression results show that the household head's educational attainment and experience (proxied by the household head's age) positively influence household welfare, irrespective of the survey year. Households headed by males have lower welfare levels than those headed by females, holding other factors constant. Household size negatively influences household welfare. And so does the proportion of children in household, all other things remaining the same. But household size positively affects welfare if household members are employed. Together, household composition and the household head's attributes, most especially educational attainment, explain one half of the variance explained by the model.

Employment sector contributes only a relatively small proportion (less than 10 percent) of the variance explained by the model. This suggests that it is differences in welfare levels within a sector, rather than differences in mean welfare levels between sectors, that accounts for a significant proportion of the variation in household welfare nationally. Nonetheless, employment in agriculture is negatively associated with household welfare. This factor in fact contributes the bulk of the variance explained by the employment-dummy variables. Infrastructure, represented by access to electricity, is another major contributor to

[4] The regression is of the form $\ln y_{it} = a_t + b_t X + e_t$, 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* is a vector of explanatory variables. This form is a standard formulation of earnings function in the human capital literature (see Mincer 1974; Atkinson 1983). Following Litchfield (1999), the relative contribution of each factor to the differences in household living standards can then be estimated as: $s_j = \mathrm{cov}[a_t Z_t, Y] / s^2(Y) = a_t * s(Z_t) * cor[Z_t, Y] / s(Y)$, where *a* is the vector of coefficients (*a*, ß), *Z* is the vector of explanatory variables plus a constant (1, X_i), and *Y* is log *y*.

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

the variance explained by the regression model. This variable accounts for 20-24 percent of the variance explained.

Returning to our main focus, spatial inequality, our regression result confirms that households located in urban areas tend to have higher welfare levels than those in rural areas, and that households in regions other than Metro Manila have lower welfare levels than those in the capital region, all else remaining the same. Location (both rural/urban disparity and regional disparities taken together) accounted for 20 percent of the total variations in the per capita consumption expenditure in 1985, of which 6 percent of the variation is explained by urban/rural disparity and 14% by regional dummies. Eighty percent of the nationwide variations in the mean expenditure is explained by the combination of intra-regional factors such as education of the household head, household composition, sector of economic activities and access to electricity. In addition, the relative contribution of the regional disparity to the nationwide inequality declined between 1985 and 1997; the variation in the living standard attributed to regional disparities declined from 14% in 1985 to 9% in 1997. In contrast, the relative importance as a source of living standard variation of collage education, of household composition, and the 'economic attributes' increased during the same period.

In sum, our regression analysis generally confirms our earlier findings that spatial disparity (i. e., mean income disparity across regions) is a relatively small source of nationwide income inequality accounting for roughly 20% at most of the overall inequality. A larger proportion of the income inequality is explained by intra-regional factors such as the household characteristics, economic sector, and access to infrastructure. Furthermore, we find that the relative importance of the regional disparity as a source of the overall income inequality declined between 1985 and 1997.

4. Is Income Inequality Increasing across Provinces in the Philippines?: absolute income convergence result[6]

In the previous section, we observed that spatial income inequality is a sizable but *not* an overwhelming source of nationwide income inequality in the Philippines, accounting for roughly 20 percent of the total variation. Nevertheless, if spatial inequality is on the rise,

then it is possible that such inequality will become an increasingly important source of income inequality at the national-level. Thus, 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 across provinces in the Philippines was converging.

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 and 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 2 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. The unit of observation here is each of the 72 provinces. We can observe a clear pattern of absolute convergence during the period. We have then replicated the study by Barro and Sala-i-Martin (1992, 1995) on the regional growth convergence in the United States, Europe and Japan for the case of the Philippines by estimating what they called the 'Beta convergence' coefficient. Following Barro and Sala-i-Martin (1995: Chapter 11) we estimated the following equation by non-linear least square (NLLS) estimation.

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

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

[6] The next two sections draw heavily on Balisacan and Fuwa (forthcoming).

initial year (1988), $PCEXP97_i$ is the level of per capita expenditure for province i in the end year (1997), and u_i is the error term.[7] The β is the 'beta convergence' coefficient indicating the annual rate of convergence. Our estimated 'Beta convergence' coefficient for the Philippines during the period 1988-1997 is 0.107.[8]

Table 8 compares our estimate from the Philippines with the estimated rates of convergence from historical data in the United States, 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 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%, 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%, 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). 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 (Figure 3).

[7] 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, Casseli *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).

[8] If we include the province of Sulu, which appears to be an outlier (see Figure 2), the estimated 'Beta convergence' coefficient is 0.114.

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.

5. Determinants of Provincial Mean Income Growth

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 section, 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:

$$Dy = f(y, y^{*}), \qquad (2)$$

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.[9] The 'target value' y^{*} presumably depends on an array of variables representing the initial conditions (economic and political/institutional) and policy choices. We estimated an empirical specification of the following form:

$$GRPCEXP_i = a + b\log(PCEXP88_i) + \Sigma c_k X_{ik} + u_i, \qquad (3)$$

[9] 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 and u_i is the error term. We initially included the following variables as the potential explanatory variables[10]:

(1) Initial economic conditions: mortality rate per 1000 of children aged 0-5; simple adult literacy rate; proportion of irrigated farm area to total farm area; Gini ratio of farm distribution.[11]

(2) Initial political characteristic: political 'dynasty' (proportion of key provincial officials—governors, vice governors, and district-level representatives to the House of Representatives—related to each other by blood or affinity, as a proxy for political competitiveness).

(3) Time-Varying Policy variables (difference between 1988 and 1997)[12]: agricultural terms of trade (the ratio of implicit price deflator for agriculture to implicit price deflator for non-agriculture); electricity access (the proportion of households with electricity); road density; Comprehensive Agrarian Reform Program(CARP) implementation (the proportion of cumulative CARP accomplishments—i.e., cumulative area acquired and distributed to tenants and landless workers—to 1990 potential land reform area).

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.

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

[10] Cross-section growth regressions are potentially subject to endogeneity bias (e. g., Caselli *et al*. 1996). We would expect, however, that land distribution and 'political dynasty' are reasonably stable over time and thus likely to be relatively less 'endogenous.' We discuss below the potential endogeneity of land reform.
[11] See Table 7 for variable definitions, descriptive statistics and data sources.

standard deviation increase in the gini coefficient in land distribution is associated with a 0.7 percentage point increase in growth rates.[13] Our finding thus suggests that there may be a disturbing trade-off between social equity and growth. This implies that mean income convergence, as we saw earlier, was accompanied by faster income growth occurring in the provinces where initial inequality in land distribution was higher. While our result appears consistent with Forbes's (2000), the latter focuses on the relationship between initial *income* inequality and growth and our finding on the positive effects of the initial *land* inequality is more difficult to interpret (e.g., Deininger and Squire 1998).

There are, however, a few theoretical models that predict positive relationships between higher inequality and higher growth, at least in the short-run, including Bénabou (1996) and Galor and Tsiddon (1997). Bénabou (1996), for example, shows that in the presence of complementarity among individuals' human capital at both community (through peer effects, neighborhood effects, local school financing) and at the economy-wide levels (e. g., higher productivity if workers and managers share similar social background) then segregated (and more unequal) societies can experience higher rates of growth in the short-run. Galor and Tsiddon (1997) demonstrates that inequality increases during periods of technological inventions, which by enhancing mobility will generate higher rates of growth.

Apart from such potential theoretical explanations, it may be the case that there emerged (possibly temporary) productivity differentials between small and large farms during our observation period. While it has generally been well documented that economies of scale do not operate in most of the developing agriculture, including that of the Philippines (e. g., Binswanger, Deininger and Feder 1995, Hayami, *et al.* 1990), Hayami and Kikuchi (2000) have recently reported some evidence of significantly higher per-hectare rice yields among

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[12] Agricultural terms of trade and CARP are defined at the 'regional' level, a higher-level aggregation of provinces, due to lack of data.

[13] 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.

larger farms than among smaller farms in an East Laguna village as of 1995, presumably due to the introduction by the larger-scale farmers of pump irrigation (which requires a relatively large amount of initial outlay in the absence of rental markets) following the rapid deterioration of the national irrigation system serving the village, although they had found no evidence of such scale-based productivity differentials in their earlier observation periods.[14] If rental markets for irrigation pumps are to develop, however, as the tractor custom-services markets have, then such productivity differentials across different farm sizes are likely to disappear (Hayami and Kikuchi 2000). If similar explanation can apply in a wider context of our empirical findings, then it is possible that the relationship we found may not hold in the long run. Similarly, recent theoretical as well as empirical studies suggest differential implications of inequality-growth relationships between the short-run and the long-run (e. g., Bénabou 1996, Forbes 2000, Banerjee and Duflo 1999). As a result, we should perhaps be cautious in drawing a definitive policy conclusion at this point regarding the trade-off between growth and equity.

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 sub-optimal policy choices in the Philippine government and thus to the relatively poor economic performances compared to those of its Asian neighbors (e. g., Balisacan, Fuwa and Debuque 2001, Hutchcroft 1998, Montes 1991). Our results show that the provinces where provincial politics is dominated by closely related families and relatives tend to grow at a slower rate than the provinces where such relations among officials are weaker.

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

[14] We should note, however, that their threshold level distinguishing 'larger' and 'smaller' farms is a quite low level of 2 hectares.

associated with 0.7 percentage point increase in annual growth in per capita expenditures.[15] 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 re-distributed 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 1999). Alternatively, the CARP implementation could be seen as endogenous; the implementation of CARP was not 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.

As we saw earlier, there is a strong convergence property among provincial income growth; now controlling for the factors affecting the steady-state level of per-capita income, the estimated conditional rate of convergence is 8.5 percent per year (while the unconditional rate of convergence was 10.7%). This appears to suggest that not only is the conditional convergence occurring given the steady-state level of income for each province but the steady-state income 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 income convergence, the rest (2.2 percentage points) is accounted for by the change in the steady-state income levels, which in turn is determined by the human capital stock, political competitiveness, land distribution inequality, and land reform implementation.

6. 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

[15] 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.

question would be beyond the scope of this paper, one way of approaching this question is to disaggregate income growth by sectors, as suggested by Bernard and Jones (1996). 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). This suggests that a gradual spread of (rural) industrialization toward lower income provinces might have been a part of the process behind the regional catching-up. We have therefore made a crude initial attempt to explore the possible linkage between sectoral income composition and income convergence. Figure 4 shows the relationship between the initial mean income (in 1988) and the subsequent growth rate disaggregated between agricultural income and non-agricultural incomes.[16] We find that the growth convergence pattern of non-agricultural incomes is quite similar to the convergence pattern of the total income (Figure 2) —with the estimated β-coefficient based on equation (1) of 0.106 (s.e. 0.0189). On the other hand, the relationship is much less clear in the case of the agricultural income growth, although there still is a significantly negative relationship with the estimated β-coefficient based on equation (1) of 0.0211 (s.e. 0.0098). Furthermore, as shown in Figure 5, there is 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.

We next re-estimated equation (3) by introducing the growth in non-agricultural income share as an additional explanatory variable as shown in Table 10, column (a).[17] We find a significantly positive association between the increase in the share of the non-agricultural income and the total income growth; our result indicates that a standard deviation increase in the share of non-agricultural income is associated with a modest 0.4 percentage point increase in annual per-capita growth rate controlling for the initial income level and other significant determinants of the steady-state income level. In order to further examine

[16] 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.

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 instead an interaction term between the log initial income and the growth in the non-agricultural income share as reported in Table 10, column (b). Surprisingly, the positive and significant coefficient on the interaction term indicates that the growth in the non-agricultural income share reduces (rather than increases) the rate of convergence. The quantitative magnitude of such an impact, however, is quite small; the impact of a standard deviation increase in the growth in the non-agricultural income share is only less than a 0.1 percentage point change in the rate of convergence.

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, typically observed in the surrounding regions of Metro Manila, does not appear to account for the high rate of provincial income convergence.[18] We will further investigate the processes behind the provincial income convergence in our future work.

7. 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 1997. As of 1997 the disparity in the mean income between the highest (Metro Manila) and the lowest (Eastern Visayas) of the 13 regions was roughly three to one. Our findings suggest that spatial inequality accounts for a sizable but not an 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

[17] Coefficients are estimated by OLS since we found in estimating equation (3) that results were nearly identical between OLS and instrumental variable estimates.

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

mean income disparity across 13 regions) accounted for 20% of the overall variations (explained by the model) in per capita incomes as of 1985, but the share declined to 14% in 1997. The rest of the variations were explained by such factors as the education of the household head, household composition, the economic sector of income sources and access to infrastructure (electricity). This suggests that the inequality *within* region tends to be a more important source of overall inequality than is the inequality *across* regions. We further examined whether spatial income inequality is 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.

Our overall conclusion about spatial income inequality in the Philippines, therefore, is that spatial inequality is increasingly less of a major concern as a source of overall income inequality, which remained at a high level and stable since the mid-1980s. Main focus of attacking such high inequality in the Philippines should thus 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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Table 1
Living standard and inequality, 1985-1997

	1985	1988	1991	1994	1997
Mean living standard (at 1997 prices)	17,197	18,926	20,049	19,600	23,694
Inequality					
Gini	0.412	0.400	0.428	0.397	0.427
Theil T	0.330	0.298	0.363	0.302	0.376
Theil L	0.282	0.264	0.306	0.260	0.303

Note: Living standards are defined as household consumption expenditures adjusted for family size and provincial cost-of-living differences. Poverty estimates are based on spatially fixed poverty norm and on per capita consumption expenditures adjusted for provincial cost-of-living differences (see Balisacan 1999a for details).

Source: Author's estimates, based on *Family Income and Expenditures Survey* data.

Table 2
Living standard and inequality, by locality, 1985-1997

	1985	1988	1991	1994	1997
Urban					
Mean living standard (at 1997 prices)	24,099	26,283	26,213	25,093	31,657
Inequality					
Gini	0.410	0.390	0.421	0.392	0.425
Theil T	0.327	0.286	0.355	0.295	0.379
Theil L	0.280	0.253	0.300	0.255	0.303
Rural					
Mean living standard (at 1997 prices)	12,838	14,414	13,864	14,154	16,475
Inequality					
Gini	0.352	0.350	0.359	0.336	0.352
Theil T	0.226	0.217	0.238	0.205	0.230
Theil L	0.204	0.200	0.211	0.183	0.202

Notes: Poverty and inequality estimates are based on per capita consumption expenditures adjusted for provincial cost-of-living differences. Poverty lines employed to calculate poverty indices are the spatially fixed norms reported in Balisacan (1999a).

Table 3
Population shares and mean living standards

	Population share		Average living standard				
	1985	1997	1985	1988	1991	1994	1997
Philippines	100.0	100.0	17,197	18,926	20,049	19,600	23,694
A. Locality				*(Urban 1997=100)*			
Urban	38.7	47.5	76.1	83.0	82.8	79.3	100.0
Rural	61.3	52.5	40.6	45.5	43.8	44.7	52.0
B. Region				*(Metro Manila 1997=100)*			
Metro Manila	14.0	14.1	64.7	69.4	79.5	77.4	100.0
Ilocos	7.2	6.9	41.0	41.9	45.1	42.7	53.5
Cagayan	4.6	4.4	35.3	36.8	37.9	40.7	44.3
Central Luzon	9.9	10.3	53.6	56.7	61.0	44.8	54.2
Southern Luzon	12.5	13.4	43.1	47.3	53.9	46.8	55.3
Bicol	6.8	7.0	26.2	29.3	27.9	33.6	38.5
Western Visayas	8.9	8.6	38.3	42.4	45.0	44.1	52.8
Central Visayas	7.6	7.2	27.2	33.8	36.2	38.8	46.7
Eastern Visayas	5.4	5.1	27.4	31.5	32.2	31.0	35.5
Western Mindanao	5.1	5.2	30.6	36.2	33.8	32.2	39.7
Northern Mindanao	6.1	5.9	32.5	39.4	34.1	41.1	52.9
Southern Mindanao	7.3	7.1	30.9	36.0	32.6	47.6	50.8
Central Mindanao	4.5	4.9	37.4	42.3	36.9	38.0	42.0
C. Sector				*(Agriculture 1997=100)*			
Agriculture	47.3	40.1	79.5	86.7	86.6	87.6	100.0
Mining	0.8	0.6	109.7	105.9	114.4	137.2	133.6
Manufacturing	7.0	7.0	136.2	151.7	163.8	170.3	194.2
Utility	0.5	0.7	167.8	229.0	187.7	190.7	251.5
Construction	4.9	7.7	103.3	111.7	126.1	106.0	138.0
Trade	8.0	8.8	145.2	161.5	176.1	171.2	199.0
Transportation	6.1	8.0	129.4	131.4	143.6	140.9	163.6
Finance	1.8	1.9	235.4	257.4	293.1	258.2	394.6
Services	12.1	12.5	160.9	182.5	192.0	184.6	229.7
Unemployed	11.4	12.7	160.2	170.1	184.7	172.0	201.7

Note: Average living standard is mean per capita consumption expenditure adjusted for provincial cost-of-living index, as estimated in Balisacan (1999a). Mean living standard in 1997 for urban areas, Metro Manila, and agriculture are 31,657 pesos, 42,367 pesos, and 14,886 pesos, respectively.

Table 4
Decomposition of expenditure inequality indices

	1985	1988	1991	1994	1997
National Inequality					
Theil T	0.330	0.298	0.363	0.302	0.376
Theil L	0.282	0.264	0.306	0.260	0.303
Gini	0.412	0.400	0.428	0.397	0.427
*Within-Group Contribution to Aggregate Inequality (%)**					
A. Locality (urban/rural)					
Theil T	85.1	85.0	86.7	86.9	86.3
	(14.9)	(15.0)	(13.3)	(13.1)	(13.7)
Theil L	82.8	83.4	83.7	84.4	82.5
	(17.2)	(16.6)	(16.3)	(15.6)	(17.5)
B. Region					
Theil T	86.5	88.1	84.8	87.5	86.7
	(13.5)	(11.9)	(15.2)	(12.5)	(13.3)
Theil L	84.6	87.0	82.4	86.5	84.9
	(15.4)	(13.0)	(17.6)	(13.5)	(15.1)
C. Sector					
Theil T	83.7	81.6	82.4	81.5	82.1
	(16.3)	(18.4)	(17.6)	(18.5)	(17.9)
Theil L	80.9	79.3	78.7	78.1	77.9
	(19.1)	(20.7)	(22.3)	(21.9)	(22.1)

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

Source: Author's estimates, based on various FIES data.

Table 5 Decomposition of inequality change

Period		Index of inequality	Change in inequality due to change in*			Total Change
			Within-group inequality	Population share	Mean group expenditure	
1985-88	Locality	Theil T	-2.60 (81.97)	-0.07 (2.09)	-0.51 (15.95)	-3.18
		Theil L	-1.29 (71.94)	-0.06 (3.49)	-0.44 (24.57)	-1.80
	Region	Theil T	-2.30 (72.56)	-0.01 (0.45)	-0.86 (27.00)	-3.18
		Theil L	-0.84 (46.78)	-0.03 (1.49)	-0.93 (51.73)	-1.80
	Sector	Theil T	-3.38 (104.99)	-0.11 (3.43)	0.27 (-8.42)	-3.18
		Theil L	-2.00 (107.96)	-0.08 (4.06)	0.22 (-12.02)	-1.80
1988-91	Region	Theil T	4.33 (66.83)	-0.02 (-0.37)	2.17 (33.54)	6.48
		Theil L	2.18 (52.79)	-0.01 (-0.21)	1.96 (47.42)	4.15
	Sector	Theil T	5.26 (80.96)	0.06 (0.95)	1.18 (18.09)	6.48
		Theil L	3.07 (73.42)	0.04 (1.04)	1.07 (25.53)	4.15
1991-94	Locality	Theil T	-5.02 (82.58)	-0.02 (0.30)	-1.04 (17.13)	-6.08
		Theil L	-3.65 (79.11)	-0.02 (0.41)	-0.94 (20.49)	-4.61
	Region	Theil T	-4.43 (72.76)	-0.02 (0.37)	-1.64 (26.87)	-6.08
		Theil L	-2.72 (59.19)	-0.02 (0.52)	-1.85 (40.29)	-4.61
	Sector	Theil T	-5.11 (84.04)	-0.06 (1.04)	-0.91 (14.92)	-6.08
		Theil L	-3.84 (83.28)	-0.01 (0.14)	-0.77 (16.58)	-4.61
1994-97	Locality	Theil T	6.23 (84.12)	-0.18 (-2.37)	1.35 (18.26)	7.40
		Theil L	3.26 (75.63)	-0.16 (-3.77)	1.21 (28.14)	4.31
	Region	Theil T	5.99 (80.74)	0.08 (1.14)	1.34 (18.12)	7.40
		Theil L	3.23 (75.10)	0.06 (1.30)	1.02 (23.60)	4.31
	Sector	Theil T	5.71 (76.93)	0.11 (1.55)	1.60 (21.52)	7.40
		Theil L	3.11 (72.33)	0.07 (1.63)	1.12 (26.04)	4.31

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

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

Attribute	1985 Regression coefficient	1985 t-stat	1985 Contribution to variance explained	1997 Regression coefficient	1997 t-stat	1997 Contribution to variance explained
Constant	9.566	159.31		9.791	227.32	
Household head			27.9			32.3
Age	0.007	3.44	3.1	0.009	6.51	3.1
Age Squared	0.000	-2.86	-2.6	0.000	-5.66	-2.7
Male	-0.061	-3.39	0.7	-0.046	-3.65	0.6
Married	0.066	3.81	-0.6	0.066	5.68	-0.7
Elementary	0.100	9.84	-1.3	0.105	14.52	-2.2
High school	0.293	26.68	6.5	0.333	38.04	7.8
College	0.879	44.86	22.1	0.918	58.25	26.5
Household composition			24.3			26.3
Family size	-0.068	-31.86	10.9	-0.072	-44.15	12.4
Child dependency	-0.539	-23.31	11.7	-0.462	-26.77	10.2
Household members employed	0.189	8.11	1.6	0.271	15.92	3.7
Economic attributes			4.1			7.6
Economic sector dummies			5..5			7.0
Class-of-worker dummies			2.1			0.4
Unemployed	0.035	1.07	0.5	0.016	0.66	0.2
Infrastructure			*23.7*			*19.6*
Electricity	0.381	39.77	23.7	0.370	51.64	19.6
Location			*20.1*			*14.2*
Urban	0.136	13.67	6.3	0.109	15.93	5.1
Regional dummies			13.7			9.0
Sample size	16,971			39,520		
R squared	0.544			0.569		
F-ratio	438.87			914.12		

Note: Estimation takes into account sampling design effects, i.e., stratification and weights. For brevity, details of dummy variables representing sector of employment (9 sectors), class of worker (10 classes), and region of residence (13 regions) are not shown (but are available from the author upon request).

Table 7
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 dencity[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 by 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).

Table 8.
Estimated Beta-convergence Coefficients of Regional Income Growth Convergence

Country and period	Estimated beta coefficient
Philippines	
1988-1997	**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

[*]: estimate based on all provinces except 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).

Table 9
Determinants of Provincial Growth Regression Results: instrumental variable estimation results (t-ratios in parentheses)

Dependent variable = annual growth rate of mean consumption per capita

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	65	70

[1]Per capita income used as instrument. (see footnote 9 in text)
[2]Outlier observation (Province of Sulu) excluded.
*: statistically significant at 10% level; **: statistically significant at 5% level.
Data 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 Coordination Board; [8]Department of Public Works and Highway.

Table10.
Non-agricultural Sector Growth and the Regional Income Growth[1]
(OLS: t-ratios in parentheses)

Dependent variable = annual growth rate of mean consumption per capita		
Independent variables:	(a)	(b)
Initial conditions:		
Log(pcexp88)	**-0.0795(10.29)****	**-0.0817(11.13)****
Non-ag. income growth*Log(pcexp88)		**0.0019 (1.89)***
Non-ag. income growth	**0.0176 (1.86)***	
Mortality rate	**-0.0006 (-4.21)****	**-0.0006 (-4.24)****
Dynasty	**-0.0181 (-1.80)***	**-0.0181 (-1.80)***
Land gini	**0.0012 (-3.60)****	**0.0012 (-3.60)****
Policy variables:		
Chg. CARP	**0.0054 (2.76)****	**0.0053 (2.76)****
Constant	0.7569 (8.67)	0.7781 (9.49)
Adj. R-squared	0.7076	0.7082
Sample size	70[2]	70[2]

[1]Outlier observation (Province of Sulu) excluded.
[2] Provinces where at least one explanatory variable is missing are excluded.
*: statistically significant at 10% level; **: statistically significant at 5% level.

Figure 1
Per capita GDP and living standard, 1980s and 1990s

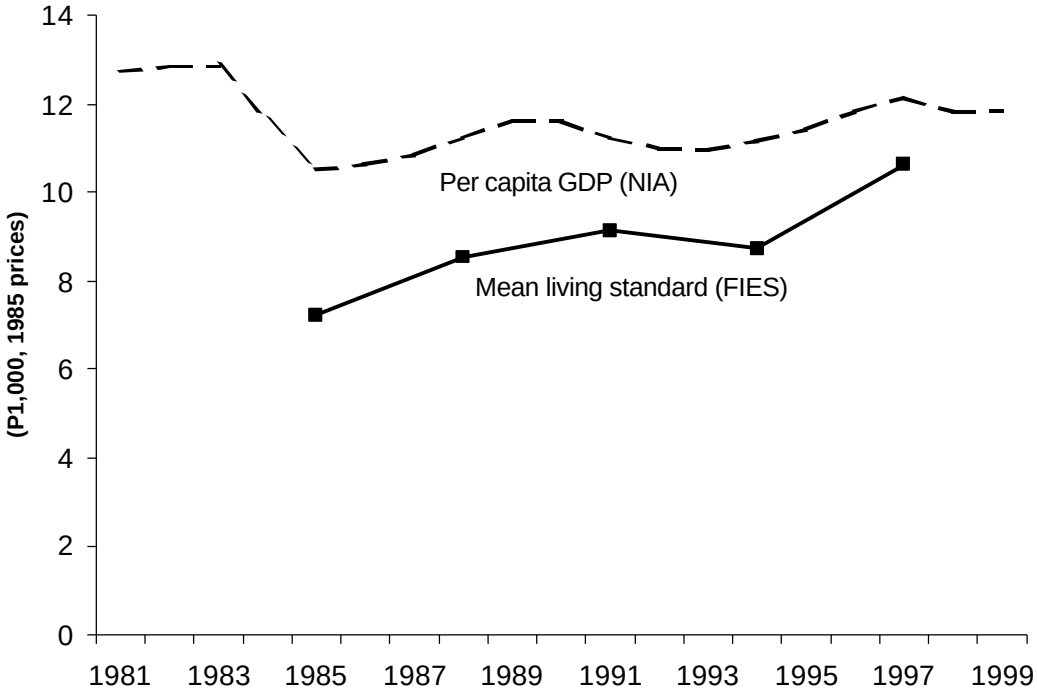
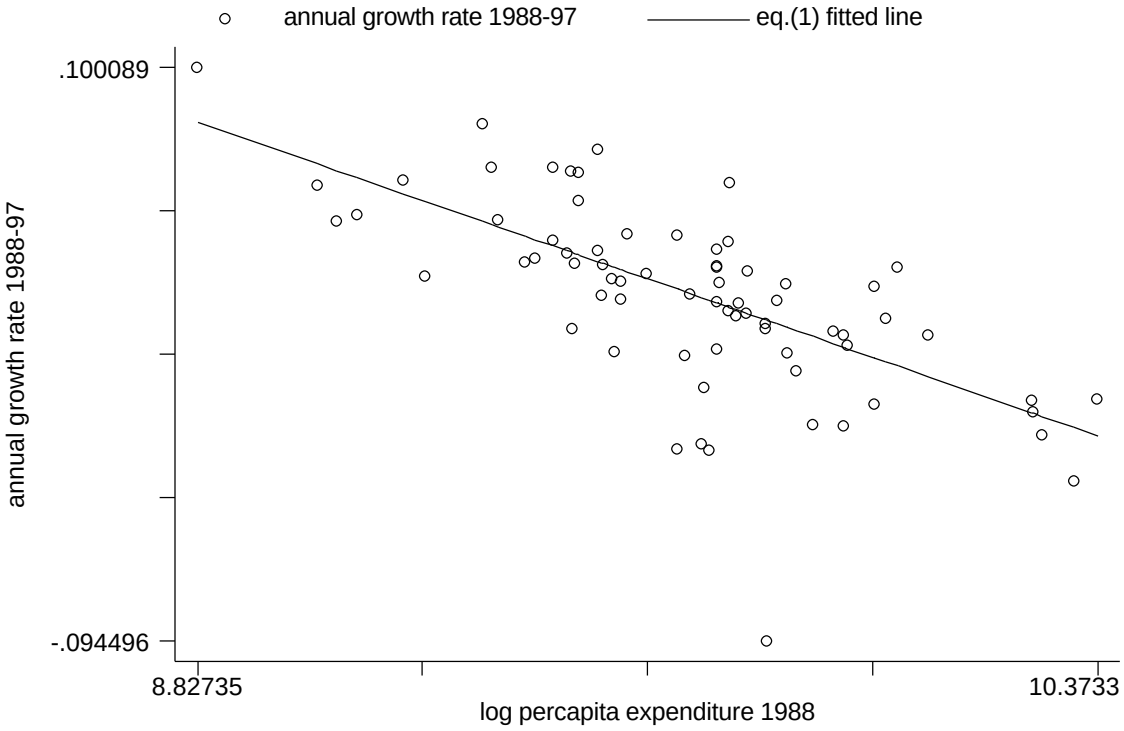
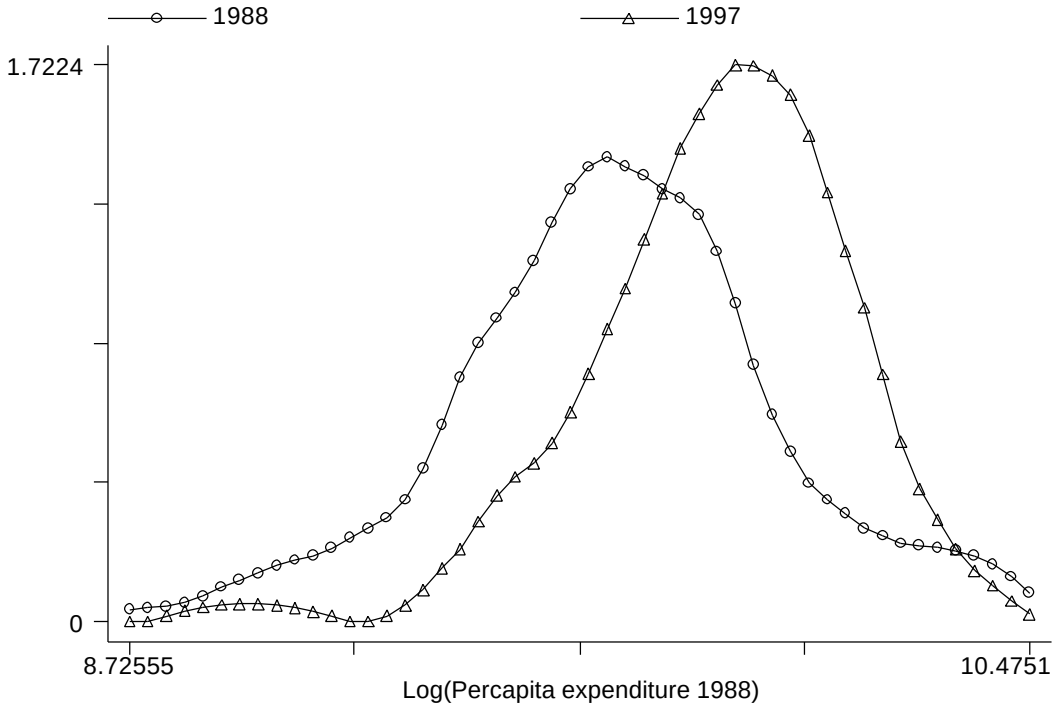


Figure 2
Absolute Convergence among Provincial Income Growth



* The outlier observation at the middle bottom is that of the province of Sulu.
(source: Family Income and Expenditure Survey)

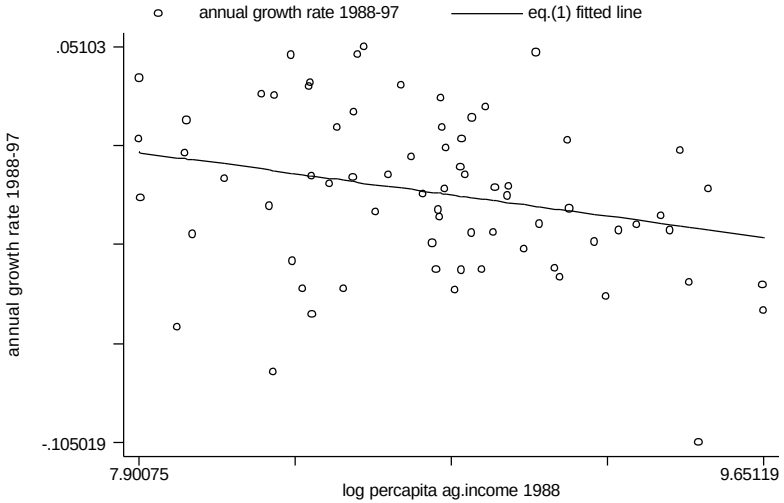
Figure 3. Kernel Density of Log of Per Capita Expenditures: 1988 vs. 1997



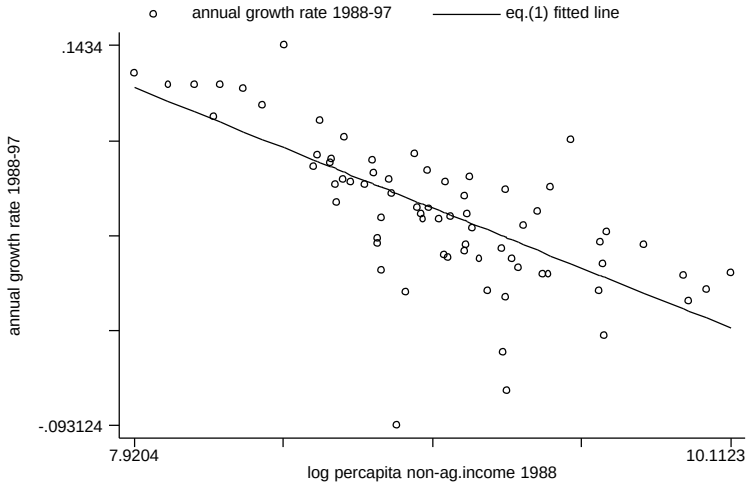
(source: Family Income and Expenditure Survey)

Figure 4. Provincial Income Convergence: Agricultural vs. Non-agricultural Income

(a) Agricultural income only



(b) Non-agricultural income only



(source: Family Income and Expenditure Survey)

Figure 5. Initial Per-capita Expenditures and Non-agricultural Income Share Growth[1]

[1] non-agricultural income growth = share of non-agricultural income in 1997/share of non-agricultural income in 1988.
(source: Family Income and Expenditure Survey)