Growth, Inequality, Politics and Poverty Reduction in the Rural Philippines, 1988-1997*

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I. Introduction

The country paper on the Philippines (Balisacan, Debuque and Fuwa 2001) noted that the rural poverty reduction performances in the Philippines lagged far behind those of Indonesia and Thailand. It also noted, however, that, in contrast with the relatively slow poverty reduction despite aggregate national income growth during the 1970s, poverty reduction in the rural Philippines did accelerate significantly after the mid-1980s through the 1990s. This paper focuses on the period of accelerated poverty reduction in the Philippines and seeks to understand the interactions among economic growth, inequality in land distribution and poverty reduction. We will attempt to characterize the patterns of growth and poverty reduction in the rural Philippines during the period between 1988 and 1997 by: (1) estimating internationally comparable measures of income growth (such as the rate of provincial convergence) and of poverty reduction (such as the growth elasticity of poverty reduction); and (2) estimating determinants of provincial growth and poverty reduction. The issues that we will address in this paper are:

1. Is there 'absolute convergence' among provinces? If so, how fast are provinces converging compared to the historical experiences in currently developed countries?
2. Does initial inequality hurt subsequent income growth and poverty reduction?
3. Does the 'oligarchic' political system that characterizes the Philippine politics hurt growth and poverty reduction?
4. What policy measures have significant impact on growth and poverty reduction?
5. How responsive has the poverty reduction been to economic growth in the rural Philippines?

Since the aggregate income growth is a major determinant of the pace of poverty reduction, we first examine the patterns of provincial mean income growth between 1988 and 1997. There are surprisingly large variations in growth experiences across provinces during this period; as we can see in Table 1, for example, the average annual growth rates of per capita expenditures in rural areas across provinces range between -9.6% and 10.9%. Based on the standard framework of the neoclassical growth model (e. g., Barro and Sala-i-Martin

* Prepared for the World Bank study: "Dynamism of Rural Sector Growth: Policy Lessons from East Asian Countries." The authors would like to thank Sharon Faye Piza and Rashiel Velarde for excellent research assistance. The views expressed in this paper are those of the authors and should not be attributed to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent.

1995) our examination of the growth episode starts with the estimation of the rate of convergence across provinces. We examine the patterns of 'convergence property,' as predicted by standard neoclassical growth models, across provinces in conjunction with the historical experiences of currently developed countries, such as the United States, Europe and Japan, by asking how much faster or slower the provinces in the Philippines were converging during our observation period.

We next seek to explain the variations among provincial rural mean expenditure growth rates; following again the familiar neoclassical growth model approach, we examine the effects of the initial human capital stock and of the inequality in the initial land distribution on subsequent growth rates. While the recent conventional wisdom tends to support the view that 'initial inequality hurts subsequent aggregate growth' (e. g., Pearsson and Tabelini), this issue remains an unsettled controversy in the cross-country empirical literature and thus deserves greater scrutiny; we tests this hypothesis in the provincial growth context in the Philippines. In addition, in light of the emphasis on the negative effects of the 'oligarchic' or non-competitive political system in the Philippines on the choice of growth enhancing policies in the country paper (which is based on the recent economics literature as well as on a large set of political science literature), we also attempt to examine the link between the political characteristics and growth; in particular we test, within the same growth regression framework, the hypothesis that the lack of competitive political regime (such as the dominance of the provincial politics by officials closely related with each other) hurts aggregate income growth in the province. Within the same framework, we also attempt to examine whether and how some of the government policy measures affected the differential income growth across provinces. For example, as was argued in the Philippine country report (Balisacan, Debuque and Fuwa 2001), one of the major factors that likely affected the rural development and poverty reduction performances in the Philippines appears to be the persistent policy of industrial protection which, by depressing the relative price of agricultural products, functioned as disincentive to agricultural sector development (especially by small farmers); we seek to examine the effects of such policies as reflected in the change in the agricultural terms of trade. In addition, we also examine the effects of other important policy measures mentioned in the country paper such as infrastructure investments and the implementation of the Comprehensive Agrarian Reform Program (CARP).

As the next step, we employ the same reduced form framework in our attempt to explain the variations across provinces of the rate of rural poverty reduction between 1988 and 1997. We use the same set of explanatory variables of initial economic conditions (including the initial level of per capita expenditures), initial political conditions and policy variables, as discussed in the previous paragraph, in assessing the determinants of the pace of rural poverty reduction. Finally, we attempt to examine the quantitative relationship between the aggregate income growth rate and the rate of poverty reduction. Balisacan, Debuque and Fuwa (2001) noted that in the Philippines such linkage appeared to be relatively weak compared to other Asian countries when we look at the entire period of the past forty years but it also noted that there appeared to be a relatively stronger linkage between aggregate growth and poverty reduction after the mid-1980s than the previous period (see also Balisacan 1998). We attempt to examine how such a presumably stronger linkage after the

mid-1980s between growth and poverty reduction *in the Philippine standard* compares with the *international standard*.

As we can see in the subsequent sections, some of our findings are in accordance with the recent conventional wisdom (such as the 'convergence property'), but others run directly counter to them (such as the relationship between inequality and growth, and between inequality and poverty reduction). Some of the latter type of findings are quite puzzling and thus raise more questions than answer them. In the concluding section we discuss some areas for future research based on our present findings as well as a few policy implications.

The paper is organized as follows; section II reports on the patterns of provincial growth 'convergence' and its comparison with historical experiences from the US, Japan and Europe). Section III seeks to explain differential rural income growth rate across provinces using the familiar growth regression framework. Section IV employs the same framework in an attempt to identify some determinants of the rate of rural poverty reduction across provinces. Section V examines the quantitative relationship between mean income growth and the rate of poverty reduction. And the final section summarizes our findings and concludes the paper.

II. Absolute Convergence in Provincial Growth

As is well known, the neoclassical growth model (due to its assumption of diminishing returns on capital) predicts that the lower the starting level of real per capita income, the higher is the predicted growth rate (the convergence property). Since national economies differ considerably —in terms of the propensities to save and to have children, willingness to work, access to technology and government policies, 'convergence' can occur only in a conditional sense. Within an economy, however, since these factors are relatively similar among different parts of the country, 'absolute convergence' is more likely to be observed—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 1995).

Figure 1 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 rural Philippines. The unit of observation here is each of the 72 provinces. It appears clear that the force of absolute convergence was in operation during the period in the Philippines. As a next step, we have followed the study by Barro and Sala-i-Martin (1992, 1995) on the regional growth convergence in the United States, Europe and Japan by estimating what they called the 'Beta convergence' coefficients. Following in particular Barro and Sala-i-Martin (1995: Chapter 11) we estimated the following equation by non-linear least square (NLLS) estimation.

$$(1/T)\log(y_{iT}/y_{i0})=a - [(1 - e^{-\beta T})/T]\log(y_{i0}) + u_{i0,T} ,$$

where T is the number of years between the two data points (in our case T = 9), y_{i0} is the level of per capita expenditures for province i in the initial year (1988), y_{iT} is the level of per capita expenditures for province i in the end year (1997), and $u_{i0,T}$ is the error term.[1] The β is the 'Beta convergence' coefficient indicating the speed of convergence.[2] Our estimated 'Beta convergence' coefficient for the Philippines during the period 1988-1997 is 0.115 (if we exclude the province of Sulu, which is a clear outlier, the estimated 'Beta convergence' coefficient is 0.109) using the per-capita expenditure data from rural areas only. Using the per-capita expenditure data from the provincial aggregate (i. e., including both the urban and rural areas), the estimated 'Beta convergence coefficient' is 0.099 (0.094 excluding the province of Sulu). The rate of absolute convergence thus appears to be slightly higher across rural-only provincial incomes than across aggregate provincial incomes.

Table 2 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). The speed of convergence observed in the historical estimates from the United States over the period 1980-1990 is 0.0174 and the estimates for ten year intervals during this hundred year period range between –0.015 (1920-30) and 0.431 (1940-50). The pace of convergence in Japan appears to have been slightly higher than that in the U.S. with the beta convergence of 0.028 during the period 1930-1990, while the estimates for five year intervals range between –0.015 (1955-60) and 0.097 (1970-75). The estimated rates of convergence in Europe, on the other hand, range between 0.01 (1980-90) and 0.023 (1960-70). Compared to these historical beta-convergence coefficient estimates in currently developed countries, the comparable estimates from the Philippines thus appear to be quite high. The only historical episode where the rate of convergence comes somewhat close to our estimates for the Philippines is the case of Japan in the period between 1970-75. We conclude therefore that there was quite a strong force of absolute growth convergence operating across provinces between 1988 and 1997 in the Philippines, and the speed of such convergence was higher than the observed pace of regional convergence in currently developed economies. It remains to be seen without similar estimates from other time periods in the Philippines, however, whether such a high rate of convergence is a longer-term trend or it was a rather exceptional episode within the history of the Philippine economic development like the Japanese episode of the 1970-75 period. (And historical experiences from currently developed countries do indicate that the rate of convergence fluctuate quite substantially over time.)

III. Determinants of Provincial Growth

In the previous section, we observed the rather strong regional growth convergence in the Philippines. The next step in our inquiry is to seek explanations for the differential rates of income growth across provinces. For this we follow the familiar 'growth regression'

[1] Barro and Sala-i-Martin (1995) also report on their alternative specifications with additional covariates, but we stick to this simplest specification because a comparable set of the same covariates was not available in our data set.

[2] Discussion on alternative concepts of 'convergence' can be found in Barro and Sala-i-Martin (1995).

framework commonly found in cross-country studies. Following Barro's exposition (1997: 8), the basic model is:

$$Dy = f(y, y^*),$$

where Dy is the annual growth rate of per capita expenditures (for each province during the period between 1988 and 1997), y is the initial level of per capita expenditures in 1988, and y^* represents the long-run or steady-state level of per capita expenditures. The convergence property based on neoclassical growth models predicts that the relationship between y and Dy be negative. 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 familiar form:

$$GRPCEXP_i = \alpha + \beta Ln(PCEXP88_i) + \Sigma\gamma_k X_{ik} + u_i,$$

where GRPCEXP is the annual average growth rate of per capita expenditures in the rural areas of each province between 1988 and 1997, Ln(PCEXP88) is the logarithm of per capita expenditures in rural areas in 1988[3], and X_k is a set of additional explanatory variables representing initial economic and political conditions and policy variables and u_i is an error term. We initially included the following variables as the determinants of y^* (X_k):

Initial economic conditions: mortality rate (mortality rate per 1000 for children of age 0 to 5), adult literacy rate (simple literacy rate as percentage of adult population who can read and write), share of irrigated areas , gini ratio of farm distribution.

Initial political characteristics: 'dynasty' (proportion of provincial officials related to each other by blood or affinity), 'governor's party' (dummy variable taking value 1 if the provincial governor belongs to the President's political party).

Policy variables (measured by the change between 1988 and 1997): agricultural terms of trade (regional*), electricity, road density, CARP (Comprehensive Agrarian Reform Program) implementation (regional*). [*: 'regional' variables are defined at the level of the 'regions' which is a higher-level aggregation of provinces due to the lack of provincial-level data.]

Among the initial economic conditions, the estimated coefficients on only morality rate and literacy rate were found to be significantly different from zero. Similarly among the initial political characteristics, only 'dynasty' was statistically significant while among the policy variables the change in the CARP accomplishments and the (initial) irrigation area were found to have coefficients significantly different from zero.

[3] 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.

The estimation results are shown in Table 3. As we saw earlier, there is a strong 'convergence' property among provincial income growth; after controlling for the factors affecting the steady-state level of per capita income, the estimated conditional rate of convergence is about 9 percent per year. Among the initial economic conditions, the initial level of human capital stock as measured by the child mortality rate (but not by literacy rate[4]) has significant effects in raising the 'target' income level y^*; on average, a one percentage point reduction in child mortality raises annual growth rate of per-capita expenditures in rural areas by 0.4 to one percentage point and one standard deviation reduction in mortality rate raises the pre-capita growth by 0.6 to 1.4 percentage point. The share of the area irrigated (in the initial year) was found to be significantly associated with growth but such relationship is not robust; once the outlier observation of the province of Sulu is excluded, the estimated coefficient is no longer statistically significantly different from zero.

Among the variables representing the initial economic conditions, a major surprise in our results was the significantly *positive* effects of the initial inequality in farm distribution; on average, one point increase in the gini coefficient (measured in the scale of 0 to 100) in land distribution is associated with a 0.1 percentage point increase in the growth of the per-capita expenditures in rural areas and one standard deviation increase in the land gini ratio is associated with an increase in the growth rate of 0.7 percentage point. Since this result runs directly counter to the recent conventional wisdom that 'initial inequality hurts subsequent economic growth' (such as in Pearsson and Tabelini 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 a higher share of small or medium size farm holdings is negatively related to subsequent growth, and a higher share of large farm holdings positively related to subsequent growth (Appendix). Thus we find no evidence of the conventional wisdom and a rather robust positive relationship between high inequality in farm distribution and subsequent income growth.

Our finding thus implies that there may be a disturbing trade-off between social equity and growth, a classic theme of Kaldor (1954). In the context of cross-country regression studies, Forbes (2000) questions the robustness of the negative relationship between income inequality and subsequent growth and finds a positive relationship; thus the inequality-growth relationship is still an unsettled issue empirically.[5] Our findings based on the variations across provinces are consistent with Forbes's results in the sense that her estimated positive inequality-growth relationship derives from within-country (rather than across country) variations due to her use of panel estimation. In addition, there are a few theoretical models that predict positive relationships between higher inequality and higher growth, at least in the short-run, although "[such] theoretical papers … have received less

[4] As we can see in the column (3) in Table 2, the literacy rate is statistically significant with the whole sample, but once an outlier observation (the province of Sulu) is excluded it is no longer significant (column (4) in Table 2).

[5] See Banerjee and Duflo (1999) for a compact survey of the theory and cross-country evidence.

attention in this branch of literature because all recent empirical work has reported a negative relationship between these variables" (Forbes (2000: 870). For example, Benabou (1996) 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. On the other hand, however, Forbes's (2000) findings are on the relationship between initial *income* inequality and growth and our findings on the positive relationship between initial *land* distribution inequality and growth may be harder to swallow. (e. g., Deininger and Squire 1998, WDR 2001: chapter 3) In addition, it is not immediately clear whether and to what extent the kinds of phenomena driving the models by Benabou and Galor-Tsiddion are relevant for our Philippine contexts. Forbes (2000) also cautions that, despite her (rather robust) findings on the positive relationship between inequality and subsequent growth, such relationship could possibly disappear (or be reversed) in the long run.

Another potentially plausible explanation of our results, which is arguably more amenable to the Philippine context, might be that there emerged (possibly temporary) productivity differentials between small and large farms during our observation period. In general, it has 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 and Kikuchi (2000), however, report some evidence of significantly higher per-hectare rice yields among larger farms than among smaller farms in their East Laguna village as of 1995 although they had found no evidence of significant yield differentials between large and small farms in their earlier observation periods (i. e., 1976 and 1987). Such differentials in production efficiency across farm size emerged, according to Hayami and Kikuchi (2000), because of 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.[6] If rental markets for irrigation pumps are to develop, as the tractor custom-services markets have, then such productivity differentials across different farm sizes are likely to disappear (Hayami and Kikuchi 2000). If such an explanation can apply in a wider context of our empirical findings, then it is not clear whether the positive relationship between the land inequality and growth held in the period prior to our observation period, nor is it clear whether the relationship we found will hold in the long run.

Among the variables representing initial political conditions, 'dynasty' (the proportion of provincial officials related by blood or affinity) has significantly negative effects on subsequent growth. As stressed in Balisacan, Debuque and Fuwa (2001), 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

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

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. Our results show that 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; one standard deviation increase in the degree of political domination by a 'dynasty' is associated with 0.4 to 0.5 percentage point fall in the growth rate.

On the other hand, the estimated coefficients on many of what we regard as policy variables are found not to be significantly different from zero (Table 3 column (1) and (2)). The only exception is the increment of the agrarian reform accomplishments under the Comprehensive Agrarian Reform Program (CARP) between 1988 and 1997; on average, one percentage point increase in the 'accomplishment' of land redistribution (as measured by the proportion of the covered areas by the redistribution program to the 'potential' land reform area) is associated with 0.5 to 0.8 percentage point increase in annual growth in per capita expenditures in rural areas. 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. 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 is that the CARP implementation is endogenous; the implementation of CARP was not random across regions but rather its implementation progressed faster in the areas with greater growth potentials. According to the official record published by the Department of Agrarian Reform, the 'accomplishment' of CARP implementation rose drastically during the Ramos administration (1992-1998) compared to the preceding Aquino and Marcos administrations (Fuwa 2000). However, how much such apparent 'accomplishments' had actual impact on the size distribution of farms is not clear. Little quantitative evidence appears to exist on the real impact of the land reform program on the patterns of land (farm) distribution. Furthermore, there is some evidence that faster implementation of land reform tends to be found in the areas with greater potentials for agricultural growth. For example, (although the time period studied is different from ours) 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.

IV. Reduced Form Determinants of Rural Poverty Reduction

In this section, we examine the determinants of rural poverty reduction across provinces between 1988 and 1997. Given that the pace of poverty reduction is strongly related to the speed of mean income growth (we will address this issue directly in the next section), in this section, we use the same empirical framework for the provincial income growth in the previous section. The underlying assumption here is that a similar reduced form specification can be used for the analysis of the rate of rural poverty reduction as for the rate of mean rural income growth. The dependent variable now is the rate of change in the

headcount poverty ratio between 1988 and 1997 in the rural areas of each province, and the same set of explanatory variables were included as in the previous section in our initial analysis. Since our dependent variable is defined as the rate of change in the poverty ratio, a negative coefficient on a variable means that the variable has negative effects on the rate of change in poverty ratio and thus *positive* effects on poverty *reduction*. Not surprisingly, among the explanatory variables included in our analysis, the set of variables found to have statistically significant association with the rate of poverty reduction was quite similar to those found to have significant association with the rate of mean consumption growth. Results of our final models are summarized in Table 4.

Reflecting the strong 'convergence' property, the level of initial per-capita expenditures in 1988 is significantly negatively related to the rate of subsequent poverty reduction; one percent increase in the initial mean expenditures (in rural areas) is associated with roughly 14 to 15 percent decrease in the rate of rural poverty reduction. Initial human capital stock, as measured by the child mortality rate, has significantly positive effects on the pace of rural poverty reduction; a one percentage point reduction in the child mortality rate is associated with a one percentage point increase in the rate of poverty reduction and one standard deviation decrease in mortality rate is associated with a substantial 1.4 percentage point increase in the rate of poverty reduction. Furthermore, the initial inequality in farm distribution is significantly associated with poverty reduction; in accordance with our finding in the previous section, higher inequality in land (farm) distribution has significantly *positive* effects on the rate of rural poverty reduction (one point increase in gini coefficient is associated with 0.3 to 0.4 percentage point increase in the rate of poverty reduction and one standard deviation increase in gini ratio is associated with 2 to 3 percentage points increase in the poverty reduction rate). Also in line with our previous findings in the determinants of per-capita expenditure growth is the significantly positive association between agrarian reform (CARP) implementation and the rate of rural poverty reduction.

In contrast with our result in the previous section, none of the initial political conditions, including the 'dynasty' variable, is found to be significantly associated with the rate of rural poverty reduction. Among the policy variables, however, the change in the agricultural terms of trade is found to be (albeit marginally) significantly associated with rural poverty reduction; our results suggest that higher agricultural terms of trade tend to accelerate poverty reduction. One standard deviation (as of 1988) increase in the agricultural terms of trade is associated with a substantial 2 percentage points increase in the rate of poverty reduction. Since this policy variable was not a significant determinant of the per-capita expenditures growth, it appears that the change in the agricultural terms of trade has independent positive effects on rural poverty reduction quite apart from the change in the level of poverty induced by the mean income growth in rural areas. Here again we must note that this variable is defined at the 'regional' level, a higher-level aggregation of provinces, due to the absence of the provincial-level data required to define the terms of trade.

V. How Does Rural Poverty Reduction Respond to Rural Income Growth?

In this section we attempt to examine the direct relationship between the mean rural income growth and the rate of rural poverty reduction, by adding the growth rate of per-capita expenditures as an additional explanatory variable to the regression explaining the rate of poverty reduction as we discussed in the previous section. We started with the following specification:

$$GRINCID_i = \alpha + \varepsilon GRPCEXPi + \beta Ln(PCEXP88_i) + \mathbf{\Sigma}\gamma_k X_{ik} + u_i,$$

where $GRINCID_i$ is the average annual rate of change in the headcount poverty ratio (poverty incidence) in the rural areas of each province i, and other variables are the same as above. The coefficient ε measures the degree of responsiveness of rural poverty reduction to the mean rural income growth. In estimating this model, we proceeded as follows. As it is clear in our framework that both the mean expenditure growth rate and the rate of poverty reduction are simultaneously determined, the additional explanatory variable of the mean expenditure growth rate needs to be treated as endogenous and thus suitable identifying instruments need to be found; since in the previous section we found that 'dynasty' variable was a significant determinant of the mean expenditure growth rate but not of the rate of poverty reduction we initially used 'dynasty' as the identifying instrument for the mean expenditure growth. As shown in Table 5 column (1) and (2), the addition of the mean expenditure growth rate to the poverty reduction regression tends to reduce the explanatory power (in the sense of not being significantly different from zero anymore) of the some of the determinants of poverty reduction as reported in the previous section, such as the initial income level and the child mortality rate, suggesting that much of the effects of these variables on poverty reduction work indirectly through increasing aggregate growth. Thus in our next step, those independent variables whose estimated coefficients are no longer significantly different from zero are dropped from the set of explanatory variables but instead are included as identifying instruments for the (endogenous) mean expenditure growth rate variable. Our final results after some experimentation are reported in the Table 5 column (3) and (4).

It appears that most of the effects of the initial conditions included in the reduced form rural poverty reduction regression as reported in the previous section come indirectly through the change in the mean rural income growth; both the initial level of per-capita expenditures (i. e., the neoclassical 'convergence effects') and the initial human capital stock affect poverty reduction through aggregate growth with relatively little direct linkage between them and poverty reduction. The only exception among the initial condition variables, however, is again the apparently strong effects of the initial inequality in farm distribution. The degree of inequality in land distribution appears to affect rural poverty reduction not only by affecting aggregate rural income growth (which in turn affects poverty reduction) but also by directly affecting poverty; again the direct effects of land inequality on poverty reduction is positive—larger initial inequality in land distribution facilitate rural poverty reduction on and above its positive effects on rural poverty reduction through its positive effects on aggregate income growth. Unlike in the case of growth, it appears difficult to explain that initial inequality helps poverty reduction. This is a major puzzle that we find quite difficult to explain.

In addition, among the policy variables, both the increase in the CARP implementation and the increase in the agricultural terms of trade have directly positive association with the rate of rural poverty reduction. The independent and significant positive effects on rural poverty reduction of CARP implementation is not surprising, nor is the significant positive effects of the agricultural terms of trade.

As is often found, there is a strong relationship between the rate of mean income growth and the rate of poverty reduction. Our estimated 'growth elasticity of poverty reduction' is around 1.5 to 1.6 based on our final specification (while our initial estimates using a smaller instrument set are roughly 1.1).[7] The magnitude of the growth elasticity, however, appears to be relatively low compared to the similar estimates obtained from other developing countries. For example, Ravallion (2000) estimated the growth elasticity of poverty reduction from bivariate regression between the proportionate change in the poverty rate and the proportionate change in mean income (with intercept) based on a sample of 47 developing countries in the 1980s and 1990s; he obtains an estimated elasticity of 2.50. An equivalent bivariate regression estimate (without any additional covariates and without instrumenting for the right hand side variable; not reported in the table) for our data from the Philippines (including the province of Sulu) is 1.79, which is rather similar to the estimate from the full specification as reported in Table 5.[8] Thus, the degree of responsiveness of poverty reduction to the aggregate income growth is about 28% smaller in the Philippines compared to the developing country average.

In sum, the linkage between poverty reduction and aggregate income growth appears to be relatively weaker in the rural Philippines compared to the developing countries at large. This finding seems to be consistent with the disappointing performance in the rate of rural poverty reduction found in the Philippines compared to its Asian neighbors. Furthermore, as Balisacan, Debuque and Fuwa (2001) argued, such 'responsiveness' of rural poverty reduction to aggregate growth improved markedly after the mid-1980s compared to that in the 1970s; since our estimates are obtained from the period between 1988 and 1997 —the period of higher responsiveness of rural poverty reduction than in the 1970s—, it appears to indicate a rather grim picture that even the relatively high growth elasticity by the Philippine standard is relatively low in the international standard.

VI. Conclusion

The major findings of our analysis can be summarized as follows:

[7] The measures of the responsiveness of poverty reduction to mean income growth can be (and have been) defined in various ways. Lipton and Ravallion (1995), for example, collect such estimates based on the 'growth elasticity' controlling for the income distribution, while our estimates and Ravallion (2000) do not control for changes in distribution.

[8] Since Ravallion (2000)'s estimate does not focus on rural areas but is based on urban-rural aggregate, our estimated elasticity of 1.79 is obtained (unlike the numbers reported in Table 5) from the data on the urban-rural aggregate. The pararell estimate of the elasticity of rural poverty with respect to rural income growth is 1.66.

- We find that there was a clear tendency of absolute growth convergence across provinces between 1988 and 1997. The rate of such convergence appears to be quite high compared to historical experiences of currently developed counties such as the United States, Europe and Japan.
- We also examined the determinants of provincial mean rural income growth:
  - Among the initial conditions, higher initial human capital stock (measured by mortality rate), lower initial income level (indicating 'convergence') and *higher* inequality in the initial land distribution lead to higher rate of mean income growth in rural areas. In addition, the more the elected officials are related with each other by blood or affinity ('political dynasty') the lower the subsequent rural income growth is likely to be.
  - Among policy variables, greater implementation of agrarian reform (CARP) is positively related to growth rate; in light of the correlation between higher land inequality and growth, however, the seemingly positive relationship between CARP implementation and growth could be due to the selective implementation of CARP targeting the provinces with higher growth potentials.
- The rate of rural poverty reduction across provinces can be explained by a similar set of variables as in the case of the mean rural income growth; lower initial income level, higher initial human capital, higher initial land inequality and greater implementation of CARP are all positively related to faster rural poverty reduction. In addition, the terms of trade more favorable to agriculture also tend to facilitate rural poverty reduction while the degree of 'political dynasty' is not significantly related to poverty reduction.
- As has been often found, faster economic growth helps poverty reduction, but the strength of such relationship appears rather weak in the rural Philippines by international standards; the estimated growth elasticity of poverty reduction is in the range between 1.0 and 1.8 while the international standard appears to be around 2.5.

In terms of policy implications, our findings are consistent with some aspects of the conventional wisdom, such as the positive impact of the human capital stock for subsequent growth and poverty reduction and the importance of the relative price of agricultural products in facilitating poverty reduction. In addition, we find some quantitative evidence that the dominance of an oligarchic political regime could hurt growth and, through lower growth, hurt poverty reduction. In addition, a disturbing implication of our results is that there may be some trade-offs between growth and equity.

With regard to the possibility of the trade-offs of between growth and equity, however, we should perhaps be cautious in drawing a definitive policy conclusion given the limited nature of our findings at this point. Further research is obviously in order. For example, more recent theoretical as well as empirical studies suggest differential implications of such relationship between the short-run and the long-run (e. g., Bénabou 1996, Forbes 2000, Banerjee and Duflo 1999). We would need to further investigate whether similar findings could be obtained from other growth episodes (such as the 1970s) or from growth episodes of a longer time span. Even if similar relationships are to be found empirically from other time periods or for longer time spans, we do not yet have a convincing explanation as to why such relationship is found in the rural Philippines. While we provided some speculative

interpretations, specific mechanisms that lead to the (macro-level) inequality-growth relationships need to be investigated at the micro level.

Apart from the issue of growth-equity trade-offs, our results suggest other potential areas for further investigation. One is the responsiveness of poverty reduction to aggregate income growth. As indicated by the Philippine country paper (Balisacan, Debuque and Fuwa 2001), such responsiveness appears to have changed over time; systematic comparisons of the growth elasticity between the 1970s and the period after the 1980s would be an obvious next step. Furthermore, based on such comparisons, it could be fruitful to investigate the determinants of the elasticity, which might yield some policy implications for facilitating poverty reduction for a given rate of aggregate income growth. Another possible area for future research could be the relationship between politics and growth. While the negative efficiency implications of various aspects of the Philippine politics may be a familiar theme, quantitative evidence is scarce. While our results are suggestive, they are based on a measure of a specific aspect of the provincial politics and more systematic study with measures of various aspects of the political and institutional characteristics could be another avenue for a better understanding of the growth and poverty reduction in the rural Philippines.

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Table 1. Descriptive Statistics

Variable name	Description	mean	Standard deviation	Min	Max	No. of obs.
Grpcexp	Average annual growth rate of per capita expenditures in rural areas 1988-97	0.017	0.035	-0.096	0.109	72
Pcexp88	Per capita expenditures in rural areas 1988	14592.89	4590.62	6053.47	30128.23	72
Pcexp97	Per capita expenditures in rural areas 1997	16613.58	3524.11	7269.84	25922.16	72
Incid88	Headcount poverty incidence in rural areas in 1988	44.67	22.16	3.87	92.23	71
Incid97	Headcount poverty incidence in rural areas in 1997	36.37	17.06	4.45	91.37	72
Grincid	Annual average rate of change in headcount poverty rate in rural areas 1988-97	-0.014	0.069	-0.138	0.259	72
Lgini	Gini coefficient of farm distribution	54.16	6.55	36.49	75.77	72
Mort	Mortality rate per 1000 of children age 0-5 in1990	84.69	14.85	55.92	121.12	73
Slit89	Simple adult literacy rate 1989	87.72	7.42	56.7	98.1	73
Irri	Share of irrigated farm area	0.27	0.22	0.015	0.95	66
dyna	Proportion of the provincial officials related by blood or affinity 1992	0.815	0.199	0	1	72
Carpa2	CARP accomplishment	1.51	1.26	0.54	5.53	72
Carpa1	CARP accomplishment	0.17	0.19	0.05	0.85	72
Cawelt89	Road density 1989	0.58	1.83	0.012	15.70	73
Cawelt97	Road density 1997	0.71	1.94	0.042	16.68	73
Tot88	Agricultural terms of trade 1988	0.47	0.13	0.28	0.75	72
Tot97	Agricultural terms of trade 1997	0.92	0.07	0.82	1.04	72
Elec88	Share of households with electricity access 1988	49.4	23.87	6.00	97.7	72
Elec97	Share of households with electricity access 1997	61.08	19.60	16.4	99.2	73

Sources: Family Income and Expenditure Surveys

Table 2. Estimated Beta-convergence Coefficients of Regional Growth Conversion

Country and period	Estimated beta coefficient
Philippines: 1988-1997	**0.094[*] (0.099[**])**
Rural Philippines: 1988-1997	**0.115[*] (0.109[**])**
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 the full sample of all provinces; [**]: estimate based on all provinces except Sulu.
Source: Philippines: authors' estimates; United States, Japan and European regions: Barro and Sala-i-Martin (1995).

Table 3. Provincial Rural Income Growth Regression Results (Instrumental Variable estimation) (t-ratios in parentheses)

Dependent variable = annual growth rate of mean rural consumption per capita				
Independent variables:	(1)	(2)**	(3)	(4)**
Log (Per capita expenditure 1988)*	**-0.090 (-9.77)**	**-0.087 (-9.59)**	**-0.090 (-11.29)**	**-0.087 (-11.13)**
Mortality rate	**-0.0004 (-1.64)**	**-0.0004 (1.99)**	**-0.0004 (-1.87)**	**-0.001 (-3.48)**
Literacy rate	**0.001 (1.71)**	0.0003 (0.59)	**0.001 (2.08)**	
Dynasty	**-0.023 (-1.90)**	**-0.025 (-2.11)**	**-0.023 (2.14)**	**-0.024 (-2.24)**
Irrigation area	**0.028 (1.75)**	0.020 (1.21)		
Land gini	**0.001 (3.53)**	**0.001 (3.08)**	**0.001 (3.09)**	**0.001 (2.94)**
Chg. CARP	**0.005 (1.76)**	**0.006 (1.98)**	**0.008 (3.99)**	**0.008 (3.79)**
Chg. Electricity	0.0001 (0.63)	0.0001 (0.35)		
Chg. Ag. terms of trade	0.021 (0.68)	0.017 (0.56)		
Chg. road density	0.032 (1.11)	0.035 (1.21)		
Constant	0.738 (7.02)	0.778 (7.46)	0.766 (8.30)	0.830 (10.01)
Adj. R-squared	0.7517	0.7224	0.7513	0.7281
Sample size	66	65	66	70

*Per capita income used as instrument. (see footnote 3)

**Outlier observation (Province of Sulu) excluded.

Table 4. Provincial Rural Poverty Reduction Regression Results (Instrumental Variable estimation) (t-ratios in parentheses)

Dependent variable = annual rate of change in headcount poverty ratio in rural areas				
Independent variables	(1)	(2)**	(3)	(4)**
Log (Per capita expenditure 1988)	**0.146 (6.06)**	**0.136 (6.19)**	**0.147 (6.90)**	**0.136 (7.05)**
Mortality rate	**0.001 (1.25)**	**0.001 (2.05)**	**0.001 (2.38)**	**0.001 (1.72)**
Literacy rate	-0.001 (-0.75)	0.001 (1.14)		
Dynasty	0.037 (1.15)	0.048 (1.65)		
Irrigation area	-0.032 (-0.76)	0.008 (0.20)		
Land gini	**-0.004 (-3.93)**	**-0.003 (-3.40)**	**-0.004 (-4.41)**	**-0.003 (-3.46)**
Chg. CARP	**-0.020 (-2.52)**	**-0.023 (-3.20)**	**-0.022 (-4.02)**	**-0.019 (-3.93)**
Chg. Electricity	-0.00003 (-0.06)	0.0002 (0.50)		
Chg. Ag. terms of trade	**-0.156 (-1.89)**	**-0.137 (-1.85)**	**-0.139 (-1.76)**	**-0.124 (-1.75)**
Chg. road density	-0.090 (-1.16)	-0.102 (-1.47)		
Constant	-1.070 (-3.87)	-1.264 (-5.04)	-1.201 (5.39)	-1.138 (-5.66)
Adj. R-squared	0.5610	0.5327	0.5587	0.5268
Sample size	66	65	71	70

*Per capita income used as instrument. (see footnote 3)

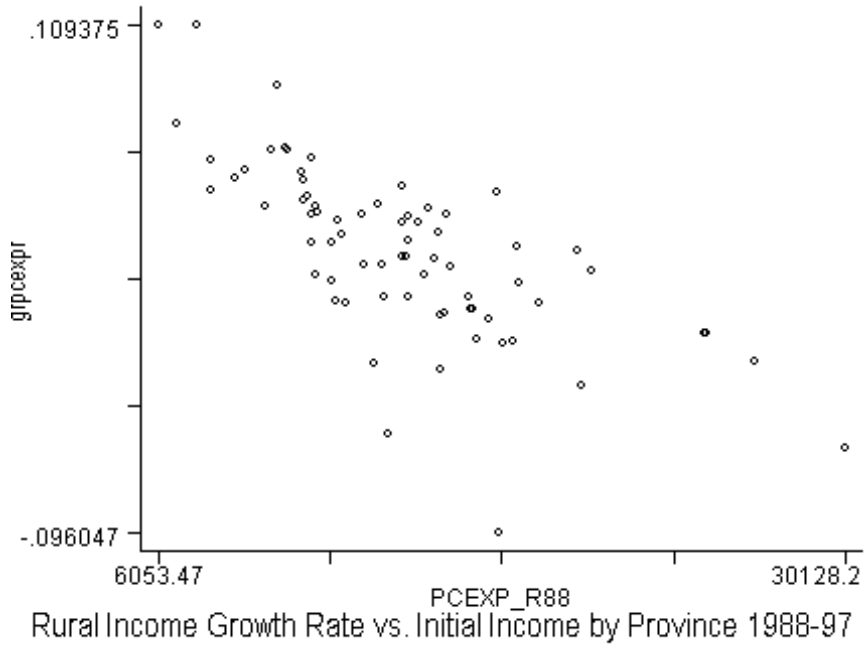
**Outlier observation (Province of Sulu) excluded.

Table 5. Estimating Growth Elasticity of Rural Poverty Reduction (Instrumental Variable estimation) (t-ratios in parentheses)

Dependent variable = annual growth rate of rural mean consumption per capita				
Independent variables	(1)	(2)*	(3)	(4)*
Mean expenditure growth rate	-1.096 (-1.30)	-1.145 (-1.51)	**-1.598 (-9.47)**	**-1.539 (-9.17)**
Log (Per capita expenditure 1988)	0.045 (0.61)	0.034 (0.53)		
Mortality rate	0.0004 (0.59)	0.0002 (0.26)		
Land gini	**-0.003 (-1.71)**	-0.002 (-1.55)	**-0.002 (-2.45)**	**-0.001 (-1.85)**
Chg. CARP	**-0.013 (-1.81)**	**-0.011 (1.82)**	**-0.009 (-2.64)**	**-0.008 (-2.23)**
Chg. Ag. terms of trade	**-0.123 (-1.92)**	**-0.113 (-1.93)**	**-0.109 (-2.04)**	**-0.113 (-2.23)**
Constant	-0.262 (-0.37)	-0.182 (-0.29)	0.172 (3.62)	0.143 (3.11)
R-squred	0.7293	0.6965	0.7983	0.7124
Sample size	71	70	71	70
Identifying instruments for mean expenditure growth rate	Dynasty		Dynasty, log(pc income 88), mortality	

* Outlier observation (Province of Sulu) excluded.

Figure 1. Absolute Convergence among Provincial Rural Income Growth



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

Appendix: Effects of Farm Distribution Inequality using Alternative Land Distribution Measures

This table summarizes qualitative results on the estimated coefficients on the alternative measures of land distribution as substituted for the Gini coefficients of farm distribution in the corresponding specifications in the Tables (with all the other covariates kept as the same). The sign "+ (-)" signifies that the estimated coefficient is positive (negative) while the one (two) asterisk(s) means that the coefficient is statistically significantly different from zero at 10% (5%) level of significance or less. (see below for the definitions of alternative land distribution measures used.)

We find that larger ratios of farm areas of the small to medium size farms to large size farms are associated with lower per-capita expenditure growth and with slower rate of poverty reduction—similar relationships hold with the land distribution measures defined as: the ratio of the total area of the farms of size below 5 hectares to the total area of the farms over 10 hectares, the ratio of the total area of the farms of size between 1 and 5 hectares to the total area of all farms; the ratio of the total area of the farms of size 3 and 10 hectares to the total area of all farms. The share of very large farms (measured by the ratio of the total area of the farms of size over 25 hectare to the total area of all farms), on the other hand, is significantly positively associated with higher growth and faster poverty reduction. Some of the measures are not significantly associated with growth or poverty reduction. None of the measures of land distribution support the recent conventional wisdom that 'initial inequality hurts subsequent growth.'

Land Distribution Measures	Specifications as reported in: Table 3 (1)	Table 3 (3)	Table 4 (1)	Table 4 (3)	Table 5 (1)	Table 5 (3)
Farm03/3	-	-	+	+	+	+
Area03/3	-	-	+	+	+	+
Farm05/10	-*	-	+**	+**	+	+*
Area05/10	-**	-**	+**	+**	+**	+**
Farm02/10	-	-	+*	+**	+	+
Area02/10	-**	-*	+**	+**	+*	+**
Area02/all	+	-	+	+	+	+
Area03/all	-	-	+	+	+	+
Area15/all	-*	-	+**	+**	+**	+**
Area310/all	-*	-	+*	+	+	+
Area25/all	+**	+**	-**	-**	-*	-**

*: statistically significant at 10% level; **: statistically significant at 5% level.

Variable definitions:

Farm03/3: Ratio of the total number of farms under 3 hectares to the total number of farms over 3 hectares

Area03/3: Ratio of the total areas of the farms under 3 hectares to the total area of the farms over 3 hectares

Farm05/10: Ratio of the total number of farms under 5 hectares to the total number of farms over 10 hectares

Area05/10: Ratio of the total areas of the farms under 5 hectares to the total area of the farms over 10 hectares

Farm02/10: Ratio of the total number of farms under 2 hectares to the total number of farms over 10 hectares
Area02/10: Ratio of the total areas of the farms under 2 hectares to the total area of the farms over 10 hectares
Area02/all: Ratio of the total areas of the farms under 2 hectares to the total area of all the farms
Area03/all: Ratio of the total areas of the farms under 3 hectares to the total area of all the farms
Area15/all: Ratio of the total areas of the farms of the size between 1 and 5 hectares to the total area of all the farms
Area310/all: Ratio of the total areas of the farms of the size between 3 and 10 hectares to the total area of all the farms
Area25/all: Ratio of the total areas of the farms over 25 hectares to the total area of all the farms