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ABSTRACT

Poverty reduction has become an overarching development concern worldwide. In September 2000, 147 heads of State and Government and 189 nations committed under the UN Millennium Declaration to halve poverty between 1990 and 2015. Consequently, donor institutions now give greater priority to programs geared towards this global objective. Governments have likewise crafted more aggressive agendas in pursuit of this goal. In the Philippines, the MTPDP states in no uncertain terms that the war against poverty must be won.

But effective poverty reduction strategies must be based on sound information about poverty. Official poverty statistics released by the NSCB are limited to the food and poverty thresholds and incidences and the FGT measures of poverty with varying timeliness and with provincial disaggreggation.

Towards enriching the statistical database on poverty-related indicators, and hopefully, contributing towards the formulation of sound poverty reduction strategies, this paper presents a methodology for measuring the geographic concentration of production, as measured by the GRDP, income as measured thru the FIES and poverty as derived from official poverty statistics. It also provides some analyses of the interrelationships among the three variables.

Keywords: equity; production; income; poverty; geographic concentration.

I. Introduction

The System of National Accounts [5] produces estimates of macroeconomic aggregates such as the gross domestic product (GDP), gross national income and gross domestic expenditure which are useful in monitoring the performance of an economy. In addition, indicators such as per capita GDP and per capita income can be used to assess progress towards poverty alleviation. However, these macro indicators provide little insight on how economic growth is shared or distributed to the different sectors of the economy. As a result, when the NSCB releases national accounts estimates of growth rates of GDP, questions are sometimes raised as to where the economic growth came from or where it went. There is therefore a need to enrich the available statistics and indicator systems to allow a deeper analysis of the impact of our development efforts, more specifically, to allow a more critical assessment of our overarching concern to reduce poverty.

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[2] Secretary General, Statistical Coordination Officer IV, Statistical Coordination Officer III, Statistical Coordination Officer III, Statistical Coordination Officer III and formerly Statistical Coordination Officer IV, respectively, of the National Statistical Coordination Board. The authors acknowledge the assistance of Amando G. Patio Jr. in the preparation of this paper. The views expressed in the paper are those of the authors and do not necessarily reflect the views of the NSCB.

Data from the Family Income and Expenditures Survey (FIES) show that in the Philippines, income is concentrated in a relatively small number of households, with the income share of the top decile at 39.3% in 1997 and 38.4% in 2000. In addition, while the Philippine GDP grew by 8.94 percent from the period 1997 and 2000 for an annual growth rate of 2.9%, the proportion of poor families in the country slightly increased by 0.3 percentage point from 28.1 percent in 1997 to 28.4[3] percent in 2000. Moreover, despite government initiatives in securing peace and development in Mindanao towards ensuring sustained growth with equity [3], the Autonomous Region in Muslim Mindanao or ARMM (poorest), Region XII (3rd poorest), and CARAGA (4th poorest) were consistently among the four poorest regions in the country for the period 1997-2000. Also, Region V was the 2nd poorest region for both 1997 and 2000. Except for CARAGA, the poverty incidence of three of the four poorest regions went up from 1997 to 2000. On the other hand, the National Capital Region (NCR) has consistently been the least poor region and the only region among all 16 regions[4] to post family poverty incidence less than ten percent for the years 1997 (4.8%) and 2000 (5.7%). These statistics certainly do not indicate overwhelming success of our efforts to secure a more balanced and equitable development across regions.

In order to assess our progress vis-à-vis the Medium Term Philippine Development Plan (MTPDP) targets of growth with equity, there is a need to measure "equity". While the Philippine Statistical System (PSS) is currently generating various social and economic indicators that provide some quantification of equity, like the Gini coefficient of the income distribution from the FIES, or the Social Accounting Matrix from the Philippine System of National Accounts, there is a need to enhance these indicators in many aspects.

One way to do this is to relate the various components of our economy and the various sectors of our society, e.g., the distribution of production, income, and poverty across space and across sectors. This allows the integration of available statistics from different sources in the form of indices. Since different dimensions of society can be examined and integrated, these indices serve as tools for measuring, for instance, equity across regions and/or provinces, thereby enhancing available tools for policy-making. Further, these additional indicators respond to the need of local policy makers and other users for more non-income based measures of poverty to help identify priority areas that should benefit from sector-specific programs and interventions of the government. This paper hopes to contribute to efforts in that direction.

The paper analyses the concentration of poverty, production and income across provinces and/or regions with respect to land area and population. It examines whether there is concentration of the poor, GDP and total family income in certain provinces/regions of the country and the trend, if any. Due to space constraints, the analysis is carried further only to the poorest and richest regions.

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[3] Unofficial revised estimates put this at 28.0%.

[4] Executive Order Numbered 103 approved on May 17, 2002 divided Region IV into Region IV-A (CALABARZON) and Region IV-B (MIMAROPA), increasing the number of regions from 16 to 17.

II. Concentration Indices [5]

Concentration indices, or measures of concentration find applications in many fields. The National Statistics Office (NSO) has used them in the sampling design of establishment surveys to ensure that the revenue share (called the concentration ratio by the NSO) of sample establishments representing a certain industry constitutes at least a certain percentage of the total revenues from the industry. They are also useful in assessing the delivery of insurance services by insurance organizations including social security institutions [6]. But the most popular application is in measuring the geographic concentration of economic activities and analyzing the dynamics of the agglomeration forces that result in or cause such geographic concentration. Several books/papers have been written on this subject during the last decade when economists rediscovered geography and the use of geographic concentration to explain important aspects of international trade and economic growth. For example, a framework on geographic concentration can be used to evaluate the impact of the European integration on the location of economic activities in Europe instead of outside of Europe.

Trends in spatial concentration can be analysed for statistical significance. Aiginger and Pfaffermayr[1] used a nonparametric sign test and a cross section and a time series test to establish the conclusion that the geographic concentration did not really increase during the so-called Post Single Market period in Europe. This paper will not, however, dwell on statistical tests of significance; instead it only offers the descriptive statistics that can be used to analyse trends in concentration patterns.

There are several measures of concentration.It must be emphasized however, that measures of concentration are not the same as measures of inequality, such as the Gini coefficient which measures inequality in the income distribution of a country. Examples of measures of concentration like the concentration ratio, the Herfindahl index, the Ellison and Glaeser index, the geographic concentration index and the adjusted geographic concentration index are found in [4]. In this paper the adjusted concentration index (AGCI) will be used.

For i = 1,2,….N, let

- Y_i = the share in the value of the variable of interest, i.e. the variable whose (geographic) concentration is being studied, of subgroup (region) i in proportion to the value of the variable for the entire group;
- X_i = the share in the value of an exogenous variable such as area, of subgroup (region) i in proportion to the value for the entire group; and
- X_{min} = the minimum value of X_i over all i.
- $Y_{(i)}$, $X_{(i)}$ = the order statistics for the Y_i's and the X_i's, respectively, with $Y_{(N)}$ and $X_{(N)}$ denoting the maxima

[5] This section draws from the paper of Virola, Romulo A., "Measuring Good Governance of Insurance Organizations thru Concentration Indices", presented during the 12th East Asian Actuarial Conference held in Makati Shangri-la, Manila, Philippines on 6-9 October 2003.

The Geographic Concentration Index GCI is defined as

$$GCI = \sum_{i=1}^{N} /Y_i - X_i /$$

where / . / denotes the absolute value function. The Adjusted Geographic Concentration Index AGCI is

$$AGCI = GC/GC^{MAX}$$

where

GCI^{MAX} = maximum value of GCI

The value of GCI^{MAX} is attained see [4] when for some j,

$Y_{(N)} = 1$, $Y_{(N)} = Y_j$ and $X_j = X_{(1)}$,

so that

$$GCI^{MAX} = 2 (1 - X_{(1)})$$

In other words, the maximum value of GCI is attained when the largest value of 1 for Y_i is allocated to a group (region) with the smallest value of X_i . Thus, for purposes of international comparison, the GCI can be misleading especially if the relative values of the variable X differ systematically among the countries being compared. It is quite clear that

$$0 \leq AGCI \leq 1,$$

where AGCI = 0 when there is no concentration and AGCI = 1 when there is maximum concentration.

If Y refers to the number of the poor and X to population, then GCI and AGCI are measures of the extent of concentration of poor people in areas in accordance with their share of the total population. If Y refers to the GDP and X to area of a region, then the concentration indices measure the distribution of the GDP in proportion to the land area of the regions, with heavier concentration associated with larger shares of GDP being produced by relatively smaller-sized regions.

As mentioned previously, the AGCI index will be used in this paper. It is noted that concentration indices as defined in the paper, could only be computed for statistics/indicators that are available in terms of levels e.g., GDP, population size, no. of the poor, etc. They could not be computed using growth rates, ratios, etc. While the illustration in this section is for geographic concentration, the next section will illustrate the applicability of concentration indices to other variables. Concentration of poverty and total family income will be analysed at the provincial level, but concentration of GDP can only be analysed at the regional level due to data constraints, specifically, the unavailability of provincial product accounts[6].

[6] Efforts have been exerted by the NSCB to compile provincial product accounts but these efforts have been hindered by manpower and financial constraints.

III. Concentration Of Production, Income, And Poverty

For purposes of this paper, production is measured in terms of the GDP as compiled by the NSCB, income[7] in terms of the total family income from the FIES of the NSO, and poverty in terms of the number of poor individuals from the official poverty statistics compiled by the NSCB. Available data for the years 1997 and 2000[8] are shown in Tables 1.1-2.2.

A. Production

Prior to the reconfiguration of Region IV, the five regions with the highest shares of GDP [2] are NCR, Southern Tagalog, Central Luzon, Central Visayas and Western Visayas. But while these five regions also have the biggest shares in population, as may be expected, the regional shares of GDP are not necessarily the same as the regional population shares. The discordant shares account for the concentration as measured by the AGCI.

1. With respect to population

In both 1997 and 2000, production has lower concentration than either income or poverty with respect to population (Table 3.1). This means that compared to either income or poverty, the Gross Regional Domestic Products (GRDPs)[9] of the various regions are more in accordance with the distribution of the population – the more populated regions are producing more goods and services. In addition, the AGCI improved (became lower) from 0.1955 in 1997 to 0.1880 in 2000.

On a per capita basis, the Philippine GDP increased from P12,483 in 1997 to P12,553 in 2000 at an almost nil annual growth rate of 0.2% (Table 2.1). Per capita GRDP for NCR which is more than double that for the entire country is the largest and grew from P27,834 to P28,339 with an annual growth rate of 0.6%. The other regions with per capita GRDP among the top five for both years are CAR and Regions X and IV. In the bottom five are ARMM and Regions V, VIII, CARAGA and 1.

Main contributors to the concentration are the NCR with a share of only 14% of the population but 31% of GDP and Region V with a share of more than 6% of the population but less than 3% of GDP (Table 4.1).

In addition to NCR, the other regions with larger shares of GDP than population are CAR and Regions IV and X. It is noted that while Region III has the third largest GDP share after NCR and Region IV, its GDP share is below its share of the population. The per capita GDP of Region III was only the fifth largest in 1997 and seventh largest in 2000.

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[7] GDP is measured in terms of Gross Value Added, which is conceptually different from income as captured in the FIES.

[8] The original plan was to use the 2003 official poverty statistics; unfortunately, they are scheduled for release in September 2004, a month after the deadline for the submission of NCS papers.

[9] The analysis can be extended to the major economic activities comprising the GDP/GRDP but has been omitted in the paper due to space constraints.

On the other hand, Bicol, Regions VIII and 1 and ARMM have the largest negative balance between GRDP and population share, which explains the per capita GDP of these four regions being the lowest.

2. With respect to land area

Compared to the distribution correspondence between GRDP and population, GDP was not as proportionately distributed with respect to land area, although the AGCI improved slightly from 0.3768 in 1997 to 0.3700 in 2000 (Table 3.1). This is to be expected because, NCR, which has close to 31% share of GDP occupies only 0.2% of the total area. In addition, while the top five in GDP shares are also the top five in population shares, three of the five regions with the largest areas, namely, Regions II, XI and VIII are outside of the top five in GDP share. Regions IV and VI are in the top five in GDP, population and land area.

On a per square kilometer of area basis, the Philippines produced P2,823,791 in 1997 and P3,030,117 in 2000 with an annual growth rate of 2.4% (Table 2.2). NCR has the largest GRDP per square kilometer, which increased from P431,061,108 in 1997 to P464,850,782 in 2000 at a slightly higher annual growth rate of 2.5%. The other regions with the highest GRDP per square kilometer are Regions III, VII, VI and IV. On the other hand, the regions with the lowest are ARMM, CARAGA and Regions II, VIII and CAR.

Contributing to the high AGCI are NCR and Region III, which have relatively larger shares of GRDP compared to land area and Regions II, ARMM, CARAGA and Region VIII which have lower GRDP shares than land area (Table 4.1).

B. Income

1. With respect to population

As with GDP, the distribution of income with respect to population is not so uneven. The top six regions in income share are also the top six in population share, although with slightly different rankings: NCR, Regions IV, III, VI, VII and XI. However, unlike with GDP, the AGCI for income worsened slightly from 0.2003 in 1997 to 0.2104 in 2000 (Table 3.1).

The Philippine per capita income grew from P24,431 in 1997 to P28,808 in 2000., at an annual rate of 5.6%, much faster than the growth of per capita GDP of 0.2% for the same period (Table 2.1). The per capita income of NCR, which is more than double that for the Philippines grew at an annual rate of 4.8% from P55,038 in 1997 to P63,272 in 2000. Aside from NCR, Regions IV and III also have high per capita income; ARMM and CARAGA have the lowest. Among the provinces, only Laguna and Bataan were in the top five for both years while the Mindanao provinces of Lanao del Sur, Sulu and Agusan del Sur were in the bottom five for both 1997 and 2000.

Major contributors to the concentration due to disparity in income versus population shares (Table 4.2) are NCR (30-31% vs 14%), Region VII (5% vs.

7%), Region VI (6% vs. 8%) and Region VIII (3% vs. 5%). Among the provinces, Laguna and Rizal (in 2000) have relatively bigger shares of income. On the other hand, Negros Occidental, Cebu and Zamboanga del Sur have the biggest negative balances between income share and population share. The other provinces with large negative balances are Pangasinan, Camarines Sur, and Davao del Norte.

Within the poorest region of ARMM, as may be expected, the income shares of its four provinces are all below their population shares. However, the distributions of income and population across provinces are not very different from each other, resulting in an AGCI of 0.1178 in 1997(Table 3.2). This improved to 0.0502 in 2000 because of greater concordance in the shares of Lanao del Sur and Tawi-tawi. The income share of Lanao del Sur went up from 22% to 28% but the income share of Tawi-tawi went down from 20% to 11% (Table 5.1).

In the richest region after NCR, Region III, the disparity in the distributions of income and population is also not great, with AGCI of 0.0856 in 1997 and 0.0812 in 2000 (Table 3.2). Bataan and Zambales had higher income shares than population shares for both years. The income share of Bulacan went up from 26% in 1997 to 32% in 2000; but that of Pampanga went down from 27% in 1997 to 24% in 2000.

2. <u>With respect to land area</u>

As with GDP, the concentration of income with respect to land area is worse than with respect to population with the AGCI deteriorating from 0.4902 in 1997 to 0.4995 in 2000 (Table 3.1). All regions of Luzon except Regions II and V have higher shares of income than area while all regions of Visayas and Mindanao except Region VII have bigger shares of area than income. Big disparities in favor of income are NCR (30-31% vs 0.2%) and Region III (10-11% vs. 5%); big disparities in favor of area are Region II (10% vs. 3%), CARAGA and ARMM (both 6% vs. less than 2%). The provinces with relatively larger shares of income are Cavite, Laguna, Bulacan, Rizal and Pampanga while those with lower shares are Palawan, Isabela, Lanao del Sur, Agusan del Sur, Bukidnon and Cagayan (Table 4.2).

In terms of income per square kilometer of area, the Philippines generated P5527 in 1997 and P6954 in 2000 for an annual growth rate of 8% (Table 2.2). For NCR, the figures are P852,383 in 1997 and P1,037,846 in 2000 with a growth rate of 6.8%. The top five provinces are Rizal, Cavite, Laguna, Bulacan and Pampanga, all located in either Region III or IV. Consistently in the bottom five provinces are Apayao, Palawan, Agusan del Sur, Lanao del Sur and Quirino pointing to untapped land resources in these areas.

In both ARMM and Region III, the concentration of income is worse with respect to area than with respect to population, the distribution being more uneven in Region III with AGCI of 0.3496 in 1997 and 0.3755 in 2000 (Table 3.2). Lanao del Sur has a much smaller share of income compared to area, while Maguindanao, Sulu and Tawi-tawi have bigger income shares than area shares

(Table 5.1). In Region III, Bulacan and Pampanga have bigger income shares than area while Nueva Ecija and Zambales have smaller income shares than area, possibly indicating that the land resources of Nueva Ecija and Zambales have not been fully tapped for development.

C. Poverty

1. With respect to population

Between 1997 and 2000, the distribution of the poor across provinces slightly became more in accordance with the distribution of the population as the AGCI went down from 0.2295 to 0.2223 (Table 3.1). Major contributors to the concentration are the rich regions of NCR, III and IV which have much lower shares of the poor than of the population and the poor region of Bicol, which has much higher share of the poor than of the population (Table 4.3). Among the provinces, Bulacan, Pampanga, Cavite and Laguna have relatively lower shares of the poor, but Masbate[10] and Negros Occidental have relatively higher shares. In terms of absolute numbers, Regions V, VI and IV have the biggest share of the poor population while CAR, NCR and Region II have the lowest. The provinces with the biggest shares for both 1997 and 2000 are Negros Occidental, Cebu and Pangasinan and those with the lowest shares are Batanes, Apayao, Siquijor, Camiguin, Guimaras.

Against a national poverty incidence of 33% of the population in 1997 and 34% in 2000, NCR had 6.5% in 1997 and 7.6% in 2000 (Table 2.1). The provinces with the lowest poverty incidences for both years are Bulacan, Rizal, Bataan and Cavite while those with the highest are Sulu, Masbate and Ifugao.

In ARMM, the poor are in provinces with relatively larger populations with the AGCI at lows of 0.1022 in 1997 and 0.0462 in 2000 (Table 3.2). Sulu has a relatively larger share of the poor population while Lanao del Sur has a relatively smaller share (Table 5.2). But in Region III, there is some concentration of the poor in less populated provinces, with the AGCI at 0.2386 in 1997 worsening to 0.2505 in 2000. Bulacan and Pampanga have relatively much smaller share of the poor population while Nueva Ecija and Tarlac have bigger shares.

2. With respect to land area

As with GDP and income, there is more concentration of the poor with respect to land area than with respect to population, with the AGCI deteriorating from 0.2501 in 1997 to 0.2649 in 2000 (Table 3.1). Major contributors are Regions V, II, VIII and IV. Provinces with relatively larger shares of the poor are Masbate, Negros Occidental, Cebu, Pangasinan, Camarines Sur, Iloilo and Apayao while those with lower shares are Palawan, Bukidnon, Lanao del Sur, Agusan del Sur, Apayao and Occidental Mindoro (Table 4.3),

The Philippines has a poor population density of 76 per square kilometer in 1997 going up to 84 in 2000 (Table 2.2). Even though the NCR has a low

[10] Revised estimates for Masbate are forthcoming.

poverty incidence, it has a very high poor population density of 1043 per square kilometer in 1997 and 1341 in 2000, which are 14 and 16 times, respectively that of the entire country. After NCR, the regions with the highest poor population densities are Regions V, VI and VII while Region II, CAR, CARAGA and Region IV have the lowest. Provinces with high poor population density for both years are Albay, Sulu, La Union and Cebu. Those with low poor population density are Batanes, Apayao, Palawan, Quirino, Nueva Vizcaya and Aurora.

In ARMM, there is a higher concentration of the poor population with respect to area than with respect to population, but the AGCI improved from 0.2746 in 1997 to 0.2421 in 2000 (Table 3.2). Sulu has a much bigger share of the poor population while Lanao del Sur has a much lower share compared to its area share (Table 5.2).

IV. The Priority Regions And The Provinces Under KALAHI-CIDSS

From the summary table (Table 6), the following are submitted for consideration in our development efforts:

1. Give very high priority for ARMM and Region VIII;
2. Give high priority to Regions I, II, V, IX and CARAGA
3. Recognize the high potential of Regions IV, VI and XI; and
4. Address the population issue in Regions III and VII

On the other hand, using per capita income, income per square kilometer, poverty incidence and poor population density as basis, the provinces are ranked and compared with the 44 KALAHI-CIDSS[11] program provinces. It is noteworthy that after incorporating population and land area dimensions to the basis of the KALAHI provincial ranking[12], the list of the 44 priority provinces did not change much. Leyte, Quezon and South Cotabato which belong to the 44 provinces have ranks 45th, 46th and 49th, respectively. In lieu of them, Basilan, Apayao and Southern Leyte should come in.

IV. Concluding Remarks

By inter-relating various social and economic indicators through the use of concentration indices, one is able to analyse the distribution of development gains/losses across various geographical areas and across sectors. In this paper, the distribution of the production of goods and services, total family income and the poor across regions/provinces in relation to the distribution of land area and population was analysed. However, concentration indices can be used to analyse other indicators of interest. For example, the distribution of taxes collected by the government can be analysed across regions/provinces and the AGCI may be able to pinpoint areas where tax evasion may be happening. Likewise, the AGCI can be used as a summary measure of the equitable distribution of financial resources, services and assistance, like expenditure on social services, and infrastructure projects to the different regions of the country or to the different sectors of society. Thus, the AGCI can be used to gauge if the program

[11] Kapit-Bisig Laban sa Kahirapan – Comprehensive and Integrated Delivery of Social Services.
[12] Based on the official provincial poverty incidence released by the NSCB.

interventions are contributing to the government's goals of good governance and growth with equity and help in answering questions whether there are imbalances and disparities across regions/provinces or across sectors in our development efforts. It is therefore hoped that through the AGCI presented in this paper, policy makers and planners will be able to formulate more effective poverty reduction strategies on our way towards rebuilding our nation.

Finally, it is important to emphasize that effective tools for decision making require the generation and dissemination of statistics, which in turn require resources.It is therefore imperative that the government and the private sector cultivate the political will to give top priority to statistical activities in the allocation of even our limited resources. Unless this happens, we will continue to lag behind our competitors, who are almost always unfriendly!

ACRONYMS

ARMM	AUTONOMOUS REGION OF MUSLIM MINDANAO
AGCI	ADJUSTED GEOGRAPHIC CONCENTRATION INDEX
CAR	CORDILLERA AUTONOMOUS REGION
FIES	FAMILY INCOME AND EXPENDITURES SURVEY
GCI	GEOGRAPHIC CONCENTRATION INDEX
GDP	GROSS DOMESTIC PRODUCT
GRDP	GROSS REGIONAL DOMESTIC PRODUCT
KALAHI	KAPITBISIG LABAN SA KAHIRAPAN
MTPDP	MEDIUM TERM PHILIPPINE DEVELOPMENT PLAN
NCR	NATIONAL CAPITAL REGION
NSCB	NATIONAL STATISTICAL COORDINATION BOARD
NSO	NATIONAL STATISTICS OFFICE
PSS	PHILIPPINE STATISTICAL SYSTEM

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