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INCOME INEQUALITY IN THE PHILIPPINES, 1961-91:

TRENDS AND FACTORS

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

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By

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We certify that we have read this dissertation and that, in our opinion, it is satisfactory in scope and quality as a dissertation for the degree of Doctor of Philosophy in Economics.

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ABSTRACT

Based on the Family Income and Expenditures Surveys from 1961 to 1991, we have found that except for a sharp decline in 1985, the Philippines is characterized by a high degree and fairly stable income inequality. Eight possible explanations for the aggregate trends were examined: the increasing proportion of (1) urban, (2) female-headed, (3) elderly-headed and (4) college-headed households, (5) shift of household population to skill-intensive jobs, (6) the rise in wage income inequality, (7) increasing inequality in the distribution of agricultural landholdings, and (8) introduction of new rice technology.

The slight decline in inequality from 1965 to 1971 is accounted for largely by the decline in "within-group" inequalities although Factor (5) has contributed, albeit minimally. From 1971 to 1985, the remarkable improvement in inequality is contributed substantially by the decrease in "within-group" inequalities whose favorable impact on the distribution of income overwhelmed the inequality-increasing influence of Factors (1), (2), (3), and (4) and the increase in income gap between college-headed households and the zero-education household group. The increase in inequality from 1985 to 1991 is explained by the increase in "within-group" inequalities, by Factors (1), (4), and (5), by the increase in income gap between rural and urban, between professionals and agricultural, and between college-headed and zero-education households, and by Factor (6), the general rise in wage income inequalities. Factors (7) and (8) were responsible for the decline in agricultural household income inequality from 1971 to 1991. The income concentrating effect of land concentration declined due to the spread of new rice technology, the implementation of land reform and the emergence of off-farm employment. The introduction of the new rice technology improved the distribution of income by increasing the amount of output accruing to hired labour and tenants vis-a-vis the landlord.

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CHAPTER 1
OVERVIEW OF THE STUDY AND THE DATA SET

1.1 An overview

The inverted U curve of Kuznets (1955) predicts a tendency for income inequality to rise in the early stage of development and then fall after the peak is reached. This seems to be the pattern followed by most of the Asian countries especially those in East Asia (Table 1.1). The Philippines seems to be an exception. Inequality is high in the Philippines and the trends are stable although the peak appears to have been reached in the 1960s and the downward tail seems to be in the 1980s. The rising portion of the Philippine curve is speculated in the 1950s when land was increasingly concentrated in the hands of the landlord group. This high degree of income inequality was combined with a low per capita GNP. In the 1970s, vis-a-vis the neighboring Southeast Asian economies, the GNP per capita of the Philippines was only about one-sixth of Singapore's, approximately one-half that of Thailand's and Malaysia's, and about three times that of Indonesia's. In the middle to late 1980s, the Philippine GNP per capita was less than one-tenth that of Singapore's, approximately half that of Thailand's, about one-third that of Malaysia's, and about three-fourths that of Indonesia's. In general, the Philippine GNP per capita was far below that of the East Asian economies of Japan, South Korea, Taiwan and Hongkong. The GNP per capita gap between these countries and the Philippines has risen since the 1970s. The Philippine GNP per capita, however,

was higher than that in South Asian countries of Bangladesh, Sri Lanka, India, Pakistan and Nepal.

This dissertation explores the trends and the factors affecting household income inequality in the Philippines for the three decades from 1961 to 1991. We investigate eight factors typically cited as causing changes in household income inequality. These are: (1) the rising proportion of urban households, (2) changes in household composition, (3) age distribution changes, (4) the increasing proportion of the highly educated, (5) changes in occupational structure, (6) changes in wage income inequality, (7) changes in the distribution of agricultural lands, and (8) technical change in rice farming.

(1) Rising proportion of urban households. The income distribution of the total population can be viewed simply as a combination of the income distributions of the rural and urban populations. The distribution of income within the urban population is generally somewhat wider than that of the rural population due to the heterogeneity of the urban group. As the economy develops and its industrial structure shifts away from agriculture towards industry and services, the urban population rises. The increasing number of urban population means an increasing share of the more unequal of the two component distributions.

(2) Changes in household composition. There has been an increase in the number of female-headed households, a factor likely to provide a disequalizing influence. Female-headed households tend to have lower income than those male-headed, so an

increase in their numbers would mean a growing number of households with low incomes.

(3) Age distribution changes. With greater longevity, we expect growing numbers of the elderly. Because the incomes of elderly people are typically lower than that of the young, an increasing number in the elderly group widens the income gap between the elderly group and the young.

(4) Increasing proportion of the highly educated. With increasing demand on skills and higher education, households tend to invest more in human capital. The distributional impact of the rise in the number of the highly educated is multi-faceted. The rise may increase the overall inequality as it induces an increase in the income differentials between those who have higher education and those who have not. On the other hand, the rise may decrease the overall inequality for the inequalities associated with the educated groups tend to be lower such that an increase in their numbers means an increase in the weight attached to the group with lower inequalities.

(5) Changes in occupational structure. The shift of the economy from agriculture to industry and service sectors creates a wide range of occupations from professional, technical, and administrative, to more traditional ones such as farming, clerical, and manual work. The increasing segmentation of the labour market is a disequalizing influence because it widens the income differentials between the newly created jobs associated with higher compensation and more traditional work with lower pay.

(6) Changes in wage income inequality. Inasmuch as wage income comprises a substantial portion of the total household income, substantial portions of the changes in total income inequality can be explained by changes in wage income inequality. Changes in wage income inequality, on the other hand, can be traced from either (or both) the wage rates inequality changes or (and) changes in inequalities associated with hours of work.

(7) Changes in the distribution of agricultural lands. Agricultural land is a form of income-earning asset. Increasing concentration of agricultural holdings may provoke an unequal distribution of income if agricultural households depend for their incomes solely on the earnings generated by land. From 1971 to 1991, there has been an increasing concentration of agricultural lands when agricultural household income inequality has declined. This is seemingly an indication that the tie between land concentration and income distribution has been loosened.

(8) Technical change in rice farming. Technological change induces changes in the allocation of resources because it induces changes in the use of different factors of production. The use of one factor relative to others is dependent on the factor-using (or factor-saving) bias of the new technology, while factor payments are explained by the relative factor use and factor prices. The introduction of the modern varieties (MVs) of rice in 1966 is the most important technological advance in Philippine agriculture. Since the first MV, there has been further improvements in the genetic characteristics of the new seeds from the "first-generation MVs", which were susceptible to multiple pests and

diseases, to the more improved "second-generation MVs", which are of shorter-growth duration and are resistant to multiple pests and diseases. The continuing evolution of new rice seeds may have induced changes in factor use, which may have altered the payments accruing to different factors of production in rice farming (land, labor, capital, and current inputs). Changes in the factor payments, in turn, may have profound income distributional consequences as factor payments are translated directly to earner's income.

Factors (1), (2), (3), (4), and (5) are "income recipient" influences hence their impacts are examined using population sub-group decompositions. Changes in wage income inequality are an "income source" influence so its effects are analyzed using factor component decompositions. We investigate the link between land concentration and agricultural household income inequality by looking at the absolute magnitude and at the trends of their respective concentration ratios. Because there is some speculation that the influence of land concentration on the distribution of income of agricultural households has declined, we examine three potential factors that may be responsible - - the introduction of the new rice technology, the implementation of land reform, and the emergence of off-farm employment. And, finally, the distribution of income as it is affected by the new rice technology is analyzed by comparing the factor shares and earners' shares in rice production in the period before MV, the period of the first-generation MVs, and during the time of the second-generation MVs.

The rest of this chapter desribe the data set and the cross-checking of the household income surveys with the national accounts. Chapter 2 shows a decomposition

of the overall inequality into the "within-group" and "between-group" inequality components. Households are divided into sub-populations corresponding to the groupings based on sector (urban or rural) and on characteristics of heads such as sex, age, education, and occupation. Chapter 3 provides decomposition of the total income inequality into the contributions of various income sources, with a special focus on the inequality contribution of wage income. Chapter 4 re-examines the linkage between land concentration and income distribution and looks at how this linkage has been affected by the introduction of new rice seeds, the implementation of land reform, and the increasing availability of off-farm employment. Chapter 5 explores how the returns to factors of production in rice farming have been affected by the introduction of and subsequent improvements in, genetic characteristics of the new rice seeds. Finally, a summary and some implications are found in Chapter 6.

1.2 The data set

The major statistical base for this study is the Family Income and Expenditures Surveys (FIES) of the Philippine government National Statistics Office (NSO)[1]. Sample sizes are fairly large[2] and, for thirty years, the surveys were conducted fairly regularly at approximately five-year intervals. The data are available for 1961, 1965, 1971, 1975, 1979, 1985, 1988, and 1991. The surveys in 1975 and 1979 were not published because of serious under reporting of income. When compared with the National Income

[1] The Bureau of Census and Statistics in 1961, 1965, and 1971; the National Census and Statistics Office in 1985; and the National Statistics Office in 1988 and 1991.

[2] The number of household respondents were 6,977 in 1961; 4,747 in 1965; 11,659 in 1971; 16,971 in 1985; 18,922 in 1988; and 24,789 in 1991.

Accounts (NIA), FIES in 1975 and 1979 captured less than half of the NIA Personal Income. Mangahas and Barros (1980) suggest that the reason for the under coverage could be due to the failure to draw a meaningful number of survey respondents from the residential enclaves of the rich. Common to all household surveys in developing countries, another reason might be the serious under reporting of non-cash income. Such non-cash items include food and other goods produced and consumed at home, basic goods provided free or at subsidized rates by the government, and goods or services provided by the employer (such as housing and meals). Excluding 1975 and 1979 however, FIES can be considered a fairly good series, in fact the only one available, from where to draw income distribution trends at the national level.

In measuring inequality, decision must be made about whether to measure the distribution of income or consumption. Conceptually, consumption is better because the spending unit may try to smooth its consumption across seasons or years by saving or dissaving, as needed. Income, on the other hand, is volatile, as it may be temporarily high or low. We nevertheless use income as our basis because, as will be discussed later, FIES income estimates relative to consumption is consistently closer to the NIA Personal Income[3] estimates.

Household is the basic recipient unit. Using FIES, it is impossible to look at individuals because all income and consumption expenditure data pertain to households.

[3] The Personal Income in the NIA as a proportion of the Gross National Product is 89 per cent in 1961, 83 per cent in 1965, 79 per cent in 1971, 78 per cent in 1985, 78 per cent in 1988, and 81 per cent in 1991.

A household (or a family)[4] is defined as a group of persons related by blood, marriage, or adoption, living together and sharing arrangements for meals and lodging.

For the purpose of examining the trends in income inequality, it is preferable but not necessary to make adjustments for family size. Such adjustments can be done by expressing household income on a per-capita or an adult-equivalent basis. We cannot, however, do this for the earlier FIES in 1961, 1965, and 1971, since we are limited to published tabulations only. And to avoid problematic computations we choose the simplest and most straightforward per capita adjustments for the FIES in 1985, 1988, and 1991 when individual household data (on tapes) are available.

Reports of income were for the reference period of one year in the 1961, 1965, and 1971 surveys. A year is probably too long a reference period to minimize recall and reporting errors but we find this problem not too serious to cause severe underestimation. For the later FIES, in 1985, 1988, and 1991, household respondents were interviewed twice for a reference period of six months. The two-period (instead of one-shot) visits apparently minimized recall problems for the FIES income estimates vis-a-vis the NIA have improved substantially since 1985.

Fields (1994) set three minimal standards by which to judge data for admissibility. These are: (1) the data base must be an actual household survey or census;

[4] With the FIES definition, there is no difference between a "household" and a "family". Conceptually however, a family denotes nuclear (head and dependents) plus any extended families living with them, while a household may include not only families but also groups of families or unrelated individuals living together and pooling their resources for the purposes of meals and lodging.

(2) the data must be national in coverage; and (3) for comparisons across time, the income concept (whether income or expenditure) and recipient unit (whether household, individual, or per capita) must be constant. While all these criteria are satisfied by the FIES, we find two discouraging aspects in this data set.

We test the reliability of the income and expenditure data from the FIES by comparing it against the personal income and consumption expenditures from the NIA[5]. It maybe assumed that the personal income and consumption expenditures from the NIA is more reliable because they are built from data in production and government accounts, which are, in turn, based on a number of censuses and surveys. In general, incomes from the household surveys capture more than 60 per cent of the personal income from the household accounts (Table 1.2). This proportion has risen to 70 per cent in the mid-1980s, perhaps due to the improvement in the NSO data collection by way of periodical visits. Philippine FIES income coverage is comparable to neighboring countries. For example, in Japan, incomes from the household surveys were 77 per cent of the personal income from the household accounts in 1984, in Taiwan it was 71 per cent in 1988, and in Thailand it was 65 per cent in 1986.

It is better to check the reliability of components of personal income (wages and salaries, proprietor's income, and property income) by comparing it against the respective

[5] There are slight conceptual differences between the personal income from the household surveys and the household accounts. The latter includes income from non-profit institutions such as churches, private schools, clubs, associations, etc. The income of such institutions comprise a very minor portion of the personal income from the household accounts.

components in the national accounts. The Philippines, however, do not have the estimates of the components of personal income in its national accounts.

With respect to personal consumption expenditures, the discrepancy between the FIES and the NIA remained somewhat steady in 1961, 1965, and 1971, but substantially increased in 1985 and 1988. This increasing discrepancy has lead us to compute the degree of inequality from the income data.

Another worrisome aspect of the FIES is the ever changing definition of the term "urban areas". In 1961 FIES, urban areas included all places within the boundaries of chartered cities, provincial capitals, Metropolitan Manila (Manila and adjacent cities and municipalities), and the *poblaciones* (town centers) of municipalities other than provincial capitals. There was no reference to population density.

In 1965 FIES, the definition of urban areas followed that of the 1960 Population Census. Here, urban places consisted of all municipalities with a population density of at least 1,000 persons per square kilometer; the town centers of municipalities with a population density of at least 500 persons per square kilometer including all contiguous villages (*barrio*) of at least 2,500 inhabitants; the *poblaciones* (regardless of population size), plus barrios having at least 2,500 or more inhabitants and contiguous to the *poblacion* of cities and municipalities with a population of at least 20,000 persons; and all other *poblaciones* having a population of at least 2,500 persons.

The 1971 FIES used a slightly different definition from that of the 1965 survey. Following the definition of urban areas used in the 1970 Population Census, the 1971

FIES also took into account the presence and number of public infrastructure and facilities, i.e. public buildings, plazas, streets, hospitals, etc. The 1985, 1988, and 1991 surveys followed the definition employed in the 1971 survey.

These changes in the definition of the urban areas may create a systematic downward bias in the estimates of urban inequalities. Because rural areas have lower levels of inequalities, the re-classification of rural to urban areas will tend to decrease urban inequalities, which might appear as an improvement, although, of course, the decline in urban inequalities may have come about because of the change in definition.

Table 1.1 Trends in Household Income Inequality in Selected Asian Economies, 1970-1991

Economy	Year of Survey	GNP Per Capita (Current US $)	Gini Coefficient
East Asia			
Japan	1970	1,940	0.41
	1975	4,940	0.36
	1980	10,440	0.33
	1985	10,950	0.35
South Korea	1971	310	0.36
	1976	780	0.37
	1980	2,330	0.39
	1982	1,890	0.36
	1985	2,260	0.41
	1987	3,230	0.46
Taiwan	1970	389	0.32
	1975	964	0.31
	1980	2,344	0.30
	1985	3,297	0.32
	1987	5,275	0.33
Hongkong	1971	1,020	0.44
	1973-74	1900[a]	0.42
	1976	2,790	0.44
	1979-80	5060[a]	0.40
	1981	6240	0.48

Table continues on the following page.

Table 1.1 (Continued) Trends in Household Income Inequality in Selected Asian Economies, 1970-1991

Economy	Year of Survey	GNP per Capita (Current US $)	Gini Coefficient
Southeast Asia			
Singapore	1972	1,270	0.44
	1974	2,240	0.43
	1979	4,060	0.42
	1984	7,330	0.47
Thailand	1975-76	410[a]	0.43
	1980-81	745[a]	0.45
	1985-86	830[a]	0.50
	1988	1,190	0.43
	1990	1,530	0.40
Malaysia	1970	390	0.51
	1973	600	0.52
	1979	1,470	0.49
	1984	1,940	0.48
	1988	2,130	0.44
Indonesia	1970	80	0.45
	1976	270	0.49
	1978	370	0.51
	1982	590	0.45
	1987	520	0.37

Table continues on the following page.

Table 1.1 (Continued) Trends in Household Income Inequality in Selected Asian Economies, 1970-1991

Economy	Year of Survey	GNP per Capita (Current US $)	Gini Coefficient
Philippines	1965	188	0.51
	1971	220	0.49
	1985	520	0.45
	1988	680	0.45
	1991	760	0.48
South Asia			
Nepal	1976-77	120[a]	0.50
Bangladesh	1973-74	95[a]	0.36
	1976-77	125[a]	0.45
	1981-82	165[a]	0.39
	1983-84	140[a]	0.35
	1988	190	0.39
Sri Lanka	1970	170	0.37
	1973	230	0.35
	1981	300	0.31
	1985	370	0.43
India	1975-76	175[a]	0.41
Pakistan	1970-71	170[a]	0.33
	1980	290	0.51
	1984	360	0.44

[a] Average

Sources: The World Tables (various issues) and Taiwan Statistical Yearbook (1994) for GNP per capita, Oshima (1993) for the Gini coefficients of all Asian countries but the Philippines, and Author's computations for the Philippine Gini.

Table 1.2 Comparison of the NIA and FIES Personal Income and Consumption Expenditures, the Philippines, 1961-91

Year	FIES Aggregated Household Income (million pesos) (A)	NIA Personal Income (million pesos) (B)	Ratio (A)/(B) (C)
1961	7,985	12,680	0.630
1965	13,025	19,387	0.672
1971	23,712	39,276	0.604
1985	305,775	466,644	0.655
1988	425,650	621,453	0.685
1991	780,632	1,028,028	0.759
	FIES Aggregated Consumption Expenditures (million pesos) (A)	**NIA Personal Consumption Expenditures (million pesos) (B)**	**Ratio (A)/(B) (C)**
1961	7,935	12,680	0.626
1965	14,748	19,387	0.761
1971	28,428	36,832	0.772
1985	264,550	469,133	0.564
1988	343,594	603,281	0.570
1991	628,568	916,367	0.686

Sources: NIA (various issues), FIES (various issues), Philippine Statistical Yearbook (various issues)

CHAPTER 2
ANATOMY OF INCOME INEQUALITY IN THE PHILIPPINES 1965-91: SUB-GROUP DECOMPOSITIONS

2.1 Introduction

The major purpose of this chapter is to identify the factors affecting household income inequality and to investigate the principal causes of the changes in aggregate inequality. Towards this aim, we quantify the contributions of income recipient influences to the level of aggregate inequality and the contributions of these influences to the intertemporal changes in inequality. To identify the factors for each separate year, we estimate the proportion of the aggregate inequality that is accounted for by the income gap between household groups based on: (1) sector (rural or urban); (2) sex; (3) age; (4) education; and (5) occupation of heads. We then quantify how much of the changes in aggregate inequality emanate from changes in factors associated with income recipients such as: (1) the rise in the proportion of urban households; (2) the increase in the number of female-headed households, (3) age distribution changes, (4) the increase in the proportion of highly educated, and (5) changes in the occupational structure.

To proceed, the population is divided into mutually exclusive sub-groups, and afterwards, the national inequality is decomposed into "within-group" and "between-group" inequality components[1]. The within-group component is the inequality

[1] This is the standard technique in analyzing the personal or size distribution of income. The size distribution is concerned with how the national income flows across groups of micro recipient units in the population. Kuznets' (1963) work is the first and probably the best-known decomposition of the size distribution of income. The other technique is the functional distribution of income which disaggregates the total household

contribution of the inequalities associated within each of the population sub-group, while the between-group component reflects the inequality contribution of the income gaps between sub-groups. The subdividing factor can be considered as a significant influence on the level of national inequality if, in general, the between-group component comprises at least one-fifth of the aggregate inequality. To look closely at the extent the changes in income recipient factors exert influences on intertemporal changes in aggregate inequality, we decompose the change in inequality between two years into three components corresponding to the influence of: (1) the changes in group inequality values, (2) shifts of population shares, and (3) changes in group mean incomes. If the combined effects of (2) and (3) is comparable to (1), then the change in the relevant income recipient factor can be considered as a significant influence affecting the intertemporal change in inequality. We use the FIES household income data for 1965, 1971, 1985, and 1991, and the per capita household income for 1985 and 1991; 1991 data were the most recently available when the study began. We disregarded the FIES in 1961 and 1988 in our analysis because the distribution of income in 1965 appears to be similar to that in 1961 and the 1985 distribution is similar to that in 1988.

In the United States (Levy and Murname, 1992) and the United Kingdom (Jenkins, 1995), examinations of the trends in aggregate inequality showed that the within-group inequality component dominates the between-group and for any relevant groupings; the largest contribution to changes in aggregate inequality is made by the

income into various sources to estimate the contributions of the various income components to the total income inequality.

changes in the within-group component. In the United States the rise in income inequality in the 1980s is traced from the rise in inequality in earnings among male heads (Burtless, 1993; Juhn, Murphy, and Pierce, 1993; Blackburn and Bloom, 1991) which, in turn, has come from the increase in wage-rates inequality. Jenkins (1995) and Johnson and Webb (1993) showed similar trends and identified the same sets of factors in the United Kingdom. The widening income distribution in the 1980s is due to, in addition to the rise in earnings inequality, changes in employment structure, particularly the movement towards self-employment and the growth in unemployment, and the rising disparity in income from investments.

In less developed countries (LDCs), size decompositions were undertaken in the whole of India by Mishra and Parikh (1992), in rural India by Nugent and Walter (1982), in Greece by Tsakloglou (1993), in Sri Lanka by Glewwe (1986), in Malaysia by Anand (1983), and in Colombia by Fields and Schultz (1980). These studies come up with similar results suggesting that intragroup inequality contributes much more to the national inequality and that changes in intragroup inequality contribute considerably more to the changes in the national inequality than do the intergroup inequality changes. Also, the contributions of the observed sectoral and regional income disparities are only minor, never more than one-fifth of the total inequality. In contrast, the Chinese inequality has been investigated to be spatial in nature, where approximately two-thirds of the total inequality originating from between-provinces inequality, which, according to Knight and Song (1993), may be due to strict goverment controls over the movement of

the rural population to urban and more developed rural areas. More importantly, if households in LDCs are grouped according to socio-economic characteristics of head, education is shown consistently to account for a relatively substantial portion of the aggregate inequality.

In the Philippines, the size distribution of income is examined carefully for the purpose of relating it to the incidence of poverty. Since the poor are concentrated in rural areas (Balisacan, 1993, 1992; Oshima, 1995, 1994), it is not surprising the focus are inter-sectoral and inter-regional inequalities. Accordingly, there exist large household income discrepancies between sectors and regions but such gaps explain, on the average, no more than 20 per cent of the national inequality (Balisacan and Bacawag, 1994; Ching, 1991; and Terasaki, 1985)[2], thus arguing against the conclusion that inter-sectoral and inter-regional income differentials are the major determinants of the overall inequality. Demographic characteristics of head have not been found to have a large impact either. Educational attainment of head appears to be the more significant factor as it can explain as high as 40 per cent of the total inequality (Ching, 1991; Encarnacion, 1978).

[2] All these studies use the FIES income or expenditure data, at the household or per capital household levels, for different survey years. Balisacan and Bacawag (1994) used expenditure per capita for 1985, 1988, and 1991 and their estimates of inter-sectoral and inter-regional inequality range anywhere between 15 to 20 per cent of the national inequality; Ching (1991) utilized income per capita for 1985 and her estimates of between-sector inequality is 25 to 27 per cent while the between-region is 22 to 24 per cent; household income data for 1961, 1965, and 1971 were used by Terasaki (1985) and his estimates of between-sector inequalities are 10 per cent for 1961, 10 per cent for 1965, and 7 per cent for 1971.

The organization of the chapter is as follows. Section 2.2 provides a general overview of the income shares of quintile groups of households in the population. The description of the chosen inequality indices is given in Section 2.3, while the results of the decomposition procedures for separate years follow in Section 2.4. In Section 2.5 can be found the decomposition of the intertemporal change in inequality while Section 2.6 offers a summary and conclusion.

2.2 Trends in income inequality: A snapshot

To get a disaggregated picture of the trends in income inequality, we present in Table 2.1 the distribution of income shares among quintile group of households and the Gini coefficients of income inequality. For almost three decades, between 1961 and 1991, household income inequality is relatively high and fairly steady, except for a secular decline in the mid-1980s; the Gini coefficients are 0.503 in 1961, 0.505 in 1965, 0.490 in 1971, 0.452 in 1985, 0.447 in 1988, and 0.477 in 1991[3]. The decrease in income inequality in 1985 was due to the rise in the income shares of the two lowest and middle quintiles at the expense of the two highest quintiles: the two lowest quintiles shares rose from 12 per cent in 1971 to 15 per cent in 1985, while the share of the middle quintile

[3] We computed the Lorenz curve coordinates for each 20 percentage points of the population for survey years 1961, 1965, 1971, 1985, 1988, and 1991. The Lorenz curve for 1985 overlaps with that of the 1988, hence precluding us from making statements about the relative inequality of income distributions for those two years. Moreover, the Lorenz curves for 1985 and 1988 are positioned closer to the diagonal (the line of perfect equality) and lies inside the intersecting Lorenz curves for 1961, 1965, 1971, and 1991, implying that the income distribution in the mid-1980s is more favorable. The reader may refer to the work of Bishop, Formby, and Smith (1991) for description of a more sophisticated technique of ranking large numbers of income distributions through the principle of Lorenz dominance.

increased from 13 per cent in 1971 to 14 per cent in 1985. Moreover, the income ratio between the highest and lowest quintiles declined from 14 in 1971 to 9 in 1985 (not shown here).

These macro trends are strongly supported by the micro-level trends. In a case study of a rice-producing village in Laguna Province, Hayami and Kikuchi (1989) similarly found no appreciable change in the size distribution of income, with the Gini coefficient of income inequality in the village remaining almost constant from 0.467 in 1974 and 0.478 in 1987. The Gini coefficient computed from our sample households drawn from all over the Central Plains of Luzon are also close to the national estimates and shows similar trends as well; the Gini is 0.475 in the 1966-67 cropping year, 0.373 in 1986-87, and 0.403 in 1990-91. It is noticeable that both the macro and micro evidences exhibit declining inequalities in the mid-1980s.

2.3 Decompositions of inequality indices

One decision to make in the study of income distribution is the choice of inequality measures[4]. A desirable inequality index satisfies four properties: (1) the Pigou-Dalton condition, (2) mean independence, (3) population-size independence, and (4) additive decomposability.

The Pigou-Dalton condition holds if an income transfer from a wealthier to a poorer person that does not reverse their relative income ranks decreases the value of the index. Mean independence holds if, when all incomes are multiplied by a constant factor

[4] A good survey of different inequality measures is given by Shorrocks (1980), Anand (1983), Fields (1980), Kakwani (1980), and Oshima and Barros (1976).

k, the value of inequality index is unchanged. Population-size indepence holds if, when the number of people at each income level is changed by the same proportion, the value of the index remains the same. Additive decomposability allows the inequality index to be expressed as the sum of the within- and between-group inequality components. The within-group component can be defined as the value of inequality index when all the between-group inequalities are suppresed by a hypothetical equalization of the group mean incomes to the overall mean. This can be achieved by an equiproportionate change in the income of every person within a group. The between-group component can be defined as the value of the inequality index when all the within-group income differences are artificially suppressed by hypothetically assigning to each person within a group the mean income of the group.

We choose the Theil index T, the Theil second measure L, the variance of log income V, and the Gini coefficient G, as our inequality indices. The first three measures obey all the desirable properties of a distribution index while the Gini coefficient, although it obeys the first three properties, may not by definition be written as the sum of the between- and within-group inequality components[5]. According to Shorrocks (1980)

[5] It is important to note that while the Gini is not additively decomposable, the value of the index can be separated out into the contributions of various income sources to the overall inequality (See Chapter 3 for the general description and Anand ,1983, p. 318) for proofs. Also, Lambert and Aronson (1993), using a fine geometric approach, argued that the Gini coefficient can be rehabilitated, to make it additively decomposable, by adding a residual term to the between- and within-group components, The residual, which represents the frequency and the magnitude of the overlaps between incomes in different sub-groups, is equal to the difference between the Gini coefficient and the sum of the between- and within-effects.

and Cowell and Kuga (1981), the Gini coefficient does not belong to what is referred to as Generalized Entrophy indices, a family of inequality measures which can be neatly written as the sum of the between- and within-group effects. We nevertheless include the Gini coefficient because this index is sensitive to changes in the middle income range. Theil L and V are sensitive to changes in the lower income levels while the sensitivity of Theil T is to changes in the upper income range.

The decomposition of our choice indices can be demonstrated in terms of notations. Let us define the following terms.

y_i = income of the i-th household

n = number of households in the population

m = arithmetic mean income of the population

m*= geometric mean income of the population

n_j = number of households belonging to the j-th group

m_j = arithmetic mean income of the j-th group

m_j = geometric mean income of the j-th group

F_i, F_{i-1} = cumulative income shares up to the i-th and i-th minus 1 household, respectively

Following Tsakloglou (1993) and Anand (1983), the formulas for the T, L, V, and G respectively are,

$$T = \frac{1}{n}\sum_i \frac{y_i}{m}\log\frac{y_i}{m} \quad (2.1)$$

$$L = \frac{1}{n}\sum_i \log\frac{m}{y_i} \quad (2.2)$$

$$V = \sum_i (\log m^* - \log y_i)^2/ \quad (2.3)$$

$$G = 1 - \sum_i \frac{1}{n}(F_i + F_{i-1}) \quad (2.4)$$

and the decomposition equations for T, L, and V, when households are segregated into mutually exclusive and exhaustive groups, are

$$T = \Sigma_j \left(\frac{n_j}{n}\frac{m_j}{m}\right) T_j + \Sigma_j \left(\frac{n_j}{n}\frac{m_j}{m}\right) \log\left(\frac{m_j}{m}\right) \quad (2.5)$$

$$L = \Sigma_j \left(\frac{n_j}{n}\right) L_j + \Sigma_j \left(\frac{n_j}{n}\right) \log\left(\frac{m}{m_j}\right) \quad (2.6)$$

$$V = \Sigma_j \left(\frac{n_j}{n}\right) V_j + \Sigma_j \frac{n_j}{n}\left(\log m_j^* - \log m^*\right) \quad (2.7)$$

where T_j, L_j, and V_j are the Theil indices (T and L) and the variance of log income corresponding to the j-th household group. Now, if we define

$v_j = \frac{n_j}{n}$, the population share of the j-th group
$k_j = \frac{m_j}{m}$,arithmetic income share of the j-th group
$k_j^* = \frac{m_j^*}{m}$,geometric income share of the j-th group,

we can rewrite Equations (2.5), (2.6), and (2.7) respectively, as

$$T = \Sigma_j v_j k_j T_j + \Sigma_j v_j k_j \log k \quad (2.8)$$

$$L = \Sigma_j v_j L_j - \Sigma_j v_j \log k_j \quad (2.9)$$

$$V = \Sigma_j v_j V_j + \Sigma_j v_j \log k_j \quad (2.10)$$

The first term of Eqs. (2.8), (2.9), and (2.10) (the within-group component) is a simple weighted sum of the sub-group inequality values. The second term is the between-group component, reflecting the inequality contribution due solely to differences in the sub-group means[6]. Notice that while L and V use population shares as weights, T uses income shares. L and V are considered strictly decomposable indices because their between-group components measure the exact reduction in overall inequality when group

[6] The proportion of the within-group inequality component tends to be arbitrary in relation to the between-group component. When households are separated into infinitesimal groupings according to criterion of interest, the within-group component declines because households belonging to those groups are becoming more homogenous, hence the within-group inequalities corresponding to each of the groupings are lower.

means are equalized while, of course, keeping the within-group component constant. T is weakly decomposable for when income shares are used as weights, any changes in the group mean incomes affects the within-group component as well, such that the reduction in the overall inequality, when group means are equalized to the overall mean, is not be strictly equal to the between-group component.

2.4 Decomposition results for separate years

In this section are presented the decomposition results of the chosen measures of inequality for the separate years 1965, 1971, 1985, and 1991. We use sector and socio-economic characteristics of household head (the major earner) such as sex, age, education, and occupation as decomposition variables.

2.4.1 Sectoral decomposition

The substantial income gap between urban and rural households is traditionally thought to be the major factor responsible for the country's high income inequality. To estimate how much such disparities contribute to the total inequality, we apply decomposition procedures to household incomes in the two sectors. Here are what the data in Table 2.2 reveal.

First, real income of all households remained the same from 1965 to 1971, declined modestly by 7 per cent from 1971 to 1985, and then rose substantially by 26 per cent from 1985 to 1991. Notice that the trends in real incomes and income inequalities are similar as both exhibited declining trends from 1971 to 1985 and rising trends from 1985 to 1991.

Second, the urban share of population has risen dramatically from 30 per cent in 1965 and in 1971, to 38 per cent in 1985, and to 50 per cent in 1991, while the urban-rural income gap remained stable throughout the years. This has lead to a rise in the urban share of income from more than 50 per cent in 1965, to 56 per cent in 1985, and to 68 per cent in 1991.

Third, despite the two-fold income advantage of the urban households, the between-sector component makes up less than 20 per cent of the national inequality. That is, if we eliminate household income disparities between sectors, keeping the within-sector component at the same level, aggregate inequality declines by no more than 20 per cent. Our estimates fall within the range of the between-sector (or -region) inequality contribution in LDCs, calculated by several authors mentioned in the introduction.

Fourth, our measures of inequality altogether come up with higher values for urban households, once again confirming the "classic" observation that the degree of income inequality is greater among urban than among rural households. To explain this, we looked at the demographic composition and sector of employment of urban and rural heads but found no remarkable differences in the sex and age compositions (not shown here), indicating that demographic structure is not the major factor explaining the high level of inequality in the urban areas. What appears to be more significant are differences in employment structure. A large proportion of rural household heads are employed in agriculture (67 per cent in 1971 and 65 per cent in 1991) in contrast to urban heads a

large percentage of whom are employed in industries and trade (44 per cent in 1971 and 30 per cent in 1991) and in services (32 per cent in 1971 and 30 per cent in 1991)(Table 2.3). The income spread among urban households is wider because employees in major urban industries generate the highest incomes (finance, insurance, real estate, and professional services) and also the lowest (retail trade and personal services). Urban industries offer a variety of occupations where wages vary considerably in contrast to industries in rural areas, where the jobs available are homogenous and payments do not vary much. Another contributing factor to the large urban income dispersion is the presence of a larger pool of unemployed heads, 13 per cent in 1971 and 18 per cent in 1991, than among rural heads, with only 7 per cent in 1971 and 10 per cent in 1991.

Fifth, the per capita household income (total household income divided by the number of family members) is distributed more equitably, as shown by the lower inequality values, than the total household income. Households belonging to upper income groups have a larger number of members and this partially closes the per capita income gap between the highest and the lowest income groups.

Lastly, from 1965 to 1971, there was a decline in urban, a rise in rural, and a constant aggregate inequality, implying that the opposite trends of urban and rural inequalities are offsetting and so allowing the overall inequality to remain at the same level. From 1971 to 1985 a general improvement in income distribution occured simultaneously with a decrease in urban and rural inequalities. A reverse trend can be observed from 1985 to 1991 when the overall, urban, and rural inequalities rose.

2.4.2 Sex decomposition

Table 2.4 group households by gender of heads. Here are some observations drawn from this table.

First, while most households are headed by males, the proportion of female-headed has increased from 9 per cent in 1971 to approximately 14 per cent in 1985 and 1991.

Second, the income share of households headed by females likewise has risen from 9 per cent in 1971 to more than 15 per cent in 1985 and 1991. The major reasons are the shift of household population towards more female heads and the higher mean annual income of female- compared to male-headed households (higher by 12 per cent in 1985 and 1991). It is puzzling why female household incomes are higher despite the fact that households with male heads have a higher number of working members (1.7 in 1985 and 1991) than females (1.4 in 1985 and 1991). The Philippine case is unique for, in general, households with female heads have lower income than their male counterparts (See for example Blackburn and Bloom (1991) for the United States and Canada and Anand (1983) for Malaysia).

Third, not only do households with female heads have a higher income, the degree of income inequality among them is higher as well. Demographic structure does not seem to be the determining factor since we find no remarkable differences in the age profile of male and female heads (not shown here). Inequality is higher among female-headed households because a large proportion (31 per cent in 1985 and 29 per

cent in 1991) of their incomes come from domestic and foreign remittances. Female compared to male heads receive five times more cash remittances from their children working domestically or abroad. Remittance income in the Philippines does not promote equality because among the major income sources, it has one of the largest contribution to aggregate inequality (See Chapter 3 for a more intensive discussion).

Fourth, on a per capita basis, the annual income of female-headed households is even higher (approximately 50 per cent) than male-headed households, due to both higher total household income and smaller family sizes; the average family size of female households is about 4.2 in 1985 and in 1991 in comparison to about 5.6 for males.

Fifth, only 1 per cent of the aggregate inequality arises from disparities in household income between sex groups. The fact that Theil L yields a between-sex contribution of 1 per cent implies that if the between-sex differences in arithmetic mean income were eliminated, but the inequality within each sex group remained the same, the reduction in the overall inequality would be exactly 1 per cent. Similarly, the fact that V yields a between-sex contribution of 1 per cent implies that if differences in the geometric mean income between sexes were eliminated, holding constant the inequalities within sex groups, the reduction in the overall inequality would be only 1 per cent.

And finally, the distribution of incomes among households within female and male groups improved remarkably from 1971 to 1985. Given this, it is fair to say that the improvement in the distribution of income in 1985 is partly brought about by the decrease in the within-sex group inequality component. Between 1985 and 1991, the male- ,

female-headed household income inequality, and the aggregate together rose once again, pointing to the inequality within sex group as the component responsible.

2.4.3 Age decomposition

We divide households into six groups in Table 2.5 according to the age of heads. A close look at the table reveals a number of patterns.

First is the inverted U-shaped relationship between the age of head and the mean annual household income; mean household income rises initially with age of head, reaches its peak when the head is between 54 to 64 years of age, then declines thereafter.

Second is the positive relationship between the age of head and the inequality within age groups. All our indices reveal the lowest degree of income inequality among households whose heads fall in the youngest age bracket and the highest inequality among those in the oldest.

Third is the decline in the proportion of the two youngest groups of households (groups under 25 and those aged 25-34) and the rise in the proportion of the two oldest (groups aged 55-64 and aged 65 and over). The population share of the two youngest groups combined has declined from approximately 29 per cent in 1965 and 1971 to 22 per cent in 1985 and 1991, while the combined share of the two oldest has risen from approximately 22 per cent in 1965 and 1971 to 29 per cent in 1985 and 1991.

Fourth, because of higher annual incomes and the increasing number of households belonging to the two oldest categories, the combined income share of these groups has risen from 25 per cent in 1965 and 1971 to 31 per cent in 1985 and 1991.

Fifth, there is a marked upward movement in real incomes of the three middle-aged groups (groups aged 25-34, 35-44, and 45-54), possibly as a result of increased female participation rates. There are moderate increases in real incomes of the youngest and the two oldest groups.

Sixth, rising income inequalities from 1965 to 1971 are evident for all age groups except the group aged 45-54, whose inequality declined, and the group aged 55-64 ,whose income distribution remained fairly the same. From 1971 to 1985, the inequalities corresponding to all age groupings declined and in 1985 to 1991, all group inequalities rose.

Seventh, between 1965 and 1991, the two-fold income gap between the highest income group (group aged 55-64) and the lowest (group aged under 25) remained constant. For all survey years, the between-group inequality accounts for less than 5 per cent of the aggregate inequality. This proportion of the between-group component has declined since 1965, because of the shift of population towards older groups characterized by higher inequality values, which, *ceteris paribus*, shrinks the between-age (or augments the within-age) component.

Lastly, the between-group inequality as a proportion of the total is lower in terms of per capita, relative to total household income, because the per capita income differences between age groups do not appear to be substantial, indicating that older households have larger sizes.

2.4.4 Education decomposition

Table 2.6 shows decomposition procedures applied to household groupings based on educational attainment of heads. Several interesting findings emerged.

First, household incomes tend to increase with education of heads. This is expected since household income comes mainly from labour services of the head.

Second, the population share of households headed by those who have completed or have undergone some college education combined has risen (from 12 per cent in 1971 to 15 per cent in 1981 to 17 per cent in 1991) while the proportion of those whose heads have no education has declined (from 12 per cent in 1971 to 7 per cent in 1985 to 5 per cent in 1991).

Third, due to the increase in their numbers and incomes, the income share of the two college-headed household groups combined has increased. Contrastingly, household groups headed by those who have no schooling show a decline in income share as a result of the decline in their numbers and incomes.

Fourth, a negative relationship exists between the level of schooling of head and the degree of income inequality; that is, incomes are more favorably distributed (lower inequality values) among households headed by the more educated and less favorably distributed (higher inequality values) among the households with heads who have never ever gone to school. However, income inequality in the group with the more favorable distribution shows a tendency to rise gradually overtime.

Fifth, the mean income gap between the highest income group (college graduate) and the lowest (no education) is the largest among the groupings we have considered earlier (sector, sex and age of head) and has gone up from 4.6 in 1971 to 4.7 in 1985 to 5.7 in 1991. These considerable variations in yearly mean income is consistent with the human capital theory which suggests, in short, that in a perfectly competitive economy, the income of persons (households in our case) with different educational characteristics (of heads) should differ.

Sixth, the between-group component as a percentage of the aggregate inequality has risen from more than 20 per cent in 1971 to more than 30 per cent in 1985 and 1991. Two forces are responsible. First is the increase in household income gap between the highest and the lowest income groups, which tends to increase, in absolute and relative terms, the between-group component. Second is the shift of household population towards the more educated heads, which increases the weighting attached to the groups with lower inequality values. This explains the decline in the within-group component, which further magnifies the absolute and relative values of the between-group.

Seventh, the inequalities associated within each of the educational groupings appears to have declined from 1971 to 1985, except for those of the households headed by college graduates. From 1985 to 1991, all the within-group inequalities show a rise.

Finally, the between-group component is markedly higher, relative to total household income, in the case of the per capita income. It is interesting this has occured despite the narrower mean per capita income differentials between sub-groups which, on

the other hand, is due to the larger family sizes of the more educated. It may be that the lower inequalities associated with each sub-group have increased the between-group (or decreased the within-group) component substantially enough to overwhelm the downward effects of the narrower income gaps on the between-group component.

2.4.5 Decomposition by occupation

Households are subdivided into eight groups according to occupation of heads. Enumerated below are the results of the decomposition procedures drawn from Table 2.7.

First, households dependent on heads in agriculture, fishing, forestry, and hunting ("agriculture-based") comprise the biggest proportion (more than 50 per cent) of the household population, followed by those in production, transportation, and laborers ("production-related"), and by the service occupation. The population share of these three groups combined has remained about the same from 1965 to 1991, while the share of the "skill-intensive" occupations, such as professionals and technical; administrative, executive, and managerial; clerical; and sales, has risen and the share of the other occupation category has declined.

Second, the income share of the skill-intensive occupations has risen because of - - the three-fold (approximate) increase in the real income of households belonging to the administrative, executive, and managerial category and because of the increase in the population shares of household heads in the sales group. The income share of agriculture-based, production-related, and services combined has remained the same, and the share of the other category has declined.

Third, the inequalities associated within sub-groups are generally lower in occupational groups requiring more skills and education; that is, the lowest within-group inequality is observed in the professionals and technical category and the highest in agriculture-based. This result is consistent with schooling where the within-group inequality is lowest among households with highly educated heads (highly skilled) and highest among households with heads who have zero education (lowly skilled). While inequality is lower in the skill-intensive job category, the degree of income inequality in this group has tended to rise. Perhaps this is because of the substantial and increasing variability in the earnings of the more skilled heads, which could be due to the rising returns to education and skills. The rising payoff to education and skills, on the other hand, can be explained in part by changes in the supply of and the demand for different classes of labour. At the opposite extreme is the income distribution of households in the class of agriculture-based occupation, which has improved remarkably in 1971 to 1985. This group has experienced a decline in income inequality because a large proportion of its constituents are engaged in land-based agriculture where an income-distributing technical change (the seed-fertilizer technology) has occured, the benefits of land reform have accrued, and non-farm employment opportunities have easily become available (detailed discussion in Chapter 4).

Fourth, the contribution of the between-group component to the aggregate inequality is outweighed by the contribution of the within-group component. But even then the between-group component comprises more than 20 per cent of the aggregate

inequality (higher than in any other groupings except education) from 1965 to 1971 and this proportion has risen to a value close to 30 per cent in 1985 to 1991. The relatively high and rising between-group component has been brought about by the substantial and rising income gap between the highest income group (administrative, executive, and managerial) and the lowest (agricultural, fishing, forestry, and hunting). The mean income ratio has increased from 3.1 in 1965 to 4.16 in 1971 to 5.95 in 1985 to 7.3 in 1991.

Lastly, the per capita between-group component explains a larger portion of the aggregate per capita inequality relative to the between-group component of the total household income. This could have been caused by the lower within-group inequalities associated with each per capita sub-group. The income gap between the highest and the lowest income group is unlikely to explain the higher contribution of the between-group component in the case of per capita income because the income gap in both income levels are about the same implying that the household size of the two groups are not significantly different.

2.5 Intertemporal changes in inequality

This section is devoted to the measurement of intertemporal changes in inequality and to the decomposition of these changes in order to calculate the relative importance of various contributory influences. For purposes of presentation the true figures have been raised by a factor of 1000.

In Table 2.8 the changes in aggregate inequality between two sub-periods are decomposed into within- and between-group components for the three indices T, L, and V. The highlight of the table is that, in general, a large proportion of the change in aggregate inequality comes from the change in the within-group component. Other features of the table include the following:

First, from 1965 to 1971, the distribution of household incomes remained about the same. The values of the inequality indices show very little change.

Second, from 1971 to 1985, the within-group component declined substantially causing a significant decrease in the aggregate inequality. Moreover, if we compare the period 1965-71 with 1971-85, we find that the proportional reduction in the values of the within-group inequality component is substantially higher than the proportional reduction in the corresponding between-group component.

Third, from 1985 to 1991, aggregate inequality has risen, an effect which again can be traced from the increase in the value of the within-group component. If we group households separately, by education and occupation of heads, the contribution of the between-group component to the change in aggregate inequality has started to increase in the period 1971-85 and has continued to do so in 1985-91. Moreover, the contribution of the between-group component is even higher in the case of per-capita household income.

Lastly, it is noticeable that the decline in the aggregate income inequality from 1971 to 1985 and the rise from 1985 to 1991 is higher when households are grouped according to the occupation of heads. This may be because the households of the

unemployed are not classified by FIES in any occupational category in 1985 and 1991. These unemployed households are nevertheless included in all the FIES and in all the groupings but occupation in 1985 and 1991.

We will now examine the extent to which changes in different factors contribute to the changes in aggregate inequality. The decomposition pattern for the three indices T, L, and V are broadly similar such that even if we restrict our attention to one of the indices, our results will not be unduly affected. We focus on L because it is a strictly decomposable inequality measure.

Applying the difference operator to both sides of Eq.(9) (Mookherjee and Shorrocks, 1982) gives

$$\Delta L = \Sigma_j v_j \Delta L_j + \Sigma_j L_j \Delta v_j - \Sigma_j \log k_j \Delta v_j - \Sigma v_j \Delta \log k$$
$$\approx \Sigma_j v_j \Delta L_j + \Sigma_j L_j \Delta v_j + \Sigma_j (k_j - \log k_j) \Delta v_j + \Sigma_j (k_j - v_j) \Delta \log \qquad (11)$$

(Term A) (Term B) (Term C) (Term D)

where Δ represents the changes in the variables from year t to t+1 and the aggregation weights in Eq. (11) are the final periods for v_j, L_j and k_j.

Eq. (11) is an exact decomposition of the change in L into four terms which can be interpreted, respectively, as the impact of the changes in within-group inequality or the "pure inequality effects" (Term A), the effect of the changes in the population shares on the within-group component of inequality (Term B), the effect of the changes in population shares on the between-group component of inequality (Term C), and the influence of the changes in the relative mean incomes of groups (Term D). The sum of Terms B and C is the change in the aggregate inequality attributed to the changes in the

structure of population as reflected in the changes in the population shares of various groups.

The next step is to link the decomposition of the intertemporal change in inequality with the changes in the income recipient factors we are interested in. As a concrete example, take the rise in the proportion of urban households. The rise has distributional impact by way of (1) increasing the relative number of urban households and (2) increasing the urban-rural income gap. Quantitatively (1) can be represented as the sum of Terms B and C while (2) corresponds to Term D in Eq. (2.11). We can consider the increase in urban households as a significant influence on the intertemporal change in inequality if the sum of Terms B, C, and D overwhelms or at least is comparable to the magnitude of Term A.

Table 2.9 shows the results of the decomposition of the change in aggregate inequality using Theil L. A summary of our observations follows.

From 1965 to 1971, the contribution of the change in within-group inequality, in general, accounts for most of the change in aggregate inequality (Term A). The effects of the shift of population structure (sum of Terms B and C) in favor of urban and older households do not appear to have any influence at all while the increase in the proportion of households headed by those who are in the skill-intensive occupations has an equalizing impact (that is, has a negative contribution on the increase in inequality). This finding is cross-checked with the earlier sub-group decompositions showing that the inequalities are lower among households whose heads' occupation are classified as

skill-intensive. Thus, the rise in the proportion of these households exerts a favorable impact on the change in the distribution of income. The effects of the changes in sub-group mean incomes on the intertemporal change in inequality (Term D) is positive but very minor in the sectoral, age and occupational groupings. In view of the five income recipient factors, we can fairly say that the slight increase in income inequality in 1965 to 1971 can be cited as partly caused by the changes in occupational structure of the household population. This is especially true because of the shift towards the more skill-intensive occupation of heads.

The remarkable decline in income inequality from 1971 to 1985 is again explained by a substantial decline in within-group inequalities. The effects of population shifts become more evident during this period when population structure started to change rather dramatically. During this period, the increasing proportion of urban, female-headed, older-generation, and college-headed (college graduate and college undergraduate) households had an unfavorable effect (large positive contribution) on the change in aggregate inequality (sum of Terms B and C). The shift of household groups in favor of urban and female-headed households had a positive contribution because the inequalities associated with these groups were higher. The increase in the number of elderly-headed households had a dominant positive contribution because the inequalities associated with the group whose heads are aged 65 and over remained the highest among the age groupings. The rise in the number of these older-generation households implies an increase in the weight attached to the group with a higher level of inequalities. The

effect of the rise in the population share of college-headed households is to increase the aggregate inequality because the inequalities associated with college groups, although lower in comparison to the zero-education group, rose significantly from 1971 to 1985. With respect to the changes in group mean incomes, the narrowing income gap between the highest income age group (aged 55-64) and the lowest (aged less 25) exerted a considerably favorable influence on the change in aggregate inequality (negative value for Term D). The change in mean income across educational groupings showed a dominant positive contribution, indicating that college-headed household had further improved their income position vis-a-vis the no-education group. In short, the intertemporal decline in income inequality from 1971 to 1985 is traced substantially from the decline in the within-group inequalities. The movement of household population towards urban, female-headed, older-generation, and college-headed household groups had a disfavorable influence (positive contribution to the aggregate trends), while the increase in the population share of households whose heads are employed in skill-intensive jobs had a negligible impact. The narrowing income gap between households falling in the groups aged 55-64 and aged less than 25 is partially responsible for the decline in income inequality, whereas the increase in the income differentials between households headed by college graduates and the zero-education group contributed positively to the change in the aggregate inequality.

From 1985 to 1991, the rise in within-group inequalities was the dominant component of the rise in aggregate inequality. The net contribution of population shift to

the change in aggregate inequality is almost nil in the case of sex and age groupings but appears to be substantial when sectoral, education, and occupation groupings are considered (notice the sum of Terms B and C especially in the decompositions referring to per capita household income). Aggregate inequality changes positively with the shift of the population towards the urban, college-headed households and with the household groups whose heads are employed in skilled jobs, where earnings are high but have become increasingly more variable. Also, changes in the group mean incomes exerted the largest positive contribution when households are segregated by sector, education and occupation of heads. Urban-rural income gap rose by 6 per cent while the income gap between college-headed and the zero-education household group rose by about 20 per cent. The average household income of households in the administrative, executive, and managerial group rose by 37 per cent, while the average income of households headed by those in agriculture, fishing, forestry, and hunting rose by only about 12 per cent. To recapitulate, then, the increase in income inequality from 1985 to 1991 can be partly explained by the shift of the population in favor of urban, college-headed households and in favor of household groups whose heads are employed in skill-intensive jobs. The increase in aggregate inequality is also associated with rise in income differential between urban and rural, between college-headed and zero-education group, and between the administrative-executive-managerial and the agriculture-fishing-forestry-hunting group.

In the light of the decompositions performed in Table 2.8, we now apply the "shift share analysis of income inequality." The shift share technique estimates the level of inequality when changes in population structure are controlled without correspondingly changing the relative income positions of the representative households of different types. In a broad sense, the shift share analysis tries to answer the question, "What would be the level of inequality in period t+1 if the structure of population had remained the same as in period t?" The answer to this question is simply the value of Theil L in period t+1 minus the value of the contribution of the changes in population shares to the change in aggregate inequality. For example, if the proportion of urban households in 1985 remained exactly the same as in 1971, the level of inequality according to Theil L would have been 0.147 instead of 0.152. Accordingly, if the structure of household population grouped based on sex, age, educational attainment, and occupation of head in 1985 remained exactly the same as in 1971, the level of inequality according to Theil L would have been 0.149, 0.150, 0.150 respectively, instead of 0.152.

2.6 Summary and conclusion

This chapter has examined the trends and investigated the major sources of household income inequality in the Philippines using the FIES in 1965, 1971, 1985, and 1991. We have examined five possible explanations for the trends in aggregate inequality. All those factors are associated with income recipients such as: the rise in the proportion of : (1) urban, (2) female-headed, (3) elderly-headed, (4) college-headed households, and (5) the changes in the occupational structure.

We have found among other things that the country's income inequality is relatively high and that the trends are fairly stable except for a sharp decline in 1985. The Gini coefficient of income inequality has been consistently close to 0.50.

The decompositions of the size distribution of income for separate years reveal that the contribution of the within-group component of inequality far outweighs the contribution of the between-group component. Moreover, if households are segregated according to sector and socio-economic characteristics of head, only education and occupation account for a relatively large part of the aggregate inequality. Elimination of the income gap between groups of households based on these two categories will bring a considerable decline in the overall inequality, anywhere between 20 to 30 per cent. And contrary to popular belief, the elimination of the urban-rural household income differentials will not result to a remarkable improvement in the distribution of incomes.

Intertemporal change in aggregate inequality from 1965 to 1971, in 1971 to 1985, and in 1985 to 1991 is accounted for largely by the changes in the within-group inequalities.

The slight decrease in income inequality in 1965 to 1971 can be partly attributed to the change in occupational structure particularly the shift of household population towards groups of households whose heads' occupations are skill-intensive such occupations as professional and technical, administrative, executive, and managerial, clerical, and sales.

There was a marked improvement in the distribution of income from 1971 to 1985. The decline in the aggregate inequality is contributed substantially by the decrease in within-group inequalities whose favorable impact on the distribution of income overwhelms the disfavorable influence of the rise in the urban, female-headed, older-generation, and college-headed households. The decline in the income gap between the group of households whose heads are aged 55-64 and the group whose head is aged less than 25 is partially responsible for the improvement in the distribution of income while the increase in the income gap between college-headed household groups and the zero-education group contributed positively to the change in inequality.

The increase in inequality from 1985 to 1991 is caused by the increase in the proportion of urban and college-headed households, and by the change in the household heads' occupational structure particularly the shift to the more skill-intensive jobs. Changes in the group mean incomes, especially the rise in the income differentials between urban and rural households, between the highest income occupational groups (administrative, executive, and managerial) and the lowest (agriculture, fishing, forestry, and hunting), and between college-headed and zero-education group also contributed positively to the rise in the aggregate inequality.

These results seem to emphasize the strong income distributing effects of public policies geared towards improving household access to higher education (secondary and above) and high-skilled occupations. Although these policies may effectively decrease income inequality intially by as much as 30 per cent, in the long run such success may be

eroded by market forces tending to increase the returns to skill and higher education. Production methods that require a more abled and skilled work force bid up wages of the skilled and educated workers, which raises the wage gap between them and workers with less skills and a lower educational attainment. Such increases in wage rates inequality serve as a stimulus to the growth of inequality in earnings, a major source of household income. It seems apparent, then, that in the long run there will be an inevitable rise in household income inequality.

Table 2.1 Income Shares by Quintiles of Households, the Philippines, 1961-91

Quintile	1961	1965	1971	1985	1988	1991
Lowest 20%	5	4	4	6	6	5
2nd Lowest 20%	8	8	8	9	10	8
3rd Lowest 20%	12	13	13	14	13	12
4th Lowest 20%	19	20	21	19	20	20
Highest 20%	56	55	54	52	51	55
Total	100	100	100	100	100	100
Gini Coefficient	0.503	0.505	0.490	0.452	0.447	0.477

Source: Author's computations from FIES 1961, 1965, 1971, 1985, 1988, 1991

Table 2.2 Income Inequality Decomposition by Sector, the Philippines, 1965-91

Sector/Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1965							
Household income							
Urban	164	0.297	0.514	0.511	0.211	0.208	0.174
Rural	65	0.703	0.486	0.419	0.133	0.138	0.124
All	95	1.000	1.000	0.505	0.184	0.191	0.174
Within -group inequality (%)					85	83	80
Between-group inequality (%)					15	17	20
No. of households ('000)					5126		

Table continues on the following page.

Table 2.2 (Continued) Income Inequality Decomposition by Sector, the Philippines, 1965-91

Sector/Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1971							
Household income							
Urban	147	0.302	0.527	0.452	0.160	0.162	0.144
Rural	71	0.698	0.473	0.459	0.169	0.164	0.139
All	94	1.000	1.000	0.490	0.191	0.197	0.177
Within-group inequality (%)					86	83	81
Between- group inequality (%)					14	17	19
No. of households ('000)					6347		

Table continues on the following page.

Table 2.2 (Continued) Income Inequality Decomposition by Sector, the Philippines, 1965-91

Sector/Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Household income							
Urban	131	0.378	0.562	0.442	0.153	0.147	0.119
Rural	62	0.622	0.438	0.380	0.119	0.106	0.086
All	88	1.000	1.000	0.452	0.168	0.152	0.116
Within -group inequality (%)					82	80	85
Between-group inequality (%)					18	20	15

Table continues on the following page.

Table 2.2 (Continued) Income Inequality Decomposition by Sector, the Philippines, 1965-91

Sector/Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Per capita household income							
Urban	27		0.558	0.327	0.108	0.106	0.086
Rural	13		0.442	0.297	0.073	0.062	0.045
All	18		1.000	0.388	0.118	0.103	0.075
Within -group inequality (%)					79	77	80
Between- group inequality(%)					21	23	20
No. of households ('000)					9847		

Table continues on the following page.

Table 2.2 (Continued) Income Inequality Decomposition by Sector, the Philippines, 1965-91

Sector/Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Household income							
Urban	152	0.496	0.681	0.465	0.190	0.166	0.129
Rural	70	0.504	0.319	0.391	0.128	0.111	0.085
All	111	1.000	1.000	0.477	0.185	0.165	0.125
Within- group inequality (%)					92	83	85
Between- group inequality (%)					8	17	15

Table continues on the following page.

Table 2.2 (Continued) Income Inequality Decomposition by Sector, the Philippines, 1965-91

Sector/Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Per capita household income							
Urban	33		0.679	0.401	0.121	0.119	0.970
Rural	15		0.321	0.311	0.081	0.069	0.048
All	24		1.000	0.418	0.137	0.124	0.092
Within- group inequality (%)					79	76	79
Between- group inequality (%)					21	24	21
No. of households ('000)					11975		

[a] Deflated by CPI (1978=100)

Source: Author's computations from FIES 1965, 1971, 1988, 1991

Table 2.3 Employment of Household Heads by Industry, the Philippines, 1971, 1991

Industry Employment of Heads	Urban	Rural	Philippines
1971			
Agriculture	11	67	50
Industries and trade	44	10	24
Services	32	16	17
Unemployed	13	7	9
Total	100	100	100
1991			
Agriculture	22	65	44
Industries and trade	30	15	22
Services	30	10	20
Unemployed	18	10	14
Total	100	100	100
No. of households ('000)			
1971	1913	4434	6347
1991	5938	6037	11975

Source: FIES unpublished tables 1971, 1991

Table 2.4 Income Inequality Decomposition by Sex of Household Head, the Philippines, 1971-91

Sex of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1971							
Household income							
Male	95	0.907	0.912	0.488	0.189	0.192	0.172
Female	90	0.093	0.088	0.547	0.241	0.251	0.225
All	94	1.000	1.000	0.490	0.191	0.197	0.177
Within -group inequality (%)					99	99	99
Between- group inequality (%)					1	1	1
No.of households ('000)					6347		

Table continues on the following page.

Table 2.4 (Continued) Income Inequality Decomposition by Sex of Household Head, the Philippines, 1971-91

Sex of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Household income							
Male	87	0.861	0.847	0.444	0.164	0.145	0.109
Female	97	0.139	0.153	0.493	0.189	0.191	0.161
All	88	1.000	1.000	0.452	0.168	0.152	0.116
Within -group inequality (%)					99	99	99
Between-group inequality (%)					1	1	1

Table continues on the following page.

Table 2.4 (Continued) Income Inequality Decomposition by Sex of Household Head, the Philippines, 1971-91

Sex of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Per capita household income							
Male	17		0.806	0.385	0.118	0.105	0.077
Female	25		0.194	0.388	0.113	0.107	0.084
All	18		1.000	0.388	0.118	0.103	0.075
Within-group inequality (%)					99	99	99
Between -group inequality (%)					1	1	1
No. of households					9847		

Table continues on the following page.

Table 2.4 (Continued) Income Inequality Decomposition by Sex of Household Head, the Philippines, 1971-91

Sex of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Household income							
Male	109	0.859	0.842	0.467	0.185	0.161	0.119
Female	123	0.141	0.158	0.486	0.183	0.188	0.161
All	111	1.000	1.000	0.477	0.185	0.165	0.125
Within -group inequality (%)					99	99	99
Between-group inequality (%)					1	1	1

Table continues on the following page.

Table 2.4 (Continued) Income Inequality Decomposition by Sex of Household Head, the Philippines, 1971-91

Sex of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Per capita household income							
Male	22		0.804	0.419	0.140	0.125	0.091
Female	33		0.196	0.391	0.111	0.110	0.090
All	24		1.000	0.418	0.137	0.124	0.092
Within -group inequality (%)					99	99	99
Between-group inequality (%)					1	1	1
No. of households ('000)					11975		

[a] Deflated by the CPI (1978=100)

Note: FIES 1965 do not provide income data for groups of households by sex of head.

Source: Author's computations from FIES 1971, 1985, 1991

Table 2.5 Income Inequality Decomposition by Age of Household Heads, the Philippines, 1965-91

Age of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1965							
Household income							
Less 25	55	0.038	0.023	0.403	0.128	0.131	0.119
25-34	73	0.247	0.199	0.446	0.159	0.162	0.149
35-44	86	0.267	0.254	0.453	0.159	0.172	0.165
45-54	106	0.234	0.276	0.481	0.189	0.189	0.173
55-64	114	0.131	0.165	0.525	0.210	0.228	0.208
65 and over	88	0.082	0.083	0.523	0.219	0.226	0.201
All	95	1.000	1.000	0.505	0.184	0.191	0.174
Within-group inequality (%)					97	96	97
Between-group inequality					3	4	3
No. of households ('000)					5126		

Table continues on the following page.

Table 2.5 (Continued) Income Inequality Decomposition by Age of Household Heads, the Philippines, 1965-91

Age of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1971							
Household income							
Less 25	57	0.051	0.030	0.435	0.148	0.151	0.139
25-34	82	0.241	0.208	0.465	0.171	0.169	0.151
35-44	94	0.271	0.268	0.463	0.170	0.177	0.160
45-54	109	0.212	0.242	0.478	0.179	0.184	0.168
55-64	114	0.146	0.175	0.520	0.209	0.225	0.207
65 and over	93	0.079	0.076	0.569	0.262	0.276	0.248
All	94	1.000	1.000	0.490	0.191	0.197	0.177
Within-group inequality (%)					97	96	97
Between-group inequality (%)					3	4	3
No. of households ('000)					6347		

Table continues on the following page.

Table 2.5 (Continued) Income Inequality Decomposition by Age of Household Heads, the Philippines 1965-91

Age of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Household income							
Less 25	55	0.020	0.013	0.384	0.126	0.107	0.077
25-34	70	0.202	0.159	0.402	0.136	0.118	0.088
35-44	87	0.266	0.262	0.427	0.158	0.134	0.098
45-54	99	0.226	0.254	0.429	0.149	0.137	0.107
55-64	103	0.164	0.192	0.485	0.186	0.179	0.144
65 and over	88	0.121	0.120	0.517	0.217	0.206	0.163
All	88	1.000	1.000	0.452	0.168	0.152	0.116
Within-group inequality (%)					97	97	97
Between-group inequality (%)					3	3	3

Table continues on the following page.

Table 2.5 (Continued) Income Inequality Decomposition by Age of Household Heads, the Philippines 1965-91

Age of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Per capita household income							
Less 25	16		0.019	0.389	0.127	0.107	0.076
25-34	16		0.180	0.392	0.119	0.108	0.083
35-44	16		0.244	0.406	0.132	0.117	0.086
45-54	18		0.231	0.379	0.114	0.102	0.076
55-64	21		0.185	0.342	0.086	0.082	0.065
65 and over	23		0.141	0.401	0.130	0.115	0.083
All	18		1.000	0.388	0.118	0.103	0.075
Within-group inequality (%)					99	99	99
Between-group inequality (%)					1	1	1
No. of households ('000)					9847		

Table continues on the following page.

Table 2.5 (Continued) Income Inequality Decomposition by Age of Household Heads, the Philippines, 1965-91

Age of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Household income							
Less 25	76	0.023	0.015	0.470	0.231	0.162	0.098
25-34	93	0.203	0.169	0.461	0.209	0.156	0.101
35-44	112	0.271	0.274	0.441	0.162	0.143	0.107
45-54	122	0.219	0.240	0.448	0.162	0.151	0.120
55-64	127	0.161	0.184	0.489	0.189	0.183	0.147
65 and over	106	0.122	0.118	0.528	0.229	0.213	0.163
All	111	1.000	1.000	0.477	0.185	0.165	0.125
Within-group inequality (%)					98	98	98
Between-group inequality (%)					2	2	2

Table continues on the following page.

Table 2.5 (Continued) Income Inequality Decomposition by Age of Household Heads, the Philippines, 1965-91

Age of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Per capita household income							
Less 25	23		0.023	0.442	0.188	0.142	0.089
25-34	22		0.185	0.451	0.170	0.146	0.104
35-44	22		0.259	0.442	0.153	0.141	0.106
45-54	24		0.219	0.403	0.123	0.115	0.089
55-64	27		0.184	0.394	0.116	0.111	0.086
65 and over	28		0.130	0.403	0.128	0.115	0.085
All	24		1.000	0.418	0.137	0.124	0.092
Within-group inequality (%)					99	99	99
Between-group inequality (%)					1	1	1
No. of households ('000)					11975		

[a]Deflated by the CPI (1978=100)

Source: Author's computations from FIES 1961, 1971, 1985, 1991

Table 2.6 Inequality Decomposition by Education of Household Head, the Philippines, 1971-91

Education of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1971							
Household income							
College graduate	264	0.074	0.203	0.353	0.091	0.098	0.094
College undergrad	158	0.047	0.077	0.417	0.134	0.137	0.124
Secondary educ graduate	133	0.088	0.121	0.401	0.125	0.123	0.107
Secondary educ undergrad	94	0.098	0.096	0.413	0.133	0.136	0.127
Primary educ graduate	85	0.194	0.171	0.466	0.181	0.172	0.147
Primary educ undergrad	66	0.378	0.260	0.456	0.169	0.169	0.148
No education	57	0.121	0.072	0.476	0.182	0.187	0.171
All	94	1.000	1.000	0.490	0.191	0.197	0.177
Within- group inequality (%)					75	80	79
Between-group inequlality (%)					25	20	21
No. of households ('000)					6347		

Table continues on the following page.

Table 2.6 (Continued) Inequality Decomposition by Education of Household Head, the Philippines, 1971-91

Education of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Household income							
College graduate	234	0.081	0.216	0.404	0.125	0.127	0.106
College undergrad	133	0.072	0.109	0.373	0.107	0.103	0.085
Secondary educ graduate	103	0.135	0.159	0.377	0.110	0.104	0.085
Secondary educ undergrad	78	0.103	0.092	0.376	0.118	0.104	0.080
Primary educ graduate	69	0.302	0.240	0.378	0.118	0.104	0.081
Primary educ undergrad	54	0.232	0.142	0.337	0.088	0.086	0.073
No education	50	0.073	0.042	0.423	0.176	0.136	0.096
All	88	1.000	1.000	0.452	0.168	0.152	0.116
Within-group inequality (%)					68	68	71
Between-group inequality (%)					32	32	29

Table continues on the following page.

Table 2.6 (Continued) Inequality Decomposition by Education of Household Head, the Philippines, 1971-91

Education of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Per capita household income							
College graduate	51	0.081	0.210	0.293	0.071	0.081	0.077
College undergrad	28	0.072	0.121	0.300	0.064	0.066	0.056
Secondary educ graduate	20	0.135	0.152	0.312	0.071	0.069	0.056
Secondary educ undergrad	15	0.103	0.087	0.315	0.077	0.070	0.054
Primary educ graduate	14	0.302	0.189	0.311	0.079	0.068	0.050
Primary educ undergrad	12	0.232	0.189	0.270	0.059	0.051	0.038
No education	13	0.073	0.052	0.288	0.095	0.067	0.039
All	18	1.000	1.000	0.388	0.118	0.103	0.075
Within-group inequality (%)					60	61	64
Between-group inequality (%)					40	39	36
No.of households ('000)					9847		

Table continues on the following page.

Table 2.6 (Continued) Inequality Decomposition by Education of Household Head, the Philippines, 1971-91

Education of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Household income							
College graduate	302	0.084	0.229	0.414	0.141	0.141	0.118
College undergrad	167	0.086	0.129	0.376	0.110	0.111	0.097
Secondary educ graduate	123	0.165	0.183	0.387	0.119	0.113	0.093
Secondary educ undergrad	94	0.110	0.093	0.389	0.123	0.109	0.085
Primary educ graduate	82	0.301	0.221	0.395	0.126	0.112	0.085
Primary educ undergrad	66	0.200	0.119	0.394	0.136	0.112	0.080
No education	53	0.054	0.026	0.393	0.133	0.112	0.080
All	111	1.000	1.000	0.477	0.185	0.165	0.125
Within-group inequality (%)					68	69	71
Between-group inequality (%)					32	31	29

Table continues on the following page.

Table 2.6 (Continued) Inequality Decomposition by Education of Household Head, the Philippines, 1971-91

Education of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Per capita household income							
College graduate	68	0.084	0.240	0.300	0.073	0.084	0.080
College undergrad	36	0.086	0.129	0.320	0.074	0.079	0.072
Secondary educ graduate	26	0.165	0.179	0.346	0.088	0.085	0.070
Secondary educ undergrad	19	0.110	0.087	0.337	0.086	0.079	0.062
Primary educ graduate	17	0.301	0.171	0.329	0.084	0.075	0.057
Primary educ undergrad	15	0.200	0.162	0.290	0.075	0.061	0.042
No education	14	0.054	0.032	0.254	0.067	0.050	0.032
All	24	1.000	1.000	0.418	0.137	0.124	0.092
Within-group inequality (%)					58	60	64
Between-group inequality (%)					42	40	36
No. of households ('000)					11975		

[a] Deflated by CPI (1978=100)

Note: FIES 1965 do not provide income data for groups of households by education of heads

Source: Author's computations from FIES 1971, 1985, 1991

Table 2.7 Income Inequality Decomposition by Occupation of Heads, the Philippines, 1965-91

Occupation of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1965							
Household income							
Professionals and technical	274	0.025	0.074	0.367	0.010	0.135	0.164
Administrative, executive, & managerial	188	0.045	0.092	0.453	0.149	0.180	0.186
Clerical	176	0.036	0.070	0.392	0.113	0.125	0.121
Sales	126	0.039	0.053	0.477	0.174	0.175	0.148
Services	91	0.064	0.064	0.355	0.103	0.112	0.113
Agricultural, fishing, forestry, & hunting	62	0.555	0.376	0.433	0.146	0.154	0.142
Production, transportation, & laborers	104	0.163	0.186	0.360	0.097	0.104	0.099
Others[b]	104	0.073	0.085	0.530	0.218	0.242	0.229
All	95	1.000	1.000	0.505	0.184	0.191	0.174
Within-group inequality (%)					76	78	80
Between-group inequality (%)					24	22	20
No. of households ('000)					4747		

Table continues on the following page.

Table 2.7 (Continued) Income Inequality Decomposition by Occupation of Heads, the Philippines, 1965-91

Occupation of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1971							
Household income							
Professionals and technical	218	0.036	0.082	0.369	0.102	0.105	0.100
Administrative, executive, & managerial	258	0.020	0.053	0.360	0.115	0.134	0.138
Clerical	186	0.032	0.062	0.355	0.093	0.096	0.087
Sales	139	0.074	0.108	0.481	0.178	0.191	0.180
Services	93	0.070	0.069	0.402	0.129	0.129	0.118
Agricultural, fishing, forestry, & hunting	62	0.500	0.326	0.453	0.166	0.164	0.145
Production, transportation, & laborers	104	0.177	0.194	0.375	0.107	0.112	0.107
Others[b]	109	0.091	0.105	0.554	0.242	0.262	0.241
All	94	1.000	1.000	0.490	0.191	0.197	0.177
Within-group inequality (%)					79	80	81
Between-group inequality (%)					21	20	19
No. of households ('000)					5757		

Table continues on the following page.

Table 2.7 (Continued) Income Inequality Decomposition by Occupation of Heads, the Philippines, 1965-91

Occupation of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Household income							
Professionals and technical	184	0.040	0.087	0.377	0.107	0.108	0.093
Administrative, executive, & managerial	339	0.016	0.065	0.390	0.120	0.138	0.130
Clerical	132	0.031	0.048	0.339	0.085	0.085	0.073
Sales	130	0.090	0.139	0.480	0.190	0.173	0.131
Services	101	0.062	0.074	0.379	0.114	0.106	0.086
Agricultural, fishing, forestry,& hunting	57	0.535	0.361	0.369	0.115	0.100	0.077
Production, transportation,& laborers	86	0.213	0.215	0.347	0.096	0.089	0.071
Others[b]	65	0.013	0.010	0.334	0.086	0.080	0.064
All	85	1.000	1.000	0.443	0.165	0.145	0.109
Within-group inequality (%)					71	72	75
Between-group inequality (%)					29	28	25

Table continues on the following page.

Table 2.7 (Continued) Income Inequality Decomposition by Occupation of Heads, the Philippines, 1965-91

Occupation of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1985							
Per capita household income							
Professionals and technical	37	0.040	0.089	0.283	0.061	0.065	0.059
Administrative, executive,& managerial	72	0.016	0.071	0.270	0.076	0.100	0.107
Clerical	26	0.031	0.047	0.278	0.056	0.058	0.051
Sales	26	0.090	0.139	0.388	0.116	0.110	0.085
Services	19	0.062	0.063	0.300	0.066	0.062	0.048
Agricultural, fishing, forestry, & hunting	12	0.535	0.364	0.285	0.068	0.058	0.042
Production, transportation, & laborers	16	0.213	0.216	0.278	0.059	0.054	0.042
Others[b]	24	0.013	0.010	0.219	0.037	0.042	0.041
All	17	1.000	1.000	0.377	0.105	0.096	0.073
Within-group inequality (%)					68	65	66
Between-group inequality (%)					32	35	34
No. of households ('000)					8556		

Table continues on the following page.

Table 2.7 (Continued) Income Inequality Decomposition by Occupation of Heads, the Philippines, 1965-91

Occupation of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Household income							
Professionals and technical	177	0.064	0.106	0.461	0.168	0.170	0.145
Administrative, executive, & managerial	466	0.018	0.078	0.432	0.151	0.173	0.171
Clerical	187	0.027	0.048	0.344	0.094	0.096	0.086
Sales	169	0.094	0.148	0.493	0.205	0.187	0.142
Services	130	0.058	0.070	0.372	0.108	0.108	0.094
Agricultural, fishing,forestry, & hunting	64	0.500	0.300	0.374	0.121	0.100	0.072
Production, transportation, & laborers	112	0.238	0.249	0.354	0.097	0.092	0.076
Others[b]	173	0.001	0.001	0.337	0.088	0.111	0.116
All	107	1.000	1.000	0.470	0.189	0.163	0.119
Within-group inequality (%)					70	70	77
Between-group inequality (%)					30	30	23

Table continues on the following page.

Table 2.7 (Continued) Income Inequality Decomposition by Occupation of Heads, the Philippines, 1965-91

Occupation of Head/ Year	Real Mean Income[a] (Peso/Year) (m_j)	Population Share (v_j)	Income Share (k_j)	Gini Index (G_j)	Theil T_j	Theil L_j	Variance of log Income (V_j)
1991							
Per capita household income							
Professionals and technical	42	0.064	0.119	0.434	0.141	0.152	0.133
Administrative,executive, & managerial	91	0.018	0.074	0.281	0.082	0.114	0.128
Clerical	40	0.027	0.048	0.287	0.060	0.064	0.057
Sales	37	0.094	0.156	0.413	0.131	0.127	0.099
Services	27	0.058	0.064	0.328	0.080	0.076	0.062
Agricultural, fishing, forestry, & hunting	13	0.500	0.294	0.294	0.077	0.062	0.043
Production, transportation, & laborers	22	0.238	0.235	0.303	0.067	0.064	0.052
Others[b]	34	0.001	0.009	0.207	0.034	0.043	0.045
All	24	1.000	1.000	0.422	0.143	0.126	0.091
Within-group inequality (%)					63	60	65
Between-group inequality (%)					37	40	35
No. of households ('000)					10322		

[a] Deflated by the CPI (1978=100)

[b] Others include workers not classified by occupation, members of the armed forces, workers engaged in non-gainful activities, and the unemployed. FIES 1985 and 1991 do not include the unemployed in any occupational category but nevertheless include them in all the other groupings.

Source: Author's computations from FIES 1965, 1971, 1985, 1991

Table 2.8 The Contribution of Changes in Within-group and Between-group Components to the Trends in Aggregate Inequality, the Philippines: 1965-71, 1971-85, and 1985-91

Index	1000 Theil T			1000 Theil L			Variance of log Income (1000 V)		
Change in	Aggregate inequality	Within-group	Between-group	Aggregate inequality	Within-group	Between-group	Aggregate inequality	Within-group	Between-group
1965-71									
Household income									
Sector	7	7	0	6	5	1	3	4	-1[a]
Age	7	6	1	6	5	1	3	3	0
Occupation	7	11	-4	6	7	-1	3	4	-1
1971-85									
Household income									
Sector	-23	-27	4	-45	-42	-3	-61	-45	-16
Sex	-23	-23	0	-45	-45	0	-61	-61	0
Age	-23	-22	-1	-45	-42	-3	-61	-59	-2
Education	-23	-29	6	-45	-54	9	-61	-57	-4
Occupation	-26	-34	8	-52	-53	1	-68	-62	-6

Table continues on the following page.

Table 2.8 (Continued)The Contribution of Changes in Within-group and Between-group Components to the Trends in Aggregate Inequality, the Philippines: 1965-71, 1971-85, and 1985-91

Index	1000 Theil T			1000 Theil L			Variance of log Income (1000 V)		
Change in	Aggregate inequality	Within-group	Between-group	Aggregate inequality	Within-group	Between-group	Aggregate inequality	Within-group	Between-group
1985-91									
Household income									
Sector	17	32	-15	13	15	-2	9	8	1
Sex	17	17	0	13	13	0	9	9	0
Age	17	18	-1	13	14	-1	9	9	0
Education	17	11	6	13	11	2	9	6	3
Occupation	24	15	9	18	9	9	10	10	0
Per capita household income									
Sector	19	15	4	21	15	6	17	13	4
Sex	19	19	0	21	21	0	17	17	0
Age	19	19	0	21	21	0	17	17	0
Education	19	9	10	21	12	9	17	11	6
Occupation	38	19	19	30	13	17	18	11	7

[a] Negative values mean decrease in inequality.

Notes: FIES 1965 do not provide income data for groups of households by sex and education of head.
Sub-groups are as defined in Table 2.2 to 2.7.

Table 2.9 Decomposition of the Change in Aggregate Inequality (Theil L x 1000), the Philippines: 1965-71, 1971-85, 1985-91

Characteristic of Head	Change in Aggregate Inequality	Contribution to Change in Theil L Due to			
		Within-group Inequality (Term A)	Population Share (Term B)	(Term C)	Group Mean Income (Term D)
1965-71					
Household income					
Sector	6	4	0	0	2
Age	6	5	0	0	1
Occupation	6	9	-2[a]	-3	2
1971-85					
Household income					
Sector	-45	-44	2	3	-6
Sex	-45	-48	3	0	0
Age	-45	-48	6	2	-5
Education	-45	-55	1	5	4
Occupation	-52	-53	0	0	1
1985-91					
Household income					
Sector	13	12	3	-4	2
Sex	13	13	0	0	0
Age	13	15	-1	-1	0
Education	13	10	1	-1	3
Occupation	18	7	2	1	8

Table continues on the following page.

Table 2.9 (Continued) Decomposition of the Change in Aggregate Inequality (Theil L x 1000), the Philippines: 1965-71, 1971-85, 1985-91

Characteristic of Head	Change in Aggregate Inequality	Contribution to Change in Theil L Due to			
		Within-group Inequality (Term A)	Population Share (Term B)	(Term C)	Group Mean Income (Term D)
1985-91					
Per capita household income					
Sector	21	10	5	4	2
Sex	21	21	0	0	0
Age	21	21	0	0	0
Education	21	8	4	2	7
Occupation	30	12	1	1	16

[a] Negative values mean decrease in inequality.

Notes: FIES 1965 do not provide income data for groups of households by sex and education of head. Sub-grroups as are defined in Tables 2.2 to 2.7.

Source: Author's computations from FIES 1965, 1971, 1985, 1991

CHAPTER 3
SOURCES OF INCOME INEQUALITY IN THE PHILIPPINES: DECOMPOSITION BY INCOME SOURCE, 1985, 1991

3.1 Introduction

This chapter is devoted to estimating the contribution of wage income to the total income inequality and to quantify how much of the change in the total income inequality is accounted for by the change in wage income inequality. We employ the factor component decomposition technique to quantitatively assess the relative contribution of the wage income to the total income inequality and the change in wage income inequality to the change in the total income inequality. Our focus is on the FIES of 1985 and 1991 because, as will be shown later in Table 3.1, there has not been any significant change in the structure of household income in the priods 1965 to 1971 and 1971 to 1985. Mangahas and Gamboa (1976) earlier did factor component decomposition using the FIES 1971.

Household income consists of factor income components which are the product of factor prices and the quantity (of factors) supplied by the households to the market. The distribution of different factor incomes, and hence the distribution of total income, is therefore, determined by the distribution of factor ownership among households and the prevailing factor prices. While factor prices are established by the demand and supply conditions in the factor markets, factor ownership is dictated by society's culture and norms (inheritance patterns, for example) and social institutions such as laws.

To identify the major sources of the overall inequality, there have been attempts in the past to assign inequality contributions to various components of income. In the United States, the focus of the studies is to explain the inequality contribution of earnings, the returns to labour. It has been shown that earnings are the largest contributor to the household income inequality (Lerman and Yitzhaki, 1985) and the most important source of increasing inequalities in the 1980s (Burtless, 1993). The growth in earnings inequalities is attributed primarily to increases in the wage rates inequality (Juhn, Murphy, and Pierce, 1993). Similarly, wage income explains the largest proportion of the total income inequality and is fundamentally responsible for the rise in income inequality in the 1980s in the United Kingdom (Jenkins, 1995). In Brazil, the improvement in the distribution of schooling has tended to reduce earnings inequality from the mid-1970s to the mid-1980s (Lam and Levison, 1991). In Mexico the distribution of human capital investments crucially affects the inequality contribution of remittance income (Stark, Taylor, and Yitzhaki, 1986). And in the Philippines, the decomposition analysis of Mangahas and Gamboa (1976) reveals that wage income is the largest source of total income inequality in 1971 attributable primarily to its high factor share.

The distribution of income is also determined by distribution of income-earning assets. In many LDCs, the growing income inequality is found to be caused in part by the increasing concentration of landholdings (Quan and Kuo, 1985). In three provinces in Pakistan for example, the unequal distribution of landownership explains why land rent is the largest source of income inequality (Adams and Alderman, 1992).

The general purpose of this chapter is to decompose the national income inequality in an attempt to explain the distribution of family incomes in terms of the unequal effects of various components that make up the total family income. To this end, we have four specific objectives. First is to identify whether the inequality in an income source serves to increase or decrease overall income inequality. Second is to compute the percentage contribution of each income component to the overall income inequality. Third is to examine which of the income sources contributed the largest proportion of the rise in income inequality in 1985 to 1991. And the last is to identify the determinants of wage income and compute the contribution of education on wage income inequality.

The decomposition procedure, which identifies and measures income component inequalities, is useful to policy makers because it gives them an overview of the structure of income inequality. This will help them evaluate alternative factor-specific redistribution policies aimed at reducing the measured overall inequality.

This chapter has four remaining sections. Section 3.2 examines two measures of income inequality and describes the decomposition procedure for each. The data source and the description of different income components are presented in Section 3.3. The leading sources of income inequality is identified in Section 3.4. To quantify the effects of education on wage income inequality, a wage income determination function is estimated in Section 3.5. A summary and conclusion is offered in Section 3.6.

3.2 Decomposition procedures by income source

There has been a long history of estimating the importance of different income components in explaining the total income inequality. The procedure involves disaggregating the total income of each individual or household into its various components and then quantifying the inequality contribution of each income source.

Decomposition procedure of this nature is pioneered by Rao (1969) who presented the Gini coefficient as a weighted average (income shares as weights) of the income component Ginis. The Gini coefficient decomposed in this manner however, is correct only in a very special case when all factor incomes are perfectly ranked correlated with the total income. In other situations, when some factor incomes do not vary monotonically with the total income, the inequality contributions add up to a higher value than the inequality that needs to be explained. Moreover, the inequality contribution allocated to each factor is always nonnegative, although of course, some income components may be equalizing influences and therefore, need to be assigned negative contributions.

To consider all possible relationships between each income component and the total income, Fei, Ranis, and Kuo (1978) and Pyatt, Chen, and Fei (1980) developed a decomposition formula which breaks down the total income Gini into income shares, "correlation effects", and the Gini ratio for each factor component. This approach has three advantages: it (1) generates factor contributions that sum exactly to the total income inequality, (2) produces both positive and negative contributions, and (3) can be extended

to inequality measures other than the Gini coefficient such as variance, squared coefficient of variation, and the Theil entrophy indices. However, as pointed out by Shorrocks (1982), this decomposition rule is not uniquely determined for there are numerous equivalent ways of representing any inequality index which will give rise, in general, to different allocations of factor contributions. This issue of non-uniqueness is never resolved except when a strong restriction is made that requires the total income to be a sum of only two components with identical distribution.

Of late, Silber (1993) indicated that the Gini coefficient can be broken down into: (1) the Gini index of the source, (2) a permutation component which arises because the ranking of the individuals by size of the income source may be different from the one based on the total income, and (3) an aggregation component which occurs when individuals do not receive every source of income.

We consider the Gini coefficient and the squared coefficient of variation as our measures of decomposition because these two are convenient indices and satisfy the four desirable properties of a distribution index; namely, Pigou-Dalton transfer sensitivity, mean independence, population size independence, and decomposability (See Chapter 2 for the definition of these properties).

3.2.1 The Gini coefficient

To decompose the Gini coefficient, the first step is to divide the total household income into mutually exclusive and exhaustive income sources. The total family income is then arranged from lowest to highest and a rank is given to each household (the lowest

rank going to the household with the lowest income). The Gini coefficient of the total income, G, according to Pyatt, Chen, and Fei (1980)[1] can then be written as,

$$G = \frac{2}{n\mu} Cov(y, r) \qquad (3.1)$$

where n is the number of households, u is the mean income from all sources, y refers to the series of total incomes, and r refers to the series of corresponding ranks. And the Gini coefficient of the i-th income source, G_i, is

$$G_i = \frac{2}{nu_i} Cov(y_i, r_i) \qquad (3.2)$$

where u_i refers to the mean income of the i-th source, y_i is the series of incomes from the i-th source, and r_i refers to the corresponding ranks. G and G_i can be combined to form

$$G = \Sigma_i \frac{u_i}{u} R_i G_i \qquad (3.3)$$

where R_i is the rank correlation ratio (or the "correlation effects"[2]) expressed as,

$$R_i = \frac{Cov(y_i, r)}{Cov(y_i, r_i)} = \frac{\text{Covariance between source income amount and total income rank}}{\text{Covariance between source income amount and source income rank}} \qquad (3.4)$$

Equation (3.3) shows the exact decomposition of G, i.e., the contribution of the i-th component to the total income inequality corresponds to the product of three terms: the (1) share of the component in the total income, (2) correlation of the source income with the rank of total income, and (3) Gini coeffient for the distribution of the component income[3].

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1 Note that this specification of the Gini coefficient while being applied to disaggregated data is analogous to the decomposition that can be obtained for grouped data. See the formulation of Fei, Ranis, and Kuo (1978).

2 It indicates in simple language how various sources of income can be substituted.

3 The term R_iG_i in Equation (3.3) is referred to as the "pseudo-Gini" coefficient. It is not the conventional Gini index for the i-th source because the weights attached to the income source y_i corresponds to the ranking of households based on the distribution of the total income y rather than their ranking in the distribution of the corresponding factor income.

To express the contribution of the i-th income source as a fraction of the overall inequality, Eq. (3.3) can be manipulated to form

$$1 = \sum w_i g_i \qquad (3.5)$$

where $w_i = \frac{u_i}{u}$ is the income share and $g_i = R_i \frac{G_i}{G}$ is the relative concentration coefficient . If $g_i > 1$, the i-th income source is inequality-increasing.

3.2.2 Squared coefficient of variation

Following Shorrocks (1983), the decomposition formula for the squared coefficient[4] of variation can be written as,

$$1 = \Sigma_i w_i c_i \qquad (3.6)$$

where $c_i = \rho_i \frac{\delta_i / u_i}{\delta / u}$ is the relative concentration coefficient of the i-th income component, ρ_i is the correlation coefficient between the i-th source and total income; and δ_i and δ are the standard deviations of the i-th income source and total income, respectively. If $c_i > 1$ the i-th income source is inequality-increasing.

3.3 Definition of income sources

The data for this chapter are the individual household incomes from FIES 1985 and 1991. Disaggregated data are advantageous because they allow the decomposition contributions to be calculated directly, thus avoiding estimation errors arising from the use of grouped data. However, the fluctuations in factor contributions arising from sampling variation are still contained because FIES is not a panel data set precluding any aggregation of household income components over the two survey years.

[4] The squared coefficient of variation of the total income is the variance divided by the squared of the mean. This index is preferred to the variance because the variance does not meet the axiom of mean independence (i.e. it is sensitive to the proportional changes in all incomes).

The total household income is presented as a sum of four major components namely; wage income, enterpreneurial income[5], remittances and pensions, property income, and other income. The total family income is gross of income taxes and any other tax forms because FIES fail to collect information on the amount of tax payments[6].

Wage incomes (or earnings) are incomes derived from work either in agricultural or non-agricultural sectors, which are paid in either cash or in kind, in time rate or piece rate basis, and include commissions, tips, bonuses plus allowances, if any, for housing, food, clothing etc., and deductions made for retirement, social security, insurance premiums, union dues, and other contributions. Agricultural wages and salaries are labour incomes coming from sectors such as farming, livestock and poultry, fishery, forestry, and hunting. Non-agricultural wages and salaries are derived from all other sectors but agriculture.

Enterpreneurial incomes are incomes derived from work such as operating family enterprises or self-employment. This includes all incomes from enterpreneurial activities like wholesale and retail trading; manufacturing; transportation; communication and storage; mining and quarrying; construction; community, social, recreation, and personal services; and all other enterprise.

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[5] Wage incomes are considered pure returns to family labor whereas, household enterpreneurial incomes represent the combined returns to family labour and returns to family-owned capital.

[6] Because income taxes tend to have redistributive effects (Lambert, 1993), the estimates of income inequality based on gross income are biased upwards if compared with the inequality computed from the net (of income taxes) income.

Remittances and pensions are non-work sources of income which include remittances from overseas and domestic sources, pensions and retirement benefits, and gifts in either cash or kind.

Property income is another non-work income source which is made up of incomes in the form of rents received for non-agricultural lands, buildings or rooms, and other properties; rental value of owner-occupied dwelling unit; interests earned and dividends received from investments; and shares of crops, livestock, and poultry raised by others.

Other income is a catchall for income sources not classified elsewhere. This includes production of articles for own use; winnings from gamblings, sweepstakes, and lotteries; and others.

3.4 Sources of income inequality

This section identifies the principal contributor to the overall income inequality by quantitatively assessing the contribution of each income source to the overall income inequality. Through a simple decomposition procedure this section is able to accomplish three specific things. First, it distinguishes which of the income sources are inequality-increasing or -decreasing. Second, it shows the proportion of the overall income inequality accounted for by each income component. And third, it pinpoints which of the different income sources contributed the largest proportion of the rise in income inequality in 1985 to 1991.

Although the major focus of the decomposition is FIES 1985 and 1991, we give an overview of the structure and the changes in the average total household income and

its component in 1961 to 1991 in Table 3.1. The average total deflated household income has increased by 13 per cent in 1961 to 1965, remained fairly constant in 1965 to 1985, increased by approximately 15 per cent in 1985 to 1988, and has risen again by 15 per cent in 1988 to 1991.

The major sources of the rise in household real income in 1961 to 1965 are wages and property income with wages accounting for 55 per cent of the income increase and property income accounting for 27 per cent. In 1985 to 1988, the major contributor to the average real income rise is non-agricultural wages which has contributed 85 per cent of the increase. And in 1988 to 1991, property income explains approximately 60 per cent of the increase in the average real household income.

From among the income sources, wage income comprises the largest proportion of the average household income, substantial portion of which comes from non-agricultural labour activities. Despite the remarkable rise (more than 50 per cent in 1961 to 1991) of the household real wage income[7], its share of the total has remained fairly constant, ranging on the average from 42 to 45 per cent. The entirety of the real wage income increase is accounted for by non-agricultural wages which has risen by 63 per cent.

The next most important source of income is enterpreneurial income which makes up approximately one third of the average total household income. This income source

[7] These trends are opposite to the trends of real wage rates which has been shown to decline since the 1970s (Oshima, de Borja, and Paz, 1986) indicating the possibility of the rise in hours of work to compensate for the decline in wage rates.

has two components - agricultural enterpreneurial income which exhibits rising trends in real income and income shares and non-agricultural enterpreneurial income which is characterized by downward trends in both real income and shares.

Deflated income received from remittances and pensions has risen by more than threefolds in 1961 to 1991 and its share of income has increased from 5 to 15 per cent. Dramatic rise in real remittances and pension income is observed between 1971 and 1985 which has coincided with the large outflows of Filipino overseas workers to the Gulf States in the late 1970s and early 1980s.

The trends in real property income and its share of the average household income are fluctuating and have indefinite trends while the other income comprises only a small percentage of the average household income.

Table 3.2 reports the decomposition results with respect to the distinction between inequality-increasing versus inequality-decreasing sources of income. The inequality associated with an income component can be considered inequality-increasing if c_i and g_i are greater than unity and inequality-decreasing if c_i and g_i are less than unity. A contradiction occurs if c_i is greater than unity but g_i is not, or vice versa, such that we can not firmly establish the inequality-increasing or -decreasing tendency of an income source.

In 1985 and 1991 at the levels of both household income and per capita household income, the decompositions of Gini coefficient and squared coefficient of variation reveal that non-agricultural wages, rental income from non-agricultural assets,

and interests and dividend incomes are inequality-increasing sources while those incomes that represent inequality-decreasing sources are agricultural wages, agricultural enterpreneurial income, domestic remittances, and other income. For the two income components - foreign remittances and pensions and gifts - the two alternative decomposition indices reveal inconsistent results; the squared coefficient of variation classifies the two income sources as inequality-decreasing whereas, the Gini coefficient distinguishes them as inequality-increasing. The contradiction has occured because the Gini coefficient is sensitive to the middle income groups, where the two incomes are concentrated, while the sensitivity of the squared coefficient of variation is to extreme incomes (Anand, 1983).

No definite patterns are observed for non-agricultural enterpreneurial income and income from net shares of crops, livestock, and poultry. Based on all decompositions using household income, non-agricultural enterpreneurial income is inequality-increasing but according to squared coefficient of variation at per capita household income level, it is inequality-decreasing. Income from net shares of crops, livestock, and poultry on the other hand, has the tendecy to increase inequality based on the decomposition of per capital household income while contradictory results are obtained using household income.

Factor inequality weights (w_ic_i and w_ig_i) represent the proportion of overall inequality contributed by an income source. Table 3.3 presents the decomposition results for the relative factor inequality weights of source incomes in the overall income

inequality. The table suggests a number of important things. First, wage income is by far the largest source of income inequality with its contribution to the overall inequality ranging from 41 to 51 per cent on the basis of household income and 42 to 48 per cent on per capita household income. And among the wage income components, it is non-agricultural wages which account for the whole of the wage income inequality contribution. Second, all our decompositions agree that the next most important source of income inequality is enterpreneurial income which explains, on the average, 23 per cent of the overall inequality. Of this contribution, 95 per cent has come from inequality emanating from non-agricultural enterpreneurial income[8]. Third, the results of the two alternative decomposition procedures are not similar with respect to either remittances and pensions or property income has the higher contribution to overall inequality. All the Gini decompositions reveal that the first is the larger contributor while the squared coefficient of variation come up with the opposite result. Indeed, according to Shorrocks (1983), the factor inequality weight for any income source can vary widely depending on the index used to decompose inequality. And while the results of the two alternative decomposition procedures do not conform, one consistent pattern is visible; that is, foreign remittances is the major source of inequality in the remittances and pensions income group while it is rents from non-agricultural assets for the property income

[8] Our results corroborate the findings of Mangahas and Gamboa (1976) that 51 per cent of the total income inequality in 1971 is contributed by the wage income and 27 per cent by the enterpreneurial income.

category. Lastly, the other income component makes the smallest contribution to income inequality; in fact, negative contribution in 1991.

To further explain the relative importance of wages and enterpreneurial income in accounting for the overall income inequality, we decompose the Gini ratio of income inequality into income shares (w_i), correlation effects (R_i), and the Gini coefficient (G_i) for each income component. By doing so we are able as well to identify which of the income sources contributed substantially to the rise in income inequality in 1985 to 1991. Household income Gini has risen from 0.480 in 1985 to 0.504 in 1991 while the per capita household Gini has increased from 0.500 to 0.529 (Table 3.4)[9].

The decompositions in Table 3.4 can explain the magnitude of factor inequality weights reported in the previous table. Wage income has the highest factor inequality weights, and therefore makes the largest contribution to overall inequality, because it has the largest share of income, a high correlation with the overall inequality, and a high source income Gini. The contribution of enterpreneurial income to overall inequality is lower than wages because its share of total income and its correlation with total inequality is middle-sized while its source Gini is almost about the same as that of the wage income Gini. Foreign remittances and rental income from non-agricultural assets contribute only

[9] The Gini estimates for 1985 and 1991 in this chapter are higher than those in the previous but the trends and the percentage increase are the same. The slight difference has come about because this chapter used unweighted individual household income data based on sample households while the previous chapter utilized grouped data where household incomes are weighted by an adjustment factor. This adjustment factor blows up the income of a sample household in order for it to capture the combined income of the members of the household population which it represents.

about 13 and 17 per cent respectively, to the overall inequality because these two incomes make up only a small portion of the total household income and that the downward effects of the small income shares on the overall inequality overwhelms the upward effects of the large correlation ratios and high income source Ginis.

The Gini coefficient for the household income has risen by 2 per cent and the per capita household income by 29 per cent in 1985 to 1991. The highest positive contributor to the rise in the Gini is rental income from non-agricultural assets followed by non-agricultural wages and non-agricultural enterpreneurial income. Income sources which contribute negatively to the rise in inequality (that is, the contribution to Gini declined) are the following in the order of magnitude: foreign remittances; pensions and gifts; net shares of crops, livestock, and poultry; interests and dividends; domestic remittances; agricultural wages; agricultural enterpreneurial income; and other income.

3.5 Determinants of wage income

The effect that wage income has on the overall inequality depends on the distribution of earnings among recipients which, on the other hand, is determined by the distribution of characteristics among labour earners. Shown in Table 3.5 are the annual wage incomes of households grouped according to age, education, and sex of household head[10]. The gross wage income differentials between household groupings are as follows: in both 1985 and 1991, two-to-one ratio between prime age heads (45 to 54

[10] By simply looking at the characteristics of the primary earner we miss the effects of the characteristics of other household members on the level of wage income. But it nevertheless simplifies our analysis considerably.

years old) and the youngest (less than 25 years old) and twelve-to-one ratio between households headed by university graduates and households whose head have no education; and 33 per cent in 1985 and 24 per cent in 1991 wage income differential advantage for male- over female-headed households.

To identify the factors affecting wage income, we estimate a standard Mincerian (1970) human capital earnings function shown by Equation (3.7) below,

$$\log w = \beta_0 + \beta_1 E + \beta_2 H + \beta_3 C + \beta_4 A + \beta_5 A^2 + \beta_6 S + \mu \qquad (3.7)$$

where

log w=logarithms of wage income[11]

E=1 if head has completed some or all primary (elementary) education, 0 otherwise

H=1 if head has completed some or all secondary (high school) education, 0 otherwise

C=1 if head has completed some or all university (college) education, 0 otherwise

A=age of head

S=sex of head; 1 if male, 0 otherwise

u=error term, and

B_i (i=0,1,...,6)=regression parameters.

The parameter B_1 in the wage income function shows the influence of primary education on log w; that is, the effect of primary education, relative to zero education,

[11] The use of log earnings as dependent variable follows from human capital earnings function but for other reason, it is intended because the variance of log earnings is used as inequality measure. It satisfies the standard axioms of inequality and among the class of conventional measures it gives relatively more weight to the bottom of the distribution (Kakwani, 1980; Atkinson, 1970). This specification is also justified by the fact that earnings are log-normally distributed (Fields, 1980).

controlling for A and S, is to increase log w by B_1. The same interpretation holds for B_2 and B_3 which corresponds respectively, to the effects of secondary and university education on log w. Differentiating Equation (3.7) with respect to A gives

$$\frac{\delta \log w}{\delta A} = \beta_4 + 2\beta_5 A \qquad (3.8)$$

which measures the effect on log w of a one-unit increase in A. If $B_5 > 0$ (or $B_5 < 0$) the effect of one-unit increase in A on log w increases (or decreases) as A increases. The parameter B_6 represents how much higher ($B_6 > 0$) log w is for male- relative to female-headed households, controlling for E, H, C, and A.

Through the comparative R^2 approach[12], the model is also useful to set intervals on how much of the variance in log w (a measure of inequality) is explained by each of the explanatory factor. Since R^2 measures the fraction of the total variation in log w explained by the model, we can define the "high estimate" contribution of the i-th variable to the variation in log w by estimating Equation (3.7) using the i-th variable as the only explanatory factor. The resulting R^2 (the "high R^2") is the upper bound of the percentage of inequality explained by the i-th variable. The "lower estimate" contribution of the i-th variable to the variation in log w is the difference between the R^2 resulting from estimating Equation (3.7) with the inclusion of all variables and the R^2 resulting from estimating Equation (3.7) with the exclusion of the i-th variable only. The residual

[12] This technique of decomposing inequality is popularized by Fields and Schultz (1980). A critical review of this approach is written and an alternative decomposition method is proposed by Behrman, Knight, and Sabot (1983).

R^2 (the "lower R^2") is the lower bound of the percentage of inequality explained by the i-th variable.

Years of schooling, which are represented by the dummy variables E, H, and C are introduced as dichotomous rather than continuous variable for reason of the survey design[13]. Years of labor force experience are assumed to be measured by A and log wage income is assumed to be a quadratic function of A. This specification is suggested by the model of optimal investment in human capital which predicts a declining rate of investment in human capital with age. The decline in human capital investment itself implies that the wage income rises to a peak and then begins to fall off. Sex of household head is used as a rough proxy for labour quality.

The regression results are reported in Table 3.6[14]. All the coefficients are significant at 1 per cent level. Regressions 1 and 4 consider the three education categories only. The coefficient of primary school dummy in 1985 is 0.491 which means that measured in logarithms households whose heads have some or finished primary school received 49 per cent more wage income compared to households whose heads have zero education. Secondary school-headed households earn twice as much and college-headed households receive three-fold more wage income in logarithms than households whose heads do not have any education. And if we consider the coefficients of the different education categories as rough approximation to returns to schooling, the 4

[13] FIES collected information on the level of educational attainment rather than exact years of schooling completed.

[14] Because the independent variable is logarithms of wage income, households who reported zero wage incomes were eliminated in the regression runs.

per cent increase in the coefficient of primary school dummy indicates an increase in returns to primary education by 4 per cent in 1985 to 1991. Returns to secondary school remains about the same while college education returns have risen by 2 per cent.

Age and sex variables are included in Regressions 2 and 5 without the education categories. The negative coefficient of age-squared confirms that wage income in logarithms rises at first, reaches a maximum, and declines eventually. Using Equation (3.7) and the coefficients of the two age variables in Regressions 2 and 5, we have computed that for every one-unit increase in age, wage income in logarithms rises by about 4 per cent in 1985 and by 6 per cent in 1991. Male-headed households have 17 per cent in 1985 and 5 per cent in 1991 wage income (in logarithms) advantage over households headed by females.

Regressions 3 and 6 combine the three educational categories with age and sex variables. Because of the covariation between these factors, the coefficients change slightly when combined. The coefficients of all education category dummies rise, the age coefficient declines, and the sex dummy coefficient declines by 2 per cent in 1985 but rises by 3 per cent in 1991.

Now we turn to the contribution of different household head characteristics on the variations in wage income measured in logarithms (Table 3.7). Of education, age, and sex, the first characteristic explains a sizeable portion, 20 per cent in both 1985 and 1991, of the inequality in wage income. And the most important category in 1985 is college education, which accounts in the order of 9 to 15 per cent of the variations in logged

wage income, followed by secondary school, and the last is primary education. In 1991, the relative importance of primary school in accounting for the inequality in wage income increased while the portion of inequality explained by secondary and college education declined. Age and sex of household heads, although both are significant determinants of the level of wage income in logarithms, are not very important factors affecting the inequality of income from wage activities.

3.6 Summary and conclusion

Using disaggregated household income data from the FIES 1985 and 1991, this chapter has decomposed the national inequality by quantifying the relative contribution of each income source to the total income inequality. The key findings are the following.

First, of the five income sources (i.e., wage income, enterpreneurial income, remittances and pensions, property income, and other income), wage income accounts for the largest proportion of the overall inequality and the other income the smallest. Enterpreneurial income is ranked the second most important source of inequality whereas, it is not clear whether income from remittances and pensions contribute more to the overall inequality than property income.

Second, there has been a rise in inequality in 1985 to 1991. Rental income from non-agricultural assets, a component of property income, represents the highest contributor to this increase followed by the wage income coming from nonagricultural employment.

Third, personal characteristics of heads are found to be significant factors affecting the level of household wage income expressed in logarithms. But the degree of variations in logged wage income is dependent substantially on the educational attainment, particularly college education, of head. Schooling in general , accounts for 20 per cent of the variability of wage incomes in logarithms.

The strong influence of wage income on the overall inequality could have emanated from the high degree of inequality associated with the wage rates and/or hours of work - wage income being the product of these two. Wage rates inequality could have significant impact because of the well-known stylized pattern of the Philippine development which promoted capital-intensive industrialization. The share of industry value added in GDP was not matched by an increase in its share of employment. The value added of the industry as a proportion of the GDP has risen from approximately 31 per cent in the 1970s to 36 per cent in the 1980s to 35 per cent in the early 1990s while the industry share of employment has remained at about 15 per cent. This indicates that the labour productivity in industry is higher in relation to agriculture and services where self-employment was more common and wage rates were low and tended to be more flexible. This study however, can not go further to calculate the wage rates inequality because the data on wage rates are lacking in the household income surveys. Wage rates information although available from the surveys of the Central Bank, the Bureau of Agricultural Economics of the Department of Agriculture, the National Statistics Office, and the Wage Council are in tabulated form precluding any calculations targeted at the

disaggregated level. With respect to the inequality in the hours of work, there is an indication (weak as it might be) that its impact on wage income inequality has gone down in 1985 to 1991 as unemployment rate during this period has plummeted from 11.1 per cent in 1985 to 9.0 per cent in 1991.

Table 3.1 Average Household Income by Source, the Philippines, 1961-91

Income Source	1961	1965	1971	1985	1988	1991
		Real annual household income (Peso/year)				
Wages	35	41	42	38	51	53
Agriculture[1]	5	7	6	4	5	4
Non-agriculture	30	34	36	34	46	49
Enterpreneurial income	35	37	35	28	33	35
Agriculture[1]	21	24	21	12	13	13
Non-agriculture[2]	14	13	14	16	20	22
Remittances and pensions[3]	4	4	7	16	15	18
Property income[4]	9	12	10	7	5	15
Other income[5]	1	1	1	3	2	2
Total	84	95	95	92	106	123
CPI (1978=100)	21.4	26.8	39.8	352.6	401.0	588.1

Table continues on the following page.

Table 3.1 (Continued) Average Household Income by Source, by Philippines, 1961-91

Income source	1961	1965	1971	1985	1988	1991
		Percentage of income				
Wages	42	43	44	42	47	43
Agriculture[1]	6	7	6	4	4	4
Non-agriculture	36	36	38	38	43	39
Enterpreneurial income	42	39	37	31	31	28
Agriculture[1]	25	25	22	14	12	10
Non-agriculture[2]	17	14	15	17	19	18
Remittances and pensions[3]	5	4	7	17	14	15
Property income[4]	10	13	11	7	5	12
Other income[5]	1	1	1	3	2	3
Total	100	100	100	100	100	100

[1]Includes income from farming, livestock and poultry, fishery, forestry, and hunting

[2]Enterpreneurial incomes from wholesale and retail; manufacturing; transportation, communication and storage; mining and quarrying; construction; enterpreneurial incomes from community, social, recreational, and personal services; and other enterprises

[3]Remittances from overseas and domestic sources, pensions and retirement payments, and gifts

[4] Rental income from non-agricultural lands, buildings, owner-occupied dwelling unit, dividends from investments, and interests from bank deposits

[5]Income from family sustenance activities and other incomes not classified elsewhere

Source: Author's computations from FIES 1961, 1965, 1971, 1985, 1988, 1991

Table 3.2 Relative Concentration Coefficients of Source Incomes in Overall Inequality, the Philippines, 1985, 1991

Source of Income	c_i^1	g_i^1	c_i^1	g_i^1
	1985		1991	
	Household income			
Wages	1.228	1.073	0.951	1.038
Agricultural[2]	0.025	0.011	0.001	-0.108
Non-agricultural	1.364	1.192	1.034	1.138
Enterpreneurial income	0.806	0.825	1.023	0.862
Agricultural[2]	0.046	0.243	0.092	0.039
Non-agricultural[3]	1.399	1.283	1.578	1.336
Remittances and pensions	0.604	1.241	0.629	1.116
Foreign remittances	0.677	1.580	0.822	1.397
Domestic remittances	0.244	0.510	0.080	0.319
Pensions and gifts	0.685	1.068	0.507	0.938
Property income	1.861	1.268	1.680	1.227
Rents[4]	2.333	1.258	1.684	1.256
Interest and dividends	2.670	1.781	2.513	1.664
Net shares of crops, livestock, & poultry	0.682	1.084	1.503	0.886
Other income[5]	0.012	-0.025	-0.083	-0.305

Table continues on the following page.

Table 3.2 (Continued) Relative Concentration Coefficients of Source Incomes in Overall Inequality, the Philippines, 1985, 1991

Source of Income	c_i^1	g_i^1	c_i^1	g_i^1
	1985		1991	
	Per capita household income			
Wages	1.189	1.061	1.149	1.015
Agricultural[2]	0.002	0.020	0.865	-0.020
Non-agricultural	1.325	1.175	1.175	1.107
Enterpreneurial income	0.901	0.778	0.627	0.806
Agricultural[2]	0.063	0.259	0.050	0.074
Non-agricultural[3]	1.584	1.199	0.973	1.236
Remittances and pensions	0.594	1.271	0.715	1.184
Foreign remittances	0.721	1.567	1.018	1.421
Domestic remittances	0.371	0.780	0.125	0.607
Pensions and gifts	0.523	1.095	0.429	1.021
Property income	1.772	1.315	1.698	1.286
Rents[4]	1.915	1.275	1.790	1.317
Interest and dividends	3.934	1.804	2.730	1.684
Net shares of crops, livestock, & poultry	0.604	0.939	0.681	0.947
Other income[5]	0.036	0.045	-0.037	-0.221
Number of samples				
1985	16,971			
1991	24,786			

Table 3.2 (Continued) Relative Concentration Coefficients of Source Incomes in Overall Inequality, the Philippines, 1985, 1991

[1] c_i and g_i are the relative concentration coefficients for the squared coefficient of variation and Gini coefficient, respectively. An income source is inequality-increasing if c_i and g_i are greater than unity and inequality-decreasing if c_i and g_i are less than unity.

[2] Income from farming, livestock and poultry, fishery, forestry, and hunting

[3] Enterpreneurial incomes from wholesale and retail; manufacturing; transportation, communication and storage; mining and quarrying; construction; enterpreneurial incomes from community, social, recreational, and personal services; and other enterprises

[4] Rental income from non-agricultural lands, buildings, and owner-occupied dwelling unit

[5] Income from family sustenance activities and other incomes not classified elsewhere

Source: Author's computations from FIES 1985, 1991

Table 3.3 Factor Inequality Weights for Source Incomes, the Philippines, 1985, 1991

Source of Income	w_ic_i[1]	w_ig_i[1]	w_ic_i[1]	w_ig_i[1]	w_ic_i[1]	w_ig_i[1]	w_ic_i[1]	w_ig_i[1]
	1985		1991		1985		1991	
	Household income				Per capita household income			
Wages and salaries	0.508	0.443	0.413	0.447	0.477	0.425	0.480	0.424
Agricultural[2]	0.001	0.001	0.001	-0.003	0.001	0.002	0.029	-0.001
Non-agricultural	0.507	0.442	0.412	0.450	0.476	0.423	0.451	0.425
Enterpreneurial income	0.247	0.252	0.285	0.240	0.267	0.231	0.164	0.211
Agricultural[2]	0.006	0.032	0.011	0.004	0.009	0.034	0.005	0.008
Non-agricultural[3]	0.241	0.220	0.274	0.236	0.258	0.197	0.159	0.203
Remittances and pensions	0.104	0.213	0.092	0.163	0.113	0.241	0.117	0.193
Foreign remittances	0.061	0.142	0.070	0.119	0.07	0.151	0.094	0.131
Domestic remittances	0.007	0.015	0.002	0.006	0.014	0.028	0.003	0.015
Pensions and gifts	0.036	0.057	0.020	0.038	0.029	0.002	0.020	0.047
Property income	0.138	0.094	0.211	0.153	0.142	0.101	0.240	0.183
Rents[4]	0.098	0.053	0.182	0.136	0.082	0.056	0.218	0.161
Interest and dividends	0.024	0.016	0.008	0.005	0.043	0.020	0.01	0.007
Net shares of crops, livestock,& poultry	0.016	0.025	0.021	0.012	0.017	0.025	0.012	0.015
Other income[5]	0.003	-0.001	-0.001	-0.003	0.001	0.002	-0.001	-0.011
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

[1] w_ic_i and w_ig_i are factor inequality weights for the squared coefficient of variation and Gini coefficient, respectively.

[2] Income from farming, livestock and poultry, fishery, forestry, and hunting

[3] Enterpreneurial incomes from wholesale and retail; manufacturing; transportation, communication and storage; mining and quarrying; construction; enterpreneurial incomes from community, social, recreational, and personal services; and other enterprises.

[4] Rental income from non-agricultural lands, buildings, and owner-occupied dwelling unit

[5] Income from family sustenance activities and other incomes not classified elsewhere

Source: Author's computations from FIES 1985, 1991

Table 3.4 Decomposition of Gini Coefficient, the Philippines, 1985, 1991

Income Source	w_i[1]	R_i[2]	G_i[3]	Contribution to Gini ($w_iR_iG_i$)	w_i[1]	R_i[2]	G_i[3]	Contribution to Gini ($w_iR_iG_i$)
			1985				1991	
			Household income					
Wages and salaries	0.414	0.737	0.699	0.213	0.432	0.768	0.681	0.226
Agriculture[4]	0.042	0.006	0.901	0.001	0.035	-0.060	0.910	-0.002
Non-agriculture	0.372	0.759	0.754	0.212	0.397	0.789	0.727	0.228
Enterpreneurial income	0.307	0.559	0.708	0.121	0.282	0.571	0.761	0.123
Agriculture[4]	0.135	0.152	0.768	0.016	0.103	0.025	0.787	0.002
Non-agriculture[5]	0.172	0.693	0.889	0.105	0.179	0.725	0.929	0.121
Remittances and pensions	0.173	0.728	0.818	0.102	0.145	0.684	0.822	0.081
Foreign remittances	0.090	0.801	0.947	0.068	0.084	0.752	0.936	0.059
Domestic remittances	0.030	0.281	0.871	0.007	0.020	0.181	0.888	0.003
Pensions and gifts	0.053	0.635	0.807	0.027	0.041	0.576	0.821	0.019
Property income	0.074	0.707	0.861	0.045	0.125	0.819	0.755	0.077
Rents[6]	0.042	0.681	0.887	0.025	0.108	0.833	0.761	0.068
Interests and dividends	0.009	0.867	0.986	0.008	0.003	0.843	0.995	0.003
Net shares of crops, livestock ,& poultry	0.023	0.549	0.948	0.012	0.014	0.465	0.960	0.006
Other income[7]	0.032	-0.018	0.665	-0.001	0.016	-0.224	0.686	-0.002
Total	1.000	1.000	0.480	0.480	1.000	1.000	0.504	0.504

Table continues on the following page

Table 3.4 (Continued) Decomposition of Gini Coefficient, the Philippines 1985, 1991

Income Source	w_i[1]	R_i[2]	G_i[3]	Contribution to Gini ($w_iR_iG_i$)	w_i[1]	R_i[2]	G_i[3]	Contribution to Gini ($w_iR_iG_i$)
			1985				1991	
			Per capita household income					
Wages and salaries	0.400	0.733	0.724	0.212	0.418	0.756	0.706	0.223
Agriculture[4]	0.041	0.011	0.906	0.001	0.034	-0.011	0.918	-0.0004
Non-agriculture	0.359	0.754	0.779	0.211	0.384	0.775	0.751	0.223
Enterpreneurial income	0.296	0.545	0.713	0.115	0.262	0.561	0.756	0.111
Agriculture[4]	0.133	0.167	0.775	0.017	0.098	0.049	0.794	0.004
Non-agriculture[5]	0.163	0.672	0.892	0.098	0.164	0.709	0.917	0.107
Remittances and pensions	0.189	0.765	0.831	0.120	0.163	0.743	0.838	0.101
Foreign remittances	0.096	0.823	0.952	0.075	0.092	0.794	0.942	0.068
Domestic remittances	0.037	0.437	0.892	0.014	0.025	0.353	0.904	0.008
Pensions and gifts	0.056	0.666	0.822	0.031	0.046	0.638	0.841	0.025
Property income	0.081	0.750	0.877	0.052	0.142	0.856	0.790	0.095
Rents[6]	0.043	0.711	0.897	0.029	0.122	0.869	0.797	0.084
Interests and dividends	0.011	0.902	1.000	0.011	0.004	0.886	1.000	0.003
Net shares of crops, livestock , & poultry	0.026	0.616	0.762	0.012	0.016	0.517	0.963	0.008
Other income[7]	0.034	0.033	0.681	0.001	0.015	-0.166	0.701	-0.001
Total	1.000	1.000	0.500	0.500	1.000	1.000	0.529	0.529

Table 3.4 (Continued) Decomposition of Gini Coefficient, the Philippines, 1985, 1991

[1] w_i is the income share.

[2] R_i is the rank correlation coefficient.

[3] G_i is the Gini coefficient corresponding to the i-th income source.

[4] Income from farming, livestock and poultry, fishery, forestry, and hunting.

[5] Enterpreneurial incomes from wholesale and retail; manufacturing; transportation, communication and storage; mining and quarrying; construction; enterpreneurial incomes from community, social, recreational, and personal services; and other enterprises.

[6] Rental income from non-agricultural lands, buildings, and owner-occupied dwelling unit.

[7] Income from family sustenance activities and other incomes not classified elsewhere.

Source: Author's computations from FIES 1985, 1991.

Table 3.5 Household Annual Wage Income by Groups, the Philippines, 1985, 1991

Household Group	No. of Households	Mean (Peso/ Year)	Standard Deviation	No. of Households	Mean (Peso/ Year)	Standard Deviation
	1985			1991		
Age of head						
Less 25	336	20	27	571	31	45
25-34	3349	32	50	5015	43	67
35-44	4530	37	84	6751	55	124
45-54	3852	47	164	5439	66	175
55-64	2800	47	158	3986	59	107
65 and above	2104	27	74	3027	37	102
All	16971	38	116	24789	53	123
Education of head						
University graduate	1468	148	352	2370	163	304
University undergraduate	1475	58	62	2322	80	97
Secondary education graduate	2419	43	48	4343	59	119
Secondary education undergraduate	1766	28	34	2731	41	51
Primary education graduate	4068	24	32	5778	36	50
Primary education undergraduate	4647	17	27	5979	24	39
No education	1128	12	46	1274	13	28
All	16971	38	116	24789	53	123
Sex of head						
Male	14505	40	122	21173	55	128
Female	2466	27	67	3616	42	82
All	16971	38	116	24789	53	123

Note: All wage income figures are in constant 1978 terms deflated by the CPI

Source: Author's computations from FIES 1985, 1991

Table 3.6 Regressions on Logarithms of Wage Income, 1985, 1991

Explanatory Variable	1985			1991		
	1	2	3	4	5	6
Education						
(deviations from none)						
Primary	0.491		0.556	0.529		0.559
	(9.84)		(10.88)	(10.88)		(11.36)
Secondary	1.086		1.189	1.085		1.162
	(21.02)		(22.15)	(21.95)		(22.96)
College	1.843		1.937	1.823		1.889
	(35.01)		(35.59)	(36.19)		(36.73)
Age		0.045	0.034		0.064	0.059
		(8.20)	(7.04)		(14.67)	(14.82)
Age^2		-0.001	-0.001		-0.001	-0.001
		(8.11)	(5.10)		(14.62)	(12.53)
Sex		0.168	0.153		0.046	0.072
(deviations from female)		(4.71)	(4.81)		(1.59)	(2.78)
Intercept	2.464	2.194	1.252	1.389	2.237	1.135
R^2	0.203	0.008	0.215	0.187	0.013	0.204

[1] t-ratios are in parentheses

Note: All incomes are deflated to 1978 levels by the CPI

Table 3.7 Contribution of Household Head Characteristics to Total Variation of Wage Income in Logarithms, 1985, 1991

Household Head Characteristics	1985		1991	
	Low Estimate[1]	High Estimate[2]	Low Estimate[1]	High Estimate[2]
Education	20	20	19	19
Primary	1	10	3	10
Secondary	3	7	2	4
College	9	15	6	14
Age	1	3	0[3]	0
Sex	1	1	0	0

[1] The difference in the R^2 of a regression equation with all the characteristics included as explanatory variables and a regression equation with only the i-th variable excluded

[2] The R^2 of a regression equation with only the i-th variable included as explanatory factor

[3] Means less than 1%

CHAPTER 4
LAND CONCENTRATION AND INCOME DISTRIBUTION OF AGRICULTURAL HOUSEHOLDS, 1971, 1991

4.1 Introduction

In the times of Malthus when technology was stagnant and households derived their incomes substantially from the streams of earnings generated by land, the best indicator of family income was the size of its landholdings. This Malthusian view clearly links landholdings with income, that is, a high concentration of land implies a high degree of income inequality. Incomes of today's farm households, however, consist not only of returns to land but of returns to other factors of production and earnings from off-farm income sources. Household incomes today are therefore, determined by the amount of land and of other factors of production the household owns, the returns to land and to other factors, and the households' access to nonagricultural activities.

In the 1960s and 1970s, for many of the developing countries, the high concentration of land strongly influenced the distribution of income (Quan and Koo, 1985). The Philippines however, does not seem to obey the conventional pattern. In 1971 to 1991, agricultural land has become more concentrated but rural income inequality has diminished. Such pattern is seemingly a reflection of the presence of counteractive forces which make land concentration less effective in influencing income distribution. The major causal factors that might be responsible for the loosened tie between land concentration and income distribution are the wide diffusion of modern

high-yielding varieties of rice, the implementation of land reform, and the increasing involvement of rural households in non-agricultural activities. This chapter is a re-examination of the linkage between land concentration and income distribution in the light of the emergence of the three counteractive forces.

This chapter has seven major parts. Section 4.2 describes the data sets, defines the major variables, and presents the formulas for land concentration and income inequality. Section 4.3 examines how the increasing population pressure affects the distribution of land resources. In Section 4.4, we explore the linkage between income distribution and land concentration. Section 4.5 describes the new rice technology, its spread among farmers, and its effect on income inequality. A description of the land reform program and how it affects the distribution of income is presented in Section 4.6. Section 4.7 examines the importance of off-farm employment by way of looking at the household income structure. Finally, Section 4.8 provides the summary and conclusion.

4.2 The data sets, the definition of variables and the concentration ratios

The major data bases for this chapter are the FIES 1971 and 1991 for income and the Census of Agriculture (refered to as "the Census") in 1971 and 1991 for agricultural lands[1]. The FIES were undertaken by the NSO fairly regularly every five years since 1961 and all the surveys were published except the 1975 and 1979 when serious income undercoverage was detected. FIES collected information on household income and

[1] FIES income data in 1971 refer to May 1970 to April 1971 while the income in the survey in 1991 pertains to January to December 1991. The information in the Census of 1971 refers to crop year July 1970 to June 1971 and the Census in 1991 to crop year July 1990 to June 1991.

expenditure, household size, number of working members, and household head characteristics such as age, sex, education, and employment. FIES data are available in 1961, 1965, 1971, 1985, 1988, and 1991. The NSO is also conducting the Census of Agriculture but every ten years since 1960[2] and published the Censuses in 1960, 1971, and 1980. The Census of 1991 is not yet published officially but NSO provides copies of selected data upon request[3]. Agricultural censuses collected information on the number, area, tenure, crop grown, value and amount of production of all agricultural landholdings; area of land under irrigation; technological adoption such as the use of modern seeds and inputs such as fertilizer and chemicals; number and kind of livestock and poultry raised; and demographic characteristics of farm population[4].

We have chosen the income surveys and agricultural censuses in 1971 and 1991 to compute income inequality and land concentration ratios, although the 1961 income survey and agricultural census are also available. There are two reasons. First, there has not been a significant change in the distribution of income in 1961 to 1971, when the major factors that might affect income inequality were not yet in existence. The new rice technology for instance, was introduced only in the mid-1960s and its spread was so slow that in 1971 barely one-third of the country's total paddy area was planted with new rice seeds. The land reform program was implemented in the whole country only in the early 1970s and it was only in the late 1970s that massive expansion of the highway systems

[2] The Censuses of 1903, 1918, 1939, and 1948 were limited in scope and were not published.

[3] At the time of this writing, I was given access to regional data only.

[4] This data is not yet released from the 1991 Census.

took place. Second, while the use of the 1971 and 1991 surveys may appear to be too limited to give an accurate picture of the land and income concentration trends, no income surveys are available to match the agricultural census of 1980.

Income data pertains to the group of "agricultural households" defined by the FIES as households whose head is employed in agriculture, forestry, fishing, and hunting[5]. Agriculture is a land-based sector inclusive of such activities as crop farming and raising of livestock and poultry. Landlords, tenants, and agricultural laborers belong to this sector. The inclusion of households classified in forestry, fishing, and hunting in the agricultural household group might appear to weaken the relationship between land concentration and income distribution because the activities in the three sectors are not dependent on land and thus, the distribution of lands may not at all affect the incomes of households falling in these sectors. This is however, not a serious loophole since these households were included in both the 1971 and 1991 agricultural household group. Their inclusion in both suverys seems unlikely to alter the income distribution trends except in the extreme case when their number (as a proportion of the total) increased significantly in 1991; fortunately this was not. The proportion of these households appears to be minimal as confirmed by the small proportion of the average agricultural household income coming from the fishing, forestry, and hunting. Also, the way the FIES data was set up, we can segregate these households from the agriculture group.

[5] The International Standard Industrial Classification (ISIC) of the United Nations define agriculture as cropping, animal husbandry, fishing, hunting, and forestry.

We group incomes of agricultural households into agricultural and non-agricultural sources. Agricultural incomes come from wage activities; raising of crops, livestock, and poultry; and fishing, forestry, and hunting. Agricultural wage income reflects pure returns to labour whereas, incomes derived from raising of crops, livestock, and poultry; and fishing, forestry, and hunting embody returns to both family labour and family-owned capital. Non-agricultural incomes are non-agricultural wages; incomes from manufacturing, trade, transportation, communication, and construction; and rents and remittances. Rents are return to non-agricultural assets which can be in the form of rents received from non-agricultural lands and buildings, rental value of owner-occupied dwelling, interests and dividends received, and profits from sales of stocks and bonds. Remittances include pensions, retirement benefits, and gifts and support.

A farm defined as land that is used for raising crops, livestock, and poultry having a total land area of at least 1000 square meters. A farm may be operated under any of the following tenurial arrangements: owner-cultivation, share tenancy, leasehold tenancy and other tenure. Owner-operated farms are cultivated by a farmer who holds either the ownership of land or the Certificate of Land Transfer (CLT) which under the land reform laws gives him the right to purchase the land after paying the amortization fees prescribed by the Land Bank (See Section 4.6). A farm is under share tenancy if a share of the produce in one cropping season is given to the landlord as rental payment for the use of the land. Leasehold arrangements require the tenant to pay the landowner either a

specified sum of money or a fixed amount of produce. Other tenurial categories include manager-operated farms, rent-free farms, and other forms.

Combining the data from the FIES with the Census is not without problems. In 1971, for a number of regions, the provinces making up a region in the FIES are different from the provinces making up a region in the Census. Because the 1971 Census provides detailed provincial data, we re-grouped the provinces in the Census to make it consistent with the provincial constituents of the regions in the FIES. And while the two data sets in 1991 have similar provincial groupings, five new regions[6] were formed in 1991 which again may require another round of provincial re-classification to make 1991 consistent with 1971. However, this is an impossible task since a number of new provinces were also formed in 1991 which of course, could not be found in the 1971 provincial groupings.

This Gini coefficient for land concentration is computed using the formula below.

$$G_l = 1 - \Sigma_i f_i(A_{i-1} + A_i) \qquad (4.1)$$

where:

G_l =Gini coefficient for land concentration

f_i =percentage of farms in size class i

A_{i-1} , A_i =cumulative percentage of area occupied by farms belonging to size class i-1 and class size i, respectively.

[6] These are the Cordillera Autonomous Region, Central Visayas, Western Mindanao, Central Mindanao, and Autonomous Region of Muslim Mindanao.

The Gini coefficient of income inequality is,

$$G_y = 1 - \Sigma_j f_j(I_{j-1} + I_j) \qquad (4.2)$$

where:

G_y=Gini coefficient of income inequality

f_j=percentage of households belonging to income class j

I_{j-1} , I_j =cumulative income share of households belonging to income class j-1 and to income class j, respectively.

4.3 Population pressure and land resources

Population pressure on limited land resources is one major force pressing change on rural income distribution. In the Philippines, rural population is growing at a rate double the rate of increase of arable lands (Table 4.1). One consequence is the deterioration of man-land ratio. The average rural population per hectare of arable lands has increased from 5.5 persons in 1971 to 6.5 in 1991. This growing scarcity of land is more pronounced in Southern Tagalog, the region closest to Metropolitan Manila, when in 1971 to 1991, population increased dramatically faster (2.82 per cent annually) than arable lands (0.67 per cent annually). The acceleration in population growth in the region is the result of high natural increase and high net in-migration (Philippine Yearbook, 1992). On the other hand, is the case of Central Luzon, Bicol, and Southern Mindanao where the deterioration in person-land ratio emanates (not from population increase) but from the decline in arable lands. Massive conversion of arable lands to permanent crop

lands has occurred in the three regions due to fiscal incentives given by the government to permanent crop sector in the 1970s (Balisacan, 1993).

Another result of the strong population pressure is the fragmentation of farms into smaller sizes. The doubling in the number of operational holdings (2354 thousand in 1971 and 4669 thousand in 1991) is not met by a proportionate increase in the amount of lands held by these farms[7] leading to the substantial rise in the number of small (less than 1.0 hectare) and medium (1.0 to 4.99 hectares) farms. The number of small farms has risen by almost five-fold while the number of middle-sized farms has increased by approximately 50 per cent only (Table 4.2).

And because of the miniaturization of farms, operational holding has become more concentrated. The Gini coefficient of the size distribution of farms has increased from 0.504 in 1971 to 0.506 in 1980 to 0.560 in 1991. This can be traced especially from the rise in the share of small farms (24 per cent increase in 1971 to 1991) without an equiproportional shift in their share of landholdings (8 per cent increase in 1971 to 1991).

Continued population growth as it pressed hard on limited land is also reflected in the changes in farm size, defined as total farm area divided by the number of landholdings. Average farm size has declined progressively from 3.61 to 2.17 hectares in 1971 to 1991 (Table 4.3). The regions that have experienced substantial decrease in

[7] The Philippine cultivation frontier closed down in the 1960s when population pressure pushed the cultivation frontier to marginal lands. As a result, the marginal cost of production via opening of new lands for cultivation has risen relative to the marginal cost of production via by more intensive land use. Since then the major source of agricultural growth is the increase in land productivity (Hayami and Ruttan, 1985).

farm size are either those where population has grown more rapidly, Cagayan and Southern Tagalog for example, or those where farms were larger in 1971, in Bicol and Southern Mindanao for example, which permitted greater subdivision.

What is the relation between population pressure and rural income distribution? As the growth of population presses hard on limited land resources, man-land ratio deteriorates and farm sizes decline. The number of near landless (and landless) households rises. With little land (or no land) to till and without any other alternative sources of income, their income position worsens relative to their landowning counterparts. And because they belong to the lowest income bracket, the share of the lowest income group in the national income declines leading to the rise in income inequality.

4.4 Income distribution and land concentration

If land is the only form by which rural households can hold their wealth, increasing land concentration provokes unequal distribution of income. If commercialization however, becomes integrated in the fabric of rural communities and brings in nonfarm economic opportunities, rural households shift their efforts away from land accumulation towards building up of human skills. The drift away from land makes income distribution less affected by the increasing land concentration.

The Philippine evidence reveals a degree of income inequality much lower than that suggested by the land data. For the whole country and for each of the region, land concentration ratio is generally higher than the corresponding income distribution index.

The Gini coefficient for the size distribution of lands varies from 0.401 to 0.591 in 1971 and 0.446 to 0.625 in 1991 while the range of the Gini coefficient for income inequality is 0.355 to 0.508 in 1971 and 0.291 to 0.455 in 1991. And while land concentration index has risen, agricultural households income inequality has declined[8]. The land concentration index for the Philippines has increased from 0.504 in 1971 to 0.560 in 1991 while the corresponding income inequality ratio has decreased from 0.466 in 1971 to 0.392 in 1991 (Table 4.4).

The divergence between land concentration ratio and income distribution is seemingly a reflection of the weakening relationship between land concentration and income distribution. To test this proposition further, we estimate the rank correlation coefficient between land concentration and income inequality in both 1971 and 1991. In 1971, the value of the rank correlation is -0.121 and in 1991 it is -0.380. The negative value implies that the ranking of land concentration ratio is different from the ranking of income inequality (that is, regions with high land concentration ratio may not be the regions where income inequality is high) and the decline in the value of the rank correlation ratio in 1991 implies a further disagreement between the ranks of land concentration and income distribution. The underlying forces that might be responsible for the loosened tie between land concentration and income distribution are the spread of

[8] Recall in Chapter 2 that the trends in the overall inequality is declining in 1971 to 1985 and rising in 1985 to 1991. The decline in the overall inequality in 1971 to 1985 has come from both the agricultural and the nonagricultural households while the rise in 1985 to 1991 has emanated exclusively from the agricultural household group because the inequality associated with this group has gone down continuously in 1971 to 1991.

technological progress in rice production as represented by the modern seeds and increased fertilizer and chemical applications, the implementation of land reform programs, and increasing urban influences in rural economic activities. In the following sections, we will try to identify the influences of these factors.

4.5 The new rice technology

One of the most important technological change in Philippine agriculture is the introduction of fertilizer-responsive high-yielding varieties (HYVs) of rice, commonly known as Green Revolution. HYVs were developed by the International Rice Research Institute (IRRI) in the 1960s and the earliest variety, IR8, was released in 1966. HYVs were observed to have significant yield advantage over the traditional varieties because these modern seeds are characterized by stronger pests and disease resistance and by shorter growth duration (Otsuka, Gascon, and Asano, 1994).

The diffusion of new seeds is observed to be rather slow and uneven. Five years after the release of IR8, HYVs have reached only 34 per cent of the country's paddy area (Table 4.5). Moreover, because HYVs developed so far were best suited in irrigated condition, early adopters were confined mostly in the northern regions of Cagayan and Central Luzon where irrigation facilities were well-developed. HYV adoption was profitable in these regions because water supply was abundant where HYVs produced the highest yield and allowed second or third rice crop during the dry season (Barker and Herdt, 1985). The adoption of new rice varieties was also high in Western Visayas and Southern Mindanao, which were characterized by adequate wet-season rainfall and water

control, where HYVs performed as well. The diffusion of HYVs was rapid in Southern Tagalog mainly because it is the region where IRRI was located.

The slow and uneven spread of HYVs between regions and the differential adoption rates between farmers were major factors responsible for the high income inequality in 1971 (Oshima and Barros, 1976). Because the new rice varieties responded more favorably in irrigated conditions, the regions where water supply were adequate experienced higher adoption rates, higher yields, and henceforth, higher income. The differential adoption rates of HYVs led to substantial income gap between regions where there had already been huge investments in irrigation facilities and those that have not. The lag in the adoption rates of small farmers vis-a-vis the large farmers in the early HYV period also exacerbated income inequality. Small farmers, due to lack of cash requirements, find it difficult to adopt the new technology which entails higher application of modern inputs. Large farmers on the other hand, have the requisite financial capability to purchase the new inputs and thus, they tend to have the monopoly power over the HYV technology.

Although at the outset, the differences in the adoption of new rice technology appears to have income inequalizing tendency, the wide diffusion of new seeds eventually became the major force contributing to the equalization of farm household income distribution. In the Philippines, the decline in agricultural households income Gini coincided with the near completion of HYV adoption in 1991 when 91 per cent of the country's paddy area was planted with HYVs. Those regions where HYV adoption

was almost complete (Central Luzon, Western Visayas, Cagayan, and Ilocos, for example) have exhibited the highest decline in income inequality. But even if the differential adoption rates of HYVs remain high between regions, the new rice technology can still be effective in improving income inequality. The productivity gains of new rice technology can be shared between regions indirectly through the adjustments in factor prices. Specifically, if irrigated regions experienced higher adoption rates relative to non-irrigated regions and labor is a mobile factor of production, the higher labor demand (and higher wages) associated with HYV use in irrigated areas will induce interregional labor migration from non-irrigated to irrigated regions which will eventually contribute to the equalization of agricultural wages and income between regions (David and Otsuka, 1994). With respect to the differential rates of HYV adoption between large and small farmers, empirical evidence supports that indeed in the early period of Green Revolution, the adoption rates of large farmers were more rapid (Herdt, 1987; Hazell and Ramasamy, 1991). But the lag in adoption rates was observed to have disappeared within few years after the introduction of HYVs. As Ruttan (1977) generalized, "Neither farm size nor tenure has been a serious constraint to the adoption of new high-yielding grain varieties".

How does the spread of HYVs counteract the income concentrating effect of land concentration? First, the HYV technology relies heavily on the intensity of land use rather than farm size. It is classified as a technological change biased in favor of land-saving and labor-using direction (Hayami, 1981). The modern rice varieties save land by

applying labor and chemical inputs more intensively and increase labor demand by increasing the labor requirements for crop care, harvesting, and threshing activities (Barker and Cordova, 1978). Second, the HYVs are bias in favor of scale neutrality or even towards smaller scale (Sidhu, 1974). This biological technology uses divisible inputs such as seeds and fertilizer so that small farmers, if they adopt, are in the best position to capture the returns from the new technology.

4.6 The land reform program

The Philippine land reform program started with the 1963 Agricultural Land Reform Code whose impact had been limited mainly in pilot project in Nueva Ecija (de los Reyes, 1972). The code was amended in 1971 to extend land reform to the whole nation, with automatic conversion of all share-tenants to leaseholders. The 1971 code was strengthened by the proclamation of Presidential Decrees No. 2 and 27 in 1972. The landlord's retention limit was successively reduced from 75 to 7 hectares (Hayami, Quisumbing, and Adriano, 1991).

The land reform program consisted of tenancy reforms and land redistribution programs. Tenancy reforms convert share tenancy to leasehold tenancy with a government-controlled fixed rent (Operation Leasehold) whereas, land redistribution policy sets a ceiling on the landlord's maximum landholdings and transfers the ownership right of the land in excess of the ceiling to the tenants cultivating the land (Operation Land Transfer). The land reform program applies only to tenanted areas growing rice and

corn, with the exclusion of owner-cultivated areas and areas growing crops other than rice and corn.

Operation Leasehold program applies to landlords who own less than 7 hectares of land. Under this program, share tenancy is converted to leasehold tenancy with rent fixed at 25 per cent of the average rice (or corn) yields for 3 normal crops years preceding 1972. Landlords who own more than the retention limit are subject to Operation Land Transfer. Under this program, lands in excess of 7 hectares retention limit are sold to former tenants at a price 2.5 times the gross normal output. The Certificate of Land Transfer (CLT) was distributed to eligible tenants, identifying their cultivated area and promising them the right to purchase the land. CLT holders are required to pay amortization fees to the Land Bank within 15 years.

The land reform program seems to have failed to convert share tenancy to leasehold tenancy particularly in rice. The area of share-tenanted farms has risen absolutely by 46 per cent and proportionately by 3 per cent in 1971 to 1991. The proportion of leasehold rice area on the other hand, has remained low at 4 per cent in 1971 and 9 per cent in 1991 while the rice area under owner-cultivation has declined proportionately by 5 per cent (Table 4.6). While this pattern holds true for the entire country, land reform has been effectively implemented in rice villages which experienced yield growth made possible by the modern seed technology. In a sample of 50 rice-dependent villages from all over Luzon and the Panay Island, Otsuka (1991) reported that the incidence of share tenancy declined drastically in irrigated and favorably rainfed

areas, where HYV adoption rates are high, while share tenancy remains high in unfavorable villages susceptible to severe flood and/or drought, where HYV adoption rate is low. He explained that the success of land reform in villages with adequate water supply lies in the coincidence of land reform and Green Revolution. The interest of tenants in land reform intensified and overwhelmed the opposition of landlords when the increase in yields due to HYVs lead to a divergence of rental value of land from leasehold rent and amortization fees prescribed by the law. Ex-sharecroppers captured the economic returns to land when leasehold rent and amortization fees are kept constant by the land reform law while rice yields rose significantly as a result of the Green Revolution.

Although land reform does not seem to be successful in converting many share tenants to leaseholders and amortizing owners, the 7-hectare limit on the landlord's landholdings has been effective in breaking down large rice *haciendas* particularly in Central Luzon. As a result, the distribution of rice lands improved as shown by the decrease in the Gini coefficient of the size distribution of rice lands from 0.416 in 1971 to 0.346 in 1991. The inequality in the distribution of corn lands has also declined with Gini coefficient for the size distribution declining from 0.451 in 1971 to 0.333 in 1991.

Although rice and corn lands occupy more than 40 per cent of the country's farm area, the improvement in the concentration of rice and corn lands did not affect the overall land concentration which has been shown to have risen. This seems to indicate that the rise in the country's landholding concentration emanates not from subsistence crops, rice and corn, but from commercial crops such as coconut, pineapple, and banana.

The net effect of the implementation of land reform in income distribution is not clear. Although in general, land reform improves income distribution by redistributing economic gains to land from landlords to former share tenants, it may have created serious income discrepancies within the village communities as well. First, by denouncing share tenancy, land reform prevented agricultural laborers from ascending to the so-called "agricultural ladder" (Spillman, 1919) which would them share the gains of new rice technology. The income of agricultural laborers did not rise despite the productivity increases because population pressure prevented wages from rising. The only way by which landless workers can share the benefit of the technical change is to ascend to share tenancy which is unfortunately blocked by the land reform laws. Second, the significant increase in rice yields widened the income gap between leaseholders and share tenants, whose rent increased proportionately with rice yields (Hayami and Kikuchi, 1981). Leaseholders improved their income position relative to share tenants when the government prevented leasehold rent from rising when rice yields were increasing. The income gap between leaseholders and share tenants is made up of the difference between the economic rent (equal to the marginal value product) of land and the actual leasehold rent paid by the leaseholders.

Whether land reform is instrumental in breaking the linkage between land concentration and income distribution depends on the existence of the inverse relationship between farm size and productivity. The inverse relationship tends to increase the productivity of small farms relative to large farms which therefore, allows

the small farmers to improve their income position vis-a-vis the large farmers. In the Philippines, the inverse relationship has been empirically confirmed to exist and the major factor responsible is the difference in land quality (Roumasset, 1977). Small farms are more productive than large farms because small farms are observed to have better water supply. With the existence of the inverse relationship and the success of the land reform program in breaking down large farm holdings, it seems reasonable to assume that the land reform program has disentangled the tie between land concentration and income distribution.

4.7 Off-farm employment

Following the Z goods of the Hymer and Resnick (1969) paradigm, we define off-farm employment as any activity that is engaged in by agricultural households which is classified as nonagriculture. This activity can be in the industrial sector (manufacturing, transportation, communication, and transportation), trade, and service sector (personal and public). Off-farm income (or nonagricultural income) is income derived from off-farm employment (or nonagricultural employment).

Agricultural households in the Philippines are becoming more engaged in off-farm economic activities as shown by the increasing proportion of the average agricultural household income derived off-farm. The share of income from nonagricultural sources has increased from 27 to 38 per cent in 1971 to 1991 while the income share of agriculture has declined from 73 to 62 per cent. The rise in the income share of nonagricultural sources can be traced from the sharp increase in the share of

wages and the share of rents and remittances[9] while the decline in the income share of agriculture is brought about by the decline in the income share of crops, livestock, and poultry (Table 4.7).

The involvement of agricultural households in non-agricultural activities is facilitated by the expansion of the highway systems and the decline in farm size. The Philippine road network doubled in 1970 to 1990 (Philippine Yearbook, 1992) which made major cities more accessible to agricultural areas. The opening of the South Superhighways in 1977, which reduced travel time by half from Southern Tagalog to Metro Manila for example, made possible the commuting of farm household members from home to work in the cities. The decline in farm size on the other hand, allows agricultural households to release family labor for employment elsewhere off-farm. Our regional data indicate that regions deriving a large part of their income from non-farm activities are where farm sizes are small (Ilocos, Central Luzon, and Central Visayas, for example). And it appears that households in the lowest income group, mostly the landless households and small farmers, are those who become much more engaged in non-agricultural activities as indicated by the rise in the income share of this group from 23 per cent in 1971 to 43 per cent in 1991.

[9] Balisacan (1993) found that in addition to the decline in income inequality in the 1980s and the increased labor participation especially of women, the substantial rise in nonwage nonenterpreneurial income (corresponding to rents and remittances in our classification) is another factor responsible for the decline in rural poverty in the Philippines from 1960s to 1980s.

Off-farm employment is a good opportunity for agricultural households to increase their incomes because it provides employment during the dry season when agricultural labor demand is low. With off-farm employment, agricultural households keep themselves working throughout the year and thus, earn relatively high income compared to when they are tied up to agricultural jobs[10]. In Ilocos, Central Luzon, and Southern Tagalog, the average annual income is higher because many agricultural households are engaged in nonagricultural employment, as shown by the higher proportion (approximately 50 per cent in 1991) of the average household income derived off-farm (Table 4.8)[11].

Off-farm employment improves the distribution of income by closing the income gap between agricultural and nonagricultural households. And within the agricultural household group, off-farm employment brings the incomes of landless households and small farmers closer to the income of large and medium farmers. The smallness of farms and the availability of off-farm opportunities in the dry months allow small farmers and

[10] Oshima (1993) cited off-farm employment as one major factor which propelled Japan, Taiwan, and South Korea to rapid growth. These economies promoted off-farm employment (and multiple cropping) to combat the underemployment during the dry season. With steady employment throughout the year, households were able to increase their incomes. And more income means higher spending (on locally produced consumption goods) and more savings which is then translated to higher growth, better distribution of income, and reduced poverty.

[11] Pante and Medalla (1990) cited that there is a strong degree of concentration of industries, particularly manufacturing, in Metro Manila, Central Luzon, and Southern Tagalog. The reason is that the industrial sector is heavily dependent on imported materials and intermediate and capital goods, a legacy of the import substitution drive in the 1950s and the 1970s, and that the industries were located near their source of supply which is the port of Manila.

landless workers to engage in pursuits other than agriculture which brings in more income and enables them to improve their income position vis-a-vis the large and medium farmers. The decline in the agricultural household income inequality in the Philippines in 1971 to 1991 can be cited as due to the increase of income coming from non-agricultural sources. A cross-section analysis of the regions in 1991 also reveals the same pattern that is, income inequality is low where agriculture is less dominant an income source. Noteworthy is Ilocos which has one of the lowest Gini index of income inequality (0.339 in 1991) and with the highest proportion of household income accounted for by nonagricultural sources (50 per cent in 1991) (Figure 2).

The availability of off-farm employment loosens the connection of land concentration with income distribution by enabling agricultural households to improve their incomes beyond the limitations of their farm sizes. With many and varied income-earning opportunites, farm households are no longer confined to their farms and their incomes are no longer dependent on the size of their landholdings. And if farm size is no longer an important determinant of household income, land concentration becomes less effective in influencing the concentration of income.

And finally, Ranis and Stewart (1993) consider the nonagricultural activities in the Philippines as generally resembling the Z goods of Hymer and Resnick which are predicted to decline with the growth of the economy. Our income data however, reveal instead an upsurge in the employment opportunities outside agriculture as the Philippines moves (slowly) to a higher growth path. It can be that the increase in non-farm

employment is coming from low level services, such as domestic work, which are counter-cyclical (to agricultural labor demand) tending to link strongly with the existence of quasi-surplus labor during off-season (Fabella, 1990).

4.8 Summary and conclusion

This chapter has attempted a close examinnation of the relationship between land concentration and income distribution of agricultural households. Our major findings indicate that the income concentrating effect of land concentration appears to have lessened due to the spread of modern rice technology, the implementation of land reform, and the emergence of off-farm employment as a major income source.

The new rice technology seems to have loosened the tie between land concentration and income distribution when it emphasized the intensity of land use and placed less importance in the size of landholdings. When the size of family income is no longer dependent on farm size, land concentration becomes a less significant factor affecting income inequity.

The land reform program on the other hand, has weakened the relationship between land concentration and income distribution when the landlord's landholding ceiling successfully cut down large farms into smaller sizes. Since the inverse relationship between farm size and productivity exists, small-scale farming became more productive and small farmers were able to improve their income position vis-a-vis large farmers, despite the increasing concentration of lands.

Lastly, off-farm employment opportunities eliminated the income inequities brought about by the increasing concentration of lands when smaller farmers (and landless workers), who belong to the lowest income groups, took advantage of such opportunities which then brought their incomes closer to that of the landed higher income group.

Table 4.1 Arable Lands and Rural Population,the Philippines and by Region, 1971, 1991

Region	Arable Lands ('000 Hectares)		Rural Population ('000 Persons)		Person-land Ratio (Person/Hectare)	
	1971 (A)	1991 (B)	1971 (C)	1991 (D)	1971 (C/A)	1991 (D/B)
Philippines	4672	5500	25676	35678	5.50	6.50
C.A.R.[1]	*[3]	108	*	687	*	6.30
Ilocos	200	277	1218	2146	6.09	7.75
Cagayan	366	455	974	1409	2.66	3.10
Central Luzon	627	500	3325	3732	5.30	7.46
Southern Tagalog	420	480	2852	4972	6.80	10.36
Bicol	366	285	1972	2350	5.40	8.25
Western Visayas	585	600	2517	3246	4.31	5.41
Central Visayas	*	399	*	2764	*	6.92
Eastern Visayas	561	251	3558	1836	6.34	7.31
Western Mindanao	*	328	*	1476	*	4.50
Northern Mindanao	535	520	2007	2107	3.75	4.05
Southern Mindanao	1012	489	2676	2675	2.64	5.47
Central Mindanao	*	419	*	1220	*	2.91
A.R.M.M.[2]	*	390	*	1103	*	2.83

Table continues on the following page.

Table 4.1 (Continued) Arable Lands and Rural Population, the Philippines and by Region, 1971, 1991

Region	Growth Rates 1971-91 (% Per Year)		
	Arable Lands	Rural Population	Person-land
Philippines	0.82	1.66	0.84
C.A.R.[1]	*	*	*
Ilocos	1.64	2.87	1.21
Cagayan	1.09	1.86	0.76
Central Luzon	-1.12	0.58	1.72
Southern Tagalog	0.67	2.82	2.13
Bicol	-1.24	0.88	2.14
Western Visayas	0.13	1.28	1.14
Central Visayas	*	*	*
Eastern Visayas	-3.94	-3.25	0.71
Western Mindanao	*	*	*
Northern Mindanao	-0.14	0.24	0.39
Southern Mindanao	-3.57	0.00	3.71
Central Mindanao	*	*	*
A.R.M.M.[2]	*	*	*

[1] Cordillera Autonomous Region

[2] Autonomous Region of Muslim Mindanao

[3] * means not available because the region has not been established

Source: Author's computations from the Census of Agriculture 1971, 1991 (forthcoming) and Census of Population and Housing 1970, 1990

Note: The population estimate is projected at 3.0 % annual growth in 1970-71 and 2.3% in 1990-91

Table 4.2 Number and Area of Farms, the Philippines, 1971, 1991

Classification of Farm	1971		1991	
	Number ('000)	Area ('000 Hectares)	Number ('000)	Area ('000 Hectares)
Small (Less 1.0 ha)	329	170	1751	1000
	(14)[1]	(2)	(38)	(10)
Medium (1.00-4.99 ha)	1671	3907	2443	5300
	(71)	(46)	(53)	(53)
Large (Above 5.0 ha)	353	4416	415	3700
	(15)	(52)	(9)	(37)
All	2354	8493	4669	10000
	(100)	(100)	(100)	(100)

[1] Numbers in parentheses are percentages

Source: Census of Agriculture, 1971, 1991 (forthcoming)

Table 4.3 Average Farm Size, the Philippines and by Region, 1971, 1991

Region	Average Farm Size (Hectares)	
	1971	1991
Philippines	3.61	2.17
C.A.R.[1]	*[3]	1.43
Ilocos	1.86	1.04
Cagayan	3.48	1.86
Central Luzon	2.77	1.77
Southern Tagalog	4.01	2.41
Bicol	4.13	2.48
Western Visayas	3.95	1.83
Central Visayas	*	1.29
Eastern Visayas	2.75	2.16
Western Mindanao	*	2.98
Northern Mindanao	4.09	2.62
Southern Mindanao	4.63	2.97
Central Mindanao	*	2.71
A.R.M.M.[2]	*	2.51

[1] Cordillera Autonomous Region

[2] Autonomous Region of Muslim Mindanao

[3] * means not available

Source: Census of Agriculture, 1971, 1991 (forthcoming)

Table 4.4 Gini Coefficients of Income Distribution of Agricultural Households and the Size Distribution of Lands, the Philippines and by Region, 1971, 1991

Region	Gini Coefficient			
	Land Concentration		Income Distribution	
	1971	1991	1971	1991
Philippines	0.504	0.560	0.466	0.392
C.A.R.[1]	*[3]	0.575	*	0.455
Ilocos	0.450	0.466	0.398	0.339
Cagayan	0.490	0.471	0.355	0.359
Central Luzon	0.401	0.488	0.456	0.384
Southern Tagalog	0.504	0.574	0.437	0.395
Bicol	0.522	0.587	0.391	0.369
Western Visayas	0.591	0.625	0.412	0.338
Central Visayas	*	0.581	*	0.396
Eastern Visayas	0.522	0.551	0.508	0.340
Western Mindanao	*	0.548	*	0.376
Northern Mindanao	0.440	0.559	0.432	0.365
Southern Mindanao	0.470	0.555	0.468	0.392
Central Mindanao	*	0.492	*	0.365
A.R.M.M.[2]	*	0.446	*	0.291

[1] Cordillera Autonomous Region

[2] Autonomous Region of Muslim Mindanao

[3] * means not available

Source: Author's computations from the Census of Agriculture 1971, 1991 (forthcoming) and FIES 1971, 1991

Table 4.5 Proportion of Total Farm Area with Irrigation and Proportion of Paddy Area Planted with Modern Rice Varieties, the Philippines and by Region, 1971, 1991

Region	Farm Area With Irrigation (%)		Paddy Area Planted With Modern Rice Varieties (%)	
	1971	1991	1971	1991
Philippines	10	23	34	91
C.A.R.[1]	*[3]	42	*	60
Ilocos	29	73	14	94
Cagayan	17	39	24	95
Central Luzon	41	62	55	98
Southern Tagalog	9	17	36	87
Bicol	8	15	39	91
Western Visayas	7	25	31	97
Central Visayas	*	11	*	86
Eastern Visayas	4	14	16	88
Western Mindanao	*	13	*	82
Northern Mindanao	3	11	18	88
Southern Mindanao	5	13	34	91
Central Mindanao	*	19	*	80
A.R.M.M.[2]	*	37	*	81

[1] Cordillera Autonomous Region

[2] Autonomous Region of Muslim Mindanao

[3] * means not available

Source: Census of Agriculture, 1971, 1991 (forthcoming) and the International Rice Research Institute

Table 4.6 Tenurial Distribution of Rice and Corn Farms, the Philippines, 1971, 1991

Tenure	Rice		Corn	
	1971	1991	1971	1991
		Area of farms ('000 hectares)		
Owner-operated[1]	1756	2092	1150	1448
Share tenancy	612	891	269	505
Leasehold tenancy	106	309	15	66
Others[2]	186	137	60	176
All	2660	3429	1494	2195
		Percentage of area		
Owner-operated[1]	66	61	77	66
Share tenancy	23	26	18	23
Leasehold tenancy	4	9	1	3
Others[2]	7	4	4	8
All	100	100	100	100

[1] Owner-operator includes owners and CLT holders

[2] Others include rent-free farms, manager-operated farms, and other forms of tenure

Source: Census of Agriculture, 1971, 1991 (forthcoming)

Table 4.7 Breakdown of the Annual Income by Source, Agricultural Households, the Philippines, 1971, 1991

Income Source	1971	1991
	Percentage of income	
Agriculture	73	62
Wages	10	14
Crops, livestock, and poultry	59	40
Fishing, forestry, and hunting	4	8
Non-agriculture	27	38
Wages	9	13
Manufacturing, trade, transportation, communication and contruction	7	8
Rents and remittances	11	17
Total	100	100
Average annual income (Peso/year)	2302	39362
Income share of the lowest three income class (%)	23	43

Source: Author's computations from FIES 1971, 1991

Table 4.8 Breakdown of Annual Income by Source and the Gini Coefficient of Income Inequality, Agricultural Households, the Philippines and by Region, 1991

Income Source/Region	C.A.R.[1]	Ilocos	Cagayan	Central Luzon	Southern Tagalog	Bicol	Western Visayas
			Percentage of income				
Agriculture	60	50	70	53	52	60	62
Wages	3	5	10	11	14	11	24
Crops, livestock, and poultry	56	37	58	37	32	40	32
Fishing, forestry, and hunting	1	8	2	5	6	9	6
Non-agriculture	40	50	30	47	48	40	38
Wages	16	15	12	20	20	12	12
Manufacturing, trade, transportation, communication, and construction	5	9	4	9	10	10	7
Rents and remittances	19	26	14	18	18	18	19
Total	100	100	100	100	100	100	100
Average annual income (Peso/year)	43049	43806	39426	56444	48334	33498	37807
Gini coefficient of income inequality	0.455	0.339	0.359	0.384	0.395	0.369	0.338

[1] Cordillera Autonomous Region

[2] Autonomous Region of Muslim Mindanao

Source: Author's computations from FIES 1971, 1991

Table 4.8 (Continued) Breakdown of Annual Income by Source and the Gini Coefficient of Income Inequality, Agricultural Households, the Philippines and by Region, 1991

Income Source/Region	Central Visayas	Eastern Visayas	Western Mindanao	Northern Mindanao	Southern Mindanao	Central Mindanao	A.R.M.M.
			Percentage of income				
Agriculture	60	67	70	71	70	74	84
Wages	13	11	8	27	20	13	1
Crops, livestock, and poultry	34	40	48	37	44	58	53
Fishing, forestry, and hunting	13	16	14	7	6	3	21
Non-agriculture	40	33	30	29	30	26	16
Wages	13	11	8	10	10	8	2
Manufacturing, trade, transportation, communication, and construction	7	7	11	8	7	7	2
Rents and remittances	20	15	11	11	13	11	12
Total	100	100	100	100	100	100	100
Average annual income (Peso/year)	27994	29448	31988	30707	38912	33669	37957
Gini coefficient of income inequality	0.396	0.340	0.376	0.365	0.392	0.365	0.291

[1] Cordillera Autonomous Region

[2] Autonomous Region of Muslim Mindanao

Source: Author's computations from FIES 1971, 1991

CHAPTER 5
THE EVOLUTION OF GREEN REVOLUTION AND INCOME DISTRIBUTION OF RICE FARMING HOUSEHOLDS, CENTRAL LUZON, 1966-91

5.1 Introduction

In the previous chapter we have examined how the new rice technology has been instrumental in preventing agricultural household income inequality from rising in the presence of the increasing concentration of agricultural landholdings. This chapter attempts to give a microscopic picture of the impact of new rice technology on income distribution by way of comparing the factor payments to different inputs in rice production before the introduction of modern rice seeds and during the two phases of the Green Revolution. We are particularly interested on how the new rice technology has improved the income position of landless agricultural workers who benefitted from the new rice technology specifically because of the labour-using bias of the new rice technology. This is also the chapter which gives a micro-level evidence supporting the argument in Chapter 4 that the coincidence of the Green Revolution and the implementation of land reform lead to a redistribution of rice output from the landlords to the tenants. A surplus which accrued to the tenant was created when the land reform laws prevented land rent from rising at the time when rice yields were increasing.

Two decades have already passed since the introduction of the first modern varieties of rice (MVs) in Asia, a phenomenom popularly known as Green Revolution. MVs refer to short-statured, stiff-strawed, fertilizer-responsive, non-photoperiod sensitive

rice varieties which was released by the International Rice Research Institute (IRRI) in the early 1970s (Chandler, 1982). Yield boost was well documented following the diffusion of early MVs, such as IR5 and IR8 (Barker and Herdt, 1985; IRRI, 1975). The first-generation MVs however, were susceptible to pests and diseases and its yields were highly unstable and subject to declining trends (Flinn and DeDatta 1984; Pingali et al., 1990). To decrease yield losses, the rice breeding programs at IRRI, since the mid-1970s, focused on the development of rice varieties resistant to various pests and diseases (Khush, 1987, 1989). The newer second-generation MVs incorporated traits such as better grain quality, greater resistance to insects and diseases, shorter growth duration, and greater tolerance for adverse environments. Because of the genetic improvements, these newer MVs were found to have highly significant yield-increasing effect over the first-generation MVs while the yield advantage of the first-generation MVs over the traditional varieties was limited (Otsuka, Gascon and Asano, 1994). The yield movements associated with Green Revolution lead Hayami and Otsuka (1994) to comment that the Green Revolution is not a one-shot phenomenom but an evolutionary process involving successive replacements of earlier MVs by new ones.

The introduction of MVs and the improvements in varietal characteristics may have induced changes in factor use which in turn may have induced changes in the distribution of rice production among factor inputs. Factor use and factor payments are determined by the relative factor prices and the factor-using or factor-saving bias of technology (Kawagoe, Otsuka, and Hayami, 1986).

During the Green Revolution period, we expect payments to all factors to increase absolutely because MVs provide higher returns to all factor inputs. The share of output accruing to a single factor however, cannot be predicted a priori because it depends on the marginal productivity of that factor relative to the marginal productivities of other factors. By requiring greater labour use and higher application of fertilizer and chemicals, the MV technology is considered moving towards land-saving and labour-using direction (Hayami and Ruttan, 1985). Given constant factor prices, the marginal product of labour and material inputs, and hence the factor shares of these inputs rise relative to that of land. While the increase in factor share of material inputs had been confirmed (Ranade and Herdt, 1978), the rise in the factor share of labour is doubted as a result of massive use of labour-saving technologies following MV adoption (Lipton and Longhurst, 1989; Jayasuriya and Shand, 1986).

This chapter is an attempt to explore the changes in factor payments and factor shares in rice production with special focus on how the factor payments and factor shares are affected by the introduction and subsequent improvements in the genetic characteristics of MVs. The analysis involves a comparison of factor payments and factor shares in three periods: pre-MV, first-generation MVs, and second-generation MVs. In addition, we assess the distributional impact of factor incomes in rice production by quantifying the contribution of each factor income to the overall income inequality of rice farming households.

This is how this chapter is organized. Section 5.2 provides a brief exposition of factor shares in economic theory. Section 5.3 describes the survey areas and the socio-economic characteristics of sample farms. In Section 5.4 can be found the adoption of various technologies, changes in labor use, and trends in factor prices. Section 5.5 presents the factor shares and earner's shares in rice production. In Section 5.6 is shown the farming household income structure and income distribution. Finally, is the summary and conclusion in Section 5.7.

5.2 Factor shares in economic theory

Factor shares are the ratio of the costs of factor inputs used in production process to the total value of output (that is, total revenue).

Consider a firm producing a single output, paddy (Q), using four factor inputs namely current input (C), capital (K), labor (L), and land (A). If that firm purchases inputs and sells output at constant unit price (P), the factor shares of the firm's inputs are:

Factor share of current inputs=$\frac{qC}{PQ}$ (5.1)

Factor share of capital=$\frac{iK}{PQ}$

Factor share of labour=$\frac{wL}{PQ}$

Factor share of land=$\frac{rA}{PQ}$

where C, K, L, and A are the physical quantities of each factor input used in the production and Q is the physical quantity of output produced. The constant unit prices of inputs are: q for the current input, i for capital, w for labour, and r for land. The numerators in Eq.(5.1) are the factor payments.

A firm's production process is generally expressed by a production function which gives the quantity of output as a function of the quantities of inputs. Assume the production function obeys the conventional requirements for a production function, we express the production function as,

$$Q=F(C, K, L, A) \qquad (5.2)$$

The firm seeks to maximize profit in the production process. Profit (π) is the difference between total revenue and total costs,

$$\pi=PQ - (qC+ iK+wL+rA)$$

Substituting Eq.(5.2) for Q, we get

$$\pi=PF(C,K,L,A) - (qC+iK+wL+rA).$$

We assume profit is maximized at the point where the value of the marginal productivity of each input equals its market price or mathematically,

$$PF_1=q \qquad (5.3)$$

$$PF_2=i$$

$$PF_3=w$$

$$PF_4=r$$

where F_j (j=1,...,4) is the partial derivative of the production function with respect to the j-th input or F_j is the marginal productivity (MP) of the j-th input. The value of the MP of an input (PF_j) is the rate at which the firm's revenue would increase when one unit of the j-th input is added to othe production process, assuming all other input levels are held constant.

Substituting Eq.(5.3) to Eq. (5.1), the factor share of labor can be written as,

$$\text{Factor share of labour}=\frac{wL}{PQ}=\frac{F_3L}{Q}=\frac{MP}{AP} \qquad (5.4)$$

where $AP=\frac{Q}{L}$ is the average productivity of labor. If profit maximization is satisfied, the factor share of an input equals its production elasticity - the proportionate rate of change of output Q with respect to input. The factor share, which is equivalent to the production elasticity of an input, can be expressed as a ratio of the marginal and average productivities of the input at profit maximizing level.

If the product market is perfectly competitive, in the sense that free entry and exit of competing firms are assured, the maximum long-run profit of the representative firm in the industry would be zero. The long-run profit of the representative firm ($\pi*$) is,

$\pi^*=PQ-(qC+iK+wL+rA)=0$

Substituting Eq.(5.3) and rearranging terms we obtain,

$$Q=F_1C+F_2K+F_3L+F_4A \qquad (5.5)$$

That is, the total output would be exhausted if the firm paid the supplier of each input the marginal product. Dividing Eq.(5.5) by Q,

$$1=\frac{F_1C}{Q}+\frac{F_2K}{Q}+\frac{F_3L}{Q}+\frac{F_4A}{Q}$$

$$1=\frac{qC}{PQ}+\frac{iK}{PQ}+\frac{wL}{PQ}+\frac{rA}{PQ}$$

The summation of factor shares over all inputs is unity at equilibrium.

5.3 The survey areas and the socio-economic charateristics of sample farms

The data in this chapter come from the Central Luzon Loop Suvey, simply "Loop Survey", of IRRI; a panel data set collected from sample farms in the Central Luzon, the "rice bowl" of the Philippines[1]. The main purpose of the survey is to monitor changes in

[1] The survey description is drawn substantially from Herdt (1987).

rice production practices, tenure, irrigation, mechanization and labor practices that occured between the wet season of 1966 to dry season of 1991. The survey covered rice farmers along a "loop" of the main highway north of Manila through the provinces of Bulacan, Nueva Ecija, Pangasinan, Tarlac, and Pampanga (See Figure 1). The samples are dispersed at fixed interval along a 200-mile distance adjacent to the main highway and the sample are fairly homogenous consisting of rice farmers with favorable access to market and technology information.

It was intended to maintain the original sample in 1966 but the sample size declined due to gradual attrition overtime caused by retirement, refusal of interview or absence during the survey visits. By 1974, less than two-thirds of the farmers from the original sample remained. Thus, 91 farmers were newly selected in 1979 from the same villages where the remaining samples lived. Also note that the sample size during the dry season was small because only those farms planted to rice during this season were included in the survey (Table 5.1).

The average cultivation size of rice farms during the wet season increased from 2.1 hectares in 1966 to 2.6 in 1970 and 1974, and then declined to 1.8 hectares in 1982 and 1990. The changes in farm size can be partly explained by the changes in sample farms but more fundamentally by increased population pressure on limited land resources.

Prior to 1972, the most common form of land tenure was share tenancy. The land reform program of 1972 converted sharecroppers to leaseholders, when the landlord

owned less than 7 hectares of land, or to amortizing owners, when the landlord owned more than 7 hectares (Hayami, Quisumbing, and Adriano, 1990). The Certificate of Land Transfer (CLT) was issued to amortizing owners, which promises them the right to purchase the land by paying amortization fees over 15 years to the Land Bank. Both leasehold rents and annual amortization fees were fixed at about 25% of yield for three normal crop years preceeding 1972. Since then yields have doubled and the rental value of land diverged substantially from the fixed leasehold rents and amortization fees prescribed by law. And as shown in Table 5.1 the proportion of land under leasehold tenancy and CLT increased remarkably at the expense of share-tenanted areas.

The average years of schooling of heads were 4 to 5 years from 1966 to 1974 and increased to 5 to 7 years from 1979 which partly reflect the cohort effect of younger households surveyed in later years.

5.4 Adoption of technology, labor use, and factor prices

The supply of irrigation water is a critical factor affecting the adoption of MVs. The ratio of rice area with irrigation had risen from 60 per cent in 1966 to 71 per cent in 1979 because of the construction of Pantabangan dam in 1975, which supplied canal water to the southern part of Nueva Ecija. The irrigation ratio had been 100 per cent during the dry season because only irrigated farms planted rice in this season (Table 5.2).

We designate the wet season of 1966 and the dry season of 1967 as pre-MV period because all farmers planted traditional varieties (TVs). The very first MV was IR8 which was released by IRRI in 1966. The diffusion of MVs was rather rapid for four

years after the release of IR8, 67 per cent of farmers was adopting the early released first-generation MVs (denoted as MV1). MV1 consisting of IR5 to IR34 developed by IRRI and C4 developed by the University of the Philippines are highly susceptible to pests and diseases and major production losses occur due to occassional epidemic outbreak. MV1 period spans the wet season of 1970 to the wet season of 1974 when majority of the farmers planted MV1. The second-generation MVs (denoted as MV2) are superior to MV1 because it is characterized by multiple pests and disease resistance. The adoption of MV2 was also rapid for three years after the release of the first MV2, IR36, 93 per cent of the farmers in 1979 planted MV2. The introduction of MV2, consisting of IR36 to IR76, expelled traditional varieties and made MV1 less popular. The quick and high adoption rates of MV2 indicates that MV2 is more profitable relative to MV1 and TVs. The MV2 period spans the wet season of 1979 to the dry season of 1991. It is also remarkable that MV adoption is higher that the irrigation ratio confirming the observation that MVs thrive equally well in shallow, favorably rainfed environments, commonly found in Central Luzon (David and Otsuka, 1994).

Rice cropping intensity increased from 1.1 in the pre-MV period to 1.2 in MV1 period, and further to 1.5 to 1.6 in the MV2 period. TVs are photo-period sensitive and hence, cannot be grown in the dry season cropping while MVs confer great advantage during the dry season because MVs are non-photo period sensitive and have shorter growth duration. The average growth durations are about 155 days for TVs, 130 days for MV1, and 115 days for MV2.

Yield of TV was about 2.0 tons per hectare while the yield of MV1 was approximately 2.5 tons per hectare from the wet season of 1970 to the wet season of 1974, when MV1 adoption was highest. While the yield advantage of MV1 over TVs is rather limited, the yield advantage of MV2 over MV1 is large. From the wet season of 1979 to the dry season of 1991, the yield of MV2 averaged 4.0 tons per hectare.

There is a growing trend in the use of labour-saving technologies, such as tractors, threshers, and direct seeding, following the adoption of MVs. Acceleration in the use of tractors coincided with the introduction of MVs in 1967. However, the adoption of tractors did not increase as fast as the adoption of MVs in subsequent years. Thresher use on the other hand, have a long history in Central Luzon. As early as 1920s, big threshers called "tilyadora" was used by big haciendas purposedly for ease of monitoring the sharing of output between landlords and share tenants (Hayami and Kikuchi, 1981). Tilyadora had been replaced by portable light thresher machine invented by IRRI. Whereas, transplanting is still the most widely used method of crop establishment in Central Luzon, direct seeding becomes much more common since the 1980s. Direct seeding has labour-saving tendency because rice seeds are sown directly in wet fields thus, omitting the nursery bed preparation and transplanting operations required in transplanting.

Although it was speculated that the introduction of MVs stimulated the adoption of labour-saving technologies, contrary empirical evidence appeared. In the Philippines, MVs did not induce the adoption of labour-saving technologies. Farmers were found to

use labour-saving technogies in response to higher wage rates (Otsuka, Gascon, and Asano, 1994; David and Otsuka, 1990).

We classify rice farming activities into four categories: (1) land preparation (plowing and harrowing), (2) crop establishment (seeding, pulling, distributing, and planting seedlings, and repair and cleaning of dikes), (3) crop care (weeding, irrigation management, and application of fertilizer, herbicides, and pesticides), and (4) harvesting and threshing.

Table 5.3 shows the pattern of labour use per hectare by cropping season as well as the percentage of hired labour activity. The total labour use increased from 60 to 64 days in 1966-67 to about 76 days in 1974-79, and 67 days in 1979-91. In absolute terms, hired labour use did not seem to have increased remarkably but in relative terms, the proportion of hired labour increased from about 62 per cent in pre-MV period and 62 per cent in MV1 period to 73 per cent in MV2 period, indicating that evolution of Green Revolution was becoming more hired-labour intensive.

In land preparation, labour input declined from 1966 to 1967 and remained fairly constant thereafter. The decline in labour use in 1967 can be explained by the substantial rise in the number of farmers adopting tractors. The use of hired labour in land preparation increased with the adoption of tractors as tractor operators are usually hired labourers.

In crop establisment, the labour days per hectare tend to increase from 1966 to the peak in 1980 and declined thereafter until it reached the trough in 1991, when the

adoption of direct seeding method reached the highest level. Crop establisment is more dependent on hired labour use; the proportion of hired labour has an average of 80 per cent.

Labour input in crop care activities increased with the adoption of MV1 in 1970 to 1974, but declined continously since then. This decline can be explained by the increased use of herbicide, which facilitates the substitution of purchased inputs for manual weeding labour. Crop care utilized little hired labour because a number of such activities require care and judgment which is not amenable to easy supervision (Otsuka, Chuma, and Hayami, 1993). Family members commonly perform crop care activities.

Harvesting and threshing is the rice farming activity most dependent on hired labour; the proportion of hired labour in this activity is about 92 per cent. There is strong indication that the introduction of MVs increased labour demand in this activity. The average labour use in harvesting and threshing rose from 20 days in the pre-MV period to 24 days in MV1 period, and further up to 26 days in MV2 period. Although MV2 is more high-yielding that MV1 and TVs, and hence may require higher labour application for harvesting and threshing, the labour demand increasing effect of MV2 was counteracted by the labour-saving effect of thresher use. Thresher adoption became more pronounced in the 1980s and 1990s, when adoption rate reached more than 90 and 100 per cent, respectively.

Factor use and the choice of labour-saving technologies are affected by factor prices, particularly wage rates and machinery rentals. Wage rates vary considerably

across different activities and maybe markedly different even in the same activity, depending on whether the contract is daily wage or piece rate (Roumasset and Uy, 1982). Land preparation and transplanting wages refer to daily rates of bullock operators and transplanters, respectively, while harvesting wage refers to average daily earnings of a harvesting worker under output-sharing contracts. Daily wage contract is more common in land preparation and transplanting but is uncommon in harvesting activity where output-sharing contracts were exclusively used.

Table 5.4 shows real wage and rental indices deflated by nominal paddy price indices. Nominal paddy price index increased by about ten times from 1966 to 1991. Input prices except urea however, increase more rapidly, which suggests that factor prices tend to have increased more than output price. The trends of the real wage rates for land preparation, transplanting, and harvesting were relatively similar up to 1979. But the real daily transplanting wage did not increase as fast as the other two wages in the 1980s, presumably because of the introduction of direct seeding, which greatly reduced the labour demand in crop establishment. Trends in tractor rental, which is defined as rental payment per hectare, and thresher rental, which is defined as rental payment per ton of paddy threshed, were different. Real tractor rental increased rapidly from 1960s to the 1970s and decreased in 1980s, whereas thresher rental gradually increased from 1966 to 1979 and then increased rapidly thereafter. The acceleration in the rate of increase in real thresher rental occured in the MV2 period because higher yields brought about higher labour demand in threshing services.

5.5 Factor shares and earner's shares in rice production

In Table 5.5 can be found factor payments in rice production estimated in kilogram paddy per hectare by season. Gross output per hectare rose by about 8 per cent from pre-MV to MV1 period and by about 66 per cent from MV1 to MV2 period. With the rise in output is the increase in the absolute payments to each factor inputs, particularly during the MV2 period.

Current inputs include seeds, fertilizer, chemicals (herbicides and pesticides), and gasoline for tractor operation. Absolute payment to current inputs increased by more than double from pre-MV to MV1 period and by about three times from MV1 to MV2 period. The increasing factor payments to current inputs can be traced to higher application of fertilizer and chemicals due to favorable fertilizer prices and the favorable response of newer MVs to higher fertilizer application. The surge in the use of chemicals, particularly herbicides, on the other hand, was observed since the mid-1970s when an effective herbicide called Machete was introduced (Moody and Cordova, 1983). Herbicides substitute effectively for weeding labour.

Capital is defined as physical inputs usable for multiple production periods. Draft animals and capital equipment, such as tractor and thresher, are included in this category. We use the average prevailing custom rates for carabao, tractors, and threshers to estimate the value of the services of family-owned capital. Payments to capital inputs declined slightly from pre-MV to MV1 period but rose by more than double from MV1 to MV2 period. The decline in capital payments during the MV1 period can be traced from the

decline in the number of thresher users, caused by the substantial rise in thresher rental rates between 1970-74. On the other hand, the doubling in the output payment to capital from MV1 to MV2 period is due to the acceleration in tractor adoption while at the same time thresher use reached 100 per cent.

Family labour payment was imputed using the average market wage rates for different rice production tasks. Factor payments to labor inputs increased by 11 per cent from pre-MV to MV1 period and by 48 per cent from MV1 to MV2 period. The increase in labour payments accrue substantially to hired labour as payments to family labour remained almost stagnant from pre-MV to MV1 and from MV1 to MV2 period. Output payment to hired labour had risen more dramatically in MV2 period because of the simultaneous rise in wage rates and hired labour requirements in threshing and harvesting activities brought about by higher yields.

Factor payments to land is computed as a residual of gross output after deducting actual and imputed costs of current inputs, capital, and labour. Output payment to land is made up of leasehold rent and farm operator surplus. Leasehold rent accrues to landlord and is regulated by the land reform law while the farm operator surplus reflects returns to farmer's management skills and errors in the imputation of family labour and the services of family-owned capital. It is noticeable that farm operator surplus is higher than the leasehold rent. This implies that the land reform program, which converted share tenants to leaseholders and regulated the leasehold rents, redistributed substantial amounts of rice output from landlords to tenants. Returns to land remained at about the same level from

pre-MV to MV1 period but rose to 33 per cent from MV1 to MV2 period. This is explained solely by the rise in the operator surplus as leasehold rents declined continously from pre-MV to MV1 and from MV1 to MV2 period.

Factor shares in rice production is shown in Table 5.6. Current inputs exhited a sharp rise in its share of output from 6 per cent in pre-MV to 12 per cent in MV1 to 19 per cent in MV2. Capital and labour shares remained fairly constant whereas, the output share of land declined gradually. The labour-using bias of the MV technology does not seem to have substantial impact in the factor share of labour due to the acceleration in the use of labour-saving technologies following the MV adoption. But the increase in the intensity of hired labour use is clear, as reflected in the rise of the hired labour's share of output in MV2 period. The output share of leasehold rent to landlord showed downward trends while the share of output going to farm operator surplus increased modestly, an indication of an improvement in the income position of tenants relative to landlords.

While the factor shares are concerned with the distribution of output among factor inputs, the earner's shares show the distribution of output among owners of factors of production. In Table 5.7 is presented the earner's shares in rice production. Output accruing to farmer includes the imputed returns to family labour and family-owned capital and surplus to farm operator. From pre-MV to MV1 period, current inputs gained, landlord lost, while hired capital owner, hired labour, and farmer maintained their relative output shares. And from MV1 to MV2 period, the proportion of output going to current inputs and hired labour had risen, landlord's share declined again, while hired capital

owner and farmer maintained their relative output shares. The increase in the factor share of current inputs during the two phases of Green Revolution can be explained by the rise in the intensity of fertilizer use, brought about by the favourable price trends, while the increase in hired labour's share of output in the MV2 period is due to the rise in the labour requirements in harvesting and threshing activities which resulted from higher yields. Finally, the substantial decline in the landlord's share of output is attributable to tenurial reforms and regulation of land rents of the land reform program.

From the personal income distributional point of view, Green Revolution is redistributive in favor of current inputs and hired labour. Landlord is at disadvantage because the MV technology is land-saving but more importantly because the Green Revolution coincided with the implementation of land reform program. Substantial amount of output was redistributed from landlords to tenants when share tenants were converted to leaseholders while the leasehold rents were set at rates below the market rental value of land.

5.6 Household income distribution

This section describes the structure of rice farming household income and its distribution. The major aim is to assess the distributional impact of factor incomes in rice production by quantifying the contribution of each factor income to the total income inequality. The decomposition of income inequality by income source determines if factor incomes in rice production are important sources of income inequality. The decomposition has been performed to annual household income in the pre-MV period

(June 1966 to May 1967) and MV2 period (June 1986 to May 1987 and June 1990 to May 1991). Comprehensive income coverage is lacking for the MV1 period (1970-74) and part of the MV2 period (1979-82) because the income from non-rice crop, livestock, and poultry was not reported. Due to this data inadequacy, the comparison of inequality contribution of factor incomes is confined only to pre-MV and MV2 periods.

In Table 5.8 is shown the total annual income of rice farming households by source in Central Luzon. In the pre-MV period, agricultural income is by far the most important source of income with 73 per cent of the household income in 1966-67 cropping year coming from agricultural sources. And from among the components of agricultural income, the most important is rice income, particularly land income in rice production. In 1986-87 and 1990-91 cropping years, nonagricultural activities have emerged as major sources of income. Nonagricultural income as a proportion of the total income has increased from 27 per cent in 1966-67 to 38 per cent in 1986-87 to 41 per cent in 1990-91. This increase is explained substantially by the rise in the income share of commerce, transport, and services.

The total deflated household income has risen modestly by about 20 per cent in 1966-67 cropping year to 1986-87. The major source of this increase is the rise in the real income coming commerce, transport, and services. Agricultural income on the other hand, especially rice income, has remained almost about the same. This is unexpected considering that major yield boost in rice production has occured following the introduction of MV2. It appears that the income-increasing effect of the yield advantage

of MV2 over TVs has been eroded by lower paddy prices. Paddy prices did not increase as fast as the prices of other consumer goods; the nominal paddy price index rose by only about seven times from 1966-67 cropping year to 1986-87 while CPI outside Manila rose by approximately thirteen times. Lower paddy prices are translated instead into lower rice prices for the consumers which means that the gains of new rice technology accrue substantially (not to rice farmers) but to rice consumers in the form of consumer surplus (Hayami and Herdt, 1978).

In 1986-87 cropping year to 1990-91, total real household income has risen by 65 per cent more than half of which is contributed by the increase in agricultural income, most notably rice income. And from among the rice income sources, land income has contributed the highest. Nonagricultural income has remained to be a major source of income in 1990-91 cropping year but its contribution to the increase in the real income in 1966-67 to 1986-87 has been significantly less (46 per cent only) compared to its contribution to the increase in the real income in 1966-67 to 1986-87 (which is 93 per cent).

Why rice income has contributed significantly to the increase in total deflated income in 1986-87 cropping year to 1990-91 is explained by the yield effects on income but more importantly by the price effects. Yield increase has already taken place between 1966-67 to 1986-87 cropping year following the introduction of MV2 yet the real income from rice farming has not risen substantially in 1986-87 because the trends in paddy prices were not favorable. Deflated rice income has increased only in 1990-91 when

price trends were reversed in favor of paddy prices. Real income gains to rice farmers were generated when nominal paddy price index has risen by approximately 100 per cent in 1986-87 to 1990-91 while CPI outside Manila rose by only about 50 per cent.

To assess to what extent the new rice technology improves (or exacerbates) the inequality in income, we have computed the inequality contribution of each factor income in rice production as well as the inequality contribution of the other income sources. We have employed the Gini decomposition procedure by income source described in detailed in Chapter 3.

The major source of income inequality is agricultural income particularly land income in rice production. However, the contribution to inequality of agricultural income has declined substantially while the contribution of nonagricultural income has increased since 1966-67 (Table 5.9).

Income inequality of rice farming households in Central Luzon has improved remarkably in 1966-67 cropping year to 1986-87 as indicated by the decline in the Gini coefficient from 0.475 to 0.373. This decline in the Gini coefficient is 21 percentage points, 77 per cent of which has been accounted for by the decline in the contribution of agricultural income while the remaining 23 per cent has been accounted for by the decline in the contribution of nonagricultural income. Land income is the major contributor to the decline in the inequality contribution of agricultural income.

In 1986-87 to 1990-91, the Gini coefficient has risen slightly from 0.373 to 0.403. This increase is contributed mainly by the rise in the inequality contribution of

agricultural income especially those coming from commerce, transport, and services. Land income on the other hand, has continued to contribute negatively to the rise in income inequality.

It appears that land income has been the major source of the decline in income inequality from 1966-67 to 1986-87 and from 1986-87 to 1990-91. One of the underlying force is the successful implementation of land reform in Central Luzon which converted many share-tenants to leaseholders in 1970s. The land reform program has positive income distributional effects because it coincided with the Green Revolution. The conversion of share tenants to leaseholders and the regulation of leasehold rents while rice yields were increasing significantly has made share tenants the beneficiaries of land reform which then improved their income position vis-a-vis the old time leaseholders. The decline in inequality contribution of land income is also explained by the improvement in the size distribution of lands as indicated by the decline in the Gini coefficient of the size distribution of lands from 0.366 in 1966 to 0.285 in 1986 to 0.276 in 1990.

While nonagricultural income has become an important source of household income, it has also become an important contributor to the rise in income inequality in 1986-87 to 1990-91. Nonagricultural employment in Central Luzon are of urban origin mostly coming from salaried employment in offices and factories in nearby Manila where payments are highly variable.

Lastly, although the Loop Survey samples are confined only in Central Luzon and comprised only of rice farming households with favorable access to markets and new rice technology with the exclusion of landless agricultural workers and landlords, the national trends in the Gini coefficient of agricultural households computed from the FIES are the same as those of the Loop Survey. The Gini coefficient of agricultural households in the national surveys and in rice farming households in Central Luzon in general, is characterized by declining trends from the mid-1960s to the mid-1980s and by slightly upwards trends from the mid-1980s to the early 1990s.

5.7 Summary and conclusion

This chapter has examined in detail the income distributional effects of the evolution of Green Revolution in the Philippines with special focus on how the genetic improvements in rice varieties have affected factor payments in rice production. We have also examined the rice farming household income structure and the distribution of income by way of looking at the inequality contribution of each of the income sources.

We have found that the yield advantage of the first-generation modern rice varieties over the traditional varieties are rather limited while the second-generation modern rice varieties, which have multiple pests and disease resistance, have highly significant yield advantage over the first-generation modern rice varieties, which are characterized by susceptibility to pests and diseases.

As a result, factor payments to all inputs have risen sharply when the second-generation modern rice varieties were introduced whereas, only a modest rise in

factor payments has been observed when the first-generation modern rice varieties were introduced. Among the factor inputs - current inputs, capital, labour, and land - current inputs has experienced substantial rise in factor payments in the two phases of Green Revolution. Factor payments to capital, labour, and land have remained about the same from the pre-MV to MV1 period while in the MV1 to the MV2 period, factor payments to capital and labour have doubled whereas the factor returns to land have increased by only 33 per cent. And among the earners in rice production from the pre-MV to MV1 period, current inputs gained proportionately, hired capital, hired labour and the farmer cultivator maintained their relative shares of the output while the landlord lost. In the MV1 to MV2 period, the proportion of output accruing to current inputs and hired labour increased, hired capital and the farmer cultivator maintained their relative output shares while the landlord's share of output declined again. During the Green Revolution period, the landlord was at disadvantage because the land reform program prevented land rents from rising when rice yields were increasing which lead to a redistribution of output from the landlords to the tenants. Hired laborers were benefitted because the Green Revolution is moving towards a more labour-using phase.

The effect of yield increases on real income has not been manifested until the yield boost in rice production was combined with favorable paddy prices. Rice income, despite the remarkable increases in rice yields, has not brought about the increase in real income in 1966-67 cropping year to 1986-87 when the positive effect of higher yields on income were overwhelmed by the negative effect of lower paddy prices. Nonagricultural

income instead has been identifed to be the major source of the increase in real income in 1966-67 to 1986-87. In the cropping year 1986-87 to 1990-91, rice yields have continued to increase while paddy prices were favorable. Thus, rice income has contributed approximately half of the increase in the household real income in 1986-87 to 1990-91.

Income distribution of rice farming households in Central Luzon has improved from the period of traditional rice varieties to the second-generation modern rice varieties. Land income in rice production is the major contributor to the decline in income inequality. And the major forces behind are the decrease in the number of share-tenanted lands, made possible by the land reform conversion of share tenants to leaseholders, and the improvement in the size distribution of land.

Table 5.1 Socioeconomic Characteristics of Sample Farms in Central Luzon, 1966-91

Category	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Sample size	92	17	62	13	58	149	81	156	120	64	108	56
Farm size (hectare) [b]	2.1	1.5	2.6	2.1	2.6	1.9	2.1	1.8	1.8	1.7	1.8	1.8
Tenure (% area)												
Owner	12.1	0	9.6	0	22.2	7.3	7.7	8.1	8.6	8.3	9.7	6.9
Share tenant	74.7	82.4	55.8	61.5	22.2	8.6	12.9	9.0	16.9	13.8	3.6	4.4
Leasehold and CLT[c]	13.2	17.6	34.6	38.5	55.6	84.1	79.4	82.8	74.5	77.9	86.8	88.7
Schooling[d]	4.6	5.5	4.5	3.9	5.2	6.5	6.1	6.3	6.5	6.3	6.9	6.5

[a] "W" means wet season and "D" means dry season.

[b] Refers to average area planted to rice

[c] Refers to Certificate of Land Transfer

[d] Pertains to household head

Source: The Loop Survey

Table 5.2 Irrigation Ratio, Rice Cropping Intensity, Adoption of MVs, Rice Yields by Variety, and Adoption of Labour-Saving Technologies, Central Luzon, 1966-91

Category	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W [a]	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Irrigation ratio (% area)	60	100	60	100	53	71	100	72	68	100	60	100
Adoption of rice varieties (% adoptors)												
TVs[c]	100	94	33	8	29	0	0	0	0	0	0	0
MV1[d]	0	6	67	92	71	7	10	2	1	2	2	5
MV2[e]	0	0	0	0	0	93	90	98	99	98	98	95
Rice cropping intensity [b]		117		116	121		158	158		151		144
Rice yield (ton/ha)												
TVs[c]	2.3	1.9	2.4	1.4	2.1	---	---	---	---	---	---	---
MV1[d]	---	1.4	2.6	2.5	2.4	2.5	3.4	4.6	4.4	3.1	5.1	5.5
MV2[e]	---	---	---	---	---	3.8	4.1	4.2	3.6	4.3	3.6	4.5

Table continues on the following page.

Table 5.2 (Continued) Irrigation Ratio, Rice Cropping Intensity, Adoption of MVs, Rice Yields by Variety, and Adoption of Labour-Saving Technologies, Central Luzon, 1966-91

Category	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W[a]	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Adoption of labour-saving technologies (% adoptors)												
Tractors	11	47	45	62	52	66	84	73	70	86	95	90
Threshers	77	59	73	62	48	53	63	90	97	92	100	100
Direct seeding	0	0	0	0	0	2	11	16	9	44	24	70

[a] "W" means wet season and "D" means dry season

[b] Index pertaining to 1966/67, 1970/71, 1973/74, 1979/80, 1981/82, 1986/87, and 1990-91

[c] Refers to traditional varieties

[d] Refers to first-generation MVs

[e] Refers to second-generation MVs

Source: The Loop Survey

Table 5.3 Labour Use per Hectare (mandays/hectare) and Percentage of Hired Labour Activity in Central Luzon, 1966-91

Activity	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Land preparation	16 (19)[b]	10 (20)	10 (17)	8 (19)	10 (36)	10 (25)	7 (41)	10 (37)	10 (49)	7 (39)	7 (59)	7 (65)
Crop establishment	20 (83)	25 (71)	22 (79)	28 (61)	29 (89)	27 (81)	30 (72)	25 (81)	26 (84)	19 (68)	26 (76)	16 (81)
Crop care	7 (30)	8 (4)	13 (16)	10 (1)	19 (29)	11 (22)	13 (23)	11 (25)	5 (28)	5 (21)	5 (26)	8 (21)
Harvesting & threshing	21 (90)	18 (91)	20 (84)	18 (87)	29 (93)	26 (95)	29 (95)	24 (96)	19 (95)	25 (95)	25 (86)	30 (88)
Total	64 (64)	60 (60)	65 (53)	65 (53)	87 (68)	75 (69)	79 (70)	70 (71)	60 (77)	56 (72)	64 (74)	61 (75)
Total hired labour	40	36	38	35	60	51	62	49	46	41	47	46

[a] "W" means wet season and "D" means dry season

[b] Numbers in parentheses refer to percentage of hired labour to total labour

Source: The Loop Survey

Table 5.4 Changes in Real Wage and Rental Price Indices in Central Luzon, 1966-91

Activity	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W[a]	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Nominal paddy price index	100	107	113	130	249	248	277	297	651	693	1174	1079
Real wages												
Land preparation	100	122	113	119	94	146	192	181	158	159	135	176
Transplanting	100	131	114	97	93	146	145	171	139	130	131	183
Harvesting	100	77	97	111	98	151	162	186	151	160	146	157
Real rentals												
Tractor	100	95	116	204	126	171	213	190	193	170	121	211
Thresher	100	69	112	102	158	109	175	176	169	180	181	223
Urea	100	97	103	90	124	148	130	159	79	67	82	132

[a] "W" means wet season and "D" means dry season

Source: The Loop Survey

Table 5.5 Factor Payments (kilogram paddy/hectare) in Rice Production, Central Luzon, 1966-91

Factor	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W[a]	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Gross output	2236	1913	2543	2436	2162	3624	4398	4107	3565	4301	3621	4521
Current inputs	117	174	207	358	348	664	1039	755	673	847	587	1065
Capital	210	196	186	232	160	275	632	464	382	405	339	434
Owned[b]	117	109	83	90	66	104	433	165	130	152	60	184
Hired	93	87	103	142	94	171	199	299	252	253	279	250
Labour	537	696	600	717	640	892	1324	905	792	871	872	1026
Family[c]	233	283	289	340	244	285	364	260	184	176	212	290
Hired	304	413	311	377	396	607	960	645	608	695	660	736
Land	1372	847	1550	1129	1014	1793	1403	1983	1718	2178	1823	1996
Leasehold rent[d]	601	673	620	501	451	474	520	520	526	520	343	362
Surplus	771	174	930	628	563	1319	883	1463	1192	1658	1480	1634

Table continues on the following page.

Table 5.5 (Continued) Factor Payments (kilogram paddy/hectare) in Rice Production, Central Luzon, 1966-91

	Average		
	Pre-MV Period (1966-67)	MV1 Period (1970-74)	MV2 Period (1979-91)
Gross output	2185	2366	3924
Current inputs	126	283	761
Capital	208	180	403
Owned[b]	116	76	161
Hired	92	104	242
Labour	562	529	932
Family[c]	241	274	252
Hired	321	255	680
Land	1289	1374	1828
Leasehold rent[d]	612	535	472
Surplus	677	839	1356

[a] "W" refers to wet season and "D" refers to dry season

[b]Imputed cost using average machinery rentals in all villages

[c]Imputed labour cost using appropriate wage rages for different rice production tasks

[d]Average leasehold rent

Source: Author's computations from the Loop Survey

Table 5.6 Factor Shares (%) in Rice Production Central Luzon, 1966-91

Factor	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W [a]	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Gross output	100	100	100	100	100	100	100	100	100	100	100	100
Current inputs	5	9	8	15	16	18	24	18	19	20	16	24
Capital	9	10	7	10	7	8	14	11	11	9	9	10
Owned[b]	5	6	3	4	3	3	10	4	4	4	2	4
Hired	4	4	4	6	4	5	4	7	7	5	7	6
Labour	24	36	24	29	30	25	30	22	22	21	24	23
Family[c]	10	15	11	14	11	9	8	6	5	4	6	6
Hired	14	21	13	15	19	16	22	16	17	17	18	17
Land	62	45	61	46	47	49	32	49	48	50	51	44
Leasehold rent[d]	27	35	24	21	21	13	12	13	15	12	9	8
Surplus	35	10	37	25	26	36	20	36	33	38	42	36

Table continues on the following page.

Table 5.6 (Continued) Factor Shares (%) in Rice Production Central Luzon, 1966-91

	Average		
	Pre-MV Period (1966-67)	MV1 Period (1970-74)	MV2 Period (1979-91)
Gross output	100	100	100
Current inputs	6	12	19
Capital	9	9	9
Owned[b]	5	4	4
Hired	4	5	5
Labour	26	26	25
Family[c]	11	11	7
Hired	15	15	18
Land	59	53	47
Leasehold rent[d]	28	22	12
Surplus	31	31	35

[a] "W" refers to wet season and "D" refers to dry season

[b]Imputed cost using average machinery rentals in all villages

[c]Imputed labour cost using appropriate wage rages for different rice production tasks

[d]Average leasehold rent

Source: Author's computations from the Loop Survey

Table 5.7 Earners' Shares (%) in Rice Production, Central Luzon, 1966-91

Factor	Pre-MV Period (1966-67)		MV1 Period (1970-74)			MV2 Period (1979-91)						
	1966 W[a]	1967 D	1970 W	1971 D	1974 W	1979 W	1980 D	1982 W	1986 W	1987 D	1990 W	1991 D
Gross output	100	100	100	100	100	100	100	100	100	100	100	100
Current inputs	5	9	8	15	16	18	24	18	19	20	16	24
Hired capital owner	4	4	4	6	4	5	4	7	7	5	7	6
Hired labour	14	21	13	15	19	16	22	16	17	17	18	17
Farmer	50	31	51	43	40	48	38	36	42	46	50	45
Landlord	27	35	24	21	21	13	12	13	15	12	9	8

Table continues on the following page.

Table 5.7(Continued) Earners' Shares (%) in Rice Production, Central Luzon, 1966-91

	Average		
	Pre-MV Period (1966-67)	MV1 Period (1970-74)	MV2 Period (1979-91)
Gross output	100	100	100
Current inputs	6	12	19
Hired capital owner	4	5	5
Hired labour	15	15	18
Farmer	47	46	46
Landlord	28	22	12

[a] "W" refers to wet season and "D" refers to dry season

Source: The Loop Survey

Table 5.8 Total Annual Income of Rice Farming Households by Source, Central Luzon, 1966-91

Income Source	1966-67[a]	1986-87[a]	1990-91[a]
	Deflated income (Peso/year)		
Agriculture	51.2	52.1	81.5
Rice	40.0	38.2	52.6
Land	27.3	30.1	40.7
Labor[b]	7.6	5.0	7.1
Capital[c]	5.1	3.1	4.8
Nonrice crop, livestock & poultry	11.2	13.9	28.9
Nonagriculture	19.4	31.9	57.2
Commerce, transport, services[d]	16.3	29.6	49.6
Rentals[e]	3.1	2.3	7.6
Total deflated income	70.6	84.0	138.7
CPI Outside Manila (1978=100)	28.4	358.0	533.0
	Percentage of income		
Agriculture	73	62	59
Rice	57	45	38
Land	39	36	29
Labor[b]	11	6	5
Capital[c]	7	3	4
Nonrice crop, livestock & poultry	16	17	21
Nonagriculture	27	38	41
Commerce, transport, services[d]	23	35	36
Rentals[e]	4	3	5
Total nominal income	100	100	100

[a]Refers to June 1966 to May 1967, June 1986 to May 1987, and June 1990 to May 1991

[b]Imputed family labor income in owned farm plus actual labor earnings outside owned farm

[c]Imputed returns to owned machinery and carabao plus actual rental earnings outside owned farm

[d] Includes earnings from domestic and overseas sources

[e]Non-agricultural assets income

Source: Author's computations from the Loop Survey

Table 5.9 Overall Gini Ratios of Rice Farming Households and Contribution by Income Components, Central Luzon, 1966-91

Income Source	1966-67[a]	1986-87[a]	1990-91[a]
Contribution to total income inequality:			
Agriculture	0.294	0.215	0.212
Rice	0.229	0.140	0.129
Land	0.194	0.130	0.101
Labor[b]	0.013	0.004	0.007
Capital[c]	0.022	0.006	0.021
Nonrice crop, livestock & poultry	0.065	0.075	0.083
Nonagriculture	0.181	0.158	0.191
Commerce, transport, services[d]	0.142	0.138	0.154
Rentals[e]	0.039	0.020	0.037
Overall Gini coefficient	0.475	0.373	0.403

[a]Refers to June 1966 to May 1967, June 1986 to May 1987, and June 1990 to May 1991

[b]Imputed family labor income in owned farm plus actual labor earnings outside owned farm

[c]Imputed returns to owned machinery and carabao plus actual rental earnings outside owned farm

[d]Includes earnings from domestic and overseas sources

[e]Non-agricultural assets income

Source: Author's computations from the Loop Survey

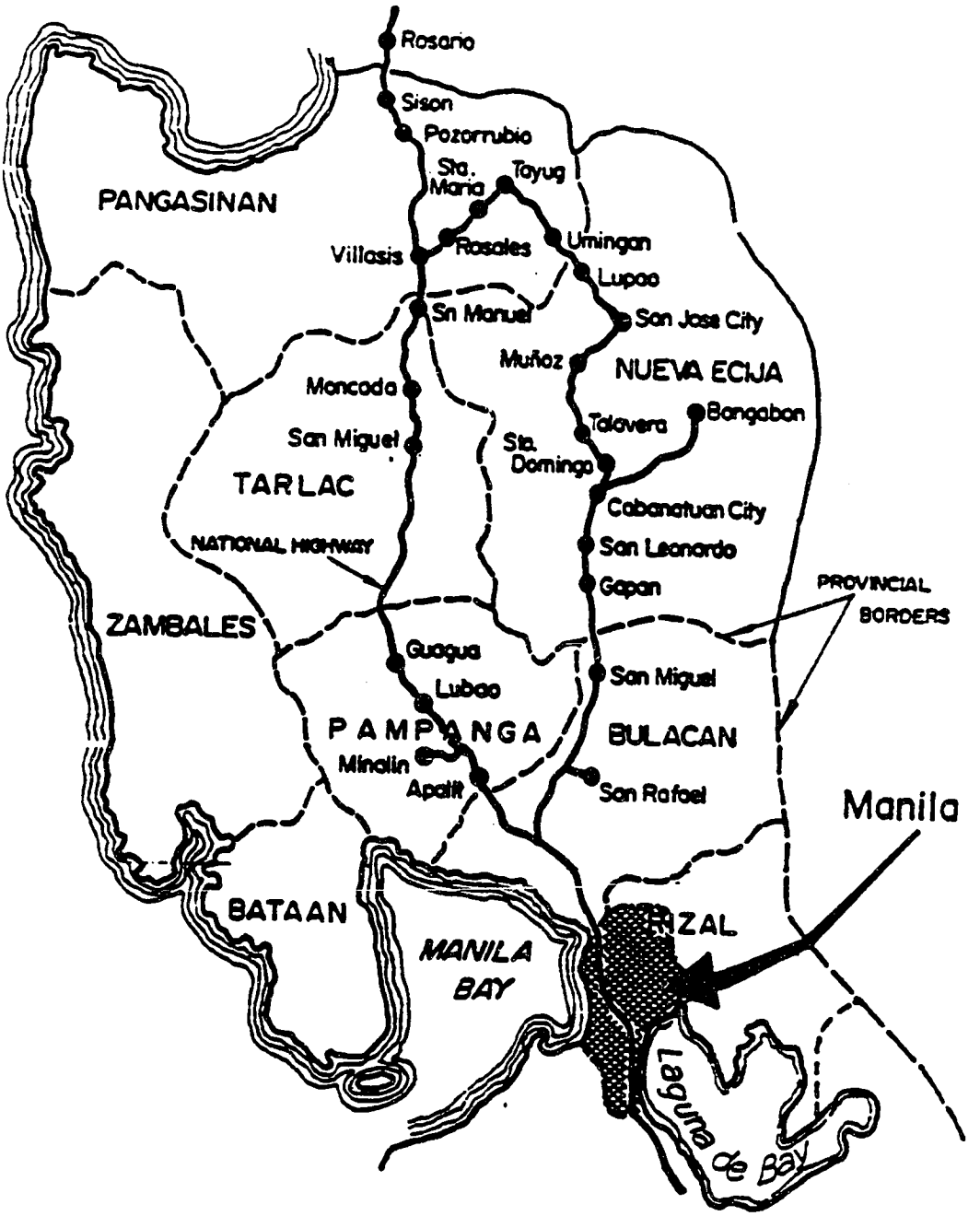

Figure 1 The Location of Sample Farms
Central Luzon Loop Surveys, 1966-91

CHAPTER 6
SUMMARY AND IMPLICATION

This dissertation has aimed to explore the trends and factors affecting household income inequality in the Philippines for the three decades from 1961 to 1991. We have examined eight factors typically cited as causing changes in household income inequality. These are the rise in the proportion of : (1) urban, (2) female-headed, (3) elderly-headed, and (4) college-headed households, (5) changes in occupational structure, (6) changes in wage income inequality, (7) changes in the distribution of agricultural landholdings, and (8) introduction of new rice technology.

We have found, among other things, that except for a sharp decline in the mid-1980s, the Philippines is characterized by a high degree and fairly stable income inequality since 1961. The value of the Gini coefficient corresponding to household income has always been close to 0.50.

All the eight factors are investigated to have brought about significant impact on the absolute level and changes in aggregate inequality. How each of these factors affacted the aggregate trends will be cited as we summarize the paper.

Using the Family Income and Expenditures Surveys in 1965, 1971, 1985, and 1991, the decompositions of the size distribution of income reveal that the "within-group" inequality component overwhelms the "between-group", and for any relevant household groupings, only education and occupation of household head account for a relatively large part of aggregate inequality.

Intertemporal changes in aggregate inequality is mainly accounted for by changes in within-group inequalities, although, the slight decrease in income inequality from 1965 to 1971 can be partly attributed to the change in occupational structure, particularly the shift of household population towards group of households whose heads' occupations are skill-intensive, such as those falling into professional and technical, administrative, executive, and managerial, clerical, and sales. From 1971 to 1985, marked improvement in distribution of income is again brought about by the decline in within-group inequalities, whose favorable impact on the change in aggregate inequality overwhelms the unfavorable influence of the rise in the proportion of urban, female-headed, older-generation, and college-headed households, and the increase in income gap between college graduate-headed household groups and zero-education group. Increase in inequality from 1985 to 1991 is explained by the rise in within-group inequalities and partly by the increase in the number of urban and college-headed households, by the shift of household head occupation to more skill-intensive jobs, and by the rise in income gap between urban and rural households, between college-headed and zero-education household group, and between administrative-executive-managerial and agriculture-fishing-forestry group.

Wage income inequality makes up 45 per cent of total income inequality because income from wages comprises more than 40 per cent of the total household income. Of five major household income sources - wage income, enterpreneurial income, remittances and pensions, property income, and other income - wage income accounts for the largest

contribution to total income inequality and the other income the smallest. Increase in wage income inequalities has also been found to be the second most important source of the rise in income inequality from 1985 to 1991.

A re-examination of the relationship between land concentration and income distribution of agricultural households has shown that the income concentrating effect of land concentration appears to have declined. The tie between land concentration and income distribution has been loosened due to the spread of modern rice technology, the implementation of land reform program, and the emergence of off-farm employment as a major income source.

The introduction of new rice seeds and subsequent improvements in genetic characteristics of new seeds is one major factor responsible for the decline in agricultural household income inequality. The labour-using bias of new rice technology has resulted in an increase in the proportion of rice output accruing to hired labour, which improved the income position of landless laborers vis-a-vis the tenant farmers and landlords. Yield increase brought about by modern rice seeds, on the other hand, has created a large surplus to tenants when land reform laws prevented land rent from rising when rice yields were increasing. This redistribution of output from landlords to tenant farmers has closed the income gap between them.

Two questions that behoove many is why Philippine household income inequality has remained high, despite the fairly rapid growth of its GDP in the 1960s and 1970s, and

why wage income inequality explains a large proportion of total income inequality. An unfavorable policy environment may give answers to these questions.

The import-substitution industrialization, which began in the 1950s and lasted on into the 1980s, for example, is one policy that promoted high levels of income inequality. This strategy was implemented with the aim of propelling the economy to higher growth, by applying capital-intensive production techniques, most notably in manufacturing. What resulted from the import-substitution policy instead was a badly distorted economy, which was biased against exports, labour-intensive industries including agriculture, and smaller units of production. The economy performed poorly in the late 1970s to mid-1980s and unemployment was at its all-time high.

During the import-substitution regime, income inequality remained high because unskilled labour was discriminated. In industry, many unskilled workers were left unemployed (or underemployed) as production processes shifted to capital-intensive mode. Meanwhile, skilled workers, who were employed, enjoyed higher wages because their productivity was enhanced further, when labour was combined with capital. The substantial income gap, between the skilled and unskilled, persisted long and still is one major cause of high wage and total income inequality.

In agriculture, the problem of unemployment was exacerbated by an over-valued exchange rate, an off-shoot of import-substitution policy. With an overvalued peso, capital became artifically cheaper than labour. The result was a massive adoption of labour-saving machinery, such as tractor and thresher, and use of herbicide, a chemical

input which substitutes for weeding labour. High population growth rate, hovering around 3 per cent annually, was another complicating factor. The growing population was responsible for the increase in the number of landless, near-landless, and small farmers. Cultivation frontier closed down in the 1960s, and since then, there was very little new arable lands available for cultivation. The pool of unemployed in agriculture swelled partly because of the sector's limited labour-absorptive capacity and the intermittent nature of agricultural labour demand. With the rise in the number of unemployed was an increase in number of families with low incomes, which perpetuates high levels of inequality.

Service sector became the depository of surplus labour in industry and agriculture. Service product grew at 5.8 per cent annual rate from the 1950s to 1970s. Contrary, the annual growth rates of service product per worker was -0.7 per cent annually in 1950s to 1970s. It was an indication that the growth of service sector, during the import-substitution period, emanated not from commerce and government services but from informal personal services where pay is low and employment irregular. The proliferation of a large number of workers in informal service sector explains why wage income inequality remains high.

If import substitution failed, what could be the strategies to attain higher growth rate and improve the distribution of income? There might be three strategic processess. First is to develop the agricultural sector by implementing a comprehensive agrarian reform and diversifying agricultural production by multiple cropping. Second is to

implement a more regionally-dispersed industrialization to increase the amount of off-farm employment throughout the Philippines. Last is to provide a favorable foreign investment climate together with export promotion policies.

Land reform plays a crucial role in agricultural development. In the Philippines, land reform program started with the 1963 Agricultural Land Reform Code whose impact had been limited mainly in pilot project in Nueva Ecija. The program was extended to the whole nation during the Marcos regime with the proclamation of Presidential Decrees No.2 and 27 in 1972.

The Marcos land reform program consisted of tenancy reforms and land redistribution programs. Tenancy reforms convert share tenancy to leasehold tenancy with a government-controlled fixed rent, whereas land redistribution policy sets a celing on the landlord maximum landholdings and transfers the ownership right of land in excess of the ceiling to tenants cultivating the land. The land reform program applies only to tenanted areas growing rice and corn with the exclusion of owner-cultivated areas and areas growing crops other than rice and corn.

Tenancy reforms appear to have failed to convert share tenancy to leasehold tenancy particularly in rice. The area of share-tenanted rice farms has risen absolutely by 46 per cent and proportionately by 3 per cent from 1971 to 1991. The proportion of leasehold rice area, on the other hand, has remained low at 4 per cent in 1971 and 9 per cent in 1991. While this holds true for the entire country, tenancy reforms have been effectively implemented in irrigated rice villages, which experienced yield growth made

possible by modern rice technology. The rental value of land diverged from the leasehold rent prescribed by law when land reform suppressed land rent when rice yields were increasing. The incidence of share tenancy declined in irrigated villages because the interests of tenants in land reform intensified and overwhelmed the opposition of landlords when the former share tenants were made entitled to a higher share of output. Meanwhile, in non-irrigated villages, where the impact of new rice technology had been minimal, share tenancy was still common. The land rent of share tenants was not substantially lower than the traditional leasehold payment which approximates the leasehold rent mandated by the law.

In contrast to tenancy reforms, the land redistribution policy, which sets a ceiling of 7-hectare landlord retention limit, was successfully implemented. Huge *haciendas*, particularly in Central Luzon, were effectively cut down as reflected in a decline in the Gini coefficient of the size distribution of rice lands from 0.461 in 1971 to 0.346 in 1991.

Like the Marcos attempts at land reform in the Philippines, the program attempted under the Aquino administration achieved little. Aquino, herself a member of a prominent plantation-owning clan, pledged during her campaign to carry out land reform but did not do so at the start of her term while she had emergency powers. She waited until the new congress, dominated by landlord interests, passed a land reform law. As a result, the new land reform law in 1988 was riddled with many loopholes. For example, the law set an ownership ceiling of five hecteres, but landlords were permitted to pass up to three hectares to each child older than fifteen years and had ten years to comply. In

practice, many landowners normally distributed their land to distant offspring while retaining their control. Alternatively, they kept title to the land confident that they had plenty of time to lobby for more favorable provisions. Also, the penalties for noncompliance were negligible: a standard fine equal to half a hectare regardless of the size of evasion attempted.

The failure of Philippine land reform is a sharp contrast to the highly successful land reform program in Japan, Korea, and Taiwan. In each country, land reform was guided by U.S. officials who had little interest in protecting the landed elite. Land reform in these countries had lower retention limits, compensation formulas were straightforward, and the implementation was too rapid to permit delaying tactics and widespread evasion. The success of land reform in each of these countries helped to lay the foundation for rapid growth which has eluded the Philippines for almost two decades.

Agricultural diversification is another important step to develop agriculture. Diversification is the shifting from a monoculture or a few crops to a larger assortment of crops and to animal, fishery, and forestry products. Philippine agriculture has traditionally been monoculture with rice planted in nearly all farmland during the wet season. The main way to diversify is by multiple cropping - planting rice in the wet season and other crops during the dry season. L.A. Gonzales (1987) found that taking into account rainfall patterns, soil texture, slope and elevation, 10.6 million hectares of the 30 million hectares were suitable for a variety of cropping patterns, of which the three major diversified crops for import-substitution, corn, soybeans, and cotton, were suited to

3.7 million hectares. He found that private profitability is high for import-substitution crops (corn, soybeans, and cotton). For other exportable crops (mungbeans and cassava), the private profit was lower but positive. For livestock, it was high for goats, carabaos, and cattle and lower for hogs, broilers and layers. Also, from a social point of view, based on domestic resource cost analysis and social profitability measures, Gonzales found that under conditions of foreign exchange constraints, a strong economic argument of efficiency exists in the domestic production of current imported commodities (cotton, corn, and soybeans), and potential export crops (rice, white potato, cassava, sorghum, garlic and peanuts). Elsewhere, Gonzales also found that, except for broilers there was comparative advantage in Philippine livestock production. Even for broilers, the improvement in domestic corn production can result to a comparative advantage.

Diversification is an effective way to combat unemployment for it gives job opportunities to rural families during the long dry season. Also, diversification increases demand for packaging, storing, marketing and transporting of crops as nonrice crops required a great deal more of these services. With diversification, both farm and off-farm employment and income increase. With higher income, rural families are able to meet their minimum calorie needs. Higher income also means a greater demand for locally produced goods and increase availability of funds for domestic investment. This then leads to more growth. More growth means higher income for everyone including rural families, more equitable distribution of income, and less poverty.

Growth and redistribution can also be achieved by implementing a more regionally-dispersed industrialization. Manila has been the major industrial center particularly during the import-substitution drive. Industries during the import-substitution were heavily dependent on imported materials and capital goods and that they were strategically located near their (only) source of supply, which is the port of Manila. Major institutions were centered in Manila, and were not dispersed across the country, because the available infrastructure facilities favored Manila and its environs.

This existing pattern of industrialization affects the type of off-farm employment available across the country. In regions contiguous to Manila (Southern Tagalog and Central Luzon), off-farm employment consists of formal employment in industries and financial and government institutions. Jobs in these sectors require skills and higher education. In regions distant from Manila, informal employment of Hymer-Resnick type proliferate. The major role of off-farm employment in these regions is to buffer the fluctuations in income caused by the seasonality of labour demand.

If the Philippines is to pursue higher growth rate and equality, its development program should entail a labour-intensive strategy for multiple cropping, a strategy for regionalization of industry, and a strategy for constructing physical infrastructure throughout the country. These strategies play a crucial role in increasing labour demand. With rising labour demand, surplus labour begins to disappear, full employment is achieved, and productivity rises. Income and savings increase. Real wages begin to rise and the process of capital-labour substitution takes place further accelerating productivity

growth. When the economy becomes more complex than rice agriculture, jobs stress the need for education beyond primary schooling.

We have seen elsewhere in this study that, even though the Philippines has yet to reach full employment, education has increasingly become important in determining the level of household income and the degree of income inequality. The distribution of wage income is the most important determinant of the distribution of total household income. Two factors can explain the degree of wage income inequality. The more powerful influence is the distribution of education. Combined with other human capital attributes, such as experience and occupation, education accounts for one-third to one-half of the variation in labour income. The second determinant is the way education are rewarded across sectors and occupations. There exist significant differences in wage payments between formal and informal sector, between wage sector and self-employment, and even between outcomes within self-employment.

The accelerated implementation of Education for All (EFA) in 1988 is one step the Philippine government has undertaken to improve the distribution of education. EFA primarily aims to expand primary and secondary public schools. However, while the goal of EFA is to make education available to all, there is a great need to improve the quality of education. Students in the Philippines spend only four or five hours per day in school, five days a week, and summer vacations are long for about three months. This is in contrast to neighboring Taiwan, South Korea, and Japan where students are kept in school for seven or eight hours, with a half day on Saturdays and only one month of

summer vacation. Also, the pretertiary education in the Philippines is only ten years compared to the standard twelve years. There is also a need to enhance the quality of teaching. The cognitive skill levels of primary and secondary pupils in the Philippines are substantially lower than in Taiwan, South Korea, Japan, and Singapore. Moreover, the Department of Education in the Philippines found that secondary school graduates attained an educational level equivalent only to seven years of schooling, while science achievement tests showed fourteen-year old Filipino students scored the lowest among the students from Philippines, Singapore, Hongkong, Thailand, and South Korea.

The last strategy to achieve equity and growth is a proper policy environment which is condusive to foreigh investments combined with export promotion policies. The Philippine government has undertaken a number of steps toward this goal. The Foreign Investment Act of 1991 substantially liberalized the environment for foreign investment, allowing investment into all but a few sectors and 100 per cent foreign equity in most sectors. A tariff code introduced in August 1991 reduced tariff dispersion and lowered overall protection. Quantitative restrictions have been removed from all but a few products, and the ratification of the Uruguay Round Final Act commits the Philippines to the orderly liberalization of all agricultural products except rice. Deregulation of the foreign exchange market was begun in 1991 and completed in 1992, allowing free use of foreign exchange funds for current and capital transactions. Foreign investment was further liberalized with the entry of new foreign banks into the domestic financial market in 1995.

With respect to export promotion, the government's 1993-98 Medium-Term Development Plan places international competitiveness at center stage and proposes policies to reach that goal, including greater emphasis on product quality and export promotion. In addition to liberalizing foreign exchange markets and the foreign investment and trade regimes, important institutional changes have cleared the way for export growth. Procedures for foreign investors have been streamlined and the government amended the build-operate-transfer law to permit an increase number of forms of private investments in infrastructure facilities.

If all goes well with the implementation of trade and investment liberalization, the Philippines will experience tightening of the labour market. Real wages and purchasing power will begin to rise. Wage gap will be eliminated and the distribution of income will improve.

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