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Michael W. Kusnic

Julie DaVanzo

December 1981

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WHO ARE THE POOR IN MALAYSIA?:

SENSITIVITY TO MEASUREMENT OF INCOME*

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The Rand Corporation

December 1981

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ABSTRACT

WHO ARE THE POOR IN MALAYSIA?
SENSITIVITY TO INCOME MEASUREMENT

Income inequality and ethnic differences in income are important political issues in Malaysia. This paper uses 1976-77 data on over 1000 households in Peninsular Malaysia to show that estimates of the extent of income inequality and of the relative incidence of poverty are sensitive to several dimensions of income measurement. For example, when the definition of income is broadened to include nonmarket sources of well-being, inequality falls and the relative position of rural Malays improves. However, standardizing to remove variations in hours of work increases estimates of the proportion of rural Malays who are poor.

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Income inequality and poverty are important political issues in all countries. However, these issues become particularly sensitive in multiracial societies, especially if income levels differ (or appear to differ) considerably among ethnic groups. In Malaysia, perceived economic imbalances among ethnic groups and dissatisfaction with government policies attempting to reduce them led to violent and prolonged race riots in May 1969. The government responded to the ethnic violence by enunciating a "New Economic Policy" (NEP), whose main objectives were "eradicating poverty irrespective of race and restructuring society to eliminate the identification of race with economic function" (Government of Malaysia, 1976, p. 2). This ethnic violence and the policies prescribed in response to it have generated increased interest in documenting ethnic inequalities in Malaysia, understanding their causes, and evaluating progress toward the NEP goals of reducing them.

Three major ethnic groups inhabit Peninsular Malaysia. A little over half of the population are Malays. The Malays tend to live in rural areas and to work in agriculture, but in recent years their representation in the government sector has increased. Chinese constitute just over one-third of the population, and tend to live in urban areas, and are much more heavily represented than Malays in trade and in the more modern sectors of the economy. Indians comprise just over 10 percent of the population. Many of them work on rubber estates, but they are also overrepresented in professional and clerical occupations. Indians are more likely than Malays, but less likely than Chinese, to live in urban areas.

Studies investigating income differences among the three ethnic groups typically show that the Chinese have higher income and less poverty than the Malays and Indians rank in the middle, as shown by mean household monthly incomes (in Malaysian dollars) for 1957/58, 1966/67, and 1970 for the three ethnic groups.[1]

Ethnic Group	1957/58	1966/67	1970
Malays	139	125	177
Chinese	300	290	399
Indians	237	234	310

How accurately do these figures reflect ethnic disparities in income and their trends over time? As in most countries, the income measures typically used in Malaysia are biased toward easily measured monetary income. For example, the 1967/68 Socioeconomic Survey, which provided the 1966/67 income data above, limited itself strictly to cash income. Even where explicit attempts are made to measure non-cash income, as in the 1970 Post Enumeration Survey, they are often restricted to such sources as employee payments in kind, production for own consumption, and implied rent on owner-occupied housing. Other sources of economic well-being, such as value of cottage industry and housework, are ignored or greatly understated.

In this paper, we consider how sensitive conclusions about levels and inequality of income and incidence of poverty are to alternative ways of measuring income. We use 1976-77 data on a sample of over 1,000

[1] 1957/58 data are from the 1957-58 Household Budget Survey of the Federation of Malaya; 1966/67 data are from the 1967/68 Social Economic Sample Survey of Households; 1970 data are from the Post Enumeration Survey of the 1970 Population Census. All figures are from Snodgrass (1980, Sec. IV).

households in Peninsular Malaysia to explore the sensitivity to five dimensions of measurement of income: (1) how broadly income is defined, (2) what adjustments are made for household size and composition, (3) how the recipient units are defined (households or individuals), (4) whether estimates are standardized for differences in hours of work (and, hence, in amount of leisure consumption), and (5) what measures are used to summarize the central tendency (e.g., means vs. medians) or inequality of the distribution. We examine these issues for the total sample and for ethnogeographic subgroups, and consider the extent to which different measures of income imply different answers to the question: "Who are the poor in Malaysia?"

EMPIRICAL METHODOLOGY

The study uses 1976-77 data on a sample of 1,064 households in Peninsular Malaysia, provided by the Malaysian Family Life Survey (MFLS).[2] Although the MFLS was primarily designed to provide data for analyzing fertility-related topics, detailed information was also collected on families' time allocation, earnings, assets, business and agricultural activities, and other income-earning activities. Thus, the data are well suited for a study of the level and distribution of income among sample members.

Because of the initial purpose of the MFLS, the sample is composed of private households that contained at least one ever-married women less than 50 years of age at the time of the initial visit.[3] Although

[2] For more information about the survey, see Butz and DaVanzo, 1978.

[3] Initially, contacts were made with a random sample of all private households in Peninsular Malaysia. Of those contacted, 7.8 percent had no ever-married woman and 16.3 percent had only an ever-married woman over 49 years of age. For the analysis we have restricted the sample to Malay, Chinese, and Indian households who responded in all three rounds of the survey.

the MFLS sample is not representative of the entire population of Peninsular Malaysia (and our estimates of levels and inequality of income should therefore be interpreted with some care), we nonetheless feel that this sample, representing around three-quarters of the population of Peninsular Malaysia, can provide useful information on what happens to the distribution of income and to the poverty profile when the definition of income is broadened.

Four successively broader income composites, each measuring households' annual before-tax income in the period 1976-77, were selected for the analysis.[4] Our first, and narrowest, income composite is Market Income, the sum of a household's monetary receipts from formal market transactions, comprising wage income, business income, and capital and interest income. Next is Total Observable Income, the total of the household's monetary and nonmonetary receipts. It comprises Market Income plus four types of nonmoney income that clearly affect a household's well-being but are often not reported in income data: in-kind income, transfer income, value of housing services from living in one's own house, and nonmonetary cottage industry income. Total Actual Income I is our third income composite. It adds to Total Observable Income the value of time adult members of the household (persons aged 15 or over) spend performing common housework tasks such as cleaning the house, washing clothes, and shopping. We include the value of time devoted to housework because it is a productive use of

[4] See Kusnic and DaVanzo, 1980, for further details on definitions.

time, time that could have been spent instead in other productive pursuits.[5] Our final income composite adds to Total Actual Income I the value of time household adults spend cooking meals and caring for children in the household.[6] We call this broadest income composite Total Actual Income II.

In this paper, the value of what is produced with nonmarket time is approximated by the opportunity cost of the individual's time, measured by his or her wage rate[7]--the observed wage if he or she works at a wage-paying job, an imputed wage if there is no observed wage.[8] With

[5] For example, woman A may stay at home and keep house, while woman B works outside her home but spends all her earnings on a servant to maintain a house as nicely kept as woman A's. If we did not value woman A's housework we would conclude that she was considerably poorer than woman B.

[6] We have separated these two forms of time use from the other types of household work for several reasons: (1) Amounts of time spent cooking meals and caring for children are subject to potential measurement error, for there is considerable ambiguity in the precise definition of these activities, both conceptually for the analyst and operationally for the interviewer and respondent. (2) Perhaps more than other household activities, cooking and childcare may be done jointly with other activities: for example, a woman may watch her children while she cleans her house. (3) Finally, there is a question of whether cooking and childcare are purely productive activities or joint production-consumption activities.

[7] The opportunity cost is a lower-bound estimate of the value of time spent in non-market activities because we assume the person chose to spend that time in non-market activities because he or she felt his or her time was equal or higher value in these activities than in the foregone market alternatives. An alternative approach would have been to use the market price that would have been paid had the household purchased the service (e.g., hired a housekeeper). We did not use this approach because (1) the service purchased through the market is not likely to be the same as that produced at home; and (2) the market prices for those services (to the extent they exist at all) are not relevant since they have been explicitly rejected by the household.

[8] For those individuals in the sample who do not participate in the formal labor force and who consequently do not have an observable wage rate, we impute a (hypothethical) wage that would be offered to them if they chose to seek work. We have estimated separate wage equations for males and females that relate natural logarithms of wage rates to economic and sociodemographic charcteristics for the sample of individuals for whom we observe wages (Kusnic and DaVanzo, 1980, Appendix C). We then use the estimated coefficients from those regressions to impute wages to nonparticipants, based on their characteristics. We found no evidence of significant selectivity bias in this wage-imputing procedure (Kusnic and DaVanzo, 1980, Appendix A).

some rather restrictive assumptions,[9] economic theory implies that an individual's wage will exactly equal his marginal value of time in terms of market goods. This implication, coupled with a notion of diminishing marginal productivity of time in household production (or diminishing marginal value of leisure), is sufficient to ensure that the total value of what is produced at home is worth at least the individual's wage rate multiplied by the amount of time spent producing it.

This study also estimates the effect on income distribution of including the value of the consumption of leisure time (or the cost of foregoing leisure) in the definition of income. By ignoring this component of welfare, most other income-distribution studies implicitly assume that leisure time has zero value. However, any measure of income that ignores leisure implicitly incorporates variation in tastes for leisure (vis-a-vis work) into the variation in the income distribution.[10] To adjust for variations in hours of work, we have constructed three standardized income composites to compare with the last three unstandardized composites defined above. These new income

[9] Complete flexibility over number of hours of work, positive hours of work, zero marginal tax rate, no disutility of work. Although these assumptions will not hold exactly, deviations from them should not bias our findings unduly (see Kusnic and DaVanzo, 1980, pp. 5-6).

[10] That is, the inevitable conclusion is that individuals with a relatively low taste for leisure are better off than those with stronger preferences for leisure, other things being equal. For example, suppose that on the basis of an income measure that excludes the value of leisure consumption we have two individuals who have the same measured income, but one works 16 hours a day while the other works only 8 hours a day. A definition that excludes the value of leisure time would conclude that these two individuals are equally well off, when in fact one enjoys 8 hours more of leisure each day than the other.

composites are denoted as Standardized Observable Income, Standardized Actual Income I, and Standardized Actual Income II.[11] For each standardized composite, the estimated cost (benefit) of high (low) hours of work is the product of (1) the individual's wage rate and (2) the difference between the sample average number of hours of work for a particular definition of income and the individual's hours of work. (See Kusnic and DaVanzo, 1980, pp. 7-8 and 19-20 for additional information and rationale.)

Each of the income measures used here includes the incomes of all adult members of the household.[12] To examine the impact of variation in household size on the distribution of household income, we consider four different distributions of each measure of household income, each representing a different size/composition adjustment and/or population-unit weighting scheme. The first, household income, makes no adjustment for household size and composition; it treats the household as if it were a homogeneous unit, and considers the distribution of command over resources of the various household units in our sample. The second measure is the per adult income of households, household income divided

[11] We chose not to generate a standardized composite corresponding to Market Income because of the ambiguity involved in allocating hours between that composite and Total Observable Income. For example, if a person working as an employee gets paid both money wages and in-kind payments, his total working hours will show up in Market Income hours.

[12] In the MFLS, a household is defined as a "group of people who sleep under the same roof and eat from the same cooking pot" (Jones and Spoelstra, 1978, p. 10). We have excluded income of children because we had no reliable way of estimating the value of their time. However, our household income measure does not totally exclude income derived from the work of children: To the extent that children have positive marginal products in their work on the family farm or business, income attributable to their efforts is unavoidably incorporated into our measure of business/farm income.

by the number of adults in the household. This is a crude way to adjust for the fact that households with more adult income earners may appear in the first distribution as having higher incomes, when they may be no better off than smaller households with proportionately smaller household incomes. The third measure examined is the per capita income of households--household income divided by the total number of household members.[13] The final measure is the per capita income of individuals. For this measure we consider one observation on each household member and hence give equal weight to each individual in the sample. The first three measures give equal weight to each household and hence the weights attached to individual welfare are inversely proportional to household size.

RESULTS FOR THE ENTIRE SAMPLE

In this section we examine how broadening the definition of income, adjusting for household size and composition, and standardizing to remove variation in hours of work affect income levels and inequality for the total sample. We also consider how these changes affect households' ranking in the overall income distribution.

Income Levels and Inequality: Unstandardized Incomes

Table 1 shows the impact of broadening the definition of unstandardized income on two measures of central tendency, the mean and

[13] The crude methods of adjustment for per adult and per capita income provide no possibility of incorporating into the income measure any notion of gains from specialization within the household, returns to scale in household consumption, or increased efficiency in the allocation of time and effort within the households. These issues have been addressed by others, but are beyond the scope of this paper.

Table 1

MEASURES OF CENTRAL TENDENCY AND INEQUALITY IN UNSTANDARDIZED INCOME COMPOSITES: ALTERNATIVE INCOME DEFINITIONS AND HOUSEHOLD SIZE/COMPOSITION ADJUSTMENTS

Income Composite	Mean (M$/yr.)	Median (M$/yr.)	Gini Coefficient	Income Share of Lowest Quintile
Distribution of Households by Household Income (n=1064)				
Market Income	8219	3829	.616	2.3%
Total Observable Income	9617	5091	.567	3.3
Total Actual Income I	11027	6443	.518	4.5
Total Actual Income II	12781	7958	.480	5.2
Distribution of Households by Per Adult Household Income (n=1064)				
Market Income	2620	1230	.614	2.6%
Total Observable Income	3064	1582	.560	3.9
Total Actual Income I	3556	2051	.512	4.9
Total Actual Income II	4174	2584	.479	5.4
Distribution of Households by Per Capita Household Income (n=1064)				
Market Income	1367	635	.625	2.3%
Total Observable Income	1601	812	.574	3.6
Total Actual Income I	1844	1033	.528	4.4
Total Actual Income II	2147	1306	.494	5.0
Distribution of Individuals by Per Capita Household Income (n=6992)				
Market Income	1251	607	.608	2.6%
Total Observable Income	1464	743	.561	3.6
Total Actual Income I	1679	947	.516	4.6
Total Actual Income II	1946	1191	.481	5.3

median, and on two commonly used measures of income inequality, the Gini coefficient and the income share of the poorest 20 percent of the population. These statistics are reported for each of the four alternative ways of adjusting for household size and composition discussed above. There are five major conclusions to be drawn from Table 1:

1. Expanding the definition of income substantially increases estimates of the standard of living in Malaysia. For example, the narrowest household income measure, Market Income, has a mean of M$8219.[14] Simply adding transfer income, the value of housing services, identified in-kind income, and nonmonetary cottage industry income to Market Income (to form Total Observable Income) increases average annual household income by M$1,398--an increase of 17 percent. The mean of the broadest income measure, Total Actual Income II, M$12,781, exceeds the mean of the narrowest measure by 56 percent, and exceeds the mean of the more commonly accepted measure, Total Observable Income, by a full 33 percent. The increase in medians is even more dramatic: median household Total Actual Income II exceeds median household Market Income by 108 percent.

2. Broadening the definition of income unambiguously[15] reduces income inequality in Malaysia. For each household size/composition

[14] This is equivalent to US$3,288 using the 1967-77 exchange rate of M$2.5 = US$1. This compares to a mean household income in the United States in 1975, for a definition very close to Market Income, of US$13,186.

[15] By "unambiguously" we mean that the distribution generated by each successively broader income concept stochastically dominates the preceding one. The existence of stochastic dominance is a powerful result: it implies that inequality rankings are invariant with respect to a wide range of choices concerning the appropriate notion of social welfare (Atkinson, 1970).

adjustment considered, the reduction in the Gini coefficient averages about 8 percent for each successive expansion of the income measure.

3. Incorporating non-monetary sources of welfare into the measure of income improves the relative position of the poor. Regardless of the household size/composition adjustment, the share of total income accruing to the poorest 20 percent of the population grows rapidly with expansion of the income concept, more than doubling in the shift from the narrowest to the broadest income measure.

4. The extent of change in income levels and inequality due to expansion of the definition of income is nearly the same regardless of the method of adjusting income for variation in household size and composition. Dividing household income by the number of adults reduces measured inequality slightly, but dividing by the total number of household members has no simple and unambiguous effect.[16]

5. Treating individuals, rather than households, as the units of analysis reduces income levels and inequality. For example, weighting per capita income by individuals rather than households reduces both means and medians by an average of 9 percent, reduces the Gini coefficient by a modest 2-3 percent, and increases the income share of the poorest quintile. This is due to the negative relationship between household size and per capita income. Larger, lower-per-capita-income households have greater representation in the individually weighted distribution.

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[16] This contrasts with the findings of Danziger and Taussig (1978), who found that the distribution of individuals by per capita household income had a lower Gini coefficient than the corresponding distribution of households by household income. Our results show that this conclusion depends upon the income definition employed.

The inequality statistics presented in Table 1 show quite clearly that broadening the definition of income tightens the distribution of income. However, these data do not tell us whether it affects a household's relative position in the income distribution. Broadening the definition of income may indeed increase every household's income and may increase that of the poor relatively more than that of the rich, but is the household that was judged to be poorest (or richest) in terms of Market Income still the poorest (or richest) for Total Observable Income or Total Actual Income I or II? The answer, based on rank correlations among our four income composites, is no. Broadening the definition changes the ranking of a substantial number of households in the distribution. The more the definition of income is expanded, the greater the average change in percentile ranking. The first expansion of the income concept--adding nonmonetary receipts to Market Income to form Total Observable Income--has a greater effect on rankings (10.2 percentage points on average for per capita household income) than the two successive broadenings to Total Actual Income I (6.5 points) and Total Actual Income II (6.7 points). The average absolute change in percentile ranking produced by moving from the narrowest definition to the broadest, 14.3 percent, is less than the sum of these three changes (23.4 percent) implying that each successive broadening does not change a household's ranking in the same way.

Additionally, for each definition of income, alternative adjustments for household size and composition affect a household's ranking in the income distribution. Simply dividing household income by

the number of adults in the household changes the average household's percentile ranking in the income distribution by between 13 and 20 percentage points, depending on how broadly income is defined. Dividing instead by the total number of household members has a somewhat smaller effect, ranging between 11 and 17 percent.[17] In both cases, the household size/composition adjustment changes a household's ranking more the more broadly income is defined.

Income Levels and Inequality: Standardized Incomes

We now turn to the measures of income that adjust for variation in hours of work across the population. The means, medians, Gini coefficients, and income shares of the poorest quintile for these standardized income composites are shown in Table 2.

In general, standardizing on alternative values of hours of work has little effect on the various means and medians. Surprisingly, standardizing for the variation across the population in hours of work has little effect on income inequality as well. Inequality in these standardized income distributions still falls with an increase in the scope of activities included in income, but the pure effect of the adjustment, i.e., eliminating variation in hours of work while holding mean hours constant, has no unambiguous effect on inequality.[18] In fact, the most commonly used measure of inequality, the Gini

[17] Dividing by number of adults changes rankings more than dividing by total number of household members because the former varies relatively more (i.e., has a greater coefficient of variation) than the latter.

[18] This result sheds some light on the results of a study similar to ours performed on U.S. data by Garfinkel and Haveman (1977). They contrast two measures of income, "pre-transfer income" and "earnings capacity," which correspond rather closely to our Market Income and Standardized Actual Income I. They find, as we do, that inequality is much less for their broader standardized measure of income than for their narrower unstandardized measure. Our results suggest that their finding results from the fact that their earnings capacity measure assumes a considerable increase in average amount of work, rather than from its removing variation in those hours among households.

Table 2

MEASURES OF CENTRAL TENDENCY AND INEQUALITY IN STANDARDIZED INCOME COMPOSITES: ALTERNATIVE INCOME DEFINITIONS AND HOUSEHOLD SIZE ADJUSTMENTS

Income Composite	Mean (M$/yr.)	Median (M$/yr.)	Gini Coefficient	Income Share of Lowest Quintile
Distribution of Households by Household Income (n=1064)				
Standardized Observable Income (H=1490)	9429	5030	.569	3.1%
Standardized Actual Income I (H=1934)	11069	6248	.535	3.7
Standardized Actual Income II (H=2481)	13107	7843	.506	4.4
Distribution of Households by Per Adult Household Income (n=1064)				
Standardized Observable Income	2975	1618	.557	3.7%
Standardized Actual Income I	3474	2035	.518	4.6
Standardized Actual Income II	4095	2511	.483	5.4
Distribution of Households by Per Capita Household Income (n=1064)				
Standardized Observable Income	1559	817	.574	3.2%
Standardized Actual Income I	1825	1019	.539	3.9
Standardized Actual Income II	2156	1276	.508	4.6
Distribution of Individuals by Per Capita Household Income (n=6992)				
Standardized Observable Income	1436	783	.557	3.5%
Standardized Actual Income I	1686	986	.521	4.2
Standardized Actual Income II	1996	1238	.491	4.8

Note: H = number of standard hours at which each adult's income was calculated, see pp. 6-7.

coefficient, is usually larger for the standardized measures than for the corresponding unstandardized ones.

However, the hours-of-work adjustment does cause an important change in the income share of the poor. Whereas one of the important conclusions drawn earlier was that failure to consider nonmarket sources of income leads to a serious understatement of the relative position of the poorest 20 percent of the population, the data in Table 2 imply that failure to adjust for variation in hours of work leads to an overstatement of the relative position of the poor. The reconciliation of these two points is worth noting: The poor (in terms of Market Income) in Malaysia appear to attempt to compensate for their relatively low Market Income by producing many goods and services for their own consumption. Ignoring this substitution among productive activities understates the relative income position of the poor. However, in the process of producing those goods and services in the household, the poor tend to work relatively long hours and hence forego relatively large amounts of potential leisure consumption. Ignoring this implicit cost of household production tends to bias upward estimates of their relative welfare position.

Standardizing for hours of work changes households' rank ordering in the income distribution. In fact it changes them somewhat more (an average of 16 to 19 percentage points) than did broadening the definition of income or adjusting for household size.

IMPLICATIONS FOR POVERTY PROFILES

In the preceding section we showed that broadening the definition of income, adjusting for variation in household size and composition,

and standardizing for hours of work can substantially affect the ranking of households in the income distribution. We now consider how these alternative ways of measuring income affect conclusions about the composition of the poorest 20 percent of the Malaysian population. The definition of poverty employed here---the probability of being in the poorest 20 percent of the population--is a purely relative one. In our context an absolute poverty line would be inappropriate, as it would have confounded changes in the composition of the poor with a reduction in the number of households falling below the poverty threshold. Our purpose here is to isolate the compositional effect of changing the measure of income.

The Definition of Income and the Ethnic/Geographic Incidence of Poverty

Table 3 shows how broadening the definition of income affects the relative incidence of poverty among the three main ethnic groups in Malaysia. Because ethnicity and urban/rural location are not independent in Peninsular Malaysia, we also stratify by urban/rural residence. (Seventy-five percent of the Malays, but only 50 percent of the Indians and 38 percent of the Chinese, in our sample live in rural areas.)

Poverty in Malaysia is primarily a rural phenomenon. Within each ethnic group, rural residents are more likely to be poor. Rural Malays and rural Indians are the two most poverty-prone subgroups. Within urban/rural strata, Chinese are least poverty-prone of the three ethnic groups, especially in rural areas.

Broadening the definition of income without standardizing for hours of work tends to redistribute the incidence of poverty, reducing it

Table 3

EFFECT OF BROADENING THE DEFINITION OF INCOME AND STANDARDIZING FOR HOURS OF WORK ON THE ETHNIC/GEOGRAPHIC POVERTY PROFILE: THE DISTRIBUTION OF INDIVIDUALS BY PER CAPITA HOUSEHOLD INCOME

	Malays		Chinese		Indians	
Income Composite	Rural (n=2528)	Urban (n=824)	Rural (n=1077)	Urban (n=1733)	Rural (n=415)	Urban (n=415)
Market Income	34.3	8.3	10.4	8.3	36.4	13.3
Total Observable Income	26.9	13.2	14.9	9.4	48.2	21.0
Total Actual Income I	27.7	13.5	16.0	9.2	39.8	21.4
Total Actual Income II	28.2	16.0	15.2	8.3	42.2	17.1
Standardized Observable Income	35.6	13.6	9.2	5.1	36.9	10.8
Standardized Actual Income I	35.8	13.1	10.0	6.3	32.5	7.7
Standardized Actual Income II	35.9	13.1	10.0	5.9	31.1	10.1

Note: Entries are the percentage of individuals within each subgroup that are included among the poorest twenty percent of the total sample.

somewhat for rural Malays, while increasing it for all other subgroups. The most dramatic change in the poverty profile occurs in the shift from Market Income to Total Observable Income, the two income concepts most commonly used in the literature. For example, on the basis of a Market Income definition, rural Malays and rural Indians are equally poverty prone. However, when the comparison is made using the more generally preferred Total Observable Income composite, the incidence of poverty among rural Indians is nearly twice that of rural Malays. This is because each of the four components that are added to Market Income to form Total Observable Income (i.e., transfer income, value of housing services, in-kind income, and cottage industry income) has a smaller mean and median for rural Indians than for rural Malays (Kusnic and DaVanzo 1980, p. 65). Beyond Total Observable Income further broadening of the income definition generates no systematic or dramatic differences in the poverty profile.

Standardizing on hours of work increases the measured incidence of poverty among rural Malays (who work more hours than others in our sample) and decreases it considerably for Chinese and Indians, urban and rural alike. The differences between rural Malays and rural Indians evident in the unstandardized measures disappear when adjustments are made for differences in hours of work.

Effect of Adjusting for Household Size and Composition on the Poverty Profile

We now examine how adjusting household income for differences in household size and composition affects conclusions about the incidence of poverty among ethnogeographic subgroups. Table 4 presents results for four measures of income--two unstandardized (Market Income and Total

Table 4

EFFECT OF ADJUSTING FOR HOUSEHOLD SIZE AND COMPOSITION ON THE ETHNIC/GEOGRAPHIC POVERTY PROFILE

	Malays		Chinese		Indians	
Income Measure	Rural	Urban	Rural	Urban	Rural	Urban
			Market Income			
Household Income	34.1	8.6	12.9	9.3	27.1	6.6
Per Adult Income of Households	33.3	7.2	12.9	9.3	30.5	9.8
Per Capita Income of Households	34.3	7.2	10.9	8.9	28.8	9.8
Per Capita Income of Individuals	34.3	8.3	10.4	8.3	36.4	13.3
			Total Observable Income			
Household Income	28.3	12.0	13.6	10.5	40.7	18.0
Per Adult Income of Households	26.8	12.8	14.3	10.1	47.5	19.7
Per Capita Income of Households	28.3	8.8	14.3	9.7	44.1	21.3
Per Capita Income of Individuals	26.9	13.2	14.9	9.4	48.2	21.0
			Standardized Observable Income			
Household Income	33.1	12.8	13.6	5.0	39.0	8.2
Per Adult Income of Households	33.6	6.4	9.5	5.8	49.2	14.8
Per Capita Income of Households	34.8	8.8	9.5	5.4	40.7	9.8
Per Capita Income of Individuals	35.6	13.6	9.2	5.1	36.9	10.8
			Standardized Actual Income I			
Household Income	33.8	12.0	13.6	5.8	33.9	6.6
Per Adult Income of Households	34.1	7.2	10.2	5.4	45.8	13.1
Per Capita Income of Households	34.3	11.2	9.5	5.0	40.7	9.8
Per Capita Income of Individuals	35.8	13.1	10.0	6.3	32.5	7.7

Note: Entries are the percentage of income recipient units within each subgroup that are incldued among the poorest twenty percent of the total sample.

Observable Income) and two standardized measures (Standardized Observable Income and Standardized Actual Income I).

Adjusting income for variations in household size has little effect on estimates of the incidence of poverty for rural Malays or urban Chinese. However, for both urban and rural Indians, estimates of the incidence of poverty are quite sensitive to which adjustment is made: Measured incidence of Indian poverty is greater when unstandardized household income is divided by the number of adults or by the total number of household members. For per adult income the difference is even greater when standardized measures are considered. Correspondingly, the apparent incidence of poverty among urban Malays and rural Chinese is reduced considerably when one looks at the standardized per adult measures of income. When individuals, rather than households, are the units of analysis, urban Malays are somewhat more likely to appear to be poor, while Indians are generally more likely to appear poor for unstandardized measures but less likely for standardized ones.

Multivariate Probit Analysis of the Poverty Profile

Our empirical analysis concludes with a multivariate probit analysis explaining the likelihood of being poor.[19] We show how the relative explanatory power of demographic characteristics of the household recipient units depends on the definition and adjustment of

[19] In the regressions, the dependent variable is a dummy that equals one if that household is among the poorest 20 percent of the population for the particular definition of income under consideration and zero otherwise. The probit functional form was chosen because it is appropriate whether one assumes that income is normally or log normally distributed.

income. Our intent is to measure, in a multivariate regression context, the relative explanatory power of a small set of variables describing the probability of a given household being among the poorest 20 percent of the population and how this differs for different measures of income. We are not specifying an empirical theory of poverty; we are merely attempting to provide a compact way of describing how the poverty profile depends on the definition of income.

Our explanatory variables include some characteristics of the heads of household, including a quadratic in "household age" (the average of the ages of the male and female heads of household),[20] the education of the male head of household, and the education of the female head of household. The second group of variables reflects aspects of household size and composition and includes the number of other adults in the household (i.e., nonheads of household), the number of nonadults (persons 14 years of age or younger), and a dummy variable indicating that there is no male head of household. In the last group of explanatory variables are the ethnic and geographic characteristics of the households in our sample. By including dummy variables for urban, Chinese, and Indian households, we can examine the size of the ethnogeographic differentials in the likelihood of poverty when the other economic and demographic characteristics of the household are held constant.

Three sets of regressions were performed, on distribution of households by household income, distribution of households by per adult

[20] If there is no male head, the variable is the age of the female head.

household income, and distribution of individuals by per capita household income. The second of these is presented in Table 5 for illustrative purposes.

The main findings of the regression analysis are the following:

Age. For each of the unstandardized measures of income, the relationship between the average age of the household heads and the probability of inclusion in the poorest quintile is U-shaped. The relationships are stronger and are statistically significant for the per household and per capita measures not presented here.

Education. For all measures of income considered, the level of education of both heads of household is significantly negatively related to the likelihood that the household is considered to be poor. The relationships are usually stronger with female education than with male education. Broadening the definition of income generally increases (in absolute value) the effect of an additional year of education for both the male and female head. Standardizing for hours of work reduces the effect of an additional year of education for the male head, but increases the impact of female education. The changes are more dramatic for the per household and per capita measures than for the per adult measures reported here.

Number of other adults. The presence of an additional adult (other than the household heads) has a different effect depending on the household size/composition adjustment. For both the per household and per capita income composites, the effect is negative and significant and does not vary systematically with the definition of income for the unstandardized composites. However, the results are just the opposite

Table 5

PROBIT POVERTY REGRESSIONS: DISTRIBUTION OF HOUSEHOLDS BY PER ADULT HOUSEHOLD INCOME

Variable	Market Income	Total Observable Income	Total Actual Income I	Standardized Actual Income I	Standardized Actual Income II
Characteristics of Household Heads					
Household Age	-.0446 (-1.08) [-.0111]	-.0356 (-.865) [-.00903]	-.0734 (-1.79) [-.0184)	-.0299 (-.686) [-.00679]	-.0354 (-.811) [-.00795]
Household Age Squared	.00054 (.982) [.000134]	.000312 (.570) [.00008]	.000744 (1.36) [.000187]	.0000426 (.073) [.00001]	.0000867 (.148) [.0000194]
Education of Male Head	-.0516 (-2.73) [-.0128]	-.0583 (-3.15) [-.0148]	-.0608 (-3.23) [-.0153]	-.0600 (-3.01) [-.0136]	-.0537 (-2.67) [-.0120]
Education of Female Head	-.0450 (-2.29) [-.0112]	-.0618 (-3.19) [-.0157]	-.0815 (-4.10) [-.0205]	-.0875 (-4.13) [-.0199]	-.0954 (-4.45) [-.0214]
Household Size and Composition					
Number of Other Adults	.00418 (.133) [.00104]	.0471 (1.57) [.0120]	.131 (4.58) [.0329]	.0438 (1.34) [.00994]	.0496 (1.51) [.0111]
Number of Persons ≤ Age 14	-.00251 (-.101) [-.000623]	-.0127 (-.521) [-.00323]	-.0263 (-1.07) [-.00662]	-.0782 (-2.93) [-.0178]	-.0671 (-2.52) [-.0150]
Female Headed Household (D)	.441 (2.71) [.109]	.185 (1.14) [.0471]	-.0209 (-.126) [-.00526]	-.197 (-1.12) [-.0449]	-.158 (-.893) [-.0354]
Geographic Location and Ethnicity					
Urban (D)	-.436 (-3.75) [-.108]	-.219 (-1.97) [-.0556]	-.0376 (-.0340) [-.00944]	-.590 (-4.83) [-.123]	-.554 (-4.53) [-.124]
Chinese (D)	-.430 (-3.71) [-.107]	-.335 (-2.92) [-.0849]	-.355 (-3.10) [-.0892]	-.604 (-4.84) [-.137]	-.713 (-5.59) [-.160]
Indian (D)	-.0818 (-.533) [-.0203]	.424 (2.96) [.108]	.255 (1.74) [.0641]	.264 (1.78) [.0600]	.190 (1.28) [.0427]
Intercept	.629 (.836) [.156]	.550 (.734) [.140]	.429 (1.72) [.323]	1.24 (1.57) [.282]	1.36 (1.71) [.304]
(-2) x log likelihood	132.5	111.4	143.6	185.6	191.7

D = dummy variable

First entry in each cell is the coefficient in the probit function. Entries in parentheses are the asymptotic t-statistics. Entries in brackets are the derivatives of the probability function evaluated at the means of the independent variables.

for the per adult income composites. For this measure, each additional adult increases the probability of poverty, and increases it more the broader the definition of income. For all three household size/composition adjustments, standardizing for hours of work reduces the likelihood that multi-adult households are considered poor.

Number of persons $\leq$ 14. For per household and per adult income measures, additional dependent children do not increase the probability of a household being considered poor. In fact, the coefficient of number of persons $\leq$ 14 is always negative, though it is only statistically significant for the standardized per adult composites. However, regardless of the definition of income, additional children significantly increase the probability that a household is considered poor when per capita income measures are used.

Female-headed households. The conclusion regarding whether female-headed households are more likely to be poor depends crucially on the income measure used. For the household and per capita unstandardized composites the absence of the male head significantly increases the probability of being considered poor. However, if one adjusts for the number of adult consumers in the household (i.e., per adult income) and uses a relatively broad definition of income (i.e., not Market Income), female-headed households are not significantly poorer than male-headed households where the male head has zero years of education.[21] In all cases, the standardization for hours of work

[21] Because the male education variable is relevant only when there is a male head, i.e., takes on a value of zero when there is no male head, it is implicitly interacted with a dummy variable that takes on a value of one when the household contains a male head. Comparisons of female-headed households with male-headed-households must include the

reduces the magnitude of the female-headed-household coefficient. The sensitivity of conclusions about female-headed households is due to two factors: (1) Holding constant the number of other (nonhead) adults, the absence of a male head reduces the household's consumption requirements; hence, when we adjust for this fact, by looking at per adult rather than household income, the relative position of female-headed households improves; (2) females who head households apparently work less than the sample mean number of hours, especially in market activities; when the income measure includes the value of their nonmarket production and of the extra leisure they consume, their relative income position again improves.

Urban/rural differences. Households residing in urban areas have a lower probability of being considered poor than rural households. However, broadening the scope of unstandardized income reduces the urban/rural difference; it is insignificant for broader measures of household and per adult income. Standardizing for hours of work, on the other hand, increases both the magnitude and significance of the urban/rural poverty differential. This is because urban households work fewer hours than rural ones.

Ethnicity. Chinese households are significantly less likely than Malay households to be considered poor, regardless of the income measure

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male education coefficient if the male head has positive years of schooling.

Without controls, female-headed households appear to have a 0.495 probability of being considered poor (compared with 0.169 for male-headed households) when household Market Income is the income measure. However, when per adult Total Actual Income I or II or Standardized Actual Income I or II are employed, the corresonding probabilities are 0.307, 0.267, 0.257, and 0.257. The last three probabilities are not significantly different from the corresponding probabilities for male-headed households.

used. Consistent with the data in Table 3, broadening the scope of unstandardized income has no systematic effect on the Chinese/Malay differential, but standardizing for hours of work further reduces estimates of the probability that Chinese households are poor. As in Tables 3 and 4, in the regressions both the sign and magnitude of the Indian/Malay differential depend crucially on the measure of income. Broadening the definition of unstandardized income from Market Income to Total Observable Income substantially increases the probability of an Indian household being among the poor. For the per household and per adult composites, we would conclude that Indian households are somewhat less likely to be poor than Malay households if Market Income were our measure, whereas we would conclude that Indian households are significantly more likely to be poor if Total Observable Income were our measure.

SUMMARY AND CONCLUSIONS

Previous studies of income distribution have used a variety of different measures of income. How much do these differences affect the comparability of results from different studies? We addressed this question here by using detailed data on income and time allocation for a recent sample of Malaysian households to examine the sensitivity of conclusions about poverty and about income levels and inequality to how income is measured and how its distribution is summarized. We examined the sensitivity to various dimensions of measurement, focusing on the <u>marginal</u> difference each makes when all the others (including the sample) are held constant. We find that conclusions about income levels and inequality and about the relative incidence of poverty are sensitive to five factors:

1. Definition of Income. Successively broader income measures that include income received from nonmarket activities not only yield considerably higher estimates of the level of income, but also affect conclusions about the extent of inequality and the composition of the "poor." For our total sample, inequality falls as the definition of income is broadened, and the rankings of households in the distribution change. The relative position of rural Malays, who derive the greatest proportion of their income from nonmarket sources, improves, while that of Indians (both urban and rural) and of urban Malays and rural Chinese becomes worse. When broader definitions of income are employed, the education of the female head is more strongly negatively related to the incidence of poverty, and female-headed households and younger and older households are less likely to be considered to be poor than they are for narrower definitions.

2. Adjustment for Household Size and Composition. These adjustments have no unambiguous effect on conclusions about income inequality for the total sample, but they do change households' relative ranking in the income distribution. In particular, the relative position of Indian households, which tend to be larger than Malay households, becomes worse when we divide household income by number of adults or number of household members.

3. Definition of Recipient Units. Average and median per capita incomes are lower when individuals, rather than households, are the units of analysis. This is because larger households, who receive more weight in the distribution of individuals, tend to have smaller per

capita income. Furthermore, use of individual weights reduces the measured inequality in the distribution of per capita incomes.

4. Standardization to Remove Variations in Hours of Work. Variation in hours of work is not an important determinant of overall income inequality in this sample. However, standardizing to remove variation in work hours does change households' rankings in the income distribution and reduces incomes of the poor, who work an above-average number of hours. Standardizing on hours of work reduces estimates of the incidence of poverty for both urban and rural Chinese and Indians but increases estimates of the proportion of rural Malays who are poor. Standardization reduces the likelihood that female-headed households and young and old households are considered poor.

5. Choice of Statistics to Summarize the Distribution of Income. Although the various statistics we have used here generally give the same picture of what happens to the central tendency or inequality of the distribution of income when we broaden the definition of income, standardize for hours of work, or adjust for household size, they sometimes yield different conclusions about the extent of change. For example, broadening the definition of income from Market Income to Total Actual Income II increases the total sample mean for household income by 56 percent, but increases the median by nearly twice as much (108 percent).

Researchers and policymakers concerned with income distribution should be aware of this sensitivity. Those doing comparative studies should take special care to ensure that a conclusion that two income distributions are different is due to true differences in the underlying

distributions of economic well-being, and not merely to differences in the income measures or statistics used.

Finally, we ask the question posed in the title: Who are the poor in Malaysia? Although the various measures of income used here yield different conclusions about the relative incidence of poverty, they nonetheless often yield the same conclusion about which ethnogeographic or socioeconomic subgroups are most likely to be poor. Regardless of which income measure is used, rural Malays and rural Indians have the greatest likelihood of being considered poor. Which of these two subgroups has the greater incidence of poverty, however, depends on the measure used. For a few measures (standardized values of broader definitions of income), rural Malays have a slightly greater incidence of poverty than rural Indians, but for most definitions, and certainly the one most commonly used (Total Observable Income), rural Indians are the most poverty-prone group in our sample.[22] However, current policies in Malaysia focus on rural Malays as the group to whom government programs should be targeted. Although our sample of rural Indians is relatively small and may not be representative of the entire population of rural Indians, our results suggest that Malaysian rural Indians deserve greater attention than they have hitherto received.

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[22] When data are stratified by only ethnicity, Indians appear to be better off than Malays because of the greater weight given to the higher-income urban subgroup. Only when data are stratified by ethnicity and urban/rural location simultaneously does the relative position of rural Indians become apparent.

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