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Patterns of Wealth Concentration

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Community wealth created from improvements in production techniques and by economic development takes two forms. One is absolute changes in quantity. The other is relative changes in the pattern of distribution. Because units of wealth are unstandardized, communities are difficult to compare based on absolute wealth differences. Four patterns of wealth distribution—hyper and normal equality, status and hyper inequality—reflect relative differences in the way wealth is distributed. No communities have perfect or hyper equality. The pattern for egalitarian, tribal communities is for wealth to be more normally distributed. Hierarchical communities have status inequality. The pattern for communities in societies with considerable dependence on external markets is for wealth to be very concentrated in the hands of a few people—hyper inequality.

Key words: equality, inequality, wealth, economic development

CHANGES IN PRODUCTION techniques, for example from gathering and hunting to horticulture to extensive agriculture, and processes of economic development can both increase a community's wealth. One objective in increasing wealth is to improve the well-being of community members. Many factors, in addition to the amount of wealth, go into the definition of improvements to well-being. Quality of life, longevity, happiness, satisfaction, and equity all are part of the description of how well off people are.

While the absolute wealth in a community may increase, the distribution may be such that only a few benefit. One of the persistent criticisms of capitalism is that the wealth generated has only increased the gap between rich and poor; most people have not benefitted. Two defenses of individual wealth accumulation are given in rebuttal (Lindert 1986:1128). One is that aside from random luck, people attain the economic rewards they deserve and society stays near an equilibrium degree of wealth concentration. The other rebuttal is that individual wealth accumulation develops benefits that, after a time, "trickle-down" to those less well off.

Data are not available for long-term studies, but economic history data from the seventeenth through the twentieth centuries in England and Wales are quite comprehensive. Lindert (1986:1153) assembled some of these data and concluded that the degree of inequality was overstated by the critics of capitalism, while those who argued for narrowing of wealth differences were overly optimistic. Answering the question of what has been the general pattern of change proves to be quite complicated.

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What can anthropologists and the ethnographic study of communities add? Tribal communities are generally viewed as egalitarian. Service (1962) identified chiefdoms as societies in which status differentiation becomes a major organizing dimension. In feudal societies relative inequality reaches a high level. The Industrial Revolution greatly increased the amount of wealth, and led to the questions about wealth distribution. Can comparison with preindustrial communities elaborate patterns of change in the distribution of wealth?

Study of several centuries of English economic history allows the comparison of fairly consistent units. Anthropologists study communities with many different definitions and measures of wealth. To compare incommensurables the approach taken is to look at the shape or pattern of wealth distribution cross-culturally. The approach develops a method to show how the form of histograms showing the distribution of wealth change between different communities.

Measurement Alternatives and Issues

The literature on equality and inequality is extensive. Economists, economic historians, sociologists, rural sociologists, and political scientists have all given extensive attention to issues of wealth distribution. Numerous measures of inequality have been proposed, and many sources have good summaries of the measurement and technical issues (Aitchison and Brown 1963, Atkinson 1975, Bronfenbrenner 1971, Champernowne 1973, Cowell 1977, Hibbs and Dennis 1988, O'Neill 1987, Samuelson 1972). Raw frequency distributions are a good visual indicator, but they are often impossible to plot. Cumulative frequency distributions, Lorenz curves, logarithmic plots, or percentiles typically are preferred (Bowman 1945). Anyone who has tried to plot United States wealth or income data knows the advantages of a log scale or conversion to percentiles. Conversion to a log plot or percentiles, however, obscures the concentration of wealth, particularly at the high end of most wealth distributions. Measure of wealth concentration

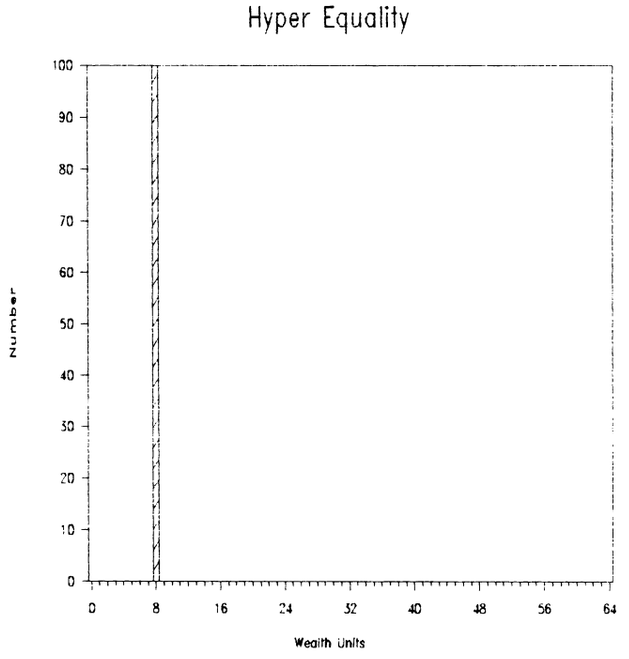

FIGURE 1. HISTOGRAM FOR DISTRIBUTION OF ABSOLUTE EQUALITY IN WEALTH, HYPER EQUALITY.

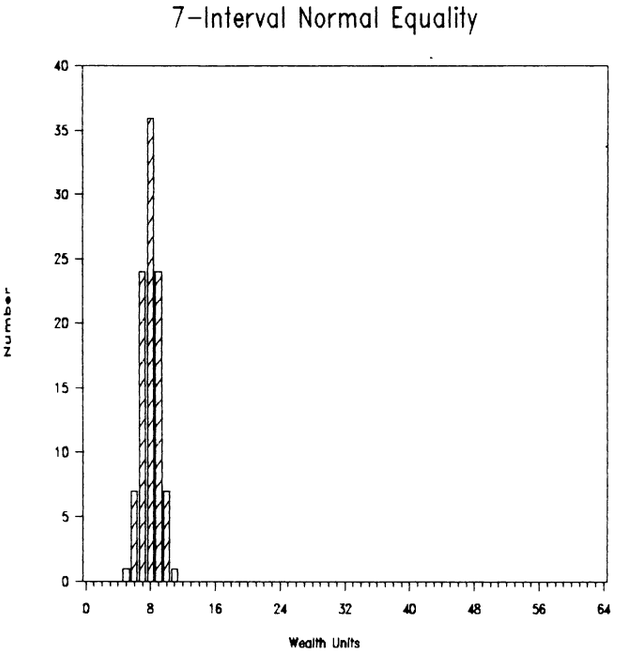

FIGURE 2. HISTOGRAM FOR A NORMAL EQUALITY IN WHICH DIFFERENCES ARE ADDITIVE. (Illustrates an egalitarian distribution.)

should enable comparison of distributions and be sensitive to changes at the extremes.

The most used measure of wealth concentration is a Lorenz curve and Gini coefficient. Plotting the cumulative percentage of wealthholders on the ordinate and cumulative percentage of wealth held on the abscissa makes a Lorenz curve. A Lorenz curve gives a visual picture of all the data in a compact space. A diagonal line drawn from the lower left to the upper right represents perfect equality. Perfect equality is when all wealthholders have the same amount of wealth.

Figure 1 is a histogram showing what the wealth distribution for perfect or Lorenz equality would look like. Perfect equality is not observed in any society due to variable household size, different individual motivation, skill, and aptitude, and differences in success and luck. Assuming differences between wealthholders are randomly distributed, the number of households falling above and below perfect equality might approach a normal distribution (Figure 2). This assumption is based on all factors by which households depart from being egalitarian being distributed randomly and being additive in their impact.

For simplicity Figure 2 is divided into seven wealth classes. This figure shows "normal" equality as opposed to the perfect or "hyper" equality of Figure 1. Normal equality approaches the shape of a normal distribution in which there is no skewing, and relative wealth differences are additive.

Normal equality is more likely to be the pattern of wealth distribution in egalitarian societies, where a number of social mechanisms act to prevent wealth concentration. Egalitarian societies are unstratified. Concentration and transfer of capital between generations by inheritance through an heir is not practiced. Special material rewards are not offered to those who excel in production of socially valued items. Rules are maintained through kin units. Authority is absent. There are no permanent leaders. Physical force is not mobilized by any public power. Government is absent, and decisions are arrived at through broad participation among community members in the decision-making process. Egalitarian societies are nonhierarchical (Fried 1967:27–107, Harris 1987:180–199, Pitt-Rivers 1963:299–333, Service 1962:47–70).

Normal equality reflects the absence of cultural factors that multiply wealth differences between individuals. Normal equality is truer to actual situations of equality than the standard of perfect equality in a Lorenz curve. Lorenz, or hyper, equality is everyone having exactly the same amount of wealth. The wealth differences in Figure 2 are not large. They are additions or subtractions of units of wealth above and below the mean based on ability, demographic characteristics, or situational factors which result in differences being additive.

Hierarchy differentiates statuses according to a cultural system of ranks. In most hierarchical systems those with higher ranks control more of the community's wealth. O'Neill (1987) makes the point that equality and hierarchy can coexist within small-scale communities. Hierarchy, in most cases, rewards differences in responsibility between queen and commoner, priest and parishioner, manager and managed by multiplying tribute to those with the higher status. Instead of the wealth histogram having a shape close to a normal distribution, the higher positions receive rewards suitable to their rank. These rewards usually are multiples of those given the average citizen.

Assume two households. One is that of the "average" citizen. The other is that of someone with a status ranked above the average citizen, and who has twice the wealth. Would giving 1000 wealth units have the same relative value for the two households? Assume the average citizen starts with 1000 wealth units and someone with a higher status has 2000 wealth units. For the first household, addition of 1000 wealth units doubles

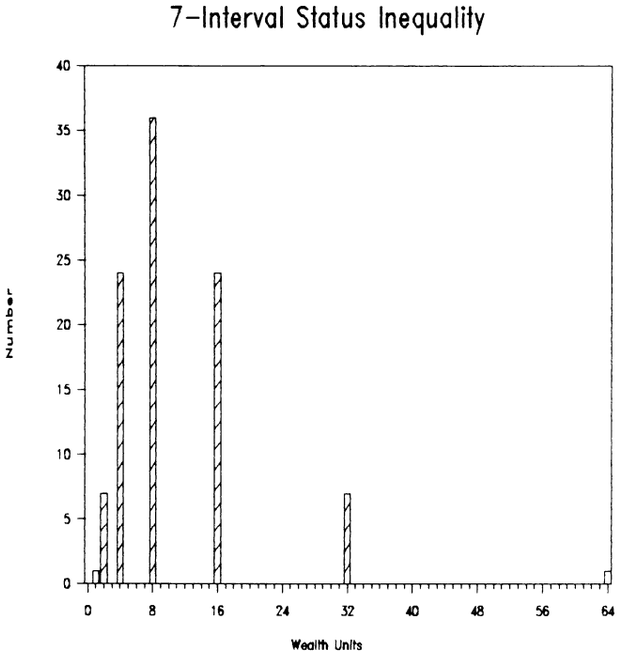

FIGURE 3. HISTOGRAM FOR LOGNORMAL DISTRIBUTION OF WEALTH IN WHICH DIFFERENCES ARE MULTIPLIED. (Shows status inequality.)

overall wealth. For the other, wealth increases only by one-half. To reward each one by the same relative amount requires multiplying each household's wealth by the same factor rather than adding the same amount to each. To double the wealth of each, the multiplier would be two. In a hierarchical society, therefore, multiplication of wealth differences maintains the position of each class relative to the other.

Multiplying rewards with random differences in ability produces a lognormal distribution (Figure 3), as opposed to the normal distribution, which results when the differences in ability and rewards are additive. Wealth distributions show the status differences that come with hierarchical systems. Thus, lognormal wealth distributions reflect "status" inequality.

Assume wealth is normally distributed among seven classes (Figure 2). This pattern converts to a hierarchical distribution in which differences are multiplied by taking the mode and doubling the spacing between each interval above the mode and halving interval distances for each one below the mode (Figure 3). The wealth distribution's shape changes from normal to lognormal. Differences change from being additions of amounts above and below the mode to multiples of differences.

Hyper equality (Figure 1) adopts the goal of Lorenz equality. Normal equality (Figure 2) assumes wealth differences are additive and take the shape of a normal distribution. Status inequality (Figure 3) adjusts the normal distribution to multiply differences and includes the effects of hierarchy. In some communities the largest number of people are in the lowest wealth category. A histogram, plotting the number of individuals and households from the lowest to the highest wealth level and multiplying the differences between intervals, declines from left to right (Figure 4). Figure 4 has a very small number of people at the highest wealth levels, but these people control a significant proportion of the wealth. Extreme wealth concentrations such as those in Figure 4 reflect "hyper" inequality.

An Indicator of Shape

How can the shape of these four curves be compared? The method of moments, suggested by Allyn Young (1917) is an approach that provides an index of a wealth distribution's pattern. Four moments commonly describe a frequency distribution. The first two moments, mean and sample variance, are measures of central tendency and not pattern. The third and fourth moments, skew and kurtosis, are pattern indices.

Skew indicates distortion. A perfectly normal curve has no distortion. Negative skewing indicates that the bulk of the population lies to the mean's right. Positive skewing shows that more of the population lies to the mean's left. For a distribution in which wealth levels are plotted from low to high, positive skewing indicates wealth distortion with more people having a low level of wealth while a few have high levels.

Kurtosis measures concentration. It indicates whether most of the population clusters close to the mode while only a few cases are well away from the mode. Wealth histograms with positive kurtosis and skewing indicate that fewer and fewer people or households have high levels of wealth while most of the households are concentrated at the low end of the wealth curve. Negative kurtosis values indicate a flatter curve and a broader distribution of wealth over the range observed for the population.

The kurtosis of a normal distribution is zero.[1] Kurtosis is

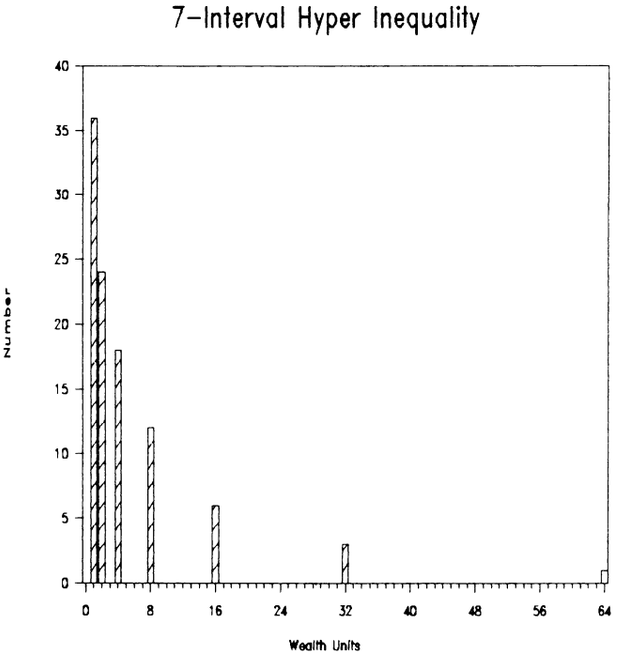

FIGURE 4. HISTOGRAM FOR A DECLINING DISTRIBUTION OF WEALTH IN WHICH DIFFERENCES ARE MULTIPLIED AND THE LARGEST NUMBER OF WEALTHHOLDERS FALL IN THE LOWEST CATEGORY. (Shows hyper inequality.)

particularly sensitive to small elements of the population having wealth many times the mode, while the majority of the population is concentrated in the lowest intervals. Kurtosis embodies a different equality objective from the Lorenz curve. For Lorenz equality, everyone is the same. Kurtosis assumes the equality objective is a normal curve. Kurtosis values greater than zero indicate inequality due to a departure from a normal curve resulting from the positive skewing and peaking of the distribution. Values less than zero indicate departure from a normal curve due to the distribution being very flat.

To use kurtosis as a pattern measure requires the assumption that wealth histograms are positively skewed. Wealth distributions typically have positive skewing. In fact, they have been found to best approximate a lognormal distribution (Aitchison and Brown 1963, Cowell 1977:79–80). For lognormal distributions skew and kurtosis have a predictable relation (Wallis 1974). While the distortion measure (skewness) is calculated, it is redundant to wealth concentration (kurtosis). Wealth concentration is the primary shape measure used to compare communities with their Gini coefficients.

Table 1 gives the kurtosis and Gini coefficient for the hyper and normal equality, status and hyper inequality distributions illustrated by Figures 1–4. For comparison are 15-interval distributions showing normal equality, as well as status and hyper inequality.

The hyper equality curve (Figure 1) has no shape, so it does not have any skew or kurtosis. For normal equality (Figure 2), the kurtosis and Gini coefficient are 0.0 and 0.15, respectively. The Gini coefficient compares the distribution with perfect or hyper equality. It is zero only when everyone is the same. With greater inequality, the Gini coefficient approaches 1.0. When the Gini coefficient is 1.0, one person holds all the wealth. Since everyone is not the same in a normal distribution, the Gini coefficient is greater than zero. Because wealth differences are only additive, the Gini coefficient is closer to zero than one.

TABLE 1. COMPARISON OF WEALTH CONCENTRATION MEASURES FOR HYPOTHETICAL FREQUENCY DISTRIBUTIONS

Type	Description[a]	Wealth concentration (Kurtosis)	Gini coefficient
Hyper equality	1-interval (figure 1)	NA	0.0
Egalitarian	7-interval normal (figure 2)	0.0	0.15
	15-interval normal	0.0	0.16
Status inequality	7-interval lognormal (figure 3)	10.4	0.40
	15-interval lognormal	81.0	0.74
Hyper inequality	7-interval declining (figure 4)	23.9	0.60
	15-interval declining	207.4	0.93

[a] Developed from Arkin and Colton (1970:189).

The kurtosis and Gini coefficient for the 7-interval status inequality curve (Figure 3) are 10.4 and 0.40. Status inequality, which takes the form of a lognormal curve, shows the effects of doubling each wealth interval above the mean and halving each interval below, the wealth levels are 1, 2, 4, 8, 16, 32, and 64.

The kurtosis and Gini coefficient values for the 7-interval hyper inequality (Figure 4) are 23.9 and 0.61. Comparing this with the status inequality values shows that wealth concentration using kurtosis as a measure more than doubles while the Gini coefficient only increases by half.

A wealth concentration measure facilitates comparison of wealth distributions for which a picture is not possible. Assume each unit of wealth for the 15-interval status inequality distribution in Table 1 is $1,000. Using one millimeter to represent each $1,000 of wealth, the 15-interval distribution requires a piece of graph paper over 16 meters (54 feet) long to include the largest $16-million interval.[2] The median wealth, $128,000, is only 0.128 meters (5 inches) from the origin. This distance effect is why the 15-interval wealth concentration measure is so much greater, 8 times, than the 7-interval status inequality wealth histogram.

As relative inequality increases, two pattern changes occur. One is concentration of most people at the bottom of the wealth histogram. These are people who accumulate little wealth from the community's economic growth. The other is increasingly large gaps between wealthholders, particularly at the high end of the distribution. Thus, people's absolute well-being can improve, but relative inequality increases greatly. To visualize this process compare Figures 2 and 3.

Each of the distributions in Table 1 vary only minimally on the Gini coefficient measure. For the 7-doubling status inequality curve in Figure 3, the top 1% control 6% of the wealth. For the 15-doubling status inequality, the top 1% control 23% of the total wealth. Wealth concentration, as measured by kurtosis, increases from 10.4 to 81.0, while the Gini coefficient increases from 0.40 to 0.74 (Table 1).

Both kurtosis and the Gini coefficient are unitless measures. They are measures that can be used to indicate the shape of wealth distributions, irrespective of the wealth unit used. The Tanzanian, Turu community of Utatuu, "wealth index," can be compared with the Kapauku community in Papua New Guinea of Botukebo that uses "glass beads." The wealth distribution pattern in "spans" for northeast Siuai in the Solomon Islands, the Swiss community of Basel "size of estate in gulden," the Mexican community of Tepoztlan "wealth score," and Washington, DC "net worth" can all be described and compared. Comparison based on a measure of pattern allows using what is defined by the community as wealth. Most descriptive statistical programs calculate kurtosis, and for approaches to calculate Gini coefficients see Atkinson (1975:45–49) and Cowell (1977:115–129). A LOTUS program was developed to calculate the Gini coefficients in Tables 1 and 2. Calculations were checked against reports by authors and other techniques to verify results.

Community Wealth Concentration Data

Listed in Table 2 are case studies used to calculate community wealth concentration. The wealth concentration and Gini coefficient for each community are based on an item that con-

TABLE 2. COMMUNITY WEALTH DISTORTION AND CONCENTRATION VALUES

Community (source)	Sample (total households)	Wealth unit	Wealth Concentration		
			Max known	Max unknown	Gini coeff.
Horailenda	63	pigs/household	−0.4		0.34
(Modjeska 1982)	63				
Utatuu (1960)	30	wealth index/farmstead	0.6		0.59
(Schneider 1970)	55				
Mohoweto	94	pigs/household	0.7		0.71
(Moulik 1973)	94				
Yadaw (1961)	123	acres/household	0.8		0.59
(Nash 1965)	123				
Nondwin (1960)	82	acres/household	7.5		0.54
(Nash 1965)	82				
Botukebo (1955)	55	beads/individual	15.5		0.78
(Pospisil 1963)	16				
Tepoztlan (1944)	853	wealth score/family	18.2		0.58
(Lewis 1951)	853				
Medong (1950)	255	acres/family	19.6		0.66
(Morris 1953)	255				
Arunpur (1964)	141	bighas/household	48.1		0.75
(Sharma 1978)	141				
Siuai (1938)	220	spans/household	52.7	7.1	0.69
(Oliver 1958)	300				
Oxfordshire (1086)	631	land value/owner	171.0		0.96
(Lennard 1957)	631				
Basel (1429)	2536	size of estate		47.1	0.84
(Spahr 1896)	2000				
London (1522)	10735	pounds/household	207.5	144.8	0.87
(Hoskins 1976)	11000				
Boston (1771)	2298	taxable wealth/man	291.4	112.0	0.77
(Henretta 1965)	2600				
Washington (1935)	7091	net worth	1494.1	68.8	0.95
(DC 1935)	158000				

stitutes wealth in the culture. Table 2 lists 15 communities selected because complete or nearly complete wealth distributions are available. This is a limited number of communities, but they cover a broad range of community types from small-scale, horticulturalists to communities heavily involved in external market and industrial economies.

These data give a general indication of how patterns of wealth concentration change. Community is the unit of analysis, rather than region or nation. Much anthropological work focuses on community. Community studies include explanations of the social and cultural mechanisms that affect wealth distribution. Communities exist within larger political units and are not always representative of larger social units, e.g. tribes, regions, states, and nations. Community studies have a rural bias and rural areas tend to be more egalitarian than urban. Community, however, is a common organizing unit in societies, and therefore facilitates comparison.

Within communities, data by household are best (Kuznets 1976), but some cases only have data by individual. Measurement of wealth should ideally control for the age distribution. Older individuals have the opportunity to accumulate more wealth. Sex ratio, too, influences wealth concentration. In a community that is male dominated, that is patrilocal, or in which males produce most of the wealth, a household with more males will have an advantage when compared to households with more females. While these factors affect interpretation of wealth patterns, in most cases data are not sufficient to control for age, household size, and sex differences.

More data on income are available than for wealth. Income, as an indicator of well-being, measures a flow. Wealth measures the stock a community has been able to accumulate from improved production techniques and economic development. Gathering and hunting as well as horticultural communities are commonly referred to as egalitarian, and wealth is not usually measured. In agrarian societies, wealth may be represented by land or animal ownership, control of valued items, or from the estimates of informants. Concepts such as net worth enter into the estimate of wealth with capitalism. Studies summarizing all the items that contribute to wealth are best, but infrequently done. Using one item to measure wealth assumes it represents the household's total wealth. The best data are net worth by household.

While wealth concentration for industrial and urban communities is often discussed, data showing wealth holdings are not commonly tabulated. The usual way of estimating wealth differences is from calculations based on inheritance tax collections or probate records. These records only are kept for large wealthholders. Since all inheritances are not taxed or probated, data are incomplete and not representative of the population as a whole. Some community studies develop estimates of wealth distributions, but data are grouped by wealth category, and the holdings of the largest wealthholders are lumped in one final interval. This means the actual amounts held by the largest wealthholders are underestimated.

The two columns of wealth concentration measures in Table 2 contrast the impacts of truncation in the last interval. The first column contains calculations made where the amount of wealth held is known for all community members. The second column is for grouped data, and for which many cases are collapsed in the highest interval. The third column gives the Gini coefficient, which is not significantly affected by truncation.

What about the quality of these data and the calculations made from them? First, are the measures used wealth indicators? Ethnographic details accompanying each case study indicate that the unit used is a community wealth indicator. Some measures are better than others. For Utatuu, Botukebo, Siuai, Tepoztlan, Philadelphia, Basel, Boston, London, and Washington, DC, actual wealth measures are available. For other communities land or animal ownership is assumed to be representative of the overall wealth distribution.

Sample size is not a problem in any of the 15 communities since the community wealth distributions are total or nearly total enumerations. Descriptive information in the text often helped fill out the wealth distribution. For example, the Solomon Island community of northeast Siuai wealth distribution is found in a footnote (Oliver 1955:517). The wealth of the largest wealthholder was in the text (Oliver 1955:361).

Concentration calculations raise data to the fourth power; therefore, the wealth concentration is very sensitive to measurement and sampling errors. This analysis assumes no measurement error and, in the cases based on sampling, that the sample is representative. The ethnographic description ideally contains enough information to fully enumerate the largest wealthholders.

Incomplete sampling and truncating the final interval occur in the wealth distribution for large, urban communities. Wealth concentration for the communities at the bottom of Table 2 is more likely to be underestimated due to grouping of data. The bias of the data, then, is to be most accurate for small communities that are fully enumerated. Underestimating wealth concentration is more common in large communities that require sampling and for which the maximum wealthholding is not known. Siuai, London, Boston, and Washington, DC, show how large the effect of not knowing the full distribution can be.

Egalitarian Communities

Unstratified, low population, tribal communities with gathering, hunting, and horticultural economic systems, typically are egalitarian. None was observed that has perfect equality. The wealth concentration scores and wealth histograms reflect normal equality. Wealth is distributed more evenly.

Assuming that a minimally stratified community has two or three ranks above the commoners, a 7-interval lognormal distribution would represent the level of status inequality common to this type of community. Table 1 indicates that the wealth concentration value for a minimally stratified community is 10.4 and the Gini coefficient is 0.40. The 7-interval status inequality distribution (Figure 3) has three doublings, i.e. ranks, above the median. Such a distribution is hypothesized to be typical of communities making the transition from normal equality to status inequality.

Four of the 15 communities, Horailenda, Utatuu, Mohoweto, and Yadaw, have wealth concentration less than 1.0, and with the exception of Mohoweto, the Gini coefficient is less than 0.6. These communities reflect a pattern of normal equality where wealth concentration is close to zero. Nondwin, whose Gini coefficient makes it like the other four, has wealth concentration nearly an order of magnitude greater than Yadaw.

Figure 5 shows the Horailenda wealth distribution. This is the closest any wealth distribution comes to the normal equality shown in Figure 2. Utatuu, Figure 6, is interesting because of its flatness. The largest number of cases are at the lowest level, and the shape takes on some of the characteristics of Figure 4. Yet the Utatuu wealth concentration pattern does not have the long right tail and large gaps shown in Figures 3 and 4. Wealthholding is spread out in all classes. The difference between the median and the maximum is 3 doublings.

The Utatuu data include the overall wealth score computed from possession of "three essentials: land, livestock, and laborers" (Schneider 1970:69). These data allow correlating the independent items with the overall index. Each component of

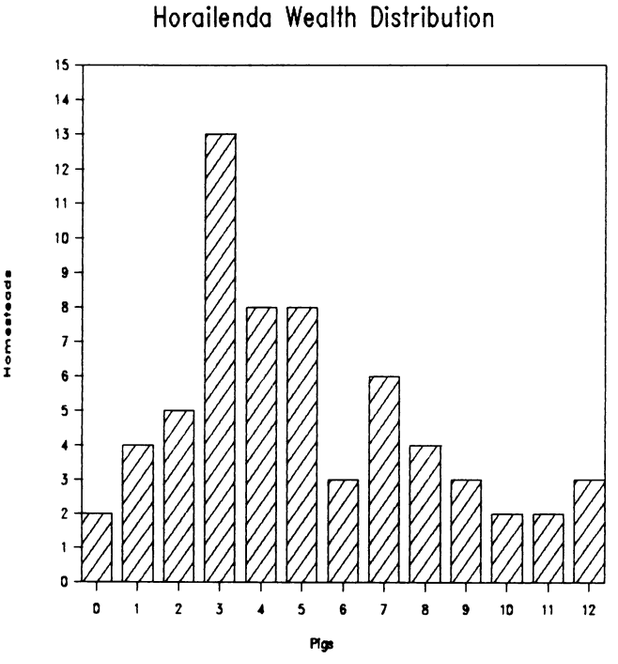

FIGURE 5. HORAILENDA PIG DISTRIBUTION PER HOUSEHOLD. (Reflects normal equality. The histogram is closest to a normal distribution.)

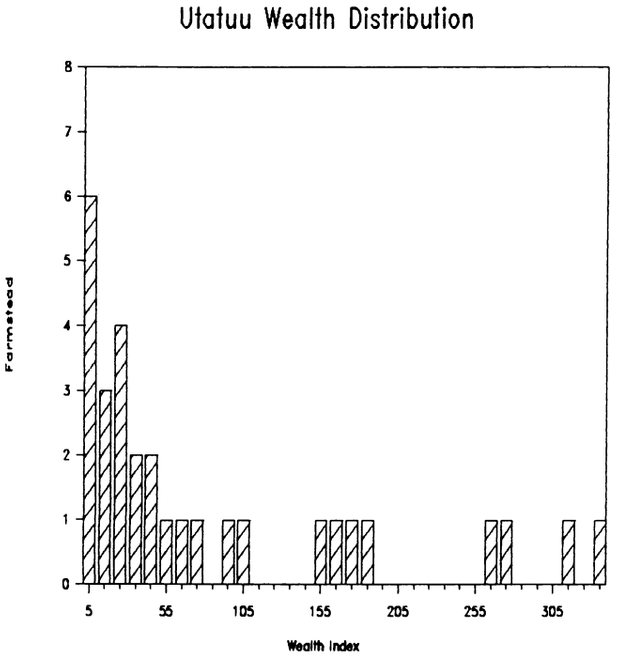

FIGURE 6. UTATUU WEALTH INDEX. (Shows some concentration at the bottom, but does not have the large gaps between wealth levels characteristic of status inequality.)

the index is positively and significantly correlated with the wealth score. Each independent asset has comparable wealth concentration. These correlations support the assumption of including some communities having only one representative item of wealth reported.

In Mohoweto the richest household had 44 pigs, which shows less range than seven doubling status inequality distributions (Figure 3). Prior to the introduction of a market economy, pigs were the major measure of wealth. Moulik (1973:55–6) summarizes the role of pigs in Eastern Papua New Guinea:

> The pig was the most important domesticated animal among these people, and played the most significant part in traditional exchanges involving birth, initiation, marriage, puberty, death and other social ceremonies. . . . The numbers of pigs owned by a household depended on its inherited wealth and on the extent of its debts and obligations to others.

Precontact cultural values limiting the accumulation of wealth tended to even out the pig distribution. Those with accumulated wealth in pigs had the duty to dispose of their wealth through social obligations to the community. A market economy is changing all this as copra and coffee plantations become major cash crops.

Manning Nash studied two Burmese communities, Nondwin and Yadaw. Nondwin was a dry farming village and Yadaw was irrigated. The time of study was 1959–1960, when the Burmese government had just begun the process of decolonization. In Nondwin, Nash identifies four status levels: poor, moderate, rich, and big rich (Nash 1965:24). For Yadaw there are "neither categories of big rich nor really rich, but six households are considered by villagers to have solid withholding power." These families got that way "through different sequences of chance: none of them planned it, strove for it, nor is there an orderly, culturally known way to get ahead in economic terms" (1965:232–233). From this description, Yadaw is expected to be more egalitarian than Nondwin. Nondwin clearly has four strata. Table 2 presents the comparison. Yadaw is more egalitarian, but Nondwin is not as nonegalitarian as the term "big rich" suggests. "Big rich" is a relative term. Nash (1965:42) goes on to say:

> These differences in the level of living are not as apparent to the eye as the figures would lead one to assume. Poverty in the Burmese village is not of high visibility. There is enough rice, beans, oils and fish. . . . The richest, of course, tend to have the wooden, two-story houses, but beyond that, a man's wealth is not discernible in his house style or in his household furnishings.

Communities with Status Inequality

The 5 communities after the Burmese village of Nondwin all have wealth scores reflecting status inequality. They have wealth concentration values greater than the 7-doubling frequency distribution showing status inequality (wealth concentration = 10.4, Gini coefficient = 0.6), but do not show a pattern of hyper inequality. With the exception of Botukebo, the communities are in peasant societies that before colonization did not have subsistence patterns geared to producing for external market economies. Precolonial agricultural communities did pay tribute to ceremonial centers.

The Kapaukan community, Botukebo, is a special case that is culturally more similar to the first group of communities with normal equality characterizing their wealth distribution patterns. Explanation of wealth concentration for Botukebo comes from Leopold Pospisil (1963:381):

> The Kapauku, unlike many primitive peoples, are basically profit motivated in most of their activities. They place a great emphasis on accumulation of personal wealth, from which they derive, through the extension of credit, the highest prestige and following.

Cultural factors determining Kapauku wealth concentration differ in two important ways from the other societies in this group. First, wealth is used up in each generation. Kapauku have no intergenerational accumulation of land for agriculture. It is in agriculture that the path to wealth accumulation starts. According to Pospisil (1963:383):

> Farming is important, especially during the early part of a man's career when the young cultivator depends on his own gardens for fodder for his pigs, in the later years clever business deals and skillful selections of contractual pig breeder . . . assure the Kapauku of further increase in wealth.

In his study of the Mexican peasant village, Tepoztlan, Oscar Lewis (1951:173–175) calculated a wealth score for each of the 853 Tepoztecan families. Peasant wealth in Tepoztlan reflects a community that is already at the lower echelon in Mexican society. Figure 7 shows the frequency distribution for this village as it was in 1944.

Lewis developed the wealth score by asking villagers how wealth was defined. Land ownership was identified as the most important item of wealth. Eleven other items were mentioned. Each item was converted to the peso value it could earn annu-

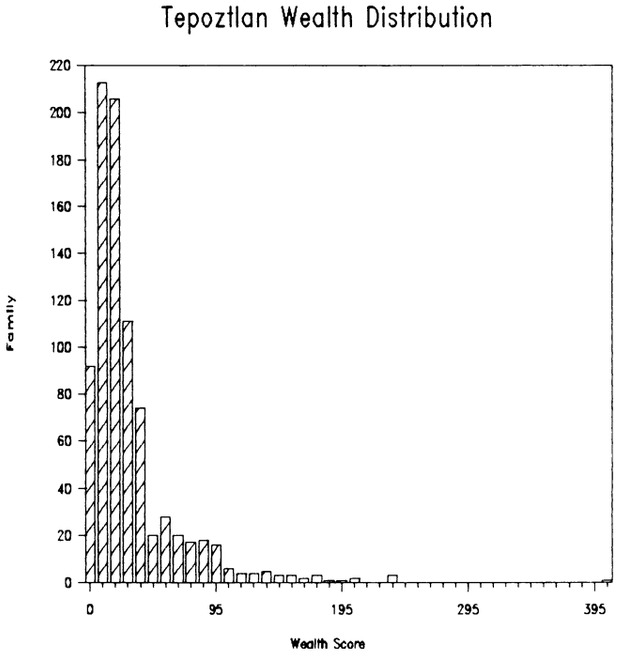

FIGURE 7. TEPOZTLAN WEALTH SCORE DISTRIBUTION. (The shape reflects both status inequality and hyper inequality. The wealth score intervals from 115 to 225 have 1 to 6 cases. One case each is at 253 and 407.)

ally. One wealth score point was awarded for each 100 pesos in value.

Most of the Tepoztecan wealthholders are concentrated at the low end of the wealth distribution. Lewis determined that a wealth score of 40, or 4000 pesos, was considered by Tepoztecans to be the minimum necessary for a decent living. Less than 20% of the population achieved this standard. While the wealth concentration at the low end of the scale is more than would be expected for a lognormal distribution, the lowest interval does not have the largest number of cases.

As the substantial number of cases in the lowest interval indicate, more than status inequality effects the Tepoztlan wealth scores. Half of the wealthiest families "inherited land from wealthy relatives who before the Revolution were caciques and dominated the village. The other half have worked their way up to their present position" (Lewis 1951:175). The Mexican Revolution had the impact of improving the possibility of achieving wealth through "hard work, thrift, and self-denial over many years" (1951:178).

Cultural mechanisms operate to level wealth differences among Tepoztecans. Those who want recognition in the community must sponsor festival activities and serve in leadership positions. Wealthier families must spend more, and this recycles some of their wealth back into the community.

The Solomon Island region of northeast Siuai illustrates the characteristics of status inequality. Douglas Oliver studied the region in 1938–39. The subsistence technology is multifaceted and includes shifting horticulture, domesticated pigs, gathering, hunting, and fishing. The boundaries of Siuai community are hard to specify. Neighborhoods have from six to 50 households (Oliver 1955:334). Yet the neighborhoods overlap and people recognize a paramount chief for the area.

In Siuai communities, wealth is inherited across generations. Leadership is institutionalized in several levels of chiefdomship. Capital accumulated in shell money from industrious pig-raising and shrewd trading help in attaining power and prestige. Having the most wealth does not equate with having the most prestige. The richest Siuai man is viewed as a miser because he is selfish and does not sponsor the feasts necessary to attain local recognition and prestige. The prestigious man is generous at the funerals of relatives, willing to lend money, and an agreeable creditor. "Renown comes from generosity manifested in frequent feast-giving and not from prodigality or mere largess. . . . renown is more the accumulating and giving away wealth" (Oliver 1955:362).

The wealth concentration measure based on kurtosis reflects considerable variance in the 10 communities with normal and status inequality. The four egalitarian communities all have wealth concentrations less than 1.0. The six communities, Nondwin to Siuai, have wealth concentrations ranging from 7.5 to 52.7. By contrast the Gini coefficient varies from 0.34 to 0.71 for the communities with normal equality. For the six with status inequality the range is 0.54 to 0.78.

Patterns Showing Hyper Inequality

In contrast to the six status inequality communities, the five wealth distributions including Oxfordshire, Basel, London, Boston, and Washington, DC, show a pattern of hyper inequality. Oxfordshire is a feudal English community. Basel and London were centers of commerce. Boston had become a shipping center when its wealth was measured in 1771. The productivity in each of these communities is meant for external markets. The subsistence pattern is not oriented mainly to serving local needs.

For each of these communities the lowest interval contains the largest number of cases. The curves show marked peaking in this one interval. Large gaps exist between the lower wealth levels and those with extensive wealthholdings. Raw histograms for these distributions cannot be drawn adequately without using log scales or percentiles, or collapsing data categories. The wealth concentration where the largest wealthholder is known exceeds 100. With the exception of Boston, the Gini coefficient is greater than 0.8.

Data for Oxfordshire resulted when King William of Normandy ordered an inventory of lands he controlled in England. The Domesday Book recorded land owned for 1086. It has been subject of much study by economic historians. Domesday data are incomplete, sometimes of questionable accuracy, but are a quantitative source about the wealth of Norman England.

Because King William was the sole owner, he overstated the distribution of wealth. As in all centralized systems, control had to be maintained through a cadre of supporters. The king's lands, therefore, were sub-infeudated to nobles, knights, and others needed to maintain the king's authority. Sub-infeudation gave the rights to the king's land in exchange for support. The effect was "to increase dispersion and intermixture of estates" (Lennard 1959:57). Moreover, other nobles and bishops owned lands not subject to the king's control. Overall, however, landed property "was in Norman England so much more

important than all other sources of wealth that its distribution may not unfairly be taken as almost equivalent, for broad statistical purposes, to the distribution of wealth in general" (Lennard 1957:25).

The Domesday data are not fully complete for Oxfordshire. The wealth data for Oxfordshire (Figure 8) lack many of the controls that would be desirable. The most complete information is for the wealthiest. Much of the wealth data are qualitative. For example, six landowners, one of whom was the Earl William, "covered something like half the agricultural land" (Lennard 1959:43). The value was 1400 pounds, while all the other tenants-in-chief held about 1000 pounds. Of the six top wealthholders the Earl William and Roger d'Ivry owned the least, valued at about 90 pounds. Two more landowners controlled about twice as much, which is estimated at 200 pounds. The value of the richest two landholders was twice again or 400 pounds each. These top wealthholders are comparable to those in other counties studied by Lennard.[3]

Lennard indicates an Oxfordshire population of 323 villans, 202 borders, 78 serfs, 17 buri, five radknights, plus the six large landowners (1959:41). If the household population is assumed to be 631, then 1% of the population owned half the wealth. Lennard's data show 85% of the households had no landholdings at all (Figure 8). To put these data in perspective with the previous community wealth comparisons, the wealth concentration measure making these assumptions is 171. This figure is slightly lower than the 15-interval hyper inequality example. Because of the extreme concentration in the lowest intervals, the three cases at 70 and the two cases each at 90, 200, and 400 cannot be seen on the graph.

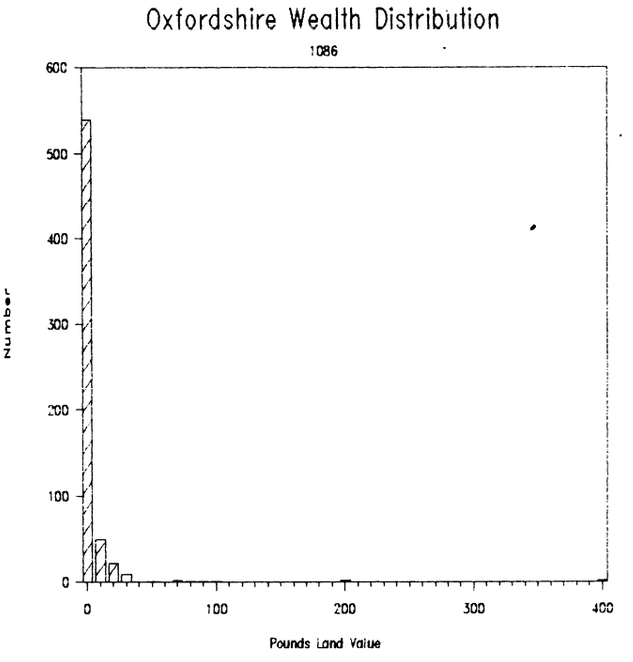

FIGURE 8. OXFORDSHIRE DISTRIBUTION OF LAND. (The shape illustrates hyper inequality. Four landowners have holdings valued at 70, 71, 90, and 92 pounds. Two each have holdings of 200 and 400 pounds.)

Oxfordshire shows extreme concentration at the bottom of the wealth distribution, but it does not have the large absolute gaps between the bottom and the top characteristic of the other hyper inequality wealth distributions. While most of the Oxfordshire population is concentrated at the bottom of the wealth distribution, the absolute difference between bottom and top is not as great. As a result, the Gini coefficient is about the same as for Washington, DC. Wealth concentrations in Oxfordshire is less than one-ninth that of Washington, DC: 171 as opposed to 1494.

Basel, Switzerland, in 1429, also indicates the kind of wealth concentration that characterizes hyper inequality. Basel is on the Rhine River in Northern Switzerland. It has been an important trading center since Roman times. Nearly 70% of the wealthholders had less than 250 gulden. The top interval, at 12,125 gulden, groups 0.5% of the population with 16% of the wealth. The top interval is nine doublings above the median. The reason wealth concentration is much lower than the other 4 hyper inequality cases is because of grouping the top cases in one averaged interval.

The impacts of grouping are illustrated for Washington, DC, in 1935. Because of the range of wealthholdings, the wealth curve for Washington, DC, cannot be plotted without resorting to percentages or logarithmic scales. A visual comparison of the wealth patterns for the other large communities with Horailenda, Utatuu, Tepoztlan, and Oxfordshire is not possible. The wealth concentration measure provides a numerical comparison where visual graphing is impractical.

Data gathered by the District of Columbia, Public Assistance Division (1936) show Depression conditions. The division summarized data for personal property estates of 7091 decedents. The value of the largest estate was $5.5 million. Data were reported in 14 unequal groups of "No recorded estate"; "Up to $10,000"; "$10,000 to 25,000"; . . ., "$500,000 to 750,000"; etc. Only 22% had estates.

For greatest accuracy, wealth concentration calculations using kurtosis require complete enumeration of the distribution. For communities where the number of households is in the thousands, gathering data for every wealthholder is very expensive. Samples of 10, 5, and even much less than 1% provide information about the distribution. With sampling, data are grouped according to intervals. Often samples of separate sizes are made of each interval. Because wealth is so concentrated in the hands of a few, to get the best wealth concentration measurements the last interval has to be completely enumerated. This is costly, and people's privacy is an issue. The grouping of data and absence of detailed information about the last interval underestimate wealth concentration in large communities.

Grouping of data means that the value of each interval has to be estimated. Wealth data from decedents in Washington, DC for 1935 illustrate the impacts of grouped data. The impact of grouping and incomplete sampling for the measurement of wealth distribution is to underestimate the degree of wealth concentration.

Compare wealth concentration for the Washington data using a 1% sample of the cases (n = 72). Of the 7091 cases, 78%, or 5561, had no recorded estate. The top 1% includes all the estates above $50,000. Averaging this last interval in one case gives a wealth level of $494,000. The largest wealthholder had ten times as much, $5,500,000. Wealth concentration for the 1% sample is 66. For all cases it is 20 times greater, 1493.

Grouping thus greatly underestimates the impact of the largest wealthholder.

Comparing Figure 5 of Horailenda with Figure 7 of Tepoztlan and Figure 8 of Oxfordshire shows different patterns for each case. Horailenda has cases distributed throughout the distribution. The mode is near the mean. For Tepoztlan most cases cluster at the low end of the distribution. There is greater spread between the high and low ends. The curve for Oxfordshire is a declining curve with the largest wealth class being in the lowest. Large gaps exist between the many people at the low end of the distribution and the substantial wealthholders at the high end. A curve shaped like Oxfordshire is indicative of hyper inequality—where the wealth distribution pattern shows restriction of the opportunities open to those at the low end of the wealth distribution.

The wealth concentration scores for Horailenda, Tepoztlan, and Oxfordshire are −0.4, 18.2, and 171.0. The Washington wealth histogram is like Oxfordshire only showing much more concentration at the low end and a much greater spread from bottom to top. In fact, the spread is so great the curve cannot be plotted in raw form.

Wealth inequality in Tepoztlan and Oxfordshire is not precisely comparable with Washington, DC. By any measure, Washington is much more inequitable. The top 0.5% of the population in Tepoztlan hold less than 5% of the wealth. In Washington the top 0.5% hold 66% of the wealth. The top 0.1%, 7 people, in Washington held 45% of the wealth. The Gini coefficient for Tepoztlan is 0.58, for Washington it is two-thirds greater, 0.95, but the wealth concentration score for Washington is 80 times greater than Tepoztlan, 1493 versus 18.2.

Table 2 shows a general association between the Gini coefficient and wealth concentration. The correlation is 0.52 (significant at $p = 0.024$). Both are relative measures. The Gini coefficient has much less variance than the wealth concentration measure. The Gini coefficient shows higher inequality among the normal equality communities and it does not show the extensive concentration of wealth associated with hyper equality. The bias of the wealth concentration measure is to draw attention to the very long right tail that characterizes wealth histograms showing hyper inequality.

Conclusions

These data suggest that the general pattern of change in wealth concentration is toward increased relative inequality. The pattern of change in wealth concentration is for increasingly smaller percentages of the total population to capture disproportionately larger shares of wealth. While overall material wealth increases, the majority of the population becomes relatively less well off.

The pattern of wealth concentration for the communities of Horailenda to Yadaw in Table 2 most reflect normal equality, and these communities are most egalitarian. For the communities represented by Nondwin to Siuai, who before colonialism were not oriented toward external markets, the data indicate a pattern of status inequality. With communities like Oxfordshire in 1086, Basel (1429), London (1522), Boston (1771), and Washington in 1935, which are oriented toward producing for external markets, hyper inequality is the pattern. With hyper inequality the lowest wealth interval has the most cases and there is a very long right tail to the distribution. Large gaps between wealthholders characterize this tail.

The evolutionary time perspective of anthropological data suggests relative inequality has increased substantially. The percentage of the population in the lowest wealth interval has increased as have the gaps between the top and bottom. While the general pattern of evolution is toward greater relative inequality, many factors—technology, community size, hierarchy, and culture—interact to change the general pattern.

The implications are that increases coming from economic development bring greater rewards to some people and more hierarchy. With continued economic development, the prediction is for greater, not less inequality, unless people act to alter the pattern. Based on these data, while the average well-being increases, there appears to be no evidence for a wider sharing of the wealth created. A wealthy few capture most of the benefits of increased community wealth.

The data are limited for illustrating changes in the pattern of community wealth concentration, and these conclusions need further testing. While the Gini coefficient and kurtosis measures of wealth concentration are correlated, Gini coefficients do not indicate the magnitude of wealth concentration that occurs with hyper inequality. Nor does the Gini coefficient match the wealth concentration measure in every case. According to the Gini coefficient, Mohoweto, Botukebo, and Boston are not that different in their wealth concentration.

Is the general pattern of wealth concentration immune to the effects of cultural values and institutions? The example of Botukebo illustrates culture can alter the general wealth distribution pattern. Can the pattern be altered toward greater equality, and are there benefits to greater relative equality?

Great Britain undertook programs to reduce wealth concentration after World War II. Atkinson and Harrison (1978) indicate that some redistribution did occur. In the United States, programs from 1929 to the 1960s reduced inequality (Smith and Franklin 1974). Social security, unemployment insurance, minimum wage, government-backed low interest loans for housing and education, progressive taxation, inheritance taxes, welfare, and job training all had a redistributive effect. The postwar period was one of rapid economic growth. Was this because the wealth created was used to release the talents of those trapped at the bottom of the wealth distribution?

Much more needs to be done. More research can outline the general pattern. Once attaining a measure for the pattern of wealth concentration, the next step is determining the relation between equality and overall economic performance.

NOTES

[1] Kurtosis for a normal distribution is 3.0. The values reported are standardized to zero by subtracting 3.0. The formula for kurtosis is

$$\text{Kurtosis} = \frac{\text{Sum}_{i=1}^{N} [(x_i - \bar{x})/s]^4}{N} - 3$$

[2] 1×2^{14}, produces 15 intervals, each which is twice the size of the previous one. The last interval is 16,384.

[3] pp. 75–100. The average of these five "specimen estates" is 446 pounds. The maximum for all areas studied by Lennard was 1325 and the minimum was 39.

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