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Welfare Measures for Regional Policies

For many years gross national product (GNP) was the byword for those wishing to measure the economic well-being of the nation because GNP was quickly available and represented the most comprehensive measure of the nation's economic performance. A similar orientation of policy is clearly seen in the design of regional policies. Under the terms of the regional legislation of the 1960s, one of the two general characteristics for qualification as a "depressed" area was low levels of regional income; more specifically, areas with median family incomes not exceeding 40 percent of the national median were to be eligible for EDA aid. (The other general characteristic is high or persistent unemployment.) Thus in regional as well as national policies the goal of measured income was a paramount goal.

There is today a backlash against using measured income or output as a social indicator on either a regional or a national level. The biologist Paul Ehrlich hardly stands alone when he writes: "We must acquire a life style which has as its goal maximum freedom and happiness for the individual, not a maximum Gross National Product." It is not proper, in other words, simply to take the pulse. We must develop better measures of health and happiness. So simply stated, who of us can disagree?

But things are not so simple. The discussion of social indicators has raised a number of questions. In what follows I address the following questions: Is income a proper measure of welfare or quality of life? If not, what can we do to improve the standard income measures to derive a measure of economic welfare?

[A] IS PER CAPITA INCOME A WELFARE MEASURE?

While everyone would probably agree that measured income is not a comprehensive gauge of the quality of life, casual judgments would suggest there is some relation. We would be surprised if the quality of life increased significantly in the five depression years from 1929 to 1934 or if it decreased during the expansion from 1960 to 1965. Moreover, we might guess that life is improving more rapidly in Japan, where until the oil crisis per capita GNP grew at more than 10 percent per annum, than in a country where there had been no growth. This association simply reflects the judgment that increases in real income are one ingredient in improving the quality of life.

At the same time, we must recognize that measured income excludes items which are usually thought to be important in welfare. Some components of income necessarily decrease the unmeasured components of welfare in increasing income. For example, the phenomenal rise in labor force participation of women over the last three decades has helped to raise family incomes. At the same time, the quantity of leisure and "home production" has declined. Which is more important in economic welfare?

These examples give the flavor of the recent criticism about GNP and measured income: they are an index of our economic health, but undoubtedly they are very defective measures of welfare or quality of life. What has measured income to do with human happiness, the skeptic might ask? The realistic defender of GNP or measured income would reply something like the following:

Income is not and was never intended to be a welfare measure. In the first place, it measures monetary inflows, not consumption. In the second place, it is consciously limited to activities which are legal and pass through markets. Finally, it relates to potential expenditures on goods and services, not to the flow of services or satisfactions these render.

In other words, measured income was never meant to be a measure of welfare. Just as taking a pulse should not be confused with the complete diagnosis, so GNP should not be thought of as the ultimate measure of a nation's well-being.

It must be said that many are less careful than the realistic defender produced above. Many an economist has used GNP or income as a synonym for economic welfare. In regional analysis, measured income and per capita GNP have been very important yardsticks by which to compare different regions; it seems a fair bet to say that these measures are accorded very high priority in allocating funds between competing regions.

Returning to the basic question, is per capita income or GNP a good measure of the quality of life? I believe it is not, basically because the process of production and exchange is too far removed from certain crucial aspects of life. This distance is a function of two problems: First, income is not a comprehensive

measure of *consumption of households*, for it contains some extraneous items and omits many more. Second, even if we were to get a comprehensive measure of consumption, we still would not be able to tell whether people were enjoying themselves more.

In developing regional indexes of the quality of life, I will hold, in section B, that an accurate assessment of the second link—between measurable socio-economic variables and personal satisfactions—is presently unobtainable. The first link—devising a comprehensive measure of consumption—is roughly within our current capability, and I turn to this question in sections C and D.

[B] WHAT CAN WE EXPECT FROM A REGIONAL INDEX OF THE QUALITY OF LIFE?

The following ground rules for social indicators, including regional indexes of the quality of life, seem reasonable to offer as the minimal professional standards which we must meet if we are to be engaged in serious scientific discourse:

1. The index must be constructed by procedures which can be reproduced.
2. The index must be based on an explicit set of value judgments, such as using market prices as values or using sample surveys.
3. The estimates must be obtained with tolerable error.

Requirements 1 and 2 are standards of procedure which stem from the idea that it is not enough for someone to say, "I don't care what the numbers say because I know things are getting worse." A commentator is required to say by what standards and with what set of experiments this judgment is formed. More than an incoherent grunt is required.

Requirement 3 is not a specific guideline. Rather, it serves to rule out certain kinds of indexes which are too imprecise. Whereas the private scientist may have a high tolerance for imprecision, the statistical standards of the federal government or of EDA should probably be higher. The realistic defender of GNP or measured income usually is a critic of other indexes because the latter are the product of guesswork.

If we follow the guidelines set out above, then the possibilities of a regional index of the quality of life are quite modest. In particular, I would argue that three very important problems are (with current technology) beyond our reach:

First, I do not think we will ever be able to devise a very precise regional index of the quality of life.

Second, there are important economic problems which no techniques can measure. These are the problems of relative income or consumption effects—sometimes called Duesenberry effects. It is possible that we are growing in absolute terms, but economic welfare is measured relative to our neighbor. I do not see how we can devise measuring rods to test for this pattern of behavior.

Finally, and most important, I do not see how we can ever go beyond material or quantitative indexes to measure the intrinsic pleasures or happiness they stimulate. Economists tend to think a higher GNP leads to greater happiness, but this is an act of faith. What tests would show a causal relationship? What measure or metric would we use for happiness? How could we aggregate the hedonic units of one household with those of another? These are very old questions dating from the dawn of utilitarianism, but they remain unanswered today. Indeed, some observers question whether the economist's act of faith is valid. Perhaps consumption is merely an addictive drug—with more consumption leading to greater craving, restlessness, and unhappiness. Bertrand Russell thought that freedom is "the absence of obstacles to the realization of desires." Perhaps the utilitarian dynamics are such that we should decrease desires rather than increase consumption.

[C] HOW CAN WE IMPROVE CURRENT CONCEPTS?

If we all agree that measured income is not an adequate welfare measure, we can perhaps agree upon some of the ingredients of a proper measure. A few years ago James Tobin and I attempted to construct a more complete measure for an economy as a whole, an index we called a measure of economic welfare (MEW).¹ The conceptual basis can be put as follows:

MEW differs from GNP in that it is a measure of consumption rather than output. Conceptually it is a comprehensive measure of the annual real consumption of households. Consumption is intended to include all goods and services, marketed or not, valued at market prices or at their equivalent in opportunity costs to consumers. Collective public consumption is to be included, whether provided by government or otherwise; and allowance is to be made for negative externalities, such as those due to environmental damage and to the disamenities and congestion of urbanization and industrialization. The real value of consumption is estimated by valuing the flows of goods and services at constant prices.

The execution is, as usual, less elegant than the concept. We calculated the index by patching together various estimates of what we felt were the important parts of a MEW. The following description goes over the high points.

[1] Elimination of Items of GNP That Do Not Contribute to Economic Welfare

The task of this part is to separate GNP into three components: consumption, investment, and intermediate goods. Intermediate products are goods and services whose contributions to present or future consumer welfare are completely counted in the values of other goods and services; to avoid double counting they should not be included in reckoning the net yield of economic activity. We also subtracted investment as not directly productive of satisfaction.²

The major problem in this section concerns government output. We separated out from government activities several production activities that are evidently not directly sources of utility themselves but are regrettably necessary inputs to activities that may yield utility. Government "purchases" of this nature are police services, sanitation services, road maintenance, and national defense. Expenditures on these items are among the necessary overhead costs of running a complex industrial nation-state, although there is plenty of room for disagreement as to the amounts required. We are making no judgments on issues of national policy in classifying these outlays as intermediate rather than final uses of resources. We view these as instrumental—like consumer outlays on commuting to work.

These judgments are difficult and controversial. The issues are clearly illustrated in the important case of national defense. There are two reasons why we excluded defense expenditures. First, we saw no direct effect of defense expenditures on household economic welfare. No reasonable country (or household) buys "national defense" for its own sake. If there were no wars or risks of war, there would be no need for defense expenditures and no one would be the worse without them. From the point of view of economic welfare, then, defense expenditures are gross but not net output.

The second reason we excluded them is that defense expenditures are input rather than output data. Measurable output is especially elusive in the case of defense. Conceptually, the output of the defense effort is national security. Has the value of the nation's security risen 100-fold, from \$0.5 billion to \$50 billion, over the period 1929 to 1965? Obviously not. It is patently more reasonable to assume that the rise in expenditure was due to deterioration in international relations and to changes in military technology. The cost of providing a given level of security has risen enormously. If there has been no corresponding gain in security since 1929, the defense cost series is a very misleading indicator of improvements in welfare.

The result of the subtraction of investment and intermediate goods is "market consumption." The estimate for market consumption is shown in line 2 of Table 1, right under GNP, for selected years since 1929.

**TABLE 1 Derivation of a Measure of Economic Welfare
(billions of dollars, 1958 prices)**

	1929	1947	1954	1958	1965
1. GNP	203.6	309.9	407.0	447.3	617.8
2. Market consumption	106.4	159.3	189.0	213.5	277.0
3. Services of consumer capital imputations	29.7	36.7	39.0	54.8	78.9
4. Imputation for leisure	339.5	466.9	523.2	554.9	626.9
5. Imputation for non- market activities	85.7	159.6	211.5	239.7	295.4
6. Disamenity cost of growth	-12.5	-19.1	-24.3	-27.6	-34.6
7. Measure of economic welfare	548.8	803.4	948.3	1,035.4	1,243.6
Index of:					
8. Per capita NNP	100	131.9	149.2	151.1	187.5
9. Per capita MEW	100	123.2	129.1	131.4	141.8

SOURCE: Nordhaus and Tobin (1972).

[2] Imputations for Capital Services, Leisure, and Household Activity

The national accounts do not attempt to measure the value of many nonmarket activities. We imputed income to two of these. First, we imputed income to consumer durables and civilian government capital. Second, we estimated and valued the time devoted to leisure and productive nonmarket activities.

The more important of these is the imputation for time. As many critics of GNP have pointed out, the omission of leisure and of nonmarket productive activity from measures of production conveys the impression that economists are blindly materialistic. Economic theory teaches that welfare could rise, even while NNP falls, as the result of voluntary choices to work for pay fewer hours per week, weeks per year, years per lifetime.

Although these imputations are of great importance, there are extremely serious problems of concept and measurement. The most important conceptual question is that of the proper deflator for these activities. Our estimates for the imputation for consumer and government capital are shown in line 3, while lines 4 and 5 give the time imputations. These are clearly very important imputations.

[3] Disamenities and Costs of Growth and Urbanization

In principle those social costs of economic activity that are not internalized as private costs should be subtracted in calculating our measures of economic

welfare. The problems of measurement are formidable, and we have but suggested one approach to this problem.

One type of social cost not recorded in the national income accounts is the depletion of per capita stocks of environmental capital. Nonappropriated resources such as water and air are used and valued as if they were free, although reduction in the stocks of these resources diminishes future consumption. If we had estimates of the value of environmental capital, we might modify our calculations of MEW accordingly. We were not able to make this adjustment.

Aside from pollution and environmental destruction, there are unrecorded social costs which diminish economic welfare directly rather than through the depletion of environmental capital. The disamenities of urban life come to mind: litter, congestion, noise, insecurity, buildings and advertisements offensive to taste, etc. Failure to allow for these negative consumption items overstates not only the level but very possibly the growth of consumption. The fraction of the population exposed to these disamenities has increased, and the disamenities themselves may have become worse.

Many of the negative "externalities" of economic growth are connected with urbanization and congestion. The secular advances recorded in GNP figures have accompanied a vast migration from rural agriculture to urban industry. Without this occupational and residential revolution we could not have enjoyed the fruits of technological progress associated with large-scale industry. But some of the higher earnings of urban residents may simply be compensation for the disamenities of urban life and work. If so, we should not count as a gain of welfare the full increments of GNP that result from moving a man from farm or small town to city. The persistent association of higher wages with higher population densities offers one method of estimating the costs of urban life as they are valued by people making residential and occupational decisions.

We used cross-sectional estimates of income to estimate disamenities of growth. More precisely, we estimated the income differentials necessary to hold people in localities with greater population densities and urbanization. The resulting estimates are called the disamenity costs of urbanization and are shown as line 6 of Table 1. As can be seen, the estimated disamenity premium is quite substantial, running about 5 percent of GNP. Nevertheless, the urbanization of the population has not been so rapid that charging it with this cost significantly reduces the estimated rate of growth of the economy.

We added the various components together to get MEW in Table 1. Although the numbers presented there are very tentative, they do suggest the following observations. MEW is quite different from conventional output measures. Some consumption items omitted from GNP are of substantial quantitative importance. It is possible to be more precise about why GNP may not be a very good index of economic welfare. In 1958, GNP was about twice as large as market consumption, which by our reckoning is that part of GNP which is

relevant for welfare comparisons. But market consumption, in turn, was only one-fifth of MEW. It is clear that if our order of magnitudes is correct, GNP is but a distant relative to MEW. A fortiori, GNP is even further removed from a comprehensive index of the quality of life.

An important word of caution is in order: the struggle to broaden GNP to a fairly comprehensive measure of economic welfare is not won without serious losses in precision. As a rough guide to the reliability of MEW, we used the reliability of the GNP estimates, which we call, for reference, low error, as a benchmark. An item with medium error is one with a percentage error we felt to be about the order of twice the percentage error of GNP. High error is about five times the percentage error of GNP; and very high error, about ten times the percentage error of GNP (Nordhaus and Tobin 1972). On the basis just described, the proportion of MEW adjustments with low error was 28 percent; with medium error, 2 percent; with high error, 11 percent; and with very high error, 59 percent (Nordhaus and Tobin 1972). In comparison to GNP, MEW makes a poor show. It is evident that a further extension to make MEW even more comprehensive or to extend MEW to a regional basis would lead to even greater imprecision. We are thus left with the troubling thought that any comprehensive index of economic welfare or of the quality of life will probably be imprecise and controversial. It will be a recipe full of arbitrary judgments and statistical compromises. How useful is such an index for making concrete policy decisions?

[D] IMPLEMENTATION OF MEW ON A REGIONAL LEVEL

It is quite clear that construction of a measure of economic welfare for a nation moving over time is a very difficult conceptual and statistical problem. What kinds of lessons can we draw as to the desirability of modification of the standard income measures to construct region indexes like MEW?

The approach I consider is to construct regional indexes of the measure of economic welfare (call them RMEWs). These could be built upon existing data, but to a certain extent RMEW would entail data not now readily available. In constructing RMEW, the concept of *median family income* (MFI) of a given region is helpful to use as a base simply because MFI was the basis of regional legislation in the United States. MFI can serve as a reference point from which to make corrections. The components of income included are the Commerce-Census concepts (see *Survey of Current Business*, May 1971).

[1] Conversion of Family Income to a Welfare-Oriented Measure

If we start with MFI as our base for welfare comparisons, we start with a measure from which a good many of the undesirable items included in GNP and

eliminated in section C.1 above (the intermediate goods and regrettable necessities) are already taken out. There are, however, a few shortcomings of the concept of measured income which should be cleared up.

First, the Commerce-Census income measure does not really correspond very closely to potential private consumption (public consumption is considered in section D.2). The shortcomings of traditional income measures are well-known, but generally ignored. In the first place, most of the income measures do not contain an allowance for taxation. Second, they ignore some important components of income, notably capital gains, gifts, and estates. Third, they do not allow for differences in wealth and age structure to transform measured income into a measure of potential consumption.³

It is difficult to know how important these corrections would turn out to be. A casual look at the literature on income distribution indicates, for example, that the fraction of the population over 65 is associated with low-income counties. Yet because of the positive correlation of the wealth-income ratio with age, there is a consistent understatement of potential consumption for older persons when measured income alone is examined.

It should be asked whether it is possible to construct a more accurate measure of potential consumption for the purpose of comparing regions. My impression is that it would be quite difficult at the present time. Not only are our income-expenditure surveys disgracefully out of date, but they do not generally allow a matching of income and wealth data with regional information. Thus, the Federal Reserve survey of 1962-1963 includes a fairly detailed rundown of income and wealth, but the regional specification is extremely broad (Projector and Weiss 1966).

A second problem with regional income comparisons is that so far they have really not faced up to the problem of geographic disparities in the cost of living. In fact, most studies of regional income disparities do not even attempt to correct for regional differences. In part this deficiency is the result of the disinterest of the federal government in constructing regional price indexes. (Thus, the only detailed indexes available are a few estimates of the cost of an intermediate budget for a four-person household and a retired couple in an SMSA.)

To my knowledge it is not possible to construct "real income" calculations on a detailed level. Yet for 1970, the estimated difference between metropolitan and nonmetropolitan areas in the cost of an intermediate budget was 14 percent. And the difference in budget cost between the cheapest Southern city (Austin, Texas) and the dearest Northeastern one (Boston) was 30 percent. It is unlikely, of course, that the huge differentials between Bibb County, Alabama, and Fairfield County, Connecticut, would be reversed by careful real income calculation. But it is of interest to note (for cities with cost-of-living indexes) that the highest-income SMSA in the Northeast (Boston) has a measured income 50 percent higher than the poorest Southern city (Orlando). Yet when these incomes are deflated the differential falls to only 18 percent. Even

more dramatic is that Atlanta's average measured income in 1970 was about 88 percent of Boston's, whereas real income was 105 percent.

The construction of a complete set of regional indexes of living costs for different areas, with special attention to rural areas currently untouched, should receive high priority.

[2] Imputations for Nonmarket Activities and Services

Recall that in the construction of MEW imputations were made for capital and nonmarket time, items omitted in conventional accounts. It would probably be desirable to attempt the same kind of imputations in constructing RMEW, but it must be acknowledged that there are very serious difficulties in implementing such imputations.

First, consider the problem of imputing income to consumer durables and public goods. The imputation of income to consumer durables on a regional level would be a fairly straightforward task. The principles of such imputation have been set forth by Juster (1966). Again, if this were to be implemented on a regional level, there would have to be more detailed survey information about consumer holdings of durable goods, but no terribly serious conceptual issues are involved.

The imputation of income to public capital on a regional level is a more difficult problem. The problem can be divided into two parts: reproducible and nonreproducible capital. I treat reproducible capital here and nonreproducible capital in the next section.

In the original MEW calculation, we imputed income to public civilian capital in a manner similar to the imputation for consumer durables. This procedure would also be desirable for regional public capital, but the conceptual difficulties on a regional level are quite different. The imputation is made by estimating the replacement cost of capital and imputing a rate of return to this public capital. On a regional level the major conceptual problem is to separate "local" public capital from "national" public capital; a secondary problem is estimating a rate of return.

Let us assume that a proper valuation of public capital can be made. Consider first the difficulty of estimating the fraction of the returns accruing to local as opposed to foreign residents. For some resources this is not very difficult: for example, for educational and health capital it is reasonable to assume that (or at least easy to determine if) all use accrues to local residents. The allocation of roads and parks is harder to determine, while expenditures for defense and general government are pretty clearly national in scope. Is there a systematic procedure by which these issues can be resolved and an appropriate imputation determined? It seems to me that to do a comprehensive job of separating regional from national capital strains reasonable limits for a RMEW. Such a procedure could undoubtedly be performed, but it would have to be done differ-

ently for each level of aggregation—city, county, or state—and it would be very arbitrary. At the same time, it would seem very important to include the more significant resources, especially educational and health capital. A reasonable compromise, then, might be to select public education and health capital for imputing income. As for the proper imputation, it seems to me that (at least for education and health) we now possess sufficient background studies of the return on these activities to make a rough guess at the rate.

The second major imputation for a RMEW concerns the correction for non-market use of time. In the original MEW calculation we imputed income for both leisure and nonmarket activity. This correction was important for assessing the bias in GNP from secular changes in hours of work, of the labor force participation rates of women, and of the trends in education and retirement.

To what extent is it desirable to correct for nonmarket use of time in a RMEW? The main problem in this is to distinguish voluntary from involuntary deviations of labor force participation rates or hours of work. In the calculation of MEW, the strong upward trend over the period 1929–1965 dominated the differences in cyclical utilization for the two end points; for shorter periods of time (such as during the Great Depression) the techniques gave strange results. The central difficulty in evaluating regional differences in hours and employment is to separate demand shifts from supply shifts.

Three problems require attention: differential levels of unemployment, labor force participation, and annual hours of work. In the original calculation, we assumed that the "working time" of unemployed workers was of no value, while the rest of their time—normal leisure—was valued the same as for employed workers. Given the great emphasis placed on unemployment in regional studies, careful consideration must be given to its treatment in regional indexes of economic welfare. In regional programs unemployment has received, crudely speaking, equal weight with low incomes. This seems to me entirely appropriate as long as it is clear that low income and unemployment are fundamentally different problems for regional programs.

To appreciate the difference, it may be well to review some recent work on unemployment. In a series of recent papers, several economists have argued that the basic problem for needy workers is not jobs, but good jobs (see especially Hall 1973, Perry 1972, and Okun 1973; for earlier influential microeconomic studies, see Piore and Doeringer 1971). In this view, high unemployment is often associated with relatively plentiful job vacancies, but these jobs are of poor quality, offering few fringe benefits and little chance for advancement and future status. As a result, workers who have access only to these low-quality jobs have high turnover rates, frequent short spells of unemployment, and high unemployment rates.

The implications of this analysis for regional programs are not very novel: part of the problem of persistent unemployment is the industrial and skill composition of available jobs. A simple increase in the number of jobs of the same

variety will not be as important as emphasis on better jobs. This suggests that more attention in regional programs should be given to the quality of jobs available and to creation of jobs with upward mobility.

A second and more important finding of recent research is that unemployment and wage rates are not closely associated, and perhaps are even associated in a counterintuitive fashion. Conventional economic theory would suggest that labor markets with relatively high rates of unemployment would have relatively low wage levels—the low wage being a result of the excess supply. A recent study by Kraft, Willens, Kaler, and Meyer (1971) casts serious doubt on the negative association between unemployment rates and per capita income. Kraft et al. (Table 1) selected the 300 "most distressed" counties of a sample of 3,097. If we compare the two-way joint membership of counties by the unemployment rate and median family incomes, we obtain the following results:

	High Unemployment Rates	Low Median Income
High unemployment rates	300	32
Low median income	32	300

It is clear that the extent of joint membership is not more than would be explained by random independent association. This led Kraft et al. (p. 68) to conclude: "The fact that the set of counties with the highest unemployment rates had little overlap with the sets based on any other measure indicates that unemployment will not serve as a substitute for other indicators of welfare."

A series of papers by Robert Hall (1973) suggests, in fact, that wages and unemployment are *positively* associated. Hall argues that, after correction for various factors, wages across different cities are an increasing function of unemployment. This represents an equilibrium across different cities in that the expected wage rate (that is, the average wage times the ex ante probability of employment) is roughly equalized. This pattern of unemployment rates can be persistent and not necessarily represent different levels of economic welfare. If Hall is correct in his interpretation, it would be very misleading to use high unemployment as *prima facie* evidence of distress.

This evidence suggests that unemployment and income should receive different treatment in regional programs. Income (or a more sophisticated version of this as in RMEW) should be viewed as the primary indicator of persistent differences in levels of economic welfare. Unemployment is a concern for regional policies when it is the result of sudden shocks to the system that differ in their effect from region to region. The best historical example for which we have data is the sudden end of hostilities after World War II. Recall that there was a sharp decline in the share of defense spending in total GNP, from 42 percent in 1944 to 4 percent in 1947. This decrease led to relatively high unemployment in states where defense was important: in 1946, covered unemploy-

ment rates in the top five states in defense spending were three times the rates of the bottom five. The amazing fact, however, is the speed of recovery of the distressed areas. Within two years the ratio of unemployment rates had declined to 1.5, and by the mid-1950s the two groups were indistinguishable. Certainly this is exactly the case where temporary relief to affected areas is appropriate. But given the short half-life of disturbances such as these, relief to affected areas should not overshoot the target, build up unreasonable expectations, or induce uneconomic investment in human or tangible capital.

The other questions involve regional variations in labor force participation rates and hours worked. In the aggregate MEW calculation, imputations were made for the value of leisure time and for other nonmarket activity. Although I am convinced that this correction is conceptually correct, I think the problems of measurement are so severe that it would probably be better to omit a full imputation for a regional MEW. The problems are that the imputations for time are very large relative to market components, that the valuation of this time is problematical, and that there is no obvious method of deflation.

At the same time, it might be useful to correct for differences in hours and labor force participation by putting all regions on a standard workweek and participation rate. Thus, average hours in manufacturing for 1970 were 39.8, while the average for SMSAs varied from 35.7 to 45.1. It might be useful to calculate income for different regions assuming that average hours were at the national average. This correction is appropriate if differentials in hours worked are determined by supply rather than demand.

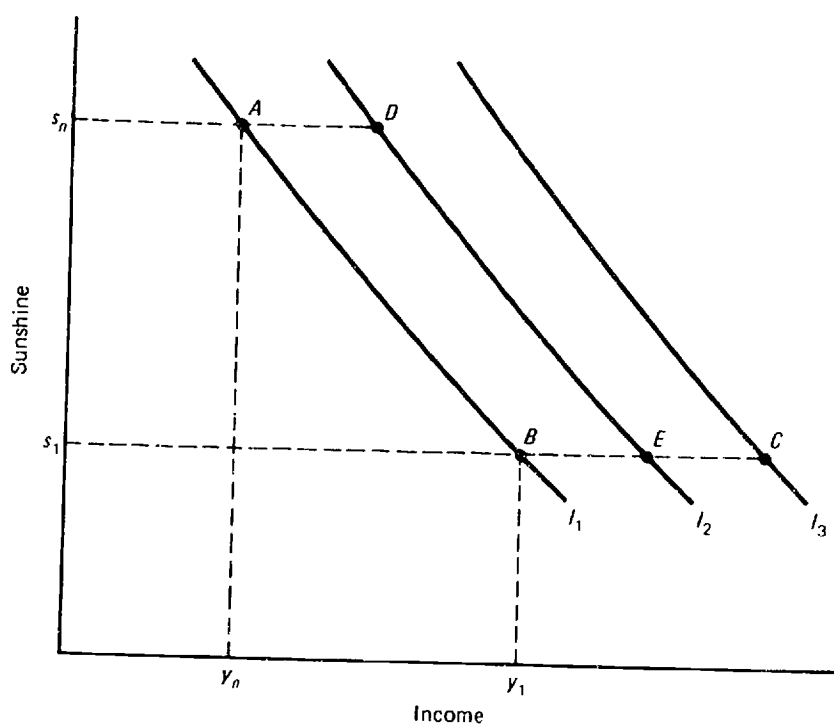
A similar correction can be made for labor force participation. It is clear that a good part of the differentials in labor force participation rates are due to the demographic composition of a region; for example, Boston has a low participation rate because students make up a large fraction of the population; but Florida has low participation rates because the climate attracts retired persons. It is especially appropriate to standardize for these differences when they occur as a result of economic variables unrelated to economic distress.

[3] Regional Amenities

Finally, I consider the problem of amenities associated with different regions. Formally, we can treat this as the measurement of returns to nonreproducible public capital or environmental resources. More concretely, we are reopening the ancient question of whether there are important unmeasured attributes associated with rural or urban life, with migration, with densely or sparsely populated areas.

It is clear that unmeasured components of regional economic life are heavily weighted by individuals. Nor can there be any doubt that individuals vary greatly in their tastes. I would further suggest that "learning-by-living" is a dynamic phenomenon that we have neglected in discussions of the cost and

FIGURE 1 Preference for Sunshine and Income



benefits of mobility. These propositions suggest that any definitive evaluation of the attributes of regional life will be extremely difficult.

One approach to evaluating regional amenities can be shown by a simple example. Let us assume that regions vary by a single exogenous attribute, say sunshine. Since this attribute differs across regions, we can rank the n regions by the sunshine index, s_1, \dots, s_n , with region n being the sunniest spot. Next assume there are many identical individuals, each having an ordinal preference function $U(s, y)$ defined over sunshine (s) and normal labor income (y). Figure 1 shows three indifference curves, where higher-numbered indifference curves represent more preferred bundles.

If individuals are perfectly mobile and have perfect information, then wage rates in different areas will tend to compensate for the subjective value of sunshine. If all individuals are on indifference curve I_1 , region 1 will be at point B , which has the lowest sunshine index, s_1 , and the highest labor income, y_1 . Conversely, region n is at point A , which has the lowest income, y_n . This analysis can easily be extended to include several regional variables.

Tobin and I used the information provided by regional observations on income to estimate "disamenity premiums" associated with urbanized and densely populated areas. We reasoned as follows:

To calculate amenities it is necessary to account for possible disequilibria. Thus we might find some regions at point A and others at point C in Figure 1.

Point C might be Smogcity, while point A might be Sunnyfarm. If in fact this situation arose, we would expect both wage adjustments and migration from Sunnyfarm to Smogcity until the two regions were on the same preference curve, as for example when A moved to D and C moved to E. Hence, we can use out-migration as a signal that the combination of unmeasured and measured attributes of a region leave it unfavorably ranked relative to other regions, and conversely for in-migration.⁴

There are three objections to this approach: First, it neglects differences in the tastes of different agents. The introduction of these entails very difficult questions concerning the determination of the observed hedonic prices traced out in Figure 1. There are complicated problems of existence and stability similar to those arising in Tiebout's hypothesis of competing public economies. Second, there has been no explicit discussion of the demand for labor; it is assumed that the observations trace out the tastes of individuals rather than the technologies facing firms. Finally, the model grossly oversimplifies the dynamics of migration, treating it as a free good. It is clear that families have a large monetary and psychological investment in their residence and that a fairly large differential between regions is necessary to induce migration.

Despite the caveats, I nevertheless feel that these hedonic indexes of regional amenities may provide considerable insight. In the original estimate, we were attempting to estimate the premium required for living in densely populated or urban areas. Our calculations are shown in Table 2. These estimates suggest that sizable premiums are associated with living in urban areas. In quantitative terms, to induce a worker to move from a rural to an urban area would require a premium of almost one-third of average family income.

TABLE 2 Calculated Premiums Associated with Densely Populated (β_1) or Urbanized (β_2) Counties

Area	Elasticity of Required Income with Respect to:	
	Total Population (β_1)	Urbanization Ratio (β_2)
Massachusetts, Rhode Island, Connecticut	.019	.059
New Mexico	.006	-.073
New York	.045	.035
Wisconsin	.055	.035
Indiana	.064	.017
Subjective weighted average	.06	.04

SOURCE: Nordhaus and Tobin (1972, p. 50).

As it now stands, this kind of calculation of the regional amenities or disamenities is probably too crude to be of much use for regional income or MEW comparisons. It would be interesting to press this technique further, using a more complete list of regional variables such as that described in the article by Kraft et al. (1971). If the conclusions reported above stand up in further testing, then we have grossly overestimated the importance of the rural-urban income differential in regional comparisons of the level of income.

NOTES

1. Nordhaus and Tobin (1972). Although I draw heavily on that joint paper in section C, the views expressed in the present paper are my sole responsibility.
2. A second measure, called potential MEW, contains a new concept of net investment and is discussed in the paper but omitted here.
3. An example of the difference between measured income and a concept closer to potential consumption is contained in Nordhaus (1972).
4. This technique is similar to the construction of "hedonic" price indexes for automobiles to estimate the movement of true price.

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