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# An Analysis of Selected Economic, Social, and Fiscal Indicators for Nonmetropolitan School Classification Schemes

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*Any classification system of rural school districts should take into account the socioeconomic environment in which school districts must operate. Here, I examine some of the most common economic, social, and fiscal indicators available from federal data sources. My focus is on potential problems that might occur because of data limitations, such as unintentional biases favoring certain types of places and the lack of timely data. I conclude that such problems need not rule out the use of these indicators in a classification scheme, since many of these indicators have strengths that outweigh their weaknesses. Nevertheless, researchers should be aware of the problems of particular indicators, and, where possible, use multiple indicators or alternative data sources to mitigate these problems.*

## Introduction

Allen Cononico, a rural school superintendent from West Virginia, was recently quoted as saying, "We need interested parents, motivated students and good teachers. We need to work on that, not some new 'radical ideas'. . .We need enough money for textbooks, workshops, globes and maps" (Jordan, 1992). Although many school officials might agree with at least some of these sentiments, not all rural schools face the same problems or require the same solutions. In theory, a federal policy-impact code or classification system could be developed to help identify and address the diverse needs of rural schools across the country.[1] Such a classification system, however, requires careful attention to the indicators selected so that the resulting code is sound both in theory and in practice.

This paper examines the major strengths and weaknesses of selected indicators believed to reflect the underlying socioeconomic difficulties facing rural schools today. Whether an indicator is strong or weak in a policy context depends primarily on practical considerations. The strengths of the indicators tend to be fairly straightforward. Many indicators are well-designed to measure particular problems affecting rural schools or problems affecting particular places. Some are also strong in the sense that they are simple to understand and/or widely accepted by the public. The principal weaknesses are the lack of timely data and the presence of unintentional statistical biases favoring certain types of places. Although these weaknesses can be important for policy, they tend to be subtle and not widely recognized by policymakers.

The objective of this analysis is to aid federal policymakers in selecting the most appropriate indicators when constructing rural school classification schemes. The indicators selected for analysis are therefore restricted to those available from federal data sources. They cover three of the major challenges facing rural school districts: economic, social, and fiscal. Economic indicators give insights into economic incentive problems facing students, since the incentive to achieve in school is thought to reflect

[1]The words rural and nonmetro, and urban and metro, are used interchangeably in this article, except where the context indicates otherwise.

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local job availability for those with a good education. Social indicators provide insights into the social environment and parental support that affect school achievement. Fiscal indicators reflect the willingness and ability of the local community to pay for the teachers and materials needed for a quality education.[2]

## Economic Indicators

Recognition of the two-way linkage between the rural economy and education has grown considerably over the last decade. Since the farm and energy industry difficulties of the early and mid-1980s, many policymakers have emphasized the need for improved education and training to encourage economic diversification and high-tech development in rural areas. At the same time, researchers have suggested that as long as a place is economically stagnant and underdeveloped, it may be difficult to achieve any meaningful educational improvements because such improvements would have to be achieved in the face of strong economic disincentives.

A recent empirical analysis by Killian and Parker (1991) found that "the initial mix of local industries and other local characteristics were more important determinants of local growth than were local education levels." Although they did find that education can independently affect local employment growth, "raising the average years of schooling completed from 11 to 12 years apparently had few, if any, benefits in terms of new jobs for local economies in the 1980s." In addition, they found that a one-percent increase in college completion rates in nonmetro areas has half the beneficial impact on employment growth of a similar increase in metro areas.

In many of these places, local job prospects are inadequate to motivate students to remain in school and improve their grades. Because these economic disincentives are so pervasive and ingrained, such problems do not seem likely to be overcome by the standard education reforms that involve changes in school administration and teaching methods, although some such education reforms might help. (E.g., Swaim & Teixeira, 1991, note that nontraditional curriculum stressing "problem solving, adaptability, and cooperative work" might help give rural students the kind of skills they need to function in a rural business environment.)

This has led some rural policymakers to advocate using noneconomic incentives, such as making youth drivers licenses contingent on school achievement. Others have advocated economic development policies that would improve local economies and give students greater economic incentives to do well in school. In some cases, this economic development policy approach has been accompanied by school policies aimed at improving student job prospects and improving retention of school graduates. For example, some schools have tried to make students identify more with the community by getting them involved in awareness activities such as community economic assessments. Other school programs emphasize entrepreneurship and other skills needed in the local business community to give students a better chance of obtaining meaningful local employment after graduation.

Economic indicators can help identify those places that might benefit most from such approaches. Three types of economic indicators—employment (and unemployment), income, and economic structure—are discussed in this section.

### *Employment Indicators*

The unemployment rate is a familiar and intuitively appealing indicator, signifying the presence of slack in the economy. In addition to its familiarity and simplicity, the unemployment rate has another major advantage: It is available at the county level on a monthly basis from the Bureau of Labor Statistics.

Importantly, the unemployment rate may reflect either short-term (cyclical) or long-term (structural) economic difficulty. This gives it more flexibility than some other measures, but also results in more ambiguity, especially if one is interested in isolating a particular type of economic problem. Adding to this ambiguity is the tendency for unemployment rates to reflect social factors, such as education and attitudes toward being unemployed, that may cause residents of some localities to be less likely to apply for unemployment compensation than residents of other localities. For this and other reasons, some researchers consider the unemployment rate to be more of a social indicator rather than an economic indicator (e.g., Cuciti, 1978).

As a measure of general economic difficulty, the unemployment rate is biased (albeit unintentionally)

[2]Most of the indicators discussed in this paper also are examined in Reeder (1990), which includes analyses of correlation and variation for many of the indicators. For references on rural data sources in general, see Salant (1990) and Martin and McHugh (1991).

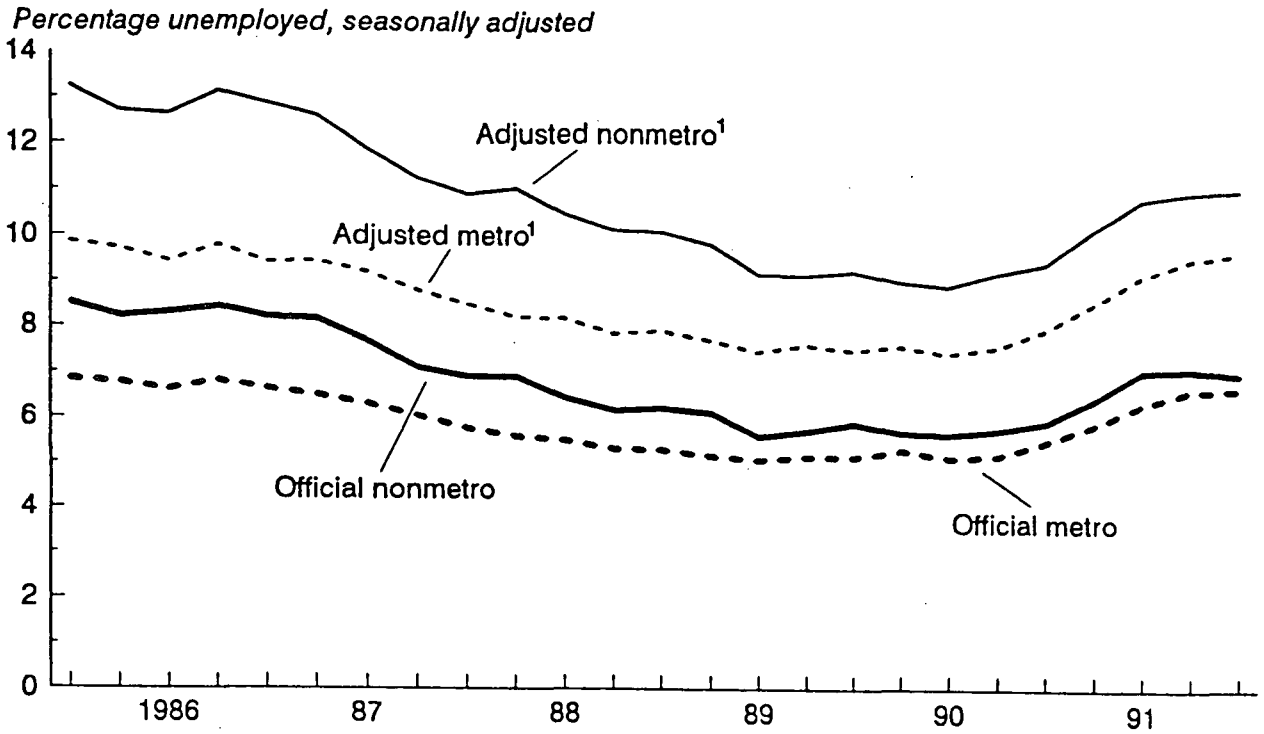


*Figure 1.* Quarterly Unemployment Rates (1986-1991)

[1]Includes discouraged workers and half of the workers employed part time for economic reasons.
*Source:* Current Population Survey (Swaim, 1991-1992).

against rural places with labor problems that do not conveniently fit the "unemployed" category, such as underemployed or discouraged workers. Excluded from the unemployed, for example, are farmers and others who are self-employed and involuntarily part-time employed for significant parts of the year. Also excluded are those workers who have lost high-paying jobs and have accepted one or more part-time jobs paying well below that to which they are accustomed. Such underemployed individuals are common in rural America, where workers are more likely to rely on two or more part-time jobs than in urban America. Discouraged workers—those who drop out of the labor force entirely—are also more common in rural areas than in urban areas, and they also are not counted in the official unemployment rate (Nilsen, 1979). Another potential bias against rural areas involves the often observed social stigma that many rural Americans associate with applying for public assistance. Such a stigma is expected to result in understated observed unemployment rates.

The Bureau of Labor Statistics (BLS) publishes a quarterly "adjusted" unemployment rate that corrects for some of these problems, adjusting for part-time job seekers, involuntarily part-time employed, and discouraged workers. Figure 1 shows the significance of this adjustment for nonmetro areas, whose official unemployment rates almost converged with those of metro areas by 1991, while their adjustment unemployment rates remain substantially higher than adjusted metro rates. Adjusted unemployment rates are only available at the national level, however, and only limited efforts have been made to compute state-level indicators of labor distress that adjust for these problems (e.g., see Yetley, 1989).

In agricultural and resource-based rural areas where outmigration occurs fairly rapidly following economic difficulty, unemployment rates may fall rapidly even though related economic problems persist, such as reduced property values, incomes, and minimal job opportunities for local school graduates. In such places, the unemployment rate (adjusted or unad-

Table 1
*Percentage Employment and Unemployment by Type of County (1979-86)*

| County type | Employment change (average annual rate) | | | Unemployment rate | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Level | | | Change | |
| | 1979-82 | 1982-86 | 1979-86 | 1979 | 1982 | 1986 | 1979-82 | 1982-86 |
| Metro | 0.4 | 2.8 | 1.7 | 5.7 | 9.3 | 6.4 | 3.6 | -2.9 |
| Nonmetro[a] | -.2 | 1.1 | .6 | 6.1 | 11.1 | 9.0 | 5.0 | -2.1 |
| Farm-dependent | -.1 | -.1 | -.1 | 5.5 | 9.6 | 8.7 | 4.1 | -.9 |
| Manufacturing | -1.4 | 1.7 | .4 | 6.4 | 12.5 | 8.9 | 6.2 | -3.6 |
| Mining and energy | 1.3 | -3.4 | -1.4 | 6.1 | 11.4 | 13.0 | 5.3 | 1.6 |

[a]Includes all nonmetro counties, not just those in farm-dependent, manufacturing, and mining and energy groups.
*Sources*: ERS analysis of data from Bureau of Economic Analysis, U.S. Department of Commerce; and Bureau of Labor Statistics, U.S. Department of Labor (Reeder, 1990).

justed) does not adequately measure the severity of local employment problems, and an alternative measure is desirable.

One such measure is the percentage change in employment over time. Data covering the 1982-86 period, when farm-restructuring problems were most noticeable, show the potential this indicator has for revealing the presence of farm economic difficulty. Although farm-dependent counties, as defined by the Economic Research Service (ERS), had lower unemployment rates than nonmetro counties in general during this period, employment actually declined in farm-dependent areas while employment grew in nonmetro counties in general (see Table 1).

Another alternative to the unemployment rate is the change in the unemployment rate over time. This avoids some of the ambiguity associated with long-term, social aspects of unemployment data, focusing more on short-term, cyclical and structural economic difficulties. It is particularly valuable when used along with the change in employment, which may be misleading when used by itself. For example, during the recessionary period from 1979 to 1982, mining and energy counties enjoyed considerable employment growth, yet they still suffered from relatively high unemployment and had a substantial increase in their unemployment rate (see Table 1).

One issue to be aware of in using unemployment rates, as well as other economic indicators, is that seasonal variations can affect monthly or quarterly data, resulting in distortions in some cases. Whether or not one should seasonally adjust depends on the context in which the indicator is used. When measuring trends in overall economic activity, seasonal adjustments are recommended. When measuring the extent of difficulties at a particular point in time, seasonal adjustments may be inappropriate because individuals who are seasonally unemployed are still unemployed and pose problems for the community.

### *Income Indicators*

Income indicators can detect economic weaknesses where employment indicators cannot. For example, rural areas characterized by the working poor will show up as having relatively low incomes, even though those areas may be at or near full employment. Similarly, many places with low incomes do not suffer from high unemployment rates because school graduates routinely leave the area in search of better job opportunities elsewhere. In such places, economic difficulties exist even though unemployment rates remain low.

Income typically varies by degree of urbanization, with the lowest incomes found in totally rural counties (those that are completely rural or having fewer than 2,500 urban population). Thus, in 1979, family incomes in metro counties were 21 percent higher than in nonmetro counties, and in large metro counties family incomes were 40 percent higher than in totally

Table 2
*Per Capita Income by Nonmetro Region (1979-86)*

| Region | Real per capita income (1986 dollars) | | | Change in real per capita income (1986 dollars) | | |
|---|---|---|---|---|---|---|
| | 1979 | 1982 | 1986 | 1979-82 | 1982-86 | 1979-86 |
| Metro | 13,963 | 13,963 | 15,642 | 0 | 1,679 | 1,679 |
| Nonmetro | 10,767 | 10,415 | 11,323 | -352 | 908 | 556 |
| Northeast | 11,058 | 11,190 | 12,672 | 132 | 1,482 | 1,614 |
| North Central | 11,705 | 10,962 | 12,051 | -743 | 1,089 | 346 |
| South | 9,659 | 9,577 | 10,332 | -82 | 755 | 673 |
| West | 12,397 | 11,582 | 12,121 | -185 | 539 | -276 |

*Source*: ERS analysis of data from Bureau of Economic Analyses, U.S. Department of Commerce (Reeder, 1990).

rural counties (McGranahan, Hession, Hines, & Jordan, 1986). Income also varies by region; it is consistently lowest in the south, where the largest concentration of rural Americans lives (see Table 2).

To a large extent, rural-urban income gaps reflect the fact that rural Americans tend to work in low-paying industries that require few skills (Nilsen, 1979). To some extent, however, these gaps may reflect cost-of-living differences and, hence, they may result in a bias exaggerating the high incomes of some urban areas, such as San Francisco, Boston, and New York.

Whether or not nationwide urban-rural cost-of-living differences exist remains an open question since there are no data to make interlocal cost-of-living comparisons. The consumer price indices prepared for individual metropolitan areas are designed to measure inflation over time for individual places; they are not meant to be used for interlocal comparisons. Recent survey research suggests, however, that urban-rural cost differences, if they exist at all, may be quite small. For example, one study in Wisconsin found only a 6-percent urban-rural difference in amounts households claimed was necessary to make ends meet (Ghelfi, 1987). This suggests that, with the exception of a few very high-cost urban areas, most of the income gap between urban and rural areas represents a real difference in economic well-being.

As was the case with unemployment rates, the meaning of income varies depending on the form it takes. If measured at a point in time, income reflects long-term as well as short-term economic well-being. In less diverse local economies, income is more likely to reflect short-term fluctuations in a single industry, making it an unstable and poor approximation for long-term economic conditions in these places.

Recent changes in income reflect mainly short-term economic developments. (For a good description of recent changes in metro and nonmetro incomes for each of the states, see Redman & Rowley, 1991). In theory, one advantage of using income change rather than unemployment change is that income reflects current conditions more than unemployment, which generally lags the business cycle by a few months. In practice, federally provided data on state and local incomes are not made public until after a one- to two-year delay. Thus a theoretical strength becomes a statistical weakness.

Earnings, which exclude unearned income such as dividends, interest, rent, and transfer payments, are sometimes used as an alternative to income. Although less inclusive, and hence not as good a measure of residents' overall economic well-being, earnings may be more appropriate for measuring the well-being of area businesses and workers. Because earnings exclude unearned income, earnings may be more appealing than income as an indicator of the economic motivation for student achievement in local schools. Like other income variables, however, earnings indicators involve some cost-of-living bias affecting urban-rural comparisons.

The change-in-earnings over time (adjusted for inflation) may be preferable to the change-in-employment measure in some situations because it is a money-based measure that encompasses both quantity and quality of employment. A recent analysis of change in earnings from 1987 to 1988 showed that

real earnings per job declined in nonmetro areas, this decline occurring mainly in the Midwest and West; real earnings increased in metro areas during this period (Ghelfi, 1991).

A breakdown of 1987-88 earnings change by nonmetro industry indicated that farm earnings declined the most, -6.1 percent (Ghelfi, 1991). Next in terms of decline in real earnings per job were transportation/public utilities services (-2.7 percent) and construction (-2.2 percent). Interestingly, mining and energy industries, which were under considerable economic distress at this time, experienced only minor declines in earnings (-.9 percent). Most services enjoyed moderate increases in real earnings during this period. These industry differences point to the importance of considering local economic structure as part of a policy impact code. This topic is explored in more detail in the following section.

*Economic Structure Indicators*

The industrial makeup of the local economy can vary considerably, depending on which industries are prominent and how diverse the local economy is. Heavy dependence on any one industry can have important policy implications for a local economy. For example, during the 1970s, the rapid growth of mining and energy industries caused many rural policymakers to search for policies that would help "cope with growth." The subsequent farm and energy industry difficulties of the 1980s led to concerns that local government services were not being maintained in farm and energy dependent areas.

Such concerns led ERS to develop its county typologies, basing them mostly on economic structure. Among ERS's categories are farming, manufacturing, mining, and government counties (Bender et al., 1985). These and other such indicators are based on Bureau of Economic Analysis (BEA) data, which include income and employment by industry. ERS used BEA income data because income was thought to be more stable than employment (Ross & Green, 1985). Both income and employment, however, tend to fluctuate from year to year. Hence, ERS was careful in selecting 1979, a peak year of a business cycle, for identifying county types. In the case of farming counties, more than one year's data were considered to avoid problems of unusual fluctuations.

These same indicators could be used for identifying ways that local school systems can enable their students to take advantage of the unique opportunities available in local industries. For example, schools in manufacturing-dependent areas might set up apprenticeship programs with local industry that would be different from apprenticeship programs in school districts in government-dependent areas.

A similar approach could be used to identify the extent to which the local economic structure places demands on (and encourages) local schools. For example, Eldon Smith and Alan DeYoung at the University of Kentucky note that large, modernized companies that employ many educated managerial, administrative, professional, and technical personnel tend to be supportive of a high quality school system ("Job providers," 1992). Such support may take the form of political support for school budgets or a direct demand for high quality school graduates. Although no one has done this yet, one could construct an indicator of a county's dependence on such modernized industries, based on county business patterns data on the number of local establishments within specific industrial and size classifications, to indicate the presence of strong private sector support for local schools.

In recent years, economic diversification has been emphasized as a goal of rural development policy. Policies have been designed to encourage the growth of services and other industries to reduce local reliance on any particular industry. This would have the beneficial effect of mitigating the adverse economic fluctuations which go with that industry. To help identify places that need such policies, several measures of diversification have been developed (Killian & Hady, 1988). Those interested in providing incentives for students in local schools might be particularly interested in diversification indicators because a diversified economy, though it may not provide more jobs or higher paying jobs, provides a wider range of job alternatives for students.

The BEA data upon which these and other economic structure indicators are based have two limitations. First, BEA county-level data are subject to confidentiality restrictions, which makes it difficult to get data on total employment or income for specific industries for most rural counties; such data are unavailable even for broad industry categories for many rural counties. Second, available data come with a one-to two-year lag. The economic censuses may be able to provide more information on economic structure, but these data are available only once every five years (Bureau of the Census, 1980).

## Social Indicators

Social indicators are descriptive statistics reflecting current conditions and trends in society. They generally focus on hardcore, intransigent problems, such as

Table 3
*Poverty Rate (Percentage) by Type of Area and Industry (1967-87)*

| Area/Industry | 1967 | 1972 | 1977 | 1982 | 1987 |
|---|---|---|---|---|---|
| Area | | | | | |
| Metro Total | 10.9 | 10.3 | 10.4 | 13.7 | 12.5 |
| Central Cities | 15.0 | 14.7 | 15.4 | 19.9 | 18.6 |
| Nonmetro Total | 20.2 | 15.3 | 13.9 | 17.8 | 16.9 |
| Industry | | | | | |
| Farm | 25.9 | 14.9 | 17.1 | 22.1 | 12.6 |
| Nonfarm | 13.5 | 11.7 | 11.3 | 14.8 | 13.5 |

*Source*: Current Population Survey, Bureau of the Census, U.S. Department of Commerce (Reeder, 1990).

poverty, crime, illiteracy, and inadequate health and housing. Many of the challenges facing school systems today arise from such social characteristics of the community. For example, schools in places with large concentrations of foreign immigrants must overcome substantial language barriers and cultural differences. Schools in high crime areas face added security costs and related problems. In poverty areas, the lack of effective parental input sometimes forces teachers to function more as parents than as educators.

Federal policies designed to overcome these problems, such as recent proposals for increased funding for Head Start, operate under the principle that ingrained social problems must be addressed directly if school reforms are to have a chance to succeed. Social indicators can help identify the nature and extent of these problems, thereby guiding policymakers in finding the best solutions to these problems. Particularly relevant to this issue are poverty and education indicators. Selected for discussion are several of the most prominent of these indicators.

*Poverty Indicators*

The poverty rate is one of the most commonly accepted indicators of social or community need. It is a good measure of overall social stress, believed to be closely associated with crime, drugs, infant mortality, and illiteracy problems. Poverty is used in many federal aid programs, including education aid, to target aid to distressed people or places. In recent years, poverty rates have increased nationwide, and this increase has been particularly noticeable for families with children. Thus, poverty has become a more significant problem for education.

Poverty rates vary for different types of metro and nonmetro areas. Central cities of large metro areas usually have high poverty rates, while their suburbs and small- and medium-sized metro areas have relatively low poverty rates. Nonmetro areas have consistently had higher rates than metro areas in general. Since the early 1970s, however, nonmetro poverty rates have been below those of metro central cities, though they remain almost twice as high as those of suburban and small- and medium-sized metro areas.

Among nonmetro areas, farming areas have traditionally had the highest poverty rates, but with much of the farm population leaving agriculture to take on nonfarm occupations or moving out of nonmetro areas entirely, there has been a long-term decline in farm poverty rates. By 1987, the farm poverty rate had dropped below the nonfarm poverty rate. Farm poverty rates continue to be quite volatile, though, as indicated by the steep rise in the late 1970s and early 1980s, and the subsequent decline by 1987 (see Table 3).

The poverty rate is measured as the percentage of individuals or families whose incomes fall below the census-defined poverty level. As such, the poverty rate can identify the presence of relatively large concentrations of poor people. One limitation of the poverty rate is that it measures only the incidence, not the severity, of poverty. Another limitation is that rural county-level data are available only once every ten years from the decennial census. Like the unemployment rate, the poverty rate changes from year to year,

particularly in times of economic boom or bust (Hoppe, 1991). Although annual fluctuations might not always reflect statistically significant changes in poverty, significant fluctuations will occur during the ten-year period that could be detected were there more than one data point every ten years. The lack of timely data is a particular drawback in states or localities that experience dramatic local economic change or rapid migration of individuals to or from the area.

Because of the fluctuating nature of poverty, and the availability of county-level data only once every ten years, ERS did not use poverty rates in its policy impact code for "persistent poverty" counties. Instead, ERS identified these counties using annual data on per capita income. Specifically, those counties that fell into the bottom quintile of all U.S. counties in 1950, 1959, 1969, and 1979 were determined to be "persistent poverty" or "persistent low income" counties (Bender et al., 1985).

The most relevant poverty indicator for rural schools is probably the poverty rate of families with children. A recent empirical analysis by Rogers (1991) showed that child poverty is independently related to such factors as number of siblings, number of parents in household, homeowner or renter, number of earners, parents' age, and metro/nonmetro residence. However, the most important determinant of child poverty was education of parents, the topic of the next section.

*Education Indicators*

Education plays an important role in the cycle of poverty, in which poorly educated individuals have problems getting jobs, making it difficult for them to move into well-funded school districts and provide nurturing home environments for their children. In turn, this makes it difficult for their children to perform well in school, so the cycle continues into the next generation. Consistent with this hypothesized cycle is the high correlation (-.67) between a county's percentage of adults with high school degrees and the county's poverty rate (Reeder, 1989).

Recognition of the role that inadequate adult education plays in perpetuating poverty and dampening student educational achievement can lead to education policies aimed at improving adult education levels and adult literacy. Adult education indicators, such as the percentage of adults with high school or college degrees, can be used to identify which places need such programs. In theory, another measure that could be used would be the rate of literacy among the adult population. Unfortunately, there are no uniform data available on this.

One problem with using these indicators is that some places may score relatively low on adult education levels without having the high poverty rates that aggravate the education process. This may be particularly true for rural places that suffer from extensive outmigration of college-educated individuals, such as occurred in the rural west and northeast in recent years (see Table 4). Although the loss of well-educated adults may present some problems for schools, especially if these adults have children, it arguably does not have the same effect on a school system as an increase in the number of hard-to-teach poverty children. (That is, it affects the top, not the bottom, tail of the distribution.)

In addition, overall adult education levels may also appear lower in such places due to the retention of the elderly, who often have lower-than-average education levels. This can be misleading, since the elderly are not normally parents, hence their presence should not have much effect on student achievement. For such places, the economic development policies discussed earlier may be more appropriate than adult education as a means of improving education levels. In places where rapid inmigration of middle- and upper-income retirees is occurring, the retirees may actually have much better educations than the local residents, distorting the statistic in the other direction. A key to the use of these education indicators, therefore, is to interpret them carefully in the context of other measures, such as poverty rates and migration data.

Another problem is that census data on educational attainment levels of adults in local areas are only available every ten years. Data on migration rates are also available with a lag, though the lag is only a couple years. Without timely data on these indicators, there is a danger of missing important changes in conditions that ought to be addressed by contemporaneous changes in policies.

*Other Social Indicators*

Among the other relevant social indicators are the crime rate, housing characteristics, and population density. While they may be useful in some contexts, policymakers should be aware that these indicators are often used incorrectly when comparing urban and rural areas.

The crime rate, for example, is based on reported crimes and ignores unreported crimes. This may lead

Table 4
*Education Indicators, 1980 and 1986*

| Area | 1980 | | |
|---|---|---|---|
| | Adult average years of education | Age 16-21, high school dropout rate (percentage) | Adult percentage college educated[a] |
| Metro | 11.6 | 15.0 | 12.8 |
| Nonmetro | 10.9 | 16.9 | 9.2 |

| | Nonmetro adult education levels (percentage), 1986 | | | 1985-86 |
|---|---|---|---|---|
| | Some college | High school graduate, but not college | Not high school graduate | Migration of college graduates to metro areas (percentage) |
| Northeast | 30.4 | 45.7 | 23.9 | 6.9 |
| Midwest | 25.8 | 48.4 | 26.0 | 1.6 |
| South | 22.6 | 37.7 | 39.7 | .6 |
| West | 37.5 | 39.8 | 22.7 | 4.5 |

[a]Four or more years of college.
*Source*: ERS computations based on data from the Bureau of the Census, U.S. Department of Commerce (Reeder, 1990).

to an urban bias (overstatement) in crime rate data, since recent research suggests that some crimes are more likely to go unreported in rural areas than in urban areas ("Study Discounts Race," 1988).

Age of housing is sometimes used to reflect urban decay and slum living conditions, particularly in the larger cities in the northeast. Housing in the sunbelt tends to be newer than in the northeast, and rural housing tends to be less old than urban housing. The most recent data available indicate that in 1980, 56 percent of urban housing was over 20 years old, while only 48 percent of rural housing was this old (Kampe & Roman, 1988). Despite the older housing in urban areas, substandard housing is more common in rural areas (Lerman, 1986). Thus, while age of housing may do a good job in explaining variations in housing conditions in a region, such as the northeast, it appears to be a poor predictor of housing conditions overall.

In research on urban distress, high population density is commonly used as an indicator of various congestion problems. Rural areas do not ordinarily have such congestion problems, or if they do, they cannot usually be measured by population density.

For example, congestion sometimes occurs in mountainous rural areas where people must crowd together in narrow valley areas. While the population density of the settlement area may be high, the population density of the county as a whole tends to be small. There are also substantial seasonal variations in population density in many of these areas. Hence, county population density fails to measure the degree of congestion difficulty.

Rural areas are more apt to suffer from the other side of the equation, low population density, which leads to a whole different set of problems, ranging from isolation to diseconomies of scale in the provision of public services (to be discussed in more detail in the following section). Because it means something different in urban and rural areas, no simple linear relationship should be assumed to exist between population density and community distress.

## Fiscal Indicators

Fiscal indicators are often used to determine the amount of federal or state fiscal assistance that is needed by local schools. Interest in school fiscal

indicators has increased in recent years as the courts have taken a more active role in forcing states to provide a more equitable distribution of aid to local schools.

Fiscal indicators come in various forms, including fiscal need, fiscal capacity, and fiscal effort (or gap) measures. Federal education programs tend to be concerned primarily with fiscal need measures, such as population and poverty; state aid programs usually involve all three measures (need, capacity, and effort).

*Fiscal Need Indicators*

Fiscal need indicates how much it costs for schools to deal with their problems. For example, in places with special needs for such activities as vocational training programs and parental education programs, schools will need more than the average amount of money to maintain a quality school system. Other factors associated with costs, such as the high cost of busing students long distances, also are expected to be reflected in fiscal need indicators.

Fiscal need indicators are often based on economic or social indicators thought to be related to expenditure needs. Socioeconomic indicators have the advantage of being intuitively appealing for programs that provide assistance for a particular purpose or service. Thus, the unemployment rate might be used as a fiscal need indicator to target assistance to schools with a particularly great need to provide vocational training or economic development activity programs. The poverty rate might be used as an indicator of the need for Head Start, parental education, and counseling programs.

The simplest approach to costing out fiscal need is to assume that costs are proportional to population and to the extent of socioeconomic need identified. Thus, for two communities with the same level of socioeconomic need, if one has twice the student population of the other, then it should have twice the fiscal need. A major problem with this approach is that unit (e.g., pupil) costs of producing and delivering many public services, including school programs, vary with population size and density.

The per-pupil cost of providing and delivering education to places with small and/or scattered populations is high in many rural areas (Fox, 1980). Because of the diseconomies associated with teaching small student populations, the cost of some programs, such as advanced science and math classes, may be prohibitive in lightly populated areas. In many rural places, these costs are so high that local schools are not financially feasible, and students must be bused elsewhere. Busing itself is a costly activity, raising the costs of education for these students and the schools they are bused to. Thus, population size may be viewed as a biased indicator of fiscal need since it understates the fiscal needs of the more rural areas.

Some might argue that the relatively low teacher salaries in rural schools may offset the high fixed overhead cost rural schools face. But much of the difference between urban and rural teacher salaries probably reflects non-cost considerations, such as the hiring of better-qualified teachers in urban areas than in rural areas. Additional salary differences may be attributable to urban politics, in which teachers often play a major role. To the extent that these non-cost considerations determine urban-rural differences in teacher salaries, then it is unwise to include teacher salaries when considering fiscal need.

Population size might also understate the fiscal needs of some densely populated central cities, where land and labor costs are high, as are the costs of maintaining older school buildings. In addition, both metro and nonmetro places that function as service centers—where nonresident commuters come to work and nonresident shoppers or tourists come to buy goods or obtain services—have fiscal needs associated with these nonresidents that are understated by their resident populations. Conversely, population size overstates the fiscal needs of suburban and rural places that are adjacent to, and are served by, these metro and nonmetro centers.

Another population-based indicator of fiscal need is population growth or decline. Rapid population growth can create problems if schools are already at their maximum capacity and expensive temporary teachers and facilities are required. Consequently, some school aid programs incorporate a population growth factor into the allocation formula (Munley, 1990). This should help some rural areas in particular, since rural school districts are more likely than urban areas to experience a rapid rate of population growth, due to their small base level population.

Population decline, a common problem for rural areas in the 1980s, represents a more serious long-term problem for rural schools, since population decline means fewer taxpayers to bear the burden of school property taxes and other local taxes. Also, due to diseconomies associated with low population size and density, highly rural areas may face prohibitive costs in maintaining schools as population declines. Large urban areas do not always face the same problems when population declines. The larger urban or suburban areas have cost-cutting options that are

unavailable to rural areas, such as closing down some of the local schools and having students go to other nearby schools. Some of the older central cities might actually benefit from declining school populations if this allows them to close down older buildings that are more expensive to maintain. Hence, population decline seems to imply a larger fiscal need for rural schools than for urban schools. Because of these urban/rural differences, policymakers should exercise caution when interpreting population-based measures of need. Some of the more sophisticated, regression-based measures of fiscal need that estimate the impact of various socioeconomic factors upon per capita (or per student) government expenditures may also contain similar urban/rural biases.

Another problem with population-based measures of fiscal need is the time lag in the availability of local population data. Population can change rapidly in rural areas in a short period. In extreme cases, such as oil and mining areas, their populations can double in only a few months. The Bureau of the Census provides annual population estimates at the county level, but with a one- to two-year time lag. This may result in a serious lag between the time when the local government needs assistance and when additional federal or state aid arrives. Although individual States may have more timely data on their K-12 student populations, nationwide data sources on student populations are not so timely.

*Fiscal Capacity Indicators*

Most schools are financed primarily by the local property tax. Thus, the most common measure of school fiscal capacity is assessed local property value. State school aid formulas are typically designed to equalize disparities in local property tax capacity.

Data on local property values have several limitations worth noting. First, the federal government does not provide uniform nationwide data on local property values (actual market values). Census only provides such data for metropolitan areas and other large counties (over 100,000 population). Census does provide *assessed* value data for all counties as part of its once-every-five-years Census of Governments. The most recent such data are for 1986. These data are not uniform and are difficult to interpret, though, because states use different assessment ratios (ratios of market value to assessed value), and they exclude different types of property from taxable property.

Second, even if uniform property value data were available for all counties, schools rely on more than just property taxes to finance education. Some employ local sales taxes, user charges and fees, donations from the private sector, and other sources of revenue, not to mention federal and state aid, which account for over half of all education funds. Thus, a more comprehensive measure of local school fiscal capacity is needed to make meaningful local comparisons. The Representative Tax System (RTS) measure was devised by the Advisory Commission on Intergovernmental Relation (ACIR) to provide this kind of uniform, comprehensive fiscal capacity estimate for each of the fifty states. (The RTS measure includes both state and local government fiscal capacity.) With a few exceptions, however, such estimates are not available for local governments. Although ACIR has produced fiscal capacity estimates for metropolitan areas, only in a few states have similar estimates been made for all counties within a state.

One way to get around these difficulties is to use per capita income as a proxy measure for local fiscal capacity. Implicit in this approach is the assumption that all property taxes and other taxes or user charges must be paid out of income. Thus, places with more income will have greater ability to pay taxes than places with less income.

There are several drawbacks which limit, but by no means rule out, the use of per capita income as a measure of fiscal capacity. The first concerns cost of living. To the extent that rural areas have lower costs of living than urban areas, per capita income will overstate the fiscal capacity of urban areas relative to rural areas. However, as previously noted, this may be only a small problem because urban/rural cost-of-living differences may be quite small.

The second drawback involves tax shifting (tax exporting). Tax shifting occurs when jurisdictions impose taxes that are paid, either directly or indirectly, by residents of other jurisdictions. The ability to shift taxes to nonresidents enhances a jurisdiction's fiscal capacity. Jurisdictions that can shift a large proportion of their taxes to nonresidents may have substantial fiscal capacity, even though their residents may have only average incomes. Per capita income tends to understate the fiscal capacity of these tax-exporting jurisdictions.

Rural places that benefit the most from tax exporting include energy and mining areas that receive royalties and property tax revenue out of proportion to local income levels. Tourist or retail centers export a large share of their taxes to nonresidents. In some recreational areas, substantial property taxes are raised from nonresident-owners' vacation homes.

Some urban areas—central cities that are service centers—also benefit substantially by shifting taxes to rural and suburban residents who work or shop in urban centers. This form of exporting either takes the form of direct taxes paid by nonresidents (sales taxes, gas taxes, commuter taxes) or indirectly (in the form of property taxes passed on to rural residents through higher retail prices to shoppers or through lower wages to workers). Tax exporting through the sales tax is an issue particularly in states that enable local governments to use sales taxes to finance education (Jansen, 1991).

Whether the additional fiscal capacity possessed by these rural and urban tax-exporting areas offsets their additional fiscal needs (discussed earlier) is difficult to say. Clearly, however, tax exporting tends to create a bias in the standard measures of capacity and need, and it also biases fiscal effort measures.

*Fiscal Effort or Gap Indicators*

Fiscal effort and gap indicators try to take into account both need and capacity. Fiscal effort is particularly important for schools in light of some recent school aid reforms that require local districts to exert a certain degree of effort in order to receive additional state aid.

Fiscal effort is usually defined as the percentage of local fiscal capacity that is actually used to raise revenues. It may be interpreted as a relative measure of tax burden: taxes relative to tax capacity. The effort indicators used in aid formulas tend to be effective tax rates, such as the property tax rate (property taxes divided by assessed property value), or total local taxes divided by income. The latter, sometimes referred to as simple tax effort, was used in the federal general revenue sharing program.

More sophisticated measures have been proposed, including some that would use RTS fiscal capacity as the denominator of the effort ratio. While this has the advantage of compensating for distortions such as those associated with tax exporting, RTS estimates are not generally available at a local level, leaving the simple tax effort the most likely indicator to be used for most purposes.

Since the demise of the general revenue sharing program, data on total local taxes and other revenues from local sources are only available once every five years from the Census of Governments. Despite this timeliness problem, tax effort data can still be fairly useful when making interlocal comparisons since interlocal differences in effort are not expected to change rapidly over time.

Tax efforts are not so easy to interpret, in part because either a high or a low effort may signify problems. Places with relatively high tax efforts are usually viewed as being vulnerable to fiscal instability associated with tax base erosion and/or "tax revolt." Places with very low efforts may suffer from inadequate public services due to minimal local commitment to government. A moderate effort may be the best situation to be in.

Many rural areas have relatively large fiscal efforts, as illustrated in Table 5, which shows simple tax effort and revenue effort. Tax effort includes only taxes, while revenue effort includes all locally raised revenues except those associated with retirement systems, utilities, and other special district funding. The places with the highest fiscal efforts are the totally rural areas, especially those that are nonadjacent to metropolitan areas (referred to in Table 5 as "independent"). These places had higher efforts than core metro counties despite their restricted range of public services. This apparent paradox may be explained by the high unit costs of providing the most basic and essential public services, such as public education, in totally rural areas. However, it may also be partly due to more tax exporting in independent totally rural areas or higher costs associated with the services provided to nonresident tourists or shoppers in some independent nonmetro service centers.

Adjacent (dependent) nonmetro areas tend to have lower efforts than nonadjacent (independent) areas, probably due to their greater level of tax importing from neighboring metro areas and lower level of services that they themselves provide to their own residents. In other words, adjacent counties obtain services from and pay taxes to metro areas, but these are not reflected in their own local governments' tax efforts. Table 5 therefore reflects, in part, the bias in favor of nonadjacent areas and metropolitan central cities that results from the use of a biased measure of fiscal capacity (income) as the denominator of the effort measure (Reeder, 1990).

Two additional problems, affecting both the simple and the more sophisticated effort indicators, are expected to create a bias favoring urban areas in programs allocating aid in proportion to effort. One problem is that fiscal effort ignores other forms of effort that the communities make to provide public services, volunteer effort in particular. Rural areas are noted for their use of volunteer firemen, for example. Since these people are paid little or nothing for their services, use of a fiscal effort measure understates the community's efforts in the provision of these public services, perhaps leading to a bias against rural areas.

Table 5
*Fiscal Effort and Capacity Measures, by Areas, 1982*

| Type of Area | Fiscal Effort | | Fiscal Capacity[c] |
|---|---|---|---|
| | Tax effort[a] | Own General Revenue Effort[b] | |
| Independent | | | |
| Metro | | | |
| Large Core | 4.3 | 6.9 | 12,174 |
| Medium | 3.2 | 5.4 | 9,794 |
| Small | 3.1 | 5.6 | 9,675 |
| Nonmetro | | | |
| Urbanized | 3.3 | 6.5 | 9,279 |
| Less urbanized | 3.7 | 6.8 | 8,723 |
| Totally rural | 4.8 | 7.5 | 8,619 |
| Dependent | | | |
| Metro large fringe | 3.7 | 5.7 | 11,283 |
| Nonmetro | | | |
| Urbanized | 3.3 | 5.8 | 9,411 |
| Less urbanized | 3.3 | 5.9 | 8,586 |
| Totally rural | 3.9 | 5.9 | 8,148 |

[a]Local taxes as a percentage of resident personal income.
[b]Local own source general revenues as a percentage of resident personal income.
[c]Resident personal income per capita.
*Sources*: ERS computations based on data from Bureau of the Census and Bureau of Economic Analysis, U.S. Department of Commerce (Reeder, 1990).

The other problem concerns the extremely low incomes (capacities) that characterize many rural areas, particularly in the south. People with low incomes must spend most of their money on essentials. Low-income rural communities cannot be expected to spend the same percentage of their incomes on public services as do high-income rural communities (Reeder, 1985). The revenue effort of persistent low income counties was only 4.5 percent of income in 1982, only two-thirds the average for other types of rural areas (Reeder, 1989). In many of these places, local fiscal capacity may be insufficient to provide even the most basic of public services. Any program that rewards communities that exert substantial fiscal efforts to finance education or other public services runs the risk of leaving out these low-income communities. This problem is present in power equalizing school aid programs, which take the form of matching grants that have the effect of rewarding school districts that make greater fiscal efforts.

In theory, this last problem may be avoided by using fiscal gap indicators that measure the gap between fiscal capacity and fiscal need. There are other variations of the gap measure. For example, one could look at the gap between fiscal capacity and actual revenues raised, or one could look at the gap between actual revenues and fiscal needs. The gap between need and capacity, though, is most important when it comes to deciding how much aid is needed to enable a community to meet its needs.

In practice, many states use a "foundation" program approach that provides school aid designed to fill the gap between minimum expenditure needs (a function of student population and other need variables) and a minimal local revenue effort. As noted previously, effort is not the same as capacity, hence this is not the same as basing aid on the gap between fiscal need and fiscal capacity. Moreover, state aid amounts are not generally based on empirically estimated fiscal need and capacity. Rather, they adjust aid for both

fiscal need and effort, but not in a systematic way that would approximate the actual gap between needs and capacity. To do this would require that the gap be estimated from empirical regression models covering local school revenues and expenditures within the state. Such models have been developed for state and local government spending in general, but they tend to have an urban- or state-level focus, and therefore may be inaccurate or biased when applied to rural areas.

## Conclusion

I have discussed strengths and weaknesses of economic, social, and fiscal indicators that might be used in a federal policy-impact code for assessing the conditions facing rural schools. This discussion is summarized in Appendix 1. A major concern of this analysis is whether the indicators suffer from any obvious bias with respect to urban or rural areas; another concern is for the timeliness of the data.

Most of the indicators are available on the local level with a minimum of a one- to two-year lag. This may be sufficient for some purposes, but for others it may be a significant drawback. Only the BLS employment data are capable of identifying places experiencing current economic difficulty. The most severe timeliness problems involve social indicators such as poverty rates, which are only available at a local level once every ten years. Federal education programs that are targeted using the local poverty rate are especially vulnerable to problems associated with data lags.

Many of the indicators display an obvious urban bias, understating the severity of problems facing some types of rural areas. The unemployment rate is a good example of this kind of bias. Although it is the most timely of the indicators and well-suited for detecting economic trends, it clearly understates the economic needs of rural areas, especially in highly rural areas with significant underemployment. Monetary measures of economic well-being, such as per capita income or earnings, should be used to augment unemployment rates in order to gauge the quality of the jobs available to students entering the labor force. Although monetary measures may understate the difficulties of some high cost-of-living urban areas, they probably involve only a slight rural bias elsewhere.

Social indicators used to assess the family and community support for education are also susceptible to this problem. Some of the most prominent social indicators, including crime rate, age of housing, and population density, clearly understate the extent of problems in rural areas compared with urban areas.

Some biases do not involve rural/urban distinctions, per se. For example, one of the most important social indicators related to the education process is the percentage of adults who have completed high school or college. This indicator, intended to measure parental support for education, can be misleading in places where a large proportion of adults are not parents. This is likely to be the case for many rural areas that have experienced extensive outmigration of the young or inmigration of the elderly. This therefore can overstate or understate a rural area's parental support, depending on the migration pattern.

Fiscal need measures, such as resident population, do not take into account the additional fiscal needs associated with nonresident demands. This can result in understated fiscal needs in urban central cities and in nonmetro service centers and tourist areas. Conversely, most fiscal capacity and effort indicators are flawed in that they do not recognize unusual sources of revenues (e.g., sales taxes, user charges), revenues raised from tax exporting that central cites and nonmetro service centers and tourist areas have. As a consequence, these measures tend to understate the fiscal capacities and overstate the fiscal efforts of these places relative to other urban and rural places. In addition, these measures appear to significantly overstate the fiscal capacities and understate the fiscal efforts of low-income communities.

The problems encountered in using these indicators need not rule out their use in a federal policy-impact code. The strengths of some of these measures may outweigh their weaknesses, depending on how they are used. Some potentially misleading indicators are widely accepted and will be used regardless of their limitations. Researchers therefore should exercise caution in interpreting results from these indicators, taking care that the conclusions they derive from policy impact codes are not unduly biased or dated.

Using more than one indicator can be helpful in offsetting the biases inherent in individual indicators and can improve one's understanding of what is going on. For example, use of a monetary indicator, such as earnings per job, together with the unemployment rate provides a fairly balanced picture of the quality and availability of jobs facing students. Other examples of indicators that make the most sense when used together are income, tax effort, and adjacency to metro area; percentage of adults completing high school and net migration rates of the young and old; and population density and population size.

Recognition of the limitations of these indicators might lead to the use of alternative indicators in some cases. State policymakers should be aware that some

superior, less biased indicators are available to state policymakers for identifying local problems. Similarly, federal policymakers have better measures for making inter-state distinctions than for making inter-local distinctions. Policymakers should make the most of these alternative measures where possible.

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*Appendix 1*
Strengths and Weaknesses of Selected Indicators

| Type of Indicator | Strengths | Weaknesses |
|---|---|---|
| ***Economic*** | | |
| unemployment rate | timely monthly data | urban bias;[a] ambiguous about duration and source of problem; seasonal |
| percentage change in employment | timely monthly data | seasonal |
| change in unemployment rate | timely monthly data | seasonal |
| per capita income | good indicator of overall economic well-being | slight rural bias; 1-2 year lag |
| real change in per capita income | good indicator of overall economic well-being | 1-2 year lag |
| earnings per worker | good indicator of quality of jobs available | slight rural bias; 1-2 year lag |
| real change in earnings per worker | good indicator of change in job quality | 1-2 year lag |
| ERS typologies | identifies major specialization | does not measure intensity of specialization; 2-10 year lag |
| indicators of industrial diversification/complexity | indicates where good variety education-based jobs exist | data confidentiality problems limit usefulness; 1-2 year lag |
| ***Social*** | | |
| poverty rate | good overall measure of social problems | available once every 10 years |
| child poverty rate | focus on parents of school children | available once every 10 years |
| ERS persistent low-income-county designation | more stable indicator of long-term problems | ignores places that recently entered high-poverty status |
| percentage of adults with high school degree | a key component of the poverty/education cycle | available once every 10 years; misleading where high rates of migration or elderly are present |
| percentage of adults with college degree | a key component of the poverty/education cycle | available once every 10 years; misleading where high rates of migration or elderly are present |
| crime rate | believed to cause problems in schools | urban bias: understates crime in rural areas because more crimes go unreported there |

*Appendix 1* (continued)

| Type of Indicator | Strengths | Weaknesses[a] |
|---|---|---|
| ***Social** (cont.)* | | |
| age of housing | related to urban decay and structural problems | urban-northeast bias; does not take into account problems of old schools that are more prevalent in rural, sunbelt areas |
| population density | good proxy for problems of central cities | urban and suburban bias; ignores diseconomies of scale in low-density areas |
| ***Fiscal*** | | |
| population | widely used and generally accepted | bias against places with high and low population density; bias against service and tourist centers; 1-2 year lag |
| percentage population growth | identifies a problem that particularly affects rural schools | 1-2 year lag |
| percentage population decline | identifies a problem that particularly affects rural schools | adjustment may be easier in urban areas; 1-2 year lag |
| assessed property value per capita | measures wealth capacity | not uniform across states; available every 5 years |
| resident income per capita | best indicator available at a national level for measuring local capacity | biased in favor of central cities, as well as rural service and tourist centers and other tax exporting places; biased against low income places; 1-2 year lag |
| simple tax or revenue effort | more comprehensive than property tax effort | same bias as above; ignores volunteer effort; available every 5 years |

*Note.* Indicators based on data available only at the state or local level were excluded from this analysis because of the inability to obtain uniform data for local areas in all states. However, such indicators should be considered when making policies at the state or local level.

[a]"Bias" refers to the potential for an indicator to overstate (unintentionally) an area's difficulties in providing an economic, social, or fiscal environment conducive to education. Thus, the phrase "urban bias" means the indicator potentially overstates these problems in urban (or metro) areas compared with rural (or nonmetro) areas.

Unless seasonally adjusted, quarterly and monthly data have a "seasonal" weakness because comparisons over time or among places with different seasonal attributes can be misleading.

1-2 year lags are weaknesses because they make it difficult to assess current conditions; longer time lags or data available only once every 5 or 10 years make it difficult to assess even long-term conditions.