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ABSTRACT

There are several ways to construct an education price index (EPI). This report represents an attempt to identify methods and procedures for producing an accurate measure of educational resource input price indices. The methods are largely mathematical equations that link student achievement to the unique social, political, and economic costs of education in a particular school district. When applied to data from school districts in Ohio and Michigan, the resulting EPI behaves reasonably because its variation is not excessive. Most districts fall in the range of 97 to 103 percent of the state average. The EPI is also stable in the sense that it is insensitive to minor changes in the methods of its derivation. It is recommended that future research concentrate on the development of theory and on its application to a more accurate specification of the variables in the structural equations. (JAM)

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EDUCATION PRICE INDICES

for the Public Schools

Bruce Loatman

A Report to
The National Institute of Education
Under Contract NIE-400-77-0022

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Contents

Preface

Many individuals contributed to the work reported here, and because it is impossible in the text of a report to register each contribution, the author wishes to state his appreciation here.

Foremost among these is Harvey E. Brazer of the University of Michigan. Professor Brazer's review of earlier drafts of this report included a number of suggestions that were adopted and a number that, sadly, could not be adopted only because the pressures of time and budget made it impossible. The work has benefited from his reviews; but it should be made clear that the methodology used and any views expressed are by no means necessarily in accord with those he might espouse.

The empirical portion of the study would not have been possible without the kind cooperation and ready assistance of officials in the two states studied. For providing data and locating sources of data in Ohio, warm thanks are due to: William Harrison, the Staff Director of the Education Review Committee of the Ohio General Assembly; Fred Walter, William Phillis, and Daniel Brown of the Ohio Department of Education; James Moore of the Ohio Department of Tax Equalization; and Richard Hindman of the Ohio Education Association. James Phelps and Thomas Nicol of the Michigan Department of Education and James Belknap of the Michigan Education Association were instrumental in providing data for that state.

Finally, the author wishes to recognize and state appreciation for the helpful suggestions and continuing guidance of David Mandel and James Fox of the National Institute of Education, and for the substantial assistance in the work of Richard Rosthal of Killalea Associates, Incorporated.

1. Introduction

Society has long been concerned with equity in the distribution of resources among public elementary and secondary school districts. This concern has recently increased in the area of inequity deriving from variations in prices of inputs to the educational process. It is felt that in order to insure an equitable distribution of resources such price variations must be compensated for in the distribution of education revenues. This requires measures of input price levels in each school district relative to others.

This report represents an attempt to identify methods and procedures for producing an accurate measure of these prices. This might appear simple at first: why not just observe prices actually paid by school districts for teachers, supplies, other staff, etc.? There are two basic problems with this naive approach. First, the quality of inputs, especially teachers, varies among districts. Thus, one cannot in practice obtain prices paid for equivalent inputs. The second problem is independent of the first, and thus, would remain even if the first could be resolved. It is that the prices paid for inputs are determined simultaneously with the quantities and qualities purchased. This means for example, that the salary that must be paid for a teacher of fixed quality will depend on the overall quality and quantity of teachers employed in the district, because teachers prefer smaller classes and, presumably, highly qualified colleagues. Another way of stating this problem is that the prices a district must pay depend to some extent on the quantities it wishes to purchase, and vice versa.

The solution of the first problem is not at hand since, in particular, there is no generally accepted measure of teacher quality. Accordingly, work in this area has concentrated on the second problem. This has often been referred to as the problem of separating supply and demand; that is, of specifying how observed prices are derived from the interaction of prices that must be paid to obtain the inputs on the free market (supply prices) with prices the district is willing to pay to obtain the inputs it wants (demand prices). Equity dictates that the amount of educational inputs provided by the state should not increase or decrease as supply prices decrease or increase, respectively.

A number of studies in recent years have addressed this problem. Most closely related to the present work are the studies by Brazer and Anderson (1977), and by Kenny, Denslow, and Goffman (1977), and earlier work by the present author. All of these attempted to estimate supply prices. Kenny, et al, estimated only the supply price of teachers. Brazer and Anderson explicitly recognized the interrelationship between the demand and supply prices for teachers. They also estimated a supply price for non-instructional current expenditures.

This author (1977-1) also investigated supply and demand prices for teachers, and supply prices for several other school district inputs. Preliminary work on the present study included separation of the price of teachers into three components: starting salary, education premium, and experience premium.

These studies constituted essential preliminary steps towards developing accurate measures of educational prices and price indices (EPIs). They adapted theory from other applications and only partially recognized the interrelationships among the various educational input prices and quantities. The present study attempts to advance this situation to the next level of development. Additional future work will be needed to further advance this situation.

There are two facets to the present development. First, a rudimentary theoretical basis is developed for understanding educational input price behavior. This is presented in Chapter 2 below. Second, guidance from this theoretical development is utilized in formulating a structural model of educational price determination that more adequately takes account of the interrelationships among these prices and between prices and school district choices. In economic terms, the endogeneity of a number of variables is recognized, and they are treated accordingly; that is, a system of simultaneous equations is developed and its parameters estimated with a simultaneous equations technique (specifically, two-stage least squares). This development is presented in Chapter 3. It is emphasized that it is guided but not dictated by the theoretical basis. Much more theoretical development is necessary before the structural form can be specified without resort to some "educated judgments" (often referred to as "ad hoc judgments").

The principal components of this model are as follows. Prices and quantities of teachers, of their quality, education level and experience, and of instructional materials and other current expenses are estimated simultaneously with one another and with district tax effort. Separate supply and demand price equations are specified for the teacher components, but not for other current expenses, since separate measures of price and quantity were not available there. No direct measure of teacher quality was available, but it is argued that average teacher education level in a district is a surrogate for quality; therefore that variable serves a dual purpose in the system. The results support this use of average education level as a surrogate for average quality.

The model is applied to data from two states -- Ohio and Michigan -- and education price indices are derived for each district. It is emphasized that the measure derived here is a price index and not a cost index; this distinction was generally not emphasized in previous work. A cost index reflects variations both in prices paid and quantities purchased; thus in two districts that must pay equal prices for an input, one may have a higher cost index if the state desires it to purchase more of that input, due, for example to special pupil needs. It is shown (in Chapter 3) that, in principle, the index derived here reflects variations only in prices, although such variations may be influenced indirectly (due to simultaneity) by variations in quantities that the state considers appropriate. The derived EPIs are presented and evaluated in Chapter 4.

A complete understanding of what follows requires some mathematical sophistication on the part of the reader, including facility with multivariate statistical analytic theory and technique.

2. Theoretical Considerations

There are several ways in which one might set about constructing an education price index. Ideally, one would simply observe the prices paid in each school district for each of a set of precisely defined components that together constitute the typical education market basket. These component prices would then be combined, in proportion to their relative importance, to yield a single index number for each district.

Unfortunately, this approach is infeasible, for two reasons. First, there are no presently acceptable precise definitions of the components of the education market basket. In particular, there is no agreement on what constitutes a typical teacher, or even on how to compare two teachers; there is no precise, accepted measure of teacher quality. The second problem is that, even if some standard components could be defined, their prices could not be observed in every district. This results from the large variation in quality (however it be measured) of teachers and of other components from one district to another. Thus, some districts would have no teachers of the "standard" quality. (It is assumed that components of different quality command different prices, otherwise variation in quality would present no problem).

It may be possible to circumvent these impediments to a direct measurement of prices by constructing a behavioral model of school district expenditures. By this is meant, roughly, a theoretical framework within which one can view observed expenditure levels in conjunction with other measurable characteristics of school districts, in such a way as to recognize relationships between such characteristics and expenditures. In particular, such a framework is intended to explicate the interplay between school district desire for and ability to pay for educational services on the one hand, and the market for such services, on the other. A price index is meant to measure the price level dictated to a district by the market. Since, as indicated above, one can directly observe only the joint effect of these factors, the market must be indirectly observed through this theoretical framework. To the extent that this can be accomplished, a price index can be constructed.

The construction of such a framework is not simple, however. It requires fairly detailed and accurate knowledge of the relationships between school district characteristics and market prices, between district characteristics and expenditures, and between market prices and district expenditures. In what follows, a general framework for understanding these relationships is presented, followed by some more specific examples of this general model designed to approximate the actual situation encountered in the typical school district. It is not claimed that any of these examples of the model accurately represent reality, but evidence is given to suggest that they are probably not far off, at least for the general purposes for which they are intended. Furthermore, a number of plausible alternative formulations of the model are shown to produce either very similar results, or incorrect results (meaning they are not plausible any longer).

These special cases of the general model are actually still quite general in themselves in that, whereas their forms are specified, their parameters are not. Therefore, they do not produce a price index. The reason for investigating them is that they give insight into the proper formulation of a still more specific model designed to directly portray school district expenditure behavior. That development is presented in the next chapter. We proceed now with the general model. This presentation is necessarily technical. Some readers may wish to skim over the mathematics, but they should not overlook the substance of this chapter, since it is important for an understanding of later sections.

General Model

The approach is similar to that used in numerous studies on analogous topics. The problem is viewed as one of constrained optimization. The object of interest is the school district. The district board of education or equivalent is the decision maker. It is assumed to desire to maximize educational output (however that may be measured) subject to the voters' dislike for high taxes and to the constraint represented by the relationship between level of services, taxes, and the market it faces (i.e., prices). Educational output, in turn, is determined by the education production function. In its most general form, the problem may be stated as follows.

$$\begin{aligned} &\text{Maximize} && U = u(Q,Y,T) \\ &\text{subject to:} && Q = f(S,Y,E) \\ & && T = h(S,M,A,Y) \qquad (1) \\ & && M = g(S,Y,E,) \\ & && A = a(T,Y,M,E) \end{aligned}$$

where:
- Q is educational production level,
- Y is a vector of district background characteristics,
- T is the tax rate,
- S is a vector of educational inputs provided,
- E is pupil enrollment in the district,
- M is the vector of market prices for educational inputs, S, and
- A is aid received from external sources.

In this form, u(Q,Y,T) represents the utility to the median voter in the school district of a particular mix (Q,T) of educational production and tax rate, given the background characteristics, Y, of the district. Generally, the voter will prefer more of Q and less T, the particular degree of preference depending on Y. For example, citizens of a district with a higher adult education level will probably prefer more Q and be willing to raise T to achieve this increase in Q.

Educational output, Q, depends on the production function f. This function operates on the level of educational inputs, S, provided; on district background characteristics, Y (e.g., students' genetic endowments, family environments, and neighborhood environment; and on the scale of operation, as represented by E, pupil enrollment. The last factor is included to allow for any efficiency or inefficiency arising from scale of operation, and not already accounted for in the components of S.

The tax rate depends on inputs provided, market prices, external aid, and district wealth, W (a component of Y). While wealth, W, is often taken to be equalized property value (EPV), we do not wish to impose that constraint here since the desire is to formulate a general model that can provide guidance on the implications of alternate assumptions. The function h may be specified, even in the general model. Thus:

$$T = \frac{S \cdot M - A}{W} \qquad (2)$$

Market prices, M, depend on S through the normal feedback mechanisms. For example, as the demand for S increases, M may well increase. It is possible, of course, that the district does not have a significant impact on the market, i.e., that M is independent of S. That possibility is not ruled out by including S as an argument of g (it may have a coefficient of zero). The inclusion of S makes the model more general, since it is quite possible that M does react to S.

M will depend on Y because teachers, in particular, have different salary requirements for districts with different characteristics. For example, they will very likely accept a lower salary in a district with an intelligent, middle-class student body, other things being equal. Finally, M may depend on E if there are economies or diseconomies of scale of operation.

External aid (state and federal) will, in general, depend on T (explicitly in the case of power equalization, for example); on Y (e.g., homestead exemption for retired people); on M (if a cost index is implemented); and on E (e.g., transportation aid is often greater per pupil in smaller districts).

The system (1) may be rewritten more simply as:

$$\begin{aligned} &\text{Maximize} \quad u(f(S,Y,E),Y,T) \\ &\text{subject to:} \quad T - h(S,g(S,Y,E),\ a(T,Y,g(S,Y,E)),Y) = 0 \qquad (3) \end{aligned}$$

In this form, it is clear that there are four variables, S, T, Y, and E, in this system with one constraint. At this point it is appropriate to investigate whether each of these variables is free (i.e., which are subject to district control). In the most general case, all are. However, the use to which this system is to be put may dictate that some of these variables be constrained. Thus, we now turn briefly to a closer examination of our intended use of this model.

A More Specific Model

It is assumed that a state is considering the use of an ed cation price index, and perhaps other reforms as well. The question at hand is: who controls the variables S, T, Y, and E, the state or the school district? Legally, the state can control any of them. In practice, however, it exerts little direct control over any of them, in a manner relevant to the construction of a price index. Specifically, while the state typically exerts substantial influence over school district activity through the setting of minimum standards for inputs and curriculum content, such influence is not relevant in the present context. This follows since our goal is to estimate variations in educational input prices, which in turn depend on variations in school district expenditure behavior. When a state sets minimum standards, all districts must meet these; this does not cause variation among districts, but uniformity. Therefore, it is assumed for the present purpose that the state exerts no direct control over variation in S; the district controls this variable.

A similar argument applies to the tax rate, T. While the state may mandate certain minimum taxes, the effect is constant from the district's viewpoint. The more relevant influence the state has over S and T is indirect; it generally takes the form of incentives built into the state aid formula.

In the case of Y and E, states do occasionally consolidate school districts (changing E) or encourage population movement through subsidies and tax incentives (changing Y). But these are erratic and are relevant only in long-term considerations. In a stable, short-term situation, such as is being considered here, these can be ignored.

Thus, at this point, we begin to specialize the model to be more appropriate to the problem at hand (an index for current use, to be updated periodically). The first step is to assume that the state relinquishes any relevant direct control over S, T, Y, and E.

Similarly, we must decide who controls the functional forms of u, f, h, g, and a. As noted above, h is determined (by definition of T) even in the most general model. It should be clear that the state has no direct control over f or g (the production function and the market). On the other hand, the state has very substantial control over a. In fact, if we ignore federal aid (which may be assumed to be largely for categorical programs, and thus not directly relevant to the "standard" market basket) then the state has complete control over a. We will take this view in the remainder of the present chapter.

This leaves only u, the utility function. Who maximizes utility? The state education department or legislature might be viewed as having a utility function which it could maximize by choosing the appropriate form of a, and by forcing districts to adopt the appropriate values of S, T, Y, and E. But we have already argued that the state does not, for present purposes, control these variables. Given this, the state cannot unilaterally maximize its utility. The best it can do is to manipulate the function a, while school districts simultaneously manipulate S, T, and perhaps also Y and E, each side meanwhile trying to maximize its utility (in the case of the district, the utility of the median voter is assumed to be operative here). To analyze such a system would require a complicated game-theoretic approach which is beyond the scope of this study. Furthermore it is doubtful that such a struggle takes place in reality. States have historically delegated much of their constitutional authority over education to localities. Considering that one recent finance "reform" is power-equalization, it is questionable whether states are taking back the reins.[1] Therefore, we will assume that the state allows each school district to maximize its own utility (subject to the given tax constraint, of course). Thus, in the present model, the state's only influence over variations in district expenditure behavior is through the functional form of a.

It follows that all remaining freedom in the system is had by the school district; i.e., any variable or functional form not constrained by external forces (such as the market g or technology f) is controlled by the school district. In particular, the district controls S and T. In the long run, it may also influence Y and E, for example, by annexing neighboring school districts. In the near term, however, the district probably takes Y and E as given, and restricts its attention to S and T. We shall adopt the view, therefore, that Y and E are fixed for any particular district; say $Y = Y_o$ and $E = E_o$. Thus, the problem is further simplified and can be restated as:

$$\text{Maximize} \quad u(f(S),T)$$
$$\text{subject to:} \quad T - h(S,g(S), a(T,g(S))) = 0 \qquad (4)$$

The major difficulty with this formulation is that it requires knowledge of the production function f. Such knowledge requires information about the output of the production function, as well as about the nature of the operation of that function on educational inputs. Such knowledge is not now available, however. While some observers, including many parents and school board members, would take standardized test scores as the measure of output, others challenge this approach, claiming that standardized tests, among other defects, are culturally biased. There is even less agreement about the nature of the production function. There is a way around this difficulty, however, although it necessarily decreases the accuracy of the model. This is to assume that, for lack of better knowledge of the education production function and its relation to educational output, the school district focuses on that argument of the production function which it can measure and control, namely, S. Therefore, f(S) will be replaced by S in the utility function. Thus the problem is now:

$$\text{Maximize} \quad u(S,T)$$
$$\text{subject to:} \quad T - h(S,g(S), a(T,g(S))) = 0 \qquad (5)$$

The solution to this system is obtained by use of the standard technique of Lagrange multipliers. To do this, let us set

$$q = T - h(S,g(S),\ a(T,g(S))). \qquad (6)$$

Note that q is a function of S,T,M (= g(S)) and A (= a(T,G(S))).

Now we wish to maximize

$$u(S,T) - \lambda q \qquad (7)$$

The solution is obtained by solving

$$\begin{aligned} \frac{\partial u}{\partial S} - \lambda \frac{\partial q}{\partial S} &= 0 \\ \frac{\partial u}{\partial T} - \lambda \frac{\partial q}{\partial T} &= 0 \\ q &= 0 \end{aligned} \qquad (8)$$

This may be expanded to

$$\begin{aligned} \frac{\partial u}{\partial S} - \lambda \left(\frac{\partial q(S,T,M,A)}{\partial S} + \frac{\partial q}{\partial M}\frac{\partial M}{\partial S} + \frac{\partial q}{\partial A}\frac{\partial A}{\partial M}\frac{\partial M}{\partial S}\right) &= 0 \\ \frac{\partial u}{\partial T} - \lambda \left(\frac{\partial q(T,S,M,A)}{\partial T} + \frac{\partial q}{\partial A}\frac{\partial A}{\partial T}\right) &= 0 \\ q &= 0 \end{aligned} \qquad (9)$$

But, from (2), we know that

$$q = T - \frac{1}{W}(SM - A). \qquad (10)$$

Therefore, the system may be written in the form

$$\begin{aligned} \frac{\partial u}{\partial S} + \frac{\lambda}{W}\left(M + S\frac{\partial M}{\partial S} - \frac{\partial A}{\partial M}\frac{\partial M}{\partial S}\right) &= 0 \\ \frac{\partial u}{\partial T} - \frac{\lambda}{W}\left(W + \frac{\partial A}{\partial T}\right) &= 0 \\ T &= \frac{1}{W}(SM - A) \end{aligned} \qquad (11)$$

Examples

The solution of this system requires knowledge of u, g, and a. We turn now to several specific versions of this model, based on various assumptions about u, g, and a. In each case, we assume that a takes one of four alternative forms: full power equalization either with or without an integrated EPI, or a basic aid plan, either with or without an integrated EPI.

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The corresponding formulas for aid are:

$$A_1 = MB_o + (MW_o - W)T$$

$$A_2 = B_o + (W_o - W)T$$

$$A_3 = MB_o$$

$$A_4 = B_o$$

where B_o is the constant basic aid and W_o is the guaranteed wealth base. Note that A_1 and A_2 include recapture for districts whose wealth is above the guaranteed base. If recapture is not desired, then A_1 and A_2 effectively become A_3 and A_4, respectively, for such districts. In fact, most forms of a can be obtained from appropriate combinations of these formulas, i.e., aid formulas which at first appear different are usually equivalent to assigning one of A_1 through A_4 to some districts and another to the remaining districts in a state.

It should be noted that A_1 is the only aid formula that results in true power equalization; that is, it is the only aid formula that results in school services S being independent of prices and district wealth, and being determined by district preferences for education as reflected in its tax rate. To prove this statement, first note that true power equalization requires that

$$S = B_o + W_oT \qquad (13)$$

and that the following algebraic identity holds:

$$S = \frac{A + WT}{M} \qquad (14)$$

Solving (13) and (14) for A yields the formula for A_1. This shows that no other formula for state aid is truly power equalizing (including any not listed here).

Formulas A_2 and A_4 are often used by states. A_2 results in school services that are independent of district wealth, but depend on prices ($S = (B_o - W_oT)/M$ for A2). A_4 results in services that depend on both W and M ($S = B_o/M + WT/M$ for A_4). A_3 results in services where the basic aid level is independent of prices but the discretionary portion of S depends on both W and M ($S = B_o - WT/M$ for A_3).

In each case presented below, one of two assumptions about M will be made. Either M does not depend on S $\left(\frac{\partial M}{\partial S} = 0\right)$ or it does. We shall denote the first case by M_1 and the second by M_2. In the latter case, we assume that M_2 decreases as S increases, up to some point (which may be outside the observable range), and then M_2 increases. In other words, we assume that unit prices decrease as the quantity of S demanded increases, for smaller values of S, and that unit prices then increase as the quantity of S demanded becomes larger. This is illustrated in

Figure 1. The precise shape of the curve is not important for our

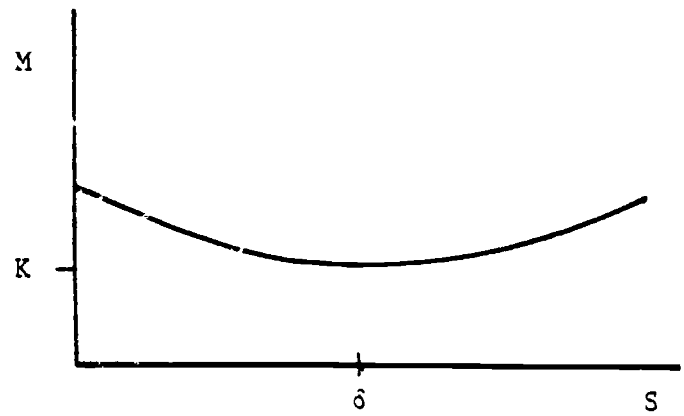

Figure 1. Supply Curve for S.

purposes. For computational convenience, the equation for M_2 will be taken to be

$$M_2 = K + \xi(S - \delta)^2 \qquad (15)$$

where $K > 0$ and $\xi, \delta \geq 0$.

This does not severely constrain g. A large variety of assumptions about g can be accommodated within the relevant range of values of S by appropriate assignments of the values of the parameters K, ξ, and δ; it is only necessary to assume that g is not concave downward (e.g., a horizontal g or a monotone increasing g can be approximated by assigning a very small value to ξ or to δ, respectively).

It is somewhat more difficult to determine an appropriate form for u. According to the assumptions stated above, utility, U, is a function of S and T. It is clear that a district would prefer a lower tax rate, other things being equal. Furthermore, a district's desire to avoid raising the tax rate is probably greater when the existing rate is already high. This means that U will decrease nonlinearly with T. Therefore, we will assume that U is proportional to $-T^2$. The quadratic form is chosen for computational convenience and does not seriously restrict the form of u, so long as the stated assumptions are accepted.

For a given tax rate, a school district would prefer more educational output. It was necessary, however, to replace output, Q, by input, S, in the utility function. Now it is not entirely clear whether a district would always prefer more inputs. The utility of S may be unbounded, may approach some limit asymptotically, or may even decrease beyond some point. At the very least, the utility of more S is less when S is already large.

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Given these considerations, three forms for U will be examined:

$$U_1 = P \log S - DT^2$$

$$U_2 = C - \frac{P}{S} - DT^2$$

$$U_3 = P \log S - S - DT^2 \ . \qquad (16)$$

P is a measure of the individual district's preference for education and D is a measure of its dislike for taxes (C is not essential since only ordinal properties of U are important: it is included only for aesthetic purposes, since some readers may feel uncomfortable with a utility function that is always negative). All three functions have the desirable property that, if T is roughly proportional to S, then U will increase as S increases up to some point, and then will decrease as the disutility of T outweighs the utility of S. This is illustrated in Figure 2. The asymptotic properties of the three functions are quite different, however, and this may be important in the relevant range of values of S and T. U_1 assumes that there is no limit to the utility of more S if T does not need to be raised (i.e., if prices approach zero). U_2 assumes that, for a given T, more S is desired, but its utility approaches a limit $(C - DT^2)$. U_3 assumes that even if S were free, its utility would reach a peak and then decline (i.e., too much S may actually impede educational production).

We now have four choices for A, two for M, and three for U. This gives 24 different cases for the model specified in (5). These will be numbered as indicated in Table I. For each case, we wish to solve (5) for S and T. It is hoped that the solutions will provide some insight into the dependence of S and T on market prices, district wealth, and district preferences for education. Such insights may be useful in formulating the structural model to be discussed in the next chapter, and for other purposes as well.

Table I. Alternative Forms of (5) to Be Considered

		Aid Formula					
		A_1	A_2	A_3	A_4		
Utility Function	U_1	1	2	3	4	M_1	Market Prices
		5	6	7	8	M_2	
	U_2	9	10	11	12	M_1	
		13	14	15	16	M_2	
	U_3	17	18	19	20	M_1	
		21	22	23	24	M_2	

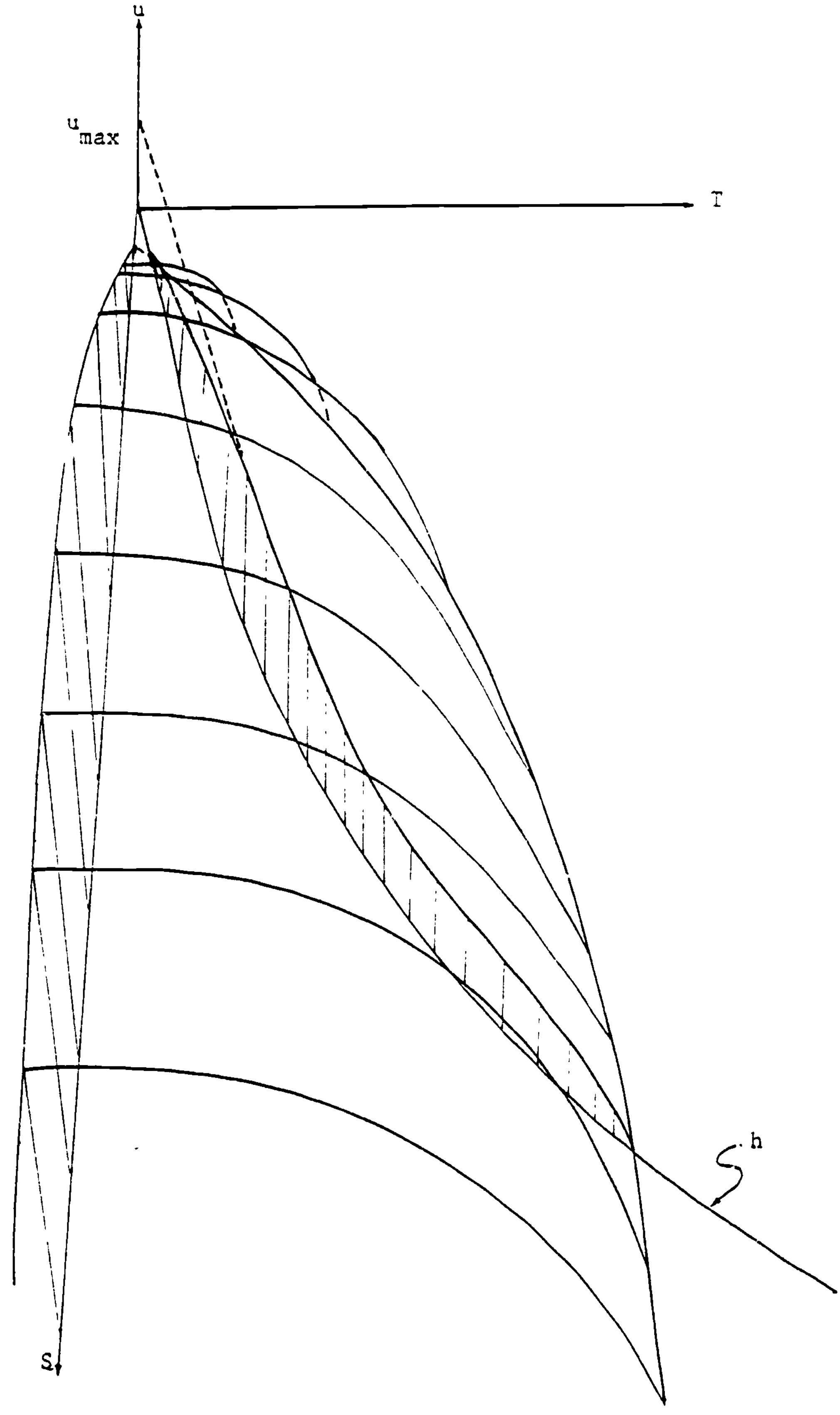

Figure 2. Constrained Maximization of Utility Function

The solutions for S and T are found by solving the system (11). This system can be simplified in many cases, however. For aid formula A_1, (11) becomes

$$\frac{\partial u}{\partial S} + \frac{\lambda}{W}\left(M + S\frac{\partial M}{\partial S} - (B_o + W_oT)\frac{\partial M}{\partial S}\right) = 0$$

$$\frac{\partial u}{\partial T} - \frac{\lambda}{W}(W + MW_o - W) = 0$$

$$T = \frac{1}{W}(SM - A)$$

This is easily simplified, noting (13), to

$$\frac{\partial u}{\partial T} = -W_o\frac{\partial u}{\partial S} \qquad T = \frac{S - B_o}{W_o} \tag{17a}$$

Similarly, (11) is simplified for A_2, A_3, and A_4, respectively, to

$$\left(M + S\frac{\partial M}{\partial S}\right)\frac{\partial u}{\partial T} = -W_o\frac{\partial u}{\partial S} \qquad T = \frac{SM - B_o}{W_o} \tag{17b}$$

$$\left(M + (S - B_o)\frac{\partial M}{\partial S}\right)\frac{\partial u}{\partial T} = -W\frac{\partial u}{\partial S} \qquad T = \frac{M(S - B_o)}{W} \tag{17c}$$

$$\left(M + S\frac{\partial M}{\partial S}\right)\frac{\partial u}{\partial T} = -W\frac{\partial u}{\partial S} \qquad T = \frac{SM - B_o}{W} \tag{17d}$$

Formulas (17b), (17c), and (17d) can be further simplified in those cases where M_1 is used, since $\frac{\partial M_1}{\partial S} = 0$. Thus, for A_2, A_3 and A_4 we must solve

$$M\frac{\partial u}{\partial T} = -W_o\frac{\partial u}{\partial S} \tag{18b}$$

$$M\frac{\partial u}{\partial T} = -W\frac{\partial u}{\partial S} \tag{18c}$$

$$M\frac{\partial u}{\partial T} = -W\frac{\partial u}{\partial S} \tag{18d}$$

respectively, together with the corresponding equation for T from (17). (Note that while (18c) and (18d) are identical, the corresponding equations for T are different, so the solutions to the two systems will, in general, be different).

Solution (17a) does not change regardless of the form of M, since M is entirely absent from the system. Therefore, cases 1 and 5 result in identical solutions for S and T; the same is true of cases 9 and 13 and of cases 17 and 21.

We may now proceed to examine each case listed in Table I. For some of these, the solutions for S and T can be obtained explicitly; for others a high-order polynomial is involved, for which there is no general method of solution. In the latter case, we can still obtain the information desired from the implicit equation; i.e., we can determine whether S and T depend on district wealth or preferences or on the market prices. The detailed calculations are omitted for most cases. Results for all cases are summarized in Table II.

The solution of each case is obtained by solving the appropriate system in (17) or (18). For example, S and T for case 1 are obtained by solving (18a) with U_1 as the utility function, as follows.

$$2\ DT = W_o \frac{P}{S}$$

$$2\ DS \frac{(S - B_o)}{W_o} = W_o\ P$$

$$S^2 - B_o\ S - \frac{P}{2D} W_o^2 = 0$$

$$S = \frac{B_o}{2} + \sqrt{\left(\frac{B_o}{2}\right)^2 + \frac{P}{2D} W_o^2} \qquad (19)$$

(The negative root is infeasible.)

$$T = \frac{S - B_o}{W_o}$$

$$T = \frac{-B_o}{2W_o} + \sqrt{\left(\frac{B_o}{2W_o}\right)^2 + \frac{P}{2D}} \qquad (20)$$

In this case S and T depend only on the relative preference of a district for education over taxes and on the components of state aid. School services and tax rate are "immune" from both market prices and district wealth. Furthermore, the result does not depend on the choice of utility function, but only on the form of the aid function (W and M are absent from (18a) unless they appear in the utility function, which seems ur :asonable, however). None of the other three aid formulas has this property, regardless of which utility function is used (see Table II).

<u>Table II. Determinants of S and T</u>

Aid Formula

Utility Function	A_1	A_2	A_3	A_4	Market Price Formula
U_1	1. S and T depend on $\frac{P}{D}$, B_o, W_o	2. S : $\frac{P}{D}$, $\frac{B_o}{M}$, $\frac{W_o}{M}$ T : $\frac{P}{D}$, $\frac{B_o}{W_o}$	3. $\frac{P}{D}$, B_o, $\frac{W}{M}$	4. S : $\frac{P}{D}$, $\frac{B_o}{M}$, $\frac{W}{M}$ T : $\frac{P}{D}$, $\frac{B_o}{W}$	M_1
		6. $\frac{P}{D}$, B_o, W_o, M	7. $\frac{P}{D}$, B_o, W, M	8. $\frac{P}{D}$, B_o, W, M	M_2
U_2	9. S and T depend on $\frac{P}{D}$, B_o, W_o	10. $\frac{P}{D}$, $\frac{B_o}{M}$, $\frac{W_o}{M}$	11. $\frac{P}{D}$, B_o, $\frac{W}{M}$	12. $\frac{P}{D}$, $\frac{B_o}{M}$, $\frac{W}{M}$	M_1
		14. $\frac{P}{D}$, B_o, W_o, M	15. $\frac{P}{D}$, B_o, W, M	16. $\frac{P}{D}$, B_o, W, M	M_2
U_3	17. S and T depend on P, D, B_o, W_o	18. P, D, $\frac{B_o}{M}$, $\frac{W_o}{M}$	19. P, D, B_o, $\frac{W}{M}$	20. P, D, $\frac{B_o}{M}$, $\frac{W}{M}$	M_1
		22. P, D, B_o, W_o, M	23. P, D, B_o, W, M	24. P, D, B_o, W, M	M_2

If a state selects A_2 (which is often the case) then S and T will, in general, depend on M (except for the anomalous case 2, which will be discussed below). This means that A_2 cannot accomplish what it is supposed to: make S depend only on state aid and district preferences. Formula A_4 is also often used by many states (it also applies to some districts in states that appear to use A_2; e.g., Ohio and Michigan have a guaranteed yield on tax rates up to a certain limit; thus, districts with a higher rate are effectively subject to aid formula A_4). It is clear from Table II that A_4 has the additional disadvantage (assuming equality of ability to provide educational services is the goal) of subjecting S and T to the influence of district wealth, as well as market prices. A_3 is somewhat of a compromise in which all districts receive the same basic level of services (B_0), but the additional discretionary services are subject to district wealth and to market prices. (In practice, it is unlikely that a state considering a price index would not have already progressed beyond A_4, thus A_3 is unlikely to be used.)

In cases 2 and 4 note that T does not depend on M. This means that a district with U_1 as its utility function would always purchase proportionally more of S if prices fell by some amount (i.e., twice as much S if M is halved, etc.) and less if prices rose. This does not seem reasonable since, if a district already has an adequate level of S then the marginal value of S will be decreasing; therefore a lowering of prices would result in some increase in S coupled with a decrease in T. This suggests that U_1 is not an appropriate form for the utility function.

No such problems arise with U_2 and U_3. Moreover, the results in Table II indicate that the choice of U_2 or U_3 will not affect the outcome significantly. A careful examination of a few cases shows U_2 and U_3 to have reasonable properties. For example, in case 12 school services S will increase without bound as M decreases toward zero and will decrease toward zero as M becomes very large. In that same case, T bears a reasonable relationship to wealth and aid, as indicated in Figure 3. Note that as state aid B_0 increases, the tax rate decreases, as one would expect. Also, note that these results can be applied to cases 9 and 10 by replacing W by W_0. This then suggests that if a state with power equalization increases the guaranteed wealth base W_0 from a low level, tax rates will tend to rise throughout the state; but if W_0 is sufficiently large then any further increase in it will result in a statewide lowering of tax rates.

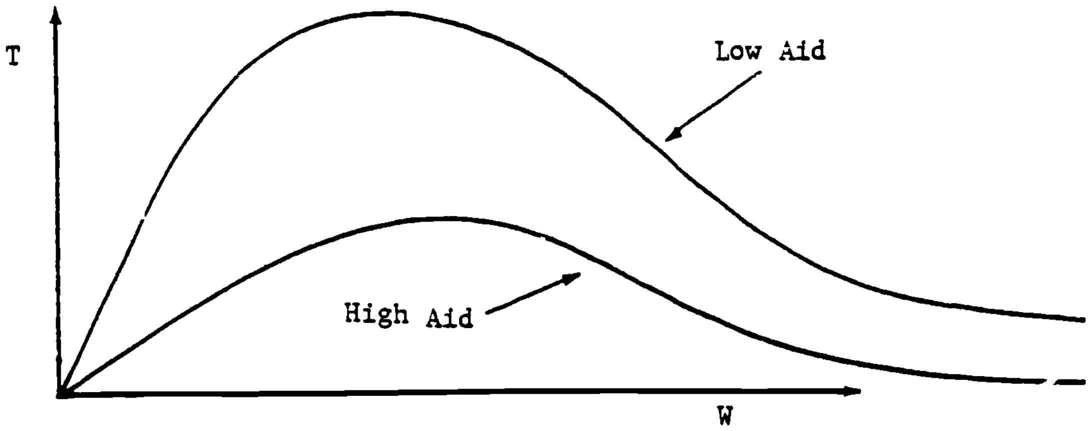

Figure 3. T as a Function of W and A for Case 12

Similarly, in case 19, S and T bear reasonable relationships to M, A, and W. In this case, the equations for S and T are

$$S = \frac{B_o}{2} - \frac{W^2}{4DM^2} + \sqrt{\left(\frac{B_o}{2} - \frac{W^2}{4DM^2}\right)^2 + \frac{PW^2}{2DM^2}} \qquad (21)$$

$$T = \frac{B_oM}{2W} - \frac{W}{4DM} + \sqrt{\left(\frac{B_oM}{2W} - \frac{W}{4DM}\right)^2 + \frac{P}{2D}} \qquad (22)$$

The relationships of S and T to M and A ($= B_o$) are illustrated in Figure 4. Note that S is finite when $M = 0$ (i.e., if services were free, the district would want only a certain amount, P).

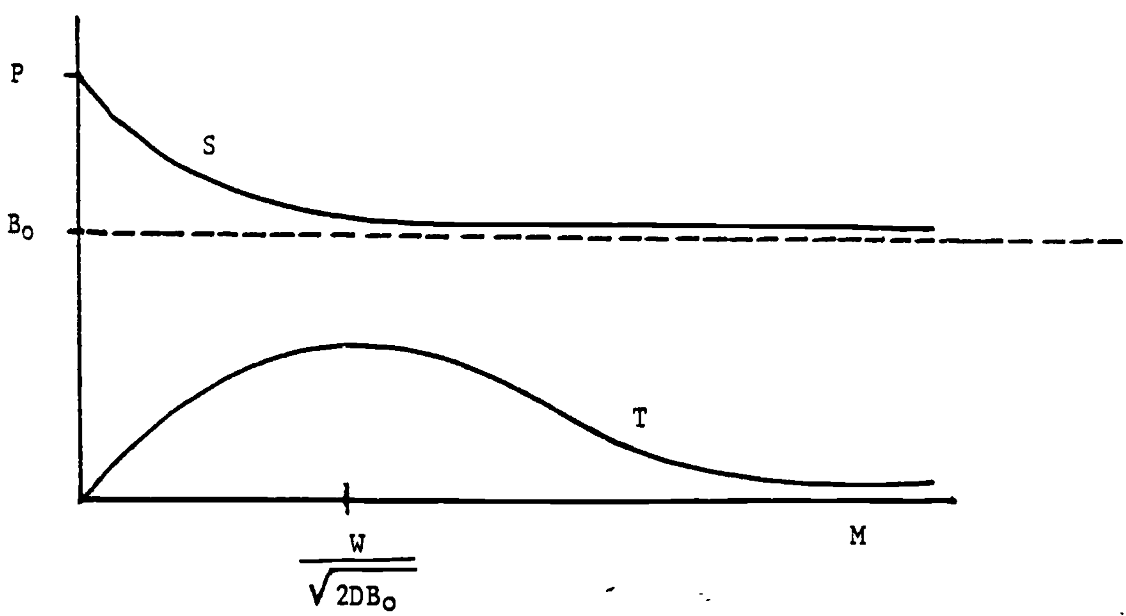

Figure 4. S and T as Functions of M and B_o for Case 19

The purpose of the foregoing discussion is to illustrate some outcomes of the models considered. If one accepts these predictions of the models as reasonably approximating reality, then these models gain credence.

The Measurement of Fiscal Capacity and "Wealth Neutrality"

Up to this point we have taken the measure of wealth or fiscal capacity, W, as given. The assumption has been that W is a reasonable measure of the true ability of a district to financially support education. The particular measure chosen is important since one of the chief goals of current school finance reform efforts is to reduce or eliminate the link between local wealth and school services offered. Ultimately, the state decides on the measure of wealth to be used. Once this measure is selected, one task of any aid formula is to make school services S independent of this measure.

The fact that the state has the legal authority to select the measure of fiscal capacity to be used in its aid formula does not constrain the school finance analyst to use that measure. There are two reasons for this. First, the measure selected by the state has often not been acceptable to the public or to the courts, and has been subject to change. Second, and more important in the present context, the measure selected by the state may not correspond closely to individual school districts' views about their capacity to support education. In that case the measure would not serve well as an aid in understanding school district behavior. Therefore, the measure would not be the most appropriate one in any model of school district expenditure behavior.

For these reasons, the definition of fiscal capacity used by the state will not necessarily be used in the model to be specified below, although that definition will be taken into account later when the effects of implementing a cost index are considered. The measure to be used in modeling district behavior should accurately reflect a district's ability to support the education of its pupils. Although property wealth is often the basis on which school taxes are determined, the actual tax payments draw on the income of the community. In fact, much of the variation in local school revenues among districts with equal property wealth is explained by variation in income. Another factor to be taken into account in determining fiscal capacity to support schools is the size and needs of the population supported by the available wealth and income, as well as the number of pupils to be educated. Therefore, the capacity measure should take account of both property wealth and income and these should be adjusted according to the fiscal burdens of the district; i.e., number of pupils, dependent population, and related factors. The details of the measure to be used in the analysis are given later.

It has been stated that, independent of the measure of capacity used, one goal of the aid formula is to eliminate the dependence of S on W. This has been taken to mean that two districts that are alike in all respects except fiscal capacity should have the same level of educational services. Or, in other words, two districts with the same preferences for education should be able to obtain the same services with no difference in their tax burdens. Stated mathematically, this means that equation (13) should hold.

It is important to recognize that definitions of "wealth neutrality" are in use that differ from the concept presented here. For example, one definition that has been proposed is that there should be "no observed relationship between revenues per pupil and wealth per pupil."[2] In this context, revenues per pupil are to be considered a surrogate for S; presumably, revenues were used because no measure of S was available. The acceptance of this criterion would require that equation (13) be systematically violated (assuming local choice is allowed to influence S). Specifically, it would require that W appear explicitly in the equation for S (i.e., in the equation that would replace (13) as the criterion for wealth neutrality), and that $\frac{\partial S}{\partial W}$ be greater than or less than zero in this equation, according to whether W is positively or negatively correlated with P.[3]

Assuming that a positive correlation exists, if one wants to observe no relationship between wealth and school services, then wealthier districts must be made to bear a greater relative tax burden (i.e., a higher tax rate) in order to achieve the same level of services as a less wealthy district with the same preferences, in order to offset the tendency of wealthier districts to prefer more education for their children, other things being equal.

This would appear to be a form of "reverse discrimination" since wealthier districts would not have the same capacity to support education as would districts less wealthy, but equivalent in other ways (including preferences). If the observed levels of S were equal it would only be because the wealthier districts had stronger preferences for education and thus were willing to bear the extra relative burden.

The reader should not mistake this for an argument against progressive taxation. Indeed, equation (13), which has been taken here as the criterion for wealth neutrality, was shown to lead directly to aid formula A_1. Under A_1 a district with twice the fiscal capacity of another would have to pay twice as many dollars to obtain equal services, S.

The alternate definition of wealth neutrality referred to above is inappropriate because it limits local choice over the level of educational services in a discriminatory way; it discriminates on the basis of wealth. Nevertheless, some may choose to ignore this defect, since this definition may appear to serve some current political goal. It is difficult to determine what that goal might be. Certainly, it is not to more quickly break the link between wealth and educational services, for, without explicit knowledge of school district utility functions, one can only approximate the form of A that would achieve this alternative form of neutrality. In fact, in practice, such neutrality could efficiently be achieved by first implementing A_1, then observing the correlation between S and W, adjusting A_1 accordingly, and proceeding iteratively in this manner.

Assuming the correct aid formula for achieving such neutrality were known, one must ask what would be the long-term effects of its implementation. The answer is that it would penalize, and therefore diminish, any preference for education that was linked to wealth. Thus, for example, if low-wealth racial or ethnic groups were convinced of the value of education as a means of upward mobility and therefore placed greater value on it, they would find that, as soon as their preferences were observed, the State aid formula would reverse their situation so as to make education more expensive for them. The long-term effect of this would be to drive the correlation between wealth and educational preference to zero.

In other words, such a form of neutrality is a rather complex means of forcing educational services to be constant with respect to wealth. This may not sound harmful. But why single out wealth? If there is any good reason (and there may well be such) why S should not correlate with wealth, then would that same reason not also apply to race, ethnicity, or any other group characteristic? It appears then that the proper question is whether S should be allowed to vary at all (except for special needs). If not, then this is easily achieved by using A_1 and requiring all districts to levy the same tax rate. This is, of course, logically equivalent to full state funding with a uniform statewide tax. On the other hand, if any local choice over educational service levels is desired, then A_1 is the only correct aid formula.

As one final note on wealth, the above discussion should have made it clear that if A_1 were used, yet the desired result did not appear to be achieved, then one should reassess the definition of W and not A_1 (one might also question whether M were properly measured).

Conclusions

In this chapter a general model of school district expenditure behavior was formulated. It relates district preferences for education and dislike of taxes to state aid, local prices for educational inputs, and district characteristics. A more specific form of the general model was shown to result from practical constraints deriving from the intended use of the model in constructing an educational input price index. Thus, for the present purpose, school district behavior is in general determined by market prices for school inputs, district preferences, district wealth, the median voter's utility function, the state aid formula (not just the amount of aid), and the relationship between market prices and level of school services. The last item depends on district characteristics that appear in the preceding examples in the form of K, ξ, and δ.

A number of alternative formulations of the district utility function, state aid formula, and market relationship to service level were proposed. These gave rise to 24 particular examples of the model. It was shown that aid formula A_1 is the only state aid formula that results in equal service levels for all districts with equal tax efforts. Under any other formula (including any not among those used in the examples) school services will be directly influenced by district wealth or by local prices for such services.

In practice, most, if not all states use some other aid formula. Therefore, a model of present school district expenditure behavior should be similar in form to the examples using A_2, A_3, A_4, or some combination of these. This fact will be useful in the next chapter where a structural model for determining school input prices will be developed. The relationships observed among prices, district preferences, district wealth, and other characteristics in the preceding examples will provide guidance in formulating that model.

3. Application to an Index of Educational Input Prices

In the preceding chapter a number of hypothetical models of school district expenditure behavior were examined. All were in the form of a constrained maximization model with the school district as the maximizer (of its median voter's utility function) and school services and tax rate T as the free variables, from the district's point of view (i.e., endogenous). For each hypothetical case, solutions for S and T were obtained. For the present purpose of constructing an educational input price index it is necessary to solve for the market prices, M, rather than for S or T. But this is easily accomplished algebraically by substituting the solution for S into equation (15) for M.

Thus, in theory, we obtain an education price index simply by solving the system of equations in (11) for M. In practice, however, the task is not so simple. While it is easy to obtain solutions to (11) for hypothetical cases, as was done in the last chapter, such solutions do not provide actual numbers for M, but only equations for M in terms of a set of parameters. Furthermore, the forms of these equations depend on the assumptions made about the utility function and the functional relationship between M and S. Even if one were to accept, for example, equation (15) for M and U_3 for the utility function, numeric values of M would still depend on the parameters K, ξ, δ, P, and D (it is assumed that in the shortrun a district cannot alter its P or D, so these are parameters). Any estimation of these parameters would be very difficult and controversial.

It is known, however, that these parameters are determined by the demographic and socioeconomic characteristics of the school district. Therefore, rather than determining utility and market functions and writing an equation for M explicitly in terms of parameters like K, ξ, δ, P, and D, we could approximate M as relatively simple function of district characteristics and estimate the coefficients of this function by regression analysis (specifically, TSLS).

It may be helpful at this point to recall why one cannot simply use actual prices paid for educational inputs as a measure of M. There are two reasons why this is inappropriate. First, the observed prices will depend on the quality of the inputs purchased. This quality is not uniform across districts. And second, M will be determined simultaneously (in the mathematical sense) with S, T and A, unless $\frac{\partial M}{\partial S} = 0$. This means that, in general, the prices a district pays for inputs are partly determined by its own choices and by its ability to raise education revenues (as reflected in T). While a state may choose to underwrite price differences attributable to differences in district preferences (a power equalization state must do this to be consistent), it is assumed that any state that would consider implementing a cost index (i.e., any state that wants services to be independent of local prices) would not want to subsidize in any way differences in services resulting from differences in wealth. But that is just what it would do if it were to ignore the relationship between M and T. Therefore, the price level that a state would want to support will not be identical to actual prices paid, even when differences in quality of inputs are controlled for.

The preceding argument is based on the results of the previous chapter and on the stated assumption that $\frac{\partial M}{\partial S} \neq 0$. The truth of this assumption is not always accepted.[1] In the last chapter two forms of M were considered, one with $\frac{\partial M}{\partial S} = 0$ and one with $\frac{\partial M}{\partial S} \neq 0$. An examination of the examples presented there does not reveal either form to be unreasonable (indeed, in many cases their asymptotic properties are identical or very similar and equally plausible).

It will be assumed here that $\frac{\partial M}{\partial S} \neq 0$. Specifically, we assume that as S increa. es, M decreases or remains constant, up to some point at which S becomes so great as to strain the resources of the local market area, beyond which M increases as S increases further. That M decreases at first as S increases seems reasonable, especially for the dominant component of S, which represents teachers. If more teachers are hired for a fixed number of pupils, classes will be smaller. Since teachers prefer smaller classes, they should be willing to accept a lower salary, other things being equal. This tendency is offset by the increasing demand placed on the local supply of teachers as S increases, which tends to drive prices up. At some point (δ in the previous chapter) the latter factor becomes dominant and observed prices increase with S. In general, observed prices will be the composite result of the simultaneous action of both factors, the first pushing prices down in accord with teacher preferences and the second pushing prices up because of market constraints.

The preceding discussion implies that the determination of M will require a system of simultaneous equations for M, S, T, and A. Moreover, differences in quality of inputs should be accounted for in this system to the extent possible so that prices may be estimated for inputs of uniform quality. The precise procedure for obtaining M will be given below. First, the system of equations needed will be specified.

Structural Specification for Input Price Determination

Educational inputs will be separated into three components: instructional staff, instructional materials, and other inputs. This separation is necessary since the prices of these three components are influenced by different factors. The price of instructional staff will depend on their perception of the district as a place of work. Instructional materials, on the other hand, should not vary significantly in price throughout the state; in fact, in some states instructional material prices are required by law to be uniform. Prices of other inputs will depend largely on local wage levels since other inputs are primarily composed of administrative and service personnel.

The instructional staff component must be further divided into several subcomponents. This is necessary because the price of instructional staff depends on four factors: the quantity of such staff to be obtained from the local market, their basic quality level, their education level, and their relevant experience. The levels of these four factors to be purchased are determined simultaneously by the district; that is, the level or quantity of any one of these to be purchased will depend on the quantities and prices of the others. None is determined independently of the others, in the mathematical sense.

In practice, we do not have a good measure of the "basic quality" of instructional staff. In order to seek such a measure, we must first define what is meant by "basic quality". Therefore, we will adopt the definition of "basic quality" of teachers as that which, aside from teacher education and experience, leads to greater educational achievement of students, as measured by standardized achievement tests. It has been found that teachers with higher achievement test scores produce students with higher scores.[2] Thus, we could take teacher achievement test scores as the measure of quality. Such scores are not now tabulated by school districts, however.[3] Nevertheless, it is possible to use a surrogate measure of quality. Teachers with high achievement scores may be expected to obtain more education since their rate of return on their investment of time and money is greater. Therefore, we may use teacher education level as a surrogate measure of quality. This has the obvious disadvantage that teacher education level may be in itself of value to students and has been included above as a component of the instructional staff input. But no other measure of quality is available to us. So teacher education level will serve two purposes in the structural model.

Before the structural model can be specified, the role of the quantity of teachers must be clarified. It was noted above that increasing the quantity of teachers has a dual effect. It makes the working environment more desirable to the teacher, due to smaller classes; and it increases the demand on the local supply of teachers. Since school districts have differing enrollments and exist in a variety of labor markets, these two effects will not always bear the same relationship to one another. That is, increasing the number of teachers in a district by some percentage p will not have the same effect on the market in all districts. The latter impact will depend on the relative size of the district's teaching staff compared to the local work force. Thus, an increase of p percent in a very large district will have more impact on the market than an equivalent percentage increase in a small district.

This leads us to separate the measure of the quantity of teachers into two components: one related to the teacher's perception of the desirability of the district as a place of work, and the other related to the impact of the teaching force on the local job market. The first measure will be the teacher-pupil ratio. The second will be the ratio of the number of teachers employed in the district to the number employed (both public and private) in the county. This assumes that the county has a reasonable correspondence to the local job market area.

Since the teaching staff has been split into three components, three prices must be determined, one basic price level and two premiums, for teacher education and experience. The basic price level will be taken to be the salary of a teacher with a Bachelor's degree and no previous teaching experience. The premiums will be determined from the district salary schedule. Since education and experience premiums do not follow any uniform pattern across districts in a state, all schedules will be converted to a standardized version that has equivalent present value to a teacher with no prior experience. This standardized schedule converts the actual schedule to one with a constant dollar increase for each year of experience, up to 20, and a constant annual premium for obtaining a Master's degree or higher. Precise definitions are given in the tables below, and in Appendix B.

We now have four prices to estimate: three for teaching staff and one for other inputs (instructional materials will be assigned a constant price). These prices are to be determined simultaneously with the corresponding quantities and with state basic aid (i.e., non-categorical aid) and district tax effort. The structural model could be formulated in several ways. One commonly used way is to write the price and quantity equations in the form of demand and supply equations for the prices. This is done since observed prices are the result of the interaction of what the district is willing to pay for given quantities of inputs and what price must be paid to obtain those quantities. In other words, observed prices and quantities are determined by the intersection of the demand function derived from the district's utility function, with the market constraint which is given to the district (i.e., not under district control) in the form of the supply function. Using U_3 as the utility function and equation (15) to represent the market constraint, the observed price and quantity would be represented by the intersection point in Figure 5. (Recall that S is not a pure quantity variable; it also reflects amenities from the teachers' point of view, thus the initial downward slope of the curve, which would be quite surprising if S were a pure quantity variable.)

One difficulty remains in specifying the structure. That is that available data do not include a measure of the quantity of "other" inputs. Therefore, we must resort to a single equation for that component. This equation must incorporate both demand and supply influences on the expenditures for other inputs. An approximation to the price of "other" can then be obtained by linking demand to one set of variables in the equation and supply to another. While this situation is less than desirable, it is unavoidable at this time. Fortunately, other inputs account for a relatively small part of the total (about one quarter).

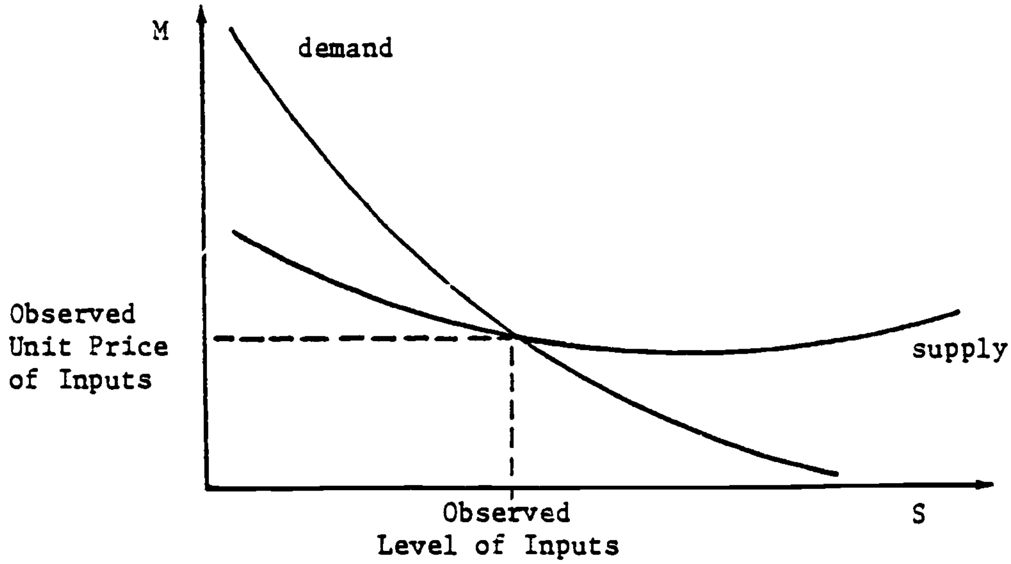

Figure 5. Determination of Price and Level of Inputs from Demand and Supply Functions

We are now in a position to specify the structural model. The proposed structure is as follows.

$$
\begin{aligned}
&\text{STSAL} &&= f_1 \ (\text{RATIO, EDLVL, EFFORT, AID, Z}) + e_1 \\
&\text{STSAL} &&= g_1 \ (\text{RATIO, PTCHR, EDLVL, Y}) + e_2 \\
&\text{EDPRM} &&= f_2 \ (\text{EDLVL, EFFORT, AID, Z}) + e_3 \\
&\text{EDPRM} &&= g_2 \ (\text{EDLVL, RATIO, EXPER, Y}) + e_4 \\
&\text{EXPRM} &&= f_3 \ (\text{EXPER, EDLVL, EFFORT, AID, Z}) + e_5 \\
&\text{EXPRM} &&= g_3 \ (\text{EXPER, RATIO, EDLVL, Y}) + e_6 \\
&\text{INSM} &&= f_4 \ (\text{EFFORT, AID, Z}) + e_7 \qquad\qquad (23) \\
&\text{EFFORT} &&= h \ (\text{STSAL, EDPRM, EXPRM, AID, Z}) + e_8 \\
&\text{OTHER} &&= p \ (\text{EFFORT, AID Z, Y}) + e_9 \\
&\text{AID} &&= a \ (\text{EFFORT, Z, Y}) + e_{10} \\
&\text{PTCHR} &&= \text{RATIO * PENRLC}
\end{aligned}
$$

The f_i and g_i represent demand and supply functions, respectively. Z is a set of variables related to district demand and Y is a set of variables that influence supply prices (Y and Z may overlap). The e_i are error terms. The variables determined by the system are defined in Table III. The types of variables that should be included in Z and in Y are listed in Tables IV and V, respectively. It is understood that not all components of Z and Y will appear in each equation. The functions f_i and g_i are assumed to be additive in keeping with the definitions of many of the variables as increments (e.g., the premiums). In other words, a simple linear regression model is intended.[4]

Table III. Variables to be Determined by Structural Model

Name	Definition
STSAL	Starting salary: salary of a teacher with a BA and no prior teaching experience.
EDPRM	Education premium: A constant amount which, if paid annually for 20 years, would have the same present value as the excess present value of the actual MA salary schedule over the present value of the BA schedule, over a 20 year period at 5% discount rate.
EXPRM	Experience premium: Average ratio of present value of actual BA and MA salary schedules to present values of a constant salary (at the BA and MA base value; i.e., the no-experience salary) over the same period of time (20 years, 5% rate).
OTHER	Non-instructional non-transportation current expenditures.
RATIO	Teacher-pupil ratio.
PTCHR	Ratio of number of teachers employed by the district to number of teachers (both public and private) employed in the county.
EDLVL	A measure of the education level of the teaching staff; precise measure used depends on available data.
EXPER	Average number of years of teaching experience of the staff.
INSM	Quantity of instructional materials purchased: ratio of expenditures on this item to state average (price assumed constant).
EFFORT	District education tax effort: ratio of local revenue per population aged 19-64 to district wealth.
AID	State basic aid per pupil (non-categorical aid).

The Z variables related to available funds belong in the three demand-price equations and in the EFFORT equation. The variables related to burdens[5] borne by taxpayers, along with RESD, belong only in the EFFORT equation. This is because prices a district is willing to pay will depend on the total funds available to it (which depend on burdens, fiscal capacity, and tax rate) but not on the source of those funds. The source will, however, affect the district's perception of its tax effort. If the proportion of property wealth that is residential is high, then taxes will be borne relatively uniformly by all voters, whereas if RESD is low, then the majority of voters may opt for a high revenue level, which will not cost them very much, since most of it will be collected from the few non-residential property owners, who may not have any vote at all (e.g., stockholders who do not live in the district). Thus, RESD affects the prices a district is willing to pay only indirectly through its effect on EFFORT. Similarly, DEP and PENRL will affect the willingness to raise education revenues.

The three demand equations for teacher component prices express the prices the district is willing to pay, as functions of the quantities purchased (RATIO, EDLVL AND EXPER), of funds available to it (from EFFORT, WEALTH, AID, TITLE I, and CAT), and of its preference for education (FINCOL).

The demand equation for instructional materials expresses the quantity the district is willing to buy, given its available funds, preferences, and other burdens. No corresponding supply equation is needed since the price is constant.

These demand functions are derived from the district's utility function. While no explicit form of the latter need be known, it is assumed that it is not radically different from those studied in the last chapter. Thus, FINCOL represents the parameter P of that chapter. While FINCOL is not a perfect measure of preference for education (it depends to some extent on whether the population had been able to afford to attend college), it is the closest approximation to P that is likely to be available. Indeed, since WEALTH is also in the equations and, therefore, controlled for, it is more reasonable to assume that the education level of adults correlates strongly with their preference for education; those who prefer more get more, WEALTH being equal.

Table IV. Variables in Z

Name	Definition
WEALTH	District wealth, defined as the principal component of equalized property value per pupil, income per pupil, income per capita, and proportion of families with 1969 income over $15,000.
RESD	Proportion of equalized property value represented by residential property.
FINCOL	Proportion of population aged 25 or more that graduated from college.
DEP	Dependency ratio: ratio of population aged 0-18 to that aged 19-64.
PENRL	Ratio of district enrollment to population 19-64.
TITLE I	FEDERAL Title I revenue per pupil.
CAT	State categorical aid per pupil.

Table V. Variables in Y

Name	Definition
OPCOST	Opportunity cost: county average wage of professional, craft, and clerical workers.
DENS	Population per square mile in county.
LADM	Natural logarithm of the number of pupils in average daily membership.
MNRTY	Proportion of children aged 5-17 who are Black or Spanish.
POVCH	Proportion of children aged 5-17 living in families below poverty level.
BRKHME	Proportion of poverty children living with only one parent.
ADA/ADM	Attendance rate.
ACH	Academic achievement level of pupils.
PENRLC	Ratio of number of pupils enrolled in district to teachers employed in county.
STBLTY	Proportion of county population over 5 living in the same dwelling as 5 years ago.

The district utility function also contains a parameter, D, representing dislike for taxes. Unlike P, no simple variable represents D. But D is assumed to be captured in the combined effect of WEALTH, DEP, and PENRL.

Recall that EDLVL plays a dual role in this system. It is both a measure of the quantity of teacher education purchased, and a surrogate measure of basic teacher quality, as discussed previously. Thus it appears in the demand equations for STSAL and EXPRM, since districts will pay more to obtain and to keep teachers of higher basic quality.[6]

Generally, a district is expected to purchase more of an input if its price is lower. Therefore, we expect that RATIO, EDLVL, and EXPER should enter f_1, f_2, f_3 respectively with negative coefficients. There is some doubt about EDLVL, however, due to its dual role just noted. Since it represents teacher quality as well as the quantity of the education input, there may be a net positive impact on the prices. That impact may be felt predominantly in STSAL and EXPRM, however, rather than in EDPRM, since a district will pay more to hire and to retain high quality teachers, but may not value their formal education much more than that of lower quality teachers. Thus, EDLVL may have a negative coefficient in f_2, although there is more doubt here than is the case with RATIO in f_1 or EXPER in f_3. As already indicated, EDLVL should enter f_1 and f_3 with a positive coefficient, since it represents teacher quality there.

The variables EFFORT, AID, WEALTH, TITLE I, and CAT should have positive coefficients since they represent additional buying power. FINCOL, of course, should have a positive coefficient, as the measure of preference for education.

Turning now to the supply price equations for the teacher inputs (g_1, g_2, g_3), these represent prices teachers require in order to accept employment in the district. As discussed above, increasing the quantity of teachers has the dual effect of improving the attractiveness of the district to the teacher, thus lowering prices, and of placing greater demand on the local labor market for teachers, thus increasing prices. Therefore, the quantity is measured by two variables in g_1, the first (RATIO) representing the attractiveness of the district to teachers, and the second (PTCHR) representing the demand placed on the local supply. Thus, RATIO should enter g_1 with a negative sign. EDLVL and EXPER are assumed to be primarily quantity variables in g_1 and g_3, respectively. Any effect they have on the desirability of a district as a place of employment is assumed to be small compared to their impact on the supply, or to be highly correlated with the impact of RATIO on perceived desirability of the district (RATIO is included in g_2 and g_3). Therefore, EDLVL and EXPER should enter their respective supply equations with positive coefficients.

EDLVL is included in g_1 and g_3 and is expected to have a positive coefficient since, other things being equal, higher quality teachers should require a higher basic rate of pay and a greater premium for remaining in the same district (their options for alternative employment are greater). EXPER is included in g_2 and is expected to carry a negative coefficient since more experienced teachers have had more time to obtain advanced degrees, so that for a given education premium they should have obtained more education. RATIO is included in g_2 and g_3 since it affects desirability of a district to a teacher; teachers should require lower premiums to remain in a district with a high RATIO.

In addition to PENRLC, which enters g_1 through PTCHR, the following variables in Y will enter g_1, g_2 or g_3: OPCOST, DENS, LADM, MNRTY, POVCH, BRKHME, ADA/ADM, ACH, and STBLTY. OPCOST should be the dominant variable in g_1 since it represents the wage level in the local labor market. It covers both professional occupations, which are viewed as alternatives available to teachers, and also craft and clerical occupations. The latter are included because professional wages alone would be subject to wide fluctuations unrelated to workers' views of an area as a place of employment, i.e., they will depend to a large extent on the particular type of professional workers dominant in an area. By broadening the base of workers, such irrelevant fluctuations should decrease. OPCOST should, of course, have a positive coefficient.

DENS is similar to OPCOST, but is more directly related to the cost of living in an area, whereas OPCOST would react to factors in addition to cost of living. DENS is also related to the desirability of an area as a place of work. It is expected to have a positive coefficient.

LADM should enter g_1 and g_3 with positive coefficients since teachers probably prefer to avoid the impersonality and bureaucracy of larger districts. It is entered in logarithmic form since its effect should not increase as fast when size is already large. The effect on EDPRM is not clear since more educated teachers are considered more qualified for supervisory positions and they might see greater opportunity for such advancement in large districts.

MNRTY, POVCH, and BRKME each measure characteristics of the students that teachers consider less desirable. Thus, they should have positive coefficients. There is some doubt again, however, in the case of EDPRM. A higher education level might signify that an individual is more committed to the teaching profession, and therefore would accept a position in a less desirable district if no other were available, whereas a less educated, less committed teacher might withdraw from the profession rather than accept such a position.

ADA/ADM and ACH also affect a teacher's perception of the desirability of a district. High values on these variables signify better, more well-behaved students, so they should carry negative coefficients.[7]

STBLTY will be included only in g_3, since it is a measure of the general rate of turnover of the population in the district. It is expected to have a negative coefficient in g_3 since a district with a highly mobile population will need to provide a higher premium to induce its teachers to remain there.

Although the price of instructional materials is assumed to be constant throughout the state, an equation for INSM is included. The reason for this will become clear below, when the procedure for constructing a price index is given. Briefly, the equation is needed in order to determine the proper weight to assign to INSM when a composite price index is constructed. This equation may be considered as determining the quantity of INSM purchased, since the price is constant. All variables on the right should have positive coefficients.

The next equation in the system determines EFFORT as a function of teacher component prices, AID, and the variables in Z. EFFORT should increase with the prices. Given some form of power equalization, that is, state aid proportional to tax effort, EFFORT will increase with AID. Under a basic aid plan, however, AID would not enter this equation; under a varying aid formula not linked to tax effort, AID would enter with a negative coefficient since it would represent buying power available to the district prior (in the mathematical sense) to its determination of its tax effort. Thus, the expected sign of AID in the equation will depend on the aid formula used in a given state.

As already discussed, a district's tax effort, as measured by the variable EFFORT, will be higher when RESD is low (i.e., RESD will have a negative coefficient). It will also be higher when the burden variable DEP is low, because the proportionate share of WEALTH going to education can be higher if non-educational burdens are light. Conversely, if PENRL is low then a high EFFORT is not needed, (i.e., PENRL will have a positive coefficient whereas DEP will have a negative coefficient). The variable FINCOL, being the surrogate for preference for education, should have a positive coefficient.

TITLE I and CAT should, by law, have coefficients of zero in the equation. We suspect, however, that districts use such funds to supplant some locally raised revenues. Therefore, they may carry negative coefficients.

The remaining variable in this equation, WEALTH, is more difficult to interpret, since its impact will depend on the state finance formula and on district characteristics. Reference to Figure 3 and to the examples related to it indicates that for low-wealth districts, tax effort will increase as wealth increases, and for high-wealth districts, effort will decrease with increasing wealth. The point at which the change from positive to negative coefficient occurs will depend on the state aid level (a foundation aid plan is assumed here; this is the form of basic aid -- i.e., non-categorical aid -- in most states, including most of those which nominally have power equalization since the latter are typically limited to a guaranteed wealth base so low or to such a low limit on the tax rate funded, that all but the poorest districts and those with very low-preference for education receive a relatively constant amount of basic aid per pupil). Since state aid averages roughly one-half of total revenues, it may be assumed that most districts are operating on the downward slope of Figure 3. Nevertheless, a significant number of districts will be on the upward slope, especially in high-aid states. This, together with the shape of the curve in Figure 3 suggests that quadratic and cubic WEALTH terms be included in the EFFORT equation for such states.

As noted above, expenditures for OTHER must be estimated by a single equation since no separate measures of price and quantity of OTHER are available. Unfortunately, this makes it very difficult to determine the price. We include the equation, nevertheless, since even if price variation can't be measured, it may be useful to know of variations in quantity in the construction of the price index (see below). This component is a function of funds available to the district and of district characteristics that affect its price.

The variables related to the funds available (EFFORT, AID, WEALTH, TITLE I, CAT) should have positive coefficients, as should the preference variable FINCOL. The variables related to fiscal burden (RESD, DEP, PENRL) should have negative coefficients.

The price of OTHER should not be as sensitive to student characteristics as were the teacher prices (<u>expenditure</u> on OTHER may be related, for example, to vandalism, but only because of the greater quantity of maintenance required and not because of an increased price). Therefore, OPCOST will be included in this equation as a determinant of price; ADA/ADM will be included as a determinant of quantity.

The great difficulty in obtaining even a crude estimate of the price of OTHER from this single equation arises from the following considerations. The variable directly related to the price of OTHER is OPCOST. But OPCOST is also one of the primary determinants of the teacher prices. Now it is quite possible that teachers and OTHER are complements as far as the school district is concerned. If that is the case, then an increase in OPCOST, which indicates an increase in the price of teachers, would result in a decrease in the quantity of OTHER, and hence a decrease in the total expenditure on OTHER (which is what is measured on the left-hand side of the equation). The other difficulty is that OPCOST will affect both price and quantity of OTHER, unless the own-price elasticity of OTHER is zero, which is highly unlikely. Therefore (assuming a negative own-price elasticity) an increase in OPCOST will result simultaneously in an increase in the price of OTHER but a decrease in its quantity.

The implication of these considerations is that it is quite likely that the positive impact of OPCOST on the price of OTHER will be substantially offset by the dual decreases in its quantity resulting if both its own-price elasticity and its cross-price elasticity with the teacher component are negative (which is likely to be the case). The net effect could well be a negative coefficient of OPCOST in the equation for OTHER. And even if the coefficient should be positive, it will be substantially underestimated for the purpose of measuring the price of OTHER. Thus, it may be that, in practice, we are unable to reliably detect any of the price variation of OTHER using this equation. This points to the need for separation of prices and quantities of this component in data collected by states that wish to use an accurate price index. For the present purpose, we will probably be forced to hold the price of OTHER constant when computing relative weights of the component inputs (see below).

One possible way to avoid the difficulties mentioned here would be to use some surrogate measure of the price of OTHER. A candidate for this is the Family Budgets Index from the Bureau of Labor Statistics. The obvious problem here is that the goods and services purchased by a typical family are different from those included in OTHER. Another problem is that BLS indices are available for only relatively few areas of any state (often only one, or even none).

The equation for aid is necessary only for states with some form of power equalization or incentives for certain inputs (such as subsidies of EDLVL or EXPER) because if the aid formula does not depend on EFFORT or the inputs then AID is not jointly determined with the other variables in the system and can be considered exogenous. Assuming now that power equalization is used, EFFORT should enter this equation with a positive coefficient. If the state subsidizes certain inputs then these should also be included in the equation and should have positive coefficients. The variables from Z and Y to be included (if any) in this equation will depend on state law, as will their coefficients. Generally, only WEALTH will be included from Z, and no variables from Y will be included, although this will vary from state to state.

The remaining equation is an identity. Since this is nonlinear, the usual system estimation technique must be modified. The technique to be used is two-state least squares regression (TSLS).[8] The problem is that the usual procedure of obtaining a first-stage estimate of PTCHR as a linear function of the exogenous variables would lose the information contained in the last equation. In order to preserve this information, yet avoid an inconsistent estimator in g_1, the following procedure will be used. A first-stage estimate of RATIO will be substituted for actual values of this variable in the equation for PTCHR. This, together with the exogenous variable in this equation will result in estimated values for this variable that utilize the information in the equation and are uncorrelated with the error term in g . Then TSLS will be applied to the first ten equations, with the estimated PTCHR treated as an exogenous variable.

Derivation of a Price Index

Once the parameters of the structural model have been estimated statistically, it is necessary to derive a price index from this information. As discussed previously, this index should reflect the prices a district would have to pay if it purchased inputs of "standard" quality and quantity. The "standards" will depend on state policy and in many cases can conveniently be taken to be constants such as the statewide averages. This corresponds to a state policy of equal inputs for all pupils.

In this case, the prices to be used in computing the index are obtained as follows. The teacher quantity and quality variables, RATIO, EDLVL and EXPER, are held constant at the state mean. Then these constant values are substituted into the equation for PTCHR and into the supply price equations for STSAL, EDPRM, and EXPRM. Actual values of variables in Y are used in the computation. The resulting price estimates will be denoted $\hat{STSAL}$, $\hat{EDPRM}$, and $\hat{EXPRM}$, respectively.

The price of OTHER is computed by holding all variables in its equation constant, except for OPCOST (even this may have to be held constant due to problems noted above). The rationale here is that the other variables all affect the quantity much more than the price of OTHER, so that observed expenditure variations related to those variable will result predominantly from variations in the quantity purchased. Any variation in price associated with these variables (or with the variation in quantity associated with them) cannot be detected, because of the lack of separate measures of price and quantity, as discussed previously. Thus, the price of OTHER will be measured by letting only OPCOST vary in the equation. The resulting price estimate will be denoted $\hat{OTHER}$.

If the state desires a non-uniform distribution of inputs across districts then this procedure must be modified. The most common deviation from non-uniformity comes from categorical aid. This aid is intended as a supplement to the standard program in districts where special needs exist. Therefore, the quantities of inputs purchased should increase with CAT and if this increase has any effect on prices then that should be reflected in the price index.

The same argument applies to Federal Title I aid since states are not permitted to use such aid to supplant local revenues. Therefore, the above procedure for computing prices will be modified by replacing state average values of the quantities by values derived from the demand equations by holding all variables constant except for the quantities, CAT, and TITLEI. In other words, the three demand equations will be solved simultaneously for RATIO, EDLVL, and EXPER in terms of CAT and TITLEI, with all other variables (STSAL, EDPRM, EXPRM, EFFORT, AID, and the other Z's) held constant at the state mean. The resulting values, denoted $\widehat{RATIO}$, $\widehat{EDLVL}$, and $\widehat{EXPER}$, will be substituted in the supply equations and in the equation for PTCHR, and the supply equations then solved as before. $\widehat{OTHER}$ is computed exactly as before. CAT and TITLEI are not allowed to vary here since their impact is predominantly on the quantity rather than the price and there is no way to separate the two effects.

A further source of non-uniformity is power equalization. Under this finance method the quantities of inputs will depend on district preferences. The resultant variation in quantities may affect the prices. This is provided for as follows. District preferences, as represented by FINCOL, are allowed to influence the estimate of EFFORT (all other variables in the EFFORT equation are held constant). This estimate, denoted $\widehat{EFFORT}$, is then used in the demand equations when they are solved for $\widehat{RATIO}$, $\widehat{EDLVL}$, and $\widehat{EXPER}$. The supply equations are then solved for prices as before (i.e., these values of $\widehat{RATIO}$, $\widehat{EDLVL}$, and $\widehat{EXPER}$ are used with the Y's to solve for STSAL, EDPRM, and EXPRM). This estimated $\widehat{EFFORT}$ is not used in the equation for $\widehat{OTHER}$ for the same reason given above for CAT and TITLEI.

It is important to note that this method does not use actual EFFORT, as do states with power equalization. This is to ensure that only preference for education affects school input quantities. Actual EFFORT will generally depend on other factors as well, such as WEALTH and prices. This would not be true if the state used aid formula A_1 of the last chapter, but no state now uses such a formula. Some nominally use A_2, which would eliminate the influence of WEALTH on EFFORT, but this formula is seldom, if ever, fully funded in any state, or as implemented, it usually excludes recapture and places a limit on the level of EFFORT (T in the preceding chapter) that will be supported. Therefore, most districts are effectively subject to a foundation aid formula combined with categoricals, while some are subject to formula A_2.

Another problem with this approach is the use of the surrogate FINCOL as the measure of district preferences for education, rather than a direct measure. FINCOL certainly represents more than just preferences; for example, it is at least partially related to wealth. Thus, using FINCOL as the measure of preferences, while acceptable for the purpose of formulating the structural model and estimating its parameters, may result in misallocation of revenues if it is used in the derivation of the price index as described above. Given this problem, and the fact just noted concerning the absence of true power equalization in any state, it would seem appropriate at this time to not allow district preferences to vary in the computation of the index. That method must await a more direct measure of preferences for education, as well as a true power equalization state aid formula.

Assuming that prices have been determined as above, the price index, I, is computed as follows.

Educational inputs have been divided into five categories: instructional staff, staff education level, staff experience, instructional materials, and other. With these are associated five prices:

$$\begin{aligned} p_1 &= \widehat{STSAL} \\ p_2 &= \widehat{EDPRM} \\ p_3 &= \widehat{EXPRM} \\ p_4 &= \widehat{INSM} \\ p_5 &= \widehat{OTHER} \end{aligned} \qquad (24)$$

Recall that instructional materials are assumed to have constant price throughout the state. This is taken as the state mean $\overline{INSM}$.

To each of these five components is associated a price index

$$I_i = \frac{p_i}{\overline{p}_i} \qquad i = 1,\ldots,5 \qquad (25)$$

where $\overline{p}_i$ denotes the state mean value of p_i. Of course, $I_4 = 1$. These five component price indices will be combined to give a composite index. This composite will be a weighted average of the five components. The weights should represent the proportion of the district's budget that would be spent on each if it paid average prices (the cost index is intended to make price differences transparent to the district) and if it purchased the quantities intended by the state (i.e., quantities that depend only on CAT, TITLEI, and, if the state had true power equalization, on differences in EFFORT due to its preferences). These quantities will be:

$$\begin{aligned} q_1 &= \widehat{RATIO} \\ q_2 &= \widehat{EDLVL} * \widehat{RATIO} \\ q_3 &= \widehat{EXPER} * \widehat{RATIO} \\ q_4 &= \widehat{INSM} / \overline{INSM} \\ q_5 &= \hat{\hat{OTHER}} / \overline{OTHER} \end{aligned} \qquad (26)$$

$\hat{INSM}$ is the estimate of INSM computed by allowing CAT, TITLEI, and EFFORT (if an acceptable measure of preference were available) to vary in its equation (just as with $\hat{RATIO}$, $\hat{EDLVL}$, and $\hat{EXPER}$). Similarly, OTHER is obtained by allowing these same variables, plus OPCOST. freedom in the equation for OTHER. The quantities q_2 and q_3 con' in the factor $\hat{RATIO}$ so that all quantities will be expressed in per-pupil units. This ensures that each product $p_i q_i$ will be in dollars per pupil.

The proper weights can now be expressed as

$$w_i = \frac{\bar{p}_i q_i}{\sum_{k=1}^{5} \bar{p}_k q_k} \qquad i = 1,\ldots,5. \tag{27}$$

The composite price index is then

$$I = \sum_{i=1}^{5} w_i I_i \quad . \tag{28}$$

combining (28) with equations (25) and (27) yields the alternative formulation

$$\bar{I} = \frac{\sum_{i=1}^{5} p_i q_i}{\sum_{i=1}^{5} \bar{p}_i q_i} \tag{29}$$

In this form I is the ratio of what the district must pay to purchase the "standard" quantities q_i, to what it would pay for these same quantities if it paid state average prices.

One minor refinement is needed before implementation of this index can be discussed. This concerns instructional staff. For practical reasons (data availability) this component has been represented by teachers alone, although it also includes principals, guidance counselors, teacher aides, and others. The implicit assumption is that these other staff will react in the same way as teachers to district characteristics, so that their price index will be roughly equal. But there is still a need for an adjustment to the above index. This is due to the fact that RATIO is the teacher-pupil ratio only. Therefore, the component I_1 will not be weighted heavily enough (i.e., w_1 understates the proportion of the budget represented by instructional staff). If we assume that the state wants the relative mix of teachers and other instructional staff to be constant[9] then this weighting problem is disposed of. The quantity q_1 above is simply replaced by an adjusted value derived by multiplying the former value by the ratio r of the state average expenditure for instructional staff to the average expenditure for teachers. It is assumed henceforth that this adjustment has been made. Thus the q_1 in (26) is replaced by

$$q_1 = \hat{RATIO} * r. \qquad (30)$$

Implementation of the Index

Implementation of the price index I is quite simple. The state merely uses formula A_1 of the previous chapter, which may be restated as

$$AID = I*B_0 + (I*W_0 - WEALTH) * EFFORT \qquad (31)$$

or, if the state does not want power equalization, it uses formula A_3, which is now

$$AID = I*B_0 . \qquad (32)$$

In the present context B_0 is understood to include CAT (the Federal government might wish to apply I to TITLEI also). Thus, B_0 is not constant across districts; but it is a constant in the model (11) because it does not depend on any variable over which the district has control.

The effort required by a state to implement the index in this way is trivial. It would act as follows. The state would first ignore price differences and determine, exactly as it does now, how large a budget to support in each district. This will be either B_0 or $B_0 + W_0 * EFFORT$, the latter corresponding to power equalization. Up to this point no effort on the state's part is attributable to implementing the price index. The next step is to multiply B_0 or $B_0 + W_0 * EFFORT$ by I. This is the end of the work attributable to implementing I. Any further work, such as subtracting WEALTH * EFFORT if the state uses power equalization, or distributing the funds to districts, would have been done anyway.

Note that, for that part of the budget -- B_0 or $B_0 + W_0 * EFFORT$ -- covered by the state, a district's buying power is invariant with respect to price. This follows from equation (29), together with (31) or (32), as appropriate. To see this, suppose the state has decided, ignoring price differences, to support a budget of B dollars in a particular district (it may or may not permit the district to supplement this base; that is a policy question and is irrelevant to the construction or implementation of a price index). By applying formula (31) or (32) it will in fact support a budget of I*B dollars. The state's original implicit intent was to permit the district to purchase the quantities q_1^o, q_2^o, q_3^o, q_4^o, and q_5^o of the respective inputs. The district is free to choose some other mix of inputs, but that is immaterial; the state wants to ensure that the district can buy the vector q^o. The amount B was what was needed to buy q^o at state average prices. But from (29) the district has available to it

$$IB = I \sum_{i=1}^{5} \bar{p}_i q_i^o = \frac{\sum_{i=1}^{5} p_i q_i^o}{\sum_{i=1}^{5} \bar{p}_i q_i^o} * \sum_{i=1}^{5} \bar{p}_i q_i^o = \sum_{i=1}^{5} p_i q_i^o \qquad (33)$$

But the last term on the right of (33) is exactly what it would cost the district to buy q^o. This, incidentally, proves that (27) was the correct weighting scheme for combining the component price indices into a composite.

It was assumed that a state that uses power equalization will use some composite measure of WEALTH in its aid formula[10], and the corresponding definition of EFFORT. It is likely, however, that the state would use something like equalized property value per pupil (EPV) as the measure of wealth and the millage rate as the measure of effort. If one accepts that EPV is not a true measure of what level of public services a district can support, then the conclusion is that the use of EPV will not make school services independent of true fiscal capacity (see Chapter 2). Furthermore, if EPV is used in the structural model (23) then true prices will not be measured. These problems do not arise from any defect of the index I, but from a defective definition of wealth. Therefore, it is essential that a state have a reasonable measure of wealth before embarking on any attempt to measure input prices.

Effort Required by a State to Construct the Index

One task of the project reported on here was to estimate the magnitude of effort required by a state to add a price index like I to its finance formula. From the previous section, it is clear that the required effort is almost entirely in constructing I, rather than in implementing it. We can estimate this effort based on our experience here. First, we assume that a state interested in a price index will already have a good data base in place. This is a reasonable assumption since any such state is probably also involved in other reforms that require it to collect individual district information. This assumption is important because primary data collection is very expensive. Florida, for example, spends several hundred thousand dollars annually to estimate the cost of living in its 67 counties, and not every county is covered each year.

The following steps are required of a state to construct and implement an index like I.

(a) Study theory and methodology of the index construction and determine whether state goals or availability of data necessitate any minor modifications to the procedures given above.

(b) Assemble the requisite data from existing sources.

(c) Obtain regression estimates of the coefficients of structural model (23) or equivalent.

(d) Solve for prices and quantities, as described above.

(e) Compute the price index using formulas (25), (26), and (29).

(f) Incorporate the index into the aid formula, as in (31) or (32) as appropriate.

(g) Recompute the index periodically.

The initial construction of the index will include the start-up costs inherent in any such complicated undertaking. This is covered in step (a). It will include familiarizing a number of research staff with the theory and methodology of the index. (It is assumed, however, that policy makers will have already decided to implement an index. Their effort expended to understand and evaluate the index is not included here.) Since some redundancy of expertise is desirable, two or three staff should become thoroughly familiar with the procedures. One of these would be a senior analyst; the other one or two would be junior or mid-level research staff.

Experience suggests that about two months of effort for each person, over four to six months of calendar time, should be sufficient for this task. After initial implementation these staff might spend five percent of their time keeping abreast of advances in the state of the art and determining any modifications necessary because of changes in state policy. These same staff would also have primary responsibility for carrying out the remaining six tasks.

Step (b) will involve extraction of data from the state's comprehensive education data base. That is assumed to include information on expenditures by category (teachers, other instructional staff, instructional materials, and other current non-transportation expenditures); revenues by source; equalized property values (a component of WEALTH); counts of students and teachers; teacher education, experience, and if available, test scores; and assorted characteristics of the students. This must be supplemented by teacher salary schedules and by demographic data. The former can usually be obtained from the state teachers' association (the affiliate of the National Education Association is a good source). The latter can be obtained from Census of Population files, which are available, aggregated to the school district level, from the National Center for Education Statistics. This will generally not be available, however, for districts with less than 300 pupils. States with many such districts may find it impractical to implement a price index. Others may aggregate such districts for indexing and treat them as a single unit, or may assume that they are similar to the smallest districts included in the census files (say those between 300 and 400 enrollment) and assign to them the average index value of the latter. It is assumed here that no primary data collection is undertaken for such districts. Under these assumptions the necessary data file could be assumbled with approximately one-half year of combined analyst and programmer effort.

Steps (c) through (e) are straightforward computing tasks and can easily be accomplished with a one-person month effort. Step (f) was discussed previously and involves negligible effort.

The last step involves maintenance of the index for long-term use. Once the price index has been determined it can be used for successive years until there is reason to believe that prices have changed in one district relative to others. Such a change could result either from local changes (changes in the values of EFFORT, AID, or of the exogenous variables) or from global changes (changes in the structure).

One area a state may want to address is the accuracy of census demographic data that is nearly ten years old. In some districts population movement may be significant over a decade. If this is felt to be the case then a survey could be conducted every few years to estimate changes in the few (5 to 10) variables based on census data. Such a survey would not be at the household level, but could obtain most of the needed data from local organizations such as chambers of commerce, from state agencies (e.g., Employment Service for OPCOST) or from estimates based on trends revealed in the Current Population Survey. This issue should be addressed by the analysts directing the price index project. If it is decided that such periodic adjustments are needed, we estimate, based on our experience in locating data sources and obtaining similar data, that such an effort would take one to two years of staff effort. This would not need to be done more often than each second year, at most, however. Therefore, the annual effort required is estimated at from one-half to one person year.

Structural changes will occur much more slowly. These necessitate a respecification of the model (23) and reestimation of the coefficients. It would probably suffice to recalibrate the model for such changes once each ten years. A somewhat different model would be needed for this purpose because the present structure models existing behavior, which takes place in an environment with no price index. After ten years under a price index, district behavior patterns will be different. Some expansion of the theory will be necessary to update the model accordingly. This will require effort of the research staff, in addition to the recomputation of the index from the new model. This effort is estimated at one person year, although that would increase somewhat if the state desired to have several analysts examine the problem concurrently.

The total work estimated here amounts to a start-up effort of about 13 to 15 person-months plus six to twelve person-months per year if biennial updating of exogenous variables is desired, and one person year each ten years for modifying the model.

Alternatives

The indexing method given above is complicated. That was necessary in order to accurately model school district behavior. But this complexity makes the index difficult to understand and evaluate for many policy makers. It is conceivable that a simple surrogate index could serve adequately. If such a surrogate correlated highly with the more accurate analytically based index then the policy makers might be willing to sacrifice a little accuracy in exchange for the simplicity of the surrogate.

Since education is so labor intensive, a logical surrogate index is one based on the local wage level.[11] Therefore, in order to test whether such a surrogate may be acceptable, an alternative index based on the single variable OPCOST could be computed and compared to the analytical index. This surrogate would be computed as the ratio of the district OPCOST to the state average value of that variable.

Alternatives between these two extremes are available but will not be considered further. The reason for this is that almost any attempt to construct an index more accurate than OPCOST leads immediately to regression analysis. For the present purpose, there is more similiarity between a simple single-equation regression model and the model (23) than between such a single equation model and the OPCOST index. In other words, once the leap to regression modelling is made, there is no reason to stop short of a comprehensive model because little additional loss of understanding by the non-technical user is involved.

4. Empirical Analysis

The structural model has been applied to data from two states, Ohio and Michigan. An Education Price Index (EPI) was constructed for each district and the impact of hypothetically implementing this EPI was examined. The results are presented in this chapter, along with an analysis of the sensitivity of the EPI to changes in certain assumptions underlying the construction of the index. A surrogate index is also compared to the EPI.

Data Requirements and Sources

Implementation of the methods of the previous chapter requires data on a variety of school district characteristics, including financing, staffing, pupil characteristics, and local demographic and labor market characteristics. The following sources of data were utilized.

Ohio

- District finance, staffing and some pupil characteristics from the Ohio Education Department Standard Forms 5, 12, and 25.
- School district tax rates from the Ohio Department of Taxation.
- Teacher salary schedules and education and experience levels of teachers in each district, from the Ohio Education Association.
- District socioeconomic characteristics from the National Center for Education Statistics' Census Fifth Count School District Data tape (SDDT).
- Additional socioeconomic data from the County and City Data Book.

Michigan

- District finance, staffing, pupil characteristics and tax rates from the Michigan Education Department Comprehensive Data tape.
- Teacher salary schedules for each district, from the Michigan Education Association.
- District socioeconomic characteristics from the NCES Census Fifth Count SDDT.
- Additional Socioeconomic data from the County and City Data Book.

The Ohio data covers the 1976-77 school year, except for census data, which is from the 1970 census. Michigan data for 1976-77 was incomplete at the time it was obtained, so most data from that state covers the 1975-76 year.

Some important information was not available. The primary example is in separate measures of prices and quantities of the variable OTHER of the previous chapter. A less serious case is the lack of detailed salary and quantity data for non-teaching instructional staff. It is assumed that their price index is the same as that for teachers. A third gap concerns the price of teachers: salary is only part of the price; total price also includes fringe benefits. We were able to obtain fringe benefit information for many districts in Ohio, but the data was not so widely available as to be useful here.

No direct measure of teacher quality was available in either state, so the variable EDLVL will serve a dual role in the model, as previously discussed. Finally, some pupil characteristic variables, such as attendance rates, were unavailable.

All required data items were available for 602 of the 616 operating school districts listed by the Ohio Education Department. Joint vocational districts are not included. The 14 other districts had enrollments less than 300, so are not on the NCES Census Fifth Count Data file. Of the total 587 operating school districts in Michigan, 53 were deleted from the file because they serve elementary students only; 18 were deleted because their enrollment was less than 300 (so census data was not available), and 70 had to be deleted because of data errors. This leaves 446 districts in the Michigan data base.

Estimation of the Structural Parameters

The structural form (23) is restated in (34), which reflects the discussion of specific variables that followed (23). Structure (23) also contained an equation for AID. Whether or not that equation should be incorporated depends on how state aid is determined. If power equalization or some other form of state aid is employed that depends on district actions, then AID is endogenous. Otherwise, AID is exogenous and no equation for it is needed. Both Ohio and Michigan have a form of partial power equalization, so AID is endogenous. There is, however, no linear equation that accurately expresses the relationship of AID to the other variables in this system. For example, the forms of power equalization used in the two states do not include recapture and do not equalize effort beyond a certain point. Moreover, they are both based on equalized property value and millage rate, rather than WEALTH and EFFORT as defined above. Thus, although one could approximate AID as a linear function increasing with millage rate and decreasing with EPV, the latter two variables are not, and should not be, incorporated into the structure, for the reasons given previously. (See Chapter 2).

The problem remains that AID is endogenous, yet if an approximate equation for it is included in the structure, it will not be clear how to interpret that equation. But, if AID is treated as exogenous, this may bias parameters elsewhere in the structure. Nevertheless, our preference is to employ a structural form that is understood; that is, we prefer not to include an equation for AID, since we would not know how to interpret it. But we would not exclude such an equation if that would result in a serious specification error. That is unlikely to happen, however (cf. Cragg (1968)). In any case, the structural

$$
\begin{aligned}
\text{STSAL} &= -b_{11}\,\text{RATIO} + b_{12}\,\text{EDLVL} + b_{13}\,\text{EFFORT} + b_{14}\,\text{WEALTH} \\
&\quad + b_{15}\,\text{TITLEI} + b_{16}\,\text{CAT} + b_{17}\,\text{AID} + k_1 + e_1 \\
\text{STSAL} &= -b_{21}\,\text{RATIO} + b_{22}\,\text{EDLVL} - b_{23}\,\text{PTCHR} + b_{24}\,\text{OPCOST} \\
&\quad + b_{25}\,\text{DENS} + b_{26}\,\text{LADM} + b_{27}\,\text{MNRTY} + b_{28}\,\text{POVCH} \\
&\quad + b_{29}\,\text{BRKHME} - b_{210}\,\text{ACH} + k_2 + e_2 \\
\text{EDPRM} &= \pm\, b_{31}\,\text{EDLVL} + b_{32}\,\text{EFFORT} + b_{33}\,\text{WEALTH} + b_{34}\,\text{TITLEI} \\
&\quad + b_{35}\,\text{CAT} + b_{36}\,\text{AID} + k_3 + e_3 \\
\text{EDPRM} &= b_{41}\,\text{EDLVL} - b_{42}\,\text{EXPER} - b_{43}\,\text{RATIO} + b_{44}\,\text{OPCOST} \\
&\quad - b_{45}\,\text{ACH} + k_4 + e_4 \qquad (34) \\
\text{EXPRM} &= b_{51}\,\text{EDLVL} - b_{52}\,\text{EXPER} + b_{53}\,\text{EFFORT} + b_{54}\,\text{WEALTH} \\
&\quad + b_{55}\,\text{TITLEI} + b_{56}\,\text{CAT} + b_{57}\,\text{AID} + k_5 + e_5 \\
\text{EXPRM} &= b_{61}\,\text{EXPER} - b_{61}\,\text{RATIO} + b_{63}\,\text{EDLVL} + b_{64}\,\text{OPCOST} \\
&\quad + b_{65}\,\text{MNRTY} + b_{66}\,\text{POVCH} + b_{67}\,\text{BRKHME} - b_{68}\,\text{ACH} \\
&\quad + b_{69}\,\text{LADM} - b_{610}\,\text{STBLTY} + k_6 + e_6 \\
\text{INSM} &= b_{71}\,\text{EFFORT} + b_{71}\,\text{AID} + b_{73}\,\text{WEALTH} + b_{74}\,\text{TITLEI} \\
&\quad + b_{75}\,\text{CAT} + k_7 + e_7 \\
\text{EFFORT} &= b_{81}\,\text{STSAL} + b_{82}\,\text{EDPRM} + b_{83}\,\text{EXPRM} - b_{84}\,\text{AID} \\
&\quad - b_{85}\,\text{RESD} - b_{86}\,\text{DEP} + b_{87}\,\text{PENRL} - b_{88}\,\text{TITLEI} - b_{89}\,\text{CAT} \\
&\quad + b_{810}\,\text{FINCOL} \pm b_{811}\,\text{WEALTH} \pm b_{812}\,\text{WEALTH}^2 \\
&\quad \pm b_{813}\,\text{WEALTH}^3 + k_8 + e_8 \\
\text{OTHER} &= b_{91}\,\text{EFFORT} + b_{92}\,\text{AID} + b_{93}\,\text{WEALTH} + b_{94}\,\text{TITLEI} \\
&\quad + b_{95}\,\text{CAT} \pm b_{96}\,\text{OPCOST} + k_9 + e_9 \\
\text{PTCHR} &= \text{RATIO} \times \text{PENRLC}
\end{aligned}
$$

parameters were estimated both with and without an equation for AID and there was little difference in the results; therefore, AID will be treated as exogenous. (It is notable that if AID is treated as endogenous, it decreases as EFFORT increases and increases with WEALTH in Ohio, and also decreases with increasing EFFORT in Michigan. In Ohio, which subsidizes EDLVL and EXPER, AID decreases as these increase. The relevant regression results are shown in Appendix A.)

Structure (34) is subject to some degree of collinearity. In order to make the coefficients more stable, the most serious collinearities were removed. This resulted in the removal of EXPRM from Ohio's EFFORT equation and of LADM from Michigan's entire structure and AID from that state's OTHER equation. The regression results with these variables included are shown in Appendix A. The extent of collinearity among the structural parameters (i.e., the coefficients) remains high in some equations. This must be considered when interpreting the results.

The regression results are shown in 35-o and 35-m for Ohio and Michigan, respectively. The standardized coefficients (β's) and t-statistics are given under each variable. The t's are in parentheses. One, two, or three asterisks are shown under those that are statistically significant at the 10, 5, or 1 percent level, respectively, using the one-tailed test.

Most coefficients have the predicted sign, and most of those that do not are insignificant or only marginally significant. The chief differences are as follows. TITLEI and CAT have an insignificant impact on the teacher prices in Michigan, except that districts with a high TITLEI are willing to pay a higher EXPRM. In Ohio, TITLEI and CAT are associated with a slight district preference for more INSM and OTHER rather than more teachers. This does not necessarily mean that districts in Ohio with high TITLEI or categorical aid are expected to pay lower teacher prices or hire fewer teachers, but only that, for a given quantity and quality of teachers, they would not pay as much. However, since they have more money available the quantity and quality that they want may be higher. The net effect could be either positive or negative.

This point also applies to the exogenous variables with insignificant or marginally significant coefficients. A few coefficients of exogenous variables are more troublesome, however. The negative coefficient of POVCH in Michigan's supply equation for STSAL is unexpected, as are the positive coefficients of ACH and STBLTY in the EXPRM supply equation for Michigan and Ohio, respectively. These suggest that supply and demand have not been completely separated in these equations.

The surprisingly insignificant and negative coefficient of OPCOST in Michigan's STSAL supply equation might also fall into this category, but is more likely the result of collinearity with the very strong coefficient of RATIO in that equation (see Appendix A for the correlation matrices of the coefficients). The behavior of DEP in the EFFORT equation is also partly due to collinearity (with PENRL), and the coefficient of FINCOL in that equation for Ohio may be due to the collinearity with the coefficient of EDPRM, and to a lesser extent, with that of RESD.

Overall, the system appears to behave as expected, although there are some notable exceptions. On the positive side, recall that EDLVL was proposed as a surrogate for teacher quality. This variable does indeed behave very much like a measure of teacher quality in both Ohio and Michigan. If one compares standardized coefficients, it is by far the most significant variable in the teacher supply and demand price equations, dominating all six of these equations in Ohio and all three

STSAL = - 6229 RATIO + 5028 EDLVL + 5.8 EFFORT + 7.232 WEALTH - 2.434 TITLE1 - 0.6689 CAT + 0.5212 AID + 7253
- 0.074(-0.94) 0.974(9.29) 0.167(2.39) 0.033(0.31) - 0.079(-2.2) - 0.055(-1.6) 0.102(2.29)
*** *** ** * **

R^2 = 0.4826 F = 79.152 ST.ERROR = 413.62

STSAL = 3931 RATIO + 2415 EDLVL + 177.8PTCHR + 0.2097 OPCOST + 0.04192 DENS + 118.6 LADM - 205.3 MNRTY - 185.4 POVCH + 258.9 BRKHME + 251.2 ACH + 5241
0.047(1.10) 0.468(6.30) 0.047(1.16) 0.275(6.07) 0.068(1.45) 0.169(3.41) - 0.23(-0.71) - 0.021(-0.55) 0.086(2.69) 0.031(0.90)
*** *** * *** ***

R^2 = 0.5613 F = 75.627 ST.ERROR = 381.82

EDPRM = 1293 EDLVL + 0.9896 EFFORT - 4.067 WEALTH - 0.3296 TITLE1 + 0.02646 CAT + 0.1127 AID + 1111
0.525(5.01) 0.06(0.67) - 0.039(-0.56) - 0.022(-0.50) 0.005(0.10) 0.046(0.80)
***

R^2 = 0.1064 F = 11.807 ST. ERROR = 259.14

EDPRM = 1019 EDLVL + 23.37 EXPER - 146 RATIO - 0.001262 OPCOST + 2.505 ACH + 1114
0.414(3.82) 0.078(0.63) - 0.004(-0.07) -0.003 (-0.07) 0.001(0.01)
***

R^2 = 0.1059 F = 14.114 ST.ERROR = 259.00

EXPRM = 449.8 EDLVL + 39.25 EXPER + 0.4998 EFFORT + 1.296 WEALTH - 0.3728 TITLE1 - 0.0571 CAT + 0.05639 AID - 25.99
0.694(7.19) 0.495(6.50) 0.115(1.97) 0.048(0.99) - 0.097(-3.24) - 0.038(-1.25) 0.088(2.31) (35 - o)
*** *** *** *** ***

R^2 = 0.6166 F = 136.488 ST.ERROR = 44.67

EXPRM = 12.64 EXPER + 1024 RATIO + 341.6 EDLVL + 0.02718 OPCOST + 3.963 MNRTY - 27.93 POVCH + 18.99 BRKHME - 2.4 ACH + 17.43 LADM + 95.61 STBLTY - 179.3
0.159(1.62) 0.097(2.76) 0.527(6.97) 0.284(7.99) 0.004(0.11) - 0.025(-0.74) 0.050(1.70) - 0.002(-0.08) 0.198(4.88) 0.051(1.82)
* *** *** *** ** *** **

R^2 = 0.6792 F = 125.115 ST.ERROR = 40.97

INSM = -0.6168 EFFORT - 0.07388 AID + 10.99 WEALTH + 1.236 TITLE1 + 0.1079 CAT + 49.42
- 0.187(-2.78) -0.153(-3.38) 0.535(13.31) 0.424(10.97) 0.094(2.40)
*** *** *** *** ***

R^2 = 0.3209 F = 56.335 ST.ERROR = 44.79

EFFORT= -0.001862 STSAL + 0.0225 EDPRM - 0.05925 AID - 37.62 RESD + 6.949 DEP + 56.95 PENRL + 0.07295 TITLE1 - 0.05072 CAT - 45.92 FINCOL + 1.331 WEALTH
- 0.065 (-0.61) 0.373(1.78) - 0.405(-9.91) - 0.357(-7.47) 0.046(0.82) 0.332(5.29) 0.082(2.17) - 0.145(-4.25) - 0.192(-2.31) 0.213(1.65)
** *** *** *** ** *** ** **

- 0.001874 $WEALTH^2$ + 0.0001886 $WEALTH^3$ + 25.91
- 0.005(-0.02) 0.013(0.08)

R^2 = 0.4854 F = 46.302 ST. ERROR = 11.92

OTHER = 3.154 EFFORT + 0.2441 AID + 36.98 WEALTH + 1.498 TITLE1 + 0.4885 CAT + 0.008317 OPCOST - 247.2
0.452(8.16) 0.239(6.40) 0.849(23.20) 0.242(7.53) 0.201(6.22) 0.054(1.53)
*** *** *** *** *** *

R^2 = 0.5463 F = 119.403 ST.ERROR = 77.70

```
STSAL= -36180 RATIO + 3021 EDLVL + 4.439 EFFORT + 17.03 WEALTH + 0.08:19 TITLE1 - 0.8096 CAT + 0.2886 AID + 9551
       -0.329(-3.74) 0.769(6.82)   0.197(1.60)    0.098(1.19)    0.031(0.74)     - 0.051(-1.0/) 0.150(..60)
           ***          ***            *                                                           *
       R^2 = 0.3405   F = 32.310    ST.ERROR = 393.20

STSAL = - 47600 RATIO + 1326 EDLVL - 135.9 PTCHR - 0.04177 OPCOST + 0.129 DENS + 478.6 MNRTY - 1411 POVCH + 353.6 BRKHME + 9.369 ACH + 11160
       - 0.433(-3.22)  0.337(3.40) - 0.054(-0.83) - 0.097(-1.08)    0.271(4.94)  0.090(1.60) - 0.169(-2.89) 0.128(2.85)    0.031(0.62)
            ***            ***                                          ***                       ***          ***
       R^2 = 0.3957     F = 31.720    ST.ERROR = 377.26

EDPRM = 4060 EDLVL + 15.03 EFFORT + 66.31 WEALTH + 0.06388 TITLE1 + 0.2136 CAT + 1.024 AID - 1997
       0.866(8.69)   0.560(5.23)    0.320(4.57)    0.020(0.56)      0.011(0.26)  0.446(5.58)
           ***          ***             ***                                          ***
       R^2 = 0.4792   F = 67.318     ST.ERROR = 416.50

EDPRM = 2633 EDLVL + 30.21 EXPER - 12950 RATIO + 0.1681 OPCOST - 3.325 ACH - 697.7
       0.561(5.74)   0.111(1.15) - 0.099( 1.22)  0.326(5.56)    - 0.010(-0.29)
           ***                                       ***
       R^2 = 0.5032   F = 89.141    ST. ERROR = 406.32

EXPRM = 784.7 EDLVL - 11.28 EXPER + 4.294 EFFORT + 20.06 WEALTH + 0.04672 TITLE1 - 0.06114 CAT + 0.2541 AID - 117
       0.889(7.59)  - 0.219(-2.08)  0.850(7.65)    0.514(6.43)    0.079(2.22)     - 0.017(-0.41)  0.588(6.25)
           ***            **            ***            ***            **                              ***
       R^2 = 0.5381    F = 72.896    ST.ERROR = 73.87

EXPRM = 12.76 EXPER - 7496 RATIO + 218.5 EDLVL + 0.05727 OPCOST + 57.82 MNRTY + 126.5 POVCH - 17.6 BRKHME + 4.236 ACH - 237 STBLTY + 199.8
       0.248(1.93) - 0.304(-3.72) 0.248(1.97)   0.591(9.85)      0.049(1.09)   0.067(1. 3)  -0.028(-0.84)  0.062(1.49) - 0.089(-2.06)
           **            ***          **            ***                             *                             *            **
       R^2 = 0.6532   F = 91.244   ST.ERROR = 64.15

INSM =  - 0.3778 EFFORT - 0.003197 AID + 3.058 WEALTH + 0.01184 TITLE1 + 1.156 CAT + 99.89
        - 0.137(-1.36)  - 0.014(-0.18)  0.144(2.40)    0.037(1.04)      0.595(15.87)
              *                             ***                             ***
       R^2 = 0.4812      F = 81.629    ST.ERROR = 42.61

EFFORT = - 0.02485 STSAL + 0.01326 EDPRM + 0.03518 EXPRM - 0.06383 AID - 10.64 RESD + 24.52 DEP + 57.98 PENRL + 0.001434 TITLE1 + 0.02109 CAT
         - 0.559(-3.54)    0.356(1.75)    0.178(1.19)   - 0.747(-18.29) -0.117(-2.87) 0.11(1.95) 0.235(3.99)  0.012(0.32)       0.030(0.71)
              ***             **                              ***            ***         **         ***

                                       + 4.926 FINCOL - 3.608 WEALTH - 0.0648 WEALTH^2 + 0.00573 WEALTH^3 + 261.9
                                         0.013(0.20)  - 0.467(-4.16) - 0.072(-0.57)      0.100(0.84)
                                                            ***
       R^2 = 0.4916       F = 32.129      ST.ERROR = 15.44

OTHER = 0.3392 EFFORT + 9.504 WEALTH + 0.02143 TITLE1 + 1.023 CAT - 0.005933 OPCOST + 252.3
        0.088(1.47)     0.319(5.81)    0.048(1.14)      0.377(8.35) - 0.08(-1.45)
           *                ***                             ***           *
       R^2 = 0.2706     F = 32.653     ST.ERROR = 70.67
```

(35 - m)

The behavior of EFFORT and of AID in the quantity equation for INSM is contrary to expectation. Districts with high values of EFFORT and AID may prefer to purchase teachers and OTHER. Evidently, more information is needed to accurately specify this equation. This equation plays only a small role in deriving the EPI, so this shortcoming is not critical.

Other than the insignificance of a few exogenous variables already noted, the EFFORT equation appears as expected except for the coefficient of STSAL. This may be at least partly due to collinearity in Ohio with the coefficient of WEALTH (r = -.73) and in Michigan to moderate collinearities with both EDPRM and WEALTH (r = -.58 and r = -.52, respectively). Note the prominence of AID in this equation for both states. It is the most significant variable and its sign is negative. Since both states have a form of power equalization based on EPV, it appears that high AID districts tend to have substantial levels of income rather than property wealth.

The equations for OTHER are as expected, but recall that the sign of OPCOST was uncertain. Its positive impact on the supply price of OTHER dominated its negative impact on the demand in Ohio; the reverse was true in Michigan. Thus, in computing the EPI for Michigan, the influence of OPCOST will be held constant, for the reason given in the preceding chapter.

The role of WEALTH in the EFFORT equation is of interest. In Ohio, EFFORT is a nearly linear increasing function of WEALTH, whereas in Michigan it is a decreasing function, with positive second partial derivative in the relevant range. These results are consistent with the implications of figure 3, with Ohio districts operating on the left side of that state's curve, and Michigan districts on the right side of its curve. Ohio districts are on the left side because Ohio's curve is shifted right by the high level of non-local revenue (55 percent versus 44 percent in Michigan). Michigan districts are shifted even further to the right relative to those in Ohio because the average level of WEALTH is higher in Michigan.

Education Price Index

An EPI was computed for each district according to the procedure in the preceding chapter. Briefly, the three teacher demand price equations are solved simultaneously for RATIO, EDLVL, and EXPER, using actual values of CAT and TITLEI and holding all other variables in these equations constant at the state means. These quantities are then substituted into the three supply equations along with actual values of the other variables, and the supply prices are computed. The equation for INSM yields an estimated quantity, allowing only CAT and TITLEI to vary. The price of INSM is assumed to be constant. The supply price of OTHER is computed by allowing only OPCOST to vary in its equation in Ohio. The price is taken as constant in Michigan since the demand side of OPCOST outweighed its supply impact in that equation.

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The five component prices are weighted and combined as described previously.

The results are given in Table VI. This table gives district name, the five weights, the five component indices, the composite EPI, and the rank order. Districts are arranged in the order in which they appear on data files provided by the respective state education departments. This results in their being grouped by county in both states. In Ohio, districts within a county are divided into three groups: City, Exempted Village, and Local. A blank line separates counties in Table VI.

Several aspects of this EPI should be noted. First, the variation is rather small; it ranges from .9393 to 1.0798 in Ohio, and from .9394 to 1.1071 in Michigan. The large cities tend to have higher indices; within counties, the cities tend to be highest, followed by suburbs, and then the rural areas, although a few remote areas have a high EPI. The highest index in Ohio is that for Switzerland of Ohio Local, which is the only district in its county. This is followed closely by Akron (1.0787) and Columbus (1.0777). The cities of Toledo (1.0674), Cleveland (1.0658), and Dayton (1.0652) are also among the highest. Cincinnatti is moderately high, at 1.045.

In Michigan, Detroit stands out among all districts with an EPI of 1.1071. The next highest is Highland Park City, with an EPI of 1.0698. The six highest EPI's are all in Wayne County (Detroit's county). The next four are all in either Wayne or adjoining Oakland county.

Sensitivity Analysis

The complexity of structure (34) and the method of extracting the EPI from it leads one to wonder how sensitive the EPI is to changes in (34) or in its application to the EPI. For this reason, several changes were made in the process and the index recomputed and compared to the EPI. These changes are as follows:

1) Hold constant the variables with incorrect signs
2) Leave out variables with the wrong sign if collinearity exists and reestimate the parameters of the system
3) Use EPV per pupil and millage rate in place of WEALTH and EFFORT throughout the system
4) Use actual values of EFFORT instead of the state average when solving the three demand equations for the teacher quantities
5) Add a variable representing the number of days teachers were on strike during the last three years, to each equation and reestimate the parameters.

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
OHIO VALLEY LOCAL S.D.	0.347	0.014	0.078	0.148	0.413	1.169	1.015	0.866	1.000	0.955	1.0298	81
DELPHOS CITY S.D.	0.466	0.018	0.100	0.086	0.330	0.962	1.000	0.969	1.000	0.998	0.9785	457
LIMA CITY S.D.	0.361	0.014	0.080	0.128	0.416	1.071	1.008	1.032	1.000	0.998	1.0274	93
BLUFFTON EX VIL S.D	0.509	0.020	0.107	0.077	0.287	0.957	0.999	0.959	1.000	0.998	0.9732	513
ALLEN EAST LOCAL S.D.	0.532	0.020	0.111	0.065	0.271	0.970	0.995	0.988	1.000	0.998	0.9821	433
BATH LOCAL S.D.	0.490	0.019	0.104	0.079	0.307	0.988	0.998	0.996	1.000	0.998	0.9930	338
ELIDA LOCAL S.D.	0.531	0.020	0.111	0.065	0.273	0.982	0.995	1.010	1.000	0.998	0.9910	353
PERRY LOCAL S.D.	0.345	0.014	0.077	0.135	0.430	0.962	1.009	0.947	1.000	0.998	0.9822	430
SHAWNEE LOCAL S.D.	0.543	0.021	0.113	0.061	0.262	0.997	0.994	1.007	1.000	0.998	0.9986	297
SPENCERVILLE LOCAL S.D.	0.488	0.019	0.104	0.086	0.304	0.959	1.001	0.972	1.000	0.998	0.9767	477
ASHLAND CITY S.D.	0.506	0.020	0.107	0.078	0.290	1.107	0.999	0.971	1.000	0.982	1.0457	30
LOUDONVILLE-PERRYSVILLE EX VIL	0.473	0.018	0.101	0.092	0.315	0.984	1.002	0.921	1.000	0.982	0.9787	455
HILLSDALE LOCAL S.D.	0.493	0.019	0.104	0.077	0.307	0.976	0.998	0.931	1.000	0.982	0.9756	487
MAPLETON LOCAL S.D.	0.441	0.017	0.095	0.093	0.354	0.967	1.001	0.912	1.000	0.982	0.9706	527
ASHTABULA AREA CITY S.D.	0.517	0.020	0.109	0.078	0.276	1.063	0.999	1.061	1.000	0.999	1.0389	45
CONNEAUT AREA CITY S.D.	0.517	0.020	0.109	0.077	0.278	1.010	0.999	1.029	1.000	0.999	1.0081	220
GENEVA AREA CITY S.D.	0.514	0.020	0.108	0.075	0.282	1.004	0.998	1.018	1.000	0.999	1.0034	255
BUCKEYE LOCAL S.D.	0.567	0.022	0.117	0.060	0.235	1.011	0.995	1.029	1.000	0.999	1.0091	212
GRAND VALLEY LOCAL S.D.	0.447	0.017	0.096	0.095	0.344	0.965	1.002	0.983	1.000	0.999	0.9821	431
JEFFERSON AREA LOCAL S.D.	0.500	0.019	0.106	0.081	0.294	0.989	0.999	1.002	1.000	0.999	0.9944	328
PYMATUNING VALLEY LOCAL S.D.	0.435	0.017	0.094	0.097	0.356	0.963	1.002	0.963	1.000	0.999	0.9797	447
ATHENS CITY S.D.	0.445	0.017	0.097	0.104	0.337	1.033	1.006	0.857	1.000	0.958	0.9867	395
NELSONVILLE-YORK CITY S.D.	0.485	0.019	0.104	0.091	0.301	0.961	1.003	0.857	1.000	0.958	0.9534	595
ALEXANDER LOCAL S.D.	0.389	0.015	0.086	0.125	0.384	0.948	1.010	0.836	1.000	0.958	0.9495	597
FEDERAL-HOCKING LOCAL S.D.	0.392	0.015	0.086	0.115	0.392	0.941	1.006	0.830	1.000	0.958	0.9457	601
TRIMBLE LOCAL S.D.	0.422	0.017	0.092	0.117	0.352	0.928	1.009	0.829	1.000	0.958	0.9393	602
SAINT MARYS CITY S.D.	0.535	0.020	0.111	0.065	0.268	1.038	0.995	0.997	1.000	0.990	1.0172	149
WAPAKONETA CITY S.D.	0.513	0.020	0.108	0.072	0.287	1.052	0.997	0.999	1.000	0.990	1.0236	113
MINSTER LOCAL S.D.	0.551	0.021	0.114	0.061	0.253	0.968	0.995	0.961	1.000	0.990	0.9754	491
NEW BREMEN LOCAL S.D.	0.510	0.020	0.107	0.072	0.291	0.958	0.997	0.941	1.000	0.990	0.9690	538
NEW KNOXVILLE LOCAL S.D.	0.533	0.020	0.111	0.068	0.268	0.938	0.997	0.919	1.000	0.990	0.9549	592
WAYNESFIELD-GOSHEN LOCAL S.D.	0.504	0.019	0.106	0.076	0.294	0.953	0.998	0.920	1.000	0.990	0.9647	565
BELLAIRE CITY S.D.	0.448	0.017	0.097	0.100	0.337	1.009	1.004	0.972	1.000	0.988	0.9971	312
MARTINS FERRY CITY S.D.	0.435	0.017	0.095	0.115	0.337	1.005	1.009	0.975	1.000	0.988	0.9959	318
GEORGETOWN EX VIL S.D	0.495	0.019	0.105	0.080	0.301	0.971	0.999	0.901	1.000	0.977	0.9683	542
EASTERN LOCAL S.D.	0.457	0.018	0.099	0.100	0.327	0.971	1.004	0.899	1.000	0.977	0.9694	535
FAYETTEVILLE-PERRY LOCAL S.D.	0.482	0.019	0.103	0.083	0.314	0.934	0.999	0.861	1.000	0.977	0.9468	600
RIPLEY-UNION-LEWIS LOCAL S.D.	0.351	0.014	0.079	0.152	0.404	0.970	1.017	0.876	1.000	0.977	0.9707	526
WESTERN-BROWN LOCAL S.D.	0.432	0.017	0.094	0.108	0.349	1.012	1.006	0.904	1.000	0.977	0.9881	383
FAIRFIELD CITY	0.527	0.020	0.110	0.066	0.277	1.016	0.995	1.083	1.000	1.014	1.0213	122
HAMILTON CITY S.D.	0.433	0.017	0.094	0.099	0.357	1.069	1.002	1.099	1.000	1.014	1.0442	35
MIDDLETOWN CITY S.D.	0.452	0.018	0.097	0.095	0.339	1.071	1.001	1.097	1.000	1.014	1.0461	29

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
EDGEWOOD LOCAL S.D.	0.512	0.020	0.108	0.073	0.288	0.990	0.997	1.046	1.000	1.014	1.0035	254
LAKOTA LOCAL S.D.	0.529	0.020	0.110	0.065	0.276	1.014	0.995	1.074	1.000	1.014	1.0195	133
MADISON LOCAL S.D.	0.513	0.020	0.108	0.071	0.289	0.985	0.996	1.038	1.000	1.014	1.0004	284
NEW MIAMI LOCAL S.D.	0.411	0.016	0.090	0.117	0.364	0.971	1.008	1.010	1.000	1.014	0.9939	335
ROSS LOCAL S.D.	0.502	0.019	0.106	0.079	0.293	0.993	0.999	1.053	1.000	1.014	1.0061	237
TALWANDA LOCAL S.D.	0.480	0.018	0.102	0.080	0.319	1.008	0.998	1.029	1.000	1.014	1.0112	192
CARROLLTON EX VIL S.D	0.460	0.018	0.099	0.095	0.329	1.142	1.002	0.970	1.000	0.987	1.0580	19
BROWN LOCAL S.D.	0.509	0.019	0.107	0.068	0.297	0.974	0.995	0.923	1.000	0.987	0.9747	499
URBANA CITY S.D.	0.467	0.018	0.100	0.088	0.328	1.053	1.000	0.978	1.000	0.993	1.0203	130
MECHANICSBURG EX VIL S.D	0.436	0.017	0.094	0.097	0.356	0.962	1.002	0.919	1.000	0.993	0.9733	512
GRAHAM LOCAL S.D.	0.442	0.017	0.095	0.090	0.356	1.007	0.999	0.965	1.000	0.993	0.9974	308
TRIAD LOCAL S.D.	0.458	0.018	0.098	0.094	0.332	0.957	1.002	0.931	1.000	0.993	0.9714	523
WEST LIBERTY-SALEM LOCAL S.D.	0.414	0.016	0.090	0.106	0.374	0.977	1.003	0.922	1.000	0.993	0.9809	441
SPRINGFIELD CITY S.D.	0.436	0.017	0.095	0.104	0.348	1.112	1.004	1.089	1.000	1.008	1.0602	15
MAD RIVER-GREEN LOCAL S.D.	0.504	0.019	0.106	0.076	0.294	1.007	0.998	1.034	1.000	1.008	1.0095	208
NEW CARLISLE-BETHEL LOCAL S.D.	0.533	0.021	0.111	0.067	0.269	1.039	0.996	1.067	1.000	1.008	1.0303	78
NORTHEASTERN LOCAL S.D.	0.511	0.020	0.107	0.073	0.289	1.003	0.997	1.031	1.000	1.008	1.0071	231
NORTHWESTERN LOCAL S.D.	0.495	0.019	0.105	0.077	0.304	0.983	0.998	1.009	1.000	1.008	0.9950	324
SOUTHEASTERN LOCAL S.D.	0.378	0.015	0.084	0.131	0.393	0.957	1.010	0.971	1.000	1.008	0.9846	410
SPRINGFIELD LOCAL S.D.	0.538	0.021	0.112	0.065	0.264	1.002	0.995	1.047	1.000	1.008	1.0082	219
MILFORD EX VIL S.D	0.504	0.019	0.106	0.074	0.296	1.021	0.997	1.034	1.000	1.003	1.0151	164
NEW RICHMOND EX VIL S.D	0.468	0.018	0.101	0.097	0.316	0.995	1.004	1.006	1.000	1.003	0.9992	293
BATAVIA LOCAL S.D.	0.446	0.017	0.097	0.103	0.336	0.960	1.005	0.966	1.000	1.003	0.9824	427
BETHEL-TATE LOCAL S.D.	0.461	0.018	0.099	0.096	0.325	0.976	1.003	0.989	1.000	1.003	0.9886	377
CLERMONT NORTHEASTERN LOCAL S.	0.470	0.018	0.100	0.083	0.329	0.980	0.998	0.993	1.000	1.003	0.9909	354
FELICITY-FRANKLIN LOCAL S.D.	0.443	0.017	0.095	0.095	0.350	0.951	1.001	0.953	1.000	1.003	0.9750	494
GOSHEN LOCAL S.D.	0.506	0.020	0.107	0.079	0.289	0.993	0.999	1.017	1.000	1.003	0.9989	295
WEST CLERMONT LOCAL S.D.	0.477	0.018	0.101	0.079	0.324	1.044	0.997	1.052	1.000	1.003	1.0271	94
WILLIAMSBURG LOCAL S.D.	0.497	0.019	0.106	0.083	0.295	0.974	1.000	0.995	1.000	1.003	0.9874	390
WILMINGTON CITY S.D.	0.444	0.017	0.096	0.105	0.337	1.069	1.006	0.952	1.000	0.984	1.0207	127
BLANCHESTER LOCAL S.D.	0.467	0.018	0.100	0.087	0.328	0.995	1.000	0.930	1.000	0.984	0.9853	406
CLINTON MASSIE LOCAL S.D.	0.421	0.016	0.091	0.102	0.370	0.977	1.002	0.918	1.000	0.984	0.9767	478
EAST CLINTON LOCAL S.D.	0.453	0.018	0.098	0.096	0.335	0.970	1.002	0.928	1.000	0.984	0.9741	505
EAST LIVERPOOL CITY S.D.	0.371	0.014	0.082	0.124	0.409	1.017	1.007	0.984	1.000	0.990	1.0009	279
EAST PALESTINE CITY S.D.	0.504	0.019	0.106	0.077	0.293	0.965	0.998	0.969	1.000	0.990	0.9757	486
SALEM CITY S.D.	0.497	0.019	0.105	0.077	0.301	1.007	0.998	0.994	1.000	0.990	0.9997	289
WELLSVILLE CITY S.D.	0.441	0.017	0.096	0.102	0.344	0.965	1.004	0.954	1.000	0.990	0.9769	474
COLUMBIANA EX VIL S.D	0.515	0.020	0.108	0.074	0.283	0.965	0.998	0.961	1.000	0.990	0.9748	496
LEETONIA EX VIL S.D	0.508	0.019	0.107	0.073	0.293	0.951	0.997	0.949	1.000	0.990	0.9667	548
LISBON EX VIL S.D	0.536	0.021	0.112	0.065	0.267	0.961	0.996	0.959	1.000	0.990	0.9718	518
BEAVER LOCAL S.D.	0.526	0.020	0.110	0.068	0.276	0.991	0.996	0.994	1.000	0.990	0.9918	346
CRESTVIEW LOCAL S. D.	0.524	0.020	0.110	0.071	0.275	0.956	0.998	0.953	1.000	0.990	0.9688	539
SOUTHERN LOCAL S.D.	0.457	0.018	0.099	0.099	0.327	0.956	1.004	0.952	1.000	0.990	0.9718	519
UNITED LOCAL S.D.	0.505	0.019	0.107	0.076	0.293	0.963	0.998	0.956	1.000	0.990	0.9733	511

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
COSHOCTON CITY S.D.	0.496	0.019	0.105	0.085	0.294	1.068	1.001	0.994	1.000	0.988	1.0294	83
RIDGEWOOD LOCAL S.D.	0.463	0.018	0.100	0.095	0.325	0.992	1.003	0.937	1.000	0.988	0.9863	398
RIVER VIEW LOCAL S.D.	0.389	0.015	0.086	0.122	0.388	1.041	1.008	0.952	1.000	0.988	1.0074	227
BUCYRUS CITY S.D.	0.475	0.018	0.101	0.087	0.319	1.011	1.000	0.981	1.000	0.994	1.0013	276
GALION CITY S.D.	0.501	0.019	0.106	0.077	0.298	1.048	0.998	1.007	1.000	0.994	1.0227	116
CRESTLINE EX VIL S.D	0.460	0.018	0.098	0.085	0.339	0.981	0.999	0.949	1.000	0.994	0.9840	413
BUCKEYE CENTRAL LOCAL S.D.	0.408	0.016	0.089	0.113	0.374	0.967	1.006	0.964	1.000	0.994	0.9813	436
COLONEL CRAWFORD LOCAL S.D.	0.480	0.018	0.102	0.083	0.317	0.983	0.999	0.957	1.000	0.994	0.9852	407
WYNFORD LOCAL S.D.	0.428	0.016	0.092	0.095	0.367	0.978	1.000	0.949	1.000	0.994	0.9834	419
BAY VILLAGE CITY S.D.	0.532	0.022	0.116	0.056	0.244	1.025	0.993	1.112	1.000	1.023	1.0325	64
BEACHWOOD CITY S.D.	0.494	0.019	0.104	0.072	0.310	1.007	0.995	1.064	1.000	1.023	1.0173	146
BEDFORD CITY S.D.	0.537	0.021	0.112	0.064	0.266	1.033	0.995	1.137	1.000	1.023	1.0392	43
BEREA CITY S.D.	0.552	0.021	0.114	0.060	0.253	1.054	0.994	1.169	1.000	1.023	1.0547	23
BRECKSVILLE CITY S.D.	0.536	0.021	0.111	0.062	0.270	1.019	0.994	1.105	1.000	1.023	1.0281	88
BROOKLYN CITY S.D.	0.453	0.017	0.097	0.080	0.352	0.986	0.996	1.041	1.000	1.023	1.0057	239
CLEVELAND CITY S.D.	0.294	0.012	0.067	0.164	0.463	1.139	1.016	1.208	1.000	1.023	1.0658	10
CLEVELAND HTS.-UNIV. HTS. CITY	0.505	0.019	0.106	0.071	0.298	1.038	0.996	1.136	1.000	1.023	1.0404	40
EAST CLEVELAND CITY S.D.	0.311	0.013	0.071	0.163	0.443	1.011	1.017	1.096	1.000	1.023	1.0207	128
EUCLID CITY S.D.	0.537	0.021	0.112	0.066	0.265	1.041	0.996	1.148	1.000	1.023	1.0449	33
FAIRVIEW PARK CITY S.D.	0.578	0.022	0.118	0.051	0.231	1.021	0.991	1.116	1.000	1.023	1.0312	73
GARFIELD HEIGHTS CITY S.D.	0.541	0.021	0.112	0.065	0.261	1.024	0.995	1.131	1.000	1.023	1.0335	62
LAKEWOOD CITY S.D.	0.518	0.020	0.108	0.069	0.285	1.034	0.995	1.130	1.000	1.023	1.0383	46
MAPLE HEIGHTS CITY S.D.	0.495	0.019	0.104	0.071	0.311	1.023	0.995	1.119	1.000	1.023	1.0310	75
MAYFIELD CITY S.D.	0.401	0.015	0.087	0.097	0.400	1.016	0.999	1.077	1.000	1.023	1.0223	118
NORTH OLMSTED CITY S.D.	0.542	0.021	0.113	0.064	0.261	1.030	0.995	1.118	1.000	1.023	1.0354	57
NORTH ROYALTON CITY S.D.	0.513	0.020	0.108	0.071	0.288	1.009	0.996	1.090	1.000	1.023	1.0212	123
OLMSTED FALLS CITY	0.531	0.020	0.111	0.063	0.275	1.014	0.994	1.092	1.000	1.023	1.0240	111
ORANGE CITY S.D.	0.517	0.020	0.108	0.064	0.291	1.017	0.994	1.063	1.000	1.023	1.0247	108
PARMA CITY S.D.	0.495	0.019	0.105	0.074	0.307	1.057	0.996	1.167	1.000	1.023	1.0527	24
ROCKY RIVER CITY S.D.	0.569	0.022	0.117	0.056	0.236	1.025	0.993	1.113	1.000	1.023	1.0327	63
SHAKER HEIGHTS CITY S.D.	0.553	0.021	0.114	0.059	0.253	1.033	0.994	1.140	1.000	1.023	1.0401	41
SOLON CITY S.D.	0.523	0.020	0.109	0.065	0.284	1.028	0.994	1.097	1.000	1.023	1.0317	70
SOUTH EUCLID-LYNDHURST CITY S.	0.546	0.021	0.113	0.061	0.258	1.027	0.994	1.131	1.000	1.023	1.0357	56
STRONGSVILLE CITY S.D.	0.532	0.020	0.111	0.062	0.276	1.024	0.993	1.114	1.000	1.023	1.0318	69
WARRENSVILLE HEIGHTS CITY S.D.	0.537	0.021	0.112	0.065	0.266	1.010	0.995	1.080	1.000	1.023	1.0206	129
WESTLAKE CITY S.D.	0.517	0.020	0.109	0.072	0.282	1.017	0.997	1.099	1.000	1.023	1.0260	100
CHAGRIN FALLS EX VIL S.D	0.546	0.021	0.113	0.058	0.263	1.015	0.993	1.082	1.000	1.023	1.0235	114
BRATENAHL LOCAL S.D.	0.592	0.023	0.120	0.048	0.217	0.959	0.991	0.974	1.000	1.023	0.9772	468
CUYAHOGA HEIGHTS LOCAL S.D.	0.605	0.023	0.122	0.045	0.205	0.999	0.990	1.081	1.000	1.023	1.0141	76
INDEPENDENCE LOCAL S.D.	0.527	0.020	0.110	0.070	0.272	0.998	0.997	1.078	1.000	1.023	1.0141	175
RICHMOND HEIGHTS LOCAL S.D.	0.569	0.022	0.117	0.053	0.240	1.005	0.992	1.068	1.000	1.023	1.0164	157
GREENVILLE CITY S.D.	0.475	0.018	0.101	0.084	0.321	1.048	0.999	0.969	1.000	0.985	1.0147	169
VERSAILLES EX VIL S.D	0.459	0.018	0.098	0.089	0.336	0.972	1.000	0.929	1.000	0.985	0.9754	489
ANSONIA LOCAL S.D.	0.439	0.017	0.095	0.102	0.348	0.952	1.004	0.921	1.000	0.985	0.9664	551
ARCANUM-BUTLER LOCAL S.D.	0.513	0.020	0.108	0.079	0.279	0.970	1.000	0.944	1.000	0.985	0.9743	503
FRANKLIN-MONROE LOCAL S.D.	0.427	0.016	0.092	0.095	0.369	0.950	1.000	0.894	1.000	0.985	0.9633	568

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
MISSISSINAWA VALLEY LOCAL S.D.	0.320	0.013	0.073	0.165	0.430	0.950	1.019	0.914	1.000	0.985	0.9715	521
TRI-VILLAGE LOCAL S.D.	0.424	0.016	0.091	0.095	0.374	0.957	1.000	0.916	1.000	0.985	0.9685	541
DEFIANCE CITY S.D.	0.494	0.019	0.105	0.078	0.305	1.072	0.998	1.014	1.000	0.999	1.0368	53
HICKSVILLE EX VIL S.D	0.575	0.022	0.118	0.053	0.233	1.000	0.992	1.012	1.000	0.999	1.0009	278
AYERSVILLE LOCAL S.D.	0.499	0.019	0.106	0.077	0.300	0.995	0.998	0.986	1.000	0.999	0.9956	319
CENTRAL LOCAL S.D.	0.480	0.019	0.102	0.088	0.312	0.991	1.001	0.976	1.000	0.999	0.9929	341
NORTHEASTERN LOCAL S.D.	0.457	0.018	0.098	0.091	0.336	0.987	1.001	0.955	1.000	0.999	0.9894	368
DELAWARE CITY S.D.	0.509	0.020	0.107	0.076	0.288	1.062	0.998	0.989	1.000	0.991	1.0278	89
BIG WALNUT LOCAL S.D.	0.506	0.019	0.106	0.071	0.298	1.009	0.996	0.979	1.000	0.991	0.9996	290
BUCKEYE VALLEY LOCAL S.D.	0.450	0.017	0.097	0.092	0.344	1.010	1.001	0.954	1.000	0.991	0.9973	310
OLENTANGY LOCAL S.D.	0.494	0.019	0.105	0.078	0.304	0.982	0.998	0.946	1.000	0.991	0.9829	423
HURON CITY S.D.	0.536	0.021	0.112	0.066	0.266	1.006	0.996	1.028	1.000	1.013	1.0100	203
SANDUSKY CITY S.D.	0.449	0.017	0.097	0.098	0.338	1.082	1.003	1.091	1.000	1.013	1.0502	26
BERLIN-MILAN LOCAL S.D.	0.513	0.020	0.108	0.075	0.285	0.995	0.998	1.036	1.000	1.013	1.0051	243
MARGARETTA LOCAL S.D.	0.529	0.020	0.110	0.064	0.277	1.006	0.994	1.046	1.000	1.013	1.0118	189
PERKINS LOCAL S.D.	0.496	0.019	0.105	0.080	0.300	1.015	0.999	1.053	1.000	1.013	1.0173	147
VERMILION LOCAL S.D.	0.549	0.021	0.114	0.064	0.252	1.045	0.995	1.084	1.000	1.013	1.0376	50
LANCASTER CITY S.D.	0.476	0.018	0.102	0.087	0.318	1.087	1.000	1.020	1.000	0.991	1.0408	39
AMANDA-CLEARCREEK LOCAL S.D.	0.450	0.018	0.097	0.102	0.333	0.957	1.005	0.948	1.000	0.991	0.9727	515
BERNE UNION LOCAL S.D.	0.463	0.018	0.100	0.096	0.323	0.946	1.003	0.940	1.000	0.991	0.9663	554
BLOOM-CARROLL LOCAL S.D.	0.503	0.019	0.106	0.077	0.295	0.968	0.998	0.957	1.000	0.991	0.9769	475
FAIRFIELD UNION LOCAL S.D.	0.456	0.018	0.098	0.094	0.335	0.967	1.002	0.950	1.000	0.991	0.9771	471
LIBERTY UNION-THURSTON LOCAL S	0.473	0.018	0.101	0.090	0.317	0.965	1.002	0.963	1.000	0.991	0.9770	473
PICKERINGTON LOCAL S.D.	0.559	0.021	0.115	0.058	0.247	0.980	0.994	0.993	1.000	0.991	0.9860	401
WALNUT TWP LOCAL S.D.	0.488	0.019	0.104	0.082	0.308	0.942	0.999	0.913	1.000	0.991	0.9598	582
WASHINGTON COURT HOUSE CITY S.	0.477	0.019	0.102	0.095	0.308	1.053	1.004	0.929	1.000	0.977	1.0108	194
MIAMI TRACE LOCAL S.D.	0.437	0.017	0.095	0.109	0.342	1.089	1.007	0.926	1.000	0.977	1.0240	112
BEXLEY CITY S.D.	0.575	0.022	0.118	0.056	0.228	0.988	0.994	1.044	1.000	1.003	0.9989	296
COLUMBUS CITY S.D.	0.408	0.016	0.089	0.114	0.372	1.158	1.006	1.135	1.000	1.003	1.0777	3
GRANDVIEW HEIGHTS CITY S.D.	0.555	0.022	0.115	0.065	0.243	0.978	0.997	1.011	1.000	1.003	0.9898	367
REYNOLDSBURG CITY S. D.	0.538	0.021	0.112	0.067	0.262	0.994	0.996	1.036	1.000	1.003	1.0014	275
SCIOTO-DARBY CITY S.D.	0.512	0.020	0.108	0.072	0.288	0.991	0.997	1.034	1.000	1.003	0.9999	288
SOUTH-WESTERN CITY S.D.	0.427	0.016	0.092	0.096	0.368	1.023	1.001	1.068	1.000	1.003	1.0171	151
UPPER ARLINGTON CITY S.D.	0.557	0.022	0.115	0.062	0.244	1.021	0.996	1.090	1.000	1.003	1.0225	117
WESTERVILLE CITY S.D.	0.537	0.021	0.112	0.064	0.267	1.012	0.995	1.064	1.000	1.003	1.0144	172
WHITEHALL CITY S.D.	0.519	0.020	0.109	0.076	0.275	0.996	0.999	1.033	1.000	1.003	1.0024	266
WORTHINGTON CITY S.D.	0.550	0.021	0.114	0.060	0.255	1.006	0.994	1.052	1.000	1.003	1.0100	205
CANAL WINCHESTER LOCAL S.D.	0.523	0.020	0.110	0.072	0.275	0.966	0.997	0.986	1.000	1.003	0.9813	437
GROVEPORT-MADISON	0.522	0.020	0.109	0.070	0.278	0.997	0.997	1.044	1.000	1.003	1.0042	247
HAMILTON LOCAL S.D.	0.486	0.019	0.103	0.083	0.309	0.981	0.999	0.992	1.000	1.003	0.9911	352
JEFFERSON LOCAL S.D.	0.544	0.021	0.113	0.063	0.259	0.994	0.995	1.044	1.000	1.003	1.0021	269
PLAIN LOCAL S.D.	0.522	0.020	0.109	0.069	0.280	0.952	0.996	0.970	1.000	1.003	0.9725	516
WAUSEON EX VIL S.D	0.521	0.020	0.109	0.070	0.280	0.999	0.996	0.993	1.000	1.000	0.9985	298

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	LPI	RANK
ARCHBOLD AREA LOCAL S.D.	0.548	0.021	0.114	0.062	0.256	0.997	0.995	0.995	1.000	1.000	0.9977	306
EVERGREEN LOCAL S.D.	0.353	0.014	0.078	0.128	0.426	0.994	1.007	0.969	1.000	1.000	0.9955	320
GORHAM-FAYETTE LOCAL S.D.	0.525	0.020	0.110	0.066	0.276	0.972	0.996	[illegible]	1.000	1.000	0.9821	432
PETTISVILLE LOCAL S.D.	0.496	0.019	0.105	0.076	0.305	0.948	0.997	0.933	1.000	1.000	0.9675	547
PIKE-DELTA-YORK LOCAL S.D.	0.428	0.017	0.094	0.115	0.347	0.989	1.008	0.989	1.000	1.000	0.9944	329
SWANTON LOCAL S.D.	0.528	0.020	0.110	0.069	0.272	1.005	0.997	1.005	1.000	1.000	1.0030	257
GALLIPOLIS CITY S.D.	0.444	0.017	0.096	0.102	0.340	1.044	1.095	0.914	1.000	0.970	1.0009	280
GALLIA COUNTY LOCAL S.D.	0.374	0.015	0.083	0.130	0.398	1.057	1.010	0.890	1.000	0.970	1.0004	283
BERKSHIRE LOCAL S.D.	0.479	0.019	0.102	0.089	0.311	1.015	1.001	1.095	1.000	1.035	1.0276	90
CARDINAL LOCAL S.D.	0.443	0.017	0.096	0.101	0.343	1.003	1.003	1.073	1.000	1.035	1.0211	124
CHARDON LOCAL S.D.	0.528	0.020	0.110	0.064	0.278	1.061	0.994	1.129	1.000	1.035	1.0562	20
KENSTON LOCAL S.D.	0.458	0.017	0.098	0.080	0.347	1.033	0.996	1.091	1.000	1.035	1.0361	55
LEDGEMONT LOCAL S.D.	0.477	0.018	0.101	0.080	0.323	0.993	0.997	1.056	1.000	1.035	1.0139	178
NEWBURY LOCAL S.D.	0.494	0.019	0.104	0.074	0.309	0.998	0.996	1.076	1.000	1.035	1.0179	143
WEST GEAUGA LOCAL S.D.	0.542	0.021	0.112	0.061	0.263	1.077	0.994	1.138	1.000	1.035	1.0666	8
FAIRBORN CITY S.D.	0.528	0.020	0.110	0.070	0.272	1.089	0.996	1.113	1.000	1.022	1.0653	11
XENIA CITY S.D.	0.455	0.018	0.098	0.098	0.331	1.071	1.003	1.110	1.000	1.022	1.0505	25
YELLOW SPRINGS EX VIL S.D	0.525	0.020	0.110	0.067	0.278	0.993	0.995	1.049	1.000	1.022	1.0077	225
BEAVERCREEK LOCAL S.D.	0.551	0.021	0.114	0.058	0.256	1.084	0.993	1.128	1.000	1.022	1.0664	9
CEDAR CLIFF LOCAL S.D.	0.481	0.019	0.103	0.088	0.309	0.973	1.001	1.005	1.000	1.022	0.9942	332
GREENEVIEW LOCAL S.D.	0.401	0.016	0.088	0.119	0.376	0.982	1.007	1.033	1.000	1.022	1.0042	248
SUGARCREEK LOCAL S.D.	0.509	0.020	0.107	0.071	0.294	1.010	0.996	1.063	1.000	1.022	1.0181	141
CAMBRIDGE CITY S.D.	0.526	0.020	0.111	0.077	0.266	1.106	1.000	0.980	1.000	0.982	1.0488	27
ROLLING HILLS LOCAL S.D.	0.493	0.019	0.105	0.087	0.296	1.039	1.002	0.964	1.000	0.982	1.0100	202
CINCINNATI CITY S.D.	0.254	0.010	0.058	0.173	0.505	1.114	1.016	1.140	1.000	1.015	1.0450	31
DEER PARK CITY S.D.	0.531	0.020	0.111	0.068	0.270	0.995	0.996	1.071	1.000	1.015	1.0094	209
GREENHILLS-FOREST PARK CITY S.	0.541	0.021	0.112	0.062	0.264	1.024	0.994	1.096	1.000	1.015	1.0276	91
LOCKLAND CITY S.D.	0.526	0.020	0.111	0.075	0.268	0.980	0.998	1.027	1.000	1.015	0.9962	317
LOVELAND CITY S.D.	0.528	0.020	0.111	0.070	0.271	0.997	0.997	1.064	1.000	1.015	1.0096	207
MADEIRA CITY S.D.	0.535	0.021	0.112	0.065	0.269	0.992	0.995	1.057	1.000	1.015	1.0063	234
MARIEMONT CITY S.D.	0.541	0.021	0.113	0.066	0.260	0.999	0.996	1.067	1.000	1.015	1.0167	195
MOUNT HEALTHY CITY S.D.	0.540	0.021	0.112	0.066	0.261	1.020	0.996	1.104	1.000	1.015	1.0262	99
NORTH COLLEGE HILL CITY S.D.	0.518	0.020	0.109	0.075	0.278	0.998	0.998	1.085	1.000	1.015	1.0122	185
NORWOOD CITY S.D.	0.555	0.022	0.115	0.067	0.241	1.014	0.997	1.100	1.000	1.015	1.0228	115
PRINCETON CITY S.D.	0.475	0.019	0.102	0.090	0.315	1.025	1.001	1.102	1.000	1.015	1.0269	95
READING CITY S.D.	[illegible]	0.020	0.108	0.073	0.283	0.998	0.997	1.064	1.000	1.015	1.0103	200
ST BERNARD-ELMWOOD PLACE CITY	0.567	0.022	0.117	0.065	0.228	0.981	0.997	1.048	1.000	1.015	[illegible]	301
SYCAMORE CITY S.D.	0.515	0.020	0.108	0.069	0.288	1.006	0.996	1.081	1.000	1.015	1.0160	158
WYOMING CITY S.D.	0.519	0.020	0.109	0.066	0.287	[illegible]	0.994	1.055	1.000	1.015	1.0081	221
INDIAN HILL EX VIL S.D	0.569	0.022	0.117	0.056	0.236	1.007	0.993	1.083	1.000	1.015	1.0172	150
FINNEYTOWN LOCAL S.D.	0.529	0.020	0.110	0.066	0.275	1.008	0.995	1.077	1.000	1.015	1.0169	153
FOREST HILLS LOCAL S.D.	0.559	0.021	0.115	0.056	0.249	1.020	0.993	1.106	1.000	1.015	1.0269	96
NORTHWEST LOC[illegible] S.D.	0.509	0.019	0.107	0.070	0.294	1.023	0.996	1.110	1.000	1.015	1.0281	87
OAK HILLS L[illegible] S.D.	0.519	0.020	0.109	0.069	0.283	1.019	0.996	1.112	1.000	1.015	1.0263	98
SOUTHWEST LOCAL S.D.	0.512	0.020	0.108	0.077	0.283	0.994	0.999	1.071	1.000	1.015	1.0089	215

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
THREE RIVERS LOCAL S.D.	0.541	0.021	0.113	0.067	0.258	0.994	0.996	1.071	1.000	1.015	1.0084	218
FINDLAY CITY S.D.	0.460	0.018	0.099	0.089	0.335	1.141	1.000	1.046	1.000	1.004	1.0707	5
ARCADIA LOCAL S.D.	0.436	0.017	0.094	0.090	0.364	0.966	0.999	0.959	1.000	1.004	0.9828	425
ARLINGTON LOCAL S.D.	0.504	0.019	0.106	0.074	0.296	0.958	0.997	0.959	1.000	1.004	0.9754	488
CORY-RAWSON LOCAL S.D.	0.462	0.018	0.099	0.089	0.332	0.960	1.000	0.962	1.000	1.004	0.9794	449
LIBERTY-BENTON LOCAL S.D.	0.533	0.020	0.111	0.064	0.271	0.957	0.995	0.958	1.000	1.004	0.9735	510
MCCOMB LOCAL S.D.	0.448	0.017	0.096	0.089	0.350	0.960	0.999	0.955	1.000	1.004	0.9790	451
VAN BUREN LOCAL S.D.	0.548	0.021	0.114	0.062	0.256	0.972	0.995	0.998	1.000	1.004	0.9851	408
VANLUE LOCAL S.D.	0.433	0.017	0.093	0.095	0.362	0.938	1.000	0.926	1.000	1.004	0.9676	545
KENTON CITY S.D.	0.491	0.019	0.104	0.084	0.301	1.024	1.001	0.931	1.000	0.976	0.9972	311
ADA EX VIL S.D	0.499	0.019	0.106	0.077	0.298	0.969	0.999	0.875	1.000	0.976	0.9639	567
HARDIN NORTHERN LOCAL S.D.	0.409	0.016	0.089	0.103	0.384	0.931	1.002	0.851	1.000	0.976	0.9492	598
RIDGEMONT LOCAL S.D.	0.479	0.019	0.103	0.093	0.307	0.932	1.003	0.882	1.000	0.976	0.9478	599
RIVERDALE LOCAL S.D.	0.452	0.017	0.097	0.088	0.346	0.976	1.000	0.899	1.000	0.976	0.9710	525
UPPER SCIOTO VALLEY LOCAL S.D.	0.460	0.018	0.099	0.094	0.330	0.960	1.002	0.894	1.000	0.976	0.9630	572
HARRISON HILLS CITY S.D.	0.449	0.018	0.097	0.106	0.331	1.164	1.006	0.968	1.000	0.981	1.0643	13
CONOTTON VALLEY UNION LOCAL S.	0.515	0.020	0.109	0.085	0.271	0.964	1.003	0.907	1.000	0.981	0.9659	558
NAPOLEON CITY S.D.	0.520	0.020	0.109	0.074	0.276	1.069	0.998	1.009	1.000	0.999	1.0363	54
HOLGATE LOCAL S.D.	0.537	0.021	0.112	0.064	0.267	0.978	0.995	0.960	1.000	0.999	0.9834	418
LIBERTY CENTER LOCAL S.D.	0.510	0.020	0.107	0.074	0.290	0.995	0.997	0.977	1.000	0.999	0.9946	325
PATRICK HENRY LOCAL S.D.	0.396	0.016	0.088	0.133	0.366	1.011	1.013	0.983	1.000	0.999	1.0025	264
HILLSBORO CITY S.D.	0.495	0.019	0.105	0.084	0.298	1.006	1.001	0.923	1.000	0.975	0.9874	389
GREENFIELD EX VIL S.D	0.473	0.018	0.101	0.094	0.314	1.016	1.003	0.917	1.000	0.975	0.9912	350
BRIGHT LOCAL S.D.	0.318	0.012	0.071	0.148	0.451	0.931	1.012	0.829	1.000	0.975	0.9545	593
FAIRFIELD LOCAL S.D.	0.429	0.017	0.093	0.107	0.354	0.954	1.005	0.868	1.000	0.975	0.9590	584
LYNCHBURG-CLAY LOCAL S.D.	0.446	0.017	0.097	0.104	0.336	0.963	1.005	0.891	1.000	0.975	0.9647	564
LOGAN CITY S.D.	0.440	0.017	0.096	0.108	0.339	1.193	1.007	0.945	1.000	0.977	1.0721	4
EAST HOLMES LOCAL S.D.	0.205	0.009	0.049	0.224	0.514	1.000	1.031	0.877	1.000	0.972	0.9800	446
WEST HOLMES LOCAL S.D.	0.413	0.016	0.090	0.107	0.375	1.058	1.004	0.890	1.000	0.972	1.0040	250
BELLEVUE CITY S.D.	0.508	0.020	0.107	0.076	0.289	1.032	0.998	1.028	1.000	1.005	1.0208	125
NORWALK CITY S.D.	0.491	0.019	0.105	0.087	0.299	1.029	1.001	1.036	1.000	1.005	1.0196	131
WILLARD CITY S.D.	0.498	0.019	[illegible]	0.084	0.293	1.013	1.001	1.027	1.000	1.005	1.0107	196
MO[illegible] VILLE LOCAL S.D.	0.469	0.018	0.100	0.088	0.325	0.957	1.000	0.963	1 000	1.005	0.9778	462
N[illegible] ONDON LOCAL S.D.	0.448	0.017	0.097	0.100	0.338	0.977	1.003	0.979	1.000	1.005	0.9894	369
SOUTH CENTRAL LOCAL S.D.	0.480	0.018	0.102	0.082	0.317	0.965	0.999	0.961	1.000	1.005	0.9807	442
WESTERN RESERVE LOCAL S.D.	0.532	0.020	0.111	0.065	0.272	0.992	0.995	1.022	1.000	1 005	0.9995	291
JACKSON CITY S.D.	0.388	0.015	0.086	0.131	0.379	1.048	1.012	0.915	1.000	0.974	1.0016	274
WELLSTON CITY S.D.	0.434	0.017	0.095	0.115	0.339	1.012	1.009	0.904	1.000	0.974	0.9874	391
OAK HILL UNION LOCAL S.D.	0.334	0.013	0.076	0.158	0.419	0.961	1.018	0.883	1.000	0.974	0.9744	502
STEUBENVILLE CITY S.D.	0.373	0.015	0.083	0.130	0.399	1.021	1.010	0.994	1.000	0.995	1.0054	240

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
TORONTO CITY S.D.	0.499	0.019	0.106	0.081	0.295	0.982	0.999	0.987	1.000	0.995	0.9882	381
BUCKEYE LOCAL S.D.	0.467	0.018	0.100	0.092	0.323	1.025	1.002	1.023	1.000	0.995	1.0125	184
EDISON LOCAL S.D.	0.503	0.020	0.107	0.081	0.290	1.029	1.000	1.021	1.000	0.995	1.0155	161
INDIAN CREEK LOCAL S.D.	0.538	0.021	0.112	0.065	0.264	1.040	0.995	1.039	1.000	0.995	1.0246	109
MOUNT VERNON CITY S.D.	0.526	0.020	0.110	0.073	0.270	1.109	0.998	1.009	1.000	0.988	1.0551	22
CENTERBURG LOCAL S.D.	0.527	0.020	0.110	0.069	0.274	0.957	0.997	0.933	1.000	0.988	0.9667	549
DANVILLE LOCAL S.D.	0.420	0.016	0.092	0.109	0.363	0.953	1.005	0.969	1.000	0.988	0.9675	546
EAST KNOX LOCAL S.D.	0.427	0.017	0.093	0.109	0.354	0.951	1.006	0.903	1.000	0.988	0.9657	559
FREDERICKTOWN LOCAL S.D.	0.483	0.019	0.103	0.085	0.311	0.982	1.000	0.941	1.000	0.988	0.9814	435
PAINESVILLE CITY S.D.	0.445	0.017	0.096	0.101	0.339	1.007	1.004	1.0[illegible]5	1.000	1.022	1.0171	152
WICKLIFFE CITY S.D.	0.513	0.020	0.108	0.069	0.291	1.018	0.995	1.[illegible]94	1.000	1.022	1.0257	102
WILLOUGHBY-EASTLAKE CITY S.D.	0.501	0.019	0.106	0.073	0.302	1.094	0.996	1.149	1.000	1.022	1.0695	6
FAIRPORT HARBOR EX VIL S.D	0.502	0.019	0.106	0.079	0.293	0.983	0.999	1.040	1.000	1.022	1.0023	268
MENTOR EX VIL S.D	0.521	0.020	0.109	0.069	0.281	1.075	0.996	1.132	1.000	1.022	1.0597	17
KIRTLAND LOCAL S.D.	0.533	0.020	0.111	0.064	0.272	0.995	0.994	1.066	1.000	1.022	1.0106	198
MADISON LOCAL S.D.	0.550	0.021	0.114	0.060	0.254	1.020	0.994	1.104	1.000	1.022	1.0285	86
PAINESVILLE TWP LOCAL S.D.	0.553	0.021	0.114	0.060	0.251	1.030	0.994	1.114	1.000	1.022	1.0350	59
PERRY LOCAL S.D.	0.532	0.020	0.111	0.064	0.273	0.997	0.994	1.069	1.000	1.022	1.0121	187
IRONTON CITY S.D.	0.367	0.015	0.082	0.140	0.395	1.009	1.014	0.954	1.000	0.983	0.9929	339
CHESAPEAKE UNION EX VIL S.D	0.459	0.018	0.099	0.104	0.320	0.972	1.006	0.944	1.000	0.983	0.9763	481
DAWSON-BRYANT LOCAL S.D.	0.379	0.015	0.084	0.131	0.391	0.957	1.011	0.916	1.000	0.983	0.9699	533
FAIRLAND LOCAL S.D.	0.488	0.019	0.104	0.090	0.299	0.970	1.003	0.931	1.000	0.983	0.9732	514
ROCK HILL LOCAL S.D.	0.362	0.014	0.080	0.131	0.413	0.974	1.009	0.907	1.000	0.983	0.9760	483
SOUTH POINT LOCAL S.D.	0.519	0.020	0.109	0.072	0.280	0.985	0.997	0.958	1.000	0.983	0.9828	424
SYMMES VALLEY LOCAL S.D.	0.377	0.015	0.083	0.122	0.403	0.938	1.007	0.892	1.000	0.983	0.9609	580
HEATH CITY S.D.	0.528	0.020	0.110	0.063	0.279	0.980	0.994	0.9[illegible]	[illegible]000	1.001	0.9886	376
NEWARK CITY S.D.	0.426	0.017	0.093	0.109	0.355	1.068	1.006	1.0[illegible]	[illegible].000	1.001	1.0338	61
GRANVILLE EX VIL S.D	0.545	0.021	0.113	0.062	0.259	0.976	0.995	0.984	1.000	1.001	0.9853	405
JOHNSTOWN-MONROE LOCAL S.D.	0.482	0.019	0.103	0.084	0.313	0.975	0.999	0.992	1.000	1.001	0.9875	388
LAKEWOOD LOCAL S.D.	0.464	0.018	0.100	0.094	0.324	0.994	1.003	1.006	1.000	1.001	0.9985	299
LICKING HEIGHTS LOCAL S.D.	0.396	0.015	0.087	0.111	0.390	0.962	1.004	0.953	1.000	1.001	0.9812	438
LICKING VALLEY LOCAL S.D.	0.470	0.018	0.101	0.088	0.323	0.977	1.000	0.991	1.000	1.001	0.9865	379
NORTH FORK LOCAL S.D.	0.455	0.018	0.098	0.091	0.338	1.008	1.001	1.005	1.000	1.001	1.0044	246
NORTHRIDGE LOCAL S.D.	0.355	0.014	0.079	0.127	0.425	0.953	1.007	0.955	1.000	1.001	0.9805	444
SOUTHWEST LICKING LOCAL S.D.	0.505	0.019	0.107	0.075	0.294	0.984	0.997	1.007	1.000	1.001	0.9928	342
BELLEFONTAINE CITY S.D.	0.471	0.018	0.101	0.091	0.319	1.038	1.002	0.950	1.000	0.982	1.0072	230
BENJAMIN LOGAN LOCAL S.D.	0.405	0.016	0.089	0.112	0.379	1.011	1.005	0.930	1.000	0.982	0.9916	349
INDIAN LAKE LOCAL S.D.	0.409	0.016	0.089	0.105	0.380	0.997	1.003	0.910	1.000	0.982	0.9839	414
RIVERSIDE LOCAL S.D.	0.478	0.019	0.102	0.090	0.311	0.950	1.002	0.895	1.000	0.982	0.9600	581
AVON LAKE CITY S.D.	0.564	0.022	0.116	0.056	0.242	1.007	0.993	1.075	1.000	1.013	1.0158	159
ELYRIA CITY S.D.	0.533	0.021	0.112	0.070	0.264	1.071	0.997	1.131	1.000	1.013	1.0560	21
LORAIN CITY S.D.	0.448	0.018	0.097	0.103	0.334	1.064	1.005	1.117	1.000	1.013	1.0446	34
NORTH RIDGEVILLE CITY S.D.	0.528	0.020	0.110	0.067	0.274	1.008	0.996	1.074	1.000	1.013	1.0157	160
OBERLIN CITY S.D.	0.445	0.017	0.096	0.101	0.340	0.985	1.004	1.030	1.000	1.013	1.0009	281

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
SHEFFIELD-SHEFFIELD LAKE CITY	0.536	0.021	0.112	0.063	0.269	0.999	0.994	1.034	1.000	1.013	1.0101	201
AMHERST EX VIL S.D	0.539	0.021	0.112	0.066	0.263	1.009	0.996	1.087	1.000	1.013	1.0177	145
WELLINGTON EX VIL S.D	0.467	0.018	0.100	0.093	0.322	0.977	1.002	1.020	1.000	1.013	0.9955	322
AVON LOCAL S.D.	0.502	0.019	0.106	0.070	0.303	0.973	0.995	1.017	1.000	1.013	0.9920	344
CLEARVIEW LOCAL S.D.	0.424	0.017	0.093	0.117	0.350	0.971	1.009	1.022	1.000	1.013	0.9944	330
COLUMBIA LOCAL S.D.	0.520	0.020	0.109	0.072	0.279	0.979	0.997	1.035	1.000	1.013	0.9966	315
FIRELANDS LOCAL S.D.	0.514	0.020	0.108	0.069	0.290	0.974	0.995	1.034	1.000	1.013	0.9942	333
KEYSTONE LOCAL S.D.	0.507	0.020	0.107	0.076	0.290	0.976	0.998	1.027	1.000	1.013	0.9945	327
MIDVIEW LOCAL S.D.	0.506	0.020	0.107	0.075	0.292	1.000	0.997	1.067	1.000	1.013	1.0107	197
SOUTH AMHERST LOCAL S.D.	0.540	0.021	0.112	0.066	0.261	0.964	0.996	1.013	1.000	1.013	0.5850	409
MAUMEE CITY S.D.	0.446	0.017	0.096	0.093	0.348	1.006	1.001	1.065	1.000	1.017	1.0148	165
OREGON CITY S.D.	0.480	0.018	0.102	0.07[illegible]	0.321	1.010	0.997	1.082	1.000	1.017	1.0186	138
SYLVANIA CITY S.D.	0.475	0.018	0.101	0.078	0.327	1.032	0.997	1.088	1.000	1.017	1.0292	84
TOLEDO CITY S.D.	0.316	0.012	0.071	0.141	0.460	1.154	1.009	1.152	1.000	1.017	1.0674	7
ANTHONY WAYNE LOCAL S.D.	0.511	0.020	0.108	0.074	0.288	1.000	0.997	1.068	1.000	1.017	1.0119	188
OTTAWA HILLS LOCAL S.D.	0.600	0.023	0.121	0.046	0.209	1.004	0.991	1.079	1.000	1.017	1.0153	162
SPRINGFIELD LOCAL S.D.	0.524	0.020	0.110	0.070	0.276	0.998	0.996	1.079	1.000	1.017	1.0121	186
WASHINGTON LOCAL S.D.	0.533	0.020	0.111	0.062	0.274	1.049	0.994	1.121	1.000	1.017	1.0437	37
LONDON CITY S.D.	0.467	0.018	0.100	0.092	0.322	1.012	1.002	0.928	1.000	0.982	0.9926	343
JEFFERSON LOCAL S.D.	0.544	0.021	0.113	0.065	0.257	0.991	0.996	0.947	1.000	0.982	0.9843	411
JONATHAN ALDER LOCAL S.D.	0.507	0.019	0.107	0.074	0.292	0.993	0.998	0.926	1.000	0.982	0.9831	422
MADISON-PLAINS LOCAL S.D.	0.462	0.018	0.099	0.094	0.327	1.011	1.002	0.913	1.000	0.982	0.9909	356
CAMPBELL CITY S.D.	0.447	0.017	0.097	0.102	0.339	0.987	1.003	1.042	1.000	1.007	1.0010	277
STRUTHERS CITY S.D.	0.500	0.019	0.106	0.077	0.298	0.999	0.998	1.059	1.000	1.007	1.0079	223
YOUNGSTOWN CITY S.D.	0.251	0.010	0.057	0.168	0.514	1.085	1.014	1.083	1.000	1.007	1.0300	79
AUSTINTOWN LOCAL S.D.	0.558	0.021	0.115	0.058	0.247	1.031	0.994	1.094	1.000	1.007	1.0297	82
BOARDMAN LOCAL S.D.	0.553	0.021	0.114	0.060	0.252	1.031	0.994	1.097	1.000	1.007	1.0299	80
CANFIELD LOCAL S.D.	0.547	0.021	0.113	0.061	0.258	0.985	0.994	1.035	1.000	1.007	0.9974	307
JACKSON MILTON LOCAL S.D.	0.467	0.018	0.100	0.082	0.334	0.974	0.998	1.007	1.000	1.007	0.9912	351
LOWELLVILLE LOCAL S.D.	0.578	0.022	0.119	0.056	0.225	0.952	0.994	1.001	1.000	1.007	0.9736	508
POLAND LOCAL S.D.	0.568	0.022	0.117	0.055	0.238	0.992	0.993	1.058	1.000	1.007	1.0037	251
SEBRING LOCAL S.D.	0.548	0.021	0.114	0.067	0.250	0.977	0.997	1.030	1.000	1.007	0.9929	340
SOUTH RANGE LOCAL S.D.	0.531	0.020	0.111	0.069	0.269	0.972	0.997	1.032	1.000	1.007	0.9904	359
SPRINGFIELD LOCAL S.D.	0.524	0.020	0.110	0.071	0.275	0.971	0.997	1.013	1.000	1.007	0.9882	382
WEST BRANCH LOCAL S.D.	0.497	0.019	0.105	0.079	0.300	0.992	0.998	1.042	1.000	1.007	1.0029	258
WESTERN RESERVE LOCAL S.D.	0.531	0.021	0.111	0.070	0.267	0.972	0.997	1.012	1.000	1.007	0.9883	380
MARION CITY S.D.	0.510	0.020	0.108	0.079	0.284	1.118	0.999	1.039	1.000	0.994	1.0628	14
ELGIN LOCAL S.D.	0.465	0.018	0.100	0.094	0.323	0.9[illegible]3	1.002	0.977	1.000	0.994	0.9880	385
PLEASANT LOCAL S.D.	0.514	0.020	0.108	0.072	0.286	0.983	0.997	0.974	1.000	0.994	0.9867	396
RIDGEDALE LOCAL S.D.	0.461	0.018	0.099	0.090	0.332	0.964	1.000	0.945	1.000	0.994	0.9759	484
RIVER VALLEY LOCAL S.D.	0.535	0.021	0.112	0.065	0.268	0.991	0.996	0.986	1.000	0.994	0.9917	347
BRUNSWICK CITY S.D.	0.546	0.021	0.113	0.060	0.257	1.053	0.994	1.102	1.000	1.016	1.0449	32
MEDINA CITY S.D.	0.532	0.020	0.111	0.067	0.269	1.036	0.996	1.077	1.000	1.016	1.0317	71
WADSWORTH CITY S.D.	0.453	0.017	0.097	0.084	0.348	1.030	0.998	1.058	1.000	1.016	1.0248	107
BLACK RIVER LOCAL S.D.	0.450	0.017	0.097	0.091	0.345	0.965	1.000	1.003	1.000	1.016	0.9901	363

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
BUCKEYE LOCAL S.D.	0.523	0.020	0.109	0.068	0.279	0.994	0.996	1.044	1.000	1.016	1.0061	236
CLOVERLEAF LOCAL S.D.	0.505	0.019	0.106	0.073	0.296	1.020	0.996	1.069	1.000	1.016	1.0221	119
HIGHLAND LOCAL S.D.	0.544	0.021	0.113	0.060	0.262	1.007	0.994	1.062	1.000	1.016	1.0148	166
EASTERN LOCAL S.D.	0.486	0.019	0.104	0.086	0.305	0.965	1.001	0.870	1.000	0.966	0.9595	583
MEIGS LOCAL S.D.	0.303	0.012	0.068	0.148	0.469	1.057	1.011	0.860	1.000	0.966	0.9920	345
SOUTHERN LOCAL S.D.	0.407	0.016	0.090	0.127	0.360	0.967	1.012	0.847	1.000	0.966	0.9609	579
CELINA CITY S.D.	0.496	0.019	0.105	0.078	0.302	1.039	0.998	0.982	1.000	0.989	1.0142	174
COLDWATER EX VIL S.D	0.509	0.019	0.107	0.070	0.295	0.983	0.996	0.954	1.000	0.989	0.9832	421
MARION LOCAL S.D.	0.459	0.018	0.099	0.094	0.330	0.964	1.002	0.955	1.000	0.989	0.9757	485
MENDON-UNION LOCAL S.D.	0.481	0.018	0.102	0.078	0.320	0.927	0.997	0.891	1.000	0.989	0.9503	596
PARKWAY LOCAL S.D.	0.480	0.019	0.102	0.084	0.315	0.966	1.000	0.946	1.000	0.989	0.9748	497
ST. HENRY CONSOLIDATED LOCAL S	0.523	0.020	0.110	0.071	0.277	0.972	0.997	0.965	1.000	0.989	0.9787	453
SOUTHWEST LOCAL S.D.	0.444	0.017	0.096	0.102	0.341	0.954	1.004	0.940	1.000	0.989	0.9704	530
PIQUA CITY S.D.	0.510	0.020	0.108	0.079	0.283	1.053	0.999	1.068	1.000	1.010	1.0372	52
TROY CITY S.D.	0.507	0.020	0.107	0.076	0.290	1.045	0.998	1.065	1.000	1.010	1.0324	65
BRADFORD EX VIL S.D	0.494	0.019	0.104	0.075	0.308	0.966	0.996	0.998	1.000	1.010	0.9862	400
COVINGTON EX VIL S.D	0.540	0.021	0.112	0.064	0.262	0.977	0.995	1.006	1.000	1.010	0.9909	355
MILTON UNION EX VIL S.D	0.528	0.020	0.110	0.065	0.277	1.000	0.995	1.029	1.000	1.010	1.0061	238
TIPP CITY EX VIL S.D	0.553	0.021	0.114	0.061	0.250	1.032	0.995	1.046	1.000	1.010	1.0144	171
BETHEL LOCAL S.D.	0.537	0.021	0.112	0.064	0.267	0.998	0.995	1.043	1.000	1.010	1.0064	233
MIAMI EAST LOCAL S.D.	0.495	0.019	0.105	0.079	0.303	0.996	0.998	1.015	1.000	1.010	1.0027	262
NEWTON TWP LOCAL S.D.	0.483	0.018	0.102	0.077	0.319	0.972	0.997	0.992	1.000	1.010	0.9886	378
SWITZERLAND OF OHIO LOCAL S.D.	0.444	0.017	0.096	0.105	0.338	1.199	1.006	0.974	1.000	0.982	1.0798	1
CENTERVILLE CITY S.D.	0.512	0.020	0.107	0.069	0.293	1.033	0.995	1.122	1.000	1.026	1.0375	51
DAYTON CITY S.D.	0.330	0.013	0.074	0.136	0.448	1.125	1.008	1.167	1.000	1.026	1.0652	12
KETTERING CITY S.D.	0.554	0.021	0.114	0.056	0.254	1.064	0.992	1.159	1.000	1.026	1.0599	16
MIAMISBURG CITY S.D.	0.526	0.020	0.110	0.064	0.280	1.024	0.994	1.115	1.000	1.026	1.0324	66
OAKWOOD CITY S.D.	0.584	0.023	0.119	0.053	0.222	1.017	0.993	1.125	1.000	1.026	1.0307	76
TROTWOOD-MADISON CITY S.D.	0.475	0.018	0.101	0.081	0.325	1.013	0.997	1.103	1.000	1.026	1.0252	106
VANDALIA-BUTLER CITY S.D.	0.531	0.020	0.111	0.063	0.275	1.014	0.994	1.101	1.000	1.026	1.0256	103
WEST CARROLLTON CITY S.D.	0.523	0.020	0.109	0.067	0.280	1.013	0.995	1.104	1.000	1.026	1.0253	105
BROOKVILLE LOCAL S.D.	0.516	0.020	0.108	0.068	0.287	1.002	0.995	1.089	1.000	1.026	1.0180	142
JEFFERSON LOCAL S.D.	0.453	0.017	0.097	0.090	0.342	0.983	0.999	1.082	1.000	1.026	1.0094	210
MAD RIVER LOCAL S.D.	0.394	0.015	0.086	0.108	0.396	1.007	1.002	1.066	1.000	1.026	1.0189	137
NEW LEBANON LOCAL S.D.	0.512	0.020	0.108	0.070	0.291	0.984	0.995	1.062	1.000	1.026	1.0062	235
NORTHMONT LOCAL S.D.	0.540	0.021	0.112	0.061	0.266	1.027	0.994	1.122	1.000	1.026	1.0350	58
NORTHRIDGE LOCAL S.D.	0.490	0.019	0.104	0.079	0.307	1.008	0.998	1.093	1.000	1.026	1.0213	121
VALLEY VIEW LOCAL S.D.	0.492	0.019	0.104	0.072	0.313	0.998	0.995	1.078	1.000	1.026	1.0152	163
WAYNE LOCAL S.D.	0.554	0.021	0.114	0.058	0.253	1.038	0.993	1.136	1.000	1.026	1.0428	38
MORGAN LOCAL S.D.	0.315	0.012	0.070	0.138	0.464	1.169	1.008	0.874	1.000	0.972	1.0315	72
MOUNT GILEAD EX VIL S.D	0.504	0.019	0.107	0.079	0.291	1.016	1.000	0.939	1.000	0.980	0.9955	321
CARDINGTON-LINCOLN LOCAL S.D.	0.488	0.019	0.104	0.086	0.303	0.988	1.001	0.911	1.000	0.980	0.9787	454
HIGHLAND LOCAL S.D.	0.439	0.017	0.095	0.095	0.355	0.993	1.001	0.905	1.000	0.980	0.9811	439

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
NORTHMOR LOCAL S.D.	0.481	0.019	0.102	0.084	0.314	0.985	1.000	0.910	1.000	0.980	0.9771	470
ZANESVILLE CITY S.D.	0.389	0.015	0.086	0.129	0.380	1.053	1.011	0.974	1.000	0.982	1.0116	190
EAST MUSKINGUM LOCAL S.D.	0.504	0.019	0.106	0.073	0.297	0.960	0.997	0.925	1.000	0.982	0.9665	550
FRANKLIN LOCAL S.D.	0.488	0.019	0.104	0.089	0.299	0.968	1.003	0.966	1.000	0.982	0.9754	490
MAYSVILLE LOCAL S.D.	0.557	0.021	0.115	0.061	0.245	0.985	0.995	0.974	1.000	0.982	0.9842	412
TRI VALLEY LOCAL S.D.	0.511	0.020	0.108	0.079	0.282	0.977	1.000	0.962	1.000	0.982	0.9788	452
WEST MUSKINGUM LOCAL S.D.	0.550	0.021	0.114	0.062	0.253	0.975	0.995	0.964	1.000	0.982	0.9775	463
CALDWELL EX VIL S.D	0.393	0.016	0.087	0.127	0.377	1.052	1.011	[illegible]	1.000	0.970	0.9984	300
NOBLE LOCAL S.D.	0.416	0.016	[illegible]	0.114	0.363	1.038	1.007	0.873	1.000	0.970	0.9933	336
PORT CLINTON CITY S.D.	0.499	0.019	0.106	0.080	0.296	1.066	0.999	1.003	1.000	0.997	1.0321	68
BENTON-CARROLL-SALEM LOCAL S.D	0.434	0.017	0.095	0.112	0.342	1.011	1.007	0.987	1.000	0.997	1.0028	261
DANBURY LOCAL S.D.	0.531	0.021	0.112	0.075	0.262	0.983	0.999	0.975	1.000	0.997	0.9871	393
GENOA AREA LOCAL S.D.	0.463	0.018	0.100	0.103	0.316	1.016	1.006	1.002	1.000	0.997	1.0067	232
PAULDING EX. VIL. S.D.	0.511	0.020	0.108	0.076	0.285	1.087	0.999	0.980	1.000	0.989	1.0390	44
ANTWERP LOCAL S.D.	0.523	0.020	0.110	0.072	0.275	0.991	0.998	0.939	1.000	0.989	0.9857	402
WAYNE TRACE LOCAL S.D.	0.446	0.017	0.097	0.104	0.335	1.022	1.005	0.958	1.000	0.989	1.0020	270
NEW LEXINGTON CITY S.D.	0.453	0.018	0.098	0.099	0.332	0.997	1.004	0.891	1.000	0.970	0.9779	459
CROOKSVILLE EX VIL S.D	0.428	0.017	0.093	0.113	0.349	0.962	1.008	0.881	1.000	0.970	0.9626	574
NORTHERN LOCAL S.D.	0.454	0.018	0.098	0.097	0.334	0.994	1.003	0.905	1.000	0.970	0.9731	458
SOUTHERN LOCAL S.D.	0.433	0.017	0.095	0.118	0.337	0.981	1.010	0.892	1.000	0.970	0.9717	520
CIRCLEVILLE CITY S.D.	0.483	0.019	0.104	0.094	0.300	1.045	1.004	0.976	1.000	0.992	1.0169	154
LOGAN ELM LOCAL S.D.	0.462	0.018	0.099	0.093	0.327	0.991	1.002	0.955	1.000	0.992	0.9888	374
TEAYS VALLEY LOCAL S.D.	0.497	0.019	0.105	0.083	0.296	1.022	1.000	0.986	1.000	0.992	1.0074	228
WESTFALL LOCAL S.D.	0.478	0.019	0.102	0.089	0.313	0.990	1.001	0.952	1.000	0.992	0.9880	384
WAVERLY CITY S.D.	0.431	0.017	0.094	0.111	0.347	1.038	1.007	0.923	1.000	0.979	1.0023	267
EASTERN LOCAL S.D.	0.422	0.017	0.092	0.116	0.353	0.973	1.008	0.884	1.000	0.979	0.9705	529
SCIOTO VALLEY LOCAL S.D.	0.324	0.013	0.073	0.156	0.433	0.980	1.016	0.888	1.000	0.979	0.9766	479
WESTERN LOCAL S.D.	0.211	0.009	0.050	0.221	0.510	0.957	1.032	0.857	1.000	0.979	0.9735	509
AURORA CITY S.D.	0.501	0.019	0.106	0.075	0.298	0.981	0.997	0.987	1.000	1.003	0.9899	365
KENT CITY S.D.	0.328	0.012	0.072	0.115	0.472	1.011	1.001	0.964	1.000	1.003	1.0026	263
RAVENNA CITY S.D.	0.490	0.019	0.104	0.080	0.307	1.021	0.998	1.036	1.000	1.003	1.0148	167
STREETSBORO CITY S.D.	0.479	0.018	0.102	0.079	0.322	0.988	0.997	1.013	1.000	1.003	0.9966	316
WINDHAM EX VIL S.D	0.498	0.019	0.105	0.077	0.300	0.973	0.998	0.988	1.000	1.003	0.9862	399
CRESTWOOD LOCAL S.D.	0.505	0.019	0.106	0.073	0.296	0.992	0.997	1.009	1.000	1.003	0.9979	304
FIELD LOCAL S.D.	0.491	0.019	0.104	0.079	0.307	1.012	0.998	1.041	1.000	1.003	1.0110	193
JAMES A. GARFIELD LOCAL S.D.	0.510	0.020	0.107	0.073	0.291	0.978	0.997	1.003	1.000	1.003	0.9902	361
ROOTSTOWN LOCAL S.D.	0.491	0.019	0.104	0.075	0.311	0.971	0.997	0.985	1.000	1.003	0.9851	404
SOUTHEAST LOCAL S.D.	0.512	0.020	0.108	0.071	0.290	0.984	0.996	1.007	1.000	1.003	0.9932	337
WATERLOO LOCAL S.D.	0.450	0.017	0.097	0.091	0.346	0.986	1.000	1.005	1.000	1.003	0.9951	323
EATON CITY S.D.	0.507	0.019	0.107	0.074	0.292	1.029	0.998	0.978	1.000	0.993	1.0100	204
C. R. COBLENTZ LOCAL S.D.	0.443	0.017	0.095	0.092	0.353	1.020	1.000	0.969	1.000	0.993	1.0033	256

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
PREBLE SHAWNEE LOCAL S.D.	0.467	0.018	0.100	0.087	0.329	1.010	1.000	0.967	1.000	0.993	0.9992	292
TWIN VALLEY LOCAL S.D.	0.497	0.019	0.105	0.076	0.303	1.037	0.998	0.978	1.000	0.993	1.0140	177
COLUMBUS GROVE LOCAL S.D.	0.387	0.015	0.084	0.105	0.409	0.954	1.002	0.8[illegible]	1.000	0.983	0.9662	556
CONTINENTAL LOCAL S.D.	0.399	0.015	0.087	0.110	0.387	0.961	1.004	0.901	1.000	0.983	0.9694	534
JENNINGS LOCAL S.D.	0.257	0.010	0.058	0.158	0.517	0.921	1.011	0.862	1.000	0.983	0.9632	570
KALIDA LOCAL S.D.	0.481	0.018	0.102	0.079	0.320	0.938	0.998	0.912	1.000	0.983	0.9561	590
MILLER CITY-NEW CLEVELAND LOCA	0.435	0.017	0.094	0.099	0.355	0.932	1.002	0.885	1.000	0.983	0.9538	594
OTTAWA-GLANDORF LOCAL S.D.	0.484	0.019	0.103	0.082	0.313	0.976	0.999	0.935	1.000	0.983	0.9765	480
OTTOVILLE LOCAL S.D.	0.449	0.018	0.097	0.101	0.335	0.946	1.004	0.906	1.009	0.983	0.9613	577
PANDORA-GILBOA LOCAL S.D.	0.311	0.012	0.070	0.154	0.452	0.932	1.014	0.875	1.000	0.983	0.9627	573
MANSFIELD CITY S.D.	0.366	0.014	0.081	0.124	0.415	1.082	1.006	1.040	1.000	1.003	1.0345	60
SHELBY CITY S.D.	0.500	0.019	0.106	0.082	0.293	1.004	1.000	1.024	1.000	1.003	1.0053	242
CLEAR FORK VALLEY LOCAL S.D.	0.479	0.019	0.102	0.088	0.312	0.977	1.001	0.992	1.000	1.003	0.9892	371
CRESTVIEW LOCAL S.D.	0.450	0.017	0.097	0.093	0.342	0.962	1.001	0.966	1.000	1.003	0.9806	443
LEXINGTON LOCAL S.D.	0.541	0.021	0.112	0.063	0.262	1.006	0.995	1.033	1.000	1.003	1.0078	224
LUCAS LOCAL S.D.	0.544	0.021	0.113	0.062	0.260	0.957	0.995	0.976	1.000	1.003	0.9745	501
MADISON LOCAL S.D.	0.469	0.018	0.100	0.082	0.331	1.028	0.998	1.032	1.000	1.003	1.0172	148
ONTARIO LOCAL S. D.	0.496	0.019	0.105	0.081	0.299	0.977	0.999	0.998	1.000	1.003	0.9891	372
PLYMOUTH LOCAL S.D.	0.441	0.017	0.095	0.095	0.352	0.960	1.001	0.968	1.000	1.003	0.9802	445
CHILLICOTHE CITY S.D.	0.488	0.019	0.104	0.087	0.303	1.085	1.001	1.002	1.000	0.987	1.0378	48
ADENA LOCAL S.D.	0.458	0.018	0.098	0.092	0.334	0.959	1.001	0.923	1.000	0.987	0.9694	536
HUNTINGTON LOCAL S.D.	0.385	0.015	0.086	0.137	0.377	0.952	1.014	0.920	1.000	0.987	0.9702	531
PAINT VALLEY LOCAL S.D.	0.423	0.017	0.092	0.111	0.357	0.951	1.006	0.908	1.000	0.987	0.9663	555
SCIOTO VALLEY LOCAL S.D.	0.369	0.015	0.082	0.132	0.402	0.954	1.010	0.918	1.000	0.987	0.9715	522
UNION-SCIOTO LOCAL S.D.	0.393	0.016	0.087	0.131	0.373	0.968	1.012	0.937	1.000	0.987	0.9772	466
ZANE TRACE LOCAL S.D.	0.451	0.017	0.097	0.096	0.338	0.958	1.002	0.924	1.000	0.987	0.9693	537
FREMONT CITY S.D.	0.493	0.019	0.105	0.091	0.291	1.103	1.003	1.065	1.000	1.002	1.0583	18
CLYDE EX VIL S.D	0.519	0.020	0.109	0.075	0.277	1.014	0.998	1.025	1.000	1.002	1.0105	199
GIBSONBURG EX VIL S.D	0.475	0.019	0.102	0.091	0.314	0.979	1.002	0.993	1.000	1.002	0.9902	362
LAKOTA LOCAL S.D.	0.506	0.019	0.107	0.076	0.292	0.992	0.998	1.004	1.000	1.002	0.9968	314
WOODMORE LOCAL S.D.	0.467	0.018	0.101	0.102	0.312	0.982	1.006	0.995	1.000	1.002	0.9917	348
PORTSMOUTH CITY S.D.	0.350	0.014	0.079	0.151	0.406	1.029	1.017	0.964	1.000	0.982	1.0002	286
BLOOM LOCAL S.D.	0.324	0.013	0.073	0.150	0.440	0.934	1.014	0.880	1.000	0.982	0.9622	575
CLAY LOCAL S.D.	0.473	0.018	0.101	0.091	0.316	0.956	1.002	0.918	1.000	0.982	0.9650	562
GREEN LOCAL S.D.	0.330	0.013	0.074	0.143	0.439	0.928	1.011	0.872	1.000	0.982	0.9590	585
NFORD LOCAL S.D.	0.361	0.014	0.081	0.136	0.408	0.958	1.011	0.922	1.000	0.982	0.9713	524
NEW BOSTON LOCAL S.D.	0.495	0.020	0.106	0.099	0.280	0.941	1.007	0.908	1.000	0.982	0.9563	589
NORTHWEST LOCAL S.D.	0.321	0.013	0.073	0.157	0.437	0.952	1.016	0.911	1.000	0.982	0.9705	528
VALLEY LOCAL S.D.	0.394	015	0.087	0.122	0.382	0.944	1.008	0.905	1.000	0.982	0.9631	571
WASHINGTON LOCAL S.D.	0.389	0.016	0.086	0.132	0.377	0.967	1.012	0.930	1.000	0.982	0.9746	500
WHEELERSBURG LOCAL S.D.	0.492	0.019	0.105	0.092	0.291	0.970	1.004	0.944	1.000	0.982	0.9739	506
FOSTORIA CITY S.D.	0.466	0.018	0.100	0.091	0.325	1.021	1.001	0.984	1.000	0.988	1.0044	245
TIFFIN CITY S.D.	0.518	0.020	0.109	0.071	0.262	1.052	0.997	1.006	1.000	0.988	1.0243	110
BETTSVILLE LOCAL S.D.	0.585	0.023	0.120	0.054	0.219	0.961	0.994	0.962	1.000	0.988	0.9701	532

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
HOPEWELL-LOUDON LOCAL S.D.	0.466	0.018	0.100	0.086	0.331	0.952	0.999	0.925	1.000	0.988	0.9664	553
NEW RIEGEL LOCAL S.D.	0.481	0.019	0.103	0.088	0.310	0.946	1.001	0.927	1.000	0.988	0.9632	569
OLD FORT LOCAL S.D.	0.235	0.010	0.056	0.227	0.471	0.951	1.040	0.931	1.000	0.988	0.9796	448
SENECA EAST LOCAL S.D.	0.481	0.019	0.103	0.088	0.309	0.970	1.001	0.955	1.000	0.988	0.9772	469
SIDNEY CITY S.D.	0.537	0.021	0.112	0.068	0.262	1.078	0.997	0.996	1.000	0.986	1.0376	49
ANNA LOCAL S.D.	0.498	0.019	0.105	0.076	0.302	0.947	0.998	0.920	1.000	0.986	0.9612	578
BOTKINS LOCAL S.D.	0.543	0.021	0.113	0.063	0.261	0.945	0.995	0.922	1.000	0.986	0.9574	588
FAIRLAWN LOCAL S.D.	0.511	0.020	0.107	0.071	0.291	0.944	0.997	0.895	1.000	0.986	0.9560	591
FORT LORAMIE LOCAL S.D.	0.548	0.021	0.114	0.068	0.249	0.954	0.998	0.945	1.000	0.986	0.9648	563
HARDIN-HOUSTON LOCAL S.D.	0.398	0.015	0.088	0.126	0.372	0.948	1.011	0.904	1.000	0.986	0.9659	557
JACKSON CENTER LOCAL S.D.	0.570	0.022	0.117	0.054	0.237	0.960	0.993	0.929	1.000	0.986	0.9653	560
RUSSIA LOCAL S.D.	0.579	0.022	0.119	0.056	0.224	0.946	0.994	0.936	1.000	0.986	0.9578	586
ALLIANCE CITY S.D.	0.380	0.015	0.083	0.117	0.405	0.995	1.005	1.021	1.000	1.002	1.0008	282
CANTON CITY S.D.	0.245	0.010	0.056	0.171	0.518	1.051	1.014	1.050	1.000	1.002	1.0167	155
LOUISVILLE CITY S.D.	0.516	0.020	0.108	0.070	0.285	0.993	0.996	1.045	1.000	1.002	1.0019	271
MASSILLON CITY S.D.	0.45[illegible]	0.018	0.098	0.089	0.340	1.007	1.000	1.052	1.000	1.002	1.0089	214
NORTH CANTON CITY S.D.	0.501	0.019	0.105	0.072	0.303	0.993	0.996	1.029	1.000	1.002	1.0001	287
CANTON LOCAL S.D.	0.459	0.018	0.098	0.088	0.337	0.987	1.000	1.032	1.000	1.002	0.9981	303
FAIRLESS LOCAL S.D.	0.461	0.018	0.098	0.083	0.340	0.974	0.998	1.011	1.000	1.002	0.9899	364
JACKSON LOCAL S.D.	0.508	0.019	0.107	0.069	0.297	0.988	0.995	1.026	1.000	1.002	0.9973	309
LAKE LOCAL S.D.	0.520	0.020	0.109	0.070	0.281	0.975	0.996	1.013	1.000	1.002	0.9893	370
MARLINGTON LOCAL S.D.	0.369	0.014	0.082	0.126	0.410	0.980	1.008	1.009	1.000	1.002	0.9944	331
MINERVA LOCAL S.D.	0.533	0.021	0.111	0.068	0.268	0.976	0.996	1.024	1.000	1.002	0.9903	360
NORTHWEST LOCAL S.D.	0.503	0.019	0.1[illegible]6	0.076	0.296	0.966	0.998	0.997	1.000	1.002	0.9834	420
OSNABURG LOCAL S.D.	0.495	0.019	[illegible]	0.074	0.308	0.966	0.997	0.997	1.000	1.002	0.9838	415
PERRY LOCAL S.D.	0.512	0.020	0.107	0.058	0.293	1.010	0.995	1.069	1.000	1.002	1.0129	182
PLAIN LOCAL S.D.	0.487	0.019	0.103	0.077	0.313	1.015	0.997	1.062	1.000	1.002	1.0144	170
SANDY VALLEY LOCAL S.D.	0.429	0.017	0.093	0.102	0.360	0.960	1.003	0.946	1.000	1.002	0.9823	428
TUSLAW LOCAL S.D.	0.510	0.020	0.107	0.071	0.293	0.972	0.996	1.012	1.000	1.002	0.9876	3[illegible]7
AKRON CITY S.D.	0.397	0.016	0.088	0.124	0.376	1.138	1.009	1.182	1.000	1.020	1.0787	2
BARBERTON CITY S.D.	0.496	0.019	0.105	0.079	0.301	1.023	0.998	1.109	1.000	1.020	1.0288	85
COPLEY-FAIRLAWN CITY S.D.	0.522	0.020	0.109	0.065	0.285	1.007	0.994	1.084	1.000	1.020	1.0185	139
CUYAHOGA FALLS CITY S.D.	0.534	0.021	0.111	0.067	0.267	1.050	0.996	1.145	1.000	1.020	1.0482	28
NORTON CITY S.D.	0.518	0.020	0.108	0.068	0.286	0.995	0.995	1.085	1.000	1.020	1.0126	183
STOW CITY S.D.	0.521	0.020	0.109	0.068	0.282	1.026	0.996	1.113	1.000	1.020	1.0312	74
TALLMADGE CITY S.D.	0.502	0.019	0.106	0.071	0.302	1.009	0.995	1.084	1.000	1.020	1.0196	132
TWINSBURG CITY S.D.	0.508	0.020	0.107	0.076	0.289	1.000	0.998	1.073	1.000	1.020	1.0137	179
COVENTRY LOCAL S.D.	0.514	0.020	0.108	0.072	0.286	1.007	0.997	1.078	1.000	1.020	1.0178	144
GREEN LOCAL S.D.	0.541	0.021	0.112	0.061	0.265	1.007	0.994	1.093	1.000	1.020	1.0191	135
HUDSON LOCAL S.D.	0.541	0.021	0.112	0.060	0.266	0.998	0.994	1.065	1.000	1.020	1.0115	191
MOGADORE LOCAL S.D.	0.547	0.021	0.114	0.064	0.255	0.999	0.995	1.078	1.000	1.020	1.0132	180
NORDONIA HILLS LOCAL S.D.	0.566	0.022	0.116	0.055	0.240	1.022	0.993	1.115	1.000	1.020	1.0305	77
REVERE LOCAL S.D.	0.547	0.021	0.113	0.063	0.255	1.016	0.995	1.104	1.000	1.020	1.0258	101
SPRINGFIELD LOCAL S.D.	0.483	0.019	0.103	0.083	0.312	1.007	0.999	1.093	1.000	1.020	1.0191	134
WOODRIDGE LOCAL S.D.	0.530	0.020	0.111	0.068	0.271	0.992	0.996	1.060	1.000	1.020	1.0080	222
GIRARD CITY S.D.	0.439	0.017	0.095	0.102	0.347	0.996	1.004	1.058	1.000	1.014	1.0086	217

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
NILES CITY S.D.	0.517	0.020	0.109	0.075	0.279	1.011	0.998	1.087	1.000	1.014	1.0190	136
WARREN CITY S.D.	0.391	0.015	0.086	0.115	0.393	1.065	1.005	1.102	1.000	1.014	1.0398	42
HUBBARD EX VIL S.D	0.510	0.020	0.107	0.076	0.288	1.004	0.998	1.083	1.000	1.014	1.0147	168
NEWTON FALLS EX VIL S.D	0.521	0.020	0.109	0.068	0.282	0.989	0.995	1.052	1.000	1.014	1.0036	253
BLOOMFIELD-MESPO LOCAL S.D.	0.510	0.020	0.108	0.089	0.273	0.945	1.003	0.992	1.000	1.014	0.9747	498
BRISTOL LOCAL S.D.	0.533	0.021	0.112	0.074	0.261	0.959	0.999	1.014	1.000	1.014	0.9834	417
BROOKFIELD LOCAL S.D.	0.520	0.020	0.109	0.070	0.281	0.995	0.996	1.073	1.000	1.014	1.0091	213
CHAMPION LOCAL S.D.	0.477	0.018	0.102	0.083	0.320	0.995	0.999	1.054	1.000	1.014	1.0075	226
FARMINGTON LOCAL S.D.	0.560	0.022	0.116	0.059	0.243	0.953	0.994	0.986	1.000	1.014	0.9751	493
FOWLER-VIENNA LOCAL S.D.	0.539	0.021	0.112	0.064	0.264	0.989	0.995	1.053	1.000	1.014	1.0037	252
HOWLAND LOCAL S.D.	0.549	0.021	0.114	0.060	0.256	1.031	0.994	1.105	1.000	1.014	1.0322	67
JOSEPH BADGER LOCAL S.D.	0.557	0.021	0.115	0.060	0.246	0.976	0.994	1.041	1.000	1.014	0.9946	326
LABRAE LOCAL S.D.	0.497	0.019	0.105	0.081	0.297	0.991	0.999	1.057	1.000	1.014	1.0053	241
LAKEVIEW LOCAL S.D.	0.473	0.018	0.100	0.080	0.329	0.991	0.997	1.041	1.000	1.014	1.0041	249
LIBERTY LOCAL S.D.	0.521	0.020	0.109	0.068	0.282	0.996	0.996	1.063	1.000	1.014	1.0087	216
LORDSTOWN LOCAL S.D.	0.554	0.021	0.114	0.056	0.254	0.966	0.993	1.011	1.000	1.014	0.9856	403
MAPLEWOOD LOCAL S.D.	0.505	0.019	0.106	0.071	0.298	0.965	0.996	1.003	1.000	1.014	0.9866	397
MCDONALD LOCAL S.D.	0.547	0.021	0.114	0.068	0.250	0.979	0.997	1.063	1.000	1.014	0.9991	294
SOUTHINGTON LOCAL S.D.	0.559	0.022	0.116	0.061	0.243	0.971	0.995	1.033	1.000	1.014	0.9908	357
WEATHERSFIELD TWP LOCAL S.D.	0.547	0.021	0.113	0.061	0.258	0.980	0.994	1.048	1.000	1.014	0.9978	305
CLAYMONT CITY S.D.	0.492	0.019	0.105	0.088	0.295	0.991	1.002	0.976	1.000	0.986	0.9890	373
DOVER CITY S.D.	0.525	0.020	0.110	0.071	0.275	1.005	0.997	0.986	1.000	0.986	0.997.	313
NEW PHILADELPHIA CITY S.D.	0.526	0.020	0.110	0.069	0.275	1.019	0.997	0.989	1.000	0.986	1.0048	244
NEWCOMERSTOWN EX VIL S.D	0.434	0.017	0.094	0.100	0.356	0.954	1.003	0.932	1.000	0.986	0.9686	540
GARAWAY LOCAL S.D.	0.388	0.015	0.086	0.122	0.390	0.944	1.007	0.912	1.000	0.986	0.9651	561
INDIAN VALLEY LOCAL S.D.	0.421	0.016	0.091	0.104	0.367	0.983	1.003	0.940	1.000	0.986	0.9823	429
STRASBURG-FRANKLIN LOCAL S.D.	0.506	0.019	0.107	0.073	0.296	0.947	0.997	0.932	1.000	0.986	0.9616	576
TUSCARAWAS VALLEY LOCAL S.D.	0.476	0.018	0.101	0.083	0.321	0.970	0.999	0.953	1.000	0.986	0.9762	482
MARYSVILLE EX VIL S.D	0.492	0.019	0.104	0.077	0.308	1.068	0.998	0.968	1.000	0.989	1.0269	97
FAIRBANKS LOCAL S.D.	0.458	0.018	0.098	0.086	0.340	0.979	0.999	0.918	1.000	0.989	0.9786	456
NORTH UNION LOCAL S.D.	0.447	0.017	0.096	0.094	0.345	1.027	1.001	0.941	1.000	0.989	1.0029	259
VAN WERT CITY S.D.	0.498	0.019	0.106	0.086	0.291	1.099	1.002	0.978	1.000	0.988	1.0438	36
CRESTVIEW LOCAL S.D.	0.497	0.019	0.106	0.084	0.295	0.994	1.001	0.945	1.000	0.988	0.9878	386
LINCOLNVIEW LOCAL S.D.	0.413	0.016	0.090	0.109	0.372	0.978	1.005	0.917	1.000	0.988	0.9793	450
OHIO CITY-LIBERTY LOCAL S.D.	0.529	0.021	0.111	0.079	0.260	0.942	1.001	0.922	1.000	0.988	0.9577	587
VINTON LOCAL S.D.	0.306	0.012	0.069	0.154	0.458	1.155	1.013	0.842	1.000	0.960	1.0184	140
FRANKLIN CITY S.D.	0.525	0.020	0.110	0.075	0.270	1.050	0.998	1.076	1.000	1.013	1.0378	47
LEBANON CITY S.D.	0.535	0.021	0.112	[illegible]69	0.263	1.021	0.997	1.057	1.000	1.013	1.0208	126
CARLISLE LOCAL S.D.	0.511	0.020	0.108	[illegible]073	0.288	1.005	0.997	1.034	1.000	1.013	1.0097	206
CLEARCREEK LOCAL S.D.	0.574	0.022	0.118	0.056	0.229	1.018	0.994	1.076	1.000	1.013	1.0218	120
DEERFIELD-UNION LOCAL S.D.	0.492	0.019	0.105	0.085	0.299	0.991	1.000	1.030	1.000	1.013	1.0025	265
LITTLE MIAMI LOCAL S.D.	0.531	0.020	0.111	0.069	0.269	1.014	0.996	1.050	1.000	1.013	1.0164	156
MASON LOCAL S.D.	0.531	0.021	0.111	0.069	0.268	1.011	0.996	1.048	1.000	1.013	1.0143	173
WAYNE LOCAL S.D.	0.498	0.019	0.106	0.080	0.297	0.985	0.999	1.017	1.000	1.013	0.9982	302

TABLE VI (OHIO)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
BELPRE CITY S.D.	0.517	0.020	0.109	0.077	0.276	1.010	1.000	0.997	1.000	0.990	1.0018	272
MARIETTA CITY S.D.	0.467	0.018	0.100	0.094	0.321	1.064	1.003	0.990	1.000	0.990	1.0255	104
FORT FRYE LOCAL S.D.	0.467	0.018	0.100	0.092	0.323	0.966	1.002	0.943	1.000	0.990	0.9752	492
FRONTIER LOCAL S.D.	0.395	0.015	0.087	0.118	0.385	0.967	1.007	0.935	1.000	0.990	0.9773	465
WARREN LOCAL S.D.	0.469	0.018	0.100	0.087	0.326	0.995	1.000	0.962	1.000	0.990	0.9904	358
WOLF CREEK LOCAL S.D.	0.581	0.023	0.119	0.061	0.217	0.955	0.997	0.958	1.000	0.990	0.9664	552
ORRVILLE CITY S.D.	0.498	0.019	0.105	0.075	0.303	0.987	0.997	0.979	1.000	0.992	0.9887	375
WOOSTER CITY S.D.	0.475	0.018	0.101	0.084	0.321	1.034	0.999	0.994	1.000	0.95	1.0131	181
RITTMAN EX VIL S.D	0.502	0.019	0.106	0.078	0.294	0.976	0.999	0.968	1.000	0.992	0.9824	426
CHIPPEWA LOCAL S.D.	0.476	0.018	0.101	0.085	0.320	0.967	1.000	0.950	1.000	0.992	0.9768	476
DALTON LOCAL S.D.	0.514	0.020	0.108	0.074	0.284	0.953	0.998	0.947	1.000	0.992	0.9680	543
GREENE LOCAL S.D.	0.514	0.020	0.108	0.074	0.284	0.968	0.998	0.965	1.000	0.992	0.9772	467
NORTH CENTRAL LOCAL S.D.	0.522	0.020	0.109	0.065	0.285	0.963	0.995	0.956	1.000	0.992	0.9736	507
NORTHWESTERN LOCAL S.D.	0.473	0.018	0.101	0.093	0.314	0.961	1.003	0.951	1.000	0.992	0.9742	504
SOUTHEAST LOCAL S.D.	0.336	0.014	0.076	0.156	0.417	0.949	1.017	0.938	1.000	0.992	0.9750	495
TRIWAY LOCAL S.D.	0.482	0.019	0.102	0.081	0.316	0.975	0.998	0.959	1.000	0.992	0.9810	440
BRYAN CITY S.D.	0.533	0.021	0.111	0.069	0.266	1.056	0.997	0.998	1.000	0.992	1.0275	92
MONTPELIER EX VIL S.D	0.473	0.018	0.101	0.091	0.316	0.992	1.002	0.962	1.000	0.992	0.9898	366
EDGERTON LOCAL S.D.	0.509	0.020	0.107	0.071	0.292	0.965	0.997	0.928	1.000	0.992	0.9719	517
EDON-NORTHWEST LOCAL S.D.	0.476	0.018	0.101	0.081	0.324	0.947	0.998	0.925	1.000	0.992	0.9647	566
MILLCREEK-WEST UNITY LOCAL S.D	0.514	0.020	0.108	0.077	0.280	0.972	0.999	0.944	1.000	0.992	0.9774	464
NORTH CENTRAL LOCAL S.D.	0.511	0.020	0.107	0.073	0.290	0.979	0.997	0.951	1.000	0.992	0.9817	434
STRYKER LOCAL S.D.	0.507	0.020	0.108	0.087	0.279	0.955	1.003	0.931	1.000	0.992	0.9677	544
BOWLING GREEN CITY S.D.	0.472	0.018	0.101	0.085	0.325	1.012	0.999	0.972	1.000	1.000	1.0028	260
PERRYSBURG EX VIL S.D	0.569	0.022	0.117	0.057	0.235	1.010	0.994	1.030	1.000	1.000	1.0091	211
ROSSFORD EX VIL S.D	0.563	0.022	0.116	0.061	0.238	0.995	0.996	1.034	1.000	1.000	1.0017	273
EASTWOOD LOCAL S.D.	0.508	0.020	0.107	0.076	0.289	0.975	0.998	0.995	1.000	1.000	0.9868	394
ELMWOOD LOCAL S.D.	0.435	0.017	0.094	0.097	0.357	0.977	1.002	0.972	1.000	1.000	0.9872	392
LAKE LOCAL S.D.	0.508	0.020	0.107	0.076	0.289	0.999	0.998	1.009	1.000	1.000	1.0003	285
NORTH BALTIMORE LOCAL S.D.	0.522	0.020	0.109	0.070	0.278	0.964	0.996	0.971	1.000	1.000	0.9779	461
NORTHWOOD LOCAL S.D.	0.552	0.021	0.115	0.063	0.249	0.964	0.996	0.976	1.000	1.000	0.9770	472
OTSEGO LOCAL S.D.	0.369	0.015	0.083	0.148	0.386	0.985	1.017	0.993	1.000	1.000	0.9940	334
CAREY EX VIL S.D	0.469	0.018	0.101	0.096	0.316	0.989	1.004	0.912	1.000	0.975	0.9779	460
UPPER SANDUSKY EX VIL S.D	0.496	0.019	0.105	0.083	0.296	1.045	1.001	0.929	1.000	0.975	1.0073	229
MOHAWK LOCAL S.D.	0.474	0.019	0.102	0.097	0.308	1.000	1.005	0.915	1.000	0.975	0.9837	416

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
ALCONA COMMUNITY SCHOOLS	0.457	0.013	0.156	0.113	0.260	0.973	0.782	0.859	1.000	1.000	0.9629	421
MUNISING PUBLIC SCHOOLS	0.470	0.014	0.164	0.101	0.252	0.990	0.737	0.821	1.000	1.000	0.9626	423
PLAINWELL COMMUNITY SCHOOLS	0.469	0.014	0.163	0.102	0.252	1.005	0.901	0.921	1.000	1.000	0.9883	278
OTSEGO PUBLIC SCHOOLS	0.478	0.014	0.169	0.093	0.247	0.992	0.901	0.941	1.000	1.000	0.9849	299
ALLEGAN PUBLIC SCHOOLS	0.470	0.014	0.164	0.100	0.251	0.992	0.905	0.931	1.000	1.000	0.9834	309
WAYLAND UNION SCHOOLS	0.467	0.014	0.162	0.103	0.253	0.999	0.902	0.909	1.000	1.000	0.9835	308
HOPKINS PUBLIC SCHOOL	0.473	0.014	0.165	0.098	0.250	0.995	0.902	0.921	1.000	1.000	0.9834	310
SAUGATUCK PUBLIC SCHOOLS	0.453	0.013	0.154	0.117	0.263	0.995	0.909	0.920	1.000	1.000	0.9842	302
HAMILTON COMMUNITY SCHOOLS	0.470	0.014	0.164	0.100	0.251	0.999	0.901	0.908	1.000	1.000	0.9828	313
ALPENA CITY SCHOOL DISTRICT	0.445	0.013	0.152	0.124	0.266	0.987	0.918	0.947	1.000	1.000	0.9852	297
BELLAIRE PUBLIC SCHOOL	0.463	0.014	0.160	0.108	0.256	0.995	0.768	0.838	1.000	1.000	0.9684	394
ELK RAPIDS SCHOOLS	0.470	0.014	0.164	0.101	0.252	0.978	0.765	0.859	1.000	1.000	0.9634	418
MANCELONA PUBLIC SCHOOL	0.473	0.014	0.165	0.098	0.250	0.984	0.770	0.847	1.000	1.000	0.9640	416
ARENAC EASTERN SCHOOL DIST	0.432	0.013	0.143	0.137	0.275	0.988	0.881	0.903	1.000	1.000	0.9794	330
AU GRES SIMS SCHOOL DISTRICT	0.458	0.013	0.157	0.112	0.259	0.985	0.873	0.924	1.000	1.000	0.9794	329
STANDISH STERL COMM SCH DIST	0.475	0.014	0.167	0.096	0.249	0.974	0.880	0.893	1.000	1.000	0.9683	395
BARAGA TOWNSHIP SCHOOL DIST	0.475	0.014	0.166	0.096	0.248	1.005	0.799	0.835	1.000	1.000	0.9723	373
L ANSE TWP SCHOOL DISTRICT	0.475	0.014	0.166	0.096	0.249	0.995	0.796	0.852	1.000	1.000	0.9700	386
DELTON KELLOGG SCHOOL DIST	0.474	0.014	0.167	0.096	0.249	0.987	0.977	0.993	1.000	1.000	0.9921	255
HASTINGS PUBLIC SCHOOL DIST	0.466	0.014	0.163	0.104	0.254	0.989	0.974	0.984	1.000	1.000	0.9918	258
THORNAPPLE KELLOGG SCH DIST	0.472	0.014	0.165	0.099	0.250	0.989	0.970	0.977	1.000	1.000	0.9908	266
BAY CITY SCHOOL DISTRICT	0.456	0.013	0.163	0.111	0.257	0.991	1.058	1.024	1.000	1.000	1.0004	203
ESSEXVILLE HAMPTON SCH DIST	0.474	0.014	0.166	0.097	0.249	0.997	1.055	1.068	1.000	1.000	1.0006	202
PINCONNING AREA SCHOOLS	0.458	0.013	0.157	0.112	0.259	0.992	1.059	1.016	1.000	1.000	0.9994	213
BENZIE CO CENTRAL SCHOOLS	0.474	0.014	0.166	0.097	0.249	0.988	0.804	0.869	1.000	1.000	0.9696	388
FRANKFORT AREA SCHOOLS	0.475	0.014	0.167	0.096	0.248	0.981	0.811	0.879	1.000	1.000	0.9680	397
BENTON HARBOR CITY SCH DIST	0.404	0.012	0.142	0.156	0.286	1.005	1.012	1.017	1.000	1.000	1.004	175
ST JOSEPH CITY SCHOOL DIST	0.426	0.012	0.140	0.143	0.279	1.017	0.976	0.994	1.000	1.000	1.0069	163
RIVER VALLEY SCHOOL DISTRICT	0.451	0.013	0.153	0.119	0.263	1.000	0.987	0.957	1.000	1.000	0.9931	249
GALIEN TOWNSHIP SCHOOL	0.442	0.013	0.148	0.128	0.269	0.997	0.984	0.981	1.000	1.000	0.9955	239
NEW BUFFALO AREA SCHOOL DIST	0.471	0.014	0.164	0.100	0.251	0.998	0.985	0.984	1.000	1.000	0.9960	235
BRANDYWINE PUBLIC SCH DIST	0.446	0.013	0.151	0.123	0.266	1.021	0.981	0.975	1.000	1.000	1.0053	167
BERRIEN SPRINGS PUB SCH DIST	0.370	0.011	0.111	0.196	0.313	1.009	0.974	1.062	1.000	1.000	1.0099	138
EAU CLAIRE PUBLIC SCH DIST	0.475	0.014	0.166	0.096	0.249	0.995	0.984	1.008	1.000	1.000	0.9990	218
NILES COMMUNITY SCHOOL DIST	0.445	0.013	0.152	0.124	0.266	1.006	0.990	0.972	1.000	1.000	0.9985	222
BUCHANAN PUBLIC SCHOOL DIST	0.455	0.013	0.156	0.115	0.261	1.009	0.981	0.981	1.000	1.000	1.0011	198
WATERVLIET SCHOOL DISTRICT	0.450	0.013	0.152	0.121	0.265	1.003	0.990	0.945	1.000	1.000	0.9927	254
COLOMA COMMUNITY SCHOOLS	0.454	0.013	0.156	0.116	0.261	0.999	0.985	0.993	1.000	1.000	0.9984	224
BRIDGMAN PUBLIC SCHOOL	0.448	0.013	0.151	0.122	0.265	1.021	0.985	0.955	1.000	1.000	1.0024	191

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
COLDWATER COMMUNITY SCHOOLS	0.476	0.014	0.167	0.095	0.248	[illegible]	0.885	0.903	1.000	1.000	0.9778	340
BRONSON COMMUNITY SCH DIST	0.468	0.014	0.163	0.102	0.252	0.986	0.885	0.909	1.000	1.000	0.9772	344
QUINCY COMMUNITY SCHOOL DIST	0.473	0.014	0.166	0.097	0.249	0.993	0.880	0.919	1.000	1.000	0.9815	316
ALBION CITY SCHOOLS	0.447	0.013	0.152	0.122	0.265	1.004	1.042	1.065	1.000	1.000	1.0121	117
BATTLE CREEK PUBLIC SCHOOLS	0.395	0.011	0.131	0.168	0.295	1.010	1.046	1.058	1.000	1.000	1.0120	118
SPRINGFIELD CITY SCHOOL DIST	0.442	0.013	0.14[illegible]	0.128	0.269	1.023	1.040	0.985	1.000	1.000	1.0086	146
ATHENS AREA SCHOOLS	0.459	0.013	0.158	0.111	0.258	0.995	1.037	1.005	1.000	1.000	0.9990	219
HARPER CREEK COMM SCHOOLS	0.452	0.013	0.155	0.117	0.262	0.997	1.035	1.034	1.000	1.000	1.0044	174
HOMER COMMUNITY SCHOOLS	0.476	0.014	0.167	0.095	0.248	0.987	1.036	1.035	1.000	1.000	0.9999	208
MARSHALL PUBLIC SCHOOLS	0.465	0.014	0.161	0.105	0.254	1.001	1.035	1.031	1.000	1.000	1.0061	162
PENNFIELD SCHOOL DISTRICT	0.476	0.014	0.167	0.095	0.248	0.993	1.039	1.023	1.000	1.000	1.0009	200
TEKONSHA COMMUNITY SCHOOL	0.468	0.014	0.163	0.103	0.253	0.988	1.037	1.038	1.000	1.000	1.0013	197
UNION CITY COMM SCHOOL DIST	0.450	0.013	0.153	0.120	0.264	0.986	1.04[illegible]	1.009	1.000	1.000	0.9955	238
CASSOPOLIS PUBLIC SCHOOLS	0.448	0.013	0.153	0.122	0.265	0.994	0.941	0.952	1.000	1.000	0.9892	274
DOWAGIAC UNION SCHOOLS	0.442	0.013	0.152	0.126	0.268	0.994	0.938	0.956	1.000	1.000	0.9899	269
EDWARDSBURG PUBLIC SCHOOLS	0.446	0.013	0.151	0.124	0.267	1.009	0.928	0.957	1.000	1.000	0.9968	230
MARCELLUS COMMUNITY SCHOOLS	0.463	0.014	0.160	0.108	0.256	0.986	0.938	0.945	1.000	1.000	0.9839	303
CHARLEVOIX PUBLIC SCH DIST	0.465	0.014	0.161	0.105	0.255	0.993	0.817	0.908	1.000	1.000	0.9793	331
CHEBOYGAN AREA SCHOOLS	0.454	0.013	0.155	0.116	0.262	0.991	0.809	0.854	1.000	1.000	0.9708	383
INLAND LAKES SCHOOL DISTRICT	0.482	0.014	0.170	0.090	0.245	0.982	0.806	0.872	1.000	1.000	0.9670	401
SAULT STE MARIE AREA SCHOOLS	0.436	0.013	0.148	0.132	0.272	0.992	0.793	0.863	1.000	1.000	0.9735	366
DETOUR TWP SCHOOL	0.485	0.014	0.172	0.086	0.242	0.992	0.791	0.811	1.000	1.000	0.9606	431
PICKFORD PUBLIC SCHOOLS	0.480	0.014	0.169	0.092	0.246	0.982	0.790	0.835	1.000	1.000	0.9605	432
RUDYARD AREA SCHOOLS	0.465	0.014	0.161	0.106	0.255	0.981	0.786	0.983	1.000	1.000	0.9856	292
BRIMLEY PUBLIC SCHOOLS	0.468	0.014	0.162	0.103	0.253	0.972	0.802	0.870	1.000	1.000	0.9632	419
CLARE PUBLIC SCHOOLS	[illegible]	0.014	0.165	0.099	0.251	0.984	0.826	0.885	1.000	1.000	0.9711	380
FARWELL AREA SCHOOLS	0.447	0.013	0.151	0.123	0.266	0.984	0.831	0.879	1.000	1.000	0.9722	375
HARRISON COMMUNITY SCHOOLS	0.452	0.013	0.154	0.118	0.263	0.981	0.826	0.913	1.000	1.000	0.9756	350
DE WITT PUBLIC SCHOOLS	0.466	0.014	0.161	0.105	0.254	0.993	1.050	1.039	1.000	1.000	1.0037	181
FOWLER PUBLIC SCHOOLS	0.472	0.014	0.164	0.100	0.251	1.001	1.050	0.993	1.000	1.000	1.0002	204
BATH COMMUNITY SCHOOLS	0.461	0.013	0.159	0.109	0.257	0.997	1.055	1.016	1.000	1.000	1.0018	195
OVID ELSIE AREA SCHOOLS	0.458	0.013	0.158	0.112	0.259	0.987	1.049	1.051	1.000	1.000	1.0027	187
PEWAMO-WESTPHALIA COMM S D	0.478	0.014	0.168	0.093	0.247	0.987	1.050	1.007	1.000	1.000	0.9954	240
ST JOHNS PUBLIC SCHOOLS	0.440	0.013	0.147	0.130	0.271	0.995	1.047	1.040	1.000	1.000	1.0043	176
CRAWFORD AUSABLE SCHOOLS	0.480	0.014	0.170	0.091	0.245	0.965	0.797	0.871	1.000	1.000	0.9587	436
ESCANABA AREA PUBLIC SCHOOLS	0.462	0.013	0.161	0.108	0.256	0.982	0.[illegible]78	0.926	1.000	1.000	0.9783	334
RAPID RIVER PUBLIC SCHOOLS	0.467	0.014	0.162	0.104	0.254	0.996	0.882	0.904	1.000	1.000	0.9811	322
BIG BAY DE NOC SCHOOL DIST	0.468	0.014	0.163	0.103	0.253	0.977	0.885	0.915	1.000	1.000	0.9737	365
BARK RIVER HARRIS SCH DIST	0.471	0.014	0.164	0.100	0.251	0.991	0.880	0.922	1.000	1.000	0.9813	321
ROCK PUBLIC SCHOOL DISTRICT	0.469	0.014	0.163	0.102	0.253	0.999	0.887	0.879	1.000	1.000	0.9782	335

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
IRON MOUNTAIN CITY SCH DIST	0.458	0.013	0.157	0.112	0.259	0.990	0.854	0.898	1.000	1.000	0.9777	341
NORWAY VULCAN AREA SCHOOLS	0.476	0.014	0.167	0.095	0.248	0.980	0.861	0.862	1.000	1.000	0.9655	407
BREITUNG TOWNSHIP SCH DIST	0.451	0.013	0.153	0.119	0.264	1.000	0.859	0.856	1.000	1.000	0.9761	348
BELLEVUE COMMUNITY SCHOOLS	0.446	0.013	0.159	0.124	0.267	0.994	1.115	1.045	1.000	1.000	1.0056	165
EATON RAPIDS PUBLIC SCHOOLS	0.466	0.014	0.162	0.104	0.254	0.992	1.110	1.080	1.000	1.000	1.0109	129
GRAND LEDGE PUBLIC SCHOOLS	0.456	0.013	0.157	0.114	0.260	0.993	1.106	1.090	1.000	1.000	1.0124	115
MAPLE VALLEY SCHOOL DISTRICT	0.438	0.013	0.146	0.131	0.271	1.000	1.107	1.068	1.000	1.000	1.0111	125
OLIVET COMMUNITY SCHOOLS	0.474	0.014	0.166	0.098	0.249	0.983	1.110	1.095	1.000	1.000	1.0090	143
POTTERVILLE PUBLIC SCHOOLS	0.446	0.013	0.150	0.124	0.267	0.992	1.108	1.084	1.000	1.000	1.0106	132
HARBOR SPRINGS SCHOOL DIST	0.467	0.014	0.162	0.104	0.254	0.990	0.829	0.905	1.000	1.000	0.9776	342
LITTLEFIELD PUBLIC SCH DIST	0.465	0.014	0.160	0.106	0.255	0.991	0.836	0.887	1.000	1.000	0.9756	351
PELLSTON PUBLIC SCHOOL DIST	0.467	0.014	0.162	0.104	0.254	0.989	0.834	0.910	1.000	1.000	0.9780	337
PETOSKEY SCHOOL DISTRICT	0.427	0.012	0.145	0.139	0.276	0.996	0.824	0.903	1.000	1.000	0.9819	315
FLINT CITY SCHOOL DISTRICT	0.395	0.011	0.147	0.159	0.287	1.016	1.183	1.178	1.000	1.000	1.0345	66
GRAND BLANC COMM SCHOOLS	0.458	0.013	0.157	0.112	0.259	1.014	1.162	1.128	1.000	1.000	1.0289	72
MT MORRIS CONS SCHOOLS	0.474	0.014	0.167	0.096	0.249	0.992	1.167	1.100	1.000	1.000	1.0154	103
GOODRICH AREA SCHOOL DIST	0.449	0.013	0.152	0.121	0.265	1.009	1.158	1.145	1.000	1.000	1.0282	73
BENDLE PUBLIC SCHOOL DIST	0.470	0.014	0.164	0.101	0.252	0.993	1.172	1.104	1.000	1.000	1.0161	101
GENESEE SCHOOL DISTRICT	0.485	0.014	0.172	0.086	0.242	0.978	1.173	1.118	1.000	1.000	1.0123	116
CARMAN SCHOOL DISTRICT	0.456	0.013	0.158	0.113	0.260	1.010	1.167	1.114	1.000	1.000	1.0249	75
FENTON AREA PUBLIC SCHOOLS	0.449	0.013	0.153	0.120	0.264	1.008	1.163	1.119	1.000	1.000	1.0238	80
KEARSLEY COMMUNITY SCHOOLS	0.432	0.013	0.143	0.137	0.275	1.001	1.167	1.098	1.000	1.000	1.0164	99
FLUSHING COMMUNITY SCHOOLS	0.468	0.014	0.163	0.102	0.253	1.000	1.159	1.135	1.000	1.000	1.0243	78
ATHERTON COMM SCHOOL DIST	0.463	0.014	0.160	0.107	0.256	1.011	1.166	1.083	1.000	1.000	1.0205	90
DAVISON COMMUNITY SCHOOLS	0.453	0.013	0.154	0.117	0.262	1.012	1.161	1.113	1.000	1.000	1.0249	76
CLIO AREA SCHOOL DISTRICT	0.464	0.014	0.161	0.106	0.255	1.004	1.166	1.103	1.000	1.000	1.0206	89
SWARTZ CREEK COMM SCH DIST	0.469	0.014	0.163	0.102	0.252	1.009	1.163	1.117	1.000	1.000	1.0254	74
LAKE FENTON SCHOOL	0.473	0.014	0.165	0.098	0.250	1.006	1.163	1.113	1.000	1.000	1.0240	79
BENTLEY COMM SCHOOL DISTRICT	0.473	0.014	0.165	0.098	0.250	1.008	1.163	1.096	1.000	1.000	1.0218	85
BEECHER SCHOOL DISTRICT	0.437	0.013	0.150	0.130	0.270	1.012	1.176	1.149	1.000	1.000	1.0297	70
LINDEN COMMUNITY SCHOOL DIST	0.475	0.014	0.167	0.096	0.248	1.001	1.166	1.107	1.000	1.000	1.0206	88
MONTROSE TOWNSHIP SCHOOLS	0.473	0.014	0.165	0.098	0.250	0.995	1.171	1.098	1.000	1.000	1.0164	100
LAKEVILLE COMM SCH DIST	0.465	0.014	0.162	0.105	0.254	0.994	1.167	1.108	1.000	1.000	1.0169	97
BEAVERTON RURAL SCHOOLS	0.477	0.014	0.167	0.095	0.248	0.983	0.907	0.919	1.000	1.000	0.9772	343
GLADWIN COMMUNITY SCHOOLS	0.471	0.014	0.164	0.100	0.251	0.993	0.899	0.924	1.000	1.000	0.9826	314
BESSEMER CITY SCHOOL DIST	0.480	0.014	0.169	0.091	0.246	0.987	0.756	0.820	1.000	1.000	0.9597	435
IRONWOOD AREA SCHOOLS	0.468	0.014	0.164	0.102	0.252	0.989	0.755	0.821	1.000	1.000	0.9623	426
WAKEFIELD TWP SCH DIST	0.476	0.014	0.167	0.095	0.248	0.994	0.762	0.782	1.000	1.000	0.9572	438
TRAVERSE CITY PUB SCH DIST	0.469	0.014	0.165	0.101	0.251	0.994	0.920	0.945	1.000	1.000	0.9872	283
KINGSLEY AREA SCHOOL DIST	0.466	0.014	0.161	0.105	0.254	0.992	0.922	0.940	1.000	1.000	0.9856	293
ASHLEY COMMUNITY SCHOOLS	0.?75	0.014	0.166	0.097	0.249	0.982	0.865	0.875	1.000	1.000	0.9689	391
BRECKENRIDGE COMM SCHOOLS	0.470	0.014	0.164	0.101	0.252	0.988	0.858	0.896	1.000	1.000	0.9752	353
FULTON SCHOOLS	0.475	0.014	0.166	0.096	0.249	0.990	0.858	0.885	1.000	1.000	0.9743	360

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TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
SAINT LOUIS PUBLIC SCHOOLS	0.461	0.013	0.159	0.109	0.257	0.995	0.856	0.911	1.000	1.000	0.9815	317
CAMDEN FRONTIER SCHOOL	0.481	0.014	0.170	0.090	0.245	0.975	0.886	0.921	1.000	1.000	0.9728	371
HILLSDALE COMMUNITY SCHOOLS	0.459	0.013	0.158	0.111	0.259	0.998	0.880	0.929	1.000	1.000	0.9864	287
JONESVILLE COMMUNITY SCHOOLS	0.473	0.014	0.165	0.098	0.250	0.994	0.885	0.908	1.000	1.000	0.9804	323
LITCHFIELD COMMUNITY SCHOOLS	0.473	0.014	0.165	0.098	0.250	0.994	0.884	0.903	1.000	1.000	0.9797	328
NORTH ADAMS PUBLIC SCHOOLS	0.478	0.014	0.168	0.093	0.247	0.985	0.864	0.911	1.000	1.000	0.9764	346
PITTSFORD RURAL AG SCHOOLS	0.467	0.014	0.162	0.104	0.254	0.981	0.883	0.936	1.000	1.000	0.9792	332
READING COMMUNITY SCHOOLS	0.475	0.014	0.166	0.097	0.249	0.990	0.888	0.884	1.000	1.000	0.9745	359
WALDRON AREA SCHOOLS	0.469	0.014	0.163	0.102	0.252	0.978	0.889	0.900	1.000	1.000	0.9715	378
HANCOCK CITY SCHOOL DISTRICT	0.459	0.013	0.158	0.111	0.258	0.986	0.721	0.832	1.000	1.000	0.9631	420
ADAMS TOWNSHIP SCHOOL DIST	0.439	0.013	0.147	0.130	0.271	0.981	0.722	0.827	1.000	1.000	0.9626	425
CALUMET PUBLIC SCHOOL DIST	0.473	0.014	0.166	0.098	0.250	0.967	0.728	0.817	1.000	1.000	0.9504	441
CHASSELL TOWNSHIP SCH DIST	0.478	0.014	0.168	0.093	0.247	1.020	0.722	0.774	1.000	1.000	0.9679	398
LAKE LINDEN HUBBELL SCH DIST	0.476	0.014	0.167	0.095	0.248	0.932	0.723	0.855	1.000	1.000	0.9394	446
ELKTON PIGEON BAYPORT S/DIST	0.451	0.013	0.153	0.119	0.264	0.990	0.828	0.853	1.000	1.000	0.9709	381
NORTH HURON SCHOOLS	0.444	0.013	0.149	0.126	0.268	0.980	0.826	0.887	1.000	1.000	0.9719	376
OWENDALE GAGETOWN AREA S D	0.479	0.014	0.169	0.092	0.246	0.976	0.834	0.860	1.000	1.000	0.9626	424
PORT AUSTIN PUBLIC SCHOOLS	0.471	0.014	0.164	0.100	0.251	0.956	0.844	0.880	1.000	1.000	0.9576	437
UBLY COMMUNITY SCHOOLS	0.449	0.013	0.152	0.121	0.265	0.990	0.828	0.852	1.000	1.000	0.9708	382
EAST LANSING SCHOOL DISTRICT	0.459	0.013	0.158	0.111	0.258	1.004	1.021	1.042	1.000	1.000	1.0088	145
LANSING PUBLIC SCHOOL DIST	0.395	0.011	0.135	0.166	0.293	1.013	1.036	1.048	1.000	1.000	1.0119	120
DANSVILLE AG SCHOOL	0.454	0.013	0.155	0.116	0.262	0.989	1.025	1.028	1.000	1.000	0.9996	212
HASLETT PUBLIC SCHOOLS	0.468	0.014	0.162	0.103	0.253	1.017	1.024	1.021	1.000	1.000	1.0118	121
HOLT PUBLIC SCHOOLS	0.466	0.014	0.162	0.105	0.254	1.006	1.030	1.022	1.000	1.000	1.0067	156
LESLIE PUBLIC SCHOOLS	0.463	0.014	0.160	0.107	0.256	1.004	1.027	1.022	1.000	1.000	1.0056	166
MASON PUBLIC SCHOOLS	0.467	0.014	0.162	0.104	0.254	1.000	1.024	1.028	1.000	1.000	1.0049	168
OKEMOS PUBLIC SCHOOLS	0.458	0.013	0.157	0.113	0.260	1.007	1.019	1.072	1.000	1.000	1.0147	108
STOCKBRIDGE COMM SCHOOLS	0.460	0.013	0.159	0.110	0.258	0.994	1.032	1.025	1.000	1.000	1.0015	196
WAVERLY SCHOOLS	0.461	0.013	0.159	0.109	0.257	1.011	1.024	1.032	1.000	1.000	1.0105	134
WEBBERVILLE PUBLIC SCHOOLS	0.471	0.014	0.164	0.100	0.251	1.001	1.025	1.030	1.000	1.000	1.0059	164
WILLIAMSTON COMM SCHOOLS	0.470	0.014	0.163	0.101	0.252	1.011	1.025	1.021	1.000	1.000	1.0090	144
BELDING AREA SCHOOL DISTRICT	0.473	0.014	0.165	0.098	0.250	0.998	0.976	0.942	1.000	1.000	0.9891	276
LAKEWOOD PUBLIC SCHOOLS	0.468	0.014	0.164	0.102	0.252	0.989	0.974	0.962	1.000	1.000	0.9881	279
SARANAC COMM SCHOOL DISTRICT	0.471	0.014	0.164	0.100	0.251	0.997	0.96	0.977	1.000	1.000	0.9945	244
OSCODA AREA SCHOOLS	0.462	0.013	0.161	0.107	0.256	0.986	0.791	0.934	1.000	1.000	0.9800	326
HALE AREA SCHOOLS	0.449	0.013	0.152	0.121	0.265	0.987	0.791	0.842	1.000	1.000	0.9676	399
TAWAS AREA SCHOOLS	0.465	0.014	0.161	0.106	0.255	1.004	0.788	0.847	1.000	1.000	0.9743	361
WHITTEMORE PRESCOTT AREA S D	0.458	0.013	0.158	0.112	0.259	0.970	0.795	0.878	1.000	1.000	0.9642	413
MT PLEASANT CITY SCHOOL DIST	0.433	0.013	0.144	0.136	0.275	0.995	0.767	0.873	1.000	1.000	0.9768	345
BEAL CITY SCHOOL DISTRICT	0.473	0.014	0.165	0.098	0.250	0.994	0.771	0.800	1.000	1.000	0.9610	430
SHEPHERD PUBLIC SCHOOL DIST	0.450	0.013	0.153	0.120	0.264	0.982	0.772	0.842	1.000	1.000	0.9646	409
WESTERN SCHOOL DISTRICT	0.475	0.014	0.167	0.096	0.248	0.995	1.053	1.038	1.000	1.000	1.0046	172

TABLE VI (NTC)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
VANDERCOOK LAKE PUB SCH DIST	0.475	0.014	0.166	0.097	0.249	1.003	1.049	1.008	1.000	1.000	1.0033	185
GRASS LAKE COMMUNITY SCHOOLS	0.481	0.014	0.169	0.091	0.245	0.993	1.054	1.014	1.000	1.000	1.0000	207
CONCORD COMMUNITY SCHOOLS	0.472	0.014	0.165	0.099	0.251	1.000	1.048	1.043	1.000	1.000	1.0078	151
HANOVER HORTON SCHOOLS	0.471	0.014	0.164	0.101	0.252	1.002	1.054	1.004	1.000	1.000	1.0026	188
MICHIGAN CENTER SCHOOL DIST	0.477	0.014	0.168	0.094	0.247	1.002	1.055	0.969	1.000	1.000	0.9998	209
NAPOLEON SCHOOL DISTRICT	0.469	0.014	0.163	0.102	0.252	0.985	1.053	1.025	1.000	1.000	0.9980	226
SPRINGPORT PUBLIC SCHOOL	0.460	0.013	0.158	0.111	0.258	0.996	1.050	1.037	1.000	1.000	1.0045	173
JACKSON PUBLIC SCHOOLS	0.409	0.012	0.139	0.154	0.286	1.004	1.055	1.057	1.000	1.000	1.0103	136
KALAMAZOO CITY SCH DIST	0.391	0.011	0.130	0.171	0.297	1.012	1.041	1.074	1.000	1.000	1.0149	107
CLIMAX SCOTTS COMM SCHOOLS	0.474	0.014	0.166	0.097	0.249	1.000	1.034	0.995	1.000	1.000	0.9997	211
COMSTOCK PUBLIC SCHOOLS	0.445	0.013	0.151	0.125	0.267	1.009	1.036	1.021	1.000	1.000	1.0077	152
GALESBURG AUGUSTA COMM S D	0.435	0.013	0.144	0.134	0.273	1.007	1.034	1.022	1.000	1.000	1.0064	158
GULL LAKE COMMUNITY SCHOOLS	0.456	0.013	0.156	0.114	0.260	1.008	1.031	1.032	1.000	1.000	1.0092	141
PARCHMENT SCHOOL DISTRICT	0.456	0.013	0.156	0.114	0.269	1.003	1.035	1.012	1.000	1.000	1.0039	179
SCHOOLCRAFT COMM SCHOOLS	0.461	0.013	0.159	0.109	0.257	0.996	1.036	1.024	1.000	1.000	1.0026	190
VICKSBURG COMMUNITY SCHOOLS	0.466	0.014	0.162	0.105	0.254	1.013	1.031	1.016	1.000	1.000	1.0092	142
GRAND RAPIDS CITY SCH DIST	0.365	0.010	0.130	0.189	0.306	1.015	1.029	1.055	1.000	1.000	1.0128	110
GODWIN HEIGHTS PUBLIC SCHS	0.462	0.014	0.160	0.108	0.256	1.014	1.012	0.988	1.000	1.000	1.0046	171
NORTHVIEW PUBLIC SCHOOL	0.466	0.014	0.162	0.105	0.254	1.003	1.009	1.017	1.000	1.000	1.0041	178
WYOMING PUBLIC SCHOOLS	0.403	0.012	0.129	0.164	0.293	1.021	1.010	1.000	1.000	1.000	1.0085	147
BYRON CENTER PUBLIC SCHOOLS	0.468	0.014	0.163	0.102	0.253	1.005	1.013	0.980	1.000	1.000	0.9993	214
CALEDONIA COMMUNITY SCHOOLS	0.475	0.014	0.167	0.096	0.248	1.000	1.012	0.995	1.000	1.000	0.9990	217
CEDAR SPRINGS PUBLIC SCHOOLS	0.470	0.014	0.164	0.101	0.251	0.992	1.020	0.990	1.000	1.000	0.9947	243
COMSTOCK PARK SCHOOL DIST	0.473	0.014	0.165	0.098	0.250	1.017	1.009	0.994	1.000	1.000	1.0071	153
E GR RAPIDS PUBLIC SCHOOLS	0.474	0.014	0.166	0.097	0.249	1.021	1.006	1.007	1.000	1.000	1.0110	126
FOREST HILLS PUBLIC SCHOOLS	0.465	0.014	0.161	0.106	0.255	1.014	1.006	1.019	1.000	1.000	1.0097	139
GODFREY LEE PUBLIC SCH DIST	0.477	0.014	0.167	0.094	0.247	1.012	1.009	0.990	1.000	1.000	1.0042	177
GRANDVILLE PUBLIC SCHOOLS	0.459	0.013	0.159	0.110	0.258	1.005	1.012	1.004	1.000	1.000	1.0033	186
KELLOGGSVILLE PUBLIC SCHOOLS	0.460	0.013	0.159	0.110	0.258	1.006	1.013	1.020	1.000	1.000	1.0061	161
KENOWA HILLS PUBLIC SCHOOLS	0.460	0.013	0.159	0.110	0.258	0.999	1.016	0.982	1.000	1.000	0.9968	229
KENT CITY COMMUNITY SCHOOLS	0.467	0.014	0.163	0.103	0.253	0.989	1.021	0.981	1.000	1.000	0.9921	256
KENTWOOD PUBLIC SCHOOLS	0.471	0.014	0.165	0.099	0.250	1.010	1.010	1.031	1.000	1.000	1.0100	137
LOWELL AREA SCHOOLS	0.459	0.013	0.158	0.111	0.258	1.001	1.016	0.997	1.000	1.000	1.0002	206
ROCKFORD PUBLIC SCHOOLS	0.464	0.014	0.161	0.106	0.255	1.011	1.012	0.997	1.000	1.000	1.0046	170
SPARTA AREA SCHOOLS	0.475	0.014	0.167	0.096	0.248	1.006	1.015	0.981	1.000	1.000	0.9997	210
LAPEER PUBLIC SCHOOLS	0.471	0.014	0.166	0.099	0.250	0.988	1.020	1.020	1.000	1.000	0.9980	225
ALMONT COMMUNITY SCHOOLS	0.480	0.014	0.169	0.091	0.245	0.993	1.018	1.028	1.000	1.000	1.0018	194
DRYDEN COMMUNITY SCHOOLS	0.482	0.014	0.170	0.090	0.245	0.998	1.020	1.025	1.000	1.000	1.0035	182
NORTH BRANCH AREA SCHOOLS	0.475	0.014	0.167	0.096	0.248	0.990	1.021	1.006	1.000	1.000	0.9964	233
GLEN LAKE COMMUNITY SCH DIST	0.479	0.014	0.168	0.093	0.246	0.982	0.831	0.878	1.000	1.000	0.9682	396
NORTHPORT PUBLIC SCHOOL DIST	0.480	0.014	0.169	0.092	0.246	0.987	0.824	0.874	1.000	1.000	0.9701	384
SUTTONS BAY PUBLIC SCH DIST	0.467	0.014	0.162	0.103	0.253	0.985	0.822	0.895	1.000	1.000	0.9735	367
ADRIAN CITY SCHOOL DISTRICT	0.479	0.014	0.170	0.092	0.245	0.998	0.938	0.963	1.000	1.000	0.9916	259
ADDISON COMMUNITY SCHOOLS	0.478	0.014	0.168	0.093	0.247	1.000	0.937	0.944	1.000	1.000	0.9898	271
BLISSFIELD COMMUNITY SCHOOLS	0.479	0.014	0.169	0.092	0.246	1.000	0.933	0.940	1.000	1.000	0.9891	275

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
BRITTON MACON AREA SCHOOL	0.479	0.014	0.168	0.093	0.247	0.997	0.934	0.963	1.000	1.000	0.9915	260
CLINTON COMMUNITY SCHOOLS	0.469	0.014	0.163	0.102	0.252	0.992	0.937	0.941	1.000	1.000	0.9857	290
DEERFIELD PUBLIC SCHOOLS	0.471	0.014	0.164	0.100	0.251	1.017	0.942	0.896	1.000	1.000	0.9902	267
HUDSON AREA SCHOOLS	0.474	0.014	0.166	0.097	0.249	0.991	0.937	0.943	1.000	1.000	0.9854	294
MORENCI AREA SCHOOLS	0.478	0.014	0.168	0.093	0.247	0.985	0.938	0.948	1.000	1.000	0.9831	311
ONSTED COMMUNITY SCHOOLS	0.474	0.014	0.165	0.098	0.250	0.996	0.936	0.954	1.000	1.000	0.9898	270
SAND CREEK COMMUNITY SCHOOLS	0.475	0.014	0.167	0.096	0.248	0.994	0.931	0.970	1.000	1.000	0.9913	262
TECUMSEH PUBLIC SCHOOLS	0.472	0.014	0.164	0.099	0.251	0.997	0.936	0.947	1.000	1.000	0.9887	277
BRIGHTON AREA SCHOOLS	0.450	0.013	0.153	0.120	0.264	1.003	1.154	1.139	1.000	1.000	1.0244	77
FOWLERVILLE COMMUNITY SCHS	0.469	0.014	0.163	0.101	0.252	0.985	1.162	1.123	1.000	1.000	1.0151	105
HARTLAND CONS SCHOOL	0.460	0.013	0.158	0.111	0.258	0.997	1.155	1.137	1.000	1.000	1.0223	84
HOWELL PUBLIC SCHOOLS	0.469	0.014	0.163	0.102	0.252	0.993	1.160	1.129	1.000	1.000	1.0201	91
PINCKNEY COMMUNITY SCHOOLS	0.474	0.014	0.166	0.097	0.249	0.987	1.158	1.140	1.000	1.000	1.0193	93
ST IGNACE CITY SCHOOL DIST	0.462	0.014	0.160	0.108	0.256	0.987	0.772	0.839	1.000	1.000	0.9655	408
LES CHENEAUX COMM SCH DIST	0.485	0.014	0.172	0.086	0.242	0.976	0.772	0.811	1.000	1.000	0.9528	440
CENTER LINE PUBLIC SCHOOLS	0.447	0.013	0.152	0.122	0.266	1.022	1.247	1.144	1.000	1.000	1.0349	65
EAST DETROIT CITY SCH DIST	0.431	0.012	0.145	0.137	0.275	1.017	1.250	1.143	1.000	1.000	1.0311	69
ROSEVILLE COMMUNITY SCHOOLS	0.446	0.013	0.153	0.122	0.265	1.012	1.252	1.161	1.000	1.000	1.0334	67
ANCHOR BAY SCHOOL DISTRICT	0.470	0.014	0.164	0.100	0.251	1.008	1.252	1.197	1.000	1.000	1.0397	53
ARMADA AREA SCHOOLS	0.441	0.013	0.148	0.129	0.270	1.002	1.246	1.185	1.000	1.000	1.0313	68
CLINTONDALE PUBLIC SCHOOLS	0.448	0.013	0.153	0.121	0.265	1.009	1.252	1.190	1.000	1.000	1.0362	62
CHIPPEWA VALLEY SCHOOLS	0.462	0.014	0.160	0.108	0.257	1.006	1.249	1.199	1.000	1.000	1.0378	59
FITZGERALD PUBLIC SCHOOLS	0.451	0.013	0.153	0.119	0.264	1.020	1.248	1.154	1.000	1.000	1.0360	63
FRASER PUBLIC SCHOOLS	0.458	0.013	0.158	0.112	0.259	1.015	1.248	1.183	1.000	1.000	1.0390	56
LAKE SHORE PUBLIC SCHOOLS	0.450	0.013	0.153	0.120	0.264	1.011	1.250	1.190	1.000	1.000	1.0375	61
L ANSE CREUSE PUBLIC SCHOOLS	0.445	0.013	0.152	0.124	0.266	1.014	1.246	1.218	1.000	1.000	1.0424	43
MT CLEMENS COMM SCHOOL DIST	0.441	0.013	0.152	0.126	0.268	1.024	1.255	1.184	1.000	1.000	1.0418	47
NEW HAVEN COMMUNITY SCHOOLS	0.434	0.013	0.144	0.135	0.274	1.017	1.247	1.207	1.000	1.000	1.0404	50
RICHMOND COMMUNITY SCHOOLS	0.448	0.013	0.152	0.122	0.265	0.999	1.249	1.173	1.000	1.000	1.0292	71
ROMEO COMMUNITY SCHOOLS	0.454	0.013	0.156	0.116	0.261	1.006	1.246	1.205	1.000	1.000	1.0380	58
SOUTH LAKE SCHOOLS	0.446	0.013	0.150	0.124	0.267	1.020	1.245	1.155	1.000	1.000	1.0356	64
VAN DYKE COMMUNITY SCHOOLS	0.433	0.013	0.146	0.134	0.273	1.022	1.248	1.170	1.000	1.000	1.0375	60
WARREN CONSOLIDATED SCHOOLS	0.450	0.013	0.155	0.119	0.263	1.018	1.243	1.200	1.000	1.000	1.0422	44
BEAR LAKE SCHOOL	0.456	0.013	0.156	0.115	0.261	0.987	0.840	0.890	1.000	1.000	0.9748	356
KALEVA NORMAN-DICKSON SCHS	0.481	0.014	0.170	0.090	0.244	0.981	0.845	0.874	1.000	1.000	0.9671	400
ONEKEMA CONSOLIDATED SCHOOL	0.479	0.014	0.168	0.093	0.246	1.000	0.839	0.867	1.000	1.000	0.9753	352
MANISTEE CITY SCHOOLS	0.466	0.014	0.162	0.104	0.254	1.005	0.838	0.853	1.000	1.000	0.9760	349
NEGAUNEE SCHOOL DISTRICT	0.473	0.014	0.165	0.098	0.250	0.998	0.870	0.895	1.000	1.000	0.9801	324
REPUBLIC MICHIGAMME SCHOOLS	0.461	0.013	0.158	0.110	0.258	0.983	0.872	0.891	1.000	1.000	0.9731	368
MARQUETTE CITY SCHOOL DIST	0.452	0.013	0.157	0.116	0.261	0.998	0.874	0.925	1.000	1.000	0.9856	291
ISHPEMING PUBLIC SCHOOL DIST	0.459	0.013	0.157	0.112	0.259	1.012	0.867	0.879	1.000	1.000	0.9847	301
MASON CO CENTRAL SCHOOL DIST	0.473	0.014	0.165	0.098	0.250	0.986	0.891	0.916	1.000	1.000	0.9780	338
MASON CO EASTERN SCHOOL DIST	0.475	0.014	0.167	0.096	0.248	0.985	0.896	0.896	1.000	1.000	0.9739	363
LUDINGTON AREA SCHOOL DIST	0.459	0.013	0.158	0.111	0.258	0.993	0.893	0.993	1.000	1.000	0.9800	327

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
CHIPPEWA HILLS SCHOOL DIST	0.471	0.014	0.166	0.099	0.250	0.970	0.814	0.857	1.000	1.000	0.9598	434
MORLEY STANWOOD COMM SCHOOLS	0.478	0.014	0.168	0.094	0.247	0.980	0.813	0.857	1.000	1.000	0.9640	414
CARNEY NADEAU PUBLIC SCHOOLS	0.479	0.014	0.168	0.092	0.246	0.963	0.751	0.794	1.000	1.000	0.9439	444
MENOMINEE AREA PUBLIC SCHOOL	0.431	0.013	0.143	0.138	0.276	0.997	0.750	0.779	1.000	1.000	0.9643	412
STEPHENSON AREA PUB SCHOOLS	0.459	0.013	0.158	0.111	0.259	0.990	0.743	0.797	1.000	1.000	0.9600	433
MIDLAND CITY SCHOOL DISTRICT	0.450	0.013	0.153	0.120	0.264	0.994	1.181	1.153	1.000	1.000	1.0232	81
BULLOCK CREEK SCHOOL DIST	0.457	0.013	0.156	0.114	0.260	1.000	1.184	1.133	1.000	1.000	1.0231	82
COLEMAN COMM SCHOOL DISTRICT	0.435	0.013	0.145	0.134	0.273	0.984	1.190	1.139	1.000	1.000	1.0157	102
MERIDIAN PUB SCHOOL DISTRICT	0.465	0.014	0.161	0.105	0.255	0.991	1.188	1.144	1.000	1.000	1.0215	86
LAKE CITY AREA SCHOOL DIST	0.482	0.014	0.171	0.089	0.244	0.959	0.694	0.814	1.000	1.000	0.9444	443
MCBAIN RURAL AG SCHOOL DIST	0.465	0.014	0.161	0.106	0.255	0.978	0.688	0.757	1.000	1.000	0.9464	442
MONROE CITY PUBLIC SCHOOLS	0.433	0.013	0.145	0.135	0.274	1.005	1.127	1.061	1.000	1.000	1.0125	113
AIRPORT COMM SCHOOL DISTRICT	0.456	0.013	0.156	0.114	0.260	0.997	1.127	1.068	1.000	1.000	1.0109	128
BEDFORD PUB SCHOOL DISTRICT	0.458	0.013	0.157	0.112	0.259	1.002	1.123	1.062	1.000	1.000	1.0125	111
DUNDEE COMM SCHOOL DISTRICT	0.468	0.014	0.163	0.103	0.253	0.990	1.127	1.069	1.000	1.000	1.0084	148
IDA PUBLIC SCHOOL DISTRICT	0.419	0.012	0.136	0.149	0.283	1.003	1.120	1.056	1.000	1.000	1.0104	135
JEFFERSON CONS SCHOOL DIST	0.445	0.013	0.150	0.124	0.267	1.004	1.130	1.057	1.000	1.000	1.0120	119
MASON CONS SCHOOL DISTRICT	0.466	0.014	0.162	0.105	0.254	0.988	1.128	1.063	1.000	1.000	1.0062	160
SUMMERFIELD SCHOOL DISTRICT	0.459	0.013	0.157	0.111	0.259	1.008	1.124	1.054	1.000	1.000	1.0137	109
WHITEFORD AGRI SCHOOL DIST	0.468	0.014	0.162	0.103	0.253	0.982	1.120	1.091	1.000	1.000	1.0080	149
CARSON CITY CRYSTAL AREA S D	0.479	0.014	0.169	0.092	0.246	0.980	0.900	0.914	1.000	1.000	0.9745	358
GREENVILLE PUBLIC SCHOOLS	0.464	0.014	0.161	0.107	0.255	0.988	0.900	0.913	1.000	1.000	0.9790	333
TRI-CO AREA SCHOOLS	0.478	0.014	0.168	0.093	0.247	0.983	0.899	0.938	1.000	1.000	0.9800	325
CENTRAL MONTCALM PUB SCHOOLS	0.420	0.012	0.138	0.148	0.282	0.992	0.893	0.947	1.000	1.000	0.9881	280
VESTABURG COMMUNITY SCHOOLS	0.446	0.013	0.151	0.124	0.267	0.973	0.906	0.914	1.000	1.000	0.9740	362
ATLANTA COMMUNITY SCHOOLS	0.474	0.014	0.166	0.097	0.249	0.961	0.768	0.850	1.000	1.000	0.9640	415
HILLMAN COMMUNITY SCHOOLS	0.451	0.013	0.153	0.119	0.263	0.976	0.767	0.853	1.000	1.000	0.9638	417
MUSKEGON CITY SCHOOL DIST	0.374	0.011	0.119	0.168	0.308	1.017	0.974	0.980	1.000	1.000	1.0038	180
MUSKEGON HGTS CITY SCH DIST	0.417	0.012	0.139	0.149	0.283	1.021	0.981	1.022	1.000	1.000	1.0118	122
MONA SHORES SCHOOL DISTRICT	0.447	0.013	0.152	0.122	0.266	1.019	0.960	0.964	1.000	1.000	1.0026	189
FRUITPORT COMMUNITY SCHOOLS	0.456	0.013	0.157	0.114	0.260	1.003	0.967	0.948	1.000	1.000	0.9928	253
HOLTON PUBLIC SCHOOLS	0.451	0.013	0.153	0.119	0.264	1.000	0.971	0.961	1.000	1.000	0.9939	247
MONTAGUE AREA PUBLIC SCHOOLS	0.439	0.013	0.147	0.130	0.271	1.007	0.963	0.959	1.000	1.000	0.9965	232
ORCHARD VIEW SCHOOLS	0.435	0.013	0.145	0.134	0.273	0.999	0.965	0.957	1.000	1.000	0.9929	252
RAVENNA PUBLIC SCHOOLS	0.464	0.014	0.161	0.107	0.256	1.004	0.969	0.954	1.000	1.000	0.9942	245
NORTH MUSKEGON CITY SCH DIST	0.478	0.014	0.168	0.093	0.247	1.020	0.956	0.987	1.000	1.000	1.0067	157
WHITE HALL DIST SCHOOLS	0.441	0.013	0.148	0.129	0.270	0.996	0.967	0.996	1.000	1.000	0.9974	227
FREMONT PUBLIC SCHOOL DIST	0.470	0.014	0.164	0.101	0.252	0.992	0.841	0.876	1.000	1.000	0.9737	364
HESPERIA COMM SCHOOL DIST	0.471	0.014	0.165	0.100	0.251	0.988	0.843	0.903	1.000	1.000	0.9762	347
NEWAYGO PUBLIC SCHOOL DIST	0.476	0.014	0.167	0.095	0.248	0.983	0.841	0.911	1.000	1.000	0.9749	355
WHITE CLOUD PUBLIC SCHOOLS	0.470	0.014	0.164	0.101	0.252	0.982	0.849	0.889	1.000	1.000	0.9713	379

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
BIRMINGHAM CITY SCHOOL DIST	0.441	0.013	0.147	0.129	0.270	1.021	1.307	1.247	1.000	1.000	1.0496	12
FERNDALE CITY SCHOOL DIST	0.428	0.012	0.140	0.141	0.278	1.019	1.319	1.210	1.000	1.000	1.0417	48
PONTIAC CITY SCHOOL DISTRICT	0.382	0.011	0.123	0.181	0.303	1.021	1.330	1.268	1.000	1.000	1.0445	31
ROYAL OAK CITY SCHOOL DIST	0.403	0.012	0.130	0.163	0.292	1.022	1.314	1.227	1.000	1.000	1.0419	46
BERKLEY CITY SCHOOL DISTRICT	0.435	0.013	0.145	0.134	0.273	1.013	1.314	1.213	1.000	1.000	1.0404	51
SOUTHFIELD PUBLIC SCH DIST	0.454	0.013	0.155	0.116	0.262	1.014	1.313	1.246	1.009	1.000	1.0486	15
AVONDALE SCHOOL DISTRICT	0.458	0.013	0.158	0.112	0.259	1.009	1.319	1.222	1.000	1.000	1.0432	39
BLOOMFIELD HILLS SCHOOL DIST	0.404	0.012	0.128	0.164	0.293	1.023	1.303	1.287	1.000	1.000	1.0495	13
CLARENCEVILLE SCHOOL DIST	0.441	0.013	0.148	0.128	0.270	1.011	1.318	1.227	1.000	1.000	1.0425	42
NOVI COMMUNITY SCHOOL DIST	0.451	0.013	0.153	0.119	0.263	1.017	1.312	1.269	1.000	1.000	1.0530	7
OXFORD AREA COMM SCHOOL DIST	0.463	0.014	0.161	0.107	0.256	1.009	1.318	1.242	1.000	1.000	1.0473	20
HAZEL PARK CITY SCHOOL DIST	0.399	0.011	0.128	0.167	0.294	1.016	1.320	1.218	1.000	1.000	1.0382	57
MADISON HEIGHTS SCHOOL DIST	0.444	0.013	0.150	0.125	0.267	1.001	1.321	1.256	1.000	1.000	1.0431	40
TROY PUBLIC SCHOOLS	0.440	0.013	0.148	0.129	0.270	1.010	1.310	1.292	1.000	1.000	1.0514	8
WEST BLOOMFIELD TWP SCH DIST	0.452	0.013	0.155	0.117	0.262	1.013	1.314	1.260	1.000	1.000	1.0501	10
BRANDON SCHOOL DISTRICT	0.459	0.013	0.158	0.111	0.259	1.002	1.316	1.256	1.000	1.000	1.0457	27
CLARKSTON COMM SCHOOL DIST	0.446	0.013	0.151	0.123	0.266	1.003	1.314	1.251	1.000	1.000	1.0435	37
FARMINGTON PUB SCHOOL DIST	0.412	0.012	0.135	0.155	0.287	1.014	1.311	1.270	1.000	1.000	1.0458	26
HOLLY AREA SCHOOL DISTRICT	0.466	0.014	0.162	0.104	0.254	1.002	1.318	1.246	1.000	1.000	1.0452	29
HURON VALLEY SCHOOLS	0.458	0.013	0.158	0.112	0.259	1.008	1.321	1.236	1.000	1.000	1.0454	28
LAKE ORION COMM SCHOOL DIST	0.456	0.014	0.162	0.104	0.254	1.010	1.318	1.230	1.000	1.000	1.0461	25
SO LYON COMMUNITY SCHOOLS	0.458	0.013	0.157	0.112	0.259	1.006	1.316	1.255	1.900	1.000	1.0471	22
OAK PARK CITY SCHOOL DIST	0.396	0.011	0.125	0.171	0.297	1.024	1.316	1.233	1.000	1.000	1.0421	45
ROCHESTER COMM SCHOOL DIST	0.463	0.014	0.161	0.107	0.256	1.007	1.315	1.249	1.000	1.000	1.0474	18
WALLED LAKE CONS SCHOOL DIST	0.426	0.012	0.141	0.142	0.279	1.002	1.316	1.253	1.000	1.000	1.0404	49
WATERFORD SCHOOL DISTRICT	0.429	0.012	0.146	0.137	0.275	1.006	1.322	1.222	1.000	1.000	1.0391	55
PENTWATER PUBLIC SCHOOL DIST	0.479	0.014	0.168	0.093	0.246	0.983	0.848	0.895	1.000	1.000	0.9722	374
WALKERVILLE COMM SCHOOL DIST	0.458	0.013	0.157	0.113	0.259	0.969	0.846	0.860	1.000	1.000	0.9619	428
W BRANCH ROSE CITY AREA SCHS	0.461	0.013	0.159	0.109	0.257	0.971	0.736	0.837	1.000	1.000	0.9569	439
EWEN TROUT CREEK CONS S D	0.468	0.014	0.163	0.103	0.253	0.978	0.820	0.844	1.000	1.000	0.9618	429
ONTONAGON AREA SCHOOLS	0.433	0.013	0.144	0.136	0.274	0.993	0.818	0.847	1.000	1.000	0.9726	372
WHITE PINE SCHOOL DISTRICT	0.474	0.014	0.166	0.097	0.249	0.993	0.814	0.922	1.000	1.000	0.9813	320
EVART PUBLIC SCHOOL	0.470	0.014	0.164	0.101	0.252	0.984	0.828	0.867	1.000	1.000	0.9685	393
MARION PUBLIC SCHOOL	0.460	0.013	0.158	0.110	0.258	0.982	0.833	0.856	1.000	1.000	0.9668	402
REED CITY PUBLIC SCHOOLS	0.475	0.014	0.166	0.096	0.249	0.981	0.824	0.884	1.000	1.000	0.9690	390
MIO AU SABLE SCHOOL DISTRICT	0.477	0.014	0.168	0.094	0.247	0.957	0.702	0.807	1.000	1.000	0.9430	445
JOHANNESBURG-CENTRAL SCHOOL	0.473	0.014	0.165	0.098	0.250	0.966	0.892	0.941	1.000	1.000	0.9729	370
VANDERBILT-AREA SCHOOL	0.475	0.014	0.166	0.096	0.249	0.972	0.902	0.937	1.000	1.000	0.9747	357
GRAND HAVEN CITY SCHOOL DIST	0.445	0.013	0.150	0.125	0.267	1.008	0.921	0.940	1.000	1.000	0.9935	248
HOLLAND CITY SCHOOL DISTRICT	0.435	0.013	0.145	0.134	0.273	1.008	0.923	0.942	1.000	1.000	0.9939	246
ALLENDALE PUBLIC SCHOOL DIST	0.474	0.014	0.166	0.097	0.249	1.000	0.920	0.948	1.000	1.000	0.9901	268
WEST OTTAWA PUB SCHOOL DIST	0.464	0.014	0.161	0.106	0.255	1.003	0.920	0.942	1.000	1.000	0.9911	263

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
COOPERSVILLE PUBLIC SCH DIST	0.448	0.013	0.152	0.122	0.265	0.996	0.921	0.931	1.000	1.000	0.9868	285
JENISON PUBLIC SCHOOLS	0.460	0.013	0.158	0.111	0.258	1.002	0.918	0.958	1.000	1.000	0.9930	250
HUDSONVILLE PUB SCHOOL DIST	0.472	0.014	0.165	0.099	0.250	1.005	0.919	0.920	1.000	1.000	0.9878	282
SPRING LAKE PUBLIC SCH DIST	0.456	0.013	0.156	0.114	0.260	1.009	0.920	0.936	1.000	1.000	0.9930	251
ZEELAND PUBLIC SCHOOL DIST	0.475	0.014	0.166	0.096	0.249	0.999	0.922	0.913	1.000	1.000	0.9838	304
ONAWAY AREA COMM SCHOOL DIST	0.477	0.014	0.168	0.094	0.247	0.978	0.814	0.866	1.000	1.000	0.9644	411
POSEN CONS SCHOOL DISTRICT	0.480	0.014	0.169	0.091	0.245	0.991	0.813	0.838	1.000	1.000	0.9658	405
ROGERS UNION SCHOOL DISTRICT	0.475	0.014	0.167	0.096	0.249	0.988	0.813	0.846	1.000	1.000	0.9661	404
HOUGHTON LAKE COMMUNITY SCHS	0.451	0.013	0.154	0.118	0.263	0.975	0.757	0.852	1.000	1.000	0.9629	422
SAGINAW CITY SCHOOL DISTRICT	0.389	0.011	0.129	0.173	0.298	1.013	1.108	1.103	1.000	1.000	1.0194	92
CARROLLTON SCHOOL DISTRICT	0.381	0.011	0.116	0.185	0.306	1.033	1.094	1.035	1.000	1.000	1.0176	96
SAGINAW TWP COMM SCHOOLS	0.449	0.013	0.152	0.121	0.265	1.006	1.091	1.084	1.000	1.000	1.0165	98
BUENA VISTA SCHOOL DISTRICT	0.420	0.012	0.138	0.148	0.282	1.019	1.107	1.066	1.000	1.000	1.0185	94
CHESANING UNION SCHOOLS	0.470	0.014	0.165	0.100	0.251	0.989	1.102	1.045	1.000	1.000	1.0035	183
BIRCH RUN AREA SCHOOL DIST	0.458	0.013	0.157	0.112	0.259	0.995	1.102	1.046	1.000	1.000	1.0063	159
BRIDGEPORT COMM SCHOOL DIST	0.453	0.013	0.154	0.117	0.262	1.001	1.098	1.062	1.000	1.000	1.0112	124
FRANKENMUTH SCHOOL DISTRICT	0.461	0.013	0.158	0.110	0.257	0.995	1.089	1.075	1.000	1.000	1.0107	131
FREELAND COMM SCHOOL DIST	0.473	0.014	0.165	0.098	0.250	1.019	1.095	1.048	1.000	1.000	1.0184	95
HEMLOCK PUBLIC SCHOOL DIST	0.462	0.013	0.160	0.108	0.257	0.991	1.095	1.060	1.000	1.000	1.0067	155
MERRILL COMM SCHOOL DISTRICT	0.431	0.013	0.143	0.138	0.276	0.985	1.092	1.087	1.000	1.000	1.0071	154
ST CHARLES COMM SCHOOL DIST	0.457	0.013	0.157	0.113	0.260	0.992	1.097	1.065	1.000	1.000	1.0079	150
SWAN VALLEY SCHOOL DISTRICT	0.462	0.013	0.160	0.108	0.257	1.005	1.099	1.072	1.000	1.000	1.0153	104
PORT HURON AREA SCHOOL DIST	0.437	0.013	0.151	0.129	0.270	1.002	1.044	1.021	1.000	1.000	1.0046	169
ALGONAC COMM SCHOOL DISTRICT	0.468	0.014	0.163	0.103	0.253	0.991	1.041	1.028	1.000	1.000	1.0008	201
CAPAC COMM SCHOOL DISTRICT	0.427	0.012	0.140	0.142	0.279	0.999	1.043	1.022	1.000	1.000	1.0034	184
EAST CHINA TWP SCHOOL DIST	0.451	0.013	0.154	0.119	0.263	0.995	1.038	1.025	1.000	1.000	1.0020	193
MARYSVILLE PUB SCHOOL DIST	0.473	0.014	0.166	0.097	0.249	0.993	1.038	1.030	1.000	1.000	1.0023	192
MEMPHIS COMMUNITY SCHOOLS	0.475	0.014	0.167	0.096	0.248	0.993	1.041	1.024	1.000	1.000	1.0011	199
YALE PUBLIC SCHOOL DISTRICT	0.469	0.014	0.165	0.101	0.252	0.986	1.047	1.009	1.000	1.000	0.9954	241
STURGIS CITY SCHOOL DISTRICT	0.454	0.013	0.155	0.116	0.262	1.002	0.945	0.966	1.000	1.000	0.9950	242
BURR OAK COMM SCHOOL DIST	0.485	0.014	0.172	0.086	0.242	0.980	0.953	0.975	1.000	1.000	0.9852	298
CENTREVILLE PUB SCHOOL DIST	0.449	0.013	0.152	0.121	0.265	1.000	0.947	0.980	1.000	1.000	0.9964	234
COLON COMMUNITY SCHOOL DIST	0.471	0.014	0.164	0.100	0.251	0.982	0.949	0.972	1.000	1.000	0.9861	288
MENDON COMMUNITY SCHOOL DIST	0.479	0.014	0.168	0.092	0.246	0.999	0.952	0.952	1.000	1.000	0.9910	265
WHITE PIGEON COMM SCH DIST	0.480	0.014	0.170	0.091	0.245	0.986	0.946	0.981	1.000	1.000	0.9894	273
THREE RIVERS PUBLIC SCH DIST	0.455	0.013	0.156	0.115	0.261	1.009	0.951	0.952	1.000	1.000	0.9960	236
BROWN CITY COMM SCHOOL DIST	0.474	0.014	0.166	0.097	0.249	0.987	0.840	0.868	1.000	1.000	0.9699	387
CARSONVILLE COMM SCHOOL DIST	0.477	0.014	0.168	0.094	0.247	0.998	0.840	0.857	1.000	1.000	0.9729	369
CROSWELL LEXINGTON COMM S D	0.469	0.014	0.165	0.101	0.252	0.986	0.839	0.881	1.000	1.000	0.9715	377
DECKERVILLE COMM SCHOOL DIST	0.467	0.014	0.162	0.104	0.254	0.980	0.841	0.878	1.000	1.000	0.9687	392
MARLETTE COMM SCHOOL DIST	0.462	0.013	0.159	0.109	0.257	0.996	0.839	0.869	1.000	1.000	0.9750	354
PECK COMMUNITY SCHOOL	0.475	0.014	0.166	0.096	0.248	0.977	0.841	0.874	1.000	1.000	0.9657	406
SANDUSKY COMM SCHOOL DIST	0.471	0.014	0.165	0.100	0.251	0.988	0.836	0.865	1.000	1.000	0.9701	385

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
MANISTIQUE AREA SCHOOLS	0.467	0.014	0.162	0.104	0.253	0.972	0.796	0.863	1.000	1.000	0.9619	427
BYRON AREA SCHOOLS	0.467	0.014	0.162	0.104	0.254	0.984	1.027	1.034	1.000	1.000	0.9984	223
DURAND AREA SCHOOLS	0.468	0.014	0.163	0.103	0.253	0.999	1.028	1.001	1.000	1.000	1.0002	205
LAINGSBURG COMM SCHOOL DIST	0.447	0.011	0.151	0.123	0.266	0.988	1.025	1.016	1.000	1.000	0.9974	228
MORRICE AREA SCHOOLS	0.461	0.013	0.158	0.110	0.258	0.987	1.026	1.028	1.000	1.000	0.9988	220
NEW LOTHROP AREA PUB S D	0.476	0.014	0.167	0.096	0.248	0.990	1.028	1.000	1.000	1.000	0.9956	237
PERRY PUBLIC SCHOOL DISTRICT	0.459	0.013	0.158	0.111	0.258	0.989	1.025	1.022	1.000	1.000	0.9986	221
CORUNNA PUBLIC SCHOOL DIST	0.465	0.014	0.161	0.105	0.255	0.992	1.025	1.015	1.000	1.000	0.9991	215
OWOSSO PUBLIC SCHOOL DIST	0.460	0.013	0.151	0.109	0.257	0.990	1.026	1.020	1.000	1.000	0.9990	216
AKRON FAIRGROVE SCHOOLS	0.456	0.013	0.156	0.114	0.260	0.987	0.951	0.952	1.000	1.000	0.9860	289
CARO COMMUNITY SCHOOLS	0.462	0.014	0.160	0.108	0.256	0.993	0.951	0.974	1.000	1.000	0.9919	257
CASS CITY PUBLIC SCHOOLS	0.476	0.014	0.167	0.095	0.248	0.990	0.952	0.944	1.000	1.000	0.9853	296
KINGSTON COMMUNITY SCHOOLS	0.455	0.013	0.155	0.116	0.261	0.988	0.949	0.985	1.000	1.000	0.9914	261
MAYVILLE COMMUNITY SCHOOLS	0.461	0.013	0.159	0.109	0.257	0.992	0.951	0.961	1.000	1.000	0.9895	272
MILLINGTON COMMUNITY SCHOOLS	0.474	0.014	0.166	0.097	0.249	0.984	0.952	0.950	1.000	1.000	0.9836	306
REESE PUBLIC SCHOOLS	0.469	0.014	0.163	0.102	0.253	0.986	0.950	0.931	1.000	1.000	0.9815	318
SEBEWAING UNIONVILLE SCHOOLS	0.465	0.014	0.161	0.106	0.255	0.984	0.949	0.949	1.000	1.000	0.9835	307
VASSAR PUBLIC SCHOOLS	0.472	0.014	0.165	0.099	0.250	0.993	0.951	0.968	1.000	1.000	0.9910	264
SOUTH HAVEN PUBLIC SCHOOLS	0.468	0.014	0.165	0.102	0.252	1.001	0.895	0.933	1.000	1.000	0.9878	281
BANGOR PUBLIC SCHOOLS	0.451	0.013	0.154	0.118	0.263	0.992	0.899	0.934	1.000	1.000	0.9848	300
COVERT PUBLIC SCHOOLS	0.437	0.013	0.146	0.132	0.272	1.009	0.904	0.960	1.000	1.000	0.9967	231
DECATUR PUBLIC SCHOOLS	0.474	0.014	0.166	0.097	0.249	0.985	0.898	0.918	1.000	1.000	0.9779	339
BLOOMINGDALE PUB SCHOOL DIST	0.457	0.013	0.158	0.113	0.259	0.978	0.894	0.963	1.000	1.000	0.9829	312
GOBLES PUBLIC SCHOOL DIST	0.474	0.014	0.166	0.097	0.249	1.007	0.890	0.908	1.000	1.000	0.9865	286
HARTFORD PUBLIC SCHOOL DIST	0.439	0.013	0.148	0.130	0.271	0.998	0.902	0.903	1.000	1.000	0.9838	305
LAWRENCE PUBLIC SCHOOL DIST	0.473	0.014	0.165	0.098	0.250	0.990	0.892	0.927	1.000	1.000	0.9814	319
LAWTON COMMUNITY SCHOOL DIST	0.462	0.014	0.159	0.109	0.257	0.987	0.895	0.909	1.000	1.000	0.9781	336
MATTAWAN CONS SCHOOL DIST	0.472	0.014	0.164	0.099	0.251	0.997	0.887	0.937	1.000	1.000	0.9869	284
PAW PAW PUBLIC SCHOOL DIST	0.471	0.014	0.165	0.100	0.251	0.994	0.888	0.938	1.000	1.000	0.9853	295
ANN ARBOR CITY SCHOOL DIST	0.442	0.013	0.152	0.126	0.268	1.007	1.069	1.123	1.000	1.000	1.0224	83
YPSILANTI CITY SCHOOL DIST	0.392	0.011	0.125	0.173	0.298	1.017	1.076	1.105	1.000	1.000	1.0207	87
CHELSEA SCHOOL DISTRICT	0.454	0.013	0.154	0.117	0.262	1.000	1.066	1.056	1.000	1.000	1.0110	127
DEXTER COMMUNITY SCHOOL DIST	0.454	0.013	0.155	0.116	0.262	1.009	1.069	1.042	1.000	1.000	1.0116	123
LINCOLN CONS SCHOOL DISTRICT	0.442	0.013	0.148	0.128	0.269	1.008	1.076	1.053	1.000	1.000	1.0124	114
MANCHESTER PUB SCHOOL DIST	0.455	0.013	0.155	0.116	0.261	1.006	1.068	1.048	1.000	1.000	1.0108	130
MILAN AREA SCHOOLS	0.451	0.013	0.154	0.119	0.263	0.995	1.072	1.069	1.000	1.000	1.0093	140
SALINE AREA SCHOOL DISTRICT	0.446	0.013	0.150	0.124	0.267	0.998	1.070	1.069	1.000	1.000	1.0106	133
WHITMORE LAKE PUB SCH DIST	0.433	0.013	0.143	0.136	0.275	1.007	1.075	1.077	1.000	1.000	1.0151	106
WILLOW RUN PUBLIC SCHOOLS	0.402	0.012	0.128	0.165	0.294	1.013	1.086	1.048	1.000	1.000	1.0125	112
DETROIT CITY SCHOOL DISTRICT	0.336	0.008	0.257	0.140	0.258	1.042	1.311	1.351	1.000	1.000	1.1071	1
CHERRY HILL SCHOOL DISTRICT	0.438	0.013	0.149	0.130	0.271	1.064	1.180	1.109	1.000	1.000	1.0465	24
DEARBORN HEIGHTS SCH DIST 7	0.461	0.013	0.160	0.109	0.257	1.056	1.177	1.093	1.000	1.000	1.0431	41
MELVINDALE N ALLEN PK S D	0.446	0.013	0.152	0.123	0.266	1.057	1.174	1.109	1.000	1.000	1.0444	32
GARDEN CITY SCHOOL DISTRICT	0.424	0.012	0.141	0.143	0.279	1.055	1.177	1.102	1.000	1.000	1.0397	54
HAMTRAMCK CITY SCHOOLS	0.427	0.012	0.143	0.141	0.277	1.057	1.184	1.121	1.000	1.000	1.0438	35

TABLE VI (MICH)

DISTRICT NAME	W1	W2	W3	W4	W5	I1	I2	I3	I4	I5	EPI	RANK
HIGHLAND PARK CITY SCHOOLS	0.419	0.012	0.145	0.145	0.279	1.032	1.189	1.228	1.000	1.000	1.0698	2
INKSTER CITY SCHOOL DISTRICT	0.376	0.011	0.117	0.188	0.308	1.096	1.191	1.188	1.000	1.000	1.0600	3
LIVONIA PUBLIC SCHOOLS	0.441	0.013	0.153	0.126	0.268	1.063	1.175	1.122	1.000	1.000	1.0489	14
PLYMOUT COMMUNITY SCH DIST	0.447	0.013	0.152	0.123	0.266	1.065	1.172	1.155	1.000	1.000	1.0550	6
RIVER ROUGE CITY SCHOOLS	0.420	0.012	0.140	0.146	0.281	1.075	1.160	1.156	1.000	1.000	1.0557	5
SOUTH REDFORD SCHOOL DIST	0.443	0.013	0.149	0.127	0.269	1.068	1.171	1.078	1.000	1.000	1.0441	34
TAYLOR SCHOOL DISTRICT	0.449	0.013	0.163	0.115	0.260	1.056	1.187	1.123	1.000	1.000	1.0475	17
WAYNE WESTLAND COMM SCHOOLS	0.412	0.012	0.149	0.147	0.280	1.059	1.187	1.138	1.000	1.000	1.0472	21
NORTH DEARBORN HGTS SCH DIST	0.440	0.013	0.147	0.129	0.270	1.063	1.173	1.091	1.000	1.000	1.0433	38
CRESTWOOD SCHOOL DISTRICT	0.452	0.013	0.154	0.118	0.263	1.058	1.174	1.103	1.000	1.000	1.0447	30
ECORSE PUBLIC SCHOOL DIST	0.430	0.012	0.145	0.137	0.275	1.073	1.187	1.155	1.000	1.000	1.0562	4
GIBRALTAR SCHOOL DISTRICT	0.450	0.013	0.153	0.120	0.264	1.062	1.176	1.114	1.000	1.000	1.0476	16
GROSSE ILE TOWNSHIP SCHOOLS	0.468	0.014	0.162	0.103	0.253	1.060	1.171	1.125	1.000	1.000	1.0506	9
HARPER WOODS CITY SCH DIST	0.431	0.013	0.142	0.138	0.276	1.067	1.169	1.089	1.000	1.000	1.0435	36
HURON SCHOOL DISTRICT	0.407	0.012	0.130	0.160	0.290	1.061	1.181	1.099	1.000	1.000	1.0398	52
NORTHVILLE PUBLIC SCHOOLS	0.281	0.008	0.067	0.277	0.366	1.103	1.153	1.211	1.000	1.000	1.0443	33
RIVERVIEW COMMUNITY SCH DIST	0.463	0.014	0.160	0.108	0.256	1.061	1.174	1.119	1.000	1.000	1.0498	11
SOUTHGATE COMM SCHOOL DIST	0.443	0.013	0.151	0.125	0.267	1.063	1.173	1.110	1.000	1.000	1.0469	23
VAN BUREN PUBLIC SCHOOLS	0.432	0.013	0.144	0.137	0.275	1.063	1.178	1.125	1.000	1.000	1.0474	19
CADILLAC AREA PUBLIC SCHOOLS	0.475	0.014	0.168	0.096	0.248	0.979	0.825	0.874	1.000	1.000	0.9665	403
MANTON CONSOLIDATED SCH DIST	0.460	0.013	0.158	0.111	0.258	0.976	0.825	0.890	1.000	1.000	0.9692	389
MESICK CONSOLIDATED SCH DIST	0.474	0.014	0.166	0.097	0.249	0.968	0.825	0.892	1.000	1.000	0.9644	410

The resulting test indices will be denoted by $T_1 \ldots T_5$, respectively. The method of computation will be identical to that for the EPI, except as specifically indicated. The fifth test can be applied only to Michigan, since similar data for Ohio could not be obtained.

The variables affected in T_1 are: TITLEI and CAT in Ohio's first equation; CAT in Michigan's first equation; RATIO, MNRTY, POVCH, and ACH in Ohio's, and PTCHR, OPCOST, POVCH, and ACH in Michigan's second equation; WEALTH and TITLEI in Ohio's third; EXPER, OPCOST and ACH in Ohio's, and EXPER in Michigan's fourth; TITLEI and CAT in Ohio's, and CAT in Michigan's fifth; and RATIO, POVCH, and STBLTY in Ohio's, and BRKHME and ACH in Michigan's sixth equation.

The variables affected in T_2 are: PTCHR and OPCOST in Michigan's second equation; WEALTH in Ohio's third; EXPER in both Ohio's and Michigan's fourth, EXPER in Ohio's fifth; POVCH in Ohio's sixth; AID in Ohio's and Michigan's seventh; and STSAL, DEP, and FINCOL in Ohio's eighth equation.

It is, of course, desirable that changes such as 1) and 5) should make little difference in the index; otherwise the method would appear to be unstable under minor changes. On the other hand, 2) represents a major change in the structure, since some important variables with significant coefficients will be removed. This may be expected to have significant impact on the index. If it does not, then the EPI must be quite stable. Tests 3) and 4) are not so much tests of sensitivity to somewhat reasonable changes as they are tests of the effects of state options in constructing an index. Test 3) is a drastic change in the entire method and violates important theoretical considerations given earlier. Test 4) does not violate anything that went into the construction of the EPI; it simply represents an alternative state policy, i.e., it accepts the influence of district preferences on prices, as in power equalization. This is a conceptually different index. These two tests are included only because it is of interest to know just how different an index based on these methods would be. Presumably, state policy makers would be interested in this if their state law recognizes EPV and millage rate in determining state aid.

The test indices were compared to the EPI by computing both ordinary correlations and rank order correlations with the EPI. The results are given in Table VII.

Table VII. Correlations of the Test Indices with the EPI

	T_1	T_2	T_3	T_4	T_5
Ohio					
ordinary r	.9829	.7882	.9516	.9983	-
rank order r	.9893	.8696	.9635	.9990	-
Michigan					
ordinary r	.9811	.9991	.9878	.7732	.9994
rank order r	.9808	.9991	.9976	.8135	.9995

Evidently, the EPI is quite insensitive to changes such as T_1 or T_5, and is surprisingly insensitive to the use of EPV and millage rate instead of WEALTH and EFFORT (T_3). Even T_2 and T_4 do not alter the index excessively. It should be noted, however, that it would be difficult to justify a structural system that yields T_2 or T_3. These are not in any sense proposed as alternatives to the EPI; they have been constructed only to test the sensitivity of the latter. The regression results for the five tests are included in Appendix A.

Implementation Impact

Further work is needed in theoretical development and in specifying structure (34) more accurately before an EPI can be implemented by any state. Nevertheless, it is likely that such further development would not result in a completely different index. For this reason it is of interest to examine the changes that would take place if a state were to implement such an EPI.

The impact of implementing an EPI depends, of course, on the state aid formula. Although both Ohio and Michigan have a form of power equalization, this is based on EPV and millage rate; when the variables WEALTH and EFFORT are used, state aid does not appear to be power equalizing. Therefore, it will be assumed that state aid is of the form A_4 of Chapter 2 (i.e., fixed basic aid; this is equivalent to assuming that it is exogenous in (34), and it was shown above that this assumption makes little difference in the estimation of the parameters of (34)). Hence in implementing the EPI the state would simply calculate the amount of aid (both basic and categorical) just as it did previously, and then multiply this amount by the index. The state then has two options: give the computed amount of aid to the district; or divide this amount by the statewide total of such amounts to determine the district's proportionate share of allocated aid. The difference is that with the first option, the statewide total of aid will change from what it would have been without the EPI, if the correlation between the index and district enrollment is not zero, whereas no change will result in the state budget under the second option.

The index is, in fact, positively correlated with enrollment in both Ohio and Michigan. Therefore, while the second option would result in an average change in aid per pupil of zero, it would result in a decrease in aid for more districts and in larger per-pupil decreases in those districts. This would appear to indicate that option 1 is politically more acceptable. Therefore, the estimation of the impact of the EPI will be based on the first option.

There is one more consideration. The state may want to implement a "hold harmless" provision whereby no district would receive less state aid as a result of the EPI than it received in the year prior to its implementation. It will be assumed that this would have a negligible effect on the outcome, since the minimum EPI is about .94 and state aid tends to increase by more than 6 percent each year.

Table VIII shows the EPI-related increase in state aid that would have been incurred if Ohio or Michigan had implemented the EPI in 1976-77 or 1975-76, respectively. The maximum additional aid to fund the most liberal hold harmless provision (i.e., do not apply any EPI that is less than 1) is also given. Table IX shows the dollar change in state aid for each district, and the percent change in its total budget.

Table VIII. Increases in State Aid from EPI Implementation

	TOTAL	Average Per Pupil	% of Current Aid	Maximum Extra Needed for Hold Harmless
Ohio	$29,531,824	$14.68	2.5	$4,589,399
Michigan	28,289,169	16.49	3.1	3,628,623

Surrogate Index

As discussed earlier, a surrogate index would offer the advantage of simplicity. It would be reasonable to use a surrogate if it produced results similar to the more accurate analytical EPI. The suggested candidate for a surrogate index was OPCOST. The correlations of this variable with the EPI are as follows:

	regular r	rank order r
Ohio	.5798	.6147
Michigan	.9470	.9644

The surrogate is quite similar to the EPI in Michigan but different in Ohio. Nevertheless, one might wish to use the surrogate because of its apparent simplicity. There are two reasons why this view is incorrect. First, in view of the results here, one should first compute the EPI for a given state in order to test whether the surrogate is valid there. But if one has computed an EPI, then it should be used. The second objection concerns the use of a surrogate that has been validated against an EPI for some base year. One might then wish to use the surrogate for say, the next nine years, revalidating it against an EPI every tenth. The problem here is that the effort required to recompute a surrogate in intervening years is at least as great as that required to generate a new EPI. Although the EPI requires greater analytical and computational effort, the surrogate requires much more data collection effort since, except for the census data, the EPI relies on data available to state education agencies, whereas the surrogate does not. Therefore, the use of this surrogate instead of the development of an EPI as presented here is not advised.

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
OHIO VALLEY LOCAL S.D.	5175	1.0296	81	71670.19	0.84
DELPHOS CITY S.D.	1375	0.9785	457	-12047.65	-0.60
LIMA CITY S.D.	7815	1.0274	93	146890.25	1.45
BLUFFTON EX VIL S.D	1050	0.9732	513	-13301.15	-1.15
ALLEN EAST LOCAL S.D.	1270	0.9821	433	-14040.77	-1.15
BATH LOCAL S.D.	2355	0.9930	338	-5710.64	-0.16
ELIDA LOCAL S.D.	2945	0.9910	353	-12395.94	-0.36
PERRY LOCAL S.D.	865	0.9822	430	-8359.88	-0.99
SHAWNEE LOCAL S.D.	2975	0.9986	297	-1345.43	-0.03
SPENCERVILLE LOCAL S.D.	1145	0.9767	477	-13732.47	-1.29
ASHLAND CITY S.D.	4265	1.0457	30	97230.63	1.99
LOUDONVILLE-PERRYSVILLE EX VIL	1465	0.9787	455	-16530.39	-0.90
HILLSDALE LOCAL S.D.	1125	0.9756	487	-16628.16	-1.30
MAPLETON LOCAL S.D.	1065	0.9706	527	-21788.50	-1.76
ASHTABULA AREA CITY S.D.	6165	1.0389	45	110168.31	1.64
CONNEAUT AREA CITY S.D.	3280	1.0081	220	14511.43	0.40
GENEVA AREA CITY S.D.	3545	1.0034	255	6926.45	0.17
BUCKEYE LOCAL S.D.	3135	1.0091	212	7751.29	0.20
GRAND VALLEY LOCAL S.D.	1425	0.9821	431	-16825.41	-0.94
JEFFERSON AREA LOCAL S.D.	2135	0.9944	328	-7727.51	-0.31
PYMATUNING VALLEY LOCAL S.D.	1505	0.9797	447	-19798.29	-1.12
ATHENS CITY S.D.	3305	0.9867	395	-25059.43	-0.59
NELSONVILLE-YORK CITY S.D.	1760	0.9534	595	-41410.28	-1.98
ALEXANDER LOCAL S.D.	1515	0.9495	597	-43532.62	-2.32
FEDERAL-HOCKING LOCAL S.D.	1325	0.9457	601	-51943.42	-3.42
TRIMBLE LOCAL S.D.	1150	0.9393	602	-57229.75	-4.32
SAINT MARYS CITY S.D.	2525	1.0172	149	21365.23	0.85
WAPAKONETA CITY S.D.	3385	1.0236	113	40688.31	1.18
MINSTER LOCAL S.D.	930	0.9754	491	-9488.13	-0.98
NEW BREMEN LOCAL S.D.	755	0.9690	538	-11106.29	-1.37
NEW KNOXVILLE LOCAL S.D.	435	0.9549	592	-9797.78	-1.97
WAYNESFIELD-GOSHEN LOCAL S.D.	635	0.9647	565	-14047.31	-2.18
BELLAIRE CITY S.D.	2635	0.9971	312	-5182.53	-0.19
MARTINS FERRY CITY S.D.	2305	0.9959	318	-5563.93	-0.21
GEORGETOWN EX VIL S.D	1055	0.9683	542	-22418.68	-2.07
EASTERN LOCAL S.D.	1205	0.9694	535	-22480.87	-1.72
FAYETTEVILLE-PERRY LOCAL S.D.	610	0.9468	600	-20904.11	-3.23
RIPLEY-UNION-LEWIS LOCAL S.D.	835	0.9707	526	-17451.40	-1.92
WESTERN-BROWN LOCAL S.D.	2115	0.9881	383	-18484.91	-0.81
FAIRFIELD CITY	6620	1.0213	122	74463.25	0.84
HAMILTON CITY S.D.	11135	1.0442	35	314669.81	2.09
MIDDLETOWN CITY S.D.	10685	1.0461	29	183308.63	1.29

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
EDGEWOOD LOCAL S.D.	2905	1.0035	254	6381.51	0.21
LAKOTA LOCAL S.D.	5695	1.0195	133	59674.12	0.86
MADISON LOCAL S.D.	2015	1.0004	284	514.08	0.03
NEW MIAMI LOCAL S.D.	1320	0.9939	335	-5563.41	-0.40
ROSS LOCAL S.D.	2430	1.0061	237	9356.76	0.35
TALWANDA LOCAL S.D.	3315	1.0112	192	21453.26	0.56
CARROLLTON EX VIL S.D	2995	1.0580	19	92261.31	3.12
BROWN LOCAL S.D.	905	0.9747	499	-12997.02	-1.36
URBANA CITY S.D.	2535	1.0263	130	25531.55	0.92
MECHANICSBURG EX VIL S.D	955	0.9733	512	-17289.52	-1.71
GRAHAM LOCAL S.D.	2095	0.9974	308	-3460.73	-0.15
TRIAD LOCAL S.D.	845	0.9714	523	-14777.77	-1.71
WEST LIBERTY-SALEM LOCAL S.D.	1020	0.9809	441	-11841.92	-1.08
SPRINGFIELD CITY S.D.	13465	1.0602	15	497816.31	2.93
MAD RIVER-GREEN LOCAL S.D.	3050	1.0095	208	19397.86	0.56
NEW CARLISLE-BETHEL LOCAL S.D.	5435	1.0303	78	113024.19	2.17
NORTHEASTERN LOCAL S.D.	3785	1.0071	231	11868.24	0.30
NORTHWESTERN LOCAL S.D.	2065	0.9950	324	-5019.34	-0.25
SOUTHEASTERN LOCAL S.D.	875	0.9846	410	-7405.93	-0.73
SPRINGFIELD LOCAL S.D.	2685	1.0082	219	11173.57	0.37
MILFORD EX VIL S.D	4435	1.0151	164	44324.88	0.84
NEW RICHMOND EX VIL S.D	2385	0.9992	293	-612.13	-0.02
BATAVIA LOCAL S.D.	825	0.9824	427	-8587.18	-1.11
BETHEL-TATE LOCAL S.D.	1675	0.9886	377	-14158.75	-0.76
CLERMONT NORTHEASTERN LOCAL S.	2275	0.9909	354	-15133.38	-0.62
FELICITY-FRANKLIN LOCAL S.D.	975	0.9750	494	-19749.36	-1.67
GOSHEN LOCAL S.D.	2865	0.9989	295	-2498.69	-0.08
WEST CLERMONT LOCAL S.D.	7155	1.0271	94	140826.69	1.58
WILLIAMSBURG LOCAL S.D.	1115	0.9874	390	-8737.80	-0.66
WILMINGTON CITY S.D.	3295	1.0207	127	33754.66	0.99
BLANCHESTER LOCAL S.D.	1885	0.9853	406	-19695.18	-0.98
CLINTON MASSIE LOCAL S.D.	1225	0.9767	478	-19462.32	-1.32
EAST CLINTON LOCAL S.D.	1475	0.9741	505	-20661.95	-1.14
EAST LIVERPOOL CITY S.D.	4375	1.0009	279	3105.29	0.06
EAST PALESTINE CITY S.D.	1855	0.9757	486	-31311.66	-1.55
SALEM CITY S.D.	3455	0.9997	289	-436.07	-0.01
WELLSVILLE CITY S.D.	1535	0.9769	474	-29015.68	-1.68
COLUMBIANA EX VIL S.D	1250	0.9748	496	-14502.77	-1.18
LEETONIA EX VIL S.D	1070	0.9667	548	-23795.33	-1.85
LISBON EX VIL S.D	1345	0.9718	518	-24927.61	-1.81
BEAVER LOCAL S.D.	2905	0.9918	346	-14886.68	-0.57
CRESTVIEW LOCAL S. D.	1025	0.9688	539	-17073.60	-1.45
SOUTHERN LOCAL S.D.	1405	0.9718	519	-26959.85	-1.95
UNITED LOCAL S.D.	1455	0.9733	511	-23827.79	-1.64

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
COSHOCTON CITY S.D.	2695	1.0294	83	38309.71	1.19
RIDGEWOOD LOCAL S.D.	1695	0.9863	398	-14482.05	-0.81
RIVER VIEW LOCAL S.D.	2755	1.0074	227	8317.98	0.20
BUCYRUS CITY S.D.	2315	1.0013	276	1709.30	0.06
GALION CITY S.D.	3455	1.0227	116	53941.30	1.18
CRESTLINE EX VIL S.D	1150	0.9840	413	-16153.86	-1.01
BUCKEYE CENTRAL LOCAL S.D.	815	0.9813	436	-10442.29	-1.07
COLONEL CRAWFORD LOCAL S.D.	1400	0.9852	407	-11111.45	-0.70
WYNFORD LOCAL S.D.	1375	0.9834	419	-16223.13	-1.05
BAY VILLAGE CITY S.D.	3915	1.0325	64	79431.88	1.62
BEACHWOOD CITY S.D.	1670	1.0173	146	23682.07	0.60
BEDFORD CITY S.D.	6475	1.0392	43	119966.44	1.33
BEREA CITY S.D.	13795	1.0547	23	403829.69	2.16
BRECKSVILLE CITY S.D.	3845	1.0281	88	62519.21	1.27
BROOKLYN CITY S.D.	1725	1.0057	239	7366.74	0.23
CLEVELAND CITY S.D.	109425	1.0658	10	5070047.00	2.06
CLEVELAND HTS.-UNIV. HTS. CITY	9755	1.0404	40	268303.69	1.91
EAST CLEVELAND CITY S.D.	7575	1.0207	128	120837.38	1.00
EUCLID CITY S.D.	8135	1.0449	33	190738.38	1.56
FAIRVIEW PARK CITY S.D.	2825	1.0312	73	45617.55	1.29
GARFIELD HEIGHTS CITY S.D.	4405	1.0335	62	81182.50	1.49
LAKEWOOD CITY S.D.	9115	1.0383	46	226827.50	1.59
MAPLE HEIGHTS CITY S.D.	4775	1.0310	75	83995.06	1.46
MAYFIELD CITY S.D.	4855	1.0223	118	70758.31	0.75
NORTH OLMSTED CITY S.D.	7235	1.0354	57	156442.25	1.54
NORTH ROYALTON CITY S.D.	2665	1.0212	123	37297.14	0.95
OLMSTED FALLS CITY	2625	1.0240	111	44485.61	1.32
ORANGE CITY S.D.	2545	1.0247	108	39315.11	0.89
PARMA CITY S.D.	20175	1.0527	24	638868.25	2.29
ROCKY RIVER CITY S.D.	3275	1.0327	63	49739.16	1.02
SHAKER HEIGHTS CITY S.D.	6405	1.0401	41	165289.25	1.34
SOLON CITY S.D.	2875	1.0317	70	52660.77	0.86
SOUTH EUCLID-LYNDHURST CITY S.	6815	1.0357	56	146430.31	1.29
STRONGSVILLE CITY S.D.	4785	1.0318	69	86298.94	1.12
WARRENSVILLE HEIGHTS CITY S.D.	2815	1.0206	129	25896.57	0.61
WESTLAKE CITY S.D.	3125	1.0260	100	45796.73	0.92
CHAGRIN FALLS EX VIL S.D	2120	1.0235	114	35865.37	1.13
BRATENAHL LOCAL S.D.	135	0.9772	468	-2947.60	-0.47
CUYAHOGA HEIGHTS LOCAL S.D.	885	1.0141	176	9061.52	0.33
INDEPENDENCE LOCAL S.D.	1040	1.0141	175	9086.68	0.45
RICHMOND HEIGHTS LOCAL S.D.	1145	1.0164	157	8463.88	0.49
GREENVILLE CITY S.D.	3965	1.0147	169	29192.57	0.70
VERSAILLES EX VIL S.D	1475	0.9754	489	-23422.81	-1.46
ANSONIA LOCAL S.D.	965	0.9664	551	-19110.88	-2.05
ARCANUM-BUTLER LOCAL S.D.	1455	0.9743	503	-19720.74	-1.41
FRANKLIN-MONROE LOCAL S.D.	885	0.9633	568	-20307.21	-2.05

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
MISSISSINAWA VALLEY LOCAL S.D.	1235	0.9715	521	-23304.48	-1.53
TRI-VILLAGE LOCAL S.D.	1015	0.9685	541	-21409.34	-1.76
DEFIANCE CITY S.D.	3185	1.0368	53	71847.31	1.75
HICKSVILLE EX VIL S.D	1215	1.0009	278	579.99	0.05
AYERSVILLE LOCAL S.D.	1055	0.9956	319	-1570.52	-0.12
CENTRAL LOCAL S.D.	1500	0.9929	341	-5959.00	-0.40
NORTHEASTERN LOCAL S.D.	1125	0.9894	368	-4583.48	-0.39
DELAWARE CITY S.D.	3350	1.0278	89	37512.09	0.91
BIG WALNUT LOCAL S.D.	2365	0.9996	290	-476.84	-0.02
BUCKEYE VALLEY LOCAL S.D.	2145	0.9973	310	-1203.31	-0.14
OLENTANGY LOCAL S.D.	1475	0.9829	423	-11068.75	-0.62
HURON CITY S.D.	1985	1.0100	203	13852.91	0.51
SANDUSKY CITY S.D.	5465	1.0502	26	183333.38	2.27
BERLIN-MILAN LOCAL S.D.	1775	1.0051	243	5326.50	0.29
MARGARETTA LOCAL S.D.	1950	1.0118	189	12784.41	0.60
PERKINS LOCAL S.D.	2455	1.0173	147	26929.40	0.83
VERMILION LOCAL S.D.	3535	1.0376	50	72830.94	1.65
LANCASTER CITY S.D.	7285	1.0408	39	156398.56	1.65
AMANDA-CLEARCREEK LOCAL S.D.	1465	0.9727	515	-24565.65	-1.66
BERNE UNION LOCAL S.D.	965	0.9663	554	-17203.27	-1.71
BLOOM-CARROLL LOCAL S.D.	1765	0.9769	475	-24281.48	-1.28
FAIRFIELD UNION LOCAL S.D.	1915	0.9771	471	-28003.58	-1.46
LIBERTY UNION-THURSTON LOCAL S	1275	0.9770	473	-16115.60	-1.27
PICKERINGTON LOCAL S.D.	2395	0.9860	401	-16537.35	-0.52
WALNUT TWP LOCAL S.D.	755	0.9598	582	-16376.70	-2.11
WASHINGTON COURT HOUSE CITY S.	2125	1.0108	194	13227.07	0.63
MIAMI TRACE LOCAL S.D.	3355	1.0240	112	42417.05	1.16
BEXLEY CITY S.D.	2325	0.9989	296	-1106.73	-0.03
COLUMBUS CITY S.D.	85625	1.0777	3	3411276.00	2.31
GRANDVIEW HEIGHTS CITY S.D.	1495	0.9898	367	-4917.61	-0.25
REYNOLDSBURG CITY S. D.	4765	1.0014	275	3857.89	0.08
SCIOTO-DARBY CITY S.D.	4200	0.9999	288	-208.80	-0.00
SOUTH-WESTERN CITY S.D.	15095	1.0171	151	131065.31	0.73
UPPER ARLINGTON CITY S.D.	7395	1.0225	117	61862.53	0.64
WESTERVILLE CITY S.D.	9935	1.0144	172	76084.69	0.64
WHITEHALL CITY S.D.	3895	1.0024	266	4740.15	0.12
WORTHINGTON CITY S.D.	6175	1.0100	205	23597.30	0.29
CANAL WINCHESTER LOCAL S.D.	1035	0.9813	437	-7672.22	-0.86
GROVEPORT-MADISON	5995	1.0042	247	14236.65	0.22
HAMILTON LOCAL S.D.	2910	0.9911	352	-15299.61	-0.49
JEFFERSON LOCAL S.D.	5115	1.0021	269	4509.27	0.07
PLAIN LOCAL S.D.	1105	0.9725	516	-13723.62	-0.55
WAUSEON EX VIL S.D	1600	0.9985	298	-1046.62	-0.06

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
ARCHBOLD AREA LOCAL S.D.	1445	0.9977	306	-1306.59	-0.08
EVERGREEN LOCAL S.D.	1575	0.9955	320	-4754.75	-0.22
GORHAM-FAYETTE LOCAL S.D.	575	0.9821	432	-5423.56	-0.77
PETTISVILLE LOCAL S.D.	525	0.9675	547	-11585.67	-1.63
PIKE-DELTA-YORK LOCAL S.D.	1725	0.9944	329	-6049.04	-0.26
SWANTON LOCAL S.D.	1865	1.0030	257	3529.76	0.15
GALLIPOLIS CITY S.D.	2755	1.0009	280	1464.18	0.05
GALLIA COUNTY LOCAL S.D.	2885	1.0004	283	781.58	0.01
BERKSHIRE LOCAL S.D.	1495	1.0276	90	26535.05	1.48
CARDINAL LOCAL S.D.	1600	1.0211	124	18527.97	1.01
CHARDON LOCAL S.D.	2805	1.0562	20	87052.50	2.34
KENSTON LOCAL S.D.	2100	1.0361	55	46204.67	1.45
LEDGEMONT LOCAL S.D.	775	1.0139	178	8804.07	0.91
NEWBURY LOCAL S.D.	1050	1.0179	143	11429.80	0.78
WEST GEAUGA LOCAL S.D.	3875	1.0666	8	141901.94	2.81
FAIRBORN CITY S.D.	8215	1.0653	11	351321.38	3.35
XENIA CITY S.D.	6595	1.0505	25	227261.31	2.56
YELLOW SPRINGS EX VIL S.D	855	1.0077	225	3702.06	0.28
BEAVERCREEK LOCAL S.D.	7805	1.0664	9	312487.88	3.47
CEDAR CLIFF LOCAL S.D.	660	0.9942	332	-2004.76	-0.27
GREENEVIEW LOCAL S.D.	1525	1.0042	248	3491.31	0.21
SUGARCREEK LOCAL S.D.	1865	1.0181	141	24402.26	1.10
CAMBRIDGE CITY S.D.	3585	1.0488	27	73636.38	1.96
ROLLING HILLS LOCAL S.D.	2205	1.0100	202	11211.69	0.49
CINCINNATI CITY S.D.	58185	1.0450	31	1348891.00	1.04
DEER PARK CITY S.D.	2195	1.0094	209	10242.42	0.29
GREENHILLS-FOREST PARK CITY S.	7365	1.0276	91	130316.06	1.41
LOCKLAND CITY S.D.	845	0.9962	317	-1267.56	-0.08
LOVELAND CITY S.D.	2955	1.0096	207	19445.11	0.59
MADEIRA CITY S.D.	1690	1.0063	234	5414.22	0.27
MARIEMONT CITY S.D.	1735	1.0107	195	7574.01	0.28
MOUNT HEALTHY CITY S.D.	6755	1.0262	99	113451.06	1.62
NORTH COLLEGE HILL CITY S.D.	1785	1.0122	185	10457.12	0.52
NORWOOD CITY S.D.	4715	1.0228	115	33227.67	0.48
PRINCETON CITY S.D.	7965	1.0269	95	93548.63	0.57
READING CITY S.D.	2355	1.0103	200	10022.62	0.33
ST BERNARD-ELMWOOD PLACE CITY	1105	0.9983	301	-443.17	-0.02
SYCAMORE CITY S.D.	4475	1.0160	158	25526.37	0.29
WYOMING CITY S.D.	1945	1.0081	221	9310.86	0.34
INDIAN HILL EX VIL S.D	3075	1.0172	150	15770.82	0.33
FINNEYTOWN LOCAL S.D.	2545	1.0169	153	25985.79	0.70
FOREST HILLS LOCAL S.D.	8175	1.0269	96	104420.25	0.96
NORTHWEST LOCAL S.D.	13035	1.0281	87	203904.31	1.16
OAK HILLS LOCAL S.D.	8175	1.0263	98	107601.06	0.93
SOUTHWEST LOCAL S.D.	2875	1.0089	215	10713.84	0.30

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
THREE RIVERS LOCAL S.D.	2085	1.0084	218	5215.48	0.18
FINDLAY CITY S.D.	7330	1.0707	5	299663.50	3.20
ARCADIA LOCAL S.D.	595	0.9828	425	-5222.79	-0.79
ARLINGTON LOCAL S.D.	575	0.9754	488	-7185.84	-1.21
CORY-RAWSON LOCAL S.D.	785	0.9794	449	-6623.81	-0.84
LIBERTY-BENTON LOCAL S.D.	735	0.9735	510	-6941.77	-0.99
MCCOMB LOCAL S.D.	865	0.9790	451	-8636.24	-1.01
VAN BUREN LOCAL S.D.	895	0.9851	408	-3 99.06	-0.28
VANLUE LOCAL S.D. •	355	0.9676	545	- 03.23	-1.65
KENTON CITY S.D.	2425	0.9972	311	-3009.05	-0.10
ADA EX VIL S.D	995	0.9639	567	-22723.15	-2.15
HARDIN NORTHERN LOCAL S.D.	635	0.9492	598	-19768.02	-2.81
RIDGEMONT LOCAL S.D.	605	0.9478	599	-14615.17	-2.27
RIVERDALE LOCAL S.D.	1285	0.9710	525	-21680.43	-1.60
UPPER SCIOTO VALLEY LOCAL S.D.	1035	0.9630	572	-25459.13	-2.07
HARRISON HILLS CITY S.D.	3175	1.0643	13	101896.31	2.63
CONOTTON VALLEY UNION LOCAL S.	595	0.9659	558	-8043.99	-1.17
NAPOLEON CITY S.D.	2570	1.0363	54	33837.48	1.21
HOLGATE LOCAL S.D.	735	0.9834	418	-6179.25	-0.84
LIBERTY CENTER LOCAL S.D.	1130	0.9946	325	-3552.01	-0.28
PATRICK HENRY LOCAL S.D.	1445	1.0025	264	1611.51	0.11
HILLSBORO CITY S.D.	2285	0.9874	389	-17065.30	-0.74
GREENFIELD EX VIL S.D	2225	0.9912	350	-13563.97	-0.61
BRIGHT LOCAL S.D.	705	0.9545	593	-25052.53	-3.22
FAIRFIELD LOCAL S.D.	635	0.9590	584	-18435.70	-2.99
LYNCHBURG-CLAY LOCAL S.D.	1145	0.9647	564	-28070.79	-2.50
LOGAN CITY S.D.	3905	1.0721	4	151628.63	2.92
EAST HOLMES LOCAL S.D.	1495	0.9800	446	-15290.81	-0.91
WEST HOLMES LOCAL S.D.	2335	1.0040	250	5870.69	0.21
BELLEVUE CITY S.D.	2735	1.0208	125	34996.43	1.08
NORWALK CITY S.D.	2755	1.0196	131	31416.67	0.98
WILLARD CITY S.D.	2245	1.0107	196	15042.96	0.55
MONROEVILLE LOCAL S.D.	775	0.9778	462	-10638.73	-1.08
NEW LONDON LOCAL S.D.	1145	0.9894	369	-8690.99	-0.70
SOUTH CENTRAL LOCAL S.D.	1015	0.9807	442	-15023.81	-1.26
WESTERN RESERVE LOCAL S.D.	1395	0.9995	291	-458.75	-0.04
JACKSON CITY S.D.	2825	1.0016	274	2990.27	0.08
WELLSTON CITY S.D.	1305	0.9874	391	-15087.29	-0.76
OAK HILL UNION LOCAL S.D.	1445	0.9744	502	-21771.99	-1.37
STEUBENVILLE CITY S.D.	3210	1.0054	240	8648.88	0.20

TABLE IX (CONT)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
TORONTO CITY S.D.	1475	0.9882	381	-8115.11	-0.43
BUCKEYE LOCAL S.D.	3925	1.0125	184	20869.50	0.49
EDISON LOCAL S.D.	1890	1.0155	161	27708.30	0.56
INDIAN CREEK LOCAL S.D.	4535	1.0246	109	48174.38	0.94
MOUNT VERNON CITY S.D.	4355	1.0551	22	100638.13	2.14
CENTERBURG LOCAL S.D.	835	0.9667	549	-16728.25	-1.93
DANVILLE LOCAL S.D.	695	0.9675	546	-16490.72	-2.01
EAST KNOX LOCAL S.D.	725	0.9657	559	-12205.86	-1.39
FREDERICKTOWN LOCAL S.D.	1375	0.9814	435	-15858.89	-1.16
PAINESVILLE CITY S.D.	2805	1.0171	152	35579.14	0.87
WICKLIFFE CITY S.D.	3310	1.0257	102	55026.85	1.26
WILLOUGHBY-EASTLAKE CITY S.D.	12645	1.0695	6	601978.06	3.15
FAIRPORT HARBOR EX VIL S.D	535	1.0023	268	851.16	0.11
MENTOR EX VIL S.D	11115	1.0597	17	449783.63	2.82
KIRTLAND LOCAL S.D.	1335	1.0106	198	10191.38	0.49
MADISON LOCAL S.D.	4395	1.0285	86	94462.38	1.86
PAINESVILLE TWP LOCAL S.D.	4485	1.03[illegible]	59	93518.31	1.65
PERRY LOCAL S.D.	1605	1.01[illegible]	187	15264.94	0.78
IRONTON CITY S.D.	2435	0.9929	339	-10530.33	-0.37
CHESAPEAKE UNION EX VIL S.D	1685	0.9763	481	-26884.95	-1.51
DAWSON-BRYANT LOCAL S.D.	1565	0.9699	533	-37202.64	-2.11
FAIRLAND LOCAL S.D.	1905	0.9732	514	-34671.03	-1.84
ROCK HILL LOCAL S.D.	2255	0.9760	483	-38928.86	-1.56
SOUTH POINT LOCAL S.D.	2335	0.9828	424	-24050.15	-1.03
SYMMES VALLEY LOCAL S.D.	1015	.9609	580	-30989.46	-2.62
HEATH CITY S.D.	1645	0.9886	376	-7295.42	-0.35
NEWARK CITY S.D.	7785	1.0338	61	154994.13	1.57
GRANVILLE EX VIL S.D	1575	0.9853	405	-12262.05	-0.59
JOHNSTOWN-MONROE LOCAL S.D.	1495	0.9875	388	-12295.77	-0.77
LAKEWOOD LOCAL S.D.	2455	0.9985	299	-1932.82	-0.07
LICKING HEIGHTS LOCAL S.D.	1175	0.9812	438	-14842.16	-1.18
LICKING VALLEY LOCAL S.D.	1910	0.9885	379	-14501.47	-0.72
NORTH FORK LOCAL S.D.	2175	1.0044	246	6268.46	0.28
NORTHRIDGE LOCAL S.D.	1285	0.9805	444	-16371.77	-1.06
SOUTHWEST LICKING LOCAL S.D.	2590	0.9928	342	-11431.30	-0.37
BELLEFONTAINE CITY S.D.	2835	1.0072	230	10783.14	0.32
BENJAMIN LOGAN LOCAL S.D.	1815	0.9916	349	-9696.00	-0.48
INDIAN LAKE LOCAL S.D.	1685	0.9839	414	-12924.80	-0.68
RIVERSIDE LOCAL S.D.	835	0.9600	581	-21590.23	-2.51
AVON LAKE CITY S.D.	3005	1.0158	159	28183.73	0.52
ELYRIA CITY S.D.	12095	1.0560	21	391297.75	2.50
LORAIN CITY S.D.	14035	1.0446	34	363302.63	1.97
NORTH RIDGEVILLE CITY S.D.	4635	1.0157	160	44939.92	0.86
OBERLIN CITY S.D.	1755	1.0009	281	1134.42	0.05

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
SHEFFIELD-SHEFFIELD LAKE CITY	2715	1.0101	201	20617.66	0.66
AMHERST EX VIL S.D	3730	1.0177	145	43063.77	1.03
WELLINGTON EX VIL S.D	1575	0.9955	322	-5149.63	-0.26
AVON LOCAL S.D.	1320	0.9920	344	-7794.16	-0.45
CLEARVIEW LOCAL S.D.	1485	0.9944	330	-6094.34	-0.35
COLUMBIA LOCAL S.D.	1565	0.9966	315	-4018.56	-0.24
FIRELANDS LOCAL S.D.	1715	0.9942	333	-7122.17	-0.36
KEYSTONE LOCAL S.D.	1475	0.9945	327	-5431.71	-0.36
MIDVIEW LOCAL S.D.	3625	1.0107	197	27622.93	0.71
SOUTH AMHERST LOCAL S.D.	785	0.9850	409	-8621.66	-1.02
MAUMEE CITY S.D.	3490	1.0148	165	39125.17	0.74
OREGON CITY S.D.	4435	1.0186	138	52060.12	0.65
SYLVANIA CITY S.D.	7120	1.0292	84	146038.50	1.56
TOLEDO CITY S.D.	47385	1.0674	7	2339388.00	3.34
ANTHONY WAYNE LOCAL S.D.	3125	1.0119	188	24146.71	0.64
OTTAWA HILLS LOCAL S.D.	925	1.0153	162	8852.14	0.62
SPRINGFIELD LOCAL S.D.	3075	1.0121	186	25030.45	0.68
WASHINGTON LOCAL S.D.	9695	1.0437	37	248021.44	1.93
LONDON CITY S.D.	1830	0.9926	343	-6972.69	-0.31
JEFFERSON LOCAL S.D.	1525	0.9843	411	-12685.66	-0.79
JONATHAN ALDER LOCAL S.D.	1435	0.9831	422	-12126.01	-0.78
MADISON-PLAINS LOCAL S.D.	1715	0.9909	356	-7036.06	-0.37
CAMPBELL CITY S.D.	1815	1.0010	277	706.00	0.03
STRUTHERS CITY S.D.	2435	1.0079	223	10903.04	0.40
YOUNGSTOWN CITY S.D.	17785	1.0300	79	350597.63	1.20
AUSTINTOWN LOCAL S.D.	7595	1.0297	82	114445.81	1.27
BOARDMAN LOCAL S.D.	6105	1.0299	80	68925.75	0.79
CANFIELD LOCAL S.D.	2685	0.9974	307	-3601.70	-0.12
JACKSON MILTON LOCAL S.D.	1375	0.9912	351	-7292.08	-0.46
LOWELLVILLE LOCAL S.D.	475	0.9736	508	-6784.29	-1.20
POLAND LOCAL S.D.	2715	1.0037	251	5597.67	0.14
SEBRING LOCAL S.D.	1095	0.9929	340	-4744.97	-0.39
SOUTH RANGE LOCAL S.D.	1435	0.9904	359	-7715.58	-0.44
SPRINGFIELD LOCAL S.D.	1625	0.9882	382	-12097.90	-0.74
WEST BRANCH LOCAL S.D.	2815	1.0029	258	5432.06	0.19
WESTERN RESERVE LOCAL S.D.	995	0.9883	380	-6747.87	-0.62
MARION CITY S.D.	7290	1.0628	14	235359.31	2.85
ELGIN LOCAL S.D.	1685	0.9880	385	-9316.06	-0.41
PLEASANT LOCAL S.D.	1495	0.9867	396	-11025.90	-0.59
RIDGEDALE LOCAL S.D.	1105	0.9759	484	-14052.59	-1.08
RIVER VALLEY LOCAL S.D.	2365	0.9917	347	-9170.95	-0.35
BRUNSWICK CITY S.D.	7075	1.0449	32	201285.56	2.24
MEDINA CITY S.D.	4215	1.0317	71	55688.98	0.99
WADSWORTH CITY S.D.	3965	1.0248	107	62254.57	1.35
BLACK RIVER LOCAL S.D.	1255	0.9901	363	-7775.25	-0.37

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
BUCKEYE LOCAL S.D.	2045	1.0061	236	6029.63	0.26
CLOVERLEAF LOCAL S.D.	3375	1.0221	119	41463.95	1.20
HIGHLAND LOCAL S.D.	2475	1.0148	166	19279.75	0.72
EASTERN LOCAL S.D.	985	0.9595	583	-27737.82	-2.79
MEIGS LOCAL S.D.	2395	0.9920	345	-14498.26	-0.45
SOUTHERN LOCAL S.D.	975	0.9609	579	-25667.53	-2.62
CELINA CITY S.D.	3075	1.0142	174	20496.74	0.62
COLDWATER EX VIL S.D	1645	0.9812	421	-13749.08	-0.85
MARION LOCAL S.D.	1015	0.9757	485	16108.52	-1.[illegible]7
MENDON-UNION LOCAL S.D.	385	0.9503	596	-12302.84	[illegible]30
PARKWAY LOCAL S.D.	1075	0.9748	497	-12872.16	-1.15
ST. HENRY CONSOLIDATED LOCAL S	122[illegible]	0.9787	453	-16094.37	-1.46
SOUTHWEST LOCAL S.D.	1025	0.9704	530	-18969.03	-1.89
PIQUA CITY S.D.	4515	1.0372	52	72514.06	1.56
TROY CITY S.D.	4665	1.0324	65	64809.25	1.11
BRADFORD EX VIL S.D	805	0.9862	400	-9248.97	-0.99
COVINGTON EX VIL S.D	1075	0.9909	355	-5353.07	-0.51
MILTON UNION EX VIL S.D	2290	1.0061	238	8756.24	0.38
TIPP CITY EX VIL S.D	2545	1.0144	171	17061.66	0.67
BETHEL LOCAL S.D.	1065	1.0064	233	4398.73	0.35
MIAMI EAST LOCAL S.D.	1555	1.0027	262	2604.58	0.17
NEWTON TWP LOCAL S.D.	595	0.9886	378	-4263.62	-0.71
SWITZERLAND OF OHIO LOCAL S.D.	4343	1.0798	1	134869.88	2.10
CENTERVILLE CITY S.D.	7265	1.0375	51	143064.75	1.29
DAYTON CITY S.D.	37935	1.0652	12	1478793.00	2.28
KETTERING CITY S.D.	11915	1.0599	16	258937.94	1.65
MIAMISBURG CITY S.D.	4425	1.0324	66	63482.59	1.24
OAKWOOD CITY S.D.	1855	1.0307	76	21403.03	0.70
TROTWOOD-MADISON CITY S.D.	4965	1.0252	106	74431.69	1.04
VANDALIA-BUTLER CITY S.D.	4585	1.0256	103	54786.24	0.92
WEST CARROLLTON CITY S.D.	5055	1.0253	105	59789.55	0.89
BROOKVILLE LOCAL S.D.	1775	1.0180	142	18789.64	1.03
JEFFERSON LOCAL S.D.	1865	1.0094	210	14754.48	0.56
MAD RIVER LOCAL S.D.	5965	1.0189	137	97620.31	1.17
NEW LEBANON LOCAL S.D.	1725	1.0062	235	7405.16	0.39
NORTHMONT LOCAL S.D.	6655	1.0350	59	137258.19	1.88
NORTHRIDGE LOCAL S.D.	2795	1.0213	121	34801.39	0.97
VALLEY VIEW LOCAL S.D.	2215	1.0152	163	22319.44	0.93
WAYNE LOCAL S.D.	8315	1.0428	38	228095.44	2.38
MORGAN LOCAL S.D.	2695	1.0315	72	58813.89	1.75
MOUNT GILEAD EX VIL S.D	1465	0.9955	321	-3138.92	-0.21
CARDINGTON-LINCOLN LOCAL S.D.	1125	0.9786	454	-1[illegible]105.99	-1.37
HIGHLAND LOCAL S.D.	1430	0.9811	439	-18673.87	-1.16

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
NORTHMOR LOCAL S.D.	1305	0.9771	470	-17300.32	-1.28
ZANESVILLE CITY S.D.	5975	1.0116	190	48485.88	0.62
EAST MUSKINGUM LOCAL S.D.	1965	0.9665	550	-39557.55	-1.71
FRANKLIN LOCAL S.D.	2485	0.9754	490	-28805.69	-0.85
MAYSVILLE LOCAL S.D.	2365	0.9842	412	-22949.29	-1.01
TRI VALLEY LOCAL S.D.	2715	0.9788	452	-36056.58	-1.36
WEST MUSKINGUM LOCAL S.D.	2155	0.9775	463	-30231.00	-1.32
CALDWELL EX VIL S.D	1285	0.9984	300	-1165.18	-0.08
NOBLE LOCAL S.D.	1215	0.9933	336	-4500.79	-0.35
PORT CLINTON CITY S.D.	2925	1.0321	68	56631.43	1.69
BENTON-CARROLL-SALEM LOCAL S.D	1975	1.0028	261	3220.09	0.15
DANBURY LOCAL S.D.	825	0.9871	393	-5731.11	-0.59
GENOA AREA LOCAL S.D.	1985	1.0067	232	8811.80	0.40
PAULDING EX. VIL. S.D.	2510	1.0390	44	54775.01	2.26
ANTWERP LOCAL S.D.	995	0.9857	402	-8187.00	-0.85
WAYNE TRACE LOCAL S.D.	1355	1.0020	270	1326.52	0.09
NEW LEXINGTON CITY S.D.	1865	0.9779	459	-26986.77	-1.29
CROOKSVILLE EX VIL S.D	1165	0.9626	574	-32044.39	-2.66
NORTHERN LOCAL S.D.	2045	0.9781	458	-27194.34	-1.20
SOUTHERN LOCAL S.D.	1265	0.9717	520	-25001.00	-2.05
CIRCLEVILLE CITY S.D.	2965	1.0169	154	23091.14	0.75
LOGAN ELM LOCAL S.D.	2285	0.9880	374	-11273.13	-0.35
TEAYS VALLEY LOCAL S.D.	2775	1.0074	228	8485.43	0.33
WESTFALL LOCAL S.D.	1820	0.9880	384	-9309.92	-0.52
WAVERLY CITY S.D.	1975	1.0023	267	2858.18	0.14
EASTERN LOCAL S.D.	945	0.9705	529	-21594.71	-2.11
SCIOTO VALLEY LOCAL S.D.	1315	0.9766	479	-19587.09	-1.12
WESTERN LOCAL S.D.	825	0.9735	509	-17336.96	-1.76
AURORA CITY S.D.	1935	0.9899	365	-13825.57	-0.51
KENT CITY S.D.	3665	1.0026	263	7951.05	0.13
RAVENNA CITY S.D.	3995	1.0148	167	41160.45	0.84
STREETSBORO CITY S.D.	2245	0.9966	316	-6677.19	-0.25
WINDHAM EX VIL S.D	1510	0.9862	399	-16883.36	-0.92
CRESTWOOD LOCAL S.D.	2815	0.9979	304	-4460.42	-0.14
FIELD LOCAL S.D.	3075	1.0112	193	26351.77	0.70
JAMES A. GARFIELD LOCAL S.D.	1505	0.9902	361	-11697.41	-0.64
ROOTSTOWN LOCAL S.D.	1575	0.9853	404	-18499.87	-0.97
SOUTHEAST LOCAL S.D.	2295	0.9932	337	-10274.41	-0.45
WATERLOO LOCAL S.D.	1665	0.9951	323	-6474.39	-0.34
EATON CITY S.D.	2000	1.0100	204	9679.90	0.42
C. R. COBLENTZ LOCAL S.D.	1555	1.0031	256	3321.45	0.19

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
PREBLE SHAWNEE LOCAL S.D.	1915	0.9992	292	-1013.15	-0.05
TWIN VALLEY LOCAL S.D.	2565	1.0140	177	22281.19	0.83
COLUMBUS GROVE LOCAL S.D.	935	0.9662	556	-18338.30	-1.89
CONTINENTAL LOCAL S.D.	835	0.9694	534	-17614.31	-2.08
JENNINGS LOCAL S.D.	435	0.9632	570	-11790.54	-2.18
KALIDA LOCAL S.D.	695	0.9561	590	-20173.94	-2.70
MILLER CITY-NEW CLEVELAND LOCA	615	0.9538	594	-19136.52	-3.02
OTTAWA-GLANDORF LOCAL S.D.	1555	0.9765	480	-15378.74	-0.79
OTTOVILLE LOCAL S.D.	725	0.9613	577	-18738.59	-2.68
ANDORA-GILBOA LOCAL S.D.	740	0.9627	573	-15317.25	-1.86
MANSFIELD CITY S.D.	8245	1.0345	60	174100.44	1.53
SHELBY CITY S.D.	2735	1.0053	242	6934.70	0.22
CLEAR FORK VALLEY LOCAL S.D.	1745	0.9892	371	-12666.81	-0.65
CRESTVIEW LOCAL S.D.	1335	0.9806	443	-17153.07	-1.21
LEXINGTON LOCAL S.D.	3035	1.0078	224	13802.05	0.41
LUCAS LOCAL S.D.	815	0.9745	501	-11601.03	-1.25
MADISON LOCAL S.D.	4920	1.0172	148	46917.37	0.75
ONTARIO LOCAL S. D.	2035	0.9891	372	-7324.96	-0.29
PLYMOUTH LOCAL S.D.	1235	0.9802	445	-18657.84	-1.33
CHILLICOTHE CITY S.D.	4855	1.0378	48	88402.19	1.45
ADENA LOCAL S.D.	1095	0.9694	536	-21643.82	-1.84
HUNTINGTON LOCAL S.D.	1165	0.9702	531	-26341.91	-2.19
PAINT VALLEY LOCAL S.D.	1135	0.9663	555	-26101.79	-2.16
SCIOTO VALLEY LOCAL S.D.	1235	0.9715	522	-23555.09	-1.72
UNION-SCIOTO LOCAL S.D.	1345	0.9772	466	-21504.04	-1.53
ZANE TRACE LOCAL S.D.	1275	0.9693	537	-25152.79	-1.47
FREMONT CITY S.D.	6040	1.0583	18	150718.44	1.84
CLYDE EX VIL S.D	2595	1.0105	199	14834.93	0.49
GIBSONBURG EX VIL S.D	1220	0.9902	362	-6978.20	-0.54
LAKOTA LOCAL S.D.	1855	0.9968	314	-2994.27	-0.17
WOODMORE LOCAL S.D.	1305	0.9917	348	-3575.43	-0.22
PORTSMOUTH CITY S.D.	4455	1.0002	286	641.61	0.01
BLOOM LOCAL S.D.	1065	0.9622	575	-29106.41	-2.28
CLAY LOCAL S.D.	855	0.9650	562	-20724.46	-2.10
GREEN LOCAL S.D.	765	0.9590	585	-13415.29	-1.42
MINFORD LOCAL S.D.	1435	0.9713	524	-32728.84	-1.86
NEW BOSTON LOCAL S.D.	560	0.9563	589	-8128.73	-0.86
NORTHWEST LOCAL S.D.	1805	0.9705	528	-41998.77	-2.01
VALLEY LOCAL S.D.	1295	0.9631	571	-36556.24	-2.38
WASHINGTON LOCAL S.D.	2195	0.9746	500	-45194.67	-1.80
WHEELERSBURG LOCAL S.D.	1795	0.9739	506	-29201.68	-1.44
FOSTORIA CITY S.D.	2875	1.0044	245	5428.43	0.14
TIFFIN CITY S.D.	4415	1.0243	110	47082.75	0.88
BETTSVILLE LOCAL S.D.	335	0.9701	532	-2520.00	-0.74

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
HOPEWELL-LOUDON LOCAL S.D.	975	0.9664	553	-17774.92	-1.81
NEW RIEGEL LOCAL S.D.	545	0.9632	569	-14492.34	-2.41
OLD FORT LOCAL S.D.	575	0.9796	448	-7780.55	-0.56
SENECA EAST LOCAL S.D.	1285	0.9772	469	-15686.00	-1.21
SIDNEY CITY S.D.	4045	1.0376	49	60924.39	1.15
ANNA LOCAL S.D.	910	0.9612	578	-20967.72	-2.22
BOTKINS LOCAL S.D.	625	0.9574	588	-13610.11	-2.28
FAIRLAWN LOCAL S.D.	535	0.9560	591	-13716.93	-2.66
FORT LORAMIE LOCAL S.D.	850	0.9648	563	-16118.39	-1.99
HARDIN-HOUSTON LOCAL S.D.	840	0.9659	557	-16832.23	-2.00
JACKSON CENTER LOCAL S.D.	465	0.9653	560	-4948.86	-1.02
RUSSIA LOCAL S.D.	465	0.9578	586	-11927.34	-2.64
ALLIANCE CITY S.D.	4615	1.0008	282	2933.29	0.05
CANTON CITY S.D.	14380	1.0167	155	199190.38	0.92
LOUISVILLE CITY S.D.	3755	1.0019	271	4529.45	0.11
MASSILLON CITY S.D.	5565	1.0089	214	34840.71	0.48
NORTH CANTON CITY S.D.	4165	1.0001	287	154.91	0.00
CANTON LOCAL S.D.	3310	0.9981	303	-4139.20	-0.08
FAIRLESS LOCAL S.D.	2345	0.9899	364	-16984.21	-0.67
JACKSON LOCAL S.D.	4685	0.9973	309	-6600.95	-0.13
LAKE LOCAL S.D.	2905	0.9893	370	-19494.86	-0.57
MARLINGTON LOCAL S.D.	3140	0.9944	331	-14455.48	-0.38
MINERVA LOCAL S.D.	2765	0.9903	360	-16540.55	-0.58
NORTHWEST LOCAL S.D.	2165	0.9834	420	-25070.71	-1.09
OSNABURG LOCAL S.D.	1335	0.9838	415	-16459.59	-1.19
PERRY LOCAL S.D.	5710	1.0129	182	44571.76	0.66
PLAIN LOCAL S.D.	8215	1.0144	170	79106.06	0.78
SANDY VALLEY LOCAL S.D.	1725	0.9823	428	-21284.02	-1.10
TUSLAW LOCAL S.D.	1865	0.9876	387	-17125.45	-0.91
AKRON CITY S.D.	42760	1.0787	2	1842365.00	2.93
BARBERTON CITY S.D.	5825	1.0288	85	82763.63	1.03
COPLEY-FAIRLAWN CITY S.D.	3335	1.0185	139	24050.25	0.42
CUYAHOGA FALLS CITY S.D.	9175	1.0482	28	270005.44	2.29
NORTON CITY S.D.	3565	1.0126	183	29703.82	0.64
STOW CITY S.D.	6040	1.0312	74	102592.94	1.45
TALLMADGE CITY S.D.	3675	1.0196	132	40010.98	1.04
TWINSBURG CITY S.D.	2345	1.0137	179	11705.84	0.29
COVENTRY LOCAL S.D.	2435	1.0178	144	25084.30	1.01
GREEN LOCAL S.D.	3555	1.0191	135	39602.41	0.95
HUDSON LOCAL S.D.	3295	1.0115	191	12326.86	0.22
MOGADORE LOCAL S.D.	1195	1.0132	180	9102.31	0.67
NORDONIA HILLS LOCAL S.D.	5145	1.0305	77	80161.06	1.18
REVERE LOCAL S.D.	3155	1.0258	101	30992.07	0.79
SPRINGFIELD LOCAL S.D.	4455	1.0191	134	42651.44	0.73
WOODRIDGE LOCAL S.D.	1555	1.0080	222	4509.46	0.20
GIRARD CITY S.D.	2165	1.0086	217	10923.12	0.41

TABLE IX (OHIO)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
NILES CITY S.D.	3935	1.0190	136	34163.04	0.70
WARREN CITY S.D.	10475	1.0398	42	248525.56	1.57
HUBBARD EX VIL S.D	3395	1.0147	168	27619.73	0.80
NEWTON FALLS EX VIL S.D	1910	1.0036	253	3812.14	0.21
BLOOMFIELD-MESPO LOCAL S.D.	655	0.9747	498	-9707.69	-1.44
BRISTOL LOCAL S.D.	795	0.9834	417	-8152.36	-1.05
BROOKFIELD LOCAL S.D.	2005	1.0091	213	10043.70	0.42
CHAMPION LOCAL S.D.	2655	1.0075	226	11136.34	0.38
FARMINGTON LOCAL S.D.	395	0.9751	493	-5805.94	-1.74
FOWLER-VIENNA LOCAL S.D.	1725	1.0037	252	3946.76	0.23
HOWLAND LOCAL S.D.	5220	1.0322	67	52615.38	0.83
JOSEPH BADGER LOCAL S.D.	1665	0.9946	326	-5359.57	-0.31
LABRAE LOCAL S.D.	2365	1.0053	241	7205.59	0.27
LAKEVIEW LOCAL S.D.	2025	1.0041	249	4402.58	0.17
LIBERTY LOCAL S.D.	2715	1.0087	215	10228.07	0.30
LORDSTOWN LOCAL S.D.	725	0.9856	403	-5370.18	-0.19
MAPLEWOOD LOCAL S.D.	1215	0.9866	397	-11169.47	-0.81
MCDONALD LOCAL S.D.	1030	0.9991	294	-343.03	-0.02
SOUTHINGTON LOCAL S.D.	895	0.9908	357	-5334.32	-0.60
WEATHERSFIELD TWP LOCAL S.D.	995	0.9978	305	-790.71	-0.04
CLAYMONT CITY S.D.	2575	0.9890	373	-18752.82	-0.65
DOVER CITY S.D.	2855	0.9971	313	-3803.68	-0.11
NEW PHILADELPHIA CITY S.D.	3665	1.0048	244	8344.03	0.19
NEWCOMERSTOWN EX VIL S.D	1330	0.9686	540	-26425.93	-1.54
GARAWAY LOCAL S.D.	1105	0.9651	561	-19624.22	-1.40
INDIAN VALLEY LOCAL S.D.	1915	0.9823	429	-22670.30	-1.03
STRASBURG-FRANKLIN LOCAL S.D.	740	0.9616	576	-19453.47	-2.00
TUSCARAWAS VALLEY LOCAL S.D.	1705	0.9762	482	-25670.21	-1.29
MARYSVILLE EX VIL S.D	2575	1.0269	97	28490.35	1.04
FAIRBANKS LOCAL S.D.	945	0.9786	456	-8426.00	-0.64
NORTH UNION LOCAL S.D.	1545	1.0029	259	2664.30	0.17
VAN WERT CITY S.D.	2245	1.0438	36	39214.24	1.68
CRESTVIEW LOCAL S.D.	930	0.9878	386	-4724.04	-0.42
LINCOLNVIEW LOCAL S.D.	815	0.9793	450	-7218.95	-0.76
OHIO CITY-LIBERTY LOCAL S.D.	405	0.9577	587	-8636.13	-1.89
VINTON LOCAL S.D.	2195	1.0184	140	26652.25	1.06
FRANKLIN CITY S.D.	4255	1.0378	47	125717.38	2.70
LEBANON CITY S.D.	3235	1.0208	126	44812.42	1.29
CARLISLE LOCAL S.D.	2425	1.0097	206	16501.98	0.61
CLEARCREEK LOCAL S.D.	2175	1.0218	120	30027.78	1.42
DEERFIELD-UNION LOCAL S.D.	1985	1.0025	265	4114.95	0.16
LITTLE MIAMI LOCAL S.D.	2790	1.0164	156	33794.18	1.23
MASON LOCAL S.D.	2035	1.0143	171	20186.63	0.94
WAYNE LOCAL S.D.	1325	0.9982	302	-1921.04	-0.13

TABLE IX (0010)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
BELPRE CITY S.D.	2005	1.0018	272	1626.57	0.08
MARIETTA CITY S.D.	4425	1.0255	104	59075.13	1.24
FORT FRYE LOCAL S.D.	1365	0.9752	492	-11770.94	-0.59
FRONTIER LOCAL S.D.	1325	0.9773	465	-23615.19	-1.66
WARREN LOCAL S.D.	2455	0.9904	358	-8613.34	-0.34
WOLF CREEK LOCAL S.D.	675	0.9664	552	-3239.22	-0.35
ORRVILLE CITY S.D.	2095	0.9887	375	-12141.49	-0.44
WOOSTER CITY S.D.	3885	1.0131	181	21776.34	0.41
RITTMAN EX VIL S.D	1470	0.9824	426	-15306.42	-0.87
CHIPPEWA LOCAL S.D.	1575	0.9768	476	-24100.60	-1.21
DALTON LOCAL S.D.	995	0.9680	543	-18437.11	-1.42
GREENE LOCAL S.D.	1265	0.9772	467	-16297.61	-1.27
NORTH CENTRAL LOCAL S.D.	1465	0.9736	507	-25376.97	-1.64
NORTHWESTERN LOCAL S.D.	1385	0.9742	504	-22074.04	-1.54
SOUTHEAST LOCAL S.D.	1705	0.9750	495	-24464.84	-1.09
TRIWAY LOCAL S.D.	1925	0.9810	440	-21061.54	-1.07
BRYAN CITY S.D.	2205	1.0275	92	35895.94	1.21
MONTPELIER EX VIL S.D	1225	0.9898	366	-9309.19	-0.59
EDGERTON LOCAL S.D.	875	0.9719	517	-17361.23	-1.90
EDON-NORTHWEST LOCAL S.D.	675	0.9647	566	-15448.30	-2.21
MILLCREEK-WEST UNITY LOCAL S.D	825	0.9774	464	-11529.45	-1.40
NORTH CENTRAL LOCAL S.D.	795	0.9817	434	-9328.49	-1.05
STRYKER LOCAL S.D.	670	0.9677	544	-14189.87	-1.87
BOWLING GREEN CITY S.D.	3285	1.0028	260	4025.78	0.09
PERRYSBURG EX VIL S.D	2665	1.0091	211	9841.76	0.25
ROSSFORD EX VIL S.D	1725	1.0017	273	966.44	0.03
EASTWOOD LOCAL S.D.	1795	0.9868	394	-9728.60	-0.51
ELMWOOD LOCAL S.D.	1555	0.9872	392	-12172.75	-0.68
LAKE LOCAL S.D.	2145	1.0003	285	387.01	0.02
NORTH BALTIMORE LOCAL S.D.	855	0.9779	461	-9975.91	-1.15
NORTHWOOD LOCAL S.D.	865	0.9770	472	-7448.81	-0.50
OTSEGO LOCAL S.D.	1755	0.9940	334	-5788.20	-0.30
CAREY EX VIL S.D	1075	0.9779	460	-10725.97	-0.89
UPPER SANDUSKY EX VIL S.D	2200	1.0073	229	6754.88	0.28
MOHAWK LOCAL S.D.	1455	0.9837	416	-14199.26	-0.91

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
ALCONA COMMUNITY SCHOOLS	1322	0.9629	421	-5796.27	-0.29
MUNISING PUBLIC SCHOOLS	1431	0.9626	423	-37014.17	-2.03
PLAINWELL COMMUNITY SCHOOLS	2736	0.9883	278	-17754.59	-0.53
OTSEGO PUBLIC SCHOOLS	2777	0.9849	299	-23766.63	-0.71
ALLEGAN PUBLIC SCHOOLS	2957	0.9834	309	-25443.45	-0.82
WAYLAND UNION SCHOOLS	2356	0.9835	308	-31592.27	-0.88
HOPKINS PUBLIC SCHOOL	1216	0.9834	310	-14189.28	-1.02
SAUGATUCK PUBLIC SCHOOLS	673	0.9842	302	-4464.58	-0.36
HAMILTON COMMUNITY SCHOOLS	1761	0.9828	313	-9235.39	-0.43
ALPENA CITY SCHOOL DISTRICT	8477	0.9852	297	-71485.38	-0.58
BELLAIRE PUBLIC SCHOOL	628	0.9684	394	-966.78	-0.14
ELK RAPIDS SCHOOLS	1061	0.9634	418	-2151.66	-0.10
MANCELONA PUBLIC SCHOOL	1074	0.9640	416	-11831.81	-0.94
ARENAC EASTERN SCHOOL DIST	661	0.9794	330	-8775.14	-1.20
AU GRES SIMS SCHOOL DISTRICT	536	0.9794	329	-584.60	-0.06
STANDISH STERL COMM SCH DIST	2157	0.9683	395	-35874.77	-1.36
BARAGA TOWNSHIP SCHOOL DIST	724	0.9723	373	-17905.93	-1.84
L ANSE TWP SCHOOL DISTRICT	1100	0.9700	386	-21289.85	-1.63
DELTON KELLOGG SCHOOL DIST	2331	0.9921	255	-12685.28	-0.36
HASTINGS PUBLIC SCHOOL DIST	3809	0.9918	258	-19987.59	-0.36
THORNAPPLE KELLOGG SCH DIST	2012	0.9908	266	-13316.90	-0.46
BAY CITY SCHOOL DISTRICT	15374	1.0004	203	2792.50	0.01
ESSEXVILLE HAMPTON SCH DIST	2006	1.0006	202	21.04	0.00
PINCONNING AREA SCHOOLS	3290	0.9994	213	-1435.40	-0.04
BENZIE CO CENTRAL SCHOOLS	1896	0.9696	388	-19110.51	-0.88
FRANKFORT AREA SCHOOLS	824	0.9680	397	-989.92	-0.10
BENTON HARBOR CITY SCH DIST	9239	1.0044	175	30149.54	0.18
ST JOSEPH CITY SCHOOL DIST	3847	1.0060	163	7268.86	0.12
RIVER VALLEY SCHOOL DISTRICT	2006	0.9931	249	-5477.82	-0.22
GALIEN TOWNSHIP SCHOOL	786	0.9955	239	-3023.99	-0.30
NEW BUFFALO AREA SCHOOL DIST	1367	0.9960	235	-1732.62	-0.11
BRANDYWINE PUBLIC SCH DIST	2131	1.0053	167	9886.42	0.30
BERRIEN SPRINGS PUB SCH DIST	1983	1.0099	138	15311.63	0.47
EAU CLAIRE PUBLIC SCH DIST	1316	0.9990	218	-1041.25	-0.06
NILES COMMUNITY SCHOOL DIST	5681	0.9985	222	-5280.35	-0.07
BUCHANAN PUBLIC SCHOOL DIST	2074	1.0011	198	800.78	0.03
WATERVLIET SCHOOL DISTRICT	1581	0.9927	254	-7481.85	-0.39
COLOMA COMMUNITY SCHOOLS	2966	0.9984	224	-3020.16	-0.08
BRIDGMAN PUBLIC SCHOOL	788	1.0024	191	93.34	0.00

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
COLDWATER COMMUNITY SCHOOLS	4107	0.9778	340	-41791.53	-0.84
BRONSON COMMUNITY SCH DIST	1624	0.9772	344	-20645.96	-1.15
QUINCY COMMUNITY SCHOOL DIST	1478	0.9815	316	-15885.08	-0.96
ALBION CITY SCHOOLS	3042	1.0121	117	19536.20	0.51
BATTLE CREEK PUBLIC SCHOOLS	8338	1.0120	118	53911.55	0.39
SPRINGFIELD CITY SCHOOL DIST	1247	1.0086	146	1711.69	0.07
ATHENS AREA SCHOOLS	1047	0.9990	219	-871.11	-0.06
HARPER CREEK COMM SCHOOLS	3073	1.0044	174	10230.99	0.24
HOMER COMMUNITY SCHOOLS	1303	0.9999	208	-101.21	-0.01
MARSHALL PUBLIC SCHOOLS	3029	1.0061	162	9258.31	0.23
PENNFIELD SCHOOL DISTRICT	2097	1.0009	200	1354.22	0.05
TEKONSHA COMMUNITY SCHOOL	605	1.0013	197	569.97	0.08
UNION CITY COMM SCHOOL DIST	1581	0.9955	238	-5324.98	-0.27
CASSOPOLIS PUBLIC SCHOOLS	1861	0.9892	274	-10751.23	-0.44
DOWAGIAC UNION SCHOOLS	3761	0.9899	269	-23109.64	-0.47
EDWARDSBURG PUBLIC SCHOOLS	2101	0.9968	230	-4251.71	-0.14
MARCELLUS COMMUNITY SCHOOLS	1143	0.9839	303	-12301.55	-0.90
CHARLEVOIX PUBLIC SCH DIST	1697	0.9793	331	-2339.62	-0.09
CHEBOYGAN AREA SCHOOLS	2676	0.9708	383	-35601.54	-1.10
INLAND LAKES SCHOOL DISTRICT	919	0.9670	401	-4732.58	-0.34
SAULT STE MARIE AREA SCHOOLS	4556	0.9735	366	-92729.19	-1.43
DETOUR TWP SCHOOL	410	0.9606	431	-1233.39	-0.20
PICKFORD PUBLIC SCHOOLS	503	0.9605	432	-23535.57	-3.00
RUDYARD AREA SCHOOLS	2044	0.9856	292	-25398.55	-0.85
BRIMLEY PUBLIC SCHOOLS	544	0.9632	419	-12219.93	-1.83
CLARE PUBLIC SCHOOLS	1676	0.9711	380	-30770.09	-1.42
FARWELL AREA SCHOOLS	1285	0.9722	375	-3191.99	-0.13
HARRISON COMMUNITY SCHOOLS	1873	0.9756	350	-11171.04	-0.40
DE WITT PUBLIC SCHOOLS	1737	1.0037	181	5202.51	0.19
FOWLER PUBLIC SCHOOLS	624	1.0002	204	148.90	0.01
BATH COMMUNITY SCHOOLS	1311	1.0018	195	2023.18	0.11
OVID ELSIE AREA SCHOOLS	2323	1.0027	187	4782.26	0.16
PEWAMO-WESTPHALIA COMM S D	907	0.9954	240	-2812.74	-0.23
ST JOHNS PUBLIC SCHOOLS	3998	1.0043	176	11868.56	0.22
CRAWFORD AUSABLE SCHOOLS	2089	0.9587	436	-32294.98	-1.01
ESCANABA AREA PUBLIC SCHOOLS	4893	0.9783	334	-48000.03	-0.80
RAPID RIVER PUBLIC SCHOOLS	655	0.9811	322	-5869.21	-0.49
BIG BAY DE NOC SCHOOL DIST	591	0.9737	365	-7410.98	-1.02
BARK RIVER HARRIS SCH DIST	750	0.9813	321	-13590.35	-1.36
ROCK PUBLIC SCHOOL DISTRICT	323	0.9782	335	-5356.23	-1.42

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
IRON MOUNTAIN CITY SCH DIST	1527	0.9777	341	-21344.14	-1.16
NORWAY VULCAN AREA SCHOOLS	923	0.9655	407	-22094.16	-1.81
BREITUNG TOWNSHIP SCH DIST	2176	0.9761	348	-43725.20	-1.54
BELLEVUE COMMUNITY SCHOOLS	1282	1.0056	165	5984.43	0.36
EATON RAPIDS PUBLIC SCHOOLS	3382	1.0109	129	28058.86	0.62
GRAND LEDGE PUBLIC SCHOOLS	5754	1.0124	115	42666.61	0.56
MAPLE VALLEY SCHOOL DISTRICT	1882	1.0111	125	16398.51	0.80
OLIVET COMMUNITY SCHOOLS	1193	1.0090	143	6915.19	0.45
POTTERVILLE PUBLIC SCHOOLS	822	1.0106	132	6727.25	0.54
HARBOR SPRINGS SCHOOL DIST	819	0.9776	342	-1185.53	-0.08
LITTLEFIELD PUBLIC SCH DIST	416	0.9756	351	-4500.59	-0.83
PELLSTON PUBLIC SCHOOL DIST	880	0.9780	337	-6283.13	-0.56
PETOSKEY SCHOOL DISTRICT	2792	0.9819	315	-6512.46	-0.14
FLINT CITY SCHOOL DISTRICT	36932	1.0345	66	652373.19	0.90
GRAND BLANC COMM SCHOOLS	7779	1.0289	72	79953.69	0.67
MT MORRIS CONS SCHOOLS	3532	1.0154	103	33548.75	0.89
GOODRICH AREA SCHOOL DIST	1484	1.0282	73	25457.78	1.30
BENDLE PUBLIC SCHOOL DIST	1911	1.0161	101	23409.45	1.05
GENESEE SCHOOL DISTRICT	781	1.0123	116	6000.64	0.46
CARMAN SCHOOL DISTRICT	7924	1.0249	75	23841.81	0.21
FENTON AREA PUBLIC SCHOOLS	3332	1.0238	80	48174.54	1.03
KEARSLEY COMMUNITY SCHOOLS	4928	1.0164	99	60875.34	0.93
FLUSHING COMMUNITY SCHOOLS	5404	1.0243	78	94690.94	1.39
ATHERTON COMM SCHOOL DIST	1961	1.0205	90	21548.32	0.84
DAVISON COMMUNITY SCHOOLS	5774	1.0249	76	106655.25	1.37
CLIO AREA SCHOOL DISTRICT	5318	1.0206	89	71822.00	1.14
SWARTZ CREEK COMM SCH DIST	5567	1.0254	74	55242.32	0.72
LAKE FENTON SCHOOL	2078	1.0240	79	30759.43	1.14
BENTLEY COMM SCHOOL DISTRICT	2089	1.0218	85	31215.39	1.53
BEECHER SCHOOL DISTRICT	5142	1.0297	70	113490.94	1.46
LINDEN COMMUNITY SCHOOL DIST	2535	1.0206	88	34197.43	0.90
MONTROSE TOWNSHIP SCHOOLS	2049	1.0164	100	23731.73	1.10
LAKEVILLE COMM SCH DIST	3104	1.0169	97	36440.29	0.98
BEAVERTON RURAL SCHOOLS	1753	0.9772	343	-20325.77	-0.82
GLADWIN COMMUNITY SCHOOLS	1902	0.9826	314	-12827.89	-0.50
BESSEMER CITY SCHOOL DIST	587	0.9597	435	-20858.63	-2.70
IRONWOOD AREA SCHOOLS	2001	0.9623	426	-67754.31	-2.45
WAKEFIELD TWP SCH DIST	711	0.9572	438	-22203.78	-2.31
TRAVERSE CITY PUB SCH DIST	9013	0.9872	283	-39647.03	-0.35
KINGSLEY AREA SCHOOL DIST	702	0.9856	293	-5759.42	-0.67
ASHLEY COMMUNITY SCHOOLS	585	0.9689	391	-13836.59	-2.00
BRECKENRIDGE COMM SCHOOLS	1617	0.9752	353	-24194.66	-1.44
FULTON SCHOOLS	1224	0.9743	360	-20370.58	-1.37

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
SAINT LOUIS PUBLIC SCHOOLS	1847	0.9815	317	-23925.84	-0.99
CAMDEN FRONTIER SCHOOL	671	0.9728	371	-11251.63	-1.53
HILLSDALE COMMUNITY SCHOOLS	2359	0.9864	287	-18643.60	-0.60
JONESVILLE COMMUNITY SCHOOLS	1271	0.9804	323	-16497.15	-1.07
LITCHFIELD COMMUNITY SCHOOLS	800	0.9797	328	-10333.13	-1.00
NORTH ADAMS PUBLIC SCHOOLS	804	0.9764	346	-14324.13	-1.53
PITTSFORD RURAL AG SCHOOLS	734	0.9792	332	-10145.77	-1.23
READING COMMUNITY SCHOOLS	1101	0.9745	359	-19641.39	-1.41
WALDRON AREA SCHOOLS	616	0.9715	378	-10658.22	-1.37
HANCOCK CITY SCHOOL DISTRICT	1197	0.9631	420	-24590.70	-1.81
ADAMS TOWNSHIP SCHOOL DIST	632	0.9626	425	-29126.07	-2.66
CALUMET PUBLIC SCHOOL DIST	2010	0.9504	441	-68297.56	-2.60
CHASSELL TOWNSHIP SCH DIST	343	0.9679	398	-6869.20	-1.60
LAKE LINDEN HUBBELL SCH DIST	693	0.9394	446	-23125.18	-2.81
ELKTON PIGEON BAYPORT S/DIST	1666	0.9709	381	-3938.50	-0.27
NORTH HURON SCHOOLS	671	0.9719	376	-6805.01	-0.89
OWENDALE GAGETOWN AREA S D	493	0.9626	424	-4727.21	-0.95
PORT AUSTIN PUBLIC SCHOOLS	349	0.9576	437	-1362.31	-0.33
UBLY COMMUNITY SCHOOLS	1141	0.9708	382	-22588.55	-1.59
EAST LANSING SCHOOL DISTRICT	4789	1.0088	145	10634.74	0.06
LANSING PUBLIC SCHOOL DIST	28242	1.0119	120	203554.25	0.38
DANSVILLE AG SCHOOL	1074	0.9996	212	-271.16	-0.02
HASLETT PUBLIC SCHOOLS	1934	1.0118	121	16632.66	0.54
HOLT PUBLIC SCHOOLS	4308	1.0067	156	22236.16	0.35
LESLIE PUBLIC SCHOOLS	1710	1.0056	166	7389.37	0.34
MASON PUBLIC SCHOOLS	3307	1.0049	168	9507.25	0.23
OKEMOS PUBLIC SCHOOLS	3216	1.0147	108	16824.11	0.31
STOCKBRIDGE COMM SCHOOLS	2057	1.0015	196	1961.23	0.07
WAVERLY SCHOOLS	4242	1.0105	134	1421.01	0.02
WEBBERVILLE PUBLIC SCHOOLS	827	1.0059	164	3572.74	0.32
WILLIAMSTON COMM SCHOOLS	1808	1.0090	144	8727.65	0.34
BELDING AREA SCHOOL DISTRICT	2507	0.9891	276	-17953.26	-0.58
LAKEWOOD PUBLIC SCHOOLS	2915	0.9881	279	-25881.32	-0.68
SARANAC COMM SCHOOL DISTRICT	1152	0.9945	244	-4437.77	-0.27
OSCODA AREA SCHOOLS	3741	0.9800	326	-32972.40	-0.71
HALE AREA SCHOOLS	719	0.9676	399	-2133.81	-0.20
TAWAS AREA SCHOOLS	1861	0.9743	361	-6931.43	-0.36
WHITTEMORE PRESCOTT AREA S D	1256	0.9642	413	-29048.33	-1.51
MT PLEASANT CITY SCHOOL DIST	4306	0.9768	345	-58678.94	-0.88
BEAL CITY SCHOOL DISTRICT	652	0.9610	430	-19880.38	-2.14
SHEPHERD PUBLIC SCHOOL DIST	1862	0.9646	409	-52567.30	-2.11
WESTERN SCHOOL DISTRICT	2312	1.0046	172	5417.35	0.17

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
VANDERCOOK LAKE PUB SCH DIST	1303	1.0033	185	3602.17	0.24
GRASS LAKE COMMUNITY SCHOOLS	956	1.0000	207	-0.56	-0.00
CONCORD COMMUNITY SCHOOLS	1076	1.0078	151	5859.21	0.37
HANOVER HORTON SCHOOLS	1361	1.0026	188	1992.01	0.11
MICHIGAN CENTER SCHOOL DIST	1839	0.9998	209	-129.35	-0.01
NAPOLEON SCHOOL DISTRICT	1668	0.9980	226	-1827.62	-0.09
SPRINGPORT PUBLIC SCHOOL	1235	1.0045	173	3455.11	0.24
JACKSON PUBLIC SCHOOLS	11126	1.0103	136	59463.92	0.32
KALAMAZOO CITY SCH DIST	13842	1.0149	107	70046.06	0.26
CLIMAX SCOTTS COMM SCHOOLS	835	0.9997	211	-193.07	-0.02
COMSTOCK PUBLIC SCHOOLS	3040	1.0077	152	1694.74	0.06
GALESBURG AUGUSTA COMM S D	1406	1.0064	158	7757.61	0.37
GULL LAKE COMMUNITY SCHOOLS	2907	1.0092	141	14859.55	0.37
PARCHMENT SCHOOL DISTRICT	2139	1.0039	179	4531.44	0.16
SCHOOLCRAFT COMM SCHOOLS	867	1.0026	190	1319.79	0.12
VICKSBURG COMMUNITY SCHOOLS	2901	1.0092	142	18097.67	0.61
GRAND RAPIDS CITY SCH DIST	27178	1.0128	110	373046.00	0.53
GODWIN HEIGHTS PUBLIC SCHS	2375	1.0046	171	65.76	0.00
NORTHVIEW PUBLIC SCHOOL	3177	1.0041	178	9338.08	0.21
WYOMING PUBLIC SCHOOLS	6296	1.0085	147	40410.21	0.41
BYRON CENTER PUBLIC SCHOOLS	1576	0.9993	214	-587.95	-0.03
CALEDONIA COMMUNITY SCHOOLS	2103	0.9990	217	-1216.84	-0.05
CEDAR SPRINGS PUBLIC SCHOOLS	2382	0.9947	243	-9131.84	-0.34
COMSTOCK PARK SCHOOL DIST	1848	1.0071	153	11503.46	0.48
E GR RAPIDS PUBLIC SCHOOLS	2977	1.0110	126	17118.28	0.43
FOREST HILLS PUBLIC SCHOOLS	4774	1.0097	139	14510.15	0.16
GODFREY LEE PUBLIC SCH DIST	1199	1.0042	177	1896.41	0.12
GRANDVILLE PUBLIC SCHOOLS	4134	1.0033	186	7033.46	0.15
KELLOGGSVILLE PUBLIC SCHOOLS	2223	1.0061	161	5963.36	0.19
KENOWA HILLS PUBLIC SCHOOLS	3360	0.9968	229	-2490.17	-0.05
KENT CITY COMMUNITY SCHOOLS	1537	0.9921	256	-9033.14	-0.45
KENTWOOD PUBLIC SCHOOLS	6049	1.0100	137	34773.18	0.33
LOWELL AREA SCHOOLS	2927	1.0002	206	340.08	0.01
ROCKFORD PUBLIC SCHOOLS	3910	1.0046	170	13225.27	0.22
SPARTA AREA SCHOOLS	2627	0.9997	210	-508.31	-0.02
LAPEER PUBLIC SCHOOLS	7498	0.9980	225	-7414.61	-0.07
ALMONT COMMUNITY SCHOOLS	1485	1.0018	194	1334.13	0.08
DRYDEN COMMUNITY SCHOOLS	769	1.0035	182	1123.85	0.10
NORTH BRANCH AREA SCHOOLS	2274	0.9964	231	-5247.57	-0.20
GLEN LAKE COMMUNITY SCH DIST	799	0.9682	396	-1301.18	-0.13
NORTHPORT PUBLIC SCHOOL DIST	298	0.9701	384	-220.44	-0.05
SUTTONS BAY PUBLIC SCH DIST	716	0.9735	367	-6433.47	-0.48
ADRIAN CITY SCHOOL DISTRICT	5666	0.9916	259	-23740.87	-0.31
ADDISON COMMUNITY SCHOOLS	1534	0.9898	271	-6708.60	-0.34
BLISSFIELD COMMUNITY SCHOOLS	1806	0.9891	275	-3882.69	-0.20

TABLE IX (MICH)

DISTRICT NAME	FUM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
BRITTON MACON AREA SCHOOL	597	0.9915	260	-1796.17	-0.28
CLINTON COMMUNITY SCHOOLS	1148	0.9857	290	-5354.84	-0.34
DEERFIELD PUBLIC SCHOOLS	513	0.9902	267	-2649.55	-0.40
HUDSON AREA SCHOOLS	1500	0.9854	294	-12345.76	-0.69
MORENCI AREA SCHOOLS	1046	0.9831	311	-8513.04	-0.77
ONSTED COMMUNITY SCHOOLS	1615	0.9898	270	-7944.12	-0.44
SAND CREEK COMMUNITY SCHOOLS	962	0.9913	262	-4408.24	-0.40
TECUMSEH PUBLIC SCHOOLS	3471	0.9887	277	-20284.15	-0.43
BRIGHTON AREA SCHOOLS	4365	1.0244	77	81131.81	0.94
FOWLERVILLE COMMUNITY SCHS	1979	1.0151	105	19808.32	0.74
HARTLAND CONS SCHOOL	2843	1.0223	84	34475.20	0.73
HOWELL PUBLIC SCHOOLS	5781	1.0201	91	57898.02	0.69
PINCKNEY COMMUNITY SCHOOLS	3009	1.0193	93	30701.04	0.60
ST IGNACE CITY SCHOOL DIST	1024	0.9655	408	-29029.95	-2.00
LES CHENEAUX COMM SCH DIST	477	0.9528	440	-1079.61	-0.21
CENTER LINE PUBLIC SCHOOLS	4935	1.0349	65	20863.30	0.32
EAST DETROIT CITY SCH DIST	10247	1.0311	69	197572.50	1.38
ROSEVILLE COMMUNITY SCHOOLS	11231	1.0334	67	216692.44	1.46
ANCHOR BAY SCHOOL DISTRICT	4125	1.0397	53	87065.69	1.43
ARMADA AREA SCHOOLS	1591	1.0313	68	17660.75	0.61
CLINTONDALE PUBLIC SCHOOLS	5263	1.0362	62	159678.75	1.96
CHIPPEWA VALLEY SCHOOLS	4466	1.0378	59	101329.63	1.01
FITZGERALD PUBLIC SCHOOLS	4534	1.0360	63	4251.02	0.06
FRASER PUBLIC SCHOOLS	7740	1.0390	56	182384.13	1.45
LAKE SHORE PUBLIC SCHOOLS	8337	1.0375	61	245706.88	1.38
L ANSE CREUSE PUBLIC SCHOOLS	8178	1.0424	43	190459.13	1.28
MT CLEMENS COMM SCHOOL DIST	5237	1.0418	47	112078.00	1.29
NEW HAVEN COMMUNITY SCHOOLS	1517	1.0404	50	39386.29	1.70
RICHMOND COMMUNITY SCHOOLS	1947	1.0292	71	19239.37	0.59
ROMEO COMMUNITY SCHOOLS	4853	1.0380	58	73097.25	0.81
SOUTH LAKE SCHOOLS	4511	1.0356	64	25690.66	0.49
VAN DYKE COMMUNITY SCHOOLS	5939	1.0375	60	53180.32	1.03
WARREN CONSOLIDATED SCHOOLS	31987	1.0422	44	580099.75	1.08
BEAR LAKE SCHOOL	421	0.9748	356	-5738.95	-1.08
KALEVA NORMAN-DICKSON SCHS	736	0.9671	400	-4077.86	-0.51
ONEKEMA CONSOLIDATED SCHOOL	819	0.9753	352	-8919.84	-0.73
MANISTEE CITY SCHOOLS	2420	0.9760	349	-18343.31	-0.64
NEGAUNEE SCHOOL DISTRICT	1939	0.9801	324	-26729.50	-1.28
REPUBLIC MICHIGAMME SCHOOLS	421	0.9731	368	-5454.84	-1.31
MARQUETTE CITY SCHOOL DIST	5005	0.9856	291	-40864.02	-0.55
ISHPEMING PUBLIC SCHOOL DIST	1655	0.9847	301	-16377.73	-0.82
MASON CO CENTRAL SCHOOL DIST	1705	0.9780	338	-25856.46	-1.17
MASON CO EASTERN SCHOOL DIST	651	0.9739	363	-11583.23	-1.43
LUDINGTON AREA SCHOOL DIST	2971	0.9800	327	-2000.43	-0.04

TABLE IX (MICH)

DISTRICT NAME	ADM	EFI	RANK	AID + CAT CHANGE	BUDGET % CHNG
CHIPPEWA HILLS SCHOOL DIST	2583	0.9598	434	-40620.07	-1.16
MORLEY STANWOOD COMM SCHOOLS	1224	0.9640	414	-16672.74	-1.17
CARNEY NADEAU PUBLIC SCHOOLS	357	0.9439	444	-16010.83	-3.96
MENOMINEE AREA PUBLIC SCHOOL	2811	0.9643	412	-63794.13	-1.90
STEPHENSON AREA PUB SCHOOLS	1264	0.9600	433	-31641.55	-2.56
MIDLAND CITY SCHOOL DISTRICT	11057	1.0232	81	17869.01	0.11
BULLOCK CREEK SCHOOL DIST	2196	1.0231	82	29407.70	0.97
COLEMAN COMM SCHOOL DISTRICT	1447	1.0157	102	20067.00	0.88
MERIDIAN PUB SCHOOL DISTRICT	2101	1.0215	86	38367.08	1.19
LAKE CITY AREA SCHOOL DIST	1092	0.9444	443	-10647.42	-0.75
MCBAIN RURAL AG SCHOOL DIST	714	0.9464	442	-16796.81	-1.81
MONROE CITY PUBLIC SCHOOLS	8582	1.0125	113	9390.70	0.07
AIRPORT COMM SCHOOL DISTRICT	3209	1.0109	128	13667.77	0.40
BEDFORD PUB SCHOOL DISTRICT	6248	1.0125	111	66934.75	0.72
DUNDEE COMM SCHOOL DISTRICT	1927	1.0084	148	6048.52	0.29
IDA PUBLIC SCHOOL DISTRICT	1914	1.0104	135	14321.32	0.58
JEFFERSON CONS SCHOOL DIST	2660	1.0120	119	9668.71	0.33
MASON CONS SCHOOL DISTRICT	2146	1.0062	160	6165.64	0.21
SUMMERFIELD SCHOOL DISTRICT	1236	1.0137	109	11781.52	0.68
WHITEFORD AGRI SCHOOL DIST	1105	1.0080	149	3684.68	0.29
CARSON CITY CRYSTAL AREA S D	1689	0.9745	358	-29056.44	-1.55
GREENVILLE PUBLIC SCHOOLS	3424	0.9790	333	-36180.03	-0.84
TRI-CO AREA SCHOOLS	1589	0.9800	325	-20186.10	-1.12
CENTRAL MONTCALM PUB SCHOOLS	1898	0.9881	280	-18037.36	-0.73
VESTABURG COMMUNITY SCHOOLS	881	0.9740	362	-20235.15	-1.86
ATLANTA COMMUNITY SCHOOLS	595	0.9640	415	-1394.74	-0.19
HILLMAN COMMUNITY SCHOOLS	752	0.9638	417	-2571.47	-0.28
MUSKEGON CITY SCHOOL DIST	7587	1.0038	180	25633.99	0.19
MUSKEGON HGTS CITY SCH DIST	3219	1.0118	122	33476.71	0.67
MONA SHORES SCHOOL DISTRICT	5274	1.0026	189	7748.49	0.12
FRUITPORT COMMUNITY SCHOOLS	3784	0.9928	253	-25686.82	-0.53
HOLTON PUBLIC SCHOOLS	1055	0.9939	247	-5667.07	-0.39
MONTAGUE AREA PUBLIC SCHOOLS	1842	0.9965	232	-4107.27	-0.17
ORCHARD VIEW SCHOOLS	2989	0.9929	252	-19687.99	-0.45
RAVENNA PUBLIC SCHOOLS	1387	0.9942	245	-6621.91	-0.36
NORTH MUSKEGON CITY SCH DIST	994	1.0067	157	3274.06	0.28
WHITE HALL DIST SCHOOLS	2020	0.9974	227	-3522.60	-0.13
FREMONT PUBLIC SCHOOL DIST	2564	0.9737	364	-32468.50	-1.12
HESPERIA COMM SCHOOL DIST	1106	0.9762	347	-18243.63	-1.47
NEWAYGO PUBLIC SCHOOL DIST	1266	0.9749	355	-11934.14	-0.71
WHITE CLOUD PUBLIC SCHOOLS	1276	0.9713	379	-25425.82	-1.69

TABLE IX (MICH)

DISTRICT NAME	ADM	LPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
BIRMINGHAM CITY SCHOOL DIST	12606	1.0496	12	35310.37	0.18
FERNDALE CITY SCHOOL DIST	6990	1.0417	48	183302.00	2.03
PONTIAC CITY SCHOOL DISTRICT	19021	1.0445	31	455856.56	1.32
ROYAL OAK CITY SCHOOL DIST	12927	1.0419	46	216813.44	1.39
BERKLEY CITY SCHOOL DISTRICT	6161	1.0404	51	138044.56	1.62
SOUTHFIELD PUBLIC SCH DIST	12795	1.0486	15	32258.35	0.17
AVONDALE SCHOOL DISTRICT	3507	1.0432	39	90115.25	1.90
BLOOMFIELD HILLS SCHOOL DIST	8234	1.0495	11	40131.85	0.30
CLARENCEVILLE SCHOOL DIST	2937	1.0425	42	62021.39	1.84
NOVI COMMUNITY SCHOOL DIST	2575	1.0530	7	12584.21	0.24
OXFORD AREA COMM SCHOOL DIST	3312	1.0473	20	78170.94	1.72
HAZEL PARK CITY SCHOOL DIST	6227	1.0382	57	237170.50	2.16
MADISON HEIGHTS SCHOOL DIST	3751	1.0431	40	123033.75	0.95
TROY PUBLIC SCHOOLS	8896	1.0514	8	37391.94	0.13
WEST BLOOMFIELD TWP SCH DIST	5487	1.0501	10	96280.44	0.84
BRANDON SCHOOL DISTRICT	2418	1.0457	27	67580.50	1.66
CLARKSTON COMM SCHOOL DIST	6663	1.0435	37	191765.63	2.16
FARMINGTON PUB SCHOOL DIST	13727	1.0458	26	217167.19	1.02
HOLLY AREA SCHOOL DISTRICT	3964	1.0452	29	105676.25	1.87
HURON VALLEY SCHOOLS	9160	1.0454	28	270436.25	1.64
LAKE ORION COMM SCHOOL DIST	5955	1.0461	25	172686.81	2.07
SO LYON COMMUNITY SCHOOLS	3773	1.0471	22	73717.06	1.30
OAK PARK CITY SCHOOL DIST	3904	1.0421	45	12522.83	0.18
ROCHESTER COMM SCHOOL DIST	9625	1.0474	18	140689.63	0.91
WALLED LAKE CONS SCHOOL DIST	10763	1.0404	49	190531.81	1.11
WATERFORD SCHOOL DISTRICT	16126	1.0391	55	439585.25	1.60
PENTWATER PUBLIC SCHOOL DIST	327	0.9722	374	-867.38	-0.22
WALKERVILLE COMM SCHOOL DIST	44[illegible]	0.9619	428	-13469.63	-2.27
W BRANCH ROSE CITY AREA SCHS	2538	0.9569	439	-44280.23	-1.20
EWEN TROUT CREEK CONS S U	676	0.9618	429	-22042.50	-2.73
ONTONAGON AREA SCHOOLS	1337	0.9726	372	-32458.95	-1.66
WHITE PINE SCHOOL DISTRICT	554	0.9813	320	-107.57	-0.01
EVART PUBLIC SCHOOL	1211	0.9685	393	-18862.11	-1.17
MARION PUBLIC SCHOOL	885	0.9668	402	-10216.51	-0.88
REED CITY PUBLIC SCHOOLS	2054	0.9690	390	-26075.37	1.17
MIO AU SABLE SCHOOL DISTRICT	800	0.9430	445	-10083.87	-0.67
JOHANNESBURG-CENTRAL SCHOOL	695	0.9729	370	-1476.58	-0.12
VANDERBILT-AREA SCHOOL	370	0.9747	357	-2419.06	-0.45
GRAND HAVEN CITY SCHOOL DIST	5517	0.9935	248	-10845.45	-0.13
HOLLAND CITY SCHOOL DISTRICT	4701	0.9939	246	-6693.19	-0.11
ALLENDALE PUBLIC SCHOOL DIST	758	0.9901	268	-5016.34	-0.56
WEST OTTAWA PUB SCHOOL DIST	4161	0.9911	263	-20721.30	-0.32

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
COOPERSVILLE PUBLIC SCH DIST	228[illegible]	0.9868	285	-21836.14	-0.77
JENISON PUBLIC SCHOOLS	4326	0.9930	250	-22872.44	-0.37
HUDSONVILLE PUB SCHOOL DIST	2332	0.9878	282	-15366.39	-0.55
SPRING LAKE PUBLIC SCH DIST	2125	0.9930	251	-10667.91	-0.38
ZEELAND PUBLIC SCHOOL DIST	2393	0.9838	304	-7708.95	-0.29
ONAWAY AREA COMM SCHOOL DIST	1354	0.9644	411	-15291.65	-0.99
POSEN CONS SCHOOL DISTRICT	455	0.9658	405	-4929.42	-0.93
ROGERS UNION SCHOOL DISTRICT	1235	0.9661	404	-16061.99	-1.02
HOUGHTON LAKE COMMUNITY SCHS	1708	0.9629	422	-5050.82	-0.19
SAGINAW CITY SCHOOL DISTRICT	17620	1.0194	92	175201.75	0.60
CARROLLTON SCHOOL DISTRICT	2012	1.0176	96	32029.59	1.07
SAGINAW TWP COMM SCHOOLS	7138	1.0165	98	33968.88	0.28
BUENA VISTA SCHOOL DISTRICT	2885	1.0185	94	4444.17	0.10
CHESANING UNION SCHOOLS	3582	1.0035	183	8000.87	0.19
BIRCH RUN AREA SCHOOL DIST	2621	1.0063	159	12305.59	0.43
BRIDGEPORT COMM SCHOOL DIST	4894	1.0112	124	43849.03	0.62
FRANKENMUTH SCHOOL DISTRICT	1510	1.0107	131	1495.34	0.06
FREELAND COMM SCHOOL DIST	1743	1.0184	95	18861.07	0.77
HEMLOCK PUBLIC SCHOOL DIST	2062	1.0067	155	6709.89	0.24
MERRILL COMM SCHOOL DISTRICT	1448	1.0071	154	7654.42	0.35
ST CHARLES COMM SCHOOL DIST	1678	1.0079	150	9863.34	0.45
SWAN VALLEY SCHOOL DISTRICT	2353	1.0153	104	24804.75	0.74
PORT HURON AREA SCHOOL DIST	14287	1.0046	169	44714.21	0.21
ALGONAC COMM SCHOOL DISTRICT	3124	1.0008	201	991.81	0.02
CAPAC COMM SCHOOL DISTRICT	1589	1.0034	184	3638.59	0.16
EAST CHINA TWP SCHOOL DIST	4825	1.0020	193	454.16	0.01
MARYSVILLE PUB SCHOOL DIST	2245	1.0023	192	63.77	0.00
MEMPHIS COMMUNITY SCHOOLS	1140	1.0011	199	721.71	0.05
YALE PUBLIC SCHOOL DISTRICT	2190	0.9954	241	-4449.24	-0.16
STURGIS CITY SCHOOL DISTRICT	3084	0.9950	242	-5653.07	-0.16
BURR OAK COMM SCHOOL DIST	446	0.9852	298	-3866.23	-0.80
CENTREVILLE PUB SCHOOL DIST	894	0.9964	234	-2469.31	-0.19
COLON COMMUNITY SCHOOL DIST	1474	0.9861	288	-8441.72	-0.53
MENDON COMMUNITY SCHOOL DIST	706	0.9910	265	-4717.86	-0.36
WHITE PIGEON COMM SCH DIST	1414	0.9894	273	-5226.57	-0.23
THREE RIVERS PUBLIC SCH DIST	3086	0.9960	236	-5374.16	-0.13
BROWN CITY COMM SCHOOL DIST	1304	0.9699	387	-21354.80	-1.49
CARSONVILLE COMM SCHOOL DIST	830	0.9729	369	-8529.11	-0.79
CROSWELL LEXINGTON COMM S D	2662	0.9715	377	-29887.38	-0.82
DECKERVILLE COMM SCHOOL DIST	1179	0.9687	392	-12774.42	-0.84
MARLETTE COMM SCHOOL DIST	1844	0.9750	354	-27314.67	-1.10
PECK COMMUNITY SCHOOL	677	0.9657	406	-13442.50	-1.53
SANDUSKY COMM SCHOOL DIST	1689	0.9701	385	-22885.62	-1.34

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
MANISTIQUE AREA SCHOOLS	1731	0.9619	427	-35158.91	-1.65
BYRON AREA SCHOOLS	1268	0.9984	223	-1432.69	-0.09
DURAND AREA SCHOOLS	3066	1.0002	205	480.58	0.01
LAINGSBURG COMM SCHOOL DIST	1029	0.9974	228	-1984.39	-0.15
MORRICE AREA SCHOOLS	920	0.9988	220	-764.22	-0.08
NEW LOTHROP AREA PUB S D	1417	0.9956	237	-4438.82	-0.22
PERRY PUBLIC SCHOOL DISTRICT	2079	0.9986	221	-2138.77	-0.08
CORUNNA PUBLIC SCHOOL DIST	2795	0.9991	215	-1339.73	-0.04
OWOSSO PUBLIC SCHOOL DIST	5801	0.9990	216	-2893.36	-0.04
AKRON FAIRGROVE SCHOOLS	1030	0.9860	289	-6399.01	-0.51
CARO COMMUNITY SCHOOLS	2624	0.9919	257	-15821.98	-0.43
CASS CITY PUBLIC SCHOOLS	2054	0.9853	296	-16670.14	-0.78
KINGSTON COMMUNITY SCHOOLS	851	0.9914	261	-5212.95	-0.55
MAYVILLE COMMUNITY SCHOOLS	1563	0.9895	272	-12122.24	-0.63
MILLINGTON COMMUNITY SCHOOLS	2449	0.9836	306	-30345.92	-1.14
REESE PUBLIC SCHOOLS	1247	0.9815	318	-5614.87	-0.40
SEBEWAING UNIONVILLE SCHOOLS	1171	0.9835	307	-4694.82	-0.30
VASSAR PUBLIC SCHOOLS	2155	0.9910	264	-12261.88	-0.46
SOUTH HAVEN PUBLIC SCHOOLS	3204	0.9878	281	-24405.02	-0.62
BANGOR PUBLIC SCHOOLS	1864	0.9848	300	-19014.41	-0.83
COVERT PUBLIC SCHOOLS	712	0.9967	231	-211.38	-0.02
DECATUR PUBLIC SCHOOLS	1348	0.9779	339	-20973.18	-1.38
BLOOMINGDALE PUB SCHOOL DIST	1448	0.9829	312	-22064.26	-1.13
GOBLES PUBLIC SCHOOL DIST	1067	0.9865	286	-10340.98	-0.96
HARTFORD PUBLIC SCHOOL DIST	1676	0.9838	305	-18302.33	-0.85
LAWRENCE PUBLIC SCHOOL DIST	850	0.9814	319	-12585.39	-1.26
LAWTON COMMUNITY SCHOOL DIST	972	0.9781	336	-13011.64	-1.04
MATTAWAN CONS SCHOOL DIST	1852	0.9 9	284	-17734.51	-0.75
PAW PAW PUBLIC SCHOOL DIST	2022	0.9853	295	-26318.36	-0.82
ANN ARBOR CITY SCHOOL DIST	17604	1.0224	83	23600.75	0.07
YPSILANTI CITY SCHOOL DIST	6562	1.0207	87	68408.31	0.60
CHELSEA SCHOOL DISTRICT	2537	1.0110	127	4432.62	0.12
DEXTER COMMUNITY SCHOOL DIST	2075	1.0116	123	1785.51	0.06
LINCOLN CONS SCHOOL DISTRICT	2698	1.0124	114	12007.16	0.32
MANCHESTER PUB SCHOOL DIST	1319	1.0108	130	4270.35	0.24
MILAN AREA SCHOOLS	2677	1.0093	140	10711.03	0.31
SALINE AREA SCHOOL DISTRICT	3094	1.0106	133	3522.86	0.08
WHITMORE LAKE PUB SCH DIST	1124	1.0151	106	6898.18	0.50
WILLOW RUN PUBLIC SCHOOLS	3815	1.0125	112	27739.95	0.42
DETROIT CITY SCHOOL DISTRICT	228617	1.1071	1	17572208.00	1.45
CHERRY HILL SCHOOL DISTRICT	3797	1.0465	24	130635.44	2.54
DEARBORN HEIGHTS SCH DIST 7	4374	1.0431	41	150885.63	2.72
MELVINDALE N ALLEN PK S D	4129	1.0444	32	11947.51	0.26
GARDEN CITY SCHOOL DISTRICT	10058	1.0397	54	344478.50	2.54
HAMTRAMCK CITY SCHOOLS	2125	1.0438	35	6993.39	0.24

TABLE IX (MICH)

DISTRICT NAME	ADM	EPI	RANK	AID + CAT CHANGE	BUDGET % CHNG
HIGHLAND PARK CITY SCHOOLS	6352	1.0698	2	5147[illegible].44	3.08
INKSTER CITY SCHOOL DISTRICT	3793	1.0600	3	232240.63	3.61
LIVONIA PUBLIC SCHOOLS	31006	1.0489	14	538168.63	1.16
PLYMOUTH COMMUNITY SCH DIST	12502	1.0550	6	139116.81	0.55
RIVER ROUGE CITY SCHOOLS	3295	1.0557	5	8322.71	0.13
SOUTH REDFORD SCHOOL DIST	5023	1.0441	34	9699.20	0.15
TAYLOR SCHOOL DISTRICT	20366	1.0475	17	620962.63	1.85
WAYNE WESTLAND COMM SCHOOLS	20934	1.0472	21	734594.88	1.77
NORTH DEARBORN HGTS SCH DIST	1996	1.0433	38	38234.15	1.47
CRESTWOOD SCHOOL DISTRICT	4139	1.0447	30	90202.50	1.79
ECORSE PUBLIC SCHOOL DIST	3009	1.0562	4	9957.73	0.23
GIBRALTAR SCHOOL DISTRICT	4140	1.0476	16	83414.44	1.13
GROSSE ILE TOWNSHIP SCHOOLS	2451	1.0506	9	44153.20	1.04
HARPER WOODS CITY SCH DIST	1369	1.0435	36	1035.40	0.07
HURON SCHOOL DISTRICT	2056	1.0398	52	121257.94	2.79
NORTHVILLE PUBLIC SCHOOLS	4325	1.0443	33	149750.94	1.38
RIVERVIEW COMMUNITY SCH DIST	3432	1.0498	11	819.84	0.01
SOUTHGATE COMM SCHOOL DIST	7364	1.0469	23	174301.63	1.87
VAN BUREN PUBLIC SCHOOLS	7764	1.0474	19	107286.31	0.93
CADILLAC AREA PUBLIC SCHOOLS	3812	0.9665	403	-61622.79	-1.48
MANTON CONSOLIDATED SCH DIST	777	0.9692	389	-13447.92	-1.41
MESICK CONSOLIDATED SCH DIST	720	0.9644	410	-11828.65	-1.28

5. Conclusions and Recommendation

The methods presented in this report appear to show some promise for the development of indices of educational input prices. When applied to data from the states of Ohio and Michigan, the resulting EPI behaves reasonably. For example, its variation is not excessive; most districts fall in the range of 97 to 103 percent of the state average, and even the most extreme cases are only six percent lower or eight percent higher than average, except for Detroit, which is ten percent higher than average for Michigan. The index is also stable in the sense that it is insensitive to minor changes in the methods of its derivation.

Most variables in the structural form used to derive the EPI behave as expected, although there are exceptions. It appears likely that the structural form suffers from some misspecification. This is partly due to gaps in available data, but also results from the primitive state of current theory underlying educational price indices.

It is recommended that future work concentrate on development of the theory and of its application to a more accurate specification of the structural form.

FOOTNOTES

Chapter 2

1. Recent court decisions may change this, however. For example, in Board of Education of the City School District of the City of Cincinnati vs. Walter, the Ohio State Court of Appeals ruled on September 5, 1978 that Ohio's school finance system, which includes power equalization, violated the state constitution. The Ohio Supreme Court reversed this decision in 1979. The U. S. Supreme Court has been asked to review the case.

2. R. Berne and L. Stiefel, A Methodological Assessment of Education Equality and Wealth Neutrality Measures, Report to the School Finance Cooperative, July, 1978, p. 22.

3. While no direct measure of P exists, several reasonable surrogates exist. One such is the proportion of adults in a community who have a college degree (or, alternatively, who have ever attended college). We have found a fairly consistent correlation (about .55) between this (as well as the alternative) and a composite wealth measure (a weighted average of income per pupil, income per capita, property value per pupil, and proportion of families with 1960 income in excess of $15,000) based on the 1970 Census/ELSEGIS data base.

Chapter 3

1. Brazer and Anderson (1977) and Kenny, Denslow, and Goffman (1977) assume that $\frac{\partial M}{\partial S} = 0$.

2. Levin (1970)

3. A number of states have recently moved to change this situation by testing teachers. No teacher test scores were available to this study, however.

4. Those who prefer log-linear models are cautioned that many of the variables in the model may take the value zero, and no reasonable transformations of them are available to avoid this. Thus, a log-linear model is infeasible.

5. A measure of "fiscal overburden" was considered, but it was decided not to include it here because it is not clear that the higher tax rates in some localities do not result in increased services that are worth the price paid. Harvey Brazer has suggested (personal communication) that many of these extra services provided by cities are purchased directly by suburban and rural residents, rather than paid for through taxes (e.g., water, sewer, and sanitation services).

6. Since few salary schedules recognize differences in basic quality, the question arises as to how a district can pay more for teachers of higher quality. The answer is that it can raise the entire salary schedule. Thus, it does not individually reward teachers, but instead attempts to employ only high quality teachers.

7. These two variables are to some extent outputs of the education production function and, therefore, may be considered endogenous. It is assumed here, however, that their dependence on the other endogenous variables in the system is minor compared to their dependence on family background and related exogenous factors. Therefore, little harm will be done by treating them as exogenous. See Cragg (1968) for justification of this statement.

8. While a full-information method has better asymptotic properties (it is asymptotically unbiased, whereas 2SLS is not), 2SLS is more appropriate in the present case because of the inherent complexity and uncertainty in the problem, which suggests a danger of misspecification of the model. In such a case 2SLS tends to perform better for finite samples (cf. Cragg (1968), Cragg (1967), and Summers (1965)).

9. It may be that the state wants non-teaching instructional staff expenditures to increase with CAT and TITLEI. Thus, it may be more appropriate to include in the model (23) an equation for the ratio of total instructional staff budget to teacher budget. But it seems hardly worth the effort since we are dealing here with a small second-order adjustment, i.e., we would make only a small change in a factor that affects only the relative weight of one price but has no affect on the price itself.

10. At least ten states now use composite measures of fiscal capacity in their aid formulas.

11. This has been suggested also by Halstead (1974).

APPENDIX A

Regression Results

This appendix presents the details of the regression results referred to in the text. The regressions on which the EPIs are based are given first, followed by:

a) full system (34) (near-collinearity present)

b) full system (34) plus AID equation

c) full system (34) plus AID equation; EPV and MILLG substituted for WEALTH and EFFORT

d) regression for sensitivity test T_2

e) regression for T_3

f) regression for T_5 (Michigan only)

Variables are referred to by number. The variable names corresponding to each number are as follows:

1	EPV	27	POVCH
5	STSAL	29	STBLTY
6	EDPRM	30	BRKHME
7	EXPRM	31	FINCOL
8	RATIO	32	DEP
9	FDLVL	35	PENRLC
10	EXPER	36	PENRL
12	WEALTH	37	TITLE1
13	EFFORT	38	CAT
14	INSM	41	MILLG
17	OTHER	43	RESD
18	LADM	56	PTCHR
19	ACH	58	AID
20	DENS	63	$WEALTH^2$
22	OPCOST	69	$WEALTH^3$
24	MNRTY		

SYSTEM OF EQUATIONS

```
V( 5) = F( V( 8)  V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
V( 6) = F( V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(19) )
V( 7) = F( V( 9)  V(10)  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(18)  V(29) )
V(14) = F( V(13)  V(58)  V(12)  V(17)  V(33) )
V(13) = F( V( 5)  V( 6)  V(58)  V(43)  V(32)  V(36)  V(37)  V(30)  V(31)  V(12)  V(63)  V(69) )
V(17) = F( V(13)  V(54)  V(12)  V(37)  V(38)  V(22) )
```

ENDOGENOUS VARIABLES

```
5   6   7   8   9   10   13   14   17
```

FIRST STAGE R**2 S

```
0.584 0.148 0.711 0.710 0.494 0.343 0.495 0.497 0.744
```

EXOGENOUS VARIABLES

```
35  12  37  38  58  56  22  20  18  24  27  30  19  29  43  32  36  31  63  69
```

SECOND STAGE BETAS AND TS

```
 -0.074    0.974    0.167    0.033   -0.079   -0.055    0.102
 -0.94     9.29     2.39     0.31    -2.20    -1.60     2.29
R**2 =   0.4826     F =     79.152     STERR =    413.621502

  0.047    0.468    0.047    0.275    0.068    0.169   -0.023   -0.021    0.086    0.031
  1.10     6.30     1.16     6.07     1.45     3.41    -0.71    -0.55     2.69     0.90
R**2 =   0.5613     F =     75.627     STERR =    381.818902

  0.525    0.060   -0.039   -0.022    0.005    0.046
  5.01     0.67    -0.56    -0.50     0.10     0.80
R**2 =   0.1064     F =     11.807     STERR =    259.145889

  0.414    0.078   -0.004   -0.003    0.001
  3.82     0.63    -0.07    -0.07     0.01
R**2 =   0.1059     F =     14.114     STERR =    259.004709

  0.694    0.495    0.115    0.048   -0.097   -0.038    0.088
  7.19     6.50     1.97     0.99    -3.24    -1.25     2.31
R**2 =   0.6166     F =    136.488     STERR =     44.673702

  0.159    0.097    0.527    0.284    0.004   -0.025    0.050   -0.002    0.198    0.051
  1.62     2.76     6.97     7.99     0.11    -0.74     1.70    -0.08     4.88     1.82
R**2 =   0.6792     F =    125.115     STERR =     40.970672

 -0.187   -0.153    0.535    0.424    0.094
 -2.78    -3.38    13.31    10.97     2.49
R**2 =   0.3209     F =     56.335     STERR =     44.794540

 -0.065    0.373   -0.405   -0.357    0.046    0.332    0.082   -0.145   -0.192    0.213   -0.005    0.013
 -0.61     1.78    -9.91    -7.47     0.82     5.29     2.17    -4.25    -2.31     1.65    -0.02     0.08
R**2 =   0.4854     F =     46.302     STERR =     11.916353

  0.452    0.239    0.849    0.242    0.201    0.054
  8.16     6.40    23.20     7.53     6.22     1.53
R**2 =   0.5463     F =    119.403     STERR =     77.704794
```

SECOND STAGE BS AND CONSTANTS

```
-[illegible]E+03  5.028E+03  5.800E+00  7.232E+00 -2.434E+00 -6.689E-01  5.212E-01  7.253E+03
[illegible]E+03  2.415E+03  1.778E+02  2.097E-01  4.192E-02  1.186E+02 -2.053E+02 -1.854E+02  2.589E+02  2.512E+02
[illegible]E+03
```

```
 1.293E+03  9.896E-01 -4.967E+00 -3.296E-01  2.646E-02  1.127E-01  1.111E+03
 1.019E+03  2.337E+01 -1.460E+02 -1.262E-03  2.505E+00  1.114E+03
 4.498E+02  3.925E+01  4.998E-01  1.296E+00 -3.729E-01 -5.710E-02  5.639E-02 -2.599E+01
 1.264E+01  1.024E+03  3.416E+02  2.718E-02  3.963E+00 -2.793E+01  1.899E+01 -2.400E+00  1.743E+01  9.561E+01
-1.793E+02
-6.168E-01 -7.388E-02  1.099E+01  1.236E+00  1.079E-01  4.942E+01
-1.862E-03  2.250E-02 -5.925E-02 -3.765E+01  6.949E+00  5.695E+01  7.295E-02 -5.072E-02 -4.592E+01  1.331E+00
-1.474E-03  1.886E-04  2.591E+01
 3.154E+00  2.441E-01  3.698E+01  1.498E+00  4.885E-01  8.317E-03 -2.472E+02
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	65	-27	-87	-29	1	-17
65	100	18	-85	-33	11	22
-27	18	100	14	-12	26	75
-87	-85	14	100	39	5	5
-29	-33	-12	39	100	-31	-12
1	11	26	5	-31	100	20
-17	22	75	5	-12	20	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-21	-28	-17	-25	56	-13	14	-2	-1
-21	100	6	3	-50	-40	-7	6	-19	-27
-28	6	100	45	24	-56	-2	-10	1	7
-17	3	45	100	-19	-35	-13	38	-4	11
-25	-50	24	-19	100	-13	3	-15	8	3
56	-40	-56	-35	-13	100	-16	5	-11	7
-13	-7	-2	-13	3	-16	100	-25	-19	9
14	6	-10	38	-15	5	-25	100	3	36
-2	-19	1	-4	8	-11	-19	3	100	-3
-1	-27	7	11	3	7	9	36	-3	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	48	-75	-19	13	43
48	100	-18	-21	27	74
-75	-18	100	29	11	-20
-19	-21	29	100	-32	-18
13	27	11	-32	100	20
43	74	-20	-18	20	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-76	-38	-9	-33
-76	100	40	-28	19
-38	40	100	-22	-3
-9	-28	-22	100	-11
-33	19	-3	-11	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-70	38	-73	-7	-0	38
-70	100	-5	31	-10	14	-11
38	-5	100	-19	-21	26	74
-73	31	-19	100	25	15	-22
-7	-10	-21	25	100	-33	-17
-0	14	26	15	-33	100	18
38	-11	74	-22	-17	18	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	22	-70	-40	51	-29	-38	19	-45	-39
22	100	-40	-19	0	2	-8	5	34	-4
[illegible]	[illegible]	100	14	-39	20	15	-35	-0	26
[illegible]	[illegible]	14	100	-31	52	13	1	6	20

51	0	-39	-31	100	-36	-35	17	-38	-18
-29	2	20	52	-36	100	14	30	12	8
-38	-8	15	13	-35	14	100	-11	9	23
19	5	-35	1	17	30	-11	100	0	-16
-45	34	-0	8	-38	12	9	0	100	39
-39	-4	26	20	-18	8	23	-16	39	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	67	32	-14	23
67	100	21	-11	16
32	21	100	23	32
-14	-11	23	100	-30
23	16	32	-30	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-47	-4	-21	7	-7	-19	8	45	-73	34	-11
-47	100	-36	44	-3	25	-3	4	-73	6	9	-2
-4	-36	100	-58	3	-24	3	-9	34	25	-29	14
-21	44	-58	100	-10	27	10	14	-53	-3	15	-9
7	-3	3	-10	100	-79	-15	-1	7	-10	11	-8
-7	25	-24	27	-79	100	23	9	-23	12	-14	16
-19	-3	3	10	-15	23	100	-21	-3	40	-35	25
8	4	-9	14	-1	9	-21	100	-8	4	2	-0
45	-73	34	-53	7	-23	-3	-8	100	-33	-16	22
-73	6	25	-3	-10	12	40	4	-33	100	-58	27
34	9	-29	15	11	-14	-35	2	-16	-58	100	-91
-11	-2	14	-9	-8	16	25	-0	22	27	-91	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	66	25	-12	24	8
66	100	22	-12	15	-8
25	22	100	12	23	-44
-12	-12	12	100	-27	19
24	15	23	-27	100	12
8	-8	-44	19	12	100

```
    SYSTEM OF EQUATIONS
   V( 5) = F( V( 8)  V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
   V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(24)  V(27)  V(30)  V(19) )
   V( 6) = F( V( 9)  V(13)  V(12)  V(37)  V(38.  V(58) )
   V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(19) )
   V( 7) = F( V( 9)  V(10)  V(13)  V(12)  V(37)  V(38)  V(58) )
   V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(29) )
   V(14) = F( V(13)  V(58)  V(12)  V(37)  V(38) )
   V(13) = F( V( 5)  V( 6)  V( 7)  V(58)  V(43)  V(32)  V(36)  V(37)  V(38)  V(31)  V(12)  V(63)  V(69) )
   V(17) = F( V(13)  V(12)  V(37)  V(38)  V(22) )

ENDOGENOUS VARIABLES
    5     6     7     8     9    10    13    14    17
FIRST STAGE R**2 S
 0.435 0.569 0.679 0.229 0.561 0.363 0.507 0.539 0.402
 EXOGENOUS VARIABLES
   35   12   37   38   58   56   22   20   24   27   30   19   29   43   32   36   31   63   69

SECOND STAGE BETAS AND TS

  -0.329   0.769   0.197   0.098   0.031  -0.051   0.150
   -3.74    6.82    1.60    1.19    0.74   -1.02    1.60
 R**2 =  0.3405     F =    32.310     STERR =    393.204512

  -0.433   0.337  -0.054  -0.097   0.271   0.090  -0.169   0.128   0.031
   -3.22    3.40   -0.83   -1.08    4.94    1.60   -2.89    2.85    0.62
 R**2 =  0.3957     F =    31.720     STERR =    377.264616

   0.866   0.560   0.320   0.020   0.011   0.446
    8.69    5.23    4.57    0.56    0.26    5.58
 R**2 =  0.4792     F =    67.318     STERR =    416.509466

   0.561   0.111  -0.099   0.326  -0.010
    5.74    1.15   -1.22    5.56   -0.29
 R**2 =  0.5032     F =    89.141     STERR =    406.322087

   0.889  -0.219   0.850   0.514   0.079  -0.017   0.588
    7.59   -2.08    7.65    6.43    2.22   -0.41    6.25
 R**2 =  0.5381     F =    72.896     STERR =     73.873412

   0.248  -0.304   0.248   0.591   0.049   0.067  -0.028   0.062  -0.089
    1.93   -3.72    1.97    9.85    1.09    1.40   -0.84    1.49   -2.06
 R**2 =  0.6532     F =    91.244     STERR =     64.158161

  -0.137  -0.014   0.144   0.037   0.595
   -1.36   -0.18    2.40    1.04   15.87
 R**2 =  0.4812     F =    81.629     STERR =     42.617930

  -0.559   0.356   0.178  -0.747  -0.117   0.111   0.235   0.012   0.030   0.013  -0.467  -0.072   0.100
   -3.54    1.75    1.19  -18.29   -2.87    1.95    3.99    0.32    0.71    0.20   -4.16   -0.57    0.84
 R**2 =  0.4916     F =    32.129     STERR =     15.446643

   0.088   0.319   0.048   0.377  -0.080
    1.47    5.81    1.14    8.35   -1.45
 R**2 =  0.2706     F =    32.653     STERR =     70.675183
```



```
SECOND STAGE BS AND CONSTANTS
 [illegible]+04  3.021E+03  4.439E+00  1.703E+01  8.119E-02 -8.096E-01  2.886E-01  9.551E+03
 [illegible]+04  1.326E+03 -1.359E+02 -4.177E-02  1.290E-01  4.786E+02 -1.411E+03  3.536E+02  9.369E+00  1.116E+04
 [illegible]+03  1.503E+01  6.631E-01  6.388E-02  2.136E-01  1.024E+00 -1.997E+03
```

2.633E+03	3.021E+01	-1.295E+04	1.681E-01	-3.525E+00	-6.977E+02				
7.847E+02	-1.128E+01	4.294E+00	2.006E+01	4.672E-02	-6.114E-02	2.541E-01	-1.170E+02		
1.276E+01	-7.496E+03	2.185E+02	5.727E-02	5.782E+01	1.265E+02	-1.760E+01	4.236E+00	-2.370E+02	1.998E+02
-3.778E-01	-3.197E-03	3.058E+00	1.184E-02	1.156E+00	9.989E+01				
-2.485E-02	1.326E-02	3.518E-02	-6.383E-02	-1.064E+01	2.452E+01	5.798E+01	1.434E-03	2.109E-02	4.926E+00
-3.608E+00	-6.480E-02	5.730E-03	2.619E+02						
3.392E-01	9.504E+00	2.143E-02	1.023E+00	-5.933E-03	2.523E+02				

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	-9	22	29	20	9	27
-9	100	30	-51	-19	-53	29
22	30	100	47	9	-18	89
29	-51	47	100	23	10	51
20	-19	9	23	100	-6	8
9	-53	-18	10	-6	100	-22
27	29	89	51	8	-22	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-38	70	75	20	-37	6	-9	-25
-38	100	-49	-42	-56	-8	35	-34	-10
70	-49	100	71	29	-21	-10	-4	-15
75	-42	71	100	4	-30	28	-12	-10
20	-56	29	4	100	-12	-17	18	3
-37	-8	-21	-30	-12	100	-35	-8	52
6	35	-10	28	-17	-35	100	-14	13
-9	-34	-4	-12	18	-8	-14	100	8
-25	-10	-15	-10	3	52	13	8	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	33	-51	-18	-52	33
33	100	44	5	-21	88
-51	44	100	18	7	46
-18	5	18	100	-8	2
-52	-21	7	-8	100	-25
33	88	46	2	-25	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-80	-18	-77	-6
-80	100	2	58	0
-18	2	100	41	-7
-77	58	41	100	2
-6	0	-7	2	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-60	-1	-68	4	-48	-15
-60	100	42	57	-30	11	60
-1	42	100	56	-8	-14	89
-68	57	56	100	-3	12	65
4	-30	-8	-3	100	-11	-16
-48	11	-14	12	-11	100	-13
-15	60	89	65	-16	-13	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	36	-89	64	-34	-43	-17	-44	-70
36	100	-37	59	-42	1	-14	-35	-46
-89	-37	100	-67	19	51	-1	32	67
64	59	-67	100	-40	7	-17	-26	-48
-34	-42	19	-40	100	-19	-2	59	33
[illegible]	1	51	7	-19	100	-4	29	26
[illegible]	-14	-1	-17	-2	-4	100	13	[illegible]

-44	-35	32	-26	59	29	13	100	37
-70	-46	67	-48	33	26	13	37	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	87	75	12	-4
87	100	78	9	-10
75	78	100	11	-27
12	9	11	100	-21
-4	-10	-27	-21	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-58	22	14	36	-34	-11	-33	-4	43	-52	15	-5
-58	100	-79	-22	-13	28	27	20	-17	-17	18	-25	21
22	-79	100	14	13	-21	-35	-18	-0	14	-35	22	-12
14	-22	14	100	-3	-23	-9	-8	-9	-2	13	9	-9
36	-13	13	-3	100	-15	-13	-13	-3	26	-31	6	-1
-34	28	-21	-23	-15	100	-51	15	1	-6	14	6	-10
-11	27	-35	-9	-13	-51	100	13	13	-11	28	-23	14
-33	20	-18	-8	-13	15	13	100	-7	-18	30	-2	-4
-4	-17	-0	-9	-3	1	13	-7	100	-8	16	2	-7
43	-17	14	-2	26	-6	-11	-18	-8	100	-63	-17	16
-52	18	-35	13	-31	14	28	30	16	-63	100	-12	-12
15	-25	22	9	6	6	-23	-2	2	-17	-12	100	-91
-5	21	-12	-9	-1	-10	14	-4	-7	16	-12	-91	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	14	7	7	7
14	100	8	-13	-59
7	8	100	-18	-5
7	-13	-18	100	-20
7	-59	-5	-20	100

```
 SYSTEM OF EQUATIONS
  V( 5) = F( V( 6)  V( 9)  V(13)  V(12)  V(37)  V(38)  V(56) )
  V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
  V( 6) = F( V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
  V( 6) = F( V( 9)  V(10)  V( 5)  V(22)  V(19) )
  V( 7) = F( V( 9)  V(10)  V(13)  V(12)  V(37)  V(38)  V(58) )
  V( 7) = F( V(10)  V( 3)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(18)  V(27) )
  V(14) = F( V(13)  V(58)  V(12)  V(37)  V(38) )
  V(13) = F( V( 5)  V( 6)  V( 7)  V(58)  V(43)  V(32)  V(36)  V(37)  V(35)  V(31)  V(12)  V(63)  V(69) )
  V(17) = F( V(13)  V(58)  V(12)  V(37)  V(38)  V(22) )
ENDOGENOUS VARIABLES
    5     6     7     8     9    10    13    14    17
FIRST STAGE R**2 S
 0.584 0.148 0.711 0.710 0.494 0.343 0.495 0.497 0.744
 EXOGENOUS VARIABLES
   35   12   37   38   58   56   22   20   18   24   27   30   19   29   43   32   36   31   63   69

SECOND STAGE BETAS AND TS

  -0.074    0.974    0.167    0.033   -0.079   -0.055    0.102
   -0.94     9.29     2.39     0.31    -2.20    -1.60     2.29
 R**2 =   0.4826       F =     79.152      STERR =     413.621502

   0.059    0.457    0.010    0.250    0.064    0.203   -0.022   -0.015    0.087    0.029
    1.43     6.06     0.27     6.10     1.24     4.94    -0.66    -0.40     2.70     0.85
 R**2 =   0.5585       F =     74.761      STERR =     383.052259

   0.525    0.060   -0.039   -0.022    0.005    0.046
    5.01     0.67    -0.56    -0.50     0.10     0.80
 R**2 =   0.1064       F =     11.607      STERR =     259.145689

   0.414    0.076   -0.004   -0.003    0.001
    3.82     0.63    -0.07    -0.07     0.01
 R**2 =   0.1059       F =     14.114      STERR =     257.004709

   0.694    0.495    0.133    0.060   -0.097   -0.038    0.088
    7.19     6.50     1.97     0.59    -3.24    -1.25     2.31
 R**2 =   0.6166       F =    136.468      STERR =     49.673702

   0.159    0.097    0.527    0.284    0.004   -0.025    0.050   -0.002    0.198    0.051
    1.62     1.76     6.97     7.99     0.11    -0.74     1.70    -0.08     4.88     1.82
 R**2 =   0.67         F =    125.115      STERR =     40.970672

  -0.187   -0.153    0.535    0.424    0.074
   -2.78    -3.38    13.31    10.97     2.40
 R**2 =   0.3209       F =     56.315      STERR =     44.796540

   0.077    0.365   -0.121   -0.402   -0.357    0.058    0.317    0.082   -0.165   -0.191    0.206    0.023   -0.009
    0.18     1.53    -0.35    -9.65    -7.46     0.88     4.20     2.14    -4.25    -2.29     1.58     0.11    -0.05
 R**2 =   0.4655       F =     42.696      STERR =     11.925245

   0.452    0.239    0.649    0.242    0.201    0.036
    6.16     6.40    23.20     7.51     0.22     1.33
 R**2 =   0.5963       F =    119.403      STERR =     77.704794

SECOND STAGE RS AND CONSTANTS
 -6.229E+03  5.028E+03  5.800E+00  7.232E+00 -2.434E+00 -6.609E-01  5.212E-01  7.253E+03
 [illegible]+03  2.362E+03  2.375E+03  1.904E-01  3.906E-02  1.422E+02 -1.962E+02 -1.364E+02  2.625E+02  2.371E+02
 [illegible]+03
```

```
 1.293E+01  9.890E-01 -4.067E+00 -3.270E-01  2.640E-02  1.127E-01  1.111E+03
 1.019E+03  2.337E+01 -1.460E+02 -1.202E-03  2.505E+00  1.114E+03
 4.498E+02  1.925E+01  4.950E-01  1.290E+00 -3.720E-01 -5.710E-02  5.039E-02 -2.599E+01
 1.264E+01  1.024E+03  1.416E+02  2.718E-02  1.903E+00 -2.793E+01  1.099E+01 -2.400E+00  1.743E+01  9.561E+0
-1.793E+02
-6.108E-01 -7.340E-02  1.049E+01  1.230E+00  1.079E-01  4.942E+01
 2.225E-03  2.078E-02 -2.778E-02 -5.384E-02 -1.703E+01  6.695E+00  5.444E+01  7.230E-02 -5.074E-02 -4.555E+0
 1.249E+00  9.152E-03 -1.247E-04  2.714E+00
 3.154E+00  2.441E-01  3.698E+01  1.493E+00  4.045E-01  8.317E-03 -2.472E+02
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	65	-27	-87	-29	1	-17
65	100	18	-85	-33	11	22
-27	18	100	14	-12	26	75
-87	-85	14	100	39	5	5
-29	-33	-12	39	100	-31	-12
1	11	26	5	-31	100	20
-17	22	75	5	-12	20	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-19	-5	-4	-20	43	-14	11	-3	1
-19	100	7	-1	-44	-43	-7	4	-19	-27
-5	7	100	-13	48	4	-1	13	12	1
-4	-1	-13	100	-36	-13	-13	45	-7	8
-20	-44	48	-36	100	2	3	-5	13	2
43	-43	4	-13	2	100	-21	-8	-12	13
-14	-7	-1	-13	3	-21	100	-26	-19	9
11	4	13	45	-5	-8	-26	100	5	37
-3	-19	12	-7	13	-12	-19	5	100	-3
1	-27	1	8	2	13	9	37	-3	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	48	-75	-19	13	43
48	100	-18	-21	27	74
-75	-18	100	29	11	-20
-19	-21	29	100	-32	-18
13	27	11	-32	100	20
43	74	-20	-18	20	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-76	-38	-9	-33
-76	100	40	-28	19
-38	40	100	-22	-3
-9	-28	-22	100	-11
-33	19	-3	-11	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-70	38	-73	-7	-8	38
-70	100	-5	31	-10	14	-11
38	-5	100	-19	-21	26	74
-73	31	-19	100	25	15	-22
-7	-10	-21	25	100	-33	-17
-8	14	26	15	-33	100	18
38	-11	74	-22	-17	18	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	22	-70	-60	51	-29	-38	19	-45	-39
22	100	-40	-19	0	2	-8	5	34	-4
[illegible]	40	100	14	-39	20	15	-35	-8	26
[illegible]	-19	14	100	-31	52	13	1	8	20

51	0	-33	-31	100	-36	-35	17	-38	-16
-23	2	20	52	-36	100	14	30	12	6
-38	-8	15	13	-35	14	100	-11	7	23
19	5	-35	1	17	30	-11	100	0	-16
-45	34	-0	8	-38	12	7	0	100	39
-39	-4	20	20	-16	6	23	-15	39	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	67	32	-14	23
67	100	21	-11	16
32	21	100	23	32
-14	-11	23	100	-30
23	16	32	-30	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-46	-47	18	-4	50	-55	-9	2	16	-32	45	-39
-46	100	36	-40	41	-21	40	-1	4	-70	11	-6	12
-47	36	100	-19	-1	-51	56	5	0	-5	15	-38	37
18	-40	-19	100	-57	12	-30	2	-9	35	22	-19	6
-4	41	-1	-57	100	-8	22	10	14	-53	-3	14	-9
50	-21	-51	12	-3	100	-84	-15	-1	9	-16	28	-26
-55	40	56	-30	22	-84	100	22	8	-22	18	-32	33
-9	-1	5	2	10	-16	22	100	-21	-3	40	-35	25
2	4	0	-9	14	-1	8	-21	100	-8	4	2	-0
16	-70	-5	35	-53	9	-22	-3	-8	100	-34	-13	18
-32	11	15	22	-3	-16	18	40	4	-34	100	-59	30
45	-6	-38	-19	14	28	-32	-35	2	-13	-59	100	-93
-39	12	37	6	-9	-26	33	25	-0	10	30	-93	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	66	25	-12	24	5
66	100	22	-12	15	-8
25	22	100	12	23	-44
-12	-12	12	100	-27	19
24	15	23	-27	100	12
5	-8	-44	19	12	100

```
SYSTEM OF EQUATIONS
V( 5) = F( V( 6)  V( 7)  V(13)  V(12)  V(37)  V(38)  V(56) )
V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
V( 6) = F( V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(19) )
V( 7) = F( V( 9)  V(10)  V(13)  V(12)  V(37)  V(38)  V(56) )
V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(18)  V(29) )
V(14) = F( V(13)  V(58)  V(12)  V(37)  V(38) )
V(13) = F( V( 5)  V( 6)  V( 7)  V(35)  V(43)  V(32)  V(36)  V(37)  V(38)  V(31)  V(12)  V(63)  V(69) )
V(17) = F( V(13)  V(56)  V(12)  V(37)  V(38)  V(22) )
ENDOGENOUS VARIABLES
   5     6     7     8     9    10    13    14    17
FIRST STAGE R**2 S
0.461 0.505 0.708 0.303 0.569 0.393 0.510 0.544 0.417
EXOGENOUS VARIABLES
 35  12  37  38  58  56  22  20  18  24  27  30  19  29  43  32  36  31  63  69

SECOND STAGE BETAS AND TS

 -0.286   0.730   0.211   0.127   0.038  -0.041   0.161
 -3.92    7.11    1.75    1.71    0.94   -0.86    1.77
R**2 =  0.3647    F =   35.927    STERR =   385.917425

 -0.476   0.372  -0.046   0.084   0.266  -0.054   0.103  -0.174   0.132   0.033
 -1.53    1.03   -0.88   -1.21    4.20   -0.22    1.19   -2.85    2.84    0.64
R**2 =  0.4212    F =   31.652    STERR =   369.648740

  0.878   0.560   0.314   0.019   0.009   0.447
  9.70    5.31    4.75    0.55    0.20    5.67
R**2 =  0.4949    F =   71.699    STERR =   410.162192

  0.557   0.108  -0.085   0.331  -0.010
  5.85    1.15   -1.31    5.97   -0.30
R**2 =  0.5190    F =   94.952    STERR =   399.810594

  0.970  -0.183   0.866   0.476   0.057  -0.039   0.612
  8.70   -1.78    7.98    6.16    1.74   -0.97    6.66
R**2 =  0.5577    F =   78.948    STERR =   72.276530

  0.314  -0.906   0.561   0.560   0.175  -0.002   0.010   0.088  -0.499  -0.096
  2.56   -4.79    3.79   10.36    3.11   -0.03    0.28    2.20   -3.35   -2.41
R**2 =  0.6898    F =   96.743    STERR =   60.775403

 -0.165  -0.032   0.131   0.036   0.536
 -1.66   -0.43    2.21    1.01   15.90
R**2 =  0.4823    F =   81.974    STERR =   42.574580

 -0.616   0.397   0.142  -0.768  -0.125   0.120   0.241   0.019   0.035  -0.002  -0.424  -0.080   0.097
 -4.26    2.00    0.53  -18.36   -3.16    2.13    4.12    0.51    0.84   -0.03   -4.18   -0.63    0.82
R**2 =  0.4932    F =   32.337    STERR =   15.421961

 -0.107  -0.134   0.172   0.039   0.377  -0.022
 -3.83   -1.81    1.75    0.51    8.39   -0.34
R**2 =  0.2772    F =   20.065    STERR =   70.435055

SECOND STAGE RS AND CONSTANTS
 -3.141E+04   2.869E+03   4.742E+00   2.210E+01   9.918E-02  -6.535E-01   3.107E-01   9.325E+03
 -5.230E+04   1.403E+03  -1.167E+02  -1.734E-02   1.266E-01  -2.863E+01   5.430E+02  -1.458E+03   3.634E+02   9.866E+00
       +04
```

4.118E+01 1.503E+01 [illegible] 6.03?E-0? 1.609E-01 1.025E+00 -2.?0?E+03
2.013E+05 2.953E+01 -1.115E+06 1.703E-01 -1.500E+00 -7.775E+02
8.554E+02 -7.391E+00 4.376E+00 1.957E+03 3.701E-02 -1.391E-01 2.042E-01 -1.502E+02
1.617E+01 -2.213E+04 4.772E+02 5.625E-02 2.073E+02 -3.205E+00 5.890E+00 5.995E+00 -5.893E+01 -2.564E+02
1.144E+01
-4.550E-01 -7.468E-03 2.773E+00 1.147E-02 1.157E+00 1.075E+02
-2.737E-02 1.476E-02 2.388E-02 -6.372E-02 -1.139E+01 2.037E+01 5.950E+01 2.227E-03 2.473E-02 -8.097E-01
-3.273E+00 -7.198E-02 5.563E-03 2.032E+02
-4.141E-01 -6.051E-02 5.311E+00 1.723E-02 1.024E+00 -1.504E-03 3.218E+02

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	14	19	11	13	-3	24
14	100	37	-43	-14	-49	37
19	37	100	47	7	-21	65
11	-43	47	100	16	1	50
13	-14	7	16	100	-10	6
-3	-49	-21	1	-10	100	-25
24	37	65	50	6	-25	100

CORRELATION AMONG BETAS FOR EQUATION 2

100	-89	24	36	56	96	-80	39	-34	-34
-89	100	-19	-25	-69	-91	67	-21	16	19
24	-19	100	57	19	10	-14	-4	-10	-12
36	-25	57	100	-1	21	-30	43	-23	-8
56	-69	19	-1	100	59	-49	9	-4	-11
96	-91	10	21	59	100	-78	36	-31	-28
-80	67	-14	-30	-49	-78	100	-50	19	52
39	-21	-4	43	9	36	-50	100	-24	1
-34	16	-10	-23	-4	-31	19	-24	100	17
-34	19	-12	-8	-11	-28	52	1	17	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	36	-45	-15	-49	35
36	100	46	5	-21	68
-45	46	100	17	2	49
-15	5	17	100	-10	3
-49	-21	2	-10	100	-25
35	68	49	3	-25	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-63	-11	-77	-7
-63	100	8	62	-0
-11	8	100	32	-8
-77	62	32	100	3
-7	-0	-8	3	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-65	-2	-66	7	-46	-17
-65	100	42	60	-29	14	60
-2	42	100	56	-8	-13	89
-66	60	56	100	-5	10	67
7	-29	-8	-5	100	-13	-15
-46	14	-13	10	-13	100	-12
-17	60	89	67	-15	-12	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	-4	-58	60	-13	-45	-30	-39	-16	-69
-4	100	-67	12	-73	40	-37	-24	91	-8
-58	-67	100	-60	51	11	20	15	-63	46
60	12	-60	100	-36	14	-23	-26	16	-92

-13	-71	51	-38	100	-41	21	55	-67	19
-45	40	11	14	-41	100	-17	15	41	27
-10	-37	20	-23	21	-17	100	19	-33	11
-39	-29	35	-26	55	15	19	100	-19	34
-16	94	-63	16	-67	41	-33	-19	100	0
-69	-8	40	-42	19	27	11	34	0	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	86	74	11	-4
86	100	78	9	-10
74	78	100	11	-27
11	9	11	100	-21
-4	-10	-27	-21	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-55	13	13	30	-30	-7	-28	2	37	-42	14	-7
-55	100	-77	-22	-8	25	26	17	-21	-12	10	-25	22
13	-77	100	14	7	-17	-33	-14	3	8	-27	20	-13
13	-22	14	100	-4	-23	-8	-8	-6	-3	15	9	-9
30	-8	7	-4	100	-12	-10	-9	-0	21	-24	5	-2
-30	25	-17	-23	-12	100	-54	12	-1	-2	8	8	-10
-7	26	-33	-8	-10	-54	100	11	12	-8	20	-23	14
-28	17	-14	-8	-9	12	11	100	-10	-14	25	-1	-4
2	-21	3	-8	-0	-1	12	-10	100	-5	11	3	-7
37	-12	8	-3	21	-2	-8	-14	-5	100	-60	-19	16
-42	10	-27	15	-24	8	20	25	11	-60	100	-10	-12
14	-25	20	9	5	8	-23	-1	3	-19	-10	100	-91
-7	22	-13	-9	-2	-10	14	-4	-7	16	-12	-91	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	89	77	15	3	-42
89	100	83	13	0	-50
77	83	100	15	-7	-70
15	13	15	100	-18	-11
3	0	-7	-18	100	-17
-42	-50	-70	-11	-17	100

```
 SYSTEM OF EQUATIONS
 V( 5) = F( V( 8)   V( 9)   V(13)   V(22)   V(37)   V(38)   V(58) )
 V( 5) = F( V( 8)   V( 9)   V( 8)   V(22)   V(20)   V(18)   V(24)   V(27)   V(30)   V(19) )
 V( 6) = F( V( 9)   V(13)   V(12)   V(37)   V(38)   V(56) )
 V( 8) = F( V( 9)   V(10)   V( 8)   V(22)   V(19) )
 V( 7) = F( V( 9)   V(10)   V(13)   V(12)   V(37)   V(38)   V(58) )
 V( 7) = F( V(10)   V( 5)   V( 9)   V(22)   V(24)   V(27)   V(30)   V(19)   V(18)   V(29) )
 V(14) = F( V(13)   V(59)   V(12)   V(37)   V(35) )
 V(13) = F( V( 5)   V( 6)   V( 7)   V(56)   V(43)   V(32)   V(36)   V(37)   V(36)   V(31)   V(12)   V(63)   V(69)
 V(17) = F( V(13)   V(58)   V(12)   V(37)   V(38)   V(22) )
 V(58) = F( V(13)   V( 9)   V(10)   V(12) )

ENDOGENOUS VARIABLES
    5     6     7     8     9    10    13    14    17    58
FIRST STAGE R**2 S
 0.55? 0.142 0.708 0.706 0.493 0.328 0.417 0.435 0.730 0.431
 EXOGENOUS VARIABLES
   35   12   37   38   56   22   20   18   24   27   30   19   29   43   32   36   31   63   69

SECOND STAGE BETAS AND TS

  -0.076    0.970    0.166    0.036   -0.079   -0.055    0.099
   -0.89     7.45     2.27     0.30    -2.10    -1.59     1.44
 R**2 =  0.4799      F =     78.285      STERR =    414.710645

   0.054    0.452    0.010    0.250    0.068    0.202   -0.021   -0.016    0.088    0.030
    1.30     5.99     0.27     6.10     1.31     4.70    -0.65    -0.42     2.71     0.88
 R**2 =  0.5571      F =     74.331      STERR =    383.068999

   0.439   -0.006   -0.002   -0.010   -0.005   -0.063
    1.05    -0.06    -0.02    -0.23    -0.11    -0.94
 R**2 =  0.1061      F =     11.772      STERR =    259.186615

   0.462   -0.002   -0.024    0.008   -0.003
    4.10    -0.01    -0.44     0.16    -0.07
 R**2 =  0.1037      F =     13.792      STERR =    259.317515

   0.719    0.617    0.212    0.013   -0.120   -0.016    0.283
    7.52     7.68     3.44     0.20    -4.01    -0.53     4.33
 R**2 =  0.6256      F =    141.618      STERR =    44.145353

   0.123    0.092    0.546    0.290   -0.002   -0.022    0.055   -0.004    0.205    0.055
    1.09     2.?6     6.73     7.86    -0.06    -0.63     1.79    -0.14     4.89     1.91
 R**2 =  0.6765      F =    123.600      STERR =    41.140219

  -0.247   -0.369    0.524    0.434    0.085
   -3.67    -5.87    13.26    11.42     2.21
 R**2 =  0.3453      F =     62.658      STERR =    43.986802

   0.082    0.347   -0.126   -0.375   -0.361    0.059    0.315    0.082   -0.146   -0.190    0.210    0.017   -0.006
    0.18     1.42    -0.33    -3.10    -4.27     0.81     3.48     1.99    -3.90    -2.10     1.36     0.07    -0.03
 R**2 =  0.4073      F =     31.088      STERR =    12.799328

   0.417    0.099    0.?30    0.253    0.198    0.081
    7.39     1.85    22.36     7.61     6.11     2.22
 R**2 =  0.5426      F =    117.653      STERR =    78.017790

  -0.717   -0.495   -0.213    0.215
     .95    -3.79    -1.92     3.45
      =  0.2297      F =     44.502      STERR =    98.908687
```

SECOND STAGE BS AND CONSTANTS

-6.385E+03 5.009E+01 5.760E+00 7.900E+00 -2.417E+00 -6.713E-01 5.062E-01 7.270E+03
4.534E+03 2.334E+03 2.370E+03 1.900E-01 4.217E-02 1.415E+02 -1.803E+02 -1.441E+02 2.646E+02 2.444E+0
5.194E+03
1.081E+03 -9.802E-02 -1.037E-01 -1.515E-01 -2.073E-02 -2.023E-01 .345E+03
1.139E+03 -5.998E-01 -9.666E+02 2.902E-03 -1.196E+01 1.256E+03
4.658E+02 4.895E+01 9.248E-01 3.670E-01 -1.034E-01 -2.441E-02 1.800E-01 -1.677E+02
9.771E+00 9.734E+02 3.536E+02 2.775E-02 -2.379E+00 -2.422E+01 2.004E+01 -4.157E+00 1.798E+01 1.030E+0
-1.711E+02
-8.138E-01 -1.774E-01 1.077E+01 1.205E+00 9.765E-02 1.062E+02
2.345E-03 2.089E-02 -2.697E-02 -5.795E-02 -3.802E+01 8.817E+00 5.406E+01 7.221E-02 -5.088E-02 -4.537E+0
1.311E+00 6.692E-03 -6.996E-05 2.673E+00
2.912E+00 1.016E-01 3.616E+01 1.566E+00 4.610E-01 1.243E-02 -1.998E+02
-4.496E+00 -5.022E+02 -2.049E+01 9.154E+00 9.350E+02

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	71	-13	-89	-36	5	19
71	100	30	-88	-40	15	52
-13	30	100	-0	-18	28	68
-89	-88	-0	100	45	-1	-32
-36	-40	-18	45	100	-32	-27
5	15	28	-1	-32	100	22
19	52	68	-32	-27	22	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-18	-5	-4	-21	49	-14	11	-3	1
-18	100	7	-1	-44	-43	-7	8	-19	-28
-5	7	100	-13	47	4	-1	13	12	1
-4	-1	-13	100	-36	-13	-13	45	-7	8
-21	-44	47	-36	100	2	3	-5	13	2
49	-43	4	-13	2	100	-21	-0	-12	13
-14	-7	-1	-13	3	-21	100	-26	-19	9
11	8	13	45	-5	-0	-26	100	5	37
-3	-19	12	-7	13	-12	-19	5	100	-3
1	-28	1	8	2	13	9	37	-3	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	56	-77	-23	16	56
56	100	-26	-24	29	72
-77	-26	100	32	8	-33
-23	-24	32	100	-33	-22
16	29	8	-33	100	21
56	72	-33	-22	21	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-78	-42	-4	-34
-78	100	45	-31	20
-42	45	100	-25	-1
-4	-31	-25	100	-12
-34	20	-1	-12	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-64	37	-72	-8	1	29
-64	100	9	23	-15	19	20
37	9	100	-23	-25	30	72
-72	23	-23	100	27	12	-27
-8	-15	-25	27	100	-35	-24
[illegible]	9	30	12	-35	100	24
[illegible]	0	72	-27	-24	24	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	29	-74	-46	56	-32	-43	21	-49	-43
29	100	-44	-23	5	-1	-12	7	28	-8
-74	-44	100	21	-45	24	21	-36	7	31
-46	-23	21	100	-35	54	16	-2	13	24
56	5	-45	-35	100	-38	-38	17	-42	-22
-32	-1	24	54	-38	100	17	20	15	10
-43	-12	21	16	-38	17	100	-13	13	26
21	7	-36	-2	17	20	-13	100	-2	-17
-49	28	7	13	-42	15	13	-2	100	42
-43	-8	31	24	-22	10	26	-17	42	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	60	32	-15	24
60	100	17	-12	15
32	19	100	23	32
-15	-12	23	100	-30
24	15	32	-30	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-43	96	21	-15	52	-56	-11	-1	18	-22	13	-13
-43	100	31	-1	14	-17	29	-3	1	-67	15	-11	14
-96	31	100	-30	19	-53	60	7	5	-9	2	-23	29
21	-1	-30	100	-80	23	-51	-7	-21	20	46	-45	24
-15	14	19	-80	100	-21	47	12	24	-44	-34	41	-24
52	-17	-53	23	-21	100	-83	-17	-5	12	-5	17	-20
-56	29	60	-51	47	-83	100	23	15	-26	-4	-7	18
-11	-3	7	-7	12	-17	23	100	-19	-4	33	-28	22
-1	1	5	-21	24	-5	15	-19	100	-11	-5	10	-5
18	-67	-9	20	-44	12	-26	-4	-11	100	-24	-18	21
-22	15	2	46	-34	-5	-4	33	-5	-24	100	-66	36
13	-11	-23	-45	41	17	-7	-28	10	-18	-66	100	-92
-13	14	29	24	-24	-20	18	22	-5	21	36	-92	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	57	27	-13	24	4
57	100	26	-15	12	-20
27	26	100	11	23	-45
-13	-15	11	100	-27	20
24	12	23	-27	100	11
4	-20	-45	20	11	100

CORRELATIONS AMONG BETAS FOR EQUATION 10

100	20	-12	-8
20	100	-75	-73
-12	-75	100	32
-8	-73	32	100

```
SYSTEM OF EQUATIONS
V( 5) = F( V( 6)  V( 8)  V(13)  V(12)  V(37)  V(38)  V(35) )
V( 5) = F( V( 6)  V( 7)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
V( 8) = F( V( 5))  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(17) )
V( 7) = F( V( 8)  V(10)  V(13)  V(12)  V(37)  V(38)  V(56) )
V( 7) = F( V(10)  V( 5)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(18)  V(29) )
V(14) = F( V(13)  V(53)  V(12)  V(37)  V(38) )
V(13) = F( V( 5)  V( 6)  V( 7)  V(38)  V(43)  V(32)  V(36)  V(37)  V(38)  V(31)  V(12)  V(63)  V(69) )
V(17) = F( V(13)  V(54)  V(12)  V(37)  V(36)  V(22) )
V(58) = F( V(13)  V(12) )
```

ENDOGENOUS VARIABLES

```
   5     6     7     8     9    10    13    14    17    58
FIRST STAGE R**2 S
 0.459 0.585 0.704 0.303 0.506 0.362 0.193 0.535 0.417 0.375
 EXOGENOUS VARIABLES
  35    12    37    38    56    22    20    18    24    27    30    19    29    43    32    36    31    63    69

SECOND STAGE BETAS AND TS

 -0.266    0.709    0.150    0.167    0.036   -0.049    0.248
  -3.48     6.85     1.19     2.12     0.91    -1.03     2.33
R**2 =   0.3664      F =     36.187     STERR =     305.409965

 -0.426    0.331   -0.045   -0.065    0.274   -0.018    0.093   -0.172    0.131    0.031
  -1.35     1.43    -0.85    -1.16     4.28    -0.06     1.06    -2.41     2.82     0.61
R**2 =   0.4203      F =     31.543     STERR =     369.915832

  0.864    0.523    0.333    0.018    0.004    0.469
   7.43     4.67     4.83     0.50     0.10     5.44
R**2 =   0.4959      F =     71.935     STERR =     409.754231

  0.525    0.151   -0.083    0.365   -0.010
   5.21     1.45    -1.27     6.03    -0.30
R**2 =   0.5200      F =     95.317     STERR =     399.416045

  0.671   -0.120    0.754    0.579    0.054   -0.051    0.605
   7.72    -1.17     6.00     7.14     1.56    -1.29     7.81
R**2 =   0.5687      F =     62.583     STERR =     71.365061

  0.365   -0.921    0.537    0.572    0.174   -0.012    0.008    0.082   -0.520   -0.107
   2.12    -4.75     3.32     9.32     3.07    -0.21     0.25     1.91    -3.29    -2.23
R**2 =   0.6658      F =     54.961     STERR =     61.135138

 -0.117   -0.105    0.108    0.040    0.608
  -1.11    -1.18     1.74     1.12    15.40
R**2 =   0.4764      F =     60.063     STERR =     42.815944

 -0.566    0.367    0.200   -0.067   -0.111    0.143    0.239    0.018    0.046    0.021   -0.521   -0.089    0.118
  -3.13     1.94     1.03    -0.06    -2.09     1.07     3.21     0.39     0.64     0.25    -3.09    -0.55     0.77
R**2 =   0.1775      F =      7.171     STERR =     19.046678

 -0.058   -0.578   -0.001    0.043    0.402    0.132
  -0.46    -4.24    -0.72     1.03     9.09     1.33
R**2 =   0.3053      F =     32.157     STERR =     69.053186

   .53   -0.511
   .17   -11.05
     =    0.2197      F =     62.377     STERR =     221.014976
```

SECOND STAGE BETAS AND CONSTANTS

```
-2.357E+04  2.705E+03  3.338E+00  2.532E+01  [illegible]  -7.331E-01  4.709E-01  9.152E+03
-4.704E+04  1.302E+03 -1.125E+02 -1.033E-02  1.300E-01  -7.490E+00  4.908E+02 -1.442E+03  3.006E+02  9.413E
 1.116E+04
 4.051E+03  1.400E+01  [illegible]  5.319E-02  [illegible]  1.122E+00 -2.019E+03
 2.460E+01  4.140E-01 -1.037E+04  1.778E-01 -3.078E+00 -5.002E+02
 7.600E+02 -6.179E+00  3.810E+00  2.230E+01  3.157E-02 -1.027E-01  3.475E-01 -2.001E+02
 1.878E+01 -2.271E+01  4.762E+02  5.318E-02  2.006E+02 -2.220E+01  5.217E+00  5.381E+00 -6.139E+01 -2.866E
 1.178E+03
-3.215E-01 -2.477E-02  2.213E+00  1.243E-02  1.100E+00  1.143E+02
-2.004E-02  1.360E-02  3.265E-02 -7.411E-02 -1.003E+01  3.147E+01  5.901E+01  2.153E-03  3.248E-02  8.208E
-4.019E+00 -7.949E-02  6.750E-03  2.722E+02
-2.243E-01 -1.907E-01 -2.925E+00  1.917E-02  1.072E+00  9.796E-03  3.540E+02
-7.634E+00 -4.032E+01  1.262E+03
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	11	11	17	12	-5	32
11	100	39	-45	-13	-47	25
11	39	100	32	8	-17	56
17	-45	32	100	16	-2	57
12	-13	8	16	100	-10	4
-5	-47	-17	-2	-10	100	-27
32	25	56	57	4	-27	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-90	24	36	57	90	-81	39	-34	-34
-90	100	-19	-26	-70	-93	68	-21	16	19
24	-19	100	57	19	10	-15	-4	-10	-12
36	-26	57	100	-0	21	-30	43	-23	-8
57	-70	19	-0	100	55	-30	3	-4	-11
90	-93	10	21	55	100	-78	36	-31	-28
-81	68	-15	-30	-50	-78	100	-50	20	52
39	-21	-4	43	9	36	-50	100	-24	0
-34	16	-10	-23	-4	-31	20	-24	100	17
-34	19	-12	-8	-11	-28	52	0	17	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	39	-47	-15	-47	23
39	100	31	6	-16	56
-47	31	100	14	-1	55
-15	6	14	100	-9	-0
-47	-16	-1	-9	100	-27
23	56	55	-0	-27	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-85	-11	-78	-6
-85	100	8	65	-0
-11	8	100	32	-3
-78	65	32	100	3
-6	-0	-3	3	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-66	4	-69	7	-43	-25
-66	100	36	61	-30	12	59
4	36	100	45	-5	-11	64
-69	61	45	100	-8	7	71
7	-30	-5	-8	100	-13	-18
-43	12	-11	7	-13	100	-14
[illegible]	59	64	71	-18	-14	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	-16	-65	70	-12	-53	-11	-50	-33	-80
-16	100	-53	19	-71	43	-35	-21	54	4
-65	-53	100	-67	45	23	22	43	-43	57
70	19	-67	100	-35	-9	-26	-37	-1	-57
-12	-71	45	-35	100	-16	21	53	-62	17
-53	43	23	-9	-16	100	-12	30	43	44
-11	-35	22	-26	21	-12	100	20	-23	13
-50	-21	43	-37	53	30	20	100	-6	45
-33	54	-43	-1	-62	43	-23	-6	100	22
-80	4	57	-57	17	44	13	45	22	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	53	61	13	2
53	100	77	3	-19
61	77	100	8	-30
13	3	8	100	-17
2	-19	-30	-17	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-56	18	-12	44	-22	-8	-28	5	40	-41	12	-4
-56	100	-77	4	-12	19	26	17	-23	-15	16	-24	19
18	-77	100	-27	17	-4	-32	-14	11	18	-41	17	-7
-12	4	-27	100	-10	-39	-8	-2	-24	-30	04	9	-17
44	-12	17	-10	100	-0	-11	-9	7	29	-37	3	3
-22	19	-4	-39	-0	100	-52	11	7	9	-16	5	-4
-8	26	-32	-8	-11	-52	100	12	11	-9	22	-22	13
-28	17	-14	-2	-9	11	12	100	-10	-14	28	-0	-4
5	-23	11	-24	7	7	11	-10	100	2	-6	1	-3
40	-15	18	-30	29	9	-9	-14	2	100	-63	-20	20
-41	16	-41	04	-37	-16	22	28	-6	-63	100	-4	-13
12	-24	17	9	3	5	-22	-8	1	-20	-4	100	-91
-4	19	-7	-17	3	-4	13	-4	-3	20	-13	-91	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	58	61	15	4	-31
55	100	88	8	-9	-66
61	88	100	12	-13	-76
15	8	12	100	-13	-8
4	-9	-13	-18	100	-8
-31	-66	-76	-8	-8	100

CORRELATIONS AMONG BETAS FOR EQUATION 10

100	43
43	100

FULL SYSTEM + AID EQUATION, USING V1, V41 - OHIO

```
 SYSTEM OF EQUATIONS
 V( 5) = F( V( 6)  V( 7)  V(41)  V( 1)  V(37)  V(36)  V(38) )
 V( 5) = F( V( 8)  V( 7)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
 V( 6) = F( V( 9)  V(41)  V( 1)  V(37)  V(33)  V(56) )
 V( 6) - F( V( 7)  V(10)  V( 5)  V(22)  V(19) )
 V( 7) = F( V( 9)  V(10)  V(41)  V( 1)  V(37)  V(35)  V(55) )
 V( 7) = F( V(10)  V( 8)  V( 7)  V(22)  V(29)  V(27)  V(30)  V(19)  V(18)  V(23) )
 V(14) = F( V(41)  V(56)  V( 1)  V(37)  V(35) )
 V(41) = F( V( 5)  V( 6)  V( 7)  V(35)  V(43)  V(32)  V(36)  V(37)  V(38)  V(31)  V( 1)  V(63)  V(69) )
 V(17) = F( V(41)  V(56)  V( 1)  V(37)  V(35)  V(22) )
 V(58) = F( V(41)  V( 7)  V(10)  V( 1) )

ENDOGENOUS VARIABLES
    5    6    7    8    9   10   41   14   17   58
FIRST STAGE R**2 S
 0.548 0.142 0.714 0.729 0.5 3 0.314 0.557 0.510 0.796 0.392
 EXOGENOUS VARIABLES
  35    1   37   36   56   22   20   18   24   27   30   19   29   43   32   36   31   63   69

SECOND STAGE BETAS AND TS

  -0.370    0.269    0.702    0.469  -0.043  -0.018    0.036
   -6.87    3.01     7.64     6.03   -1.57   -0.56     0.64
 R**2 =  0.5399      F =     99.592     STERR =     390.022956

   0.062    3.466    7.0      0.250    0.659    0.203   -0.021  -0.014    0.000    0.027
    1.55     6.41    0.26      6.13     1.17     4.95    -0.71   -0.38     2.60     0.81
 R**2 =  0.5033      F =     76.228     STERR =     360.971416

   0.410    0.057  -0.042  -0.004  -0.006  -0.150
    3.82     0.36   -0.76   -0.10   -0.15   -1.37
 R**2 =  0.1086      F =     12.077     STERR =     258.331255

   0.441    0.019  -0.026   0.009    0.001
    3.90     0.13   -0.47    0.16     0.01
 R**2 =  0.1031      F =     13.702     STERR -     259.405676

   0.251    0.654    0.352   0.222  -0.048    0.006    0.134
    2.99     8.61     5.54    6.37   -3.17     0.20     2.74
 R**2 =  0.6536      F =    100.066     STERR =     42.467292

   0.118    0.076    0.553    0.290  -0.003  -0.021    0.055  -0.005    0.205    0.056
    0.94     2.62     6.74     7.65   -0.10   -0.61     1.75   -0.19     4.74     1.90
 R**2 =  0.6427      F =    127.171     STERR =     40.743982

   0.661  -0.069    0.477    0.304    0.171
   14.42   -1.51    13.10    10.56     5.37
 R**2 =  0.4294      F =     69.718     STERR -     41.060007

   1.562  -0.942  -0.621    0.917  -0.336    0.105  -0.396  -0.052  -0.113    0.764  -0.260  -0.657    0.529
    1.68   -4.37   -1.61     0.55   -6.13     1.01   -4.55   -1.40   -3.29     8.52   -5.71   -3.43     3.22
 R**2 -  0.5246      F =     45.914     STERR =     3.461038

   0.354    0.435    0.910    0.098    0.205  -0.207
   14.90     9.10    20.66     3.50     7.37   -0.32
 R**2 =  0.6512      F =    155.126     STERR =     66.133387

   0.433  -0.156  -0.304  -0.179
    3.95   -1.26   -2.67   -3.53
 R**2 =  0.1436      F =     25.016     STERR -     104.291773
```

SECOND STAGE BS AND CONSTANTS

```
 -3.123E+04  1.800E+01  9.677E+01  1.573E-02 -1.301E+00 -2.186E-01  1.824E-01  7.339E+03
  5.271E+03  2.416E+03  2.122E+03  1.493E-01  3.079E-02  1.412E+02 -2.043E+02 -1.276E+02  2.593E+02  2.250E+02
  5.153E+03
  1.009E+03  3.124E+00 -9.450E-06 -6.327E-02 -3.762E-02 -3.653E-01  1.379E+03
  1.086E+03  5.600E+00 -1.047E+03  3.345E-03  2.022E+00  1.[illegible]E+03
  1.636E+02  5.143E+01  5.061E+00  2.934E-04 -3.391E-01  8.517E-03  3.547E-02 -1.662E+02
  9.393E+00  9.917E+02  3.565E+02  2.766E-02 -3.935E+00 -2.334E+01  2.000E+01 -5.648E+00  1.801E+01  1.041E+02
 -1.697E+02
  7.428E+00 -4.271E-02  1.455E-03  1.052E+00  2.196E-01 -1.570E+02
  1.356E-02 -1.714E-02 -4.249E-02  4.059E-02 -1.699E+01  4.737E+00 -2.031E+01 -1.399E-02 -1.190E-02  5.508E+01
 -7.835E-05 -7.967E-02  2.340E-03 -5.532E+01
  1.975E+01  4.450E-01  5.840E-03  6.053E-01  5.015E-01 -4.392E-02 -2.254E+02
  9.805E+00 -1.540E+02 -3.709E+01 -1.132E-03  5.458E+02
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	50	-58	-76	1	-3	-19
50	100	-86	-70	-3	-11	14
-58	-86	100	69	13	21	-19
-76	-70	69	100	1	18	28
1	-3	13	1	100	-29	-10
-3	-11	21	18	-29	100	1
-19	14	-19	28	-10	1	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-23	-5	-4	-18	50	-13	10	-2	2
-23	100	7	-0	-42	-44	-6	7	-18	-27
-5	7	100	-13	48	4	-1	13	12	1
-4	-0	-13	100	-16	-13	-13	45	-7	8
-18	-42	48	-16	100	2	2	-4	12	1
50	-44	4	-13	2	100	-21	0	-12	13
-13	-6	-1	-13	2	-21	100	-25	-20	9
10	7	13	45	-4	0	-25	100	5	37
-2	-18	12	-7	12	-12	-20	5	100	-3
2	-27	1	8	1	13	9	37	-3	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	-81	-56	-4	-11	27
-81	100	47	17	24	-37
-56	47	100	3	24	22
-4	17	3	100	-29	-10
-11	24	24	-29	100	1
27	-37	22	-10	1	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-79	-46	0	-32
-79	100	49	-35	19
-46	49	100	-26	0
0	-35	-26	100	-13
-32	19	0	-13	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-61	-66	-53	9	-18	6
-61	100	3	15	-20	16	22
-66	3	100	47	16	24	-35
-53	15	47	100	-8	26	25
9	-20	16	-8	100	-31	-14
[illegible]	[illegible]	24	26	-31	100	4
[illegible]	[illegible]	-35	25	-14	4	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	33	-76	-52	60	-35	-43	21	-55	-44
33	100	-49	-26	10	-4	-15	8	22	-12
-76	-49	100	28	-44	27	27	-35	15	35
-52	-26	28	100	-40	50	23	-3	20	28
60	10	-44	-40	100	-40	-43	17	-46	-20
-35	-4	27	50	-40	100	20	27	10	13
-43	-15	27	23	-43	20	100	-16	19	30
21	8	-35	-3	17	27	-16	100	-3	-16
-55	22	15	20	-46	10	19	-3	100	45
-44	-12	35	28	-20	13	30	-16	45	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	-26	2	23	25
-26	100	47	-9	4
2	47	100	1	21
23	-9	1	100	-10
25	4	21	-10	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-40	-98	23	-26	51	-55	-6	-7	8	-24	29	-32
-40	100	31	-8	19	-17	29	-7	3	-58	3	-2	9
-98	31	100	-26	23	-51	58	9	9	-7	15	-28	32
23	-8	-26	100	-84	28	-60	-14	-27	60	32	-43	26
-26	19	23	-84	100	-28	59	35	32	-61	4	30	-16
51	-17	-51	28	-28	100	-62	-19	-9	14	-4	13	-16
-55	29	58	-60	59	-62	100	33	22	-37	-1	-1	13
-6	-7	9	-14	35	-19	33	100	-12	-6	-2	-1	7
-7	3	9	-27	32	-9	22	-12	100	-17	6	9	-3
8	-58	-7	60	-61	14	-37	-6	-17	100	31	-57	43
-24	3	15	32	4	-4	-1	-2	6	31	100	-46	38
29	-2	-24	-43	30	13	-1	-1	9	-57	-46	100	-96
-32	9	32	26	-10	-16	13	7	-3	43	38	-96	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	5	35	-6	20	-76
5	100	53	-15	5	-27
35	53	100	-16	21	-44
-6	-15	-16	100	-10	26
20	5	21	-10	100	-4
-76	-27	-44	26	-4	100

CORRELATIONS AMONG BETAS FOR EQUATION 10

100	-70	12	57
-70	100	-63	-56
12	-63	100	9
57	-56	9	100

```
SYSTEM OF EQUATIONS
V( 5) = F( V( 6)  V( 7)  V(41)  V( 1)  V(37)  V(33)  V(53) )
V( 5) = F( V( 9)  V( 7)  V(41)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
V( 6) = F( V( 9)  V(41)  V( 1)  V(37)  V(33)  V(58) )
V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(19) )
V( 7) = F( V( 9)  V(10)  V(41)  V( 1)  V(37)  V(38)  V(50) )
V( 7) = F( V(10)  V( 5)  V( 9)  V(22)  V(20)  V(27)  V(30)  V(19)  V(18)  V(27) )
V(14) = F( V(41)  V(33)  V( 1)  V(37)  V(35) )
V(41) = F( V( 5)  V( 5)  V( 7)  V(18)  V(43)  V(32)  V(36)  V(37)  V(18)  V(31)  V( 1)  V(63)  V(69) )
V(17) = F( V(41)  V(53)  V( 1)  V(37)  V(38)  V(22) )
V(58) = F( V(41)  V( 1) )

ENDOGENOUS VARIABLES
    5    6    7    8    9    10    41    14    17    58
FIRST STAGE R**2 S
 0.458 0.584 0.707 0.316 0.590 0.386 0.529 0.591 0.692 0.665
 EXOGENOUS VARIABLES
   35   1   37   34   50   22   20   18   24   27   30   19   29   43   32   36   31   63   69

SECOND STAGE BETAS AND TS

  -0.385    0.853    0.092    1.053   -0.011   -0.209    1.260
   -5.30     7.40     0.92     7.26    -0.23    -4.10     6.90
 R**2 =   0.4269      F =    46.232      STERR =     307.167905

   0.307   -0.117   -0.013   -0.022    0.355    0.538   -0.073   -0.115    0.092   -0.010
    1.06    -0.61    -0.24    -0.30     5.55     2.31    -0.90    -1.93     2.02    -0.21
 R**2 =   0.4200      F =    31.495      STERR =     370.014561

   0.579    0.440    0.327    0.005   -0.026    0.345
    5.64     4.02     2.43     0.13    -0.55     2.00
 R**2 =   0.4861      F =    68.162      STERR =     414.531256

   0.552    0.109   -0.102    0.330   -0.009
    5.59     1.13    -1.61     5.27    -0.26
 R**2 =   0.5172      F =    94.277      STERR =     400.555062

   0.500   -0.200    0.068    0.372    0.031   -0.034    0.379
    3.15    -1.75     5.66     3.06     1.40    -1.63     2.39
 R**2 =   0.5316      F =    71.578      STERR =     74.2 9082

   0.536   -0.790    0.165    0.630    0.129   -0.025   -0.010    0.066   -0.461   -0.150
    1.50    -4.24     2.61    11.50     2.45    -0.44    -0.25     1.21    -2.91    -3.40
 R**2 =   0.6660      F =    75.022      STERR =     61.121603

   0.240   -0.177    0.03     0.043    0.568
    3.96    -1.11     0.27     1.23    12.60
 R**2 =   0.4923      F =    65.510      STERR =     92.138612

  -0.100    0.364    0.466    1.361   -0.066   -0.077   -0.07    -0.047   -0.062    0.505    0.698   -0.322    0.263
   -2.06     1.90     3.96     6.47    -1.72    -1.26    -1.30    -1.29    -1.46     0.49     3.12    -2.50     2.17
 R**2 =   0.5124      F =    14.917      STERR =     3.467551

   0.184    0.324    0.750    0.03     0.262   -0.090
    3.32     1.71     4.01     0.       5.15    -1.25
 R**2 =   0.6116      F =    51.163      STERR =     61.549999

  -0.061   -0.776
    -4     -24.93
          0.5878      F =    315.602      STERR =     160.646772
```

SECOND STAGE B'S AND CONSTANTS

```
-4.231E+04  3.152E+01  9.021E+00  3.240E-02 -2.593E-02 -1.313E+00  2.492E+00  7.336E+01
 1.375E+04 -5.593E+02 -3.712E+01 -9.319E-01  1.066E-01  2.820E+02 -3.015E+02 -9.303E+02  2.523E+02 -3.163E+00
 5.192E+03
 2.717E+03  5.121E+01  1.200E-02  1.570E-02 -1.768E-01  7.912E-01 -1.890E+03
 2.556E+03  2.760E+01 -1.343E+00  1.778E-01 -3.167E+00 -6.807E+02
 4.413E+02 -1.029E+01  1.094E+01  3.250E-01  2.994E-02 -3.003E-01  1.634E-01 -8.320E+01
 2.756E+01 -1.540E+00  1.220E+02  6.103E-02  1.534E+02 -4.610E+01 -5.973E+00  3.200E+00 -5.437E+01 -3.391E+02
 1.000E+03
 2.467E+00 -4.100E-02  1.136E-03  1.332E-02  1.109E+00  4.703E+01
-3.071E-01  1.129E-01  2.217E-02  2.053E-02 -1.379E+00 -3.912E+00 -4.198E+00 -1.256E-03 -1.320E-02  4.537E+01
 2.199E-04 -6.059E-02  3.405E-01  2.561E+01
  .925E+00  1.069E-01  3.950E-03  1.400E-02  7.109E-01 -6.600E-03  2.776E+01
-3.112E+00 -1.230E-02  9.267E+02
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	12	-3	-21	12	5	-9
12	100	-77	6	-19	-32	34
-3	-77	100	23	12	-11	-2
-21	6	23	100	-13	-44	92
12	-19	12	-13	100	-3	-17
5	-32	-11	-44	-3	100	-51
-9	34	-2	92	-17	-51	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-89	21	31	57	95	-77	32	-27	-28
-89	100	-17	-21	-70	-93	64	-15	9	14
21	-17	100	56	18	6	-11	-7	-3	-10
31	-21	55	100	-3	15	-25	40	-13	-4
57	-70	18	-3	100	59	-48	5	-8	-8
95	-93	6	15	59	100	-75	29	-26	-22
-77	64	-11	-25	-48	-75	100	-45	12	49
32	-15	-7	40	5	29	-45	100	-13	6
-27	9	-3	-13	-8	-26	12	-13	100	13
-28	14	-10	-4	-8	-22	49	6	13	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	-77	9	-20	-31	35
-77	100	23	13	-11	-3
9	23	100	-10	-46	93
-20	13	-10	100	-4	-16
-31	-11	-46	-4	100	-50
35	-1	93	-16	-50	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-84	-7	-77	-7
-84	100	2	63	1
-7	2	100	24	-6
-77	63	24	100	3
-7	1	-6	3	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-79	-69	-4	13	-27	17
-79	100	67	12	-32	8	5
-69	67	100	25	-12	-2	2
-4	12	25	100	-14	-47	93
13	-32	-12	-14	100	-6	-17
-27	8	-2	-47	-6	100	-30
17	5	2	93	-17	-30	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	-38	-53	62	9	-62	-1	-39	-69	-75
-38	100	-46	5	-67	50	-29	-9	95	21
-53	-46	100	-56	37	22	11	30	-41	45
62	5	-56	100	-22	-5	-15	-24	-11	-47
9	-67	37	-22	100	-44	13	[illegible]	-61	1
-62	50	22	-5	-44	100	-15	2	52	94
-1	-29	11	-15	13	-15	100	12	-26	1
-39	-9	30	-24	[illegible]	2	12	100	1	35
-69	95	-41	-11	-61	52	-26	1	100	34
-75	21	45	-47	1	94	1	35	34	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	41	46	-4	-53
41	100	96	-10	-44
46	96	100	-9	-44
-4	-10	-9	100	-11
-53	-44	-44	-11	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-53	-12	-37	25	-10	11	-14	32	-11	-46	21	-25
-53	100	-72	5	-6	20	23	14	-22	-1	11	-27	25
-12	-72	100	28	-4	-24	-32	-11	-13	5	24	11	-8
-37	5	28	100	-13	-44	-21	-17	-69	58	96	-22	29
25	-6	-4	-13	100	-3	-1	-2	11	-1	-13	6	-5
-10	20	-24	-44	-3	100	-42	17	27	-21	-39	16	-19
11	23	-32	21	-1	-42	100	9	20	-3	-10	-10	11
-14	14	-11	-17	-2	17	9	100	1	-8	-14	5	-5
32	-22	-13	-69	11	27	20	1	100	-38	-68	19	-25
-11	-1	5	58	-1	-21	-3	-8	-38	100	57	-38	26
-46	11	24	96	-13	-39	-10	-14	-68	57	100	-25	31
21	-27	11	-22	6	16	-10	5	19	-38	-25	100	-94
-25	25	-8	29	-5	-19	11	-5	-25	26	31	-94	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	55	62	-4	-55	-41
55	100	97	-10	-50	-41
62	97	100	-9	-54	-40
-4	-10	-9	100	-10	1
-55	-50	-54	-10	100	29
-41	-41	-40	1	29	100

CORRELATIONS AMONG BETAS FOR EQUATION 10

100	18
18	100

```
SYSTEM OF EQUATIONS
  V( 5) = F( V( 8)  V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
  V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
  V( 6) = F( V( 9)  V(13)  V(37)  V(38)  V(58) )
  V( 6) = F( V( 9)  V( 8)  V(22)  V(19) )
  V( 7)   F( V(10)  V(13)  V(12)  V(37)  V(38)  V(58) )
  V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(30)  V(19)  V(18)  V(29) )
  V(14) = F( V(13)  V(12)  V(37)  V(38) )
  V(13) = F( V( 6)  V(58)  V(43)  V(36)  V(37)  V(38)  V(12)  V(63)  V(69) )
  V(17) = F( V(13)  V(58)  V(12)  V(37)  V(38)  V(22) )

ENDOGENOUS VARIABLES
   5    6    7    8    9   10   13   14   17
FIRST STAGE R**2 S
 0.583 0.135 0.711 0.709 0.479 0.337 0.492 0.480 0.739
EXOGENOUS VARIABLES
  35  12  37  38  58  56  22  20  18  24  27  30  19  29  43  36  63  69

SECOND STAGE BETAS AND TS

   0.029   1.171   0.370  -0.145  -0.100  -0.051   0.111
    0.35   10.23    2.46   -1.26   -2.80   -1.49    2.51
 R**2 =  0.4976     F =    84.054     STERR =    407.575271

   0.051   0.514   0.0[illegible]   0.250   0.048   0.189  -0.023  -0.013   0.083   0.022
    1.25    6.45    0.33    6.12    0.92    4.56   -0.73   -0.35    2.56    0.65
 R**2 =  0.5615     F =    75.681     STERR =    381.743086

   0.465   0.052  -0.[illegible]   [illegible].005   0.040
    6.57    0.60   -0.39    0.11    0.70
 R**2 =  0.0965     F =    12.738     STERR =    260.351450

   0.442  -0.017   0.013  -0.000
    6.12   -0.35    0.27   -0.01
 R**2 =  0.0959     F =    15.826     STERR =    260.230179

   0.903  -0.047   0.290  -0.08   -0.036  -0.019
   15.92   -0.85    8.45   -2.73   -1.16   -0.51
 R**2 =  0.5885     F =   141.814     STERR =    46.245494

   0.095   0.084   0.611   0.296  -0.013   0.054  -0.008   0.194   0.057
    0.94    2.36    7.59    9.76   -0.42    1.83   -0.28    4.80    2.03
 R**2 =  0.6840     F =   142.383     STERR =    40.627060

  -0.047   0.561   0.410   0.113
   -0.93   14.15   10.60    2.91
 R**2 =  0.3084     F =    66.555     STERR =    45.168105

   0.209  -0.380  -0.408   0.359   0.082  -0.154   0.085  -0.123   0.152
    1.27  -10.05  -10.05    9.51    2.22   -4.56    0.90   -0.74    1.06
 R**2 =  0.4611     F =    60.986     STERR =    11.935925

   0.448   0.237   0.849   0.243   0.200   0.054
    8.03    6.33   23.14    7.53    6.20    1.52
 R**2 =  0.5449     F =   118.733     STERR =    77.824216

SECOND STAGE BS AND CONSTANTS
  2.451E+03  6.046E+03  5.915E+00 -3.146E+01 -3.090E+00 -6.160E-01  5.651E-01  6.775E+03
  4.310E+03  2.652E+03  [illegible]E+03  1.903E-01  2.977E-02  1.323E+02 -2.089E+02 -1.180E+02  2.493E+02  1.805E+02
  [illegible]E+03
```

1.146E+03 8.666E-01 -2.502E-01 2.958E-02 3.646E-02 1.144E+03
1.090E+03 -6.874E+02 4.651E-03 -1.243E+00 1.234E+03
7.160E+01 -2.061E-01 7.909E+00 -3.238E-01 -5.486E-02 -1.184E-02 -8.446E+01
7.536E+00 8.844E+02 3.958E+02 2.825E-02 -1.426E+01 2.026E+01 -6.373E+00 1.704E+01 1.069E+02 -1.620E+02
-1.555E-01 1.153E+01 1.196E+00 1.302E-01 -7.266E+00
1.261E-02 -5.570E-02 -4.299E+01 6.167E+01 7.281E-02 -5.380E-02 5.326E-01 -4.935E-02 2.229E-03 3.082E+01
3.127E+00 2.423E-01 3.695E+01 1.500E+00 4.872E-01 8.286E-03 -2.449E+02

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	70	-26	-88	-32	1	-16
70	100	15	-87	-36	11	20
-26	15	100	15	-11	26	75
-88	-87	15	100	41	4	4
-32	-36	-11	41	100	-31	-12
1	11	26	4	-31	100	20
-16	20	75	4	-12	20	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-20	-5	-4	-19	50	-13	10	-2	1
-20	100	8	-1	-46	-45	-7	8	-20	-29
-5	8	100	-13	47	3	-1	13	12	1
-4	-1	-13	100	-35	-13	-13	45	-7	8
-19	-46	47	-35	100	5	3	-5	14	4
50	-45	3	-13	5	100	-20	-8	-11	14
-13	-7	-1	-13	3	-20	100	-26	-19	9
10	8	13	45	-5	-8	-26	100	5	36
-2	-20	12	-7	14	-11	-19	5	100	-2
1	-29	1	8	4	14	9	36	-2	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	53	5	33	44
53	100	-17	30	73
5	-17	100	-37	-13
33	30	-37	100	23
44	73	-13	23	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-12	-49	-30
-12	100	-12	-12
-49	-12	100	-5
-30	-12	-5	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	32	-41	-20	19	24
32	100	14	-19	28	69
-41	14	100	29	21	9
-20	-19	29	100	-33	-15
19	28	21	-33	100	20
24	69	9	-15	20	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	28	-72	-32	49	-37	34	-44	-41
28	100	-45	-25	4	-10	8	32	-7
-72	-45	100	6	-39	15	-48	-1	28
-32	-25	6	100	-16	8	-19	4	20
49	4	-39	-16	100	-33	34	-37	-18
-37	-10	15	8	-33	100	-17	9	23
34	8	-48	-19	34	-17	100	-4	-21
[illegible]	32	-1	4	-37	9	-4	100	39
[illegible]	-7	28	20	-18	23	-21	39	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	24	-9	17
24	100	26	30
-9	26	100	-29
17	30	-29	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-28	13	34	-15	-1	-70	8	20
-28	100	-51	-29	1	-4	39	-18	0
13	-51	100	21	9	11	-33	8	4
34	-29	21	100	19	9	0	-19	27
-15	1	9	19	100	-19	39	-30	21
-1	-4	11	9	-19	100	14	-6	5
-70	39	-33	0	39	14	100	-53	22
8	-18	8	-19	-30	-6	-53	100	-92
20	0	4	27	21	5	22	-92	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	66	25	-12	24	8
66	100	23	-12	15	-8
25	23	100	12	23	-44
-12	-12	12	100	-27	19
24	15	23	-27	100	12
8	-8	-44	19	12	100

REGRESSION FOR T_2 - MICHIGAN

SYSTEM OF EQUATIONS

```
V( 5) = F( V( 8)  V( 9)  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 5) = F( V( 8)  V( 9)  V(20)  V(24)  V(27)  V(30)  V(19) )
V( 6) = F( V( [illegible])  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 6) = F( V( 9)  V( 8)  V(22)  V(19) )
V( 7) = F( V( 9)  V(10)  V(13)  V(12)  V(37)  V(38)  V(58) )
V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(29) )
V(14) = F( V(13)  V(12)  V(37)  V(38) )
V(13) = F( V( 5)  V( 6)  V( 7)  V(58)  V(43)  V(32)  V(36)  V(37)  V(35)  V(31)  V(12)  V(63)  V(69) )
V(17) = F( V(13)  V(12)  V(37)  V(38)  V(22) )
```

ENDOGENOUS VARIABLES

```
 5     6     7     8     9     10    13    14    17
```

FIRST STAGE R**2 S

```
0.417 0.569 0.674 0.211 0.553 0.355 0.501 0.537 0.393
```

EXOGENOUS VARIABLES

```
35  12  37  38  58  20  24  27  30  19  22  29  43  32  36  31  63  69
```

SECOND STAGE BETAS AND TS

```
 -0.284   0.737   0.236   0.135   0.038  -0.043   0.178
 -2.93    6.28    1.82    1.51    0.90   -0.85    1.82
R**2 =  0.3238    F =    29.963    STERR =    398.160233

 -0.269   0.252   0.292   0.070  -0.166   0.131   0.022
 -3.05    2.84    5.60    1.28   -3.25    2.88    0.43
R**2 =  0.3806    F =    38.451    STERR =    381.066510

  0.885   0.541   0.302   0.018   0.007   0.435
  8.75    5.00    4.19    0.50    0.16    5.40
R**2 =  0.4605    F =    67.680    STERR =    415.[illegible]73205

  0.688  -0.177   0.256  -0.009
 11.49   -2.04    5.17   -0.27
R**2 =  0.5080    F =   113.856    STERR =    403.885102

  0.846  -0.218   0.891   0.555   0.084  -0.008   0.614
  7.14   -2.07    7.95    6.80    2.36   -0.19    6.49
R**2 =  0.5397    F =    73.358    STERR =    73.747567

  0.242  -0.326   0.262   0.581   0.052   0.068  -0.029   0.065  -0.084
  1.86   -3.64    2.04    9.32    1.14    1.40   -0.85    1.53   -1.91
R**2 =  0.6487    F =    89.447    STERR =    64.574907

 -0.115   0.153   0.038   0.595
 -2.27    4.10    1.07   15.95
R**2 =  0.4804    F     101.949    STERR =    42.601577

 -0.460   0.244   0.238  -0.742  -0.107   0.097   0.226   0.003   0.023   0.031  -0.511  -0.054   0.092
 -1.95    0.87    1.30  -17.72   -2.42    1.55    3.67    0.07    0.68    0.43   -3.75   -0.40    0.77
R**2 =  0.4859    F -    31.413    STERR =    15.532025

  0.073   0.318   0.047   0.376  -0.081
  1.22    5.77    1.12    8.32   -1.46
R**2 =  0.2695    F =    32.468    STERR =    70.729577
```

SECOND STAGE BS AND CONSTANTS

```
-3.125E+04  2.896E+03  5.317E+00  2.346E+01  1.007E-01 -6.843E-01  3.432E-01  9.255E+03
[illegible]E+04  9.921E+02  1.369E-01  3.682E+02 -1.[illegible]E+03  3.592E+02  6.[illegible]9E+00  1.021E+04
[illegible]E+03  1.453E+01  6.250E+01  5.602E-02  1.352E-01  9.984E-01 -1.955E+03
```

3.226E+03	-2.317E+04	1.319E-01	-3.277E+00	6.049E+01					
7.460E+02	-1.121E+01	4.502E+00	2.165E+01	4.961E-02	-2.867E-02	2.651E-01	-1.349E+02		
1.242E+01	-8.036E+03	2.315E+02	5.633E-02	6.152E+01	1.276E+02	-1.767E+01	4.394E+00	-2.247E+02	2.219E+02
-3.178E-01	3.260E+00	1.213E-02	1.155E+00	9.360E+01					
-2.042E-02	9.102E-03	4.709E-02	-6.342E-02	-9.751E+00	2.139E+01	5.566E+01	3.608E-04	2.045E-02	1.200E 01
-3.945E+00	-4.796E-02	5.297E-03	2.240E+02						
2.829E-01	9.448E+00	2.109E-02	1.021E+00	-6.000E-03	2.560E+02				

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	-17	30	39	24	13	34
-17	100	22	-55	-22	-54	22
30	22	100	52	13	-14	89
39	-55	52	100	27	14	55
24	-22	13	27	100	-4	11
13	-54	-14	14	-4	100	-17
34	22	89	55	11	-17	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-7	18	-24	-12	0	-25
-7	100	-57	-24	49	-44	-19
18	-57	100	-12	-5	19	8
-24	-24	-12	100	-31	-13	52
-12	49	-5	-31	100	-10	12
0	-44	19	-13	-10	100	8
-25	-19	8	52	12	8	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	29	-53	-19	-53	30
29	100	46	6	-19	88
-53	46	100	19	9	48
-19	6	19	100	-7	3
-53	-19	9	-7	100	-24
30	88	48	3	-24	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-34	-66	-10
-34	100	54	-7
-66	54	100	3
-10	-7	3	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-59	-3	-69	4	-49	-16
-59	100	41	56	-30	11	60
-3	41	100	58	-7	-12	89
-69	56	58	100	-2	14	65
4	-30	-7	-2	100	-10	-16
-49	11	-12	14	-10	100	-12
-16	60	89	65	-16	-12	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	36	-89	63	-34	-43	-16	-45	-70
36	100	-40	63	-43	0	-12	-36	-48
-89	-40	100	-69	20	50	-2	33	68
63	63	-69	100	-41	6	-16	-27	-50
-34	-43	20	-41	100	-19	-2	59	34
-43	0	50	6	-19	100	-4	29	26
-16	-12	-2	-16	-2	-4	100	13	12
-45	-36	33	-27	59	29	13	100	38
-70	[illegible]	68	-50	34	26	12	38	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	22	8	8
22	100	6	-30
8	6	100	-20
8	-30	-20	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-79	54	24	51	-50	-27	-49	-5	59	-70	28	-12
-79	100	-86	-29	-35	46	37	40	-10	-41	50	-35	22
54	-86	100	22	32	-38	-43	-36	-2	36	-56	31	-16
24	-29	22	100	4	-28	-13	-15	-9	7	-1	14	-11
51	-35	32	4	100	-28	-21	-26	-4	38	-45	15	-6
-50	46	-38	-28	-28	100	-35	28	3	-22	33	-4	-5
-27	37	-43	-13	-21	-35	100	22	14	-21	38	-28	16
-49	40	-36	-15	-26	28	22	100	-5	-32	44	-11	1
-5	-10	-2	-9	-4	3	14	-5	100	-9	15	1	-7
59	-41	36	7	38	-22	-21	-32	-9	100	-72	-4	10
-70	50	-56	-1	-45	33	38	44	15	-72	100	-23	-3
28	-35	31	14	15	-4	-28	-11	1	-4	-23	100	-90
-12	22	-16	-11	-6	-5	16	1	-7	10	-3	-90	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	14	7	7	7
14	100	8	-12	-59
7	8	100	-18	-5
7	-12	-18	100	-20
7	-59	-5	-20	100

REGRESSION FOR T_3 1810

SYSTEM OF EQUATIONS

```
V( 5) = F( V( 8)  V( 9)  V(41)  V( 1)  V(37)  V(38)  V(58) )
V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(18)  V(24)  V(27)  V(30)  V(19) )
V( 6) = F( V( 9)  V(41)  V( 1)  V(37)  V(38)  V(58) )
V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(19) )
V( 7) = F( V( 9)  V(10)  V(41)  V( 1)  V(37)  V(38)  V(58) )
V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(18)  V(29) )
V(14) = F( V(41)  V(58)  V( 1)  V(37)  V(38) )
V(41) = F( V( 5)  V( 6)  V(58)  V(43)  V(32)  V(36)  V(37)  V(38)  V(31)  V(12)  V(63)  V(69) )
V(17) = F( V(41)  V(58)  V( 1)  V(37)  V(38)  V(22) )
```

ENDOGENOUS VARIABLES

```
    5     6     7     8     9    10    41    14    17
FIRST STAGE R**2 S
 0.594 0.149 0.719 0.734 0.507 0.344 0.586 0.513 0.810
 EXOGENOUS VARIABLES
   35   1   37   38   58   56   22   20   18   24   27   30   19   29   43   32   36   31   12   63
   69
```

SECOND STAGE BETAS AND TS

```
  -0.340    0.293    0.682    0.441   -0.046   -0.022   -0.044
   -6.57     3.32     7.08     7.92    -1.44    -0.68    -1.30
 R**2 =   0.5421       F =     100.464      STERR =     389.111300

   0.067    0.482    0.011    0.249    0.053    0.202   -0.024   -0.013    0.085    0.025
    1.67     6.70     0.29     6.15     1.05     4.76    -0.75    -0.34     2.65     0.76
 R**2 =   0.5670       F =      77.380      STERR =     379.359607

   0.425    0.034    0.000   -0.009    0.001    0.005
    3.97     0.33     0.01    -0.21     0.02     0.11
 R**2 =   0.1047       F =      11.599      STERR =     259.369738

   0.398    0.086   -0.008   -0.000    0.004
    3.74     0.70    -0.16    -0.00     0.09
 R**2 =   0.1053       F =      14.023      STERR =     259.093220

   0.334    0.500    0.370    0.177   -0.073   -0.010   -0.025
    4.00     7.25     5.76     5.33    -2.64    -0.37    -0.86
 R**2 =   0.6456       F =     154.585      STERR =      42.952328

   0.154    0.096    0.535    0.284    0.002   -0.024    0.050   -0.004    0.199    0.052
    1.59     2.57     7.33     6.60     0.06    -0.73     1.72    -0.13     4.97     1.87
 R**2 =   0.6875       F =     129.991      STERR =      40.439006

   0. 84   -0.103    0.473    0.365    0.191
   14.59    -2.98    14.21    10.61     5.39
 R**2 =   0.4321       F =      90.684      STERR =      40.965434

   0.605   -0.981    0.164   -0.022   -0.005   -0.093    0.035   -0.034    0.638    0.073    0.796    0.686
    5.95    -4.71     8.46    -0.46    -0.09    -1.49     0.93    -0.99     7.72     0.58    -4.23     4.55
 R**2 =   0.4900       F =      47.158      STERR =      1.581775

   0.745    0.102    0.779    0.129    0.188   -0.148
   12.97     3.85    27.31     4.50     6.52    -3.41
 R**2 =   0.6240       F =     164.555      STERR =      70.740822
```

SECOND STAGE BS AND CONSTANTS

```
 -2.[illegible]E+04  1.513E+01  7.856E+01  1.422E-02 -1.411E+00 -2.634E-01 -2.214E-01  7.534E+03
  5.[illegible]E+03  [illegible]E+03  2.490E+03  1.900E+01  1.282E-02  1.41[illegible]E+02 -2.142E+02 -1.164E+02  2.550E+02  2.089E+02
```

```
 5.134E+03
 1.048E+03  1.857E+00  5.790E-06 -1.341E-01  5.065E-03  1.299E-02  1.201E+03
 9.807E+02  2.594E+01 -3.113E+02 -6.892E-06  1.511E+01  1.096E+03
 2.166E+02  3.961E+01  5.341E+00  7.147E-04 -2.618E-01 -1.597E-02 -1.624E-02 -5.272E+01
 1.218E+01  1.042E+03  3.409E+02  2.713E-02  2.204E+00 -2.692E+01  1.900E+01 -3.946E+00  1.749E+01  9.690E+0
-1.778E+02
 7.456E+00 -4.946E-02  1.443E-03  1.004E+00  2.190E-01 -1.544E+02
 5.253E-03 -1.785E-02  1.51[illegible]E-02 -7.030E-01 -2.427E-01 -4.819E+00  9.415E-03 -3.553E-03  4.598E+01  1.376E-0
-9.675E-02  3.033E-03 -6.928E-01
 1.721E+01  1.106E-01  5.042E-03  7.993E-01  4.574E-01  2.266E-02 -1.452E+02
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	49	-58	-74	-8	-2	4
49	100	-86	-72	-4	-11	35
-58	-86	100	71	14	21	-42
-74	-72	71	100	4	17	-5
-8	-4	14	4	100	-29	-10
-2	-11	21	17	-29	100	-7
4	35	-42	-5	-10	-7	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-24	-5	-4	-18	50	-13	10	-2	2
-24	100	7	-8	-41	-44	-6	7	-18	-26
-5	7	100	-13	48	4	-1	13	12	1
-4	-8	-13	100	-37	-13	-13	45	-7	8
-18	-41	48	-37	100	2	2	-4	12	1
50	-44	4	-13	2	100	-21	0	-12	13
-13	-6	-1	-13	2	-21	100	-25	-20	9
10	7	13	45	-4	0	-25	100	5	37
-2	-18	12	-7	12	-12	-20	5	100	-3
2	-26	1	8	1	13	9	37	-3	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	-81	-61	-4	-12	38
-81	100	52	16	24	-49
-61	52	100	5	23	-3
-4	16	5	100	-29	-10
-12	24	23	-29	100	-7
38	-49	-3	-10	-7	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-76	-41	-7	-32
-76	100	42	-29	19
-41	42	100	-21	-2
-7	-29	-21	100	-12
-32	19	-2	-12	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-59	-69	-52	7	-16	35
-59	100	6	6	-17	12	-8
-69	6	100	52	15	25	-49
-52	6	52	100	4	24	-3
7	-17	15	4	100	-30	-8
-16	12	25	24	-30	100	-8
35	-8	-49	-3	-8	-8	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	[illegible]3	-70	-41	51	-28	-38	18	-45	-39
[illegible]	[illegible]0	-43	-19	1	2	-8	6	34	-5
[illegible]	[illegible]3	100	14	-38	20	15	-34	-1	25

-41	-19	14	100	-31	53	13	0	9	20
51	1	-38	-31	100	-35	-35	17	-38	-17
-28	2	20	53	-35	100	14	30	12	7
-38	-8	15	13	-35	14	100	-11	9	23
18	6	-34	0	17	30	-11	100	0	-15
-45	34	-1	9	-38	12	9	0	100	39
-39	-5	25	20	-17	7	23	-15	19	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	-34	6	23	26
-34	100	27	-9	-3
6	27	100	3	20
23	-9	3	100	-29
26	-3	20	-29	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-47	-3	-21	7	-7	-18	8	45	-71	32	-11
-47	100	-37	44	-3	25	-4	4	-73	5	10	-2
-3	-37	100	-58	3	-24	3	-9	35	25	-29	14
-21	44	-58	100	-10	27	10	14	-53	-4	15	-9
7	-3	3	-10	100	-79	-15	-1	7	-9	11	-8
-7	25	-24	27	-79	100	23	9	-23	13	-14	16
-18	-4	3	10	-15	23	100	-21	-3	40	-35	25
8	4	-9	14	-1	9	-21	100	-9	5	2	-0
45	-73	35	-53	7	-23	-3	-9	100	-33	-17	22
-71	5	25	-4	-9	13	40	5	-33	100	-57	26
32	10	-29	15	11	-14	-35	2	-17	-57	100	-92
-11	-2	14	-9	-8	16	25	-0	22	26	-92	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	-28	27	-2	16	-75
-28	100	23	-7	-3	7
27	23	100	-4	20	-31
-2	-7	-4	100	-29	23
18	-3	20	-29	100	-1
-75	7	-31	23	-1	100

```
SYSTEM OF EQUATIONS
V( 5) = F( V( 8)  V(35)  V(41)  V( 1)  V(37)  V(38)  V(58) )
V( 5) = F( V( 8)  V( 9)  V(56)  V(22)  V(20)  V(24)  V(27)  V(30)  V(19) )
V( 6) = F( V( 9)  V(41)  V( 1)  V(37)  V(38)  V(58) )
V( 6) = F( V( 9)  V(10)  V( 8)  V(22)  V(19) )
V( 7) = F( V( 9)  V(10)  V(41)  V( 1)  V(37)  V(38)  V(58) )
V( 7) = F( V(10)  V( 8)  V( 9)  V(22)  V(24)  V(27)  V(30)  V(19)  V(29) )
V(14) = F( V(41)  V(58)  V( 1)  V(37)  V(38) )
V(41) = F( V( 5)  V( 6)  V( 7)  V(58)  V(43)  V(32)  V(36)  V(37)  V(38)  V(31)  V(12)  V(63)  V(69) )
V(17) = F( V(41)  V( 1)  V(37)  V(38)  V(22) )

ENDOGENOUS VARIABLES
   5     6     7     8     9    10    41    14    17
FIRST STAGE R**2 S
 0.437 0.570 0.679 0.271 0.561 0.364 0.537 0.571 0.538
 EXOGENOUS VARIABLES
  35   1   37   38   58   56   22   20   24   27   30   19   29   43   32   36   31   12   63   69

SECOND STAGE BETAS AND TS

  -0.441    0.687    0.057    0.267    0.016   -0.065    0.190
  -4.98     5.47     0.48     3.51     0.44    -1.36     2.91
 R**2 =   0.3509     F =      33.725      STERR =    390.102883

  -0.239    0.296    0.010   -0.002    0.283    0.058   -0.160    0.120    0.011
  -2.18     3.01     0.16    -0.02     5.14     1.06    -2.73     2.65     0.22
 R**2 =   0.3684     F =      30.760      STERR =    379.545198

   0.445    0.484    0.069    0.021    0.034   -0.038
   3.96     4.61     1.06     0.59     0.79    -0.67
 R**2 =   0.4658     F =      63.780      STERR =    421.845364

   0.568    0.108   -0.132    0.317   -0.009
   5.81     1.12    -1.82     5.49    -0.25
 R**2 =   0.5035     F =      89.226      STERR =    406.223782

   0.163   -0.170    0.842    0.196    0.076    0.007   -0.102
   0.97    -1.45     6.42     3.03     2.08     0.18    -1.87
 R**2 =   0.5154     F =      66.561      STERR =    75.663661

   0.281   -0.249    0.217    0.615    0.035    0.068   -0.033    0.051   -0.103
   2.25    -3.55     1.75    10.75     0.80     1.41    -0.97     1.25    -2.45
 R**2 =   0.6519     F =      90.719      STERR =    64.279196

   0.307    0.260    0.385    0.033    0.514
   5.76     5.03     7.22     0.99    13.00
 R**2 =   0.5229     F =      96.432      STERR =    40.871837

  -0.376    0.499    0.141    0.291   -0.078    0.055    0.052    0.018    0.067    0.234    0.418   -0.319    0.115
  -2.50     2.59     0.97     7.27    -1.94     0.98     0.90     0.47     1.62     3.74     3.81    -2.55     0.99
 R**2 =   0.6080     F =      34.312      STERR =    3.503132

   0.328    0.489    0.039    0.296   -0.008
   3.49    12.10     1.05     6.79    -1.08
 R**2 =   0.4131     F =      61.946      STERR =    63.397046

SECOND STAGE HS AND CONSTANTS
 -4.841E+04  2.700E+03  5.523E+00  8.203E-03  4.719E-02 -1.035E+00  3.655E-01  1.012E+04
 [illegible]E+04  1.164E+03  2.458E+01 -8.293E-04  1.345E-01  3.092E+02 -1.338E+03  3.299E+02  3.287E+00  1.010E+04
 [illegible]E+03  5.633E+01  2.514E-03  6.671E-02  6.432E-01 -8.639E-02 -1.169E+03
```

2.662E+03	2.954E+01	-1.733E+04	1.632E-01	-3.060E+00	-4.862E+02				
1.438E+02	-8.723E+00	1.045E+01	1.352E-03	4.470E-02	2.622E-02	-4.426E-02	4.099E+01		
1.454E+01	-6.137E+03	1.917E+02	5.960E-02	4.128E+01	1.278E+02	-2.022E+01	3.497E+00	-2.741E+02	1.446E+0
3.671E+00	6.137E-02	1.451E-03	1.072E-02	9.974E-01	-5.937E+01				
-3.851E-03	4.283E-03	6.410E-03	5.740E-03	-1.628E+00	2.777E+00	2.976E+00	4.798E-04	1.096E-02	2.098E+0
7.442E-01	-6.591E-02	1.524E-03	4.173E+01						
5.488E+00	2.578E-03	1.762E-02	6.066E-01	-5.039E-03	1.287E+02				

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	-16	21	-34	19	14	-33
-16	100	-85	-39	-21	-26	24
21	-85	100	41	19	-3	-18
-34	-39	41	100	1	-14	61
19	-21	19	1	100	-8	-13
14	-26	-3	-14	-8	100	-21
-33	24	-18	61	-13	-21	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-36	63	68	19	-29	3	-6	-20
-36	100	-46	-39	-56	-12	36	-36	-14
63	-46	100	65	28	-13	-14	-1	-10
68	-39	65	100	0	-23	20	-10	-3
19	-56	28	0	100	-10	-17	19	5
-29	-12	-13	-23	-10	100	-34	-11	50
3	36	-14	20	-17	-34	100	-14	14
-6	-36	-1	-10	19	-11	-14	100	7
-20	-14	-10	-3	5	50	14	7	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	-84	-49	-19	-24	20
-84	100	52	16	-6	-12
-49	52	100	8	-10	56
-19	16	8	100	-12	-7
-24	-6	-10	-12	100	-17
20	-12	56	-7	-17	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-80	-16	-77	-6
-80	100	1	58	0
-16	1	100	38	-6
-77	58	38	100	3
-6	0	-6	3	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-77	-91	-52	13	-22	-6
-77	100	65	29	-32	9	23
-91	65	100	57	-10	1	6
-52	29	57	100	-2	-7	59
13	-32	-10	-2	100	-15	-14
-22	9	1	-7	-15	100	-15
-6	23	6	59	-14	-15	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	30	-83	61	-30	-44	-15	-42	-68
30	100	-32	53	-36	1	-11	-30	-40
-83	-32	100	-66	15	52	-3	30	65
61	53	-66	100	-35	7	-15	-21	-44
-30	-36	15	-35	100	-20	-4	56	29
-44	1	52	7	-20	100	-4	30	27
	-11	-3	-15	-4	-4	100	12	11

-42	-30	30	-21	50	30	12	100	34
-60	-40	65	-44	29	27	11	34	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	9	24	-1	-51
9	100	76	-3	-13
24	76	100	-1	-25
-1	-3	-1	100	-17
-51	-13	-25	-17	100

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	-55	19	12	35	-32	-10	-32	-5	42	-51	14	-4
-55	100	-78	-22	-11	26	27	19	-17	-15	16	-25	20
19	-78	100	13	12	-19	-34	-17	-1	13	-34	21	-11
12	-22	13	100	-4	-22	-8	-8	-9	-3	13	9	-9
35	-11	12	-4	100	-14	-12	-13	-4	25	-30	6	-1
-32	26	-19	-22	-14	100	-52	15	1	-5	13	7	-10
-10	27	-34	-8	-12	-52	100	13	14	-10	28	-23	13
-32	19	-17	-8	-13	15	13	100	-7	-17	29	-1	-4
-5	-17	-1	-9	-4	1	14	-7	100	-8	16	2	-7
42	-15	13	-3	25	-5	-10	-17	-8	100	-61	-17	17
-51	16	-34	13	-30	13	28	29	16	-61	100	-11	-12
14	-25	21	9	6	7	-23	-1	2	-17	-11	100	-91
-4	20	-11	-9	-1	-10	13	-4	-7	17	-12	-91	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	42	2	-38	-78
42	100	3	-25	-33
2	3	100	-18	-3
-38	-25	-18	100	9
-78	-33	-3	9	100

```
SYSTEM OF EQUATIONS
  V( 5) = F( V( 8)   V( 9)   V(11)   V(52)   V(12)   V(37)   V(38)   V(58) )
  V( 5) = F( V( 8)   V( 9)   V(52)   V(56)   V(22)   V(20)   V(24)   V(27)   V(30)   V(19) )
  V( 6) = F( V( 9)   V(13)   V(52)   V(12)   V(37)   V(38)   V(58) )
  V( 6) = F( V( 9)   V(10)   V( 8)   V(52)   V(22)   V(19) )
  V( 7) = F( V( 9)   V(10)   V(13)   V(52)   V(12)   V(37)   V(38)   V(58) )
  V( 7) = F( V(10)   V( 8)   V( 9)   V(52)   V(22)   V(24)   V(27)   V(30)   V(19)   V(29) )
  V(14) = F( V(13)   V(52)   V(58)   V(12)   V(37)   V(31) )
  V(13) = F( V( 5)   V( 6)   V( 7)   V(52)   V(58)   V(43)   V(32)   V(36)   V(37)   V(38)   V(31)   V(12)   V(63)   V(69)
  V(17) = F( V(13)   V(52)   V(12)   V(37)   V(36)   V(22) )

ENDOGENOUS VARIABLES

   5     6     7     8     9    10    13    14    17
FIRST STAGE R**2 S
 0.435 0.576 0.680 0.235 0.561 0.364 0.509 0.541 0.402
 EXOGENOUS VARIABLES
  35   52   12   37   38   58   56   22   20   24   27   30   19   29   43   32   36   31   63   69

SECOND STAGE BETAS AND TS

  -0.276   0.722   0.207   0.088   0.189   0.023  -0.046   0.156
  -3.10    6.30    1.71    2.05    1.33    0.56   -0.92    1.70
 R**2 =  0.3467    F =    28.993    STERR =    391.800134

  -0.424   0.336  -0.025  -0.049  -0.091   0.286   0.088  -0.166   0.128   0.036
  -3.10    3.38   -0.53   -0.75   -1.01    4.71    1.55   -2.88    2.83    0.60
 R**2 =  0.3950    F =    28.397    STERR =    377.922107

   0.846   0.571   0.067   0.319   0.011   0.010   0.450
   8.45    5.41    1.82    4.59    0.29    0.24    5.70
 R**2 =  0.4879    F =    59.610    STERR =    413.488565

   0.537   0.[illegible]8  -0.047   0.035   0.337  -0.010
   5.46    1.22   -0.57    0.94    5.78   -0.29
 R**2 =  0.5056    F =    74 19     STERR =    405.816531

   0.797  -0.215   0.897   0.152   0.506   0.058  -0.008   0.551
   6.80   -2.12    7.49    4.41    6.45    1.63   -0.18    6.03
 R**2 =  0.5540    F =    67.851    STERR =    72.674738

   0.291  -0.243   0.165   0.086   0.604   0.032   0.059  -0.024   0.053  -0.116
   2.28   -2.87    1.28    2.66   10.20    0.73    1.23   -0.72    1.27   -2.63
 R**2 =  0.6594    F =    84.198    STERR =    63.659267

  -0.126  -0.050  -0.004   0.161   0.046   0.599
  -1.26   -1.36   -0.06    2.67    1.28   15.94
 R**2 =  0.4830    F =    68.351    STERR =    42.593807

  -0.548   0.372   0.173  -0.019  -0.747  -0.115   0.111   0.236   0.014   0.028   0.013  -0.474  -0.067   0.097
  -3.37    2.05    1.23   -0.46  -18.37   -2.81    1.95    4.04    0.37    0.66    0.20   -4.16   -0.52    0.81
 R**2 =  0.492[illegible]    F =    29.918    STERR =    15.445076

   0.0[illegible]9   0.041   0.315   0.041   0.375  -0.088
   1.49    0.94    5.70    0.96    8.29   -1.57
 R**2 =  0.2720    F =    27.340    STERR =    70.688518

SECOND STAGE BS AND CONSTANTS
 -3.033E+04  2.837E+03  4.669E+00  6.088E+00  1.899E+01  6.152E-02 -7.283E-01  3.009E-01  9.319E+03
 -4.656E+04  1.319E+03 -1.743E+00 -1.234E+02 -3.946E-02  1.362E-01  4.648E+02 -1.409E+03  3.518E+02  9.070E+00
 [illegible]E+04
```

```
 3.967E+03  1.534E+01  5.500E+00  6.612E+01  3.329E-02  1.955E-01  1.033E+00 -1.990E+03
 2.520E+03  3.214E+01 -6.137E+03  2.871E+00  1.737E-01 -3.583E+00 -1.012E+03
 7.029E+02 -1.126E+01  4.079E+00  2.349E+00  1.975E+01  3.418E-02 -2.676E-02  2.381E-01 -7.405E+01
 1.495E+01 -5.941E+03  1.454E+02  1.335E+00  5.852E-02  3.858E+01  1.109E+02 -1.500E+01  3.588E+00 -3.085E+02
 1.621E+02
-3.471E-01 -4.176E-01 -1.023E-03  3.419E+00  1.479E-02  1.163E+00  9.460E+01
-2.435E-02  1.384E-02  3.422E-02 -5.932E-02 -6.386E-02 -1.047E+01  2.449E+01  5.829E+01  1.649E-03  1.971E-02
 5.068E+00 -3.659E+00 -6.035E-02  5.556E-03  2.574E+02
 3.431E-01  4.827E-01  9.369E+00  1.834E+02  1.017E+00 -6.488E-03  2.572E+02
```

CORRELATIONS AMONG BETAS FOR EQUATION 1

100	-16	19	26	29	17	11	24
-16	100	28	-21	-52	-17	-53	28
19	28	100	2	47	8	-18	88
26	-21	2	100	6	-9	5	1
29	-52	47	6	100	22	10	50
17	-17	8	-9	22	100	-6	7
11	-53	-18	5	10	-6	100	-21
24	28	88	1	50	7	-21	100

CORRELATIONS AMONG BETAS FOR EQUATION 2

100	-38	31	70	75	4	-36	7	-9	-26
-38	100	-6	-49	-42	-48	-8	35	-34	-10
31	-6	100	15	21	-43	-10	5	-5	-9
70	-49	15	100	71	19	-20	-10	-4	-15
75	-42	21	71	100	-6	-30	28	-12	-10
4	-48	-43	19	-6	100	-7	-18	19	7
-36	-8	-10	-20	-30	-7	100	-35	-8	52
7	35	5	-10	28	-18	-35	100	-14	12
-9	-34	-5	-4	-12	19	-8	-14	100	9
-26	-10	-9	-15	-10	7	52	12	9	100

CORRELATIONS AMONG BETAS FOR EQUATION 3

100	32	-18	-50	-15	-52	33
32	100	-4	44	5	-20	88
-18	-4	100	-2	-14	3	-6
-50	44	-2	100	18	7	47
-15	5	-14	18	100	-8	3
-52	-20	3	7	-8	100	-25
33	88	-6	47	3	-25	100

CORRELATIONS AMONG BETAS FOR EQUATION 4

100	-79	-20	-13	-76	-7
-79	100	-1	-5	57	0
-20	-1	100	25	39	-6
-13	-5	[illegible]	100	-1	4
-76	57	39	-1	100	3
-7	0	-6	4	3	100

CORRELATIONS AMONG BETAS FOR EQUATION 5

100	-60	-1	-18	-67	7	-48	-14
-60	100	41	6	56	-30	12	59
-1	41	100	-1	56	-8	-14	89
-18	6	-1	100	2	-16	3	-1
-67	56	56	2	100	-3	13	64
7	-30	-8	-16	-3	100	-12	-16
-48	12	-14	3	13	-12	100	-13
[illegible]	[illegible]	89	-1	64	-16	-13	100

CORRELATIONS AMONG BETAS FOR EQUATION 6

100	37	-89	17	63	-34	-44	-15	-44	-70
37	100	-41	35	58	-44	-1	-11	-35	-49
-89	-41	100	-28	-67	21	51	-3	33	69
17	35	-28	100	13	-17	-7	3	-12	-27
63	58	-67	13	100	-40	6	-16	-26	-48
-34	-44	21	-17	-40	100	-18	-3	59	35
-44	-1	51	-7	6	-18	100	-4	29	27
-15	-11	-3	3	-16	-3	-4	100	12	11
-44	-35	33	-12	-26	59	29	12	100	38
-70	-49	69	-27	-48	35	27	11	38	100

CORRELATIONS AMONG BETAS FOR EQUATION 7

100	2	85	74	11	-4
2	100	0	-13	-18	-8
85	0	100	77	9	-10
74	-13	77	100	13	-25
11	-18	9	13	100	-19
-4	-8	-10	-25	-19	100

CORRELATIONS AMONG BETAS FOR EQUATION 8

100	-58	22	-34	13	38	-33	-10	-29	-7	43	-54	18	-7
-58	100	-75	25	-21	-15	27	24	16	-14	-16	20	-26	21
22	-75	100	-30	12	15	-19	-32	-14	-5	14	-38	22	-12
-34	26	-30	100	-6	-14	11	8	-3	4	-7	21	-18	13
13	-21	12	-6	100	-3	-22	-8	-7	-10	-3	12	9	-9
38	-15	15	-14	-3	100	-16	-13	-12	-4	26	-32	8	-3
-33	27	-19	11	-22	-16	100	-53	14	3	-6	15	6	-10
-10	24	-32	8	-8	-13	-53	100	12	15	-10	28	-23	13
-29	16	-14	-3	-7	-12	14	12	100	-6	-17	28	-0	-5
-7	-14	-5	4	-10	-4	3	15	-6	100	-9	17	0	-6
43	-16	14	-7	-3	26	-6	-10	-17	-9	100	-63	-16	16
-54	20	-38	21	12	-32	15	28	28	17	-63	100	-14	-10
18	-26	22	-18	9	8	6	-23	-0	0	-16	-14	100	-91
-7	21	-12	13	-9	-3	-10	13	-5	-6	16	-10	-91	100

CORRELATIONS AMONG BETAS FOR EQUATION 9

100	4	14	7	7	6
4	100	-8	-17	-5	-14
14	-8	100	9	-12	-57
7	-17	9	100	-17	-3
7	-5	-12	-17	100	-19
6	-14	-57	-3	-19	100

Appendix B

Notes on Selected Variables

The definitions of the variables used in the analysis were given in the text. A few, however, may require more detail. These are the two teacher premiums, EDPRM and EXPRM, teacher education level, EDLVL and state basic aid, AID.

The two premiums were based on actual salary schedules for each district. Salary schedules are stated in terms of specified salary for a given education level and number of years of teaching experience. Education levels typically used are: less than BA, BA, BA + 15 credits, BA + 30 credits, MA, MA + 15 credits, MA + 30 credits, MA + 45 credits, MA + 60 credits and Ph.D. Because there is variation among districts in which of these levels are recognized in the schedule, only the two most constantly recognized levels were used in the computation of the premiums. These were BA and MA. If a district did not specify MA in its schedule, then BA + 30 was taken to be equivalent. The salary for each of the first 20 years was then discounted to the present value (P.V.) at the base year. A five percent discount rate was used.

EDPRM was taken to be that constant amount which, if paid for each of 20 years, would have the same present value as the excess present value of the MA scale over the BA scale:

P.V.(EDPRM for 20 years) = P.V.(MA scale) - P.V. (BA scale)

EXPRM is a weighted average of two experience premiums: one for the BA scale and one for the MA scale. The weights are percentage of teachers in the state with a BA or less, and percentage with more than a BA. The individual BA or MA premium is that constant dollar amount that if added to the base salary each year, would give the same present value as the actual schedule. That is, it is the amount P such that

P.V.(base + kP) = P.V.(actual scale),

where base + kP is the reference salary level after k years.

For Michigan, the variable EDLVL is simply the proportion of teachers with an MA or higher. For Ohio more information was available, so there EDLVL is the average education level score based on the following scale:

Education	Score
less than BA	0
BA	1/2
BA + 15	3/4
MA	1
MA + 15	1 1/4
MA + 30	1 1/2
MA + 45	1 3/4
MA + 60 or Ph.D.	2

The variable AID represents state basic aid, i.e., non-categorical aid, per pupil. This required two adjustments in Ohio. Both are indirect forms of aid in which local taxes are effectively reduced. The first is a homestead exemption whereby older individuals pay lower property taxes. The state pays to the district the amount of such reductions. The second is a ten percent reduction in all property taxes, which is also compensated for by the state. In other words, if a district has a nominal tax rate of T then its actual tax rate is

$$T' = .9rt$$

where r is the ratio of what Ohio calls "effective" rate (after homestead exemption) to the stated rate. Thus, the district's locality raised revenue is T' * EPV. The state pays the difference between this and T * EPV. Therefore state aid is the sum of nominal state aid and this tax rebate:

$$AID = \text{basic aid} + (T - T')EPV$$

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Appendix C

Mean Values and Standard Deviations of Variables Used in Regressions

Variable	Ohio Mean	σ	Michigan Mean	σ
EPV	27223	17735	27678	15625
TSAL	9098	571.7	9541	489.4
EDPRM	1617	272.8	1296	573.2
EXPRM	442	71.73	556	107.8
RATIO	.04285	.00678	.04220	00437
EDLVL	.3471	.1107	.3462	.1222
EXPER	6.982	.9048	8.883	2.097
WEALTH	6.823	2.634	9.260	2.766
EFFORT	38.08	16.45	44.40	21.34
INSM	108.16	54.13	150.81	58.84
OTHER	394.63	114.78	344.57	82.29
LADM	7.651	.8162	7.680	.9134
ACH	.8698	.0687	20.48	1.584
DENS	583.3	921.1	513.7	1009.2
OPCOST	7614	750.5	7986	1112
MNRTY	.0254	.0637	.0328	.0907
POVCH	.0868	.0648	.0943	.0574
STBLTY	.2881	.0383	.2860	.0404
BRKHME	.3792	.1904	.4013	.1745
FINCOL	.0765	.0689	.0732	.0548
DEP	.7542	.1099	.7971	.0969
PENRLC	3.588	3.771	3.934	4.629
PENRL	.4904	.0958	.5246	.0866
TITLEI	21.57	18.57	30.34	182.65
CAT	129.60	47.11	35.12	30.31
MILLG	26.06	4.065	28.43	4.921
RESD	.3772	.1561	.1766	.2349
PTCHR	.1488	.1516	.1646	.1909
AID	452.58	112.32	494.01	249.64

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