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Equity and Efficiency of Community College Appropriations: The Role of Local Financing

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More than two decades ago, David Breneman and Susan Nelson posed the question, "Should Serrano Go to College?" (1981). The authors of *Financing Community Colleges* were referring to the landmark case of *Serrano v. Priest,* which was decided in the California State Supreme Court in 1971. The *Serrano* decision found the California school financing system unconstitutional under the equal protection provision of the state constitution. The educational resources provided to students depended on the wealth of the neighborhoods in which they lived, a fundamentally unjust arrangement stemming from the tradition of local control and local financing. Breneman and Nelson concluded that, similarly, the local finance role for community college systems likely creates resource disparities that disadvantage students in less affluent communities (p. 126).

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As in primary and secondary school (K–12) finance, approximately half the states in the United States have a local government finance role for funding community colleges. Colleges serving areas with a weak economic base that rely on local property or other taxes for a share of their revenues will receive lower revenues than peer colleges located in wealthier areas of their state, creating an inequitable finance system.

Three decades after *Serrano,* which set off waves of school finance litigation and reform across the United States (Verstegen, 1998), the effect of local control on school finance equity is still a matter of contentious debate and legal action. (The Web site of the Campaign for Fiscal Equity http://www.schoolfunding.info/ summarizes recent legal actions and court decisions.) In contrast, since Breneman and Nelson's consideration of community college finance equity, and a similar study at that time by Walter Garms (1981), the role of local control in community college finance systems and its effect on equity have received comparatively little attention.

This comparative inattention may result from the authors' conclusion that community college finance equity is a less pressing issue than school finance equity because a college education is not compulsory, nor "essential for functioning or succeeding in life" (p. 124). In addition, Breneman and Nelson (1980, p. 174) argued the efficiency benefits of local control: Those who are most likely to take advantage of a community college have the opportunity to express their educational preferences through the local governance and tax system. Furthermore, the task of disentangling geographic and program cost differentials across colleges in a state, economies of scale on large and small campuses, and the impact of student college choice and their effects on measures of resource equity presents a daunting challenge that may have inhibited study of this topic. With funding coming from state, local, and federal governments and from the private sector in the form of tuition, fees, and philanthropic donations, community college finance systems are relatively more complex than K–12 finance systems.

Nevertheless, even in an era when efficiency rhetoric dominates the politics of public finance (Alexander, 2000; Dowd, 2003), the issue of community college finance equity has not entirely faded. Several state-level reports provide evidence that wide variations do exist in the level of resources allocated to community colleges and that finance equity is a concern of state policy analysts (*Budget Development,* 2000; *Community Colleges and SUNY,* 1999; *Iowa Community College,* 1998). The Education Commission of the States (*State Funding,* 2000) issued a comprehensive state-by-state portrait of community college finance systems and highlighted policy questions that arise from the local finance role, including the issue of equal access to postsecondary education within states (p. 10). In a paper updating the application of the economic tenets of equity and efficiency to an analysis

of community college finance, Richard Romano (2003) highlights local taxes as more regressive than state and federal taxes, because they rely on property taxes, rather than more progressive income taxes. Flores (2003) analyzed state community college finance data from Texas and found inequities in the funding of Hispanic-serving institutions (HSIs) located on the U.S.-Mexican border. Most recently, in a case with arguments echoing K–12 finance litigation, three community colleges in Oregon challenged the state's equalization formula, arguing that it was unfair to penalize colleges that received relatively high, local property-tax revenues. In November 2003, a circuit court judge ruled against the plaintiffs, upholding the right of the Board of Education to determine the funding formula. The decision did not directly rule on the equity of the finance system (Gomstyn, 2003).

In a trend perceived as equity enhancing, the local share of income for community colleges has declined over time (Breneman & Nelson, 1981; *State Funding,* 2000). From 1950 to 1997, it decreased on average from 49% to 19%, while the average share of state revenue increased from 26% to a high of 60% in 1980, before declining to 44% in 1997 (Romano, 2003, Table 3). The view that financing systems are more equitable under state control is consistent with the direction of court-ordered school finance reforms, which have often mandated "power-equalizing" roles for state governments to redistribute resources among school districts of disparate wealth.

While a community college education is not compulsory and states do not have a legal obligation to provide equitable postsecondary schooling resources, as they do for primary and secondary schooling, there is, perhaps, a growing sense that an associate's degree is today the minimal credential necessary to attain social and economic security. This view is reflected in the rhetoric that surrounded Bill Clinton's initial proposal for the federal "Hope Scholarship." In his acceptance speech at the Democratic National Convention in 1996, Clinton proposed a tax credit for the first two years of college to "make at least two years of college as universal as four years of a high school education is today" (Bill Clinton, 1996).

That the implementation of the "scholarship" as a tax credit provided a boon for the middle class more than it helped low-income students enter college (*Study,* 2003) demonstrates the tension between the rhetoric of access and the politics of resource distribution. The growing importance of a college education and heightened conflicts over financial resources suggest that the equity of community college financing systems deserves greater national consideration. This study contributes to that goal by analyzing the local role, which is generally viewed as an equity-reducing component of finance systems, in resource distribution to community colleges within state systems.

Conceptual Framework

Based on national data, this study characterizes current intrastate variation in revenues from state and local sources to community colleges and analyzes differences and similarities in distribution patterns in states with and without local-share financing. We consider the fairness of these funding variations from the perspective of equity and efficiency. The conceptualization of equitable and efficient funding strategies is based on the scholarship of school finance (Monk, 1990; Odden & Picus, 2004; Verstegen, 1998; Wong, 1994) and community college finance (Breneman & Nelson, 1981; DesJardins, 2002; Garms, 1981). Equal funding for students with equal needs is understood as creating "horizontal equity," while the provision of greater resources for students with greater need contributes to "vertical equity."

Under the principles of horizontal and vertical equity, equal funding does not necessarily represent equitable funding. Equal funding is considered just when students have equal needs but unjust when students have disparate needs. Providing more public resources to less affluent communities is understood as promoting vertical equity, while providing more resources to affluent communities undermines it.

Disparities in funding can be created by rational and political factors. Rational funding strategies such as cost adjustments for urbanization, economies of scale, and program type may create funding disparities as a matter of efficiency. These factors generate disparities in per capita student funding that are not viewed as inequitable, as, for example, when a state provides greater resources to colleges to rent facilities in high-cost urban areas. A plan to locate high-cost facilities for technical programs at just one campus in a system may be argued from the perspective of investment efficiency, even though it would provide greater resources to one college in comparison to the others. The investment benefits of initiating such a program might well be outweighed by the costs if the state undertook to build the necessary facilities on each campus. A college's capacity to convert resources to outputs presents another efficiency consideration, that of productive or "technical" efficiency. For example, some states award funding premiums to rural schools and colleges to offset inefficiencies in the "production" of educated students due to smaller class sizes in comparison to more populated urban areas.

However, these rational systems may be undermined by "politically mobilized and well-connected groups," who garner a greater share of resources through political means (Timar, 1994, p. 144). These political forces can have equitable effects (as when their efforts result in creating categorical aid for students with high educational needs) or inequitable effects (as in the flow of funds to wealthy suburbs). Recent research by Caroline Hoxby (2001), Jeffrey Metzler (2003), and Thomas Timar (2003) shows that court-ordered

finance reform is often an ineffective tool to counter finance inequities. Their studies indicate that rational resource allocation systems are undermined by political lobbying and individual choices in educational markets. Therefore, rational policies can be counteracted by political systems operating at both the local and state levels.

Within this conceptual framework, we addressed the following questions:

1. How much do college revenues per student vary within state systems?
2. Is local-share funding associated with higher or lower revenues per student?
3. Is local-share funding associated with higher intrastate variation in tuition and fees?
4. Is local-share funding associated with higher intrastate variation in revenues per student?

To establish the context of revenue disparities, Questions 1 and 2 provide descriptive information. Question 3 evaluates the relationship between local funding and variation in tuition and fees to test a conclusion presented in the Education Commission of the States community college financing report, where the authors observed: "Dramatic differences in property tax valuations across a state can lead to large disparities in tuition rates between wealthier communities and poorer districts, because poorer districts may be forced to raise tuition and fees to meet their basic budgets" (*State Funding,* 2000, p. 10). We would therefore expect greater variation in tuition and fees in states with local financing.

Question 4 builds on the assumption that states relying strictly on state funding will have lower variation in revenues than states with local shares, due to the equalizing effects of the state role. As high variation in state-funded states may be created by power-equalizing formulas, which are intended to direct greater than average funds to colleges with high-need students, we also examine the relationship between funding disparities and community wealth.

This study focuses on local and state appropriations and tuition and fees, which are the largest sources of revenues for community colleges. Other sources of funding may well have an impact on finance equity, but we do not address these effects here. Our purpose is to document revenue disparities and present descriptive statistics and graphs that facilitate comparisons of revenue distribution patterns in local-share and state-funded states. The study serves as a starting point for future state-level analyses by supporting purposeful sampling of states with similar and dissimilar funding patterns. It fills a gap in the literature by providing a systematic national analysis of contemporary community college funding patterns with a focus on the role of local financing.

DATA AND METHODS

We analyzed a subsample of data from the national 2000–2001 Integrated Postsecondary Education Data System (IPEDS) Finance survey. IPEDS is a census survey of higher education institutions in the United States. Because IPEDS is a census and the analyses are descriptive, we treat the data as population rather than sample data and do not present tests of statistical significance for observed differences in values. We limit the sample to institutions that IPEDS classifies as two-year public colleges in U.S. states (not territories) and that did not contain the word "technical" in their names. Our reason for omitting technical colleges was that technical programs often carry greater costs for equipment and materials. While this step restricts the institutional type, it does not completely omit technical programs, which are also offered in community colleges.

Since we focused on variation in revenues to colleges within a state, we excluded those reporting financial data on fewer than five community colleges. This step excluded 15 states: Alaska (2), Delaware (3), Idaho (3), Indiana (13 of 14 technical colleges), Kentucky (which reported financial data for Lexington Community College only), Maine (7 of 7 technical colleges), Montana (5 of 8 technical colleges), Nevada (3), New Hampshire (5 of 7 technical colleges), Rhode Island (1), South Dakota (4), Utah (3), Vermont (1), West Virginia (3) and Wisconsin (16 of 17 technical colleges). The remaining sample includes 705 community colleges with nonmissing data in 35 states.

Our primary focus is on appropriations from state and local governments. To compare revenue across colleges with different enrollments, we analyzed appropriations per full-time equivalent student (FTE).[1] We group colleges in five local funding-share categories based on the ratio of local appropriations to state appropriations. Based on the distribution of colleges in these five categories, we designate states as primarily local-share funded or as state-funded.

Our measure of variation in local and state appropriations is the deviation from the median value for each state. We used median values as the measure of central tendency because the means are affected by outliers that may be colleges with a special mission or unusual funding. Similarly, we measure dispersion by statistics that are not affected by extreme values, including the interquartile range (*IQR*) and the ratio of 90th to 10th percentile values. The mean of absolute revenue deviations for each state provides a summary statistic of variation for comparison across states. A college's position above

[1]The FTE calculation is based on the same ratio used to publish enrollment statistics in the annual *Digest of Education Statistics*. For the public two-year sector, the FTE equals full-time enrollment plus part-time enrollment multiplied by one-third.

or below the median of state and local appropriations within the state is also represented by an index of the college's revenue divided by the state median. The index is an expression of revenue deviations that is not sensitive to the differing magnitudes of spending in states. To test the direction of revenue deviations as flowing toward relatively wealthy or poor communities, we used the proportion of full-time students at each college who receive federal grant aid as a measure of community wealth. A college's geographic locale is indicated with an ordinal variable with seven categories ranging from "large city" to "rural."

Limitations

The research design has several important limitations. First, the study does not directly account for state-level differences in community college history, mission, status, governance, and finance structure. We treat local funding as evidence of a local political role but do not investigate the nature of state and local political structures. For this reason, we measure revenue disparities at the state level and present descriptive statistics summarizing revenue deviations by state. This step facilitates the review of the findings by knowledgeable analysts at the state level.

Second, while all surveys are subject to measurement error, with hundreds of institutional researchers and administrators across the country entering complex financial data, IPEDS may suffer from this problem even more greatly than usual. We acknowledge this limitation but emphasize that IPEDS is the primary national collection of college financial data. Analyses of the type reported here that may reveal significant measurement error may strengthen this major data source.

We use the percentage of full-time students receiving federal financial aid as a proxy for community wealth for each community college. Variation in tuition and fees, which occurs both across and within states, partially determines who qualifies for financial aid. Both financially needy students and students attending more expensive colleges are more likely to be eligible for aid. Therefore, we restrict our analysis to intrastate differences in the proportion of students receiving grant aid and to states where the correlation between tuition and aid is weak.

We evaluated the accuracy of using this financial aid variable as a measure of community wealth by using census data from New York State and Massachusetts, matching colleges to the county or counties in which they are located. Using logarithmic transformations to correct for skewed distributions, we found that the Pearson correlation between aid and the percentage of children in poverty was moderately strong at $r = .766$ and $r = .614$ in New York State ($n = 32$) and Massachusetts ($n = 15$), respectively.

Finally, the study uses the NCES's FTE measure, in which three part-time students are treated as equivalent to one full-time student, to compare per capita funding. This measure is not sensitive to potential differences in the resource needs of campuses with high and low proportions of part-time students and may not be equally appropriate to campuses serving different populations of students. Alternative measures of student enrollment may produce different results concerning resource disparities among campuses.

RESULTS

In this sample of U.S. community colleges, state appropriations are the largest source of all revenues with a mean share of 38%. Tuition and fees contribute 20% and federal grants and contracts add another 13%. Including colleges with zero local share, local appropriations average 13%. The local share contingent on non-zero local funding increases to 20%, reducing the state share to 34%. Auxiliary revenues contribute 6%, and state grants contribute 5%. Other sources of revenue such as private gifts and local grants contribute 3% or less, on average.

The mean value of total revenues from all sources except tuition and fees per FTE is $8,230, with a standard deviation (*SD*) of $3,800. The mean value of state and local appropriations per FTE is $5,180 (*SD* = $2,440). The median of this skewed variable is $4,740. Average tuition and fees are $1,400 (*SD* = $717). Table 1, which presents the median and interquartile range of state and local appropriations per FTE by state, reveals a great deal of variation both within and across states. In 16 states in the sample, the median value is zero local appropriations. A review of the full range of values indicates that in ten states no colleges received local funding.

We created five categories of local funding share based on the ratio of local appropriations to state appropriations. These categories, which were created based on the overall distribution of ratios as shown by a histogram, encompass local-share funding ratios of 0.0–0.01 ($n = 268$), 0.02–0.50 ($n = 199$), 0.51–1.0 ($n = 121$), 1.01–2.0 ($n = 70$), 2.1 and above ($n = 47$). Colleges within the same state may appear in different local funding share categories, because the ratios differ by college. Table 2 shows the distribution of colleges within the local-share categories by state, divided into 17 "local-share" and 17 "state-funded" states (n = 256 and 368 colleges respectively). We designated states as funded by local share when at least 75% of the colleges reported ratios greater than 0.02. All local-share states also have state funding.

In some states, such as Connecticut, Florida, and Georgia, colleges consistently report no local funding. Five states—Alabama, Arkansas, Colorado, Ohio, and Oklahoma—are dominantly state funded, but have two or more cases reporting local funding. In two of these states, Arkansas and Ohio,

Table 1

State and Local Appropriations ($s) per FTE

State		*State*		*Local*	
	n	*MDN*	*IQR*	*MDN*	*IQR*
AL	21	4187	1669	0	27
AR	15	5361	2368	0	416
AZ	19	1396	1344	3188	1243
CA	77	3044	1073	1824	1046
CO	15	3243	1771	0	0
CT	12	7197	1109	0	0
FL	28	4617	1513	0	0
GA	14	6211	2203	0	0
HI	7	4609	886	0	0
IA	14	3439	853	675	355
IL	45	1560	869	2302	1388
KS	19	1856	664	3773	2927
LA	6	3363	757	0	0
MA	14	5840	1554	0	0
MD	15	2307	988	2844	1307
MI	28	3129	1058	2484	3505
MN	12	4618	2237	0	0
MO	10	2727	1169	940	1335
MS	15	4348	955	722	377
NC	49	6142	1561	1008	426
ND	5	5057	1882	0	0
NE	5	4000	182	1147	117
NJ	19	1662	350	2037	712
NM	15	4693	1714	658	990
NY	33	2359	229	1786	914
OH	28	3750	743	0	0
OK	14	3569	1003	0	0
OR	13	4222	1148	2209	688
PA	14	2495	312	1462	885
SC	5	5401	737	0	0
TN	10	3691	316	0	0
TX	58	3432	1103	1194	1569
VA	24	4055	850	23	22
WA	27	3928	657	0	0
WY	7	4414	897	1365	1964

Source: NCES IPEDS 2000-2001
Number of colleges in state based on n reporting financial data.

TABLE 2

DISTRIBUTION OF COLLEGES BY FUNDING TYPE BY STATE

State	State-Funded State					Local-Share State				
	0.0-	*0.02-*	*0.51-*	*1.1-*	*>2.0*	*0-*	*0.02-*	*0.51-*	*1.1-*	*>2.0*
AL	19	2								
AR	11	4								
AZ							1	1	5	12
CO	13			1	1					
CT	12									
FL	28									
GA	14									
HI	7									
IA						1	13			
IL							6	9	13	13
KS							2	5	4	8
LA	6									
MA	14									
MD						1		5	8	1
MI						6	5	5	9	3
MN	12									
MO						1	6	3		
MS							15			
NC							46			
ND	5									
NE							5			
NJ								7	11	1
NM						2	9	4		
NY							4	20	8	1
OH	22	3	2	1						
OK	12	1	1							
OR							7	5	1	
PA							7	7		
SC	5									
TN	10									
TX						7	34	13	3	1
VA	24									
WA	27									
WY							5	1	1	
*CA						9	24	33	5	6
Total	241	10	3	2	1	18	165	85	63	40

Source: NCES IPEDS 2000-2001

Number of colleges in state based on n reporting financial data. Local-share categories represent a ratio of local-to-state appropriations of 0.0-0.01, 0.02-0.50, .51-1.0, 1.1-2.0, > 2.0.

Local-share states include those with at least 75% of colleges reporting a ratio of local-to-state appropriations > = 0.02

*California colleges report local shares; but we examine that state, which includes a large proportion of U.S. community colleges, separately.

local taxes may be raised and used to fund community colleges in 2000. In Colorado, two junior colleges previously funded by their local districts were recently incorporated into the state system and uniquely continued to receive local funding (*State Funding,* 2000, pp. 12–13).

We apply the "local-share" designation to states where local funding is a regular component of the funding system. In states with a local funding role, such as Illinois, Kansas, and Maryland, colleges are distributed across the funding share categories. California colleges report local funding share across the five categories. However, we analyze California separately due to the large number of colleges and the state's unique funding system in the state. Here "districts receive a portion of the 1% countywide property tax based on their proportional share of property tax revenue received from their county prior to tax control (Prop. 13, 1978)" (*State Funding,* 2000, p. 12).

Table 3 presents the mean and standard deviation of tuition and fees and the percentage of students receiving federal grant aid, by local funding category and by state. The tuition burden placed on students varies considerably, from a low of $314 in California to a high of $2,650 in Ohio. As the standard deviations indicate, tuition and fee charges vary considerably within states.[2] State-funded states have higher mean tuition, $1700 (*SD* = $555), than local-funded states, which have a mean tuition of $1,479 and higher variation (*SD* = $638). Whether assessed by the range or *IQR* of the distribution, local-share states have greater variation in tuition and fees. The median range and *IQR* in local-share states are $1,412 and $300, both more than double the respective values of $713 and $138 in state-funded states.

The mean proportion of students receiving grant aid ranges from a quarter to half, with the lowest standard deviation at 8% and typical values ranging between 10 to 19%. This indicates that in all states the dispersion of the grant aid variable is sufficient to distinguish the relative wealth of the college's local community. The mean and standard deviation of grant aid receipt is similar in state- and local-funded states, at 35% (*SD* = 16%) and 38% (*SD* = 18%), respectively. The value in California where tuition is low is also relatively low at a mean of 29% (*SD* = 15%).

The upper panels of Table 4 and Figure 1 illustrate that colleges in the zero local-share category have the lowest median appropriations, which at $4,259 is roughly $400 to $1,000 less per FTE than the median value of any of the local-share categories. With an inter-quartile range only slightly

[2]To some extent, such variations in tuition and fees are due to mismeasurement at the college level. A review of reported tuition charges in Massachusetts, where the Board of Higher Education sets a uniform tuition, showed that individual colleges reported different tuition rates, in some cases due to different approaches to calculating full-time enrollment status. In Massachusetts, fees are set by the individual colleges and therefore create valid variation in the total of tuition and fees.

TABLE 3

TUITION/FEES AND FEDERAL GRANT AID BY FUNDING TYPE AND STATE

State-Funded	*Tuition/Fees($s)*		*Grant Aid(%)*	
	M	*SD*	*M*	*SD*
AL	1681	158	48	17
AR	1042	218	48	17
CO	1739	284	34	15
CT	1870	34	26	12
FL	1438	149	30	11
GA	1646	505	40	14
HI	1061	19	30	8
LA	1178	338	39	10
MA	1822	190	30	15
MN	2621	155	34	14
ND	1948	88	56	19
OH	2650	568	32	15
OK	1296	451	34	17
SC	2200	0	36	12
TN	1437	6	27	22
VA	1181	167	42	16
WA	1725	56	23	10
Local-Funded	*Tuition/Fees($s)*		*Grant Aid(%)*	
	M	*SD*	*M*	*SD*
AZ	910	105	38	19
IA	2208	220	36	14
IL	1522	190	29	19
KS	1387	119	34	10
MD	2165	436	33	19
MI	1754	378	32	15
MO	1504	271	38	15
MS	1144	358	54	12
NC	897	64	42	18
NE	1429	95	42	27
NJ	2284	448	36	18
NM	808	392	52	16
NY	2560	248	49	14
OR	1726	230	36	18
PA	2156	294	26	12
TX	874	275	37	21
WY	1469	109	34	11
CA	314	61	28	17

Source: NCES IPEDS 2000–2001

higher or less than the other categories, the 75th percentile value for zero local-share colleges is always less than the 75th percentile in the other categories and, in some comparisons, is closer to the median value for colleges receiving local appropriations. Only one college with local funding has per FTE appropriations less than the lowest values in the zero-share category. Typically, then, colleges that receive local funding have higher levels of appropriations per FTE from state and local sources than colleges that receive state-level appropriations only.

The lower panel of Table 4 and Figure 1 illustrate these analyses using a measure of revenues per FTE from all sources, excluding tuition and fees. Colleges in the zero local-share category no longer have the lowest median value. At a median of $7,454 and *IQR* of $3,132, the distribution is very similar to that for colleges in the local-to-state appropriations ratio categories of 0.51–1.0 and 1.1–2.0. Colleges reporting a local-share ratio of 0.02–0.50 have the highest distribution of revenues from all sources per FTE, with a median value $1000 greater than that for colleges with no local share. The colleges with a local share greater than 2.0 have a high median, but also have a high *IQR,* which makes the overall distribution similar to the zero-share category. Typically, then, colleges with no local appropriations have levels of total revenue similar to those of colleges with local appropriations, with the exception of colleges in the smallest local-share category.

Table 5 reports, by state within the local- and state-share funding categories, the extent to which the FTE funding received by colleges from local and state appropriations varies within states. Five states each have one case reporting revenues more than double the 95th percentile value in the state. These have been treated as extreme, unique values and omitted from the estimates of average revenue deviations.[3] The mean (absolute value) deviation of revenues from the state median is $973 (*SD* = $314) per FTE, excluding California, which has a mean deviation of $1,330. The ratio of appropriations at the 90th percentile to the 10th percentile is equal to or greater than 2.0 in 13 of the 26 states. The majority of states exceed an *IQR* of $1,000 per FTE and 15 states have an *IQR* greater than $1,500.

Local-share funding is associated with a slightly higher intrastate variation of local and state appropriations per FTE. The upper panel of Table 6 and Figure 3 compare the distribution of average absolute deviations per FTE measured in dollars by local-share and state-funded states.[4] At $904, the median deviation in local-share states is $100 more than the median value of

[3]The cases and values are Mid-South Community College, Arizona ($26,648 per FTE above the state median of local and state appropriations), South Piedmont Community College, North Carolina ($27,547), Coahoma Community College, Minnesota (($15,516), Illinois Eastern Community Colleges—Olney Central College, ($13,491), and Foothill College, California ($9,114).

[4] The five extreme cases are excluded from the calculation of average deviations.

TABLE 4

VARIATION IN REVENUE PER FTE ($S) BY LOCAL-SHARE CATEGORIES

Local and State Appropriations

Local-Share Funding Ratio	*n*	*Min*	*Mdn*	*IQR*	*Max*
0.0–.01	259	2007	4259	1984	32373
0.02–0.50	175	2574	5207	2656	34652
0.51–1.0	88	2586	4636	2036	9677
1.1–2.0	65	3175	4979	2290	10853
>2.00	41	1283	5389	1954	11208
Total	628	1283	4676	2276	34652

Total Revenues, Minus Tuition and Fees ($s)

Local-Share Funding Ratio	*n*	*Min*	*Mdn*	*IQR*	*Max*
0.0–0.01	259	3182	7454	3132	58690
0.02–0.50	175	3840	8459	2839	47286
0.51–1.0	88	4444	7390	2791	14054
1.1–2.0	65	4720	7347	3181	13931
>2.00	41	3373	8059	3246	15550
Total	628	3182	7715	3121	58690

Source: NCES IPEDS 2000-2001

$807 in state-funded states. The 25th percentile in local-share states ($846) is also higher than the median value in state-funded states. One hundred dollars is 2% of the mean value of $5,000 of state and local appropriations per FTE. Thus, while variation is typically larger in local- than in state-funded states, the revenue disparities at the center of the distribution are not great. Above the median, local-funded states cluster near a 75th percentile value of $1,350, while state-funded states fall around a lower 75th percentile value of $1,081. This difference in variation, nearing $300, is greater, but still a relatively small proportion of typical state and local appropriations.

The larger variation in revenues in local-share states is in part due to higher levels of spending in those states. When revenue deviations are in-

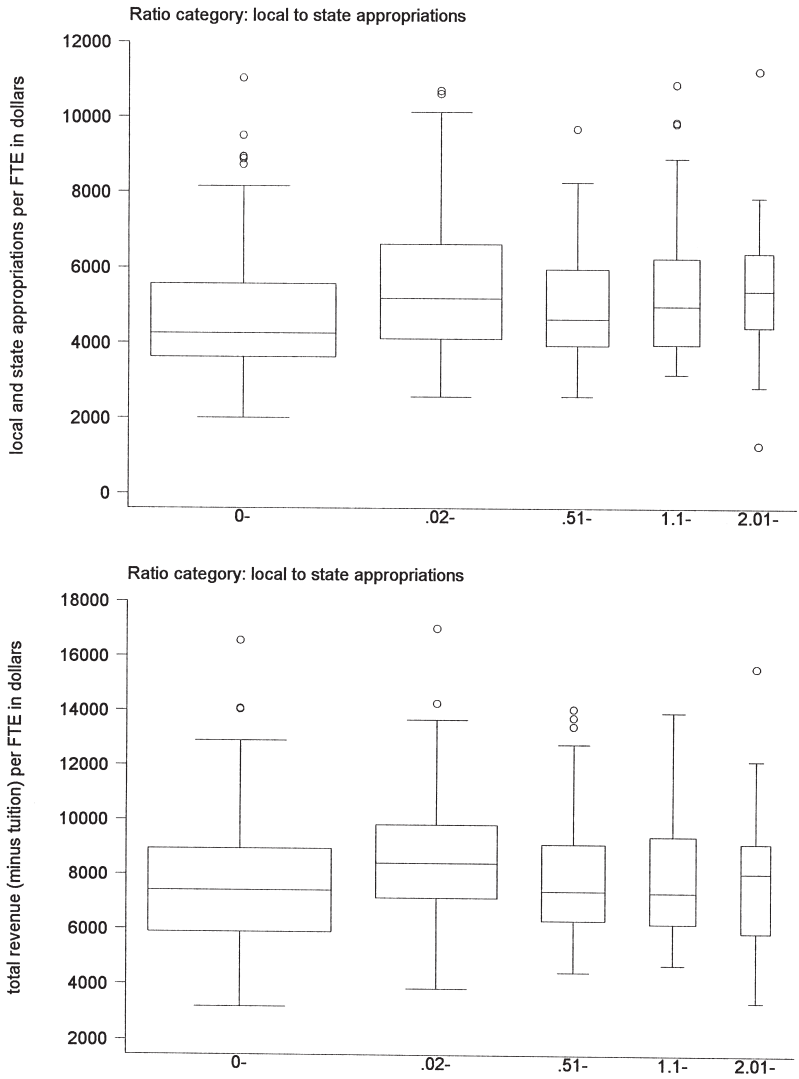


Figure 1. ***Local and state appropriations (top panel) and revenues from all sources excluding tuition (lower panel) per FTE by college ratio of local appropriations to state appropriations.*** *The width of the boxes corresponds to the proportion of cases in each category. The lower and upper bounds of the box represent the 25th and 75th percentile, the center line is the median, and the circles beyond the whiskers are outliers. Five extreme values are omitted, excluding one case in 0.0-0.01 and 4 in 0.02-0.50 categories.*

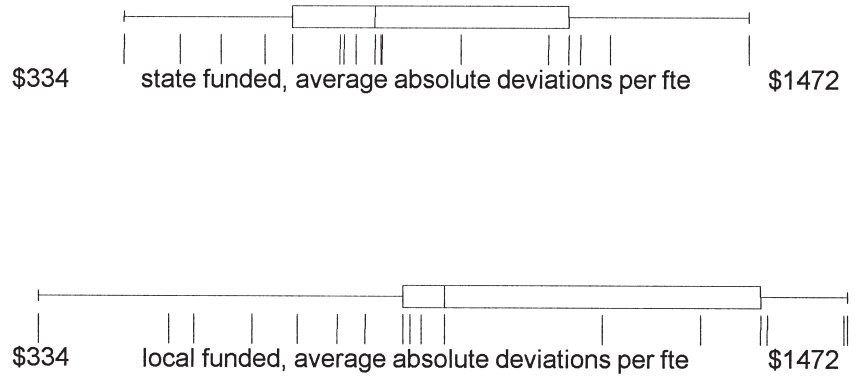


Figure 2. ***Average absolute deviations per FTE by state and local funding.*** *The lower and upper bounds of the box represent the 25th and 75th percentiles and the center line is the median. Each vertical line under the boxes represents the location of a state in the distribution of values.*

dexed by college as a proportion of the state median (Table 6, lower panel), the distribution is quite similar under both funding types, with the exception that the index for local-share states has a higher maximum value. In addition, as shown in Figure 2, the local-share category includes 6 of 17 states with an average deviation lower than the median in the state-funded category, which indicates that variation in local-share states is not uniformly high. Similarly, six states without a local role have an average deviation greater than $900, the midpoint of deviations in local-share states, which indicates that high-revenue deviations are found in states with no local role.

To assess the hypothesis that revenue deviations in state-funded states promote vertical equity by providing higher levels of funding to communities with greater need, while deviations in local-funded states are regressive, we selected an average funding deviation of $1,000 as a threshold for designating high-disparity states. This designation encompasses five state-funded states (Arkansas, Colorado, Florida, Georgia, and Minnesota) and six local-funded states (Kansas, Maryland, Michigan, North Carolina, New Mexico, and Texas). The use of an *IQR* exceeding $1,500 as a selection criterion would add Alabama, Massachusetts, and North Dakota as state-funded, high-disparity states and Arizona, Illinois, New Mexico, and Wyoming as high-disparity local-funded states. We graphed revenue deviations against the proportion of full-time, first-time students at each college receiving federal grant aid. Since the grant aid proportion serves as a proxy for community wealth, we first obtained the Pearson's correlation between tuition/fees and grant aid. The correlation between these two variables was relatively weak, ranging from

Table 5

Variation in Local and State Appropriations per FTE by Funding Type and State

State Funded	*n*	*Mean Deviation ($s)*	*Deviations from Median* 90P/10P	*IQR ($s)*	*min ($s)*	*90P ($s)*
AL	21	763	1.6	1713	-1045	1543
AR	15	1334	2.5	2368	-2778	3764
CO	15	1052	2.4	1945	-1814	2242
CT	12	757	1.5	1109	-1478	1524
FL	28	1081	2.0	1513	-1551	2987
GA	14	1139	1.8	2203	-3804	1070
HI	7	929	2.4	886	-942	4313
LA	6	590	2.0	757	-885	1569
MA	14	815	1.5	1554	-1217	1288
MN	12	1097	1.9	2237	-1674	1487
ND	5	780	1.6	1882	-1878	142
OH	28	807	1.9	1223	-1025	1898
OK	14	817	1.8	1431	-767	1997
SC	5	651	1.7	737	-1679	841
TN	10	454	1.8	316	-1504	665
VA	24	690	2.0	840	-1014	2248
WA	27	533	1.8	657	-1142	1163

State Funded	*n*	*Mean Deviation ($s)*	*Deviations from Median* 90P/10P	*IQR ($s)*	*min ($s)*	*90P ($s)*
AZ	19	846	2.0	1796	-1441	1749
IA	14	792	1.8	769	-1026	2866
IL	45	904	1.9	1303	-2781	1925
KS	19	1266	2.1	2549	-2025	2003
MD	15	1128	2.2	1425	-1485	4077
MI	28	1467	2.8	2788	-3558	2555
MO	10	334	1.4	705	-523	671
MS	15	517	1.4	1052	-1503	1327
NC	49	1472	2.0	1827	-2598	2381
NE	5	753	1.8	299	-686	2778
NJ	19	633	1.6	755	-1270	1571
NM	15	1360	2.1	1800	-3623	1955
NY	33	872	1.7	1103	-1435	1471
OR	13	856	1.4	1132	-1564	970
PA	14	551	1.6	1088	-733	1250
TX	58	1350	2.4	2341	-2241	2792
WY	7	697	1.4	1912	-603	1698
CA	77	1330	2.5	1488	-4748	2036

Table 5, cont.

Source: NCES IPEDS 2000–2001
Mean deviation equals the sum of the absolute value of deviations from the state median divided by the number of colleges with non-missing data in the state. 90P/10P is the 90th percentile/10th percentile ratio.

$r = .11$ to $r = .23$, with the exception of Arkansas and Colorado, where the values were $r = .28$ and $r = .47$, respectively. We excluded Colorado from the analysis to eliminate variation in tuition as a strong alternative explanation for differences in the proportion of students receiving financial aid.

Scatterplots graphing revenue deviations by the proportion of students receiving grant aid are presented for state-funded states in Figure 3 and local-share states in Figures 4 and 5. The case markers indicate the geographic locale of the college to assess simultaneously if revenue deviations may be attributed to geographic cost differences or economies of scale. Revenue deviations in Minnesota are strongly correlated with grant aid receipt ($r = .80$). In addition, all colleges with positive revenue deviations are located in small towns, while most with negative deviations are located on the fringe of large cities, suggesting economies of scale for larger campuses. Deviations are more weakly, but positively, correlated in Florida ($r = .35$) and Arkansas ($r = .12$), where, in the latter case, the low value does not provide a good summary. The graph for Arkansas shows a stronger linear relationship with the exception of an unusual case with high positive revenue deviations and a relatively small proportion of grant recipients. In both these states, small towns tend to have positive deviations. In contrast, the correlation in Georgia is negative ($r = -.26$). Colleges with lower proportions of grant recipients have positive revenue deviations. Small towns appear both above and below the median line.

In local-share states, Michigan and North Carolina (Figure 4) have positive correlations with grant receipt ($r = .31$ and .19, respectively). Rural and small towns appear both above and below the median line in both states. Maryland (Fig. 5) has a positive correlation of $r = .39$, but this high value is strongly affected by one rural college with high positive deviations and high grant receipt. The association between funding and need in Maryland is much weaker among the remaining cases. Similarly, Kansas, New Mexico, and Texas have weak correlations, at $r = .13$, .10, and .08, respectively. In Texas, all but one of six colleges with more than 70% of students receiving grant aid have positive revenue deviations, but many colleges with lower proportions of grant recipients show equivalent or higher positive deviations. In California (not shown), where the average absolute revenue deviation is

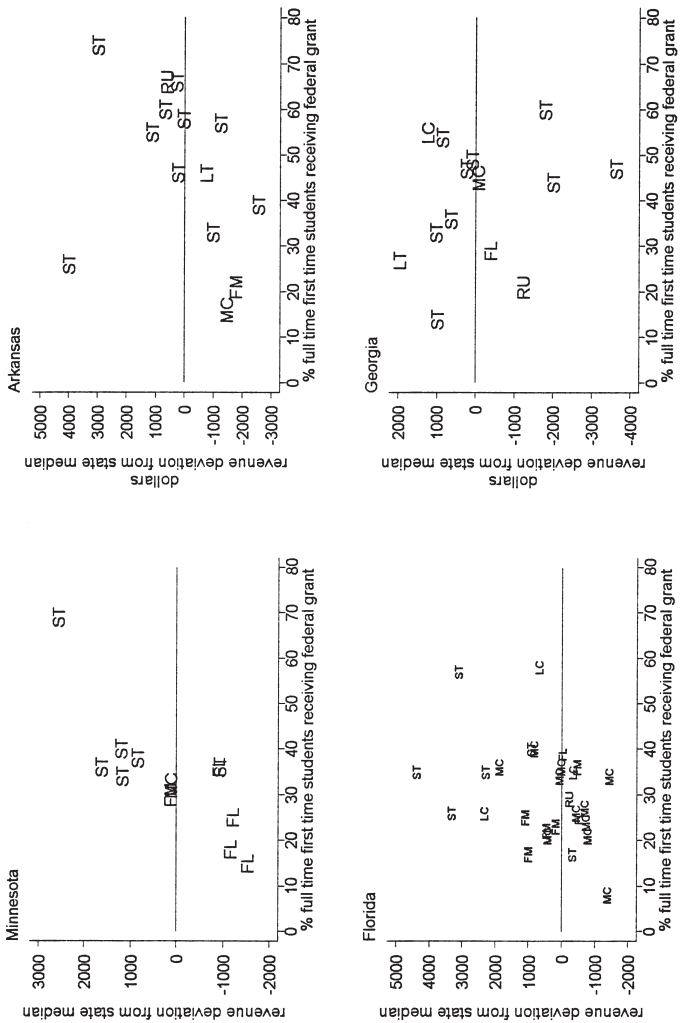
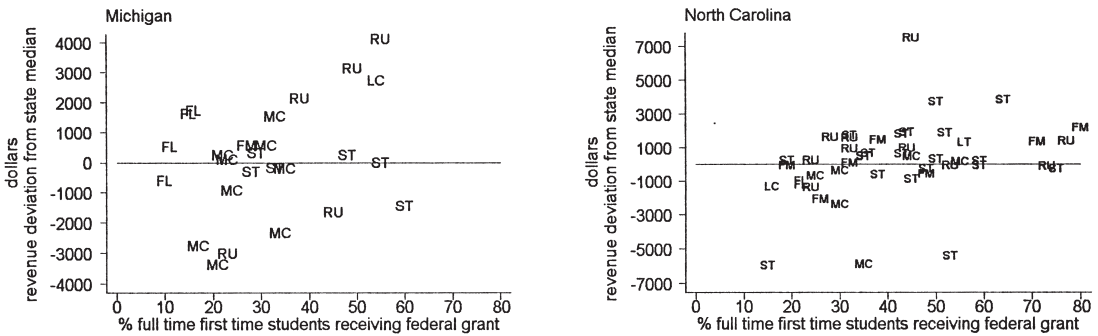


Figure 3. Revenue deviations by grant receipt in state-funded states, with geographic locale as case marker. The y-axis scale differs by state.



LC large city, MC midsize city, FL fringe large city, FM fringe midsize city, LT large town, ST small town, R rural

Figure 4. Revenue deviations by grant receipt in local-share states, with positive associations. Geographic locale is the case marker. The y-axis scale differs by state.

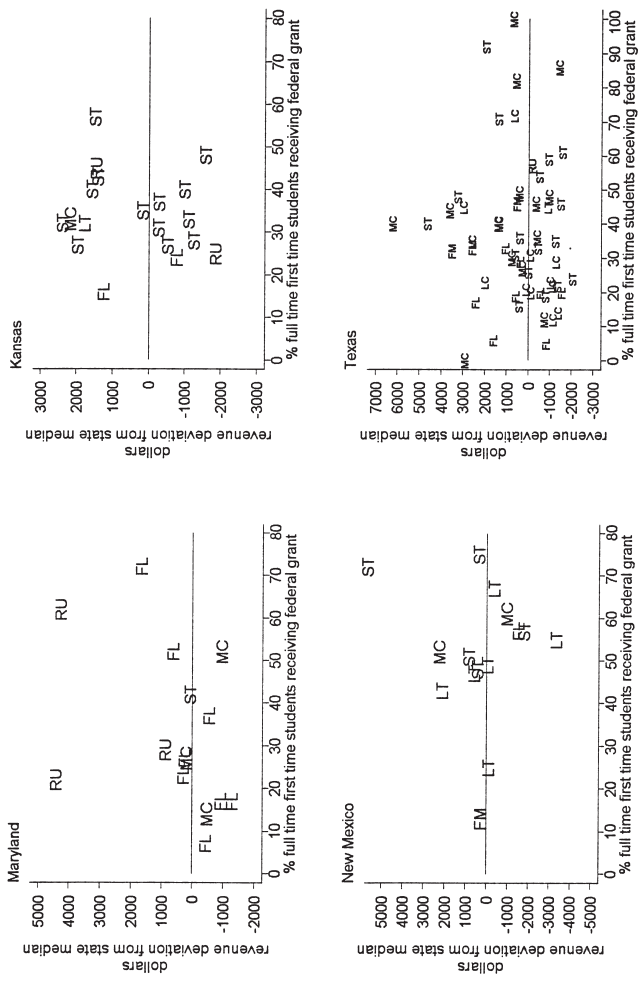


Figure 5. Revenue deviations by grant receipt in local-share states, with no association. Geographic locale is the case marker. The y-axis scale differs by state.

TABLE 6

VARIATION IN REVENUE DEVIATIONS BY FUNDING TYPE

In Dollars	*n*	*Min*	*25P*	*Mdn*	*75P*	*90P*	*Max*
State funded	256	454	690	807	1081	1139	1334
Local funded	368	334	846	904	1350	1472	1472
Total	624	334	763	872	1334	1467	1472
Revenue Index	*n*	*Min*	*25P*	*Mdn*	*75P*	*90P*	*Max*
State funded	256.00	0.39	0.86	1.00	1.14	1.37	2.15
Local funded	368.00	0.32	0.89	1.00	1.19	1.38	2.60
Total	624.00	0.32	0.74	1.00	1.16	1.38	2.60

Source: NCES IPEDS 2000–2001
n is based on sample with non-missing data, excluding California.
The revenue index is the absolute value of college revenue deviations as a proportion of the state median.

$1,330, there is no correlation between revenue deviations and grant receipt ($r = .01$). In summary, while deviations in three of four state-funded colleges are positively associated with grant aid, this relationship is found in only two of six local-share colleges. Positive revenue deviations in state-funded states are also more consistently associated with smaller geographic locales, suggesting that economies of scale are at play in these states.

DISCUSSION

This study examines several questions about the impact of local funding on community college finance equity. Community college systems in half of the United States have a structure similar to K–12 finance systems in that they rely on local governments for funding. By analogy between community college and K–12 finance structures, we hypothesized that local funding in community colleges creates revenue disparities that disadvantage the least affluent communities in a state.

Analyzing the federal IPEDS 2000–2001 finance data in 35 states, the study demonstrates that significant intrastate revenue disparities do exist. The average amount of appropriations from local and state governments for community colleges is $5,000 per FTE. The average of the absolute value of college revenue deviations from the state median is close to $1,000, ap-

proximately 20% of typical appropriations. The majority of the 35 states analyzed have an inter-quartile range of revenue disparities greater than $1,500 per FTE. In half of the states analyzed, the ratio of appropriations at the 90th and 10th percentiles falls in the range of 2.0 to 2.8. In comparison, Kenneth Wong (1994) characterizes spending disparities between high and low revenue K–12 districts of 2.6 in New York, 3.1 in Illinois, and 2.8 in Texas as among the "most severe" (p. 277), based on a 1990 report by the Congressional Research Service.

Though not as pronounced as these K–12 disparities, the size of community college revenue disparities in many states may nevertheless be considered quite substantial. Further analysis is required to determine where these disparities may be attributed to different combinations of general education, vocational, remedial, and other programs across campuses in a state. Several states employ weighting schemes in their funding formulas, based on cost studies of different fields of instruction, in which technical and remedial courses receive 1.5 to 2.0 times the funding of general education courses (*State Funding,* 2000).

Revenue variations tend to be larger in states with a local finance role, but the difference is a small proportion of total funding and is due in part to higher levels of appropriations in those states. Taking into account this broader context, state- and local-funded states have quite similar levels of revenue variation. However, some resource disparities are progressive, or equity enhancing, while others are regressive. To assess the equity of resource differences, we examined a subsample of 10 states with average absolute deviations exceeding $1,000 per FTE. We observed revenue deviations in these high-disparity states as equity enhancing in three of four state-funded states and in two of six local-share states, suggesting that local funding is more often, though not always, regressive. Since all local-share states also have state funding, these differences in funding patterns cannot be attributed exclusively to the local role but may be understood as resulting when local funding is commingled with state funding. Thus, the direction of revenue disparities, not the overall level, presents a cause for concern.

The results support theoretically based equity and efficiency arguments about the effects of a local role on community college finance. The local finance role appears to create revenue disparities that do not promote vertical equity. On the other hand, local-share states tend to have lower tuition and higher levels of funding from within-state sources, which may reflect the "efficient" nature of local voters supporting their local colleges. Colleges with a ratio of local appropriations to state appropriations of less than one-half also have the highest levels of revenues from all sources, excluding tuition and fees. This correlation suggests that, when local governments have responsibility for funding community colleges in collaboration with state governments, students benefit from a broader revenue stream. With

government officials at both the state and local level having a stake in the success of the local college, lobbying on behalf of the college and support for entrepreneurial activities may well increase.

These findings have implications for community college finance systems. States with a local finance share subordinate to the state share appear to receive higher revenues. It appears that intrastate variation in the resources available to a college in these states is also less likely to be determined by "rational" planning objectives, such as budget adjustments for low-income students or economies of scale. This situation may be socially beneficial if local financing contributes to a "leveling up" of resources, where all colleges benefit from higher public funding than they would in the absence of the local contribution. If this is the case, states with an existing local finance role should maintain them, while adopting policies that tax relatively high local revenue districts to provide additional funds to low-revenue districts. As Hoxby (2001) has shown in her analysis of the "leveling up" and "leveling down" effects of K–12 finance reforms, the tax price on high wealth districts should not be so high that it provides a disincentive for local funding in those districts; otherwise, the equalization policy may depress funding.

As state funding decreases, even states without a traditional local-finance role are placing greater expectations on individual colleges to generate additional funds, whether through academic entrepreneurship, auxiliary business activities, or fund raising (Burke & Serban, 1998). These efficiency initiatives have the potential of raising additional revenues but also create equity concerns as the state role in allocating resources diminishes. These states should also incorporate resource-sharing policies into incentive plans.

It is important to note that several factors for which controls have not been included due to data limitations may affect the interpretation of the findings. Most important, the observed correlation between positive revenue deviations and the proportion of students receiving grant aid may have meanings other than the equity-enhancing effect ascribed to it in this analysis. The proportion of students receiving grant aid may be affected by access to information and counseling regarding financial aid or by clarity of purpose among first-time students. If such factors are decisive in determining the proportion of grant recipients at a college, the positive correlation between higher levels of local and state appropriation and grant receipt may indicate revenue disparities in favor of more affluent communities with higher levels of college-related information and networking, or "social capital" (Coleman, 1988). In future analyses, the use of the IPEDS federal grant receipt variable should be supplemented with census income and poverty data to provide a better control for community wealth.

The higher levels of funding going to small-town colleges in some states have been interpreted here as compensating for diseconomies of scale. However, determining whether observed revenue disparities are appropriate

for that purpose requires more information about fixed and variable costs and controls for geographic price differences among urban, suburban, and rural areas. Higher costs in urban areas are likely to diminish the purchasing power of each dollar in revenue. This means that, for more accurate comparison revenue, differences must be adjusted by a cost index similar to those developed for studies of K–12 finance equity. Generally, we would expect that the use of a geographic index will shift state funding from rural to urban areas (Carey, 2003; Odden & Picus, 2004). With significantly greater appropriations per FTE awarded to rural and small colleges in several of the high-disparity states, it is important to evaluate whether the appropriation premiums for small size are based on actual cost differences. Such estimates are clearly politically sensitive, as they have the potential to significantly shift funding among institutions. In states where white residents are disproportionately located in small towns and students of color in urban areas, the higher funding for small towns may be due to racial group politics and disparities in legislative power. Complex interactions may also be at play. Stella Flores (2003) shows that Texas's funding formula and reliance on local-share funding results in both higher and lower funding for Hispanic Serving Institutions (HSIs) in communities providing a threshold tax rate. The majority of the HSIs receiving the short end of the deal are located on the U.S.-Mexican border.

As discussed above, some portion of the revenue disparities may be due to the location of high-cost programs, but there may also be differences in the geographic accessibility of students to those programs. States may locate specialized programs requiring technical facilities at a small number of campuses and expect mobile adults to travel to them, but this may not be a realistic option for students constrained by work and family commitments. Thus, while high-cost programs may explain some portion of the funding disparities, their location may also raise equity issues in regard to program access.

K–12 finance equity cases initially focused on inputs, but over time the judicial focus has shifted to promoting equitable student outcomes. This approach is termed "adequacy," and it holds states accountable for providing resources to schools sufficient to enable students to meet educational standards and become successful competitors in a global economy (Verstegen, 1998). The incorporation of adequacy standards into community college finance analyses would be consistent with the recent policy focus on higher education performance accountability (Dowd, 2003). An adequacy, or "outcome equity," approach shifts the question from "Is equitable funding being provided to colleges in the state?" to "Are equitable program completion rates being achieved?" The answer to the latter question implies disparate funding because students with greater educational needs will require greater resources. For example, a college enrolling a relatively high proportion of im-

migrants in a nursing degree program may well require resources to provide language tutoring to attain graduation rates equal to those of a program enrolling native English speakers. This example underscores the significance of such funding decisions when we consider the shortage of bilingual and ethnically diverse nurses in the United States (Butters, 2003). Similarly, as community colleges take on an increasing role in remedial education, it is important to ask what levels of resources are needed to successfully educate students to desired standards of achievement.

This study has focused on states with high-revenue deviations. However, it should also be noted that states with low funding disparities may have inequitable systems if students with unequal needs are being treated as equals by the financing system. In addition, without state-by-state information about unique programs and institutional missions, the analysis has focused on conservative measures of variation that were not determined by extreme values. This approach may have minimized the characterization of funding inequities in some states.

Half of the states in the sample have 90th percentile revenue deviation values greater than $1,900, which may deserve greater attention. Does the high funding for these institutions stem from unique institutional histories, unusual levels of political clout, data-reporting error, or rational planning decisions to efficiently locate high-costs programs? This study provides a foundation for future multivariate analyses and purposeful sampling for case studies. State analysts and institutional researchers may wish to replicate the results for their state using IPEDS and state data. The following factors should be considered when evaluating the equity of revenue disparities: economies and diseconomies of scale, geographic price differences, mix of program types, community and student racial and demographic characteristics, and program completion rates.

Notwithstanding the recent community college finance litigation in Oregon (Gomstyn, 2003), determination of what constitutes "fair" intrastate community college resource allocations will most likely depend on political processes, rather than on legal decisions like those that have so significantly shaped K–12 financing. While primary and secondary schooling are a constitutional right mandated by state law, postsecondary education is not. Today, however, many would argue that a community college education now sets the contemporary standard for full participation in the economic and democratic institutions of our country. If this rhetorical claim gains political support, then it could also be argued that states have a responsibility to fund community colleges according to adequacy or "outcome equity" standards. Many community college students have limited options about where they attend college, constrained as they often are by family responsibilities, employment obligations, and financial hardship. In these conditions, the funding disparities documented in this paper certainly deserve greater

understanding through academic analysis, action research by community college practitioners, and political debate within states.

References

Alexander, F. K. (2000). The changing face of accountability. *Journal of Higher Education, 71*(4), 411.

Bill Clinton's view on education: From acceptance speech. *Chronicle of Higher Education* (1996, September 16). Retrieved December 19, 2003, from http://www.chronicle.com.

Breneman, D. W., & Nelson, S. C. (1981). *Financing community colleges: An economic perspective.* Washington, DC: Brookings Institution.

Budget development approach/options and impact of formula/fair share funding. (2000). (Budget Request Framework Proposal). Boston: Board of Higher Education.

Burke, J. C., & Serban, A. M. (Eds.). (1998). *Performance funding for public higher education: Fad or trend?* San Francisco: Jossey-Bass.

Butters, C. (2003). *Associate degree nursing students: A study of retention in the nursing education program.* Unpublished dissertation, University of Massachusetts Boston.

Carey, K. (2003). *The funding gap: Low-income and minority students still receive fewer dollars in many states.* Retrieved December 15, 2003, from http://www2.edtrust.org/EdTrust/Product+Catalog/special+reports.htm#2003.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94* (Supplement), S95–S120.

Community colleges and the State University of New York. (1999). Boulder, CO: National Center for Higher Education Management Systems.

DesJardins, S. L. (2003). Understanding and using efficiency and equity criteria in the study of higher education policy. In J. C. Smart & W. G. Tierney (Eds.), *Higher education: Handbook of theory and research* (pp. 173–219). New York: Agathon Press.

Dowd, A. C. (2003, March). From access to outcome equity: Revitalizing the democratic mission of the community college. *Annals of the American Academy of Political and Social Science, 586,* 92–119.

Flores, S. (2003, November). *Disproportionate policies: Latino access to community colleges in Texas.* Paper presented at the Association for the Study of Higher Education, Portland, Oregon.

Garms, W. I. (1981). On measuring the equity of community college finance. *Educational Administration Quarterly, 17*(2), 1–20.

Gomstyn, A. (2003). Oregon judge rejects community-colleges' lawsuit seeking more state money. *Chronicle of Higher Education.* Retrieved November 17, 2003, from http://chronicle.com.

Hoxby, C. M. (2001, November). All school finance equalizations are not created equal. *Quarterly Journal of Economics,* 1189–1231.

Iowa Community College funding formula task force report. (1998). N.p.: Iowa Department of Education.

Metzler, J. (2003, Spring). Inequitable equilibrium: School finance in the United States. *Indiana Law Review, 36,* 561–608.

Monk, D. H. (1990). *Educational finance: An economic approach.* New York: McGraw Hill.

Odden, A. R., & Picus, L. O. (2004). *School finance: A policy perspective* (3rd ed.). Boston: McGraw-Hill.

Romano, R. M. (2003, October). *Financing community colleges across the states: An economic perspective.* Paper presented at the "Complex Community College" Conference, Cornell Higher Education Research Institute, Cornell University, Ithaca, NY.

State funding for community colleges: A fifty-state survey. (2000). Denver, CO: Center for Community College Policy, Education Commission of the States.

Study: Hope and Lifetime Learning are middle-class tax benefits, not financial aid. (2003, March 14, 2003). Retrieved December 19, 2003, from www.NASFAA.org.

Timar, T. B. (1994). Politics, policy, and categorical aid: New inequities in California school finance. *Educational Evaluation and Policy Analysis, 16*(2), 143–160.

Timar, T. B. (2003). *School governance in California: You can't always get what you want.* Retrieved April 30, 2003, from www.ucla-idea.org.

Verstegen, D. A. (1998, Summer). Judicial analysis during the new wave of school finance litigation: The new adequacy in education. *Journal of Education Finance, 24,* 51–68.

Wong, K. K. (1994). Governance structure, resource allocation, and equity policy. *Review of Research in Education, 20,* 257–289.