Financial Decentralization and Educational Performance:

Evidence from State-level Panel Data for the United States [*]

Nobuo Akai [†] Masayo Sakata[1] Ryuichi Tanaka[2]

Version 2005/08/09

Abstract

The purpose of this paper is to test the real effect of financial decentralization in two levels of school. While devolution of authority and responsibility for schools from central to local levels, decentralization of school functions, and reforms to the incentive structure of schools and their teachers are effective for achieving the high level of educational performance, increased local financing of schools after financial decentralization has opposite two effects, that is, (1) the local finance derives incentive for effective management (2) it may induce the lack of public resource for managing school, which is particularly needed in the basic level of education in the elementary school. This paper analyzes the effect of financial decentralization by focusing on the difference of levels of education, elementary and secondary educations. Our result shows that the effect of financial decentralization is not so clear in the elementary level but the financial decentralization is effective in the secondary level.

Key Words: Financial Decentralization, Educational Performance

JEL: H71, H72, H73, H77

[*] Any errors or shortcomings in the paper are our responsibility.

[†]Correspondence to: Nobuo Akai, School of Business administration, University of Hyogo, 8-2-1 Gakuen-Nishimachi, Nishiku, Kobe, 651-2197, Japan, TEL:+81-(0)78-794-6161, FAX:+81-(0)78-794-6166, E-mail: akai@biz.u-hyogo.ac.jp

[1] Faculty of Politics, Economics and Law, Osaka International University

[2] Institute of Social and Economic Research, Osaka University

CONTENTS

1. Introduction

While decentralizations of education in developed and developing countries have largely been driven, the role of a central government in delivering education services is also focused on in US, especially from the financial viewpoint. (Courant and Loeb, 1997)

The previous studies reveal that devolution of authority and responsibility for schools from central to local levels, decentralization of school functions, and reforms to the incentive structure of schools and their teachers, are effective for achieving the high level of educational performance. However, it is not often clear whether increased local financing of schools is compatible with the possible effect of management decentralization, because the local finance derives incentive for effective management but it may induce the lack of public resource for managing school, which is particularly needed in the district with disadvantaged economic backgrounds and end up reinforcing preexisting inequities. (Aaronson, 1999)

There is still no clear understanding of the appropriate finance system under which management decentralization leads to more effective education. Designing finance system needs careful attention.

At this standpoint, it is important to consider how the divergence of school finance among districts affects the educational outcome created in the school. This problem is related to Quality-Quantity Trade-Offs in Resource Allocation, which is discussed in Behrman et. al (2002). This is a trade-off between allocating resources toward providing broad access to education and improving the quality of existing ones.

Thus, in economies where both access to, and quality of, education are problems, should resources be expended on setting up schools in remote regions or on, say, increasing textbook availability in existing ones? Some researchers argue that the trade-off is only apparent because setting up schools without paying careful attention to quality encourages high dropout rates and grade failure, thereby leading to a failure to increase access to education in a meaningful way. The relevant issue for policy may be to identify at least approximately what constitutes a minimally acceptable quality of schooling and to determine how this level of quality may be delivered. This means that a serious attempt should be made in the elementary level of school and the financial intervention by the central government may be necessary.

If decentralization involves raising the resources for education locally, it runs the risk of unfairly favoring more prosperous municipalities and regions relative to those that have a weaker revenue base. The economic shock also directly affects the local finance of educational system. It is often discussed that financial decentralization results in the cut of fund for education because of the lack of resources in weak revenue base of the local level.

Society may have social benefits beyond private benefits from a distribution perspective that accrue to the nation rather than just the locality. For this reason, it is desirable to raise some of the funds nationally and transfer them to poor or disadvantage localities in which the social benefits, for distribution reasons, are relatively large.

So the central government needs to compensate for such regional differences by providing larger subsidies for education to poorer local governments and municipalities. Especially, in order to achieve the basic level of education which is the

primal purpose of the elementary education, this transfer scheme is needed.

The central government should take on a regulatory role to ensure that students from all municipalities and communities meet at least some basic learning and skills standards. (Roy, 2003) Indeed, it could be argued that the regulatory role of the central government in setting and enforcing minimum education standards is even more important in a decentralized than centralized management system.

However, designing the central transfer for achieving the primal goal of basic education faces the problem of how to provide information that can be used for assessments of distributions among localities of resources raised at the regional or national level and what criteria should be used for such redistribution. For pure distribution purposes, it would be desirable to have criteria that are related to the nature of the distribution targets.

If the criteria or goal of the elementary education is to maximize the lowest level in the elementary school, the power of distribution, which is the degree of financial centralization, will become relatively large.[3]

[3] In this paper, we focus on central government transfer to the local district as a tool decreasing the divergence and increasing the minimum level of education in the specific disadvantage district. However, there is another tool for it, that is, the direct transfer to student. It is often called demand side financing. Examples include stipends, student loans, targeted bursaries, and vouchers. This system, by making public schools compete with private schools for students, puts pressure on public schools to improve the quality of the education that they offer. The net result is increased efficiency and greater accountability in both public and private schools. However this movement has gained enormous political momentum in the US and the number of states that adopt this system is still low. No country in Asia has a national voucher program. So in this paper, we focus on only the central transfer. The efficiency of various types of finance system is analyzed in (Fernandez and Rogerson, 2003)

Giving distributional disadvantage and informational disadvantage of financial centralization, it seems important to consider its effect in each stage, namely elementary, secondary and so on.

It is theoretically discussed that elementary school should focus on the minimum level of education and the primary purpose of basic education is to provide the chance to having the minimum amount of education for all children in all districts equally. So the divergence of education system is not appropriate for elementary school from this point of view. This is because the lowest level of element education affects the externality for all students. The basic learning level in the element stage is very important for all over economy. If the level of basic learning is very low in some district, then the student having the education in this district may not have a chance to get a job and this creates negative externality for other people in the society. Actually, some previous papers insist that financial decentralization distorts the chance to have a basic education thus financial centralization is effective for raising the educational outcome in the lowest level strongly. (Benabou, 1996) [4]

This discussion clearly reveals that the financial divergence by local school finance, especially in elementary schools, becomes the social problem. This problem may dominate the advantage of local school finance. Then this inequity should be decreased by the intervention of the upper level of government, state government in US.

On the other hand, at the next stage of education, namely secondary education, this problem seems to be not so high. The local public finance may create the efficient

[4] Benabou (1996) analyzes the case where negative externality due to complementarity decreases economic efficiency.

educational outcome, by giving a chance for the student with highest level of learning ability. Noting that the imperfect information about local needs and local costs of goods and services may be disadvantage of centralization, the effect of decentralization in the higher level of education becomes large, compared with the low level education that is required to decrease inequity and increase the minimum learning level.

In this paper, in order to capture the difference of the effect of financial decentralization in the different stage of education, namely, elementary and secondary, we examine the real effect of financial decentralization in both stages of schools separately but by using the same method. In addition, we should be careful for the indicator of financial decentralization because the effect of financial decentralization depends on distributional characteristics. So we measure the degree of financial decentralization from the viewpoint of how the central transfer or intervention affects the divergence of local school finance. What the decentralization measure should be captured is not the amount of transfer to local level but quality of transfer viewed from the distributional point.

The rest of paper is constructed as follows. Section 2 presents the previous empirical studies focusing on the different effect of financial decentralization. Data and method for examining the effect is explained in Section 3. Results are presented in Section 4. Section 5 concludes our paper.

2. Previous empirical literatures

Using data for the American states, many researchers have studied the empirical relationship between educational finance system and several educational outcomes.

Some analyze the relationship between education finance system and educational expenditure (Peltzman, 1993 with cross-state data, Manwaring and Sheffrin, 1997, Murray, Evans and Schwab, 1998, Blankenau and Skidmore, 2004 with cross-state panel data, and Downes, 1992, Hoxby, 2001, Garvey, 2002, Wilson, Lambright and Smeeding, 2004 with district-level data). Others investigate the relationship between education finance system and student performance measured by test scores (Figlio, 1997 and Roy, 2003). However, since most of these studies treat primary and secondary education homogenously, none of them provide information on how the effects of decentralization vary across primary and secondary education.

For developing countries, several researchers study the effects by dividing school level into elementary school and secondary school. Behrman, Deolalikar and Soon (2002) estimate the effect of fiscal decentralization on schooling performance such as average test scores and dropout rates for the Philippines. King and Ozler (2005) estimate the effect of a school autonomy reform (decentralization in school management) on student performance measured by test scores for Nicaragua. Their results for developing countries show in common that educational decentralization (both in finance and management) has positive effect in elementary school, while its effect is insignificant in secondary school. Since their findings imply that the effect of decentralization be different across education levels, we estimate the effects of decentralization in education finance on the student performance in the U.S. for each primary and secondary education separately. Also our approach enables us to compare the effects of educational decentralization in the U.S. as a developed country with those in developing countries.

3. Data and Methods

We explain our data and variables in detail below. Descriptive statistics of all variables are shown in Table 1. The total numbers of observations in our data for the United States are different by variables. Hawaii is dropped from all observations, because all education services in Hawaii are provided by State, and not School District. Thus, Hawaii does not take system setting School District on providing service of public education. Therefore, we consider that Hawaii would have perfectly centralization system in education service.

The dependent variable, **Educational Outcome**, is measured by scores of test taken by students belonging with American elementary and secondary schools, or dropout rate in secondary schools.

In the American elementary school, we are able to obtain scores by seven subjects (Civics, Geography, History, Mathematics, Reading, Science, and Writing) presented by *National Assessment of Educational Progress* (NAEP) in National Center for Education Statistics[5]. NAEP Questions ask knowledge and skills of specific content area to students at 4^{th}, and 8^{th} grades in all states[6]. It is possible to compare performance on a specific question to the students across the states. However, there are not continuous test scores in all subjects and all states, because this test has been not carried out every year by all schools forcibly. We select mathematics score at 4^{th} and 8^{th} on 1996 and 2000 years to collect numbers of sample as many as possible. Unfortunately, pre-1992 data and pro-2000 data for our independent variables are

[5] These data by states is derived from web site, http://nces.ed.gov/nationsreportcard/states/.
[6] However, national assessment is conducted at 4^{th}, 8^{th}, and 12^{th} grade levels.

lacking. We modify these real score to deviation score (T-score) to take differences of test's difficulty by year into consideration.

Next, we use panel data of two test scores and dropout rate by state in American secondary school from 1995 to 2000 year. We are able to obtain two types of test score data measuring educational achievements of secondary school students in all states. They are college entrance exams taken most college-bound high school seniors, Scholastic Aptitude Test (SAT)[7] and the American College Testing (ACT)[8]. These nationwide college entrance exams are applied one or the other exam over the vast majority of college entrances. These test scores are available to represent an educational performance.

The former is SAT data in *Digest of Education Statistics* carried out by the National Center for Education Statistics (NCES). [9] The purpose of SAT is to check ability for applying the knowledge to sophisticated graduate program.

The latter, ACT is America's most widely accepted college entrance exam to assess high school students' general educational development and their ability to complete college-level work. The purpose of SAT is to check the learning level of high school curriculums.

However, these two data represents different characteristics because the purposes of two tests are different as described above and this difference derives the different outcome from the different viewpoint. Test takers are a self-selected group, and their decision on whether to take a test and which test to take can be affected by local

[7] The web site is http://nces.ed.gov/programs/digest/.
[8] The web site is http://www.act.org/news/data.html.
[9] The *Digest of Education Statistics* is to provide a compilation of statistical information covering the broad field of American education from pre-kindergarten through graduate school.

idiosyncrasies. Peltzman (1993) points out that they include any distortions because there are substantial differences in the geographic distribution of the SAT and ACT populations. This might be because some regional universities adopt one of two tests as a formal test.

Data shows that a correlation coefficient between percentage of graduates taking the SAT and the ACT (**Participation Rate**) on 2000 year is -0.96. Thus, neither test may be drawing a representative sample of college-bound students in a state. Moreover, if only the student who wants to enter small but high level university that requires one of two tests, test score becomes high in the region with the low participation rate and average test scores may fall as more students take a test. In fact, a correlation coefficient between percentage of graduates taking the SAT and mathematical score in SAT on 2000 year is -0.857. However, that of ACT represents -0.170. Given this situation, Peltzman (1993) adopts a single index of average test score by combining two data by weighting the participation rate. However this weighted average score may be not persuasive.

This paper resolves these biases behind test scores, by considering the following two points.

First, we consider the **Participation Rate** as one of the control variables.

Second, in order to capture unobservable geographic difference of distribution, we consider regional specific effects to control the differences across states in the panel regression and modifying these real scores to deviation score (T-score).

We can get cross-sectional and time-series score data of mathematical and verbal tests from SAT. In order to compare with the result of the elementary school, we report

the result from the mathematical score in our regression[10]. We can get the panel data of the total test score from ACT.

In addition, in order to check the robustness of our result, we adopt percent of 9th to 12th graders who dropped the school out as another indicator of educational outcome in secondary school. This data is available from 1995 to 2000 in the *Digest of Education Statistics.*

The key control variable is **Educational Decentralization Index**. As described in introduction, the disadvantage of decentralization is the divergence of financial positions among jurisdictions. The role of the state government is to decrease these differences among district. The degree of role of each government should be measured from this point. So we adopt a new indicator measuring the distributional role of the state government in education. In other words, we focus on the degree of state government's contribution to reduce a disparity of local education. We calculate its degree as a coefficient of variation of education expenditure per pupil for public education service in each state to a coefficient of variation of own tax revenue per pupil for education service in each state, which we call **Redistribution Power**. This indicator captures how the state government behaves in each state in order to decrease the disparity of educational level across school districts, by redistributing resources in each state. We should note that this indicator is different from existing one because our indicator captures the quality of transfer while the total transfer share, which is almost equal to the own revenue share in the total budget, capture only the degree of the transfer amount.

[10] We estimate regression model with vertical score as a dependent variable. We found out that its result is similar to the one that applies mathematical score.

In order to take differential school level in each school district into consideration, its indicator in our elementary school's regression is calculated by school districts' data of "elementary school system only"[11] and "elementary/secondary school system"[12] as strict as possible. If we use only data of "elementary school system only ", much of samples are dropped from. Similarly, its indicator in secondary school's regression is measured by school districts' data of "secondary school system only"[13] and "elementary/secondary school system". We obtain these data from *Public Elementary-Secondary Education Finance Data* in U.S. Census Bureau[14].

Based on the existing empirical studies of educational effect, we also use a set of control variables related with input on education service, and socio-economic characteristics. All variables excluded **Corruption Index** are taken from the *Statistical Abstract of the United States* published by the US Department of Commerce.

First, **Education Expenditure** (state and local governments' education expenditure on state as a proportion of nominal GSP) estimates the effect of expenditure on educational performance.[15] Second, **Pupil per Teacher (**proportion of number of students to number of teachers**)** estimates the effect of class size on educational performance. Third, **Households Income** (median household income of in

[11] "Elementary school system only" indicates a public school system that typically serves grades Pre-Kindergarten through 8.
[12] "Elementary/secondary school system" indicates a public school system that serves grades Pre-Kindergarten through 12.
[13] "Secondary school system only" indicates a public school system that typically serves grades 7 - 12.
[14] The web site is http://www.census.gov/govs/www/school.html
[15] We try to estimate with other variables; a share of state population living in metropolitan areas, average salary of teacher in each public school, unemployment rate, a proportion of public school to numbers of total school, and academic background of teacher. We drop them from variables in main results representing on tables, because they show strong correlation between other variables.

constant (1999) dollars) is used to capture a different level of household income. Forth, **Black Rate** (black population on state as a proportion of total population) is used to account for difference in state's racial composition. Finally, **Corruption Index** is used to account for political effects. The cross-state index of corruption is obtained from Boylan and Long (2002), who conducted a survey of state house reporters' perceptions of public corruption in their state in 1998. State house reporters were asked to rate the level of corruption among all employees in the state government (including elected officials, political appointees, and civil servants) on a scale from one to seven (least corrupt to most corrupt). Note that all variables are in log.

4. Regression Results

The aim of this paper is to estimate the effects of financial decentralization on educational performances of elementary and secondary schools, respectively. Moreover, we compare among both results. We represent the results based on both pooled data and panel models with one-way and two-way fixed effects.

4.1 Empirical Results of Elementary School

The results of regressions using data of two years (1996, 2000) of forty-nine states are summarized in Table 2. Table 2 shows the results of mathematical T-scores for Grade 4 and Grade 8.

Before examining the estimated marginal effects of our control variable, we discuss the appropriateness of our model specification. First, we check the problem related to collinearity among independent variables, by calculating VIF (variance

inflation factors) of each independent variable (not-reported). Since the mean VIF is quite low (about 1.5) for each regression, we do not need to be concerned about multicolinearity.

The basic empirical findings from pooled data and panel regressions can be stated as follows. The most important finding is that the estimated coefficient on educational decentralization of **Redistribution Power** is statistically insignificant in almost regressions excluding from one-way fixed effect model in Grade 4. And result of one-way fixed effect model in Grade 4 has a negative sign and statistically significant. These findings support that decentralization in elementary school doesn't affect to educational performance or retards advances on knowledge and skill of students in elementary school.

Table 2 also shows some other interesting findings. **Pupil per Teacher** is negative and significant in all models. This confirms that small size of class is progressed educational level. The **Black Rate** also has negative effect on educational performance in US states. Test scores would be sensitive to the racial composition. And **Corruption** is negative and significant in several regressions. This result implies that an inefficient allocation resource or a distortion of political power has negative effects on educational performance. However, this logic has been not sure in this paper yet. The positive effect of **Household Income** is also significant in all regressions. This result implies that educational performance depends on economic level of household in US states. The **Education Expenditure** is found to be insignificant.

4.2 Empirical Results of Secondary School

The estimated results of regressions in secondary school by using data collected with

six years (period from 1995 to 2000) and forty-nine states are presented in Table 3[16]. There are three independent variables indicating educational outcome in secondary school, mathematical test's t-score on SAT, t-score on ACT, and dropout rate (this variable is modified by 100 minus dropout rate).

It should be emphasized that the results of **Redistribution Power** are positively signed and statistically significant in almost of regressions, excepted from panel analyses in ACT score. The positive significant coefficient of this indicator suggests that smaller degree of concernment to educational management of state government develops more educational performance in secondary school.

The estimated results of other variables derived are similar to elementary school.

4.3 Summary of Empirical Results

We discussed the results in elementary and secondary schools. These results are summarized that the educational decentralization in elementary school has no effect or might be injured to advance of education, while in secondary school, the effect is positive significantly. These results support our theoretical hypothesis explained in introduction, namely the main purpose of education in the elementary school raises the minimum learning level and decreases inequity among districts while education in secondary school is expected to promote the learning level in efficient district, rather

[16] Appendix A shows the result using weighted average score of SAT and ACT. The single score is sum of t-score in SAT and t-score in ACT multiplied by share of percentage of graduates taking the SAT and the ACT, respectively. Appendix A shows the robust result that educational decentralization contributes to educational achievement in secondary school.

than inequity. This efficient mechanism works in decentralized financing system.

5. Conclusion

The effect of financial decentralization on educational performance has been a major focus of debate and discussion in the context of recent public reforms. This paper has presented new empirical evidence on this important issue, which is that financial decentralization may contribute to educational performance in secondary school, not in elementary school.

To investigate the contribution of financial decentralization more thoroughly, it is necessary to construct accurate decentralization indicators that reflect American educational system.

Appendix A: Weighted Average T-Score of SAT and ACT assessment

Weighted Average T-Score of SAT and ACT in Secondary School : 1995-2000.

		Secondary School Weighted Average T-Score of SAT and ACT		
		Pooled	Panel	Panel
	Constant	-1.238	-	-2.018
		[.106]	-	[.005]
Education Variables	Education Expenditure	0.016	0.241	0.158
		[.840]	[.019]	[.057]
	Pupil per Teacher	-0.038	-0.031	-0.066
		[.633]	[.734]	[.383]
Economic and Social Variables	Household Income	0.491	0.621	0.594
		[.000]	[.000]	[.000]
	Black Rate	-0.063	-0.059	-0.061
		[.000]	[.000]	[.000]
	Corruption, 1998	-0.014	-0.027	-0.011
		[.673]	[.469]	[.709]
Educational Decentralization	Redistribution Power	0.133	0.136	0.135
		[.000]	[.000]	[.000]
	Adj R-squared	0.530	0.540	0.538
	Number of obs	234	65	65
	State Dummy	no	yes	yes
	Time Dummy	no	no	yes
Hausman test				
	CHISQ(6), or CHISQ(11)	-	23.723	4.715
	P-value	-	[.0006]	[.9442]

Note: Figures in parentheses are the absolute values of p-statistics.Hawaii is exculed from sample. The Hausman test tests the null hypothesis of a random effects model against a fixed effects model. The dependent varible is the average score adjusted

Table 1: Descriptive Statistics

Variable	Period	Obs	Average	Std. Dev.	Min	Max
Mathematical Socre for Grade 4	1996, 2000	81	223.62	6.61	208	234
Mathematical Socre for Grade 8	1996, 2000	77	271.92	8.79	250	287
Mathematical Socre in SAT assessment	1995 - 2000	294	533.15	34.13	473	609
ACT Score	1995 - 2000	294	21.06	0.88	18.70	22.70
Dropout Rate	1995 - 2000	203	5.082	1.849	2.40	11.60
Redistribution Power	1996, 2000	80	0.444	0.185	0.129	0.934
	1995 - 2000	246	0.273	0.036	0.180	0.373
Education Expenditure	1996, 2000	98	0.289	0.041	0.189	0.373
	1995 - 2000	294	0.273	0.036	0.180	0.373
Pupil per Teacher	1996, 2000	98	16.156	2.253	12.128	24.415
	1995 - 2000	294	16.220	2.193	12.128	24.415
Participation Rate of SAT	1995 - 2000	294	35.486	27.009	4	81
Participation Rate of ACT	1995 - 2000	294	41.262	27.900	1	84
Household Income	1996, 2000	98	38,769	6,069	26,637	56,042
	1995 - 2000	294	38,690	5,923	26,637	56,042
Black Rate	1996, 2000	98	0.101	0.095	0.003	0.363
	1995 - 2000	294	0.101	0.094	0.003	0.363
Corruption Index	1998	47	3.484	1.137	1.500	5.500

Table 2: Empirical Results of Elementary School

Mathmatical T-Score for Grade 4 and 8 in Elementary School : 1996, 2000.

		Elementary School Mathematical T-Score for Grade 4			Elementary School Mathematical T-Score for Grade 8		
		Pooled	Panel	Panel	Pooled	Panel	Panel
	Constant	-1.065	-1.235	-4.462	-2.230	-2.464	-4.620
		[.574]	[.506]	[.000]	[.166]	[.113]	[.000]
Education Variables	Education Expenditure	0.173	0.167	0.346	0.071	0.062	0.121
		[.280]	[.295]	[.007]	[.609]	[.652]	[.273]
	Pupil per Teacher	-0.378	-0.385	-0.523	-0.242	-0.255	-0.398
		[.031]	[.024]	[.000]	[.094]	[.070]	[.000]
Economic and Social Variables	Household Income	0.591	0.609	0.974	0.654	0.679	0.928
		[.002]	[.001]	[.000]	[.000]	[.000]	[.000]
	Black Rate	-0.055	-0.053	-0.061	-0.073	-0.072	-0.082
		[.008]	[.007]	[.000]	[.000]	[.000]	[.000]
	Corruption, 1998	-0.117	-0.126	-0.146	-0.124	-0.132	-0.135
		[.144]	[.112]	[.013]	[.066]	[.046]	[.008]
Educational Decentralization	Redistribution Power	0.028	0.024	-0.066	0.061	0.059	0.014
		[.599]	[.638]	[.052]	[.173]	[.176]	[.640]
	Adj R-squared	0.487	0.488	0.546	0.656	0.657	0.681
	Number of obs	65	65	65	62	62	62
	State Dummy	no	yes	yes	no	yes	yes
	Time Dummy	no	no	yes	no	no	yes
Hausman test							
	CHISQ(6), or CHISQ(7)	-	8.203	2.279	-	6.640	1.414
	P-value	-	[.2236]	[.9428]	-	[.3554]	[.9851]

Note: Figures in parentheses are the absolute values of p-statistics.Hawaii is exculed from sample. The Hausman test tests the null hypothesis of a random effects model against a fixed effects model.

Table 3: Empirical Results of Secondary School

T-Score of SAT and ATC and Dropout Rate for Secondary School : 1995-2000

		Secondary School Mathematical T-Score for SAT			Secondary School T-Score for ACT			Secondary School 100 - percentage of Dropout Rate		
		Pooled	Panel	Panel	Pooled	Panel	Panel	Pooled	Panel	Panel
	Constant	0.988	-	-	-5.355	-	-	4.643	-	-
		[.017]	-	-	[.000]	-	-	[.000]	-	-
Education Variables	Education Expenditure	-0.135	-0.050	-0.065	-0.248	-0.099	-0.114	0.031	0.056	0.052
		[.001]	[.339]	[.220]	[.003]	[.358]	[.298]	[.021]	[.003]	[.006]
	Pupil per Teacher	-0.065	0.211	0.176	-0.123	-0.189	-0.225	-0.040	-0.054	-0.064
		[.112]	[.089]	[.172]	[.141]	[.056]	[.030]	[.003]	[.001]	[.000]
	Participation Rate	-0.197	-0.191	-0.191	-0.006	-0.005	-0.003	-	-	-
		[.000]	[.000]	[.000]	[.580]	[.719]	[.821]	-	-	-
Economic and Social Variables	Household Income	0.338	0.394	0.401	0.863	1.050	1.071	0.007	0.030	0.033
		[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.531]	[.028]	[.016]
	Black Rate	-0.014	-0.014	-0.017	-0.095	-0.094	-0.097	-0.001	0.001	-0.001
		[.004]	[.005]	[.001]	[.000]	[.000]	[.000]	[.586]	[.727]	[.787]
	Corruption, 1998	-0.038	-0.041	-0.035	-0.010	-0.027	-0.018	-0.009	-0.011	-0.007
		[.022]	[.023]	[.057]	[.781]	[.481]	[.632]	[.115]	[.096]	[.293]
Educational Decentralization	Redistribution Power	0.031	0.031	0.040	0.060	0.038	0.045	0.008	0.008	0.010
		[.009]	[.026]	[.005]	[.015]	[.191]	[.143]	[.029]	[.069]	[.026]
	Adj R-squared	0.882	0.894	0.895	0.623	0.647	0.641	0.227	0.276	0.300
	Number of obs	234	234	234	234	234	234	165	165	165
	State Dummy	no	yes	yes	no	yes	yes	no	yes	yes
	Time Dummy	no	no	yes	no	no	yes	no	no	yes
Hausman test										
	CHISQ(6), or CHISQ(11)	-	20.585	24.857	-	27.092	22.773	-	12.617	17.777
	P-value	-	[.0044]	[.0155]	-	[.0003]	[.0297]	-	[.0495]	[.0869]

Note: Figures in parentheses are the absolute values of p-statistics.Hawaii is exculed from sample. The Hausman test tests the null hypothesis of a random effects model against a fixed effects model.

References

Aaronson, D., (1999), “The Effect of School Finance Reform on Population Heterogeneity”, National Tax Journal, Vol. 52(1), 5-29.

Behrman, J. R., Deolalikar, A. B., and Soon, L. Y. (2002), “Promoting Effective Schooling through Education Decentralization in Bangladesh, Indonesia, and Philippines”, ERD Working Paper No.23, Asian Development Bank.

Benabou, R., (1996), “Heterogeneity, Stratification and Growth,” American Economic Review, Vol. 86, 584-609.

Blankenau, W., and Skidmore, M., (2004), “School Finance Litigation, Tax and Expenditure Limitations, and Education Spending: An Empirical Analysis,” Contemporary Economic Policy, Vol. 22(1), 127-143.

Boylan, R.T. and Long, C.X., (2002), “A Survey of State House Reporters’ Perception of Public Corruption, Washington University in St. Louis, St. Louis, Missouri”, mimeo.

Courant, P., and Loeb, S., (1997), “Centralization of School Finance in Michigan”, Journal of Policy Analysis and Management, Vol.16, 114-136.

Downes, T., (1992), “Evaluating the Impact of School Finance Reform on the Provision of Public Education: The California Case”, National Tax Journal, 45(4), 405-19.

Fernandez, R., and Rogerson, R., (2003), “Equity and Resources: An Analysis of Education Finance Systems”, Journal-of-Political-Economy, 111(4), 858-897.

Figlio, D., (1997), “Did the ‘Tax Revolt’ Reduce School Performance?” Journal of Public Economics, Vol. 65(1), 245-69.

Galiani, S., and Schargrodsky, E., (2001), “Evaluating the Impact of School Decentralization on Education Quality”, mimeo.

Garvey, D. L., (2002), “Does School Finance Centralization Reduce The Growth of Instructional Spending: The Case of Reform in Washington”, mimeo.

Hoxby, C., (2001), “All School Finance Equalizations Are Not Created Equal,” The Quarterly Journal of Economics, Vol.116(4), 1189-1231.

King, E. M., and Ozler, B., (2005), “What's Decentralization Got To Do With Learning? School Autonomy and Student Performance”, 21COE, Interfaces for Advanced Economic Analysis, Kyoto University.

Manwaring, R., and Sheffrin, S. M., (1997), “Litigation, School Finance Reforms and Aggregate Educational Spending”, International Tax and Public Finance, Vol.4, 107-127.

Murray, S. E., Evans, W. N., and Schwab, R. M., (1998), “Education-finance Reform and the Distribution of Education Resources.” American Economic Review, 88(4), 789-812.

Peltzman, S., (1993), “The Political Economy of The Decline of American Public Education”, Journal of Law & Economics, Vol. XXXVI, 331-370.

Rajkumar, A. S., and Swaroop, V., (2002), “Public Spending and Outcomes: Does Governance Matter?”, Word Bank.

Roy, J., (2003), “Impact of School Finance Reform on Resource Equalization and Academic Performance: Evidence from Michigan”, Princeton University. mimeo.

Wilson, K., Lambright, K., and Smeeding, T. M., (2004), “School Finance, Equivalent Educational Expenditure and Income Distribution: Equal Dollars or Equal

Chances for Success?”, mimeo.