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Kim, Soojin; Eom, Tae Ho

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A panel data analysis of the impacts of institutional differences on local governments' budgetary decisions

Soojin Kim

Rutgers University, USA

Tae Ho Eom

Yonsei University, Republic of Korea

Abstract This study provides empirical evidence on how institutional differences influence school budget decisions by using panel data from 178 K-12 New Jersey school districts for the period 1996 to 2007. The findings obtained by the Newey-West model, correcting heteroskedasticity and serial correlation, support our hypothesis that school districts with elected school boards (Type II districts) are more likely to be effective at lowering school spending than ones with appointed school boards (Type I districts). Viewing school systems through the lens of new institutional economics, this study argues that institutional differences in governance are critical in leading to differences in budgetary decisions by affecting incentive structures faced by public officials, along with transaction costs and agency costs.

Points for practitioners To date, the issue of the impact of institutional differences on local budgetary decisions has been an ongoing topic of debate among many scholars and practitioners in the public administration field. This implies that as an effective incentive structure as well as constraint mechanism, direct electoral institutions in school districts can be a valuable tool to control growing education spending by placing clear accountability on school boards in shaping school budget decisions. Policy makers should consider feasible strategies accompanied by institutional changes in a situation in which local governments are challenged to manage their budget effectively under fiscal stress.

Introduction

The last few decades have witnessed dramatic changes in U.S. local public finances due to unforeseen financial crises. Most local governments, including school districts, have struggled with collecting sufficient revenue to cover spending demands and maintaining budget balances. Historically, in their status as independent special-purpose local governments, school districts in the United States have provided an elementary and secondary education service under state law. They hold a power to tax and have independent authority over the education policy, budget decisions, and recruitment of instructional personnel (Moscovitch et al., 2010). The governing body for school districts is

generally called a school board, board of education, or board of trustees, and is typically elected by direct voting or appointed by other government officials such as city mayors. The school board appoints a superintendent as a chief executive to implement and carry out the administrative functions.

Like general-purpose local governments including towns, cities and counties, school districts are funded by local revenue sources, mainly local taxes, and subsidy from upper-level governments, i.e. states and federal government. Most school districts today are facing difficulties in dealing with the declines in both external and internal funding; such declines have primarily resulted from reduced local revenues from real estate taxes, as well as lagging state budgets and increasingly high-cost state programs (Center for Public Education, 2010). In this situation, school districts are required to decide how to balance their budgets without compromising the needs of their students, and are expected to allocate and manage their financial resources effectively.

Examining school districts' spending behavior has been a popular and significant research topic in terms of identifying and testing the theoretical framework – including public choice theories – and its policy implications in the U.S. local public finance field. Particularly, it has attracted increasing scrutiny of the likelihood that differentiated institutional arrangements between school districts may trigger a disparity in budget

decisions. To shed light on the impact of individual institutions, a line of recent research has empirically examined how institutional differences lead to different levels of local spending in the context of a general political dichotomy—direct versus indirect democracy—at large (Ebdon, 2000; LaManque, 1992; Nguyen-Hoang, 2012). However, it seems that despite progress in the research, somewhat limited and contradictory sets of results obtained by these studies still leave some questions unanswered. This appears to be partly due to the lack of consensus on the causal link between a certain institution, participants' spending behaviors, and subsequent local spending levels. Additionally, using mostly cross-sectional data, a body of studies has tended to focus on program evaluation approaches along with generally accepted theories, including a budget constraint model based on consumer choice theory. Most of them have failed to address the variations in the incentive structures faced by public officials and the embedded costs of their behaviors, particularly in terms of deciding the local government budget, given their specific political structures and socio-economic circumstances.

With these challenges in mind, this study aims to go a step further with an estimation model using a panel data analysis for a relatively long time period, and to fill the gap in the literature by drawing on a broad perspective taking in transaction cost theories based on institutional economics. The empirical setting of this study allows for deeper probing of the

issue regarding how institutional differences shape budget participants' behaviors and affect spending levels in school districts.

Institutional Differences in New Jersey School Districts

In determining the size of school budgets each year, each state has its own fiscal rules and related institutions. For example, Pennsylvania has elected school boards, and New York implements school budget referendums in most school districts (Feld and Grossman, 1984). New Jersey appears to combine both methods when it comes to proposing and adopting school budgets. In New Jersey school districts, the allocation decisions for financial resources occur after individual schools (school administrators) prepare their budgets according to their best interests and submit them to the district for approval. The school boards then engage in a process of overseeing budgets, preparing to vote for issuing bonds or raising school taxes, and awarding contracts (Hochschild, 2005). At the final stage, that is to say when confirming the budgetary decision on the overall educational programs for the next school year, whether or not there is a budget referendum appears to induce considerable variance among school districts.

According to the New Jersey School Boards Association (2011), out of 603 school districts in total, 50 districts with mayor-appointed school boards are categorized as Type I

districts, while 553 districts including consolidated local districts, regional districts, and non-regional/non-consolidated districts with elected boards are categorized as Type II districts in the 2010-2011 school year. Specifically, Type I districts refer to local school districts established in a city, where board members are appointed to three-year terms by the municipality (e.g., mayor or other chief executive officers of the borough, city, town, township, or village) (NJDOE, 2007). The boards can consist of five, seven, or nine members depending on the size of the population. In contrast, Type II districts represent local school districts where board members are elected or appointed by the municipality, as applicable (Moscovitch et al., 2010). To get elected to a school board, candidates must complete a nominating petition including the signatures of at least ten voters living within the district, and must then comply with all state requirements for the campaign. On the other hand, to be appointed (by a mayor), no special requirements exist. In practice, however, all Type II districts have only elected school boards as in the dataset we are analyzing. Since 1990, ten school districts have changed from appointed to elected school board structures, whereas four districts have changed from elected to appointed school boards. In our dataset covering 1996–2007, only Englewood city changed its status.

Arguably, these two types of school districts have markedly different budgetary decision-making processes. Although both types prepare their budgets with the same

formats and guidelines (e.g., public hearing and evaluation), there is a clear difference with regard to the final adoption of proposed budgets. Table 1 presents a list of chronological steps in the school budget procedure for each type of district (NJDOE, 2013). It shows that each school district type has a different set of important dates for budget preparation, determination, and restoration,¹ as well as different actors engaged in the budget procedures.

Type I districts have a relatively short budget decision-making process, lasting about three months; it begins with the adoption and filing of the budget and continues until the first regular board meeting after the application for budget restoration. In contrast, Type II districts generally take about four months to implement the budget adoption and annual school election followed by the first regular board meeting; this includes the public notice for the annual school election, petitions, voter registration deadlines, the mailing of sample ballots, and application for restoration¹ based on comments by the board of education and governing body. In the event of a budget defeat in Type II districts, municipal governing bodies (e.g., the mayor and council members, board of trustees, or committee members) should consult with the school boards to determine the items rejected during the election, although they do not have the authority to reinstate any amount of the rejected item(s) (NJDOE, 2012, 2013).

In Type I districts, fiscal requirements such as school appropriations are subject to review and final determination by the board of school estimate. This governing body consists of two members from the school board, two members from the governing body of the municipality, and the mayor or chief executive officer of the municipality (Moscovitch et al., 2010). On the other hand, in Type II districts, the budget decisions such as the amount of local school tax levies and bonds to be issued are made by elected school board members and subsequently, voters' approval being followed (U.S. Census Bureau, 2007). Taken together, this study posits that the main differences concern whether school districts have elected or appointed boards and are obligated to hold a budget referendum as a final step in the school budget decision-making process.

Literature Review

In the broad context of direct versus indirect democracy, a body of previous research has focused on local municipalities and school districts to empirically examine how institutional differences lead to differences in local budgetary decisions. Yet, empirical evidence provides little consensus on the relationship between institutional arrangements and local spending levels.

Santerre (1989) compared education spending in an open-town-meeting form of local governments and representative local governments using 90 jurisdictions in Connecticut. The regression analysis results provided contradictory findings. While school expenditure per pupil was nearly 3–5 percent lower in communities with a representative government than in directly democratic ones with open town meetings, the per capita municipal spending was nearly 8–9 percent higher in representative governments (Santerre, 1989: 149). Later, Sass (1991) examined spending differences across two forms of democratic government, representative democracy (e.g., representative town meeting, mayor-council, and council-manager government) and direct democracy (e.g., open-town-meeting government). In particular, this study explored the impact of government structures on public spending based on whether the structure was exogenous or endogenous. The findings revealed that in the former case, per-pupil school expenditures in representative democracies were lower than in direct democracies, whereas in the latter case, no differences were found.

Farnham (1990) examined the impact of three different institutions of direct citizen influence—initiative, referendum, and recall—on the level of public expenditure, using a national sample of communities with populations greater than 10,000 persons. The study revealed that only the referendum had a significant positive effect on the level of local

public expenditure. Likewise, Steunenberg (1992) compared how three different institutional arrangements—obligatory fiscal referendum, voter initiative, and veto power of an elected executive official—affected the level of public expenditure in different ways. He found that direct voter initiatives yielded the smallest budgets compared with jurisdictions that used the other institutional arrangements.

Analyzing spending levels of school districts in New Jersey and New York, respectively, Megdal (1983) and LaManque (1992) reported no significant differences in total expenditures per pupil and annual percentage changes in public school expenditures, respectively, between school districts with and without budget referendums, nor did they find a consistent pattern regarding expenditure increases in the non-referendum districts. In contrast, other studies have offered evidence that budget referendums have the effect of lowering total local spending. Ebdon's (2000: 36) regression results indicated that in the state of New York, city districts without budget referendums tended to spend about 2 percent more on teaching expenditures and 7.9 percent more on non-teaching expenditures than suburban districts with budget referendums. More recently, Nguyen-Hoang (2012: 89–90) explored the fiscal impact of budget referendums on school inputs by using difference-in-difference estimations for small-city NY school districts in 1998. The findings revealed

that budget referendums, as a budget constraint mechanism, led to reductions in the total school spending per pupil (\$160) and instructional spending per pupil (\$139).

Transaction Costs and Institutional Incentives

A key rationale behind new institutional economics is that institutions provide incentives or constraints to mitigate the behavioral and interactional problems arising from information asymmetry and the uncertainty of human actions, such as self-interested and opportunistic behaviors in the public decision-making process. Specifically, political institutions can shape the actions of policy makers, including elected officials or bureaucrats, through institutional arrangements (Chan and Rosenbloom, 1994; Clingermayer and Feiock, 2001). For example, when making policy decisions at the local level, mayor-council governments are more inclined to respond to economic and political incentives than are council-manager governments, as appointed leaders tend to maximize their personal and political goals (Feiock et al., 2003). Although previous studies reported contradictory findings with regard to expenditure levels between governance structures (Jung, 2006), in the mayor-council government, mayors usually face re-election every certain number of years; therefore, they are more likely to be responsive to voters' preferences (Sass, 1991).

According to transaction cost theory, transaction costs occur naturally when people interact because human actions are related to uncertainty, limited rationality and information, frequency, choice, exchange, and opportunistic behaviors (Williamson, 1995). Inman and Rubinfeld (1997) and Feiok et al. (2009: 257) view such costs in terms of five different categories: (1) bargaining (negotiating) costs, (2) information costs, (3) agency costs, (4) division costs, and (5) monitoring costs. As a collective choice mechanism, group decision making occurs under representative democracies and causes higher agency costs, as public officials tend to use discretions for political ends without considering a majority of citizens' preferences (Feiok, 2002). Conversely, in the decision-making process under a direct democracy, bargaining costs increase because a large number of participants can cause delays in the reaching of mutual consensus, while agency costs decrease due to the higher probability that the interests of constituents are more likely to be reflected (Feiok, 2007).

Principal-agent theory, another branch of new institutional economics, asserts that, ideally, although agents' actions and information are not perfectly observed by the principal, they should serve the principals' interests. In practice, however, due to asymmetric information and conflicts of interest, bureaucrats, as agents, are able to shirk their principals to pursue their own interests; this entails inefficiency or overproduction (Brehm and Gates,

1997). The idea underlying this theory is that those who make claims on governmental resources are agents; on the other hand, the counterparts who are in charge of allocating and rationing such resources are principals (Forrester, 2001). In a broader context, Niskanen's budget-maximizing bureaucrat approach argues that the agent is the budget-maximizing bureaucrat and the principal is the "budgetary sponsor" or "collective organization," which is ultimately the electorate (Niskanen, 1975). Thus, voters are principals and school boards (public officials), regardless of being elected, are agents. Given such relations, principals tend to control school budgets and monitor their agents' behaviors through political and direct control such as budget referendums and school elections as in existing studies (Ebdon 2000; Nguyen-Hoang, 2012; Steunenberg, 1992).

In examining school districts and local municipalities, previous studies have commonly found that voters as "fiscal conservatives" tend to be in favor of lower levels of public spending (Farnham, 1990; Megdal, 1983; Nguyen-Hoang, 2012; Peltzman, 1992; Steunenberg, 1992). Additionally, scholars have long recognized that electoral institutions can function as an incentive to hold public officials and political agents accountable in terms of not only principals' preferences but also agents' past performance (Persson and Tabellini, 2000). Appointed school boards (non-elected executives), who generally represent the government bureaucracy, may behave like budget maximizers under relatively

weak bureaucratic control (LaManque, 1992; Steunenberg, 1992). In contrast, elected school board members are more likely to act in response to the preferences of a majority of their constituents because of their re-election or chances of appointment in the next term (Feiock et al., 2009). As such, citizens' preferences regarding school resource allocation are more likely to be voiced and reflected in elected school boards than in appointed ones (Ebdon, 2000; Megdal, 1983).

In line with the aforementioned theoretical approaches, we posit that institutional differences in governance matter not only in influencing the incentive structures faced by public officials, along with transaction costs, particularly agency costs, but also in leading to differential budgetary decisions. It can be hypothesized that direct electoral institutions are more likely to be effective at lowering agency costs and mitigating the principal-agent problem by substituting bureaucratic incentives based on self-interest with those based on public interest in response to voters' preferences.

Research Model

Taking into account the conceptual context described above, we examine the likelihood that institutional differences in school districts influence budget decisions. Specifically, to test this framework, our model to be estimated is:

$$E = f(I, M, N, C, D, W, O)$$

where E represents expenditure per pupil as a measure of school budget decisions; I represents institutional differences in school districts, including elected or appointed school boards; M represents median voter characteristics measured by median income and tax share; N represents the size of school districts, indicating economies of size in education; C represents cost and environmental factors; D represents student demographic factors as a proxy for household environment that cannot be captured by cost and environmental variables; W represents community fiscal capacity; and O represents other factors surrounding school districts as controls. We discuss each component of the model in further detail.

One of the conceptual difficulties facing researchers in the research on local public goods is the aggregation of individual preferences in a community. As with the existing literature on local spending behaviors, we use the median voter framework as the basic model for exploring the underlying collective decision-making mechanism (Duncombe and Yinger, 1999; Gramlich and Rubinfeld, 1982; Megdal, 1983; Nguyen-Hoang, 2012). Based on previous assumptions (Inman, 1978), the preferred level of local services is determined by the median voter's income and tax price. Institutional differences, then, represent the

impacts of elected versus appointed school boards while controlling for the impact of the primary determinant, i.e., the median voter's preference.

The size of school districts is another important component of school districts' expenditure in terms of economies of scale. The literature on economies of scale in education has been debated theoretically rather than empirically, and most empirical studies suffer from methodological and theoretical weaknesses (e.g., Fox, 1981).

Including cost and environmental factors in the model is critical to ensure the validity of the results. A body of literature on education costs argues that school districts in disadvantaged areas must spend more compared with those in favorable environments (Duncombe and Yinger, 1999). This argument is analogous to the idea that households in regions with harsh winters must spend more for heating than those in warm regions (Duncombe and Yinger, 2001). Cost and environmental harshness is measured by students' characteristics within a district. For example, a district with a relatively large proportion of students receiving free lunch must spend more to increase its students' average performance, assuming that such students are more likely to live and be educated in an underprivileged environment.

Data, Measures, and Methods

Data

Table 2 displays descriptive statistics using 12-year panel data for 178 New Jersey school districts for the period of 1996 to 2007. Statistics are based on a total of 2,136 observations with balanced panel data. As noted earlier, New Jersey school districts have unique institutional arrangements. They are basically highly fragmented into different types of districts, including those that educate students in grades K-12, K-8, K-6, 7-12, and 9-12. Among them, K-12 districts covering kindergarten (preschool) through to 12th grade are most typical of the U.S. school system. To promote the validity of the comparison and the consistency of our estimation, we therefore focus only on K-12 districts that have both fiscal and operating responsibilities, excluding county vocational and special service districts. In addition, descriptive statistics reveal that, compared with Type II districts, Type I districts are all located in urban areas, having larger enrollments of students and suffering from cost and environmental disadvantages measured by the percentages of students receiving free lunch, limited English proficient (LEP) students, and special education students. The aggregated panel data were collected from the New Jersey Department of Education, New Jersey Legislative District Data Book, New Jersey School Boards Association, and the U.S. Census Bureau.

Variable specifications

As the dependent variables, we construct three different measures of education spending level—total expenditure per pupil, instructional expenditure per pupil, and administrative expenditure per pupil. School districts are primarily financed by local resources which are mainly derived from property taxes and intergovernmental transfers (federal and state aid based on sales and income taxes). The total amounts of intergovernmental transfers are determined by state and federal governments so that once the total budget of a school district is determined, the gap between the total budget and external revenue should be filled by own revenue through adjusting tax rates. A combination of internal and external sources is used to support a certain level of education expenditure necessary to student performance. Hence, the total expenditure reflects the local preferences for a certain level or quality of education and the costs of educating the students in the district (Resch, 2008: 23).

As in previous studies (e.g., Ebdon, 2000; Nguyen-Hoang, 2012), not only to track how school districts spend their money, but also to capture how they modify their resource allocation patterns, it is common to divide the total operating expenditure of the district into two subcategories (instructional versus non-instructional items) based on subunits of

expenditure divided by functions. In the same vein, this study is motivated by the need to determine which specific expenditure category (instructional or administrative spending) is more likely to be affected by institution-induced changes. The instructional spending (e.g., teachers' salaries, classroom activities, and textbooks) is computed by subtracting the administrative one (e.g., expenses for operations and maintenance including food and extracurricular services) from the total school expenditures (Dye and McGuire, 1997; Nguyen-Hoang, 2012). The three expenditure categories are then divided by the number of students and finally logged as in previous studies. Based on this specification, we can interpret the coefficients of independent variables as semi-elastic or elastic.

For the main independent variable, two types of school districts are coded as a simplistic dummy variable (1 for Type II districts, 0 for Type I districts). In our dataset, there appear to be clear differences in the ways Type I and Type II districts in New Jersey decide on proposed budgets. All Type II districts in the dataset have school boards that are elected and use a budget referendum as the final step in the school budget decision-making process. In contrast, Type I districts are managed under appointed school boards and function without budget referendums. Previous studies have focused primarily on the effects of such referendums, but we explore the electoral institutional differences between districts in terms of school boards in a broad manner; as such, cases related to defeated or

approved budgets are not our primary concern. If we were able to include a separate variable for referendum results, we would be able to expect rigorous estimation results regarding the differential impacts of appointed versus elected school boards while controlling for the impacts of referendum results. However, data regarding referendum results prior to 2002 are not available. Furthermore, although our panel dataset includes a variable related to referendums for the period of 2002 to 2007, the main institutional variables were dropped because of collinearity problems. We thus tested the impact of budget referendum results on budgetary decisions (here, total expenditure per pupil) separately using the 2002-2007 data. The second estimation model in Table 4 includes only the referendum variable, without school board types, while the first estimation model includes only the school board type variable, without the referendum variable; these are the same as the models in Table 3 but with a shorter time period. In the second model in Table 4, the coefficient of budget referendum (Defeat dummy) has negative signs, as expected, but this is statistically insignificant. This result implies that the referendum variable alone does not have statistically meaningful impacts on school budget decisions, controlling for other independent variables. Therefore, we argue that, although the school district type variable in our estimation model might include partial impacts of the referendum, its impacts are not mainly due to the referendum, given that it is not statistically significant

without the institutional difference variable. We posit that the estimated coefficient for institutional differences in our original model captures the impacts of elected or appointed school boards (board structure), along with budget referendum.

Moreover, Abbott districts, which education finance researchers consider a significant institutional feature of New Jersey school districts, are included to be controlled. Since the New Jersey Supreme Court ruled that the funding system, as it existed then, violated the state's constitutional requirements (*Robinson vs. Cahill*, 1973),² a series of court rulings have ordered the state to prepare a constitutionally viable education funding system. As a provisional method of intergovernmental fiscal transfer, the court ordered the state to provide special state aid, later called Abbott Parity Remedy Aid, to thirty poor urban school districts, including supplemental programs, preschool education, and school facilities improvements (Carr and Fuhrman, 1999; Goertz and Edward, 1999).

About two-thirds of Abbott districts receiving special state aid are in the Type I category, and the average residential income level of Type I districts is lower than that of Type II districts. Thus, the higher per-pupil spending level of Type I districts might be attributable to such systematic differences, and the differences measured by the related variables must be included in the estimation model in order to control for their impacts on

the primary causal relationship of interest, i.e., institutional differences and budgetary decisions.

In this regard, we expect that Abbott districts, as poor urban districts in need of state fiscal support, will clearly correlate with district-specific expenditure changes and increases in school spending. In our model, they are coded as a dummy variable (1 for Abbott district, 0 for otherwise). Furthermore, we assume that Abbott districts may correlate and overlap somewhat with the two types of school districts. When we look at the reality of their surroundings, most school districts with appointed school boards (Type I districts) are located in urban areas; these are more densely populated, higher-cost school districts, with high concentrations of lower income communities (Megdal, 1983). In contrast, districts with elected school boards (Type II districts) are distributed in rural areas and are considered relatively low-cost districts. Thus, it is likely that Type I districts receive more Abbott-related state aid, leading to a greater increase in school spending, compared to Type II districts. We therefore add an interaction term in addition to the two original institutional factors (here, Type dummy and Abbott dummy). In this way, the overlapping issues can be controlled, thereby producing more rigorous estimation results for institutional differences.

Drawing upon the median voter framework for the analysis, we use the median (household) income as determined by the U.S. Census Bureau. The median tax share, as in

previous studies, is defined as the median property value divided by the total property value per household, which represents the cost that the median voter bears as a result of tax increases for public goods. In the same vein, state and federal aid is constructed as part of median income, meaning that per-pupil state and federal aid is multiplied by the tax share. All of the median voter variables are logged.

As variables for economies of scale, the logged resident enrollment and the quadratic term of enrollment are included (Fox, 1981; Nguyen-Hoang, 2012). The cost and environmental impoverishment within districts are measured by students' characteristics. As in the existing literature, we include the percentages of students receiving free and reduced price lunch, LEP students, and special education students in our model.

For student demographic factors, we focus on the composition of students enrolled in the school districts, dividing them based on characteristics of race and ethnicity (the percentages of African American, Hispanic, and Asian students). Generally, minority students are recognized as being economically disadvantaged, and districts with greater ratios of high-needs students bear increased costs. In turn, we assume that the composition of minority students, as a proxy variable for social inequity in household environment, correlates with district-specific education expenditure changes (Duncombe and Yinger 1999; Ebdon, 2000; Santerre, 1989).

Furthermore, we control for the effect of community fiscal capacity, which is seen as a critical source of school district revenues, on education spending. It is measured by the ratio of per pupil property value to state average, given that all property values are equalized to full market value (Eom and Rubenstein, 2006). As Nguyen-Hoang (2012: 82) posited, we anticipate that districts with greater fiscal capacity have an ability to spend more. Lastly, other control variables such as owner-occupied housing units, rural areas, and population above the age of 65 are included in our model. While the percentages of rural areas and people over age 65 are expected to have a negative relationship with school spending, the percentage of owner-occupied housing units is expected to have a positive effect on school spending (Ebdon, 2000; Nguyen-Hoang, 2012).

Estimation Model

Before determining our estimation model for the analysis, we performed a set of robustness tests for heteroskedasticity and autocorrelation in the error components. First, after conducting modified Wald tests (Stock and Watson, 2008), we found heteroskedasticity in the residuals of the model. Second, through Wooldridge's test (Wooldridge, 2002) for autocorrelation in linear panel-data models, autocorrelation was detected. When there is autocorrelation in the regression model, conventional estimates of standard errors—

regardless of whether they are heteroskedasticity robust—are biased downward; in addition, related t -statistics and P -values turn out to be less reliable. In light of these test results, we employed the Newey-West test (Newey and West, 1987) to not only correct these problems but also generate Newey-West standard errors (heteroskedasticity- and autocorrelation-consistent SEs). This test allows us to estimate correlations between lags (lagged residuals in the same cluster) (Peterson, 2004).³

Estimation Results

Table 3 shows the estimation results of the Newey-West model with three different measures of school budget decisions. First of all, excluding administrative expenditure per pupil, the estimated coefficients of school districts by type (Type dummy) in the first and second columns are negative, as expected, and statistically significant. The results indicate that Type II districts spend approximately 5 percent and 10 percent less than Type I districts on total expenditure per pupil and instructional expenditure per pupil, respectively. Meanwhile, institutional differences do not cut administrative spending. Overall, however, such results provide empirical support for our conceptual framework suggesting that institutional differences can lead to disparate local budgetary decisions and that direct electoral institutions are more effective in lowering school spending than indirect ones.

Moreover, as we expected, the Abbott variable has a positive influence on school district spending. If a school district is identified as an Abbott district, its total expenditure per pupil, instructional expenditure per pupil, and administrative expenditure per pupil are 17.6 percent, 12.9 percent, and 25.2 percent higher than those of non-Abbott districts, respectively. These results are mainly due to the special funding system called APRA, which was mentioned earlier. The effects of interaction terms between Abbott districts and Type II districts are unclear. While the coefficient is positive and statistically significant in the model for instructional expenditure, those for total and administrative expenditures are statistically insignificant, with opposite signs. Because we control for Abbott districts, these results indicate that districts categorized as both Type II and Abbott districts spend more on instructional expenditure and less on administrative expenditure; this is in line with our primary hypothesis, as it suggests that Type II districts are more likely to be efficient in their spending decisions.

As predicted by previous studies, median voter-related variables—i.e., median income, median tax share, state aid per pupil, and federal aid per pupil—have the expected signs with statistical significance in the three models.

With respect to the size of districts, the enrollment variables in the three models show a negative sign, indicating the existence of economies of scale, but only the enrollment

variable in the model with administrative expenditure per pupil has statistically significant coefficient. In this model, the quadratic term also has a significant coefficient with a negative sign, which means that the impacts of economies of scale decreased as enrollment size increased. While these results are in line with the existing literature (Fox, 1981; Nguyen-Hoang, 2012), it is notable that the impact was identified only in administrative expenditure.

Cost and environmental factors reveal mixed results. While the variable of students eligible for free and reduced price lunch is negatively associated with school spending in Model 2 and Model 3, the variable of special education students is positively associated with school spending in all models. Given that cost and environmental variables are relatively constant over time, it is more likely that their impacts are partially captured by other district-specific factors, including wealth and student demographic composition.

The effect of community fiscal capacity on school budget decisions was found to be relatively small, with contradictory results. These results may be explained by the fact that these impacts are partially captured by other key variables, especially median income and environmental and demographic variables, limiting the impact of the community wealth variable. We tested different types of community wealth variables, such as the ratio of per pupil income to the state average, and all were insignificant.

Conclusion and Discussion

This study basically emphasizes the need for a clearer understanding of the determinants of different budgetary decisions in the specific context of school districts. Participants in budgetary decision making have various individual preferences and values with regard to how, and how much, public money should be spent. Besides, in the local budget process, having political and direct control over others' behaviors can play a critical role in determining the level of public spending, as prior studies have observed (Farnham, 1990; LaManque, 1992; Megdal, 1983; Peltzman, 1992; Sass, 1991; Steunenberg, 1992). Arguably, this provides a theoretical reason to expect that electoral institutions matter in the local budget decision-making process.

Using data from 178 K-12 school districts in New Jersey for the period of 1996–2007, we focused on differences in three different measures of school spending—total expenditure per pupil, instructional expenditure per pupil, and administrative expenditure per pupil—between Type I and II districts. The empirical results provide evidence that school districts with elected school boards (Type II districts) are more effective at lowering school spending than ones with appointed school boards (Type I districts); the results also

reaffirm the findings of previous studies examining the relationship between institutional differences and local budget decisions measured by total spending levels.

This study provides several contributions to knowledge-building in the existing literature. Unlike prior studies, this study explores electoral institutions related to school boards while embedding the impact of budget referendums with a large panel dataset covering more than 10 years. It also extends the traditional view of public administration, which centers on the dichotomy between direct and representative democracies, by using a new institutional economics analytical approach, broadly embracing transaction cost theory and principal-agent theory. Overall, our study suggests that direct electoral institutions in school districts can serve as a valuable tool to control growing education spending by placing clear accountability on school boards in shaping school budget decisions; institutional differences not only affect the incentive structures faced by public officials, along with agency costs, but also lead to different budgetary decisions.

Despite our scholarly attempt, several fundamental limitations prompting further examination remain. Although our analysis is strictly based on the previous literature in terms of research model and variable specifications, confounding factors cannot be completely eliminated by the control variables as in other studies using regression analysis. Moreover, it is reasonable to expect that institutional differences may represent other

underlying differences besides the ones that are included as independent variables in our analysis. This perspective is noteworthy because institutions are essentially constraints devised to shape human interactions and may be created by human beings or evolve over time (North, 1990:4). Indeed, as North (1990) argued, it seems that institutional change is a complicated process and works accompanied by other institutional changes including informal ones.

Thus, investigating the historical context and bringing the underlying components of institutional differences into a quantified analysis is obviously an extremely difficult task. Most influential studies using a quantitative analysis appear to have enough reason to treat institutional arrangements as given exogenous variables. Although the research methods adopted in previous studies may provide partial justification for our approach, we admit that the institutional differences in our analysis, i.e. the district types, may represent other underlying factors that may cause differences in the districts' spending behavior.

We used a transaction costs model to provide the theoretical background for the behavioral differences between Type I and Type II districts. While this adds meaningful contributions to the existing literature, which has mainly focused on principal-agent theories and direct vs. indirect democracy frameworks up to now, our analysis does not directly measure the transaction costs. Considering that there are several different types of

transaction costs associated with critical points of the budgeting process as differentiated in each type of district, subsequent studies are required to identify what specific transaction costs may or may not have impacts on the budgeting behaviors of the actors involved.

Needless to say, the issue of institutional differences' impact on local budgetary decisions continues to be a critical topic of debate among many scholars and practitioners in the public administration and school finance fields. Thus, this study is expected to encourage policy makers to take institutional factors into account when weighing feasible strategies for more effective management of budgets under fiscal stress.

Table 1. School budget procedures (as of the 2013-2014 school year)

Type I Districts (Appointed school boards)	Type II Districts (Elected school boards)
Adoption and Filing of Budget (March 7)	
Notice of Public Hearing (March 17)	
Budget Approval by Executive County Superintendent (March 21)	
Last Day for Public Hearing (March 28) and Budget Posting to District Website (within 48 hours after the public hearing)	
Deadline for Board of School Estimate to Adopt and Certify Budget (April 8)	School Election (April 16)
Delivery of Budget Statement Certification to Executive County Superintendent of Schools (April 8)	First Meeting of Board (Any day of the first or second week following the annual school election)
Application for Restoration – Comments by Board of Education (10 working days after action by board of school estimate)	Determination by Municipal Governing Body Where Items Rejected at Election (May 20)
Application for Restoration – Comments by Board of School Estimate (10 working days after receipt of district board of education's application)	Application for Restoration – Comments by Board of Education (10 working days after action by governing body)
First Meeting of Board (May 16)	Application for Restoration – Comments by Governing Body (10 working days after receipt of district board of education's application)

Table 2. Descriptive statistics of variables

Variables	Type I districts				Type II districts			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
Total expenditure per pupil (log)	9.49	0.145	9.233	9.813	9.366	0.149	8.558	10.06
Instructional expenditure per pupil (log)	8.672	0.161	9.211	9.173	8.56	0.16	8.094	9.256
Administrative expenditure per pupil (log)	6.979	0.215	6.516	7.54	6.9	0.216	6.186	8.069
Abbott districts (Abbott dummy)	0.677	0.469	0	1	0.12	0.325	0	1
Interaction term of Type and Abbott dummy	0	0	0	0	0.12	0.325	0	1
Median income (log)	10.701	0.382	10.33	11.605	11.003	0.351	10.047	12.017
Median tax share (log)	-0.563	0.438	-1.409	0.202	-1.065	0.449	-3.852	0.304
State aid per pupil (log)	0.126	0.103	0.002	0.326	0.032	0.056	0.001	0.374
Federal aid per pupil (log)	5.78	0.564	4.571	6.522	5.216	0.598	4.242	9.176
Resident enrollment (log)	8.707	0.588	7.476	9.624	8.043	0.75	6.303	10.398
Quadratic term of resident enrollment (log)	75.739	10.409	55.893	92.618	64.737	12.478	39.723	108.127
Free and reduced lunch students (pc)	0.526	0.25	0.094	0.902	0.233	0.223	0	0.918
LEP students (pc)	4.267	8.358	0	36.992	1.48	3.453	0	36.124
Special education students (pc)	4.025	5.758	0.022	16.122	4.298	6.138	0.013	26.167
African American students (pc)	0.335	0.342	0.005	0.953	0.136	0.181	0	0.919
Hispanic students (pc)	0.387	0.333	0.039	1.049	0.151	0.174	0.005	0.957
Asian students (pc)	0.027	0.025	0	0.084	0.081	0.089	0	0.499
Ratio of per pupil property value to state average	0.758	0.662	0.2	2.619	1.097	0.8	0.08	12.241
Owner-occupied housing units (pc)	37.021	16.045	18.168	69.9	69.138	27.45	0.708	682
Rural areas (pc)	0	0	0	0	0.025	0.077	0	0.681
Population above age 65 (pc)	0.116	0.026	0.061	0.168	0.141	0.051	0.061	0.545

Table 3. Estimation results (1996–2007) using Newey-West model

Variables	(1)	(2)	(3)
	Total expenditure per pupil (log)	Instructional expenditure per pupil (log)	Administrative expenditure per pupil (log)
<i>Institutional differences</i>			
School districts by type (Type dummy)	-0.053 (0.014)**	-0.100 (0.021)**	-0.022 (0.041)
Abbott districts (Abbott dummy)	0.176 (0.033)**	0.129 (0.037)**	0.252 (0.057)**
Interaction term of Type and Abbott Dummy	0.048 (0.033)	0.108 (0.036)**	-0.021 (0.057)
<i>Median voter variables</i>			
Median income (log)	0.352 (0.036)**	0.414 (0.046)**	0.402 (0.063)**
Median tax share (log)	-0.149 (0.022)**	-0.218 (0.028)**	-0.258 (0.044)**
State aid per pupil (log)	1.077 (0.202)**	1.431 (0.222)**	1.642 (0.272)**
Federal aid per pupil (log)	0.035 (0.010)**	0.050 (0.012)**	0.082 (0.022)**
<i>Size of school districts</i>			
Resident enrollment (log)	-0.158 (0.100)	-0.053 (0.100)	-0.725 (0.142)**
Quadratic term of resident enrollment (log)	0.008 (0.006)	0.002 (0.006)	0.036 (0.009)**
<i>Cost and environmental factors</i>			
Free and reduced lunch students (pc)	-0.080 (0.068)	-0.149 (0.073)*	-0.358 (0.101)**
LEP students (pc)	0.047 (0.163)	0.075 (0.175)	-0.341 (0.231)
Special education students (pc)	1.185 (0.040)**	1.189 (0.201)**	0.752 (0.273)**
<i>Student demographic variables</i>			
African American students (pc)	0.041 (0.040)	0.017 (0.041)	0.279 (0.060)**
Hispanic students (pc)	0.120 (0.051)*	0.188 (0.054)**	0.298 (0.077)**
Asian students (pc)	0.136 (0.059)*	0.234 (0.079)**	0.232 (0.102)*
<i>Community fiscal capacity</i>			
Ratio of per pupil property value to state average	0.023 (0.007)**	0.007 (0.013)	-0.036 (0.017)*
<i>Other variables</i>			
Owner-occupied housing units (pc)	-0.002 (0.001)**	-0.002 (0.001)**	-0.002 (0.001)**
Rural areas (pc)	-0.108 (0.044)*	-0.076 (0.050)	-0.066 (0.090)
Population above age 65 (pc)	0.199 (0.084)*	0.101 (0.094)	0.283 (0.142)*
Constant	5.798 (0.575)**	3.819 (0.642)**	5.306 (0.912)**
Observation (N)	2136	2136	2136
F	49.87	36	21.59
<i>Robustness tests</i>			
Wald test for heteroskedasticity	2.9e+25 (0.000)	2.2e+27 (0.000)	60895.73 (0.000)
Wooldridge test for autocorrelation	51.372 (0.000)	15.606 (0.000)	5.010 (0.0265)

Note: *statistically significant at 5 percent, **statistically significant at 1 percent. Newey-West standard errors in parentheses. For robustness tests, *P*-values in parentheses.

Table 4. Estimation results (2002–2007). Dependent variable: total expenditure per pupil (log)

Models	(1)	(2)
	Board structure only (Type dummy)	Budget referendum only (Defeat dummy)
<i>Institutional differences</i>		
School districts by type (Type dummy)	-0.052 (0.024)**	-
Budget referendum by result (Defeat dummy)	-	-0.015(0.011)
Abbott districts (Abbott dummy)	0.223(0.057)**	0.275(0.042)**
Interaction term of Type and Abbott Dummy	0.081(0.055)	-
<i>Median voter variables</i>		
Median income (log)	0.341(0.060)**	0.344(0.064)**
Median tax share (log)	-0.163 (0.041)**	-0.162 (0.041)**
State aid per pupil (log)	1.184 (0.396)**	1.509 (0.392)**
Federal aid per pupil (log)	0.031 (0.019)	0.026 (0.019)
<i>Size of school districts</i>		
Resident enrollment (log)	-0.098 (0.163)	0.043 (0.157)
Quadratic term of resident enrollment (log)	0.004 (0.010)	-0.005 (0.010)
<i>Cost and environmental factors</i>		
Free and reduced lunch students (pc)	-0.086 (0.112)	-0.086 (0.122)
LEP students (pc)	0.271 (0.229)	0.003 (0.332)
Special education students (pc)	1.351 (0.273)**	1.184 (0.289)**
<i>Student demographic variables</i>		
African American students (pc)	0.036 (0.056)	0.048 (0.064)
Hispanic students (pc)	0.081 (0.073)	0.112 (0.090)
Asian students (pc)	0.099 (0.091)	0.111 (0.093)
<i>Community fiscal capacity</i>		
Ratio of per pupil property value to state average	0.021 (0.010)**	0.021 (0.010)**
<i>Other variables</i>		
Owner-occupied housing units (pc)	-0.001 (0.001)	-0.001 (0.001)
Rural areas (pc)	-0.155 (0.091)*	-0.150 (0.089)*
Population above age 65 (pc)	0.029 (0.155)	0.073 (0.164)
Constant	5.606 (0.922)**	5.036 (0.911)**
Observation (N)	1068	996
F	24.59	23

Note: *statistically significant at 5 percent, **statistically significant at 1 percent. Newey-West standard errors in parentheses.

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Note:

¹ Restoration refers to a situation where specific budget reductions are needed in Type I districts or where a proposed budget is defeated by a school election in Type II districts. In this case, the reduced amount of the tax levy should be certified by the board of school estimate (Type I districts) or the governing body (Type II districts).

² See: *Robinson v. Cahill*, 62 N.J. 473, 303 A.2d. 273 (1973).

³ While Newey West estimates of standard errors are also biased downward, the bias is smaller than the original ones in a panel data setting (Peterson, 2004: 16).