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Abstract

State monitoring and intervention has been implemented to reveal and address fiscal problems in local governments, yet we know very little about its role in promoting financial performance in a causal sense. This paper estimates the causal effect of state intervention on fiscal performance of monitored school districts by using district-level administrative data from Illinois State Board of Education. Utilizing the system design that only low-performing districts receive intervention from the state, I employ a regression discontinuity design based on financial indicators that are introduced in the system to evaluate fiscal positions and determine intervention. Results indicate that there are precisely zero effects on future financial outcomes of school districts. However, in heterogeneity analysis, I document statistically significant positive impacts on financial indicators reflecting long-run fiscal health in a relatively long term for districts with certain characteristics. For elementary school districts, I show that state intervention improves the long-term debt capacity remaining by 15-20 percentage points more on average for districts just receiving the intervention in three to four years since the intervention, compared to those barely not. This indicates that they are less reliant on issuing long-term debt in order to meet obligations. Similarly, among accrual basis school districts, I find that the intervention decreases the value of Expenditure to Revenue Ratio by 0.035-0.050 unit more for districts barely receiving the intervention, suggesting that their budget is becoming more structurally balanced.

Keywords: Education Finance, State Intervention, Fiscal Performance, School Districts

JEL Codes: H75, H52, I22, I28

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1. Introduction

It has been a recent concern for states across the country that local governments suffer severe financial trouble, and are not capable of resolving budgetary challenges and satisfying the needs of their residents. Many states have started to introduce a combination of indicators to provide early warning and detect existing fiscal problems, and make the effort to offer technical assistance or intervene in local government affairs in order to guarantee that fiscally distressed localities recover quickly and robustly.[1] For instance, Office of the New York State Comptroller has developed a set of specific financial indicators and environmental indicators to evaluate fiscal performance, identify issues with budgetary solvency, and encourage sound fiscal health for local governments since 2012. The office provides localities facing fiscal distress with budget reviews, technical financial assistance, guidance on multi-year financial planning, and training services.

There are numerous works, either academic or practitioner, on the impact of state intervention on fiscal performance of monitored local governments.[2] However, very few of them examine these effects in a causal sense. This paper contributes to this literature by studying a fiscal monitoring and intervention system in Illinois. This program was implemented by Illinois State Board of Education (ISBE) and named "School District Financial Profile" (SDFP). Every fiscal year since 2003, SDFP calculates a total financial score for each school district based on fiscal data from their prior fiscal year annual financial reports. The calculation is determined

[1] The Pew Charitable Trusts (2013, 2016) show that nineteen states have enacted laws allowing the state government to intervene in local government financial crises. Twenty-two states have actively and regularly monitored financial information from local governments to detect fiscal distress.

[2] For example, Coe (2007) documents that bond rating agencies assign higher ratings to North Carolina's municipal bonds because of state oversight over local government fiscal management. Gerrish and Spreen (2017) show that the introduction of North Carolina's financial benchmarking tool only exerts small effects on the mean values of monitored financial indicators.

using a weighted average score for five financial indicators: Fund Balance to Revenue Ratio (FBRR), Expenditure to Revenue Ratio (EXRV), Days Cash on Hand (DCOH), Percent of Short-Term Borrowing Ability Remaining (STB), and Percent of Long-Term Debt Margin Remaining (LTD). The total score is employed to provide an overview of school district finances, and to measure the fiscal health by placing each district into one of four categories: Financial Recognition (best), Financial Review, Financial Early Warning and Financial Watch (worst). ISBE will monitor districts with the two worst designations (indicating more serious financial difficulties) tightly and provide intervention: regionally-based finance consultants from ISBE are available to offer technical assistance and help financially distressed districts with financial data analysis, proper accounting for state and federal funds, and development of sound financial management practices.

In this paper, I use district-level administrative data from ISBE to examine the causal effect of state intervention on fiscal performance of school districts. Instead of using difference-in-differences approach that has been mostly employed in studying this topic (e.g., Thompson, 2016, 2017; Spreen & Cheek, 2016), I design a regression discontinuity (RD) framework by using the exogenous variation in state intervention generated by the cutoffs for each of the five financial indicators. SDFP system sets three cutoffs for each financial indicator to determine how much score will be assigned to that indicator, and sums the weighted indicators' scores to obtain a district's overall total financial score. The highest total score a district could receive is 4.00 (highest financial strength) and the lowest score is 1.00 (lowest financial strength). State offers customized financial management guidance and technical assistance to districts with total score less than or equal to 3.07. Among districts of which total scores are close to intervention threshold score, some of them score barely below (or above) the intervention cutoff because the

value of one financial indicator falls just below (or above) one of its indicator cutoffs, given other indicator values fixed. Therefore, for these districts, movement across the corresponding indicator cutoff due to small changes in the value of that financial indicator, will lead to a discontinuous change in treatment status of receiving intervention. My analysis focuses on these groups of districts by stacking them based on the corresponding indicator cutoff, such that observations below the cutoff will receive the intervention while those above will not. Intuitively, I compare future fiscal performance of these districts to each other, which enables me to distinguish the effect of state intervention from unobserved confounding factors such as districts' capacity and superintendents' motivation.

This approach has two primary advantages. The first is that the design of SDFP and the high-quality administrative district-level data are ideally suited for providing credible estimates of the impact of state intervention. This is in large part because it is difficult, if not impossible, for school districts to perfectly manipulate the value for each financial indicator relative to the indicator cutoff. There are various economic and demographic factors confronting districts, which are beyond the control of superintendents but may affect the five indicators. As a result, it is hard to propose a scenario where observations right above and below the corresponding indicator cutoff are not otherwise similar to each other. In addition, introducing indicator cutoffs to isolate the exogenous variation in state intervention can substantially increase the statistical power by boosting sample size.[3]

[3] Thompson (2016) recommends employing a regression discontinuity framework by using the natural cutoff of receiving a fiscal stress label in his context. However, one potential concern of this approach is that there are very few districts around the cutoff from which to identify the causal effect. By taking advantage of the system design of SDFP and the ideally-suited administrative data from ISBE, the stacked RD design proposed in this paper is able to address the issue of statistical power by increasing the sample size near the cutoff.

The second main advantage of my research is that the RD framework provides a plausible method to address the bias of mean reversion from a straightforward difference-in-differences analysis. Districts are selected to receive state intervention based on their total financial scores. The total score may provide a noisy measure of districts' fiscal performance because of their being lucky or unlucky temporarily in the monitoring year. Given that the total score doesn't properly reflect a district's true performance, I would expect some improvement in fiscal health for treated districts independent of the intervention's effectiveness. A regression discontinuity approach is able to tackle this issue under the condition that districts around the threshold have almost identical pre-treatment performance, such that they would have experienced a similar shift toward the average performance and thus would have the same degree of mean reversion on average in the absence of the state intervention. Consequently, RD estimates will return unbiased estimates. A more detailed discussion of this matter will follow in Section 2 below. To my knowledge, this study is the first to use the predetermined thresholds of financial indicators to investigate how state intervention influences future fiscal performance of monitored school districts. My proposed estimators might be fruitfully applied in evaluating the effectiveness of state intervention systems with similar indicator design.[4]

I begin by documenting the descriptive relationship between state intervention and school districts future fiscal health. I show that on average receiving intervention is associated with worse future performance (measured by the values of the five abovementioned financial

[4] For instance, the Fiscal Stress Monitoring System implemented in New York State in 2013 has developed a very similar scoring system for local governments and school districts. Consider the school district financial indicators scoring as an example. There are seven financial indicators used for evaluating fiscal health. A score for each indicator is decided based on the indicator value and indicator cutoffs. An overall score is then obtained by calculating the weighted average of the seven indicator scores. According to this total score, each district will receive a classification of fiscal stress. The state will provide specialized assistance to districts with different levels of fiscal stress. More details about the Fiscal Stress Monitoring System are available at https://www.osc.state.ny.us/localgov/fiscalmonitoring/pdf/fiscalstressmonitoring.pdf.

indicators), and more performance improvement (measured by the gains of financial indicator values). However, OLS estimates are biased due to omitted variables and mean reversion. I next consider the causal effects of state intervention. I find that the magnitudes of RD estimates are small and precisely close to zero, with both values and gains in values as the outcomes. These results are robust with different bandwidths on either side of the cutoff.

However, in heterogeneity analysis, I document statistically significant positive impacts on financial indicators reflecting long-run fiscal health in a relatively long term for districts with certain characteristics. Splitting by types of school districts (i.e., elementary, high school, and unit districts), I find that elementary school districts witness significant gains in LTD in three to four years since the intervention: the intervention increases the long-term debt capacity remaining by 15-20 percentage points more on average for districts just receiving the intervention, compared to those just not. This indicates that they are less reliant on issuing long-term debt in order to meet obligations. Similarly, with respect to accrual basis school districts, state intervention leads to greater improvement in EXRV for treated districts relative to untreated: the intervention decreases the value of Expenditure to Revenue Ratio by 0.035-0.050 unit more on average for districts barely receiving the intervention, suggesting that their budget is becoming more structurally balanced.

The remainder of the paper proceeds as follows: Section 2 provides a discussion on the theoretical framework and how this paper contributes to existing research. Section 3 describes the institutional background about fiscal monitoring and intervention system in Illinois. Section 4 includes a description of the data, while Section 5 discusses the identification strategy and presents descriptive statistics for the analytical sample. Section 6 examines the validity of regression discontinuity design. Section 7 describes the regression discontinuity analysis of the

effect of state intervention on school district fiscal performance, in comparison with the OLS results. Section 8 concludes.

2. Theoretical Framework and Prior Literature

A broad and long-standing concern, both among policy-makers and in diverse academic literatures, involves the question of whether state intervention programs are effective in promoting fiscal performance of monitored local governments (see Coe (2008) for an excellent discussion). State intervention is usually initiated as a response to demands from groups unsatisfied with local performance, requests from local officials for assistance, or an attempt to resolve local-local disputes (Berman, 2015). By reviewing local government budgets and financial statements, states are able to detect whether localities have the ability to meet their obligations and offer appropriate assistance to localities that have financial problems or are heading towards that direction. The goal of state intervention is to make local governments more accountable, effective and efficient, and to ensure that localities with a state of financial emergency restore fiscal stability and financial sustainability.

There are three main mechanisms through which monitored local governments would be influenced by state intervention system. First, states take actions to help financially struggling local units avert financial distress based on the detection and assessment results from the system. These localities are assisted by states once they are identified with fiscal crisis. Such intervention includes on-site technical assistance (e.g., budget auditing, financial projections, trend analysis based on previous financial data), debt issuance control, no-interest or low-interest loans and grants, temporary tax raise or services cut, or takeover of local decision-making authority if

needed (The Pew Charitable Trusts, 2013, 2016). These practices will contribute to mitigating current local government fiscal distress and consequently improve the fiscal outcomes of monitored units.

States also provide assistance to local governments proactively. State officials review local government finances and uncover early warning signs of fiscal distress according to the report from fiscal monitoring. These officials then offer consulting services to local governments on accounting and budgetary issues, and help educate local government officials and staff on best financial practices in order to assure that they understand local government finances and budgets properly. The assistance from states is essential for localities that lack the capacity to detect, assess, or address fiscal matters on their own.

Technical assistance from the state particularly enables local officials to be acquainted with their government's financial status. It ensures that these governments are aware of the potential fiscal issues and tackle them before they become unmanageable. Especially for governments with high and continuous turnover in local officials, information on financial performance of the localities from the intervention serves as the guidance of fiscal status for the newly elected administrators of finance directors (Rivenbark & Roenigk, 2011). Local officials could take advantage of the information and make correct decisions about where and how to improve fiscal health.

The second mechanism is that yardstick competition among local governments creates strong incentives to promote fiscal performance. The idea of yardstick competition is that residents of a jurisdiction will consider information about the goods and services offered by other jurisdictions as a benchmark to evaluate the performance of their own government (Salmon, 1987; Besley & Case, 1995). State intervention uncovers evidence of fiscal distress and releases

information on financial status publicly. It enhances fiscal transparency and accountability. Voters make comparisons and pressure their own local jurisdictions to improve the quality and efficiency of their own administration. Therefore, the presence of the informational externality induced by the yardstick competition forces incumbents to care about what other incumbents are doing. Being identified as financially troubled (and therefore receiving the state intervention) will provide strong motivation to administrators to "mimic" other high-performing jurisdictions and address ongoing fiscal distress.

The third channel is that the identification of a local government as being in fiscal distress and the fact of receiving state intervention convey the signal to the public that the local unit is fiscally poorly performing. This fiscal stress label would jeopardize the financial reputation and downgrade bond rating, which incentivizes local governments to strengthen their financial conditions. However, on the other hand, depressed residents will flee financially troubled localities and make other choices on where to reside or where to send their children. The enrollment declines would result in reduced funding from the state which offers school districts a certain amount of money for every student. This will consequently aggravate already bad fiscal situations.

It is worth mentioning that the effects of state intervention could vary across local governments with different characteristics. In Illinois, there are three types of school districts: elementary districts (PreK-8), high school districts (9-12), and unit districts (PreK-12). Elementary districts have lower student enrollment in the median level and less administrative staffs, compared to high school districts and unit districts (ISBE, 2018b). Due to limited staff with enough knowledge on school finance and budgeting in elementary districts, state intervention is expected to be more beneficial for this type of school districts. In addition, there

might be differential effects between cash basis districts and accrual basis districts. Cash basis refers to the basis of accounting under which revenues are recorded only when cash is received, and expenses are recorded only when cash is paid out. However, under the accrual basis accounting method, revenues are recognized in the period they become available and measurable, and expenditures are recognized when the associated liability is incurred, regardless of when the money is actually received or paid. Accrual basis attempts to match revenues and expenses and place them in the same period, which provides a more accurate portrait of how school district finance is performing over the long-term than the cash basis method (Illinois Auditor General, 2011). Therefore, state intervention is expected to improve fiscal performance, especially the performance reflecting revenues and expenditures (for example, Expenditure to Revenue Ratio), for accrual basis districts in a relatively long term.

This paper contributes to three distinct strands of literature. First, I build on quantitative studies of the effectiveness of state monitoring and intervention programs. Petersen (1977), Groves, Godsey, and Shulman (1981), Streib and Poister (1989), Hendrick (2004, 2011), Kloha, Weissert, and Kleine (2005), Coe (2007, 2008), Cabaleiro, Buch, and Vaamonde (2013), and Gerrish and Spreen (2017) describe the role of fiscal performance indicators developed to predict and evaluate financial status. Though these authors suggest the importance of these indicators, they do not provide causal evidence on the impact of the state monitoring and corresponding intervention. In addition, much research focuses on municipalities. Responses of school districts to fiscal stress are important, but very much unexplored in the education finance literature (Nelson & Balu, 2014). This paper attempts to fill that gap in the literature. School districts occupy a central position in the education finance policy and reform. According to the Illinois Department of Revenue, approximately two-thirds of property tax revenue is allocated to school

districts for education in Illinois, which is the largest share among all local government units.[5] Regarding the expenditures for school districts in Illinois, education fund accounts for 71.6 percent of total spending for the average school district.[6]

Second, I contribute to a growing body of research using administrative data to examine the causal effect of state monitoring and reporting on financial performance of local governments. To my knowledge, there is only one paper attempting to study the causal impact for school districts. Thompson (2016) analyzes the Ohio fiscal stress labeling system, and documents statistically significant impacts on operating and capital expenditures, and local property tax revenues, but not on total revenue, for school districts. In addition, only two papers investigate the importance of fiscal monitoring and evaluation for other types of local governments in a causal sense. These studies find mixed results. Thompson (2017) complements his previous analysis by instead looking at municipal governments in Ohio, and draws similar conclusions that municipalities with fiscal stress labels reduce total expenditures per capita and per capita capital and operating expenditures. Spreen and Cheek (2016) evaluate Michigan's fiscal stress indicator system by using a sample of counties and municipalities, and find no significant effects on monitored indicators.

Third, my work extends abovementioned literature on the causal relationship by employing a stacked regression discontinuity approach similar to that of Pop-Eleches and Urquiola (2013). Thompson (2016, 2017) examine the effects with difference-in-differences method that compares the outcomes pre and post the receipt or removal of fiscal stress labels

[5] The Illinois Department of Revenue documents that 62 percent of local property tax goes to school districts for education. See the website available at http://www.revenue.state.il.us/publications/pios/pio-16.pdf.
[6] Information for school district finances is available at Illinois Report Card website (https://www.illinoisreportcard.com/state.aspx?source=environment&source2=expenditurepercentages&Stateid=IL).

within each local government. Spreen and Cheek (2016) also use difference-in-differences but compare financial indicators in Michigan to those in neighboring control states, pre and post the implementation of the monitoring system. There are two potential concerns with the approaches used by these studies that I attempt to address in this study. First, the stacked RD framework developed based on my setting allows me to demonstrate that school districts just above the cutoff can likely serve as a valid counterfactual for those right below, because they have similar observable characteristics and financial indicator values in pre-treatment periods. Regression discontinuity approach may better deal with the self-selection into treatment or control regimes as long as school districts cannot precisely manipulate the running variable (see Lee & Lemieux, 2010). Second, a local government's appearance at the designation which reflects bad (or good) fiscal health may be the result of transitory bad (or good) luck in the monitoring year, and may not be indicative of the local government's true financial performance. If the transitory labeling noise is mean reverting, then the monitoring and intervention approach will yield misleading estimates of the effect of state intervention which uses financial indicator values to assess and select local governments. This is because the measured changes in fiscal performance from the difference-in-differences analysis reflect a combination of the true intervention effect and spurious mean reversion. Fortunately, the RD design provides a compelling way to address the mean reversion (see Chay, McEwan, and Urquiola, 2005). Since school districts around the threshold have nearly identical pre-treatment financial indicator values, they have similar differences in financial performance relative to the average school district. Therefore, they would have the same degree of mean reversion on average in the absence of the state intervention.

Most pertinent to this paper with respect to the institutional background is the research by Crosby (2016), which also examines the effectiveness of Illinois' SDFP system. His paper shows

that state intervention only improves Expenditure to Revenue Ratio, in both short and long term, and that only unit districts are positively affected by the intervention. However, these results cannot be interpreted as causal effects. Controlling for district fixed effects and year fixed effects, he regresses scores for each financial indicator on lagged scores and an interaction term between lagged scores and an indicator variable for state intervention. The OLS regression with fixed effects will introduce the Nickell bias in the estimate of the coefficient of the interaction term in the presence of a lagged dependent variable (Nickell, 1981). Furthermore, the concern of mean reversion still exists. Suppose school districts with very low financial indicator scores in a given fiscal year are selected to receive the state intervention. If the measured poor fiscal performance of these school districts is to some extent a consequence of having suffered a strongly negative but temporary noise due to bad luck, one would expect these scores to increase in the subsequent fiscal year, even in the absence of the state intervention. Therefore, the true impact of state intervention will be overstated due to mean reversion.

3. Fiscal Monitoring and Intervention System in Illinois

3.1. History of Fiscal Monitoring and Intervention System in Illinois

In 1981, Illinois General Assembly added Section 1A-8 to the School Code (105 ILCS 1A-8), which gave Illinois State Board of Education (ISBE) the responsibility to monitor the financial health and promote the financial integrity of all public school districts (Illinois General Assembly, n.d.; ISBE, 1993). Since then, the State of Illinois started to develop formal approaches to identify districts that are moving towards, or are already in, fiscal stress.

The state determined to use Operating Fund Balance to Revenue Ratio as the measure of financial health in 1985.[7] Based on the Annual Financial Report for each public school district in the prior year, the ratio was calculated and districts which had the ratio smaller than -10% were contacted by the state and provided with technical assistance from state officials (ISBE, 1993). The criteria were revised in 1988 when "Financial Watch List" (FWL) was implemented. The same ratio was used but the threshold of being categorized with financial distress changed from -10% to 5%. All districts that met the new criteria were notified and placed on the List which was available to the public. In addition, ISBE used a progressive approach in offering assistance. Districts were at first encouraged to take voluntary actions to address financial concerns. If financial performance did not become better or if no steps were taken to reverse the financial conditions, these districts would be certified as being "in financial difficulty" pursuant to Section 1A-8 of the School Code. They were then required to develop a multi-year financial plan under the guidance of ISBE. ISBE would also offer technical support in assisting certified districts to implement the plan (ISBE, 1993; Sharp & Lair, 1994). ISBE expanded FWL in January 1996 and employed five designations to categorize districts' fiscal health.[8] The new system was named "Financial Assurance and Accountability System" (FAAS). FAAS improved the old monitoring and intervention system in the way that the financial problems in *all* public school districts are taken into account by ISBE in the new system, not just those districts with severe financial difficulties (ISBE, 2001, 2002a).

However, FAAS only used a single measure, Operating Fund Balance to Revenue Ratio, to evaluate the financial performance of school districts. Therefore, it cannot portray a

[7] Operating Funds include Educational Fund, Operations and Maintenance Fund, Transportation Fund, and Working Cash Fund. Revenue refers to the sum of the annual revenue in the abovementioned funds (ISBE, 2001, 2002a).
[8] These five designations are (from best to worst financial performance): Financial Recognition, Financial Technical Assistance, Financial Watch List, Financial Certification, and Financial Oversight Panel.

comprehensive picture of the complexities of school district finances and might understate the financial difficulties (ISBE, 2002b).[9] ISBE redesigned the system in partnership with experts in finance and lending, credit agencies, and school business officials, and replaced FAAS with "School District Financial Profile" in November 2002 (ISBE, 2018c). Since then, ISBE has been using this system to help monitor the finances of school districts.

3.2. "School District Financial Profile" (SDFP) System

The goal of SDFP is to accurately provide information on districts' financial status, objectively assess the financial health of all school districts, and promptly offer technical assistance activities and services. As a multi-dimensional analysis and reporting system, SDFP assigns all districts a rating based on five indicators of financial stability. In addition to Fund Balance to Revenue Ratio (FBRR) that was previously used in FAAS, the new system includes four newly-developed indicators: Expenditure to Revenue Ratio (EXRV), Days Cash on Hand (DCOH), Percent of Short-Term Borrowing Ability Remaining (STB) and Percent of Long-Term Debt Margin Remaining (LTD). Table A1 in the online Appendix A summarizes the definition and calculation of each financial indicator.

Each of the five indicators is assigned four score categories (Score 4, Score 3, Score 2, and Score 1) based on its value (see Table 1). According to the definition of each indicator, for FBRR, DCOH, STB and LTD, a bigger value reflects better fiscal health, which indicates that the indicator will receive a higher Score. However, it is the opposite direction for EXRV where a higher Score will be assigned if the value of EXRV is smaller. ISBE calculates each indicator

[9] This became a crucial concern when ISBE found in 2002 that more than 60 percent of Illinois school districts were operating with deficit budgets and 163 of those had budget deficits for at least three years; however, FAAS showed that there were only 11 districts on the Financial Watch List, which was misleading (ISBE, 2002c, 2003b).

and weighs each indictor's score to obtain a district's overall "Total Profile Score". This composite financial score is equal to the sum of the five weighted scores and ranges from the highest possible score of 4.00 to the lowest 1.00.

<Table 1 about here>

The total financial score places all public school districts into one of four designations: Financial Recognition, Financial Review, Financial Early Warning, and Financial Watch. Table 2 shows how designations are defined based on total financial score and the specific intervention corresponding to each designation. Districts with a score higher than 3.07 (labeled with either "Financial Recognition" or "Financial Review") are identified with the higher level financial strength, and will receive no or little involvement from ISBE. Districts with "Financial Early Warning" (scoring 2.62 to 3.07) and "Financial Watch" (scoring 1 to 2.61) are monitored more closely. For these districts, ISBE offers comprehensive financial management guidance and technical assistance, and provides increased` support to districts in "Financial Watch". In addition, these two groups of districts are evaluated by ISBE to determine whether they are qualified for Financial Oversight Panel based on Section 1A-8 of the School Code (ISBE, 2014a).

<Table 2 about here>

Since 2003, ISBE has calculated the total financial score for all public school districts in Illinois by using this new methodology. The annual financial profiles are released in March every calendar year based on prior fiscal year financial data from the Annual Financial Report.[10]

[10] For example, ISBE compiled and distributed the 2018 School District Financial Profiles in March 2018. The 2018 profiles are generated by using FY 2017 (spanning July 1, 2016 – June 30, 2017) fiscal data from Annual Financial Report that is due at ISBE on November 15, 2017.

Before the release, ISBE requests that district superintendents review and verify the calculated profile score through the ISBE Web Application Security System. Districts are also allowed to write comments (500 characters maximum per comment) to explain any financial situations that have significantly affected or will impact districts' fiscal performance and their total financial score. Upon the approval of ISBE, the adjusted financial profile, including total profile scores, designations and district comments, will be posted on the ISBE website and made publicly available (ISBE, 2014a, 2018a).

Beginning from 2009 Financial Profile, Section 1A-8 of the School Code mandates that the Financial Profile calculations shall incorporate delayed state payments for General State Aid and Mandated Categorical.[11] Accordingly, ISBE started to use *revised* prior fiscal year data to calculate total financial score and determine designations, which incorporates late payment such as pupil transportation, special education and other expenditures due to the state and national financial crisis (ISBE, 2009, 2016b).[12] Therefore, districts are not designated as being in financial difficulty solely due to delayed state payments. This indicates that total financial score calculated is no longer taking into account districts' fiscal hardship due to late payments.[13] Along with the Financial Profile based on revised data, ISBE also publishes the Profile report by using original (unadjusted) fiscal data as a comparison.

[11] Mandated categorical program and funds appropriated for it are earmarked and mandated by statute for a particular purpose or population and may be used for that purpose or population only (ISBE, 2017).
[12] According to ISBE, this resulted in adjustments to FBRR, EXRV, and DCOH indicators for *cash basis* school districts. For *accrual basis* school districts, the adjustment depended on the amount of delayed payments that were recognized in the Annual Financial Report and received an adjustment for DCOH indicator since earned but not yet received (ISBE, 2016b).
[13] To illustrate how this adjustment works, for example, the State Board vouchered mandated categorical payments for FY 2017, but the Comptroller made the payment after June 30, 2017. For districts on the cash basis of accounting, these payments were not recognized until the next fiscal year, FY 2018. If the payments had not been delayed, these payments would have been received in FY 2017. Therefore, the Financial Profile indicators were adjusted as if the delayed payments were received in FY 2017 (ISBE, 2014b).

4. Data Collection

My analysis leverages district-by-fiscal year data for all public school districts in the State of Illinois between FY 2002 and FY 2016 from the SDFP system. These data, generously provided by ISBE through Freedom of Information Act (FOIA) requests, span the entire period since the implementation of SDFP in 2002.[14] For each district-fiscal year observation, these data include total financial score and designation, score contribution for each of five financial indicators, detailed fiscal information (e.g., beginning and ending fund balances, total direct receipts/revenues (adjusted and unadjusted), total direct disbursements/expenditures, late payment amount, accounting methods, etc.), and district geographic information (e.g., RCDT, county name, district name, location, district type, administrator name).[15]

As described in Section 3.2, districts with a total financial score above 3.07 will receive no or little involvement from ISBE, while districts scoring less than or equal to 3.07 are monitored more closely and receive intensive financial monitoring and technical assistance (hereafter intervention) from the state. Accordingly, I define the treatment in this paper as whether districts receive the intervention in the fiscal year, and create a treatment indicator variable which takes the value one if total financial score at district-fiscal year level is below or equal to 3.07. My main outcome variables are measures of district fiscal health and financial performance (i.e., the value for each financial indicator). Changes in the abovementioned outcomes will also be explored in order to document the effects on the gains.

[14] ISBE also posts SDFP data for most recent fiscal years on its public website. See https://www.isbe.net/Pages/School-District-Financial-Profile.aspx and http://webprod1.isbe.net/finprofile/profile.aspx.
[15] RCDT refers to Region-County-District-Type. RCDT serves as the unique identifier for each district in Illinois.

ISBE revised SDFP system slightly for 2009 and later annual Financial Profile Report by adjusting delayed state payment in the calculation of total financial score. The negative impact of fiscal hardship due to late payments on financial performance is therefore not reflected in the total financial score any longer. For this reason, I divide the entire sample into two sub-samples: sample for FY 2002-2007 and sample for FY 2008-2016. In this paper, I will focus on sample FY 2008-2016 since more observations are available for empirical analyses.[16]

5. Empirical Strategy

5.1. Empirical Methods

My goal is to explore the impact of state intervention on districts fiscal performance in subsequent fiscal years. I begin my analysis by estimating a series of ordinary least squares (OLS) models that take the following form:

$$Y_{d,T} = \alpha_0 + \alpha_1 Intervention_{dt} + \boldsymbol{\varphi}' \boldsymbol{X_{dt}} + \lambda_t + \varepsilon_{d,T}, \quad (1)$$

where d, t index district and current fiscal year, respectively. T refers to subsequent fiscal years, including $t+1$, $t+2$, and $t+3$. $Y_{d,T}$ denotes different measures of financial performance for district d in fiscal year T. $Intervention_{dt}$ is a binary variable that equals one if district d has a total financial score below or equal to 3.07 in current fiscal year t. $\boldsymbol{X_{dt}}$ is a vector of control variables, such as district types and indicator variables for accounting methods (cash basis or accrual basis) for district d in current fiscal year t. λ_t is a vector of fiscal year fixed effects, and $\varepsilon_{d,T}$ is an error term with mean zero. The coefficient of primary interest in equation (1) is α_1,

[16] Results for sample FY 2002-2007 are similar and available upon request.

which gauges the impact of receiving intervention in fiscal year t on fiscal conditions in subsequent fiscal year T for district d. Note that the total financial score and corresponding designation for each district is finalized and published online in mid-fiscal year (around March) $t+1$ based on Annual Financial Report data for fiscal year t. Therefore, the intervention announced in mid-fiscal year $t+1$ which is determined by data in fiscal year t (i.e., $Intervention_{dt}$) would affect, if there is any, the financial performance in fiscal year $t+1$ (i.e., $Y_{d,t+1}$) for about four months.

OLS estimate of α_1 in equation (1) is typically regarded as being inconsistent, since there might be omitted variables that are correlated with both $Y_{d,T}$ and $Intervention_{dt}$. For instance, districts receiving intervention this year because of worse financial performance, are more likely to perform poorly in the next year due to unobservable inherent characteristics (either time-varying or time-invariant) that make financial status similar over time. In this scenario, OLS estimates will be biased downward when examining the impact of intervention on the level of fiscal performance.

I am also interested in exploring the impact on the improvement of fiscal performance (i.e., gains of financial indicator values). The regression model is exactly the same as equation (1) except for the dependent variable:

$$Y_{d,T} - Y_{d,t} = \alpha_0 + \alpha_1 Intervention_{dt} + \boldsymbol{\varphi}' \boldsymbol{X_{dt}} + \lambda_t + \varepsilon_{d,T}. \quad (2)$$

In terms of how much financial situations have been improved, OLS regression could bias the estimate upward because of mean reversion. An example is that, an unanticipated and temporary expenditure increase that happens specifically in district d in fiscal year t (such as a sudden fire in a school) would make the district more likely to score low and fall into either "Financial Early

Warning" or "Financial Watch" in that year. If this negative shock dies out quickly after the first period, the district would recover to its normal level, and a bigger improvement in its financial indicators is expected.

In order to circumvent the problems of omitted variable bias and mean reversion, this paper uses regression discontinuity design to estimate the impact of state intervention in a causal sense. Specifically, I propose a RD specification which takes advantage of the cutoffs for each of the five financial indicators.[17] As displayed in Table 1, each financial indicator has three cutoffs which generate a source of exogenous variation in the Score level the indicator will be assigned. Following Pop-Eleches and Urquiola (2013), I summarize information from each of five financial indicators' cutoffs by stacking data across all fifteen cutoffs.[18] Instead of using all observations below and above each cutoff, I choose to only keep the district-fiscal year observations belonging to the Score level which is closest to the cutoff on each side when constructing the stacking group.[19] Within each of the fifteen stacking groups, compared to observations on the right side of the indicator cutoff, those on the left side will have a lower Score level and therefore be more likely to receive the intervention.[20]

[17] There is another potential approach to construct the regression discontinuity, which utilizes the total financial score as the running variable. This running variable also creates a clear discontinuity in the probability of treatment, in the way that school districts with total financial scores below 3.07 would receive the state intervention while those above 3.07 would not. However, this type of RD specification lacks sufficient power to tease out the causal relationship because there is not enough density around the cutoff.

[18] Since each financial indicator has three cutoffs and there are five financial indicators, I have in total fifteen different cutoffs being used to stack the data.

[19] Take cutoff 0.10 from FBRR as an example to illustrate this approach. For the stacking group based on cutoff 0.10, instead of using all observations below cutoff 0.10 (assigned with either Score 1 or Score 2) and all observations above cutoff 0.10 (assigned with either Score 3 or 4), I only keep the district-fiscal year observations that are *originally* assigned Score 2 (i.e., $0 \leq FBRR < 0.10$), and observations *originally* assigned Score 3 (i.e., $0.10 \leq FBRR < 0.25$). Note that, due to the additional calculation (described in Note (3) of Table 1) that might cause a different final Score assignment to EXRV indicator, I use the *original* Score assignment to construct the stacking group because it is this original assignment that is determined directly by EXRV indicator cutoffs.

[20] Note that, as for EXRV indicator, an observation with a higher value is more likely to be assigned a lower Score by definition. In order to make the stacking procedure consistent across all financial indicators, I choose to use the additive inverse of EXRV to construct the stacking groups for EXRV. The distribution of EXRV values and its

For each stacking group in this RD specification, I construct the running variable, $S_{idt,g}$, as:

$$S_{idt,g} = Indicator\_Value_{idt} - Cutoff_{i,g}, \quad (3)$$

where i indicates financial indicator FBRR, EXRV, DCOH, STB, or LTD. $g = 1, 2, 3$ which indexes the first, second, and third cutoff for indicator i. $Indicator\_Value_{idt}$ is the *standardized* indicator value by subtracting the mean of corresponding indicator and then dividing the result by the standard deviation of that indicator. $Cutoff_{i,g}$ refers to the *standardized* cutoff value for indicator i. The standardization method makes the values of each stacking group (with subscript i, g) on the same scale. Following the stacking rationale as discussed above, I stack all groups based on their cutoffs to construct the raw stacked data. Then I further restrict the stacked data by only keeping those district-indicator-fiscal year level observations of which treatment status would change discontinuously when they move across the corresponding cutoff. This procedure would establish a regression discontinuity framework with first stage discontinuity equal to one (i.e., local average treatment effect is equal to the intention-to-treat effect), and guarantee that small changes in the running variable cause discontinuous change in treatment status. See Figure A1 in the online Appendix A for the first stage figure, and online Appendix B for a detailed explanation of the proposed stacked RD specification with examples.

I estimate the regression discontinuity specification by taking the following reduced-form:

inverse are symmetrical with respect to the y axis. Therefore, the additive inverse of EXRV follows these Score assignment rules: Score 1, if $EXRV\_Inverse < -1.20$; Score 2, if $-1.20 \leq EXRV\_Inverse < -1.10$; Score 3, if $-1.10 \leq EXRV\_Inverse < -1.00$; Score 4, if $EXRV\_Inverse \geq -1.00$.

$$Y_{id,T} = \beta_0 + \beta_1 \mathbf{1}(S_{idt} < 0) + h(S_{idt}) + \boldsymbol{\rho}' \boldsymbol{X_{dt}} + \theta_t + \mu_{id,T}, \quad (4)$$

$$Y_{id,T} - Y_{id,t} = \beta_0 + \beta_1 \mathbf{1}(S_{idt} < 0) + h(S_{idt}) + \boldsymbol{\rho}' \boldsymbol{X_{dt}} + \theta_t + \mu_{id,T}. \quad (5)$$

The running variable S_{idt} in equation (4) and (5) is a combination of all $S_{idt,g}$ after stacking the data. I call this centered-at-zero running variable S_{idt} "composite running variable" throughout this paper. $h(\cdot)$ is a flexible function of the composite running variable.[21] $\mathbf{1}(S_{idt} < 0)$ is a dummy equal to one, if the value of indicator i for district d in fiscal year t falls below the corresponding cutoff.[22] The parameter of interest, β_1, identifies the effect of receiving the intervention due to the situation where the value of an indicator is just below the corresponding threshold and the value of other indicators keeps constant. The use of stacked data means that some district-fiscal year observations may show up in the data more than once. To account for this in inference, standard errors are clustered at the district-fiscal year level in the RD specification.

Under the assumption that school districts are unable to precisely manipulate the value of each financial indicator (i.e., the composite running variable), the abovementioned RD design will isolate the variation in state intervention which is randomized near the threshold as though from a randomized experiment. This indicates that all characteristics, either time-varying or time-invariant, determined prior to the realization of the running variable, should be balanced for observations right above and right below the threshold. Therefore, school districts just above the corresponding cutoff could serve as a valid counterfactual for those just below. Additionally, this

[21] I use a linear function of the running variable that is allowed to vary on either side of the threshold in this paper.
[22] In this RD specification, the dummy variable $\mathbf{1}(S_{idt} < 0)$ is equal to 1 if $Indicator\_Value_{idt} < Cutoff_{i,g}$ (rather than $Indicator\_Value_{idt} \leq Cutoff_{i,g}$) is satisfied. By construction, when an observation has its indicator value equal to the cutoff value (i.e., $Indicator\_Value_{idt} = Cutoff_{i,g}$), a higher Score will be assigned (see Table 1). Therefore, given the value of other indicators fixed, this observation will score above the intervention cutoff 3.07 and receive no intervention.

RD framework also provides a compelling way of addressing the concern of mean reversion. Since observations near the threshold have almost identical baseline characteristics and pre-treatment outcomes, they have similar differences in outcome relative to the average and would have the same degree of mean reversion on average in the absence of the state intervention.

5.2. Strategy to Address the Concern of Multiple Hypothesis Testing

Following the estimation by using the full sample, I conduct heterogeneity analysis by district type and accounting method. Since I estimate effects on many outcomes and subsamples, this raises issues related to multiple hypothesis testing. In order to avoid overemphasizing any single significant result, I control the false discovery rate (FDR) when estimating these impacts on each outcome. FDR controls the expected proportion of incorrectly rejected null hypotheses (i.e., type I errors) among rejected hypotheses. To account for the false discovery rate, I apply the procedure proposed by Benjamini and Hochberg (1995) and implemented in Stata by Anderson (2008).[23] In addition, to calculate FDR q-values, I need to define the families of related hypotheses. In this study, I group the statistical tests on financial indicators in each subsequent fiscal year separately by subsamples. In the table of heterogeneity analysis, I report both unadjusted standard errors and FDR q-values which are analogous to p-values when correcting for multiple hypothesis testing.

5.3. Regression Discontinuity Sample

The descriptive statistics for FY 2008-2016 sample before and after stacking are displayed in Table 3. By construction, total financial scores for the stacked sample have smaller range. Panel A reports that, on average, the stacked sample has relatively smaller total financial

[23] I also use the false discovery rate procedure proposed by Benjamini, Krieger, and Yekutieli (2006) to adjust p-values. Qualitative results are similar and robust.

score (3.190) and higher probability of receiving intervention (25.0%), compared to the broader samples discussed in Section 4. In addition, the stacked sample has smaller score contribution for each of the five financial indicators, which is consistent with the smaller financial indicator values shown in Panel B. Panel C shows that 56% of observations in the stacked sample are unit districts, and 35% are elementary districts. Most districts (85%) maintain records on a cash basis. These observable characteristics are quite similar on average between the stacked sample and the sample before stacking.

<Table 3 about here>

6. Validity Checks for the Regression Discontinuity Design

The key identifying assumption of the regression discontinuity design is that there is no perfect manipulation around the threshold. For the RD specification discussed in Section 5.1, the assumption requires that districts cannot perfectly manipulate the value of each financial indicator in a way that guarantees a higher Score level. Regression discontinuity estimates will return unbiased estimates of state intervention effects only if other determinants of financial performance outcomes are balanced across the threshold.

I consider two tests of cross-threshold balance. The first is to look for a density discontinuity in the distribution of composite running variable at the cutoff based on the stacked data. If there is perfect manipulation around the cutoff point, for example, districts with superintendents who care very much about the financial score are more likely to manipulate their financial indicator values so as to fall right above the indicator cutoffs to get a higher Score level, one would expect to observe a discontinuously higher density at the cutoff. Figure 1 displays the

histogram of the composite running variable relative to the cutoff for the stacked sample. The densities are smooth across the cutoff.

<Figure 1 about here>

The second test of RD validity is to examine the balance of predetermined covariates across the threshold. Panel A of Figure 2 shows binned means of district type dummy variables, an indicator equal to one if a district adopts cash-basis accounting method, and an indicator if accrual-basis accounting method, respectively. I also show supportive evidence by testing whether financial indicator values in previous fiscal years move smoothly through the threshold (see Figure 2, Panel B). Taken together, these results suggest that precise manipulation of the running variable is unlikely in this context.

<Figure 2 about here>

7. Main Results

7.1. OLS Regression Results

Table 4 reports results from the ordinary least squares estimations of equation (1) and (2), which serve as a benchmark for the regression discontinuity estimates. Column (1)-(3) show the OLS coefficients with the value of each financial indicator in subsequent fiscal year $t + 1$, $t + 2$, $t + 3$ as the dependent variable, respectively. Coefficients for FBRR, DCOH, STB, and LTD are all statistically significant negative, and almost positive for EXRV. Again, note that better performance is reflected by higher values for FBRR, DCOH, STB, LTD and lower values for EXRV, according to how these indicators are defined and calculated. Therefore, these

coefficients indicate that on average receiving intervention is associated with worse financial performance in the future. Column (4)-(6) present the coefficients for the improvement of performance by examining the impact on future indicator values relative to current values. The significant positive results for FBRR, DCOH and negative results for EXRV show that the intervention is positively correlated with the improvement of future financial performance. There are no significant correlations between the intervention and gains in STB and LTD.

<Table 4 about here>

7.2. Regression Discontinuity Regression Results

OLS results in Table 4 are consistent with my predictions discussed in Section 5.1, where I argue that the simple OLS estimation is prone to bias due to omitted variables and mean reversion. To address these potential biases in the OLS estimator, I use the regression discontinuity framework specified in equation (5) which exploits each predetermined financial indicator cutoff as the source of exogenous variation.[24] I employ a combination of graphical and statistical evidence in the analysis.

7.2.1. The Impact of State Intervention on Gains in Financial Indicator Values

I begin illustrating the main findings graphically. Figure 3 displays the unconditional binned scatterplots for gains in future values of each financial indicator against the composite running variable. By construction, for observations to the left of the corresponding threshold (which is centered on zero), the first-stage value is one, indicating that these observations will receive state intervention. For those to the right, the first-stage value is zero, which means that

[24] In this section, I only display RD results with *gains* in future values of each financial indicator as dependent variables by following equation (5). Results are similar when using level values as the outcomes (equation (4)) and available upon request.

they are not treated. By eyeballing these figures, I argue that there are no significant discontinuities around the threshold for any of the gains in financial indicator values. I also residualize each dependent variable on the y-axis in Figure 3 respectively by all controls employed in OLS regressions, and plot these residuals against composite running variable separately.[25] Almost same patterns are observed with respect to the discontinuities at the threshold.

<Figure 3 about here>

I report RD estimates and standard errors that correspond to these figures in Table 5. Table 5 displays the RD estimates of β_1 in equation (5) where dependent variables are the gains for financial indicator values in subsequent fiscal year $t+1$, $t+2$, $t+3$ relative to values in fiscal year t. The coefficients are estimated by using the observations within a one-unit (i.e., one standard deviation) window of the running variable on either side of the threshold. Again, note that I restrict the stacked sample by only keeping those observations of which treatment status would change discontinuously when they move across the corresponding threshold. Therefore, the reduced-form estimates in Table 5 are exactly reflecting the local average treatment effects (LATE). These results suggest that the effects of state intervention on gains for financial indicator values are almost no longer statistically significantly different from zero within three years since the intervention is determined, compared to OLS estimates. Coefficients change very little when adding control variables into the baseline regressions.

<Table 5 about here>

[25] Results are not displayed in this paper and available upon request.

In order to further understand the causal effects of the intervention, I argue that the magnitudes of these coefficients are small and precisely close to zero effects. To take one example, considering the coefficient for gains in DCOH in year $t+1$ relative to t with no controls (Column (1) of Table 5). The estimate is 0.732 with standard error equal to 2.886. The 95% confidence interval for this estimate is $[-4.929, 6.392]$, which suggests that we are 95% confident that the range will contain the true mean value of the policy effect on gains in DCOH from t to $t+1$. Another way to interpret this statement is that we are 95% confident that districts receiving intervention would have the true effect ranging between 4.9 days less in terms of increased days cash on hand and 6.4 days more, compared to districts without intervention. Therefore, we can rule out the treatment effects larger than 6.4 days with 95% confidence. DCOH refers to the estimated number of days a district could meet operating expenditures provided no additional revenues were received. To get a feel for how small the magnitude is, consider a representative treated district with DCOH value in fiscal year t equal to 118.816 (i.e., the mean value of DCOH for the stacked sample) and an identical but untreated district with same DCOH in year t. One year later, DCOH in the treated district increases to 125.216 but is unchanged in the untreated in year $t+1$. This would induce a 6.4 days difference in changes in DCOH in year $t+1$ relative to t between treated and untreated districts, which is a small difference. In addition, when comparing the 95% confidence interval $[-4.929, 6.392]$ to the standard deviations of DCOH and difference in DCOH between $t+1$ and t displayed in Table 3 (85.386 and 39.246, respectively), it also implies that the range itself reflects a very small treatment effect.

7.2.2. Robustness

For each outcome displayed in Table 5, I now consider how the estimates vary according to the bandwidth chosen with covariates included into the regressions. Table 6 presents the robustness of estimated discontinuities by using different pre-specified windows around the cutoff. Broadly, the estimates are robust to either a narrower or a wider bandwidth relative to the one standard deviation window (i.e., BW = 1, Column (3) of Table 6) I choose in the baseline RD regressions, even though the smaller bandwidths generally produce bigger standard errors. Some estimates, such as for gains in DCOH in year $t + 3$ relative to t, vary a bit, but I argue that these coefficients are still small and precisely close to zeros with respect to the magnitudes by following the same logic from the discussion in Section 7.2.1. Note that for gains in LTD in year $t + 3$ relative to t, the coefficients are not quite robust across different bandwidth choices: compared to the estimate with bandwidth equal to 1, coefficients are similar with wider bandwidths and big in terms of the magnitudes, but much smaller when narrowing down the bandwidth and become insignificant. These coefficients cannot convey helpful information related to the impact on gains in LTD between year $t + 3$ and t. I will discuss this in more details when I examine this effect based on different sub-groups in Section 7.2.3. The coefficients in Table 6 appear to be generally invariant to the scenario without any covariates added.[26]

<Table 6 about here>

7.2.3. Heterogeneity

The main takeaway of the RD results presented above is that there are precise zero causal effects of state intervention on gains in any of future financial indicator values in subsequent

[26] Results are not displayed in this paper and available upon request.

three fiscal years after the treatment is imposed, when using the stacked sample as a whole. I investigate the heterogeneous treatment effect of receiving intervention by splitting the stacked sample into different sub-groups in Table 7. Broadly, I see similar patterns as discussed previously for various groups, which implies that the impacts are precisely zero. However, there are two exceptions in which I find there are statistically significant effects and these effects are robust and large in magnitude. After accounting for multiple hypothesis testing across all of the outcomes within each family, FDR q-values displayed in the table show that these effects remain statistically significant.

<Table 7 about here>

One exception is the impact on gains in LTD in year $t + 3$ relative to t for elementary school districts (Panel C, Column (1) of Table 7). The regression estimate indicates that intervention raises the long-term debt capacity remaining by 15.165 percentage points more on average for districts that score right below the corresponding threshold compared to those scoring right above. As reported in Panel A of Table 8, the coefficients are quantitatively similar across different bandwidths. Panel A also displays the impact on gains in LTD between year $t + 4$ and t, which is larger with respect to the magnitude and quite robust. Panel A of Figure 4 shows regression discontinuity plots with gains in LTD as the dependent variable for the elementary school districts. These figures show easily-observable discontinuities around the threshold, which are consistent with the regression results.

<Table 8 about here>

<Figure 4 about here>

The other exception is the impact on gains in EXRV in year $t+3$ relative to t for accrual basis school districts (Panel C, Column (4) of Table 7). Again, by definition negative values for differences in EXRV between $t+3$ and t suggest the improvement of financial performance represented by EXRV. As reported in Table 7, the difference in EXRV values in year $t+3$ relative to year t, is 0.035 unit lower for districts which score just below the threshold and therefore receive the intervention, compared to their counterfactual districts that score just above but do not receive the intervention. The estimates remain large and statistically significant across different bandwidths, as presented in Panel B of Table 8. In Panel B, I also observe similar patterns of regression results by using gains in EXRV between $t+4$ and t as the outcome variable displayed. Panel B of Figure 4 provides supportive visual evidence of discontinuities at the threshold for these two dependent variables.

The large and statistically significant effects on improvement in LTD for elementary school districts and in EXRV for accrual basis districts in a relatively long period of time (i.e., fiscal year $t+3$ and $t+4$), suggest that state intervention yields long-term benefits to school districts' financial health for these types of districts. These results are consistent with the mechanisms and my predictions discussed in Section 2. First, with respect to financial indicators LTD and EXRV, they are the performance measures in SDFP system which could represent districts' long-run financial health. LTD reflects how much room is left for debt-capacity available when taking away total long-term debt outstanding out of total amount of long-term debt allowed for each district. Higher LTD values suggest that districts are less reliant on issuing long-term debt to meet operational needs. As for EXRV, it refers to the ratio of expenditure to revenue. It would take districts a few years to maintain all current levels of programming without making significant budgetary spending reductions, and determine an optimal approach to

eliminate redundant staff and unnecessary programs in order to reduce operational costs. Lower values for EXRV indicates a more structurally balanced budget.

Second, in terms of certain types of school districts, elementary school districts would benefit more from the intervention because they have less personnel and limited staff with enough training on school district budgeting and finance. The assistance from ISBE is therefore essential to these districts in the way that they will be acquainted with what is happening regarding their fiscal performance. As for accrual basis districts, their accounting method requires that revenues are recognized in the period they become available and measurable, and expenditures are recognized in the period the associated liability is incurred. The intervention will make these districts pay much more attention to their adjustment in revenues and expenditures, which would exert long-run effects on a balanced budget.

7.2.4. Discussion

The stated intent of Illinois's implementation of School District Financial Profile is to objectively evaluate the fiscal health of all school districts and promptly provide financial management guidance and technical assistance to financially distressed districts. Even though it is somewhat disappointing that results suggest that the state intervention has precisely zero effects on future financial indicators, the conclusion is not surprising. There are two possible explanations. First, ISBE intervention activities are conducted by only four regionally-based finance consultants.[27] These financial consultants are engaged in a variety of financial matters in the region they are responsible for. Since the implementation of SDFP in 2002, over one hundred

[27] See more details about these regional financial consultants at https://www.isbe.net/Pages/Regional-Financial-Consultants.aspx and https://www.isbe.net/Documents/consbroch.pdf. Unfortunately, ISBE dose not keep a record of the exact type of intervention that occurs in the treated school districts (Crosby, 2016).

school districts each year on average (which is about 14 percent of total school districts in Illinois) are identified as financially distressed and receive specialized consulting services from these consultants.[28] The time and effort they dedicate into these troubled districts might be quite limited. Second, as discussed in Section 2, state intervention will improve financial performance due to direct technical assistance and competitive pressure from peer districts, and because the receipt of state intervention also sends a signal to the public that these districts are in bad shape fiscally, will also make well-informed parents escape these failing districts and thus further exacerbate their fiscal distress. The overall impact on fiscal performance is likely to be rather small, as these effects would tend to cancel out.

Notice that the econometric results reported above cannot be interpreted in the way that Illinois's state intervention, in the form of customized technical assistance, is not effective at all. Rather, it helps elementary districts and accrual basis districts improve the long-term capacity of relying less on long-term debt issuance and balancing the budget, respectively. Moreover, regression discontinuity design in this setting estimates the average treatment effect of the compliers with total financial score close to the intervention threshold. The conclusions are only defined for this group of sub-population in the absence of additional assumptions (e.g., constant treatment effects).

8. Conclusion

[28] Table A2 in the online Appendix A presents the historical trend of the proportion of school districts in each of the four SDFP designations since the implementation year of SDFP.

For decades researchers have been debating whether state intervention is able to alleviate the fiscal difficulties in monitored local governments. This paper examines the causal relationship between state intervention and school district financial performance by investigating a fiscal monitoring and intervention system, “School District Financial Profile”, in Illinois. It does so by combining district-level administrative data from ISBE with a regression discontinuity design that exploits the exogenous variation created by the thresholds for each of the financial indicators. Descriptively, I find that the state intervention is associated with the improvement of financial conditions for treated districts. However, results from RD analysis suggest that these effects are small in magnitude and precisely close to zero. I then extend the empirical analysis by examining the heterogeneous treatment effect across different sub-groups. However, I document large and statistically significant increases in gains of Percent of Long-Term Debt Margin Remaining (LTD) values for elementary school districts and in gains of Expenditure to Revenue Ratio (EXRV) values for accrual basis school districts due to the intervention in a relatively long term. These findings indicate that state intervention is successful among certain types of school districts in improving the capacity of being less reliant on incurring long-term debt and maintaining balanced budgets for treated districts which barely receive intervention.

The conclusions have important implications for the literature on the effectiveness of state-level intervention. First, by demonstrating the heterogeneity of impacts on future financial performance, the results here highlight the importance of evaluating the power of intervention separately according to certain district characteristics. In addition, in order to make the intervention more rewarding, ISBE needs to differentiate intervention and assure that certain assistance targets at specific type of districts at a specific time.

Second, it should be noted again that under the RD design the treatment effects are estimated only for the group of compliers, which refers to the sub-population of school districts that just receive the intervention and those barely not at the discontinuity threshold in this setting. An important question is whether results from compliers can be extrapolated to other treated school districts in Illinois which score further below the threshold (i.e., districts with conceptually higher levels of treatment intensity). If it is more likely that the RD estimates have external validity, another separate but related research question is how LATE estimates from the RD design would change if the thresholds (either the intervention cutoff 3.07 for total financial score or the cutoffs for each financial indicator) are marginally changed. The state has been engaged in developing proactive approaches to detect early signs of local fiscal distress and assisting school districts which are already in financial trouble through the state-level monitoring and intervention system. In order to spot potential financial difficulties correctly and offer assistance wisely, the state needs to carefully select the thresholds which are the key to determine the fiscal health classification. Further research is needed to study these policy-relevant questions.

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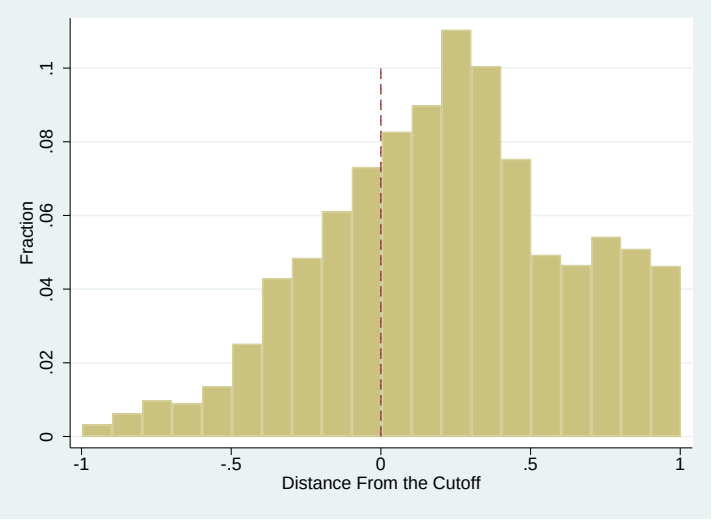
1. Figures

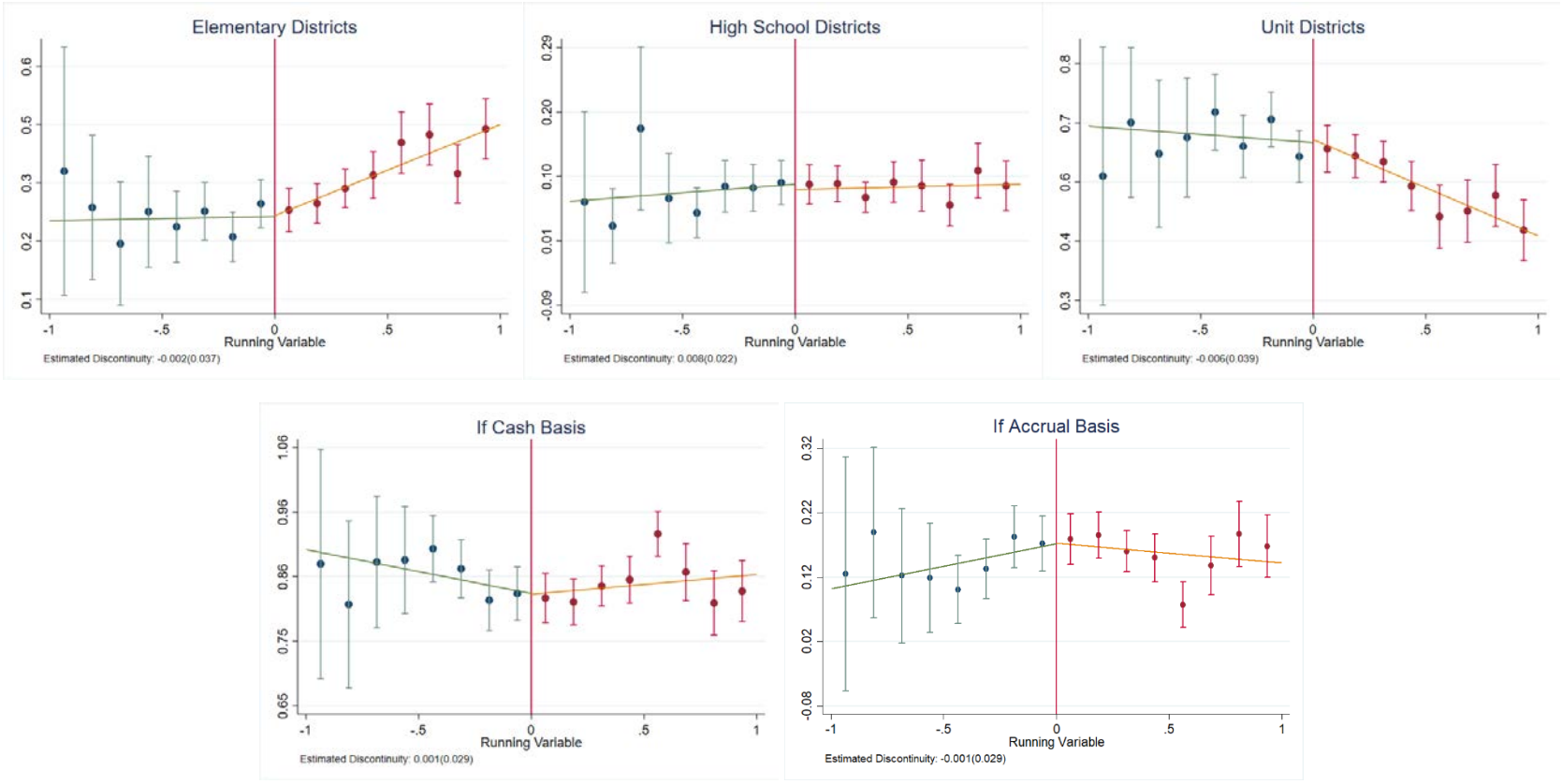
Figure 1: Histogram of Composite Running Variable



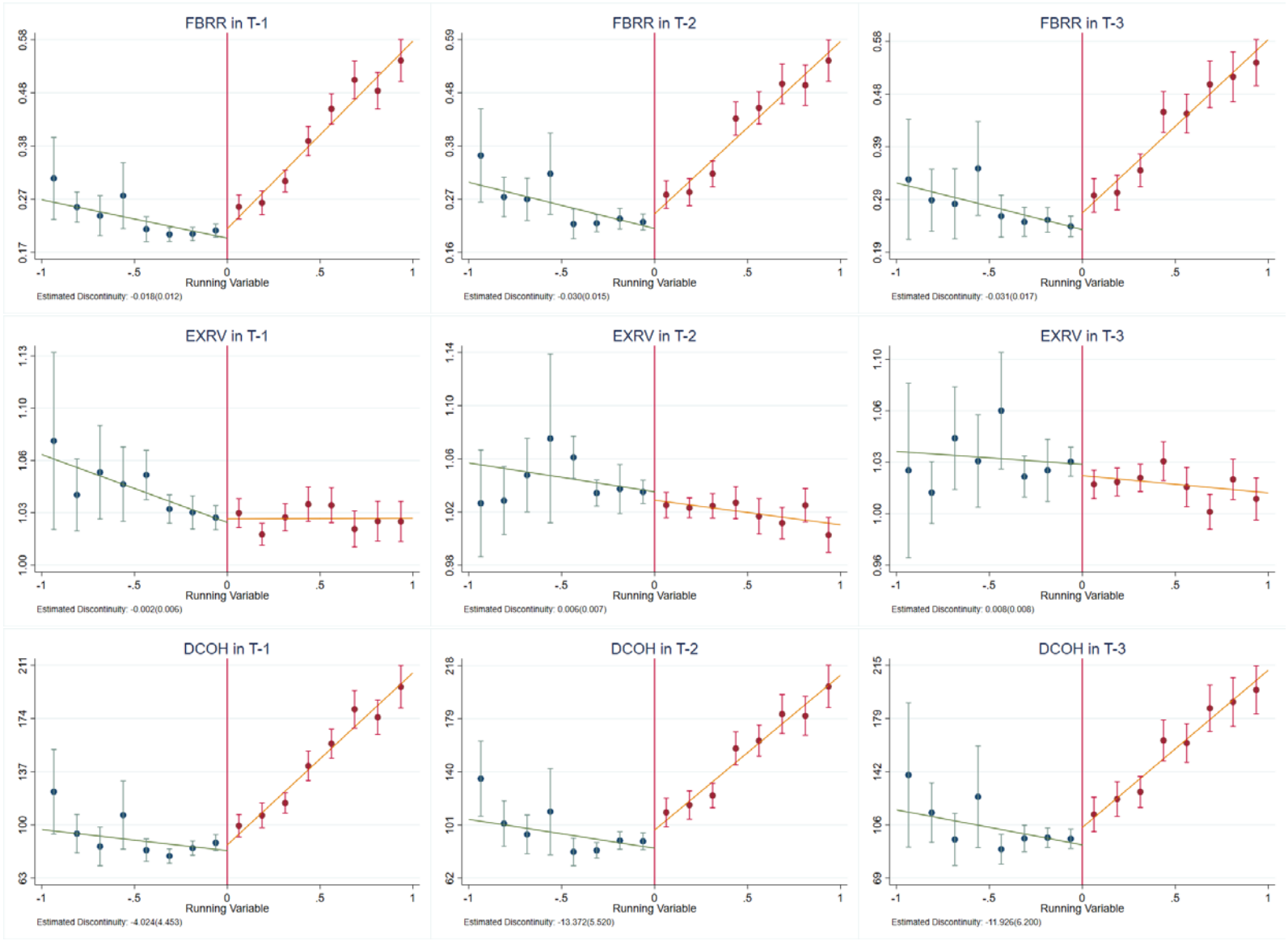
Note: Observations come from stacked samples, which are at district-indicator-fiscal year level. Distributions are displayed within one unit (i.e., one standard deviation) of composite running variable on either side of the cutoff. Fractions are reported within bins of width 0.1.

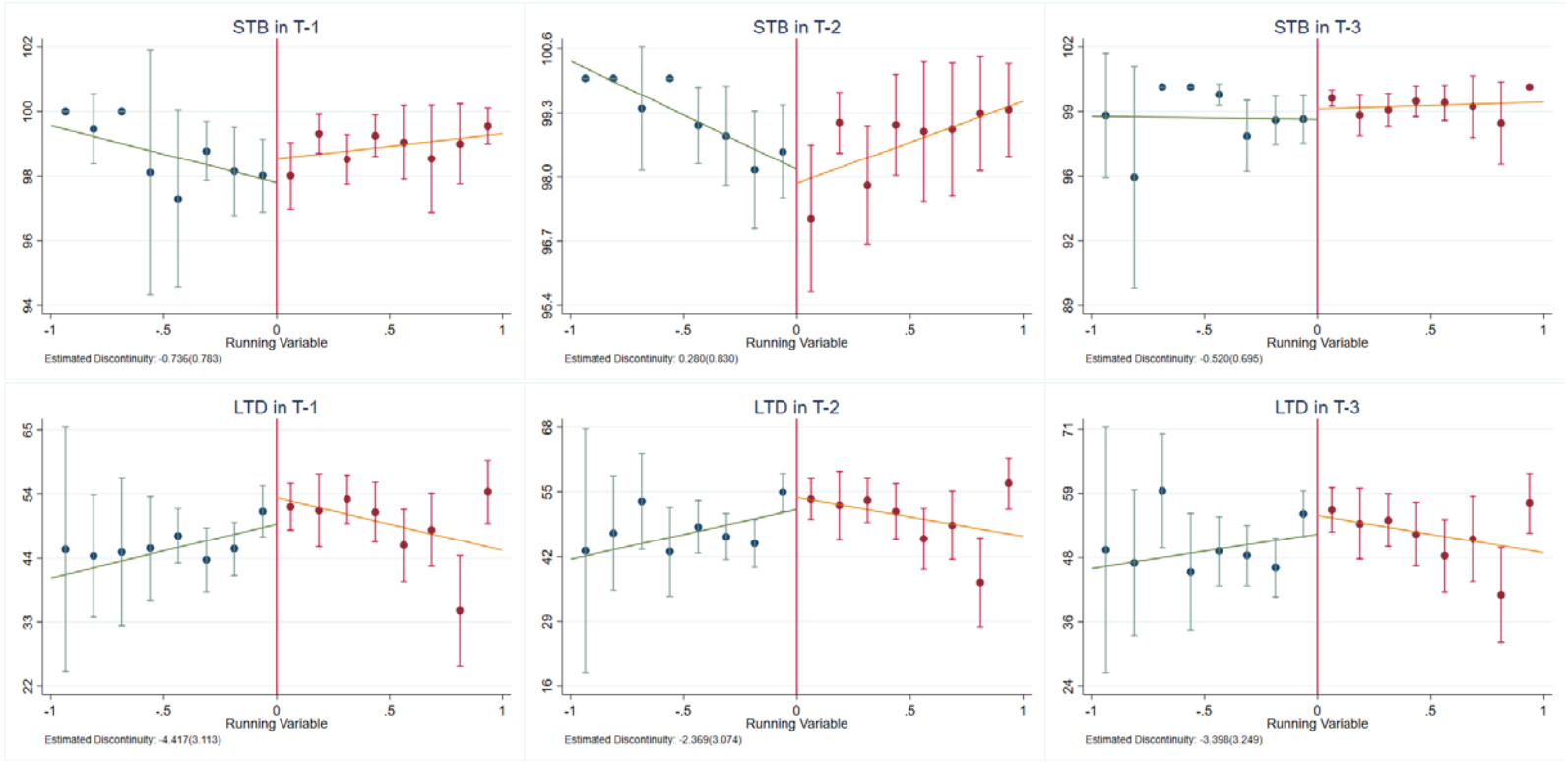
Figure 2: Smoothness Tests for Predetermined Covariates and Outcomes in Previous Fiscal Years

A. Predetermined Covariates



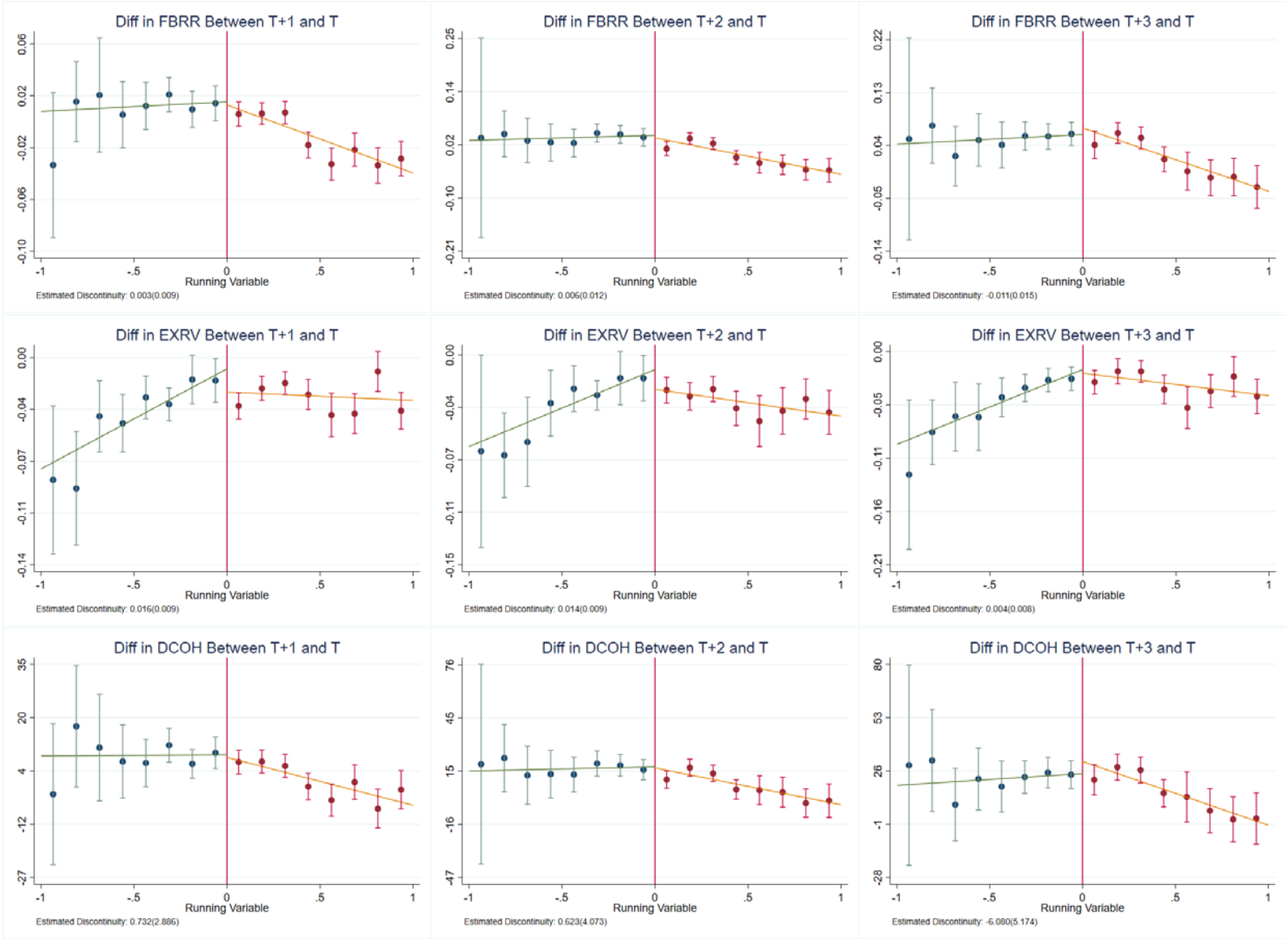
B. Outcomes in Previous Fiscal Years

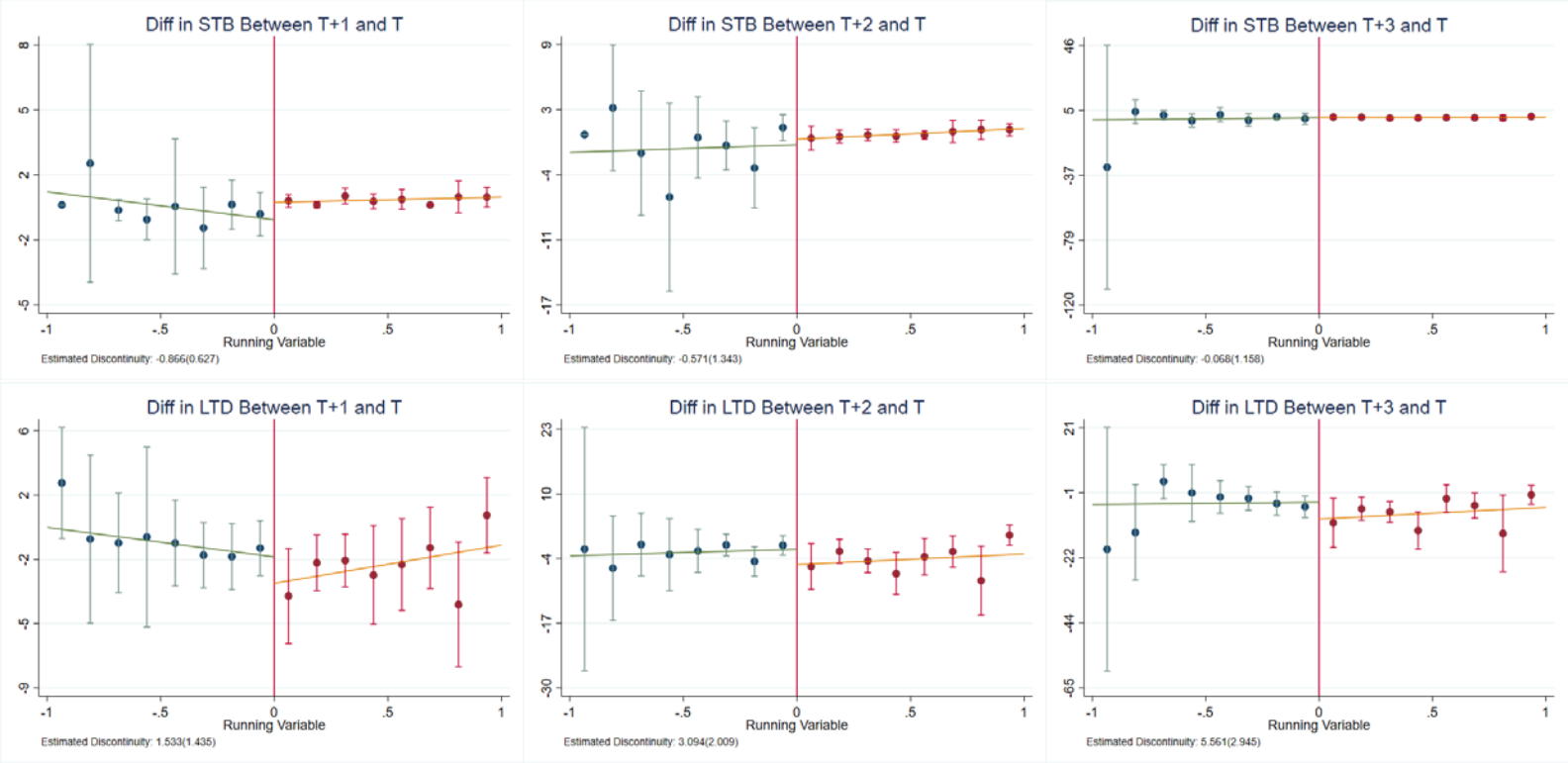




Note: Figures in Panel A and B display binned means and fitted values of predetermined covariates and financial indicator values in previous years by composite running variable relative to the threshold, respectively. Dependent variables are given by figure title. Points reflect binned average of dependent variables for observations that fall within one unit (i.e., one standard deviation) window of composite running variable around the threshold. 95% confidence intervals are presented for each binned plot. Discontinuities at the threshold are calculated and displayed in the notes below each figure. Standard errors in parentheses and clustered at the district-fiscal year level.

Figure 3: Unconditional Scatterplots for Gains in Financial Indicator Values against Composite Running Variable

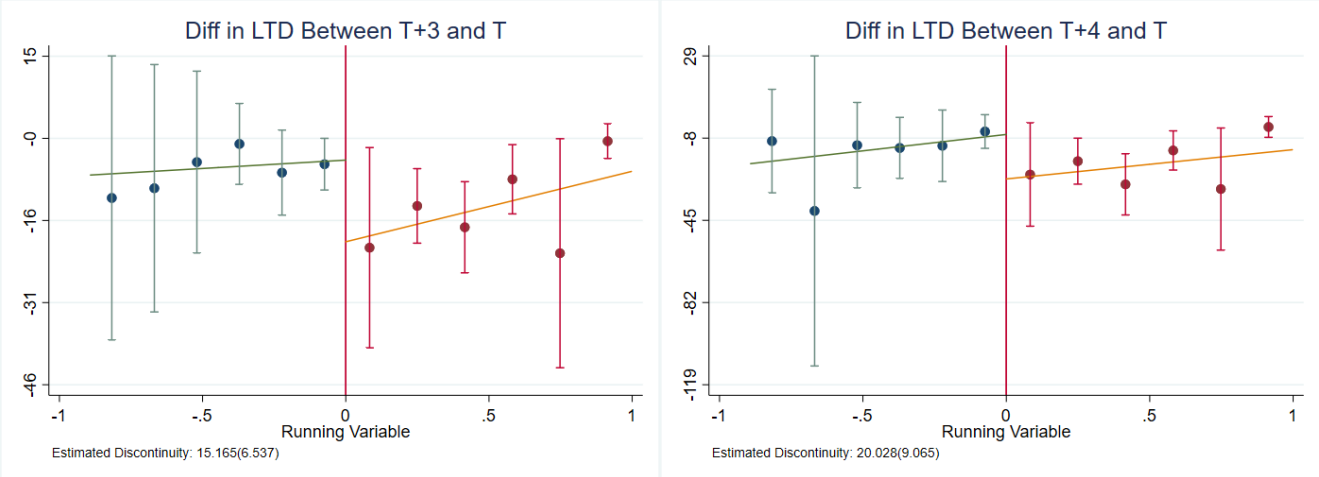




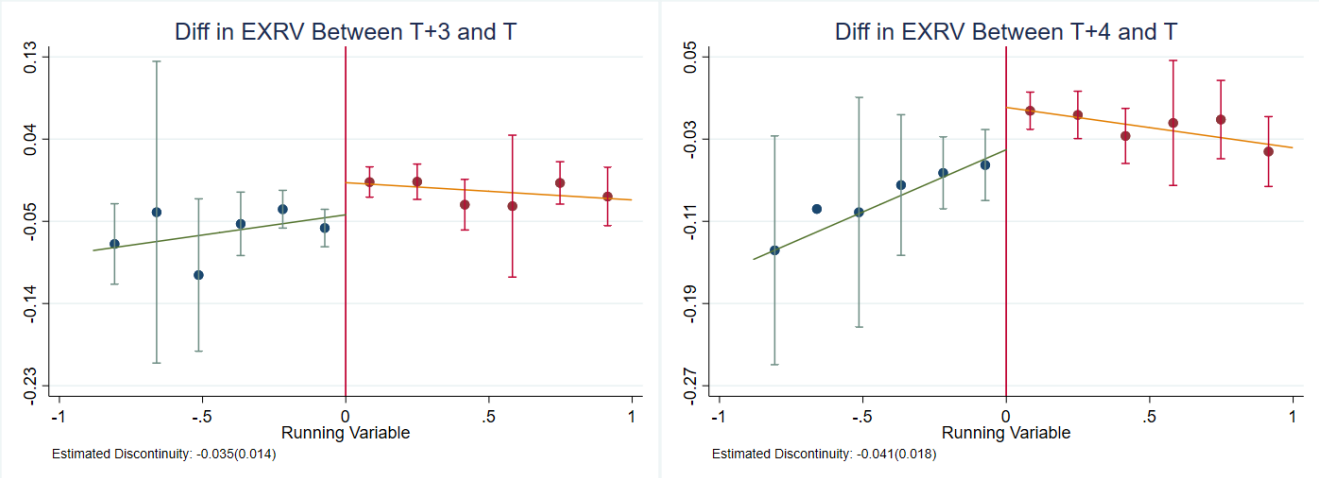
Note: Figures above display binned means and fitted values of unconditional gains in financial indicator values in future fiscal years by composite running variable relative to the threshold. Dependent variables are given by figure title. Points reflect binned average of dependent variables for observations that fall within one unit (i.e., one standard deviation) window of composite running variable around the threshold. 95% confidence intervals are presented for each binned plot. Discontinuities at the threshold are calculated and displayed in the notes below each figure. Standard errors in parentheses and clustered at the district-fiscal year level.

Figure 4: Unconditional Scatterplots for Gains in Financial Indicator Values against Composite Running Variable (Elementary School Districts & Accrual Basis School Districts)

A. Elementary School Districts



B. Accrual Basis School Districts



Note: Panel A and Panel B restrict the stacked sample to elementary school districts and accrual basis school districts, respectively. Figures above display binned means and fitted values of unconditional gains in Percent of Long-Term Debt Margin Remaining (LTD) values (Panel A) and unconditional gains in Expenditure to Revenue Ratio (EXRV) values (Panel B) in future fiscal years by composite running variable relative to the threshold. Dependent variables are given by figure title. Points reflect binned average of dependent variables for observations that fall within one unit (i.e., one standard deviation) window of composite running variable around the threshold. 95% confidence intervals are presented for each binned plot. Discontinuities at the threshold are calculated and displayed in the notes below each figure. Standard errors in parentheses and clustered at the district-fiscal year level.

2. Tables

Table 1: Score Categories for Five Financial Profile Indicators

Indicator	Score Categories		Weight	Highest Possible Score	Lowest Possible Score
Fund Balance to Revenue Ratio (FBRR)	Score 4	If $FBRR \geq 0.25$	35%	1.40 (= 4×35%)	0.35 (= 1×35%)
	Score 3	If $0.10 \leq FBRR < 0.25$			
	Score 2	If $0 \leq FBRR < 0.10$			
	Score 1	If $FBRR < 0$			
Expenditure to Revenue Ratio (EXRV)	Score 4	If $EXRV \leq 1.00$	35%	1.40 (= 4×35%)	0.35 (= 1×35%)
	Score 3	If $1.00 < EXRV \leq 1.10$			
	Score 2	If $1.10 < EXRV \leq 1.20$			
	Score 1	If $EXRV > 1.20$			
Days Cash on Hand (DCOH)	Score 4	If $DCOH \geq 180$	10%	0.40 (= 4×10%)	0.10 (= 1×10%)
	Score 3	If $90 \leq DCOH < 180$			
	Score 2	If $30 \leq DCOH < 90$			
	Score 1	If $DCOH < 30$			
Percent of Short-Term Borrowing Ability Remaining (STB)	Score 4	If $STB \geq 75$	10%	0.40 (= 4×10%)	0.10 (= 1×10%)
	Score 3	If $50 \leq STB < 75$			
	Score 2	If $25 \leq STB < 50$			
	Score 1	If $STB < 25$			
Percent of Long-Term Debt Margin Remaining (LTD)	Score 4	If $LTD \geq 75$	10%	0.40 (= 4×10%)	0.10 (= 1×10%)
	Score 3	If $50 \leq LTD < 75$			
	Score 2	If $25 \leq LTD < 50$			
	Score 1	If $LTD < 25$			
		Total	100%	4.00	1.00

Note:

(1) Score 4 indicates the lowest financial risk level reflected by that indicator, while Score 1 indicates the highest.

(2) By definition, for FBRR, DCOH, STB, and LTD, a higher value reflects lower financial risk level, and therefore a higher Score will be assigned; while for EXRV, a higher value reflects higher financial risk level, and a lower Score is assigned accordingly.

(3) If the resulting calculation based on the above table places a district in Score 1 or 2 for $EXRV$ **AND** in Score 4 for $FBRR$ at the same time, then an additional calculation needs to be completed:

$$FBRR - 0.1 / EXRV - 1.0$$

- If this ratio is greater than 2, then $EXRV$ will be assigned Score 3 instead.
- If this ratio is greater than 1 but less than 2, then $EXRV$ will be assigned Score 2 instead.

Source: Illinois State Board of Education, 2014a.

Table 2: School District Financial Profile Designations, ISBE

Designation Type	Score Range	Responses from ISBE	Intervention
Financial Recognition (Best financial health)	3.54 - 4.00	Districts receive little or no review from ISBE.	Little or no intervention is required.
Financial Review	3.08 - 3.53	Districts receive a limited review by ISBE but will be monitored for potential downward trends.	
Financial Early Warning	2.62 - 3.07	ISBE monitors these districts closely and offers proactive technical assistance.	Intervention includes, but not limited to: • Financial projection of operating funds • Projection of Equalized Assessed Valuation (EAV) with analysis of tax levies & extensions • Cash flow analysis for current fiscal year • Beginning FY approved budget on ISBE template • Financial amended budget for FY end • Detailed analysis of additional short- & long-term debt • Staffing plan & personnel inventory report • Enrollment projections
Financial Watch (Worst financial health)	1.00 - 2.61	ISBE monitors these districts *very* closely and offers technical assistance.	

Source: Illinois State Board of Education, 2003a, 2003c, 2016a.

Table 3: Descriptive Statistics for the Analytic Sample (FY 2008-2016)

	Before Stacking		After Stacking	
	Mean	SD	Mean	SD
Panel A: Intervention and Financial Score				
Intervention (If Total Financial Score is Below 3.07)	0.102	0.303	0.250	0.433
Total Financial Score	3.589	0.406	3.190	0.215
Score Contributed from FBRR	1.320	0.193	1.185	0.203
Score Contributed from EXRV	1.235	0.214	1.083	0.183
Score Contributed from DCOH	0.335	0.080	0.262	0.077
Score Contributed from STB	0.398	0.019	0.398	0.023
Score Contributed from LTD	0.301	0.108	0.262	0.117
Panel B: Financial Indicators				
Fund Balance to Revenue Ratio (FBRR)	0.558	0.352	0.335	0.269
Expenditure to Revenue Ratio (EXRV)	0.990	0.094	1.054	0.079
Days Cash on Hand (DCOH)	215.174	139.109	118.816	85.386
Percent of Short-Term Borrowing Ability Remaining (STB)	99.387	6.391	99.103	7.446
Percent of Long-Term Debt Margin Remaining (LTD)	59.521	48.283	46.626	55.663
Difference in FBRR Between T+1 and T	0.014	0.110	-0.009	0.107
Difference in EXRV Between T+1 and T	0.004	0.103	-0.030	0.102
Difference in DCOH Between T+1 and T	4.163	45.700	3.268	39.246
Difference in STB Between T+1 and T	0.017	6.455	0.222	7.846
Difference in LTD Between T+1 and T	-1.298	17.390	-1.628	19.500
Difference in FBRR Between T+2 and T	0.030	0.160	0.003	0.149
Difference in EXRV Between T+2 and T	0.007	0.113	-0.036	0.110
Difference in DCOH Between T+2 and T	9.298	64.621	8.686	53.504
Difference in STB Between T+2 and T	0.097	7.346	-0.094	12.310
Difference in LTD Between T+2 and T	-2.859	26.011	-3.178	28.026
Difference in FBRR Between T+3 and T	0.049	0.200	0.022	0.186
Difference in EXRV Between T+3 and T	0.011	0.116	-0.038	0.111
Difference in DCOH Between T+3 and T	15.954	78.528	17.074	65.273
Difference in STB Between T+3 and T	0.200	7.904	-0.044	12.921
Difference in LTD Between T+3 and T	-4.815	33.624	-6.421	39.262
Panel C: District-Level Characteristics				
Elementary Districts	0.435	0.496	0.353	0.478
High School Districts	0.115	0.320	0.089	0.285
Unit Districts	0.449	0.497	0.557	0.497
If Cash Basis Districts	0.803	0.397	0.847	0.360
If Accrual Basis Districts	0.197	0.397	0.153	0.360
Observations	7731		4340	

Table 4: The Impact of State Intervention on Fiscal Performance (OLS)

	Financial Indicator Values			Changes of Financial Indicator Values		
	Year(s) Since State Intervention			Year(s) Since State Intervention		
	(1)	(2)	(3)	(4)	(5)	(6)
	1 Year	2 Years	3 Years	1 Year	2 Years	3 Years
FBRR	-0.434***	-0.411***	-0.388***	0.008*	0.024***	0.036***
	(0.008)	(0.009)	(0.010)	(0.005)	(0.007)	(0.008)
EXRV	0.034***	0.020***	0.005	-0.068***	-0.083***	-0.098***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)
DCOH	-153.520***	-145.521***	-136.283***	8.522***	13.511***	18.662***
	(2.857)	(3.207)	(3.620)	(1.663)	(2.207)	(2.801)
STB	-4.427***	-3.150***	-2.383***	-0.420	1.161	2.354**
	(0.647)	(0.607)	(0.653)	(0.676)	(0.767)	(0.914)
LTD	-18.456***	-18.966***	-20.103***	-1.152	-1.729	-2.003
	(1.922)	(2.403)	(2.877)	(0.759)	(1.354)	(1.854)
Observations	6839	5973	5111	6839	5973	5111

Note: This table presents estimates of coefficient α_1 in equation (1) and (2) where dependent variables are the values of each financial indicator (Column (1)-(3)) and changes of these values (Column (4)-(6)), respectively. Observations are at district-fiscal year level. OLS regressions control for district types, a dummy for accounting methods (cash basis or accrual basis), and year fixed effects. Heteroskedasticity-robust standard errors in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: The Impact of State Intervention on Fiscal Performance (RD)

	Changes of Financial Indicator Values					
	Year(s) Since State Intervention					
	(1)	(2)	(3)	(4)	(5)	(6)
	1 Year	1 Year	2 Years	2 Years	3 Years	3 Years
FBRR	0.003	0.004	0.006	0.008	-0.011	-0.008
	(0.009)	(0.008)	(0.012)	(0.012)	(0.015)	(0.015)
EXRV	0.016*	0.014	0.014	0.017*	0.004	0.008
	(0.009)	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)
DCOH	0.732	1.464	0.623	1.152	-6.080	-5.538
	(2.886)	(2.821)	(4.073)	(4.066)	(5.174)	(5.220)
STB	-0.866	-0.804	-0.571	-0.414	-0.068	0.036
	(0.627)	(0.620)	(1.343)	(1.276)	(1.158)	(1.075)
LTD	1.533	1.457	3.094	2.791	5.561*	5.226*
	(1.435)	(1.466)	(2.009)	(2.029)	(2.945)	(2.982)
Controls	No	Yes	No	Yes	No	Yes
Observations	3313	3313	2856	2856	2399	2399

Note: This table presents estimates of coefficient β_1 in equation (5) where dependent variables are the changes of values for each financial indicator. Observations are at district-indicator-fiscal year level. The coefficients in all columns are estimated by fitting a linear specification separately on each side of the threshold by OLS, using only observations that fall within one unit (i.e., one standard deviation) window of composite running variable around the threshold. Column (2), (4) and (6) add district types, a dummy for accounting methods (cash basis or accrual basis), and year fixed effects as control variables. Standard errors, reported in parentheses, are clustered at the district-fiscal year level. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Robustness Checks of Estimated Discontinuities

	Changes of Financial Indicator Values					
	(1)	(2)	(3)	(4)	(5)	(6)
	BW: 1.4	BW: 1.2	BW: 1	BW: 0.8	BW: 0.6	BW: 0.4
A. 1 Year Since State Intervention						
FBRR	0.007	0.008	0.004	0.001	0.001	0.010
	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)	(0.011)
EXRV	0.012	0.011	0.014	0.010	0.009	0.016
	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)	(0.010)
DCOH	2.545	3.095	1.464	0.974	1.086	2.428
	(2.772)	(2.804)	(2.821)	(2.988)	(3.356)	(3.741)
STB	-0.934	-0.942	-0.804	-0.724	-0.713	-0.124
	(0.699)	(0.703)	(0.620)	(0.621)	(0.681)	(0.707)
LTD	1.521	1.447	1.457	1.680	1.699	2.479
	(1.439)	(1.452)	(1.466)	(1.543)	(1.751)	(1.937)
Observations	3510	3462	3313	2963	2566	2025
B. 2 Years Since State Intervention						
FBRR	0.012	0.012	0.008	0.012	0.012	0.022
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.015)
EXRV	0.017*	0.016*	0.017*	0.015	0.008	0.013
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
DCOH	2.643	3.345	1.152	2.183	2.449	4.375
	(4.058)	(4.081)	(4.066)	(4.177)	(4.489)	(4.994)
STB	-0.864	-0.825	-0.414	-0.050	0.541	0.607
	(1.363)	(1.369)	(1.276)	(1.235)	(1.072)	(1.339)
LTD	2.688	2.732	2.791	2.013	1.923	1.070
	(2.017)	(2.033)	(2.029)	(2.098)	(2.475)	(2.875)
Observations	3023	2983	2856	2574	2226	1766
C. 3 Years Since State Intervention						
FBRR	-0.004	-0.004	-0.008	-0.004	-0.002	0.015
	(0.015)	(0.014)	(0.015)	(0.015)	(0.017)	(0.019)
EXRV	0.008	0.008	0.008	0.006	0.001	0.012
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)
DCOH	-3.564	-2.993	-5.538	-4.342	-2.166	1.886
	(5.131)	(5.187)	(5.220)	(5.435)	(6.040)	(6.693)
STB	-0.467	-0.408	0.036	-1.063	-0.867	-0.900
	(1.226)	(1.228)	(1.075)	(1.924)	(2.090)	(2.121)
LTD	6.321**	6.318**	5.226*	2.762	2.729	1.166
	(2.914)	(2.934)	(2.982)	(3.065)	(3.799)	(4.426)
Observations	2543	2510	2399	2162	1880	1497

Note: This table presents estimates of coefficient β_1 in equation (5) where dependent variables are the changes of values for each financial indicator. Observations are at district-indicator-fiscal year level. The coefficients in all columns are estimated with different bandwidths by controlling for district types, a dummy for accounting methods (cash basis or accrual basis), and year fixed effects. Standard errors, reported in parentheses, are clustered at the district-fiscal year level. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Heterogeneous Treatment Effects for Sub-groups

	Changes of Financial Indicator Values				
	(1) Elementary Districts	(2) High School Districts	(3) Unit Districts	(4) Accrual Basis Districts	(5) Cash Basis Districts
A. 1 Year Since State Intervention					
FBRR	-0.001	-0.022	0.008	-0.006	0.004
	(0.015)	(0.027)	(0.011)	(0.016)	(0.010)
	[0.963]	[0.554]	[0.469]	[0.892]	[0.844]
EXRV	0.001	0.012	0.023*	0.002	0.019*
	(0.014)	(0.020)	(0.012)	(0.012)	(0.010)
	[0.963]	[0.554]	[0.245]	[0.892]	[0.360]
DCOH	-2.452	-6.969	3.235	1.140	0.622
	(5.435)	(11.022)	(3.533)	(7.055)	(3.169)
	[0.963]	[0.554]	[0.450]	[0.892]	[0.844]
STB	-0.682	1.972	-1.322*	-4.005	-0.214
	(1.052)	(2.463)	(0.797)	(2.597)	(0.537)
	[0.963]	[0.554]	[0.245]	[0.620]	[0.844]
LTD	-0.313	5.853	1.614	1.633	1.544
	(2.769)	(7.946)	(1.527)	(2.590)	(1.651)
	[0.963]	[0.554]	[0.450]	[0.892]	[0.844]
Observations	1085	282	1946	525	2788
B. 2 Years Since State Intervention					
FBRR	-0.012	-0.008	0.015	-0.001	0.007
	(0.025)	(0.033)	(0.015)	(0.025)	(0.014)
	[0.880]	[0.906]	[0.615]	[0.965]	[0.935]
EXRV	-0.002	0.006	0.023*	-0.013	0.020*
	(0.013)	(0.025)	(0.013)	(0.014)	(0.011)
	[0.900]	[0.906]	[0.415]	[0.468]	[0.355]
DCOH	-3.551	1.526	1.989	9.639	-1.085
	(8.368)	(12.838)	(4.941)	(10.825)	(4.406)
	[0.880]	[0.906]	[0.687]	[0.468]	[0.935]
STB	-0.754	5.496	-1.300	-2.857	-0.124
	(1.985)	(3.394)	(1.889)	(2.573)	(1.526)
	[0.880]	[0.540]	[0.615]	[0.468]	[0.935]
LTD	4.739	5.877	1.716	3.199	3.147
	(4.473)	(8.716)	(2.103)	(2.914)	(2.358)
	[0.880]	[0.906]	[0.615]	[0.468]	[0.455]
Observations	943	245	1668	459	2397

Table 7: (Continued)

	Changes of Financial Indicator Values				
	(1) Elementary Districts	(2) High School Districts	(3) Unit Districts	(4) Accrual Basis Districts	(5) Cash Basis Districts
C. 3 Years Since State Intervention					
FBRR	0.003	-0.024	-0.014	0.002	-0.013
	(0.031)	(0.038)	(0.018)	(0.030)	(0.017)
	[0.755]	[0.895]	[0.724]	[0.948]	[0.535]
EXRV	-0.011	-0.009	0.013	-0.035**	0.012
	(0.018)	(0.027)	(0.010)	(0.014)	(0.010)
	[0.755]	[0.934]	[0.503]	[0.075]	[0.352]
DCOH	-2.611	0.026	-8.540	3.759	-8.101
	(10.528)	(15.235)	(6.347)	(12.144)	(5.721)
	[0.755]	[0.999]	[0.503]	[0.947]	[0.352]
STB	-0.380	2.287	-0.375	1.515	-0.369
	(2.305)	(3.688)	(1.526)	(1.202)	(1.377)
	[0.755]	[0.895]	[0.806]	[0.490]	[0.789]
LTD	15.165**	12.494	-0.973	-6.387	8.048**
	(6.537)	(11.500)	(3.023)	(6.068)	(3.306)
	[0.095]	[0.895]	[0.806]	[0.490]	[0.075]
Observations	822	210	1367	385	2014

Note: This table presents estimates of coefficient β_1 in equation (5) where dependent variables are the changes of values for each financial indicator. Observations are at district-indicator-fiscal year level. The coefficients in all columns are estimated by using only observations that fall within one unit (i.e., one standard deviation) window of composite running variable around the threshold without adding control variables. Standard errors, reported in parentheses, are clustered at the district-fiscal year level. FDR q-values, reported in square brackets, control the false discovery rate and are computed over all five outcomes within each family. Stars denote statistical significance based on unadjusted p-values. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Robustness Checks of Estimated Discontinuities (Elementary School Districts & Accrual Basis School Districts)

A. Elementary School Districts

	Changes of Financial Indicator Values					
	(1) BW: 1.4	(2) BW: 1.2	(3) BW: 1	(4) BW: 0.8	(5) BW: 0.6	(6) BW: 0.4
3 Years Since State Intervention						
LTD	15.082**	15.399**	15.165**	11.768*	14.384	14.080
	(6.447)	(6.519)	(6.537)	(6.225)	(9.204)	(12.120)
Observations	881	866	822	710	597	457
4 Years Since State Intervention						
LTD	19.273**	19.848**	20.028**	16.111*	17.948	15.872
	(8.987)	(9.033)	(9.065)	(8.760)	(12.352)	(15.987)
Observations	729	720	686	599	506	394

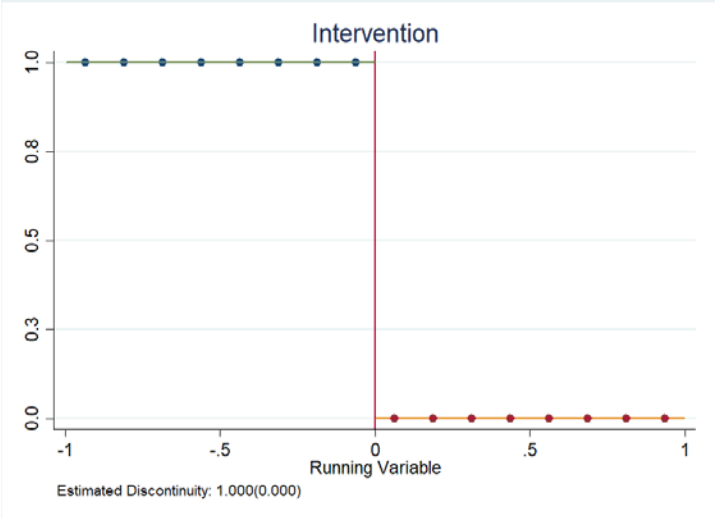
B. Accrual Basis School Districts

	Changes of Financial Indicator Values					
	(1) BW: 1.4	(2) BW: 1.2	(3) BW: 1	(4) BW: 0.8	(5) BW: 0.6	(6) BW: 0.4
3 Years Since State Intervention						
EXRV	-0.038***	-0.037***	-0.035**	-0.040***	-0.042***	-0.044**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.016)	(0.017)
Observations	411	407	385	342	302	253
4 Years Since State Intervention						
EXRV	-0.050***	-0.047***	-0.041**	-0.039**	-0.042**	-0.040**
	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)	(0.020)
Observations	358	354	335	297	263	217

Note: Panel A and Panel B restrict the stacked sample to elementary school districts and accrual basis school districts, respectively. This table presents estimates of coefficient β_1 in equation (5) where dependent variable is the change of values for Percent of Long-Term Debt Margin Remaining (LTD) (Panel A) and the change of values for Expenditure to Revenue Ratio (EXRV) (Panel B). Observations are at district-indicator-fiscal year level. The coefficients in all columns are estimated with different bandwidths without adding control variables. Standard errors, reported in parentheses, are clustered at the district-fiscal year level. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix A

Figure A1: Unconditional Scatterplot for Probability of Receiving State Intervention against Composite Running Variable



Note: The figure above displays binned means and fitted values of unconditional probability of receiving state intervention by composite running variable relative to the threshold. Points reflect binned average of dependent variable for observations that fall within one unit (i.e., one standard deviation) window of composite running variable around the threshold. Discontinuity at the threshold is calculated and displayed in the note below the figure. Standard errors in parentheses and clustered at the district-fiscal year level. Observations come from stacked samples, which are at district-indicator-fiscal year level.

Table A1: School District Financial Profile Indicators, ISBE

Indicator	Explanation	Calculation
Fund Balance to Revenue Ratio (FBRR)	Reflecting the overall financial strength of the district.	Dividing the ending fund balances by the revenues for the Educational, Operations and Maintenance, Transportation and Working Cash Funds.
Expenditure to Revenue Ratio (EXRV)	Reflecting how much is expended for each dollar received.	Dividing total expenditures for the Educational, Operations and Maintenance, and Transportation Funds by the revenues for those same funds plus Working Cash Fund. The calculation also takes into account remaining balances of these funds at the end of the year if a district is scoring low for their Expenditure to Revenue Ratio.
Days Cash on Hand (DCOH)	Providing a projected estimate of the number of days a district could meet operating expenditures provided no additional revenues were received.	Dividing total expenditures for the Educational, Operations and Maintenance, and Transportation Funds by 360 days to obtain an average expenditure per day. Then the total cash on hand and investments for the same funds plus Working Cash Fund are divided by the average expenditures per day.
Percent of Short-Term Borrowing Ability Remaining (STB)	Reflecting short-term debts incurred due to several factors (i.e., delays in receipt of local revenues, etc.).	The sum of unpaid Tax Anticipation Warrants is divided by 85% of the Equalized Assessed Valuation (EAV) multiplied by the sum of the tax rates for the Educational, Operations and Maintenance, and Transportation Funds.
Percent of Long-Term Debt Margin Remaining (LTD)	Reflecting long-term debts incurred for major expenditures such as buildings and equipment.	Computed by the product of the district's EAV multiplied by its maximum general obligation debt limitation, reduced by any outstanding long-term debt.

Source: Illinois State Board of Education, 2014a.

Table A2: Historical Trend of the Distribution of School District Financial Profile Score

SDFP Reporting Year	Fiscal Data Year	Total School Districts	Recognition		Review		Early Warning		Watch		Receiving State Intervention	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)=(6)+(8)	(11)=(7)+(9)
		N	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
2003	2002	887	429	48%	239	27%	134	15%	85	10%	219	25%
2004	2003	887	356	40%	241	27%	138	16%	152	17%	290	33%
2005	2004	887	449	51%	248	28%	111	13%	79	9%	190	21%
2006	2005	881	488	55%	225	26%	109	12%	59	7%	168	19%
2007	2006	874	513	59%	193	22%	115	13%	53	6%	168	19%
2008	2007	873	602	69%	182	21%	59	7%	30	3%	89	10%
2009	2008	870	626	72%	165	19%	57	7%	22	3%	79	9%
2010	2009	869	578	67%	196	23%	66	8%	29	3%	95	11%
2011	2010	868	604	70%	188	22%	52	6%	24	3%	76	9%
2012	2011	867	670	77%	143	16%	37	4%	17	2%	54	6%
2013	2012	865	562	65%	191	22%	67	8%	45	5%	112	13%
2014	2013	862	560	65%	181	21%	72	8%	49	6%	121	14%
2015	2014	860	553	64%	199	23%	70	8%	38	4%	108	13%
2016	2015	857	568	66%	196	23%	61	7%	32	4%	93	11%
2017	2016	852	632	74%	154	18%	47	6%	19	2%	66	8%
2018	2017	852	640	75%	147	17%	43	5%	22	3%	65	8%

Source: School District Financial Profile, Illinois State Board of Education (https://www.isbe.net/pages/school-district-financial-profile.aspx).

Appendix B

This appendix provides a detailed explanation of the stacked regression discontinuity (RD) specification proposed in this research, including the procedure for establishing stacking groups, summarizing information from all indicator cutoffs, and determining the analytical stacked sample.

Step 1: Stacking Data

I take the indicator Fund Balance to Revenue Ratio (FBRR) as an example to start describing the method for stacking the data. The scatterplot presented in Figure B1 shows the relationship between the probability of receiving state intervention and FBRR values based on the district-level data from the sample for FY 2008-2016. The three vertical dashed lines indicate the three indicator cutoffs, 0, 0.10, 0.25, for FBRR, respectively. They divide the entire distribution into four regions: R1 (i.e., $FBRR < 0$), R2 (i.e., $0 \leq FBRR < 0.10$), R3 (i.e., $0.10 \leq FBRR < 0.25$), and R4 (i.e., $FBRR \geq 0.25$). I then stack the data according to these three predetermined indicator cutoffs, by choosing R1 and R2 as a stacking group for cutoff 0, R2 and R3 as a group for cutoff 0.10, and R3 and R4 as a group for cutoff 0.25. Following exactly the same step, I am able to stack the data for each of the other four financial indicators across its indicator cutoffs. After that, I stack the data together from all five of the indicators.

Note that, the stacking process enables all fifteen stacking groups to share the same (and unique) threshold. This can be accomplished by subtracting the indicator cutoff value from the indicator value for each stacking group, such that all fifteen indicator cutoffs are centered at zero. In addition, observations are now at district-indicator-fiscal year level because of stacking.

Step 2: Selecting Analytical Stacked Sample

After summarizing information from all fifteen indicator cutoffs as discussed in Step 1, I begin to select the stacked sample that I am about to use in my estimation. According to the School District Financial Profile (SDFP) system, districts in the region below the corresponding indicator cutoff will receive a lower indicator score, compared to those in the region above the cutoff. As a result, for observations right below (or above) the corresponding indicator cutoff, if they move a little bit above (or below) the cutoff, the additional change in the total financial score resulting from the change in the indicator score, will make some of the observations experience a discontinuous change in treatment status of receiving intervention, given other indicator values fixed. I will keep these groups of observations as my analytical stacked sample.

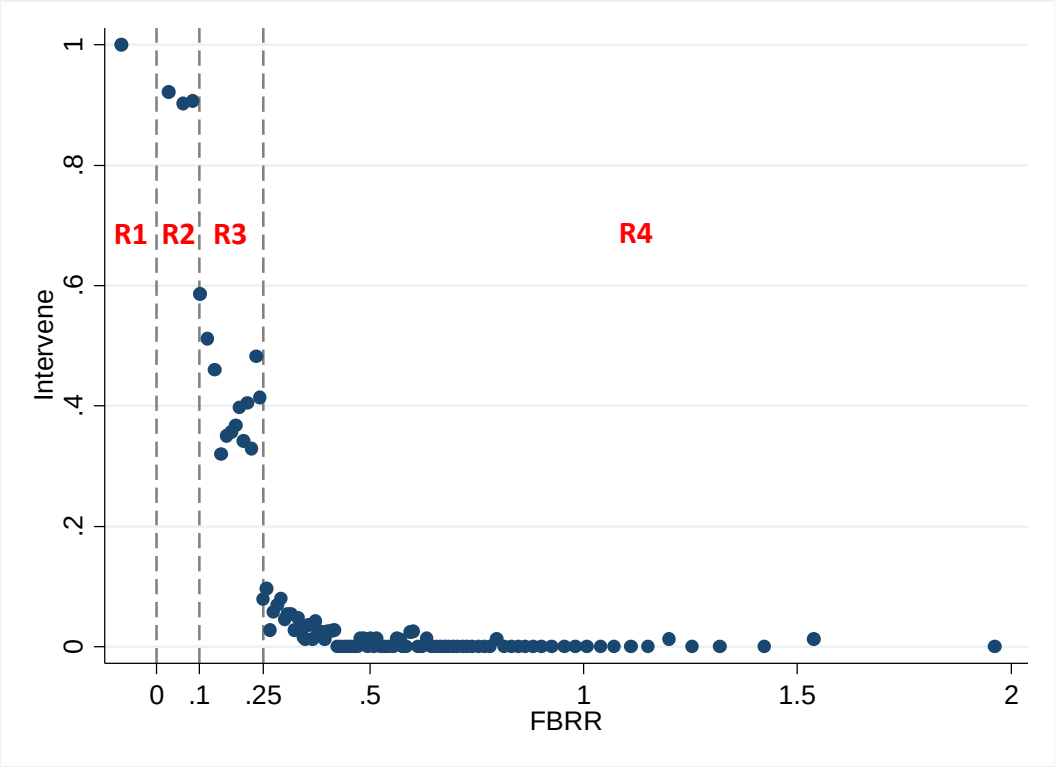
To illustrate, consider an arbitrary District A that has financial information in fiscal year t as displayed in Table B1. The total financial score for this district is 2.75. Therefore, according to the SDFP system, District A is categorized as "Financial Early Warning" and will receive technical assistance (i.e., state intervention) from regional financial consultants (see Table 2). Let me use indicator FBRR and LTD to elucidate the process of selecting observations. Recall that the indicator cutoffs for FBRR are 0, 0.10, and 0.25. The indicator cutoffs for LTD are 25, 50, and 75 (see Table 1).

Regarding indicator FBRR, a small increase in the FBRR value which ensures the movement above the cutoff 0.10 will introduce an extra 0.35 points (1×35%) gain in the total financial score. District A will therefore no longer receive intervention because the new total score (which is 3.10) is above the intervention threshold score (i.e., 3.07). I will keep this observation.

As for indicator LTD, the movement above the indicator cutoff 75 due to a small increase in the LTD value, however, cannot guarantee a change in the treatment status from receiving intervention to no intervention. This is because the gain in total score from this shift is too small (which is 0.1) to make District A score higher than the intervention threshold score 3.07. As a consequence, I will drop this observation.

I restrict the stacked sample generated in Step 1 by following the above rationale. The finalized analytical sample possesses two characteristics: (1) Observations below the corresponding indicator cutoff will receive the intervention, while those above will not; (2) The movement across the corresponding indicator cutoff due to small changes in the value of financial indicators, will lead to a discontinuous change in treatment status of receiving intervention. The sample will produce a first-stage figure as shown in Figure A1. It also indicates that the reduced-form estimates from RD regressions (i.e., intention-to-treat effects) are equal to local average treatment effects.

Figure B1: Unconditional Scatterplot for Probability of Receiving State Intervention against the Value of Fund Balance to Revenue Ratio



Note: The figure above displays binned means of unconditional probability of receiving state intervention by the value of Fund Balance to Revenue Ratio (FBRR). Observations come from the district-level sample for FY 2008-2016.

Table B1: Financial Information for Arbitrary District A in Fiscal Year *t*

	Indicator Value	Indicator Score	Indicator Weight	Weighted Indicator Score	Total Financial Score
Fund Balance to Revenue Ratio (FBRR)	0.08	2	35%	0.7	2.75
Expenditure to Revenue Ratio (EXRV)	1.09	3	35%	1.05	
Days Cash on Hand (DCOH)	92	3	10%	0.3	
Percent of Short-Term Borrowing Ability Remaining (STB)	80	4	10%	0.4	
Percent of Long-Term Debt Margin Remaining (LTD)	70	3	10%	0.3	