DISTRICTS IN THE RED:

MEASURING THE IMPACT OF SCHOOL DISTRICT FISCAL INSOLVENCY

ON STUDENT ACHIEVEMENT

A Thesis

Presented to the faculty of the Department of Public Policy and Administration

California State University, Sacramento

Submitted in partial satisfaction of
the requirements for the degree of

MASTER OF PUBLIC POLICY AND ADMINISTRATION

by

Julia Nicole Bishop

SPRING
2012

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Department of Public Policy and Administration

Abstract

of

DISTRICTS IN THE RED:

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Following the financial meltdown and the fallout of the Great Recession, California State and local governments have been forced to limit funding across the board, including consistent and timely funding to California public school districts. In 2011, out of over 1,020 school districts in California, 163 school districts, almost 16%, had inadequate or potentially inadequate budgets to meet that year's financial obligations.

The impact of district financial insolvency on student achievement has not been quantitatively examined. The following thesis measured the impact this insolvency has on student achievement. Utilizing regression analysis, five years of data from the 2005-2006 through 2009-2010 school years were examined. These data included the Academic Performance Index data set, the Certificated Salaries and Benefits data set, and a variable created from the information provided by the California Department of Education's Interim Status Reports.

After controlling for a district's previous year's achievement level, student characteristics of the district, social characteristics of the district, and district enrollment and personnel characteristics, I found that fiscally insolvent districts did not have lower levels of growth in

achievement. As such, the impact of fiscal insolvency is likely being mediated both by time and by dedicated personnel at the school level. Two of the most interesting findings were that emergency credentialed teachers have a negative impact on student achievement, and salary increases for teachers have positive effects on student achievement.

Despite the finding that fiscal insolvency may not directly impact student achievement, the increased fiscal instability of school districts in recent years mandates that additional research be done to both understand the impacts that insolvency is having and how to prevent insolvency in the future. In addition, this research design only looked for immediate impacts, and not impacts that developed over several years, insolvency's effect on achievement may be somewhat delayed as the causes and effects trickle down to the classroom level.

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ACKNOWLEDGEMENTS

First, I want to thank my dad who always encouraged me to further my education. I also want to thank my mom without whose moral support I may never have finished. Nick Perry, thank you for your patience while I spent weekend after weekend in my office working on this thesis. Robin Finnestead and Eric Joseph Chisholm, thank you for reading and responding to my numerous appeals for help and perspective and helping to keep me sane. Thank you to the rest of my cohort for your unique insights into the public policy issues of today. I would like to thank all my coworkers at Legislative Intent Service, Inc., who watched me struggle through to the finish line of this paper for the past three years, and without whose support and flexibility I may never have completed this degree. Thank you to Su Jin Jez and Robert Wassmer for your input and encouragement in completing this thesis, and your timely and thorough reviews of my drafts and questions. Finally, thank you to my remaining professors, Mary Kirlin and Peter Detwiler, without whom I would not be the writer or critical thinker I am today.

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Chapter 1

INTRODUCTION

From 1984 through 2011, thirty-two different California school districts filed for state loans, and eight went into receivership (Frazier, 2006; California Department of Education [CDE], 2011). In 2011, out of over 1,020 school districts, there were five California school districts that were under state control (CDE, 2011). In addition, 163 school districts, almost 16%, had inadequate or potentially inadequate budgets to meet that year's financial obligations (Lambert, 2010; "Interim Status", n.d.). While much attention has been given to the fiscal crisis facing the state and schools in California, its potential impact on student achievement has not been quantitatively examined.

In the remainder of this introduction I offer further background information to support this thesis on the effect of school district insolvency on student achievement. Specifically, in the following sections I discuss the underlying causes of rampant insolvency, what districts are doing to survive the financial crunch, define district insolvency, and discuss the structure of the rest of this thesis.

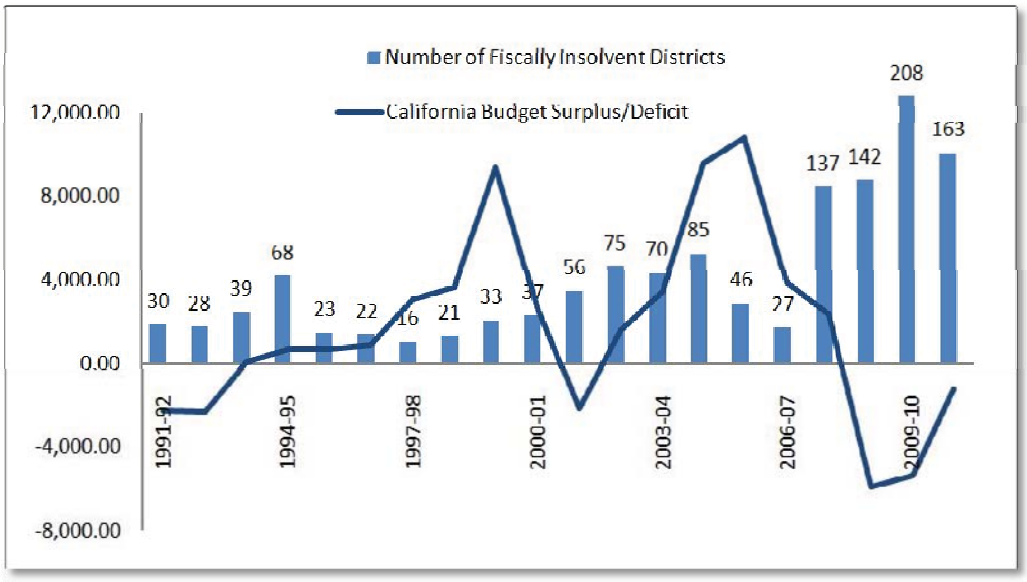
State Budget and Funding Effects on School Districts

The State of California is running large deficits, and its economy is still recovering from the recent Great Recession. Much of the funding allocations districts receive are based on student populations and student attendance, but districts around the state are suffering from declining enrollment, leading to less overall funding to districts (Christian, 2010). As seen in Figure 1, over the past five years the number of insolvent school districts has increased dramatically, more than

doubling the average of each of the previous fifteen years. Budget deficits appear to have exacerbated school district insolvency in the past, but not to the degree that it does today. Figure 1 shows that as the state budget deficit increased in the past, such as in the early 90s or early 2000s, the number of insolvent districts rose, but not in the great numbers seen between 2008 and 2011. It is not clear why the budget is having a larger effect on insolvency now than in the past, but perhaps consistently delayed funds over the past decade are taking their toll (Legislative Analyst's Office, 2011b). Getting the state's fiscal house in order would have a dramatic impact on school districts and their financial management.

Figure 1:

Fiscally Insolvent School Districts and the California Budget



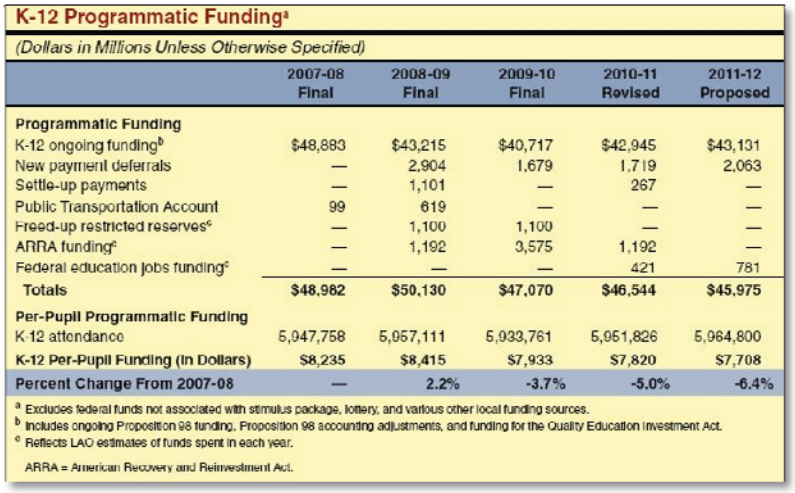
Note. Adapted from data supplied by: "Interim Status", n.d., and "California Budget Frequently Asked Questions," n.d.

Allocated funding has consistently decreased from the 2007-08 fiscal year to the 2011-2012 fiscal year (Legislative Analyst's Office, 2011a; See Figure 2).The proposed 2012-2013

budget includes the possibility of trigger cuts to K-14 education in the amount of $4.8 billion should the electorate not approve a ballot measure to increase taxes (Legislative Analyst's Office, 2012). If these trigger cuts take effect, schools will be forced to further reduce days of instruction, increase class size, and lay off additional personnel (Asimov, 2008; Mart, 2011; Yamamura, 2011).

Figure 2:

K-12 Funding Decreasing Over Time



K-12 Programmatic Funding[a]

(Dollars in Millions Unless Otherwise Specified)

	2007-08 Final	2008-09 Final	2009-10 Final	2010-11 Revised	2011-12 Proposed
Programmatic Funding					
K-12 ongoing funding[b]	$48,883	$43,215	$40,717	$42,945	$43,131
New payment deferrals	—	2,904	1,679	1,719	2,063
Settle-up payments	—	1,101	—	267	—
Public Transportation Account	99	619	—	—	—
Freed-up restricted reserves[c]	—	1,100	1,100	—	—
ARRA funding[c]	—	1,192	3,575	1,192	—
Federal education jobs funding[c]	—	—	—	421	781
Totals	**$48,982**	**$50,130**	**$47,070**	**$46,544**	**$45,975**
Per-Pupil Programmatic Funding					
K-12 attendance	5,947,758	5,957,111	5,933,761	5,951,826	5,964,800
K-12 Per-Pupil Funding (In Dollars)	**$8,235**	**$8,415**	**$7,933**	**$7,820**	**$7,708**
Percent Change From 2007-08	**—**	**2.2%**	**-3.7%**	**-5.0%**	**-6.4%**

[a] Excludes federal funds not associated with stimulus package, lottery, and various other local funding sources.
[b] Includes ongoing Proposition 98 funding, Proposition 98 accounting adjustments, and funding for the Quality Education Investment Act.
[c] Reflects LAO estimates of funds spent in each year.

ARRA = American Recovery and Reinvestment Act.

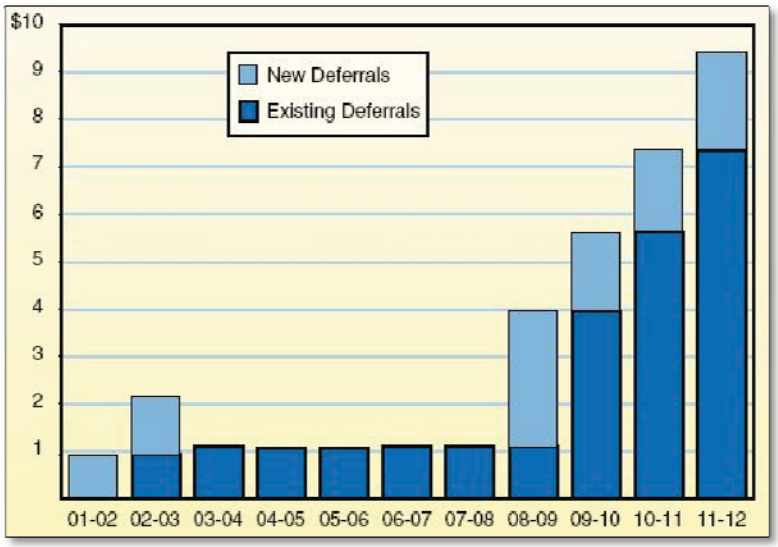
Note. From Legislative Analyst's Office, 2011a

Not only has the level of funding dropped, but the state has progressively deferred more and more school district funds from one fiscal year to the next (Legislative Analyst's Office, 2011b). Under proposition 98 the State is required to provide a minimum level of funding to K-14 education based on the economy and student population (Legislative Analyst's Office, 2005). If the state does not have enough money to cover the costs under Proposition 98, they borrow from the funds of the next fiscal year, creating a deferral of the cost (Legislative Analyst's Office, 2011a). The first of these deferrals took place in 2001 and because the funding delay was merely weeks, it did not cause any irreparable harm to districts' budgets (Legislative Analyst's Office,

2011b). But the length of time districts have been made to wait has grown over the past decade to as long as five months (Legislative Analyst's Office, 2011b). These deferrals grew from an initial $1 billion to nearly $10 billion over the ten years that they have been used by the state (Legislative Analyst's Office, 2011b; See Figure 3).

Figure 3:

California Proposition 98 Deferrals in Billions



Note. From Legislative Analyst's Office, 2011b

Every time the state defers payments to districts as a budget savings tactic, they shift the burden of interim funding to district communities and reserves (Legislative Analyst's Office, 2011b). As a result, districts resort to drawing down on budget reserves and special funds and sometimes resort to loans, the interest for which they are responsible (Legislative Analyst's Office, 2011b). Not only do these deferrals directly harm school districts, they ruin future state budgets with delayed payments which will ultimately further complicate educational funding (Legislative Analyst's Office, 2011b).

In addition to these deferred payments, the state is also behind on its mandated cost reimbursements to school districts (Chiang, 2011). A mandated cost reimbursement is a separate funding mechanism from the Proposition 98 funds. The state requires, or "mandates," that school districts implement certain programs, like parent notification of student truancy or the High School Exit Exam. Then, if the Commission on State Mandates determines the mandate to be reimbursable, the state pays them back for the costs of the program (Commission on State Mandates, n.d.; "Schools - State Mandated Costs Audit Reports," n.d.). The timeline for repaying mandates, however, is less certain. The State Controller cited in a report that combining the 2011totals and previous outstanding mandated cost payments, the State owed school districts $3.45 billion dollars for costs that the districts have already incurred (Chiang, 2011). Essentially, the state requires districts to implement costly programs, and then fails to repay them.

School district strategies to survive the funding crunch

In order to avoid fiscal insolvency, school districts have increased class sizes, reduced the number of instructional days, and dropped numerous elective courses (Blume, 2010; Fensterwald, 2010). Los Angeles Unified School District cut a week each from the 2009-2010 and 2010-2011 school years after not meeting budget requirements by increasing class size and reducing support services for students (Dev, 2010). All of these moves to save money could have potential impact on student achievement.

The State of California has attempted to alleviate some of the strain on school districts by allowing them to temporarily ignore 40 categorical programs, K-3 class size requirements, some educational mandates, instruction time requirements, routine maintenance, and purchase of instruction materials allowing them to use those funds for other more immediate needs (Legislative Analyst's Office, 2011a). While these moves increase current financial flexibility,

they add future financial burdens for districts by deferring the costs of classroom materials and school maintenance. Increased flexibility for categorical program requirements, programs that traditionally have strings-attached financing, will also likely impact student achievement (Legislative Analyst's Office, 2011a). Some examples of relaxed categorical programs are: targeted instructional improvement, school and library improvement, counseling for grades 7-12, teacher credentialing, art and music education, pupil retention, advanced placement fee waivers and so on (Legislative Analyst's Office, 2011a). Losing these programs could certainly have a negative impact on student motivation and achievement.

In the past few years, school districts have been able to rely on $7.3 billion in one-time federal aid from the American Recovery and Reinvestment Act of 2009 (ARRA) and the Education Jobs Fund Act of 2010 (Ed Jobs) to supplement their budgets (Legislative Analyst's Office, 2011a). The ARRA funds expired in September 2011, and the Ed Jobs funds will expire September 2012; as these funds run dry, and the federal mood shifts away from stimulus spending, districts face a drought of federal funds to supplement their budgets (Legislative Analyst's Office, 2011a). All these short term solutions kept many districts out of financial danger, but they cannot be relied upon forever.

Fiscal Insolvency Defined

For the purposes of this paper, I define fiscal insolvency using the California Department of Education's (CDE) measures of budget soundness. The CDE tracks the proposed budgets of all school districts, and twice a year places them into three interim status categories: negative certification, qualified certification, and positive certification ("Interim Status", n.d.). The first two categories indicate that there is some fiscal distress in the district, with a negative certification being the more serious of the two. If a school district's budget is negatively certified

by the CDE it means a school district *will not* be able to meet its financial obligations for the current or subsequent fiscal year ("Interim Status", n.d.). If a district is given a qualified certification the district *may not* meet their fiscal obligations for the in the present of following two fiscal years ("Interim Status", n.d.). A positive certification means that a district will meet their financial obligations for the current or next two fiscal years ("Interim Status", n.d.). The final measure of fiscal insolvency is when a district goes into receivership. While rare, a district goes into receivership when the Legislature approves an emergency loan to the district ("State Emergency Loans", n.d.).

Given these various categorizations, for this thesis, a district that either has a negative certified or qualified certified budget, or is currently under receivership is considered fiscally insolvent. Only a district with a positive certified budget can be considered truly solvent. While an argument could be made that a district who is merely rated qualified certified could possibly meet their obligations, the fact that their ability is in doubt is strong enough evidence of insolvency to put them in this category for this purposes of this thesis. Additionally, the sample size of districts with only negative certifications and those in receivership would be very small making a determination of connection more difficult.

Making a Connection Between Fiscal Insolvency and Student Achievement

Academics have conducted research on school district insolvency and on the district's impact on student achievement, but no one has quantitatively examined whether there is a connection between these two factors. It is important, given the number of districts in trouble, that the full impact of insolvency is understood.

In this thesis, I utilize quantitative research methods to examine the relationship between these two variables. I will use the Academic Performance Index (API) data set compiled by the

CDE, augmenting it with census figures, as well as the CDE's school district insolvency data. I will analyze five separate years of data from 2005 through 2010 to better determine the relationship between insolvency and student achievement.

In Chapter 2, I will review the relevant literature on fiscal insolvency, student achievement measures, school districts and student achievement, and teacher unions. In Chapter 3, I will review the methodology for my regression analysis followed by Chapter 4 with the results of the analysis. In Chapter 5, I draw conclusions from the results of this research, and attempt to answer the questions I have raised in this first chapter.

Chapter 2

LITERATURE REVIEW

Using research databases including: Google Scholar, Science Direct, EBSCOhost, Lexis/Nexis Academic, ProQuest, SAGE, JSTOR, and Wiley, I searched for and obtained articles related to district insolvency, the Academic Performance Index, student achievement factors, and other related terms. While I focused on peer-reviewed articles, I also found PhD student dissertations and organizational reports with interesting insights into these topics. I reviewed research that has been published since 1995, although I searched for articles on my exact question without a date range constraint. While I found many articles looking at resource-allocation models for schools and student achievement, I found no articles whose main objective was evaluating the connection between insolvency and student achievement. I located two articles that directly addressed district insolvency, and several that examined student achievement from the district level of analysis. However, analysis of student achievement at the district level was also sparse, and more often, the articles focused on the school level of analysis. To augment the number of research pieces, I considered what kinds of outside forces could be affecting districts both fiscally and academically, and thus reviewed articles that explored the impact of teacher unions and bargaining on student achievement as well. In the following pages I discuss the literature on each of these topics: fiscal insolvency, the effect of socioeconomic factors on student achievement, district-level factors that impact achievement, and teacher unions and bargaining. In Appendix A to this thesis you will find a summary table of the literature.

Factors of District Insolvency That Could Impact Student Achievement

While I was unable to locate any literature examining the impact of district insolvency on student achievement, I located two research pieces that examined the contributing factors for district insolvency. The main factors for insolvency identified across the two studies were: socio-economically depressed neighborhoods, ineffective leadership, lack of fiscal oversight, and lack of long-term budget planning (Frazier, 2006; Manca, Noonan, & Matranga,1999). Despite the lack of an academic connection made between these insolvency factors and student achievement, it seems plausible they could have a negative impact on standardized test scores. Later in this chapter, I review literature on two of the factors above as they relate to academic achievement: socio-economic status and leadership. In the following paragraphs I review each of these studies in greater detail.

Frazier's (2006) criteria for selection were districts that had gone into receivership and had comprehensive reviews from the Fiscal Crisis and Management Assistance Team (FCMAT); with these criteria, there were five districts available for study. FCMAT is an organization created by statute in 1991 to help train Local Education Agencies on fiscal management; they assist a district if their budget is disapproved, and also give expert advice and training to districts by request. Frazier (2006) utilized demographic and financial data, assessments completed by FCMAT, and practitioner interviews at the district, county, and state levels.

Frazier's (2006) goal with this research was to understand the risk factors, both demographic and fiscal, that contribute to a district's likelihood of going into receivership. Demographically, Frazier (2006) found that all five of the districts in the study were in economically depressed locales and that the district student population was at least 80% minority; augmenting these findings, all five districts had above average eligibility for free and reduced

lunches. The FCMAT team established a list of 77 different financial management standards on which to assess the financial soundness of a district, and all of the districts received failing grades for at least 58 of the standards. The practitioner interviews revealed three other factors that contributed to insolvency: ineffective leadership, staff incompetency, and lack of budget oversight and accurate data (Frazier, 2006). This research was a case-study limiting its transferability to other situations and lacks a control group, but it sheds some light on possible contributing factors.

Manca, Noonan, & Matranga's (1999) research was less thorough than Frazier (2006). Their research focused on two districts in California and one in Nevada. Their methodology included only interviews and analysis of public records such as minutes, budgets, audits, financial reports, and legislative and court testimony. They did not specify whom was interviewed, how many were interviewed, or the questions that were asked.

Manca et al.,(1999) found a number of common factors for all three school districts: fiscal issues were incremental although ultimately severe, general fund revenues were overspent, budget estimates were inflated and unrealistic, they did not track district assets, lacked internal controls, were major employers in their regions, lacked long-term financial planning, lacked communication, ignored auditors, and their policies and procedures were outdated (Manca et al., 1999). The research undertaken in this study was not complete. The research was a case study making it difficult to translate to other situations. Additionally, their model was underspecified as they did not disclose their interviewee criteria, or their line of questioning. Their research also could have benefited from a control group just as Frazier (2006). Nonetheless, their findings may be useful in understanding other districts in the same position.

In this section I examined two case studies on fiscal insolvency of school districts in both California and Nevada. While these case studies may have limited direct applicability in other districts' situations, their findings may be useful in understanding the factors that contribute to a district's insolvency. The findings of these two studies provide insight as to potential factors in insolvent districts that could impact student achievement. Both studies indicated a lack of leadership and general staff incompetency to be issues. A lack of leadership coupled with incompetency could easily trickle down to a disorganized classroom atmosphere and negative learning environment. Additionally, the link that Frazier (2006) made between insolvency and socioeconomically depressed areas provides an interesting insight into a potentially significant variable within my research model. The results of my research may find that districts that tend to be insolvent also tend to be in socioeconomically depressed neighborhoods compounding potentially poor student achievement results.

Socio-Economic Impacts on Student Achievement

Given the results of the case studies on district insolvency, I reviewed articles examining the relationship between socioeconomic status and student achievement in order to connect affects on insolvency and affects on student achievement. California district student populations vary widely from the very wealthy to the very disadvantaged; thus this is a critical variable to include in the analysis of California school districts.

Blevins (2009) utilized the Pearson r Correlation formula to measure the correlation between low socioeconomic status and student achievement. The study used the Missouri Assessment Program data set and the author randomly selected 250 districts from the 2007 data set to measure. The measure used for low socioeconomic status was the number of students on the federal free and reduced lunch program. The results of this research were that there is a

strong negative correlation between low socioeconomic status and student achievement. Blevins (2009) explained that the results did not show causation as his model did not include other potential variables such as parental education levels or ethnicity, but it did show that there is a relationship. The fact that this research only showed the correlation between these two factors makes it less robust than if a regression had been utilized in order to control for other factors. Despite this shortcoming, the correlation does show a relationship.

Sirin (2005) conducted a meta-analysis of 58 academic journal articles between 1990 and 2000 that measured the correlation between socioeconomic status and student achievement. From these articles the total sample size included 101,157 students, 6,871 schools, and 128 districts (Sirin, 2005, p. 417). The results of the meta-analysis were that there is a "medium level" of correlation between the two variables at the student level of measurement, and a "high level" of correlation between the variables at the school level of measurement. Sirin found that a number of factors affected the magnitude of correlation including the measures used for socioeconomic status and academic achievement, the grade level and ethnicity characteristics of the students, and the location of the school.

Sirin (2005) indicated that socioeconomic status is one of the most studied variables for academic achievement, so these two studies only account for a small portion of the literature available on the subject. However, given that Sirin's research accounted for much of the academic research in this area from 1990-2000 it appears that these findings are the consensus on the subject. Additionally, Blevins' research was conducted very recently, buttressing these earlier findings. Essentially, socioeconomic status is likely to have an impact on student achievement, and should be a variable included in any research model studying student achievement. Sirin (2005) noted that while the measure of socioeconomic status varies, the three measures that

indicate socioeconomic status are parental income, parental education, and parental occupation (p. 418). I do not have access to parental income figures nor parental occupation, but I am including variables for parental education level, as well the same measure used by Blevins (2009) to indicate low socioeconomic status: students eligible for free or reduced lunches.

Student Achievement Impacts at the District Level

To guide my research efforts, I examined a literature review conducted by Rorrer, Skrla, & Scheurich (2008) on school district level analysis. While they found little research at this level of analysis, they determined that the available literature found four specific roles districts play: instructional leadership, organizational structure, policy consistency, and maintenance of the focus on equity (Rorrer et al., 2008). Given the findings of Rorrer et al., (2008), and the lack of research on the direct impact district-level student achievement research they located, I proceeded to locate a number of articles that discussed various effects that school districts *can* have on student achievement and performance. In the following paragraphs I review literature regarding leadership effects, reward systems, district size, and financial inputs. While these subjects do not directly correlate with the focus of my research question, they can provide some context in which to interpret and predict my proposed model and variables.

Leadership effects. Considering the findings of Frazier (2006) and Manca et al., (1999), I reviewed district level analysis of the effects leadership can have on academic success. Contartesi (2010) prepared a dissertation examining the correlation between district leadership, communication, employee performance, and school climate in the context of student achievement. The type of research was a qualitative correlational study utilizing survey of district personnel to measure the effects of each of these factors. Contartesi's sample was one mid-size urban district in Northwest Pennsylvania; out of a total of 1,600 employees in the

district, the final sample included 874. The superintendent supported the study, participated in the study, and encouraged personnel to participate in the study. The results of the study were such that employee perception of leadership had a strong impact on employee success and school environment. Where employee perception of leadership was positive, the employees were more successful, and the schools' environment was more positive. Contartesi drew the conclusion that this would have a direct impact on classroom achievement. Contartesi also noted that this research was conducted at a time of budget constraints and high unemployment and found that positive results could be achieved with limited funding.

Useem (2009) prepared a case-study of Paul Vallas, the Superintendent for Philidelphia City Schools, from 2002 through 2007. In this case study she utilized the following: district documents, articles, notes of School Reform Commission meetings, and interviews with a variety of stakeholders. The context for this case study was that Paul Vallas became superintendent in the wake of a state takeover of Philadelphia City Schools, and following the enactment of No Child Left Behind which implemented a test score based assessment of school success. Given this context Vallas may have had more sway than the average superintendent. However, Useem argued that in the context of a standards based accountability system, superintendents have new sway, power, and tools for change. Vallas used the test scores as a validation for the changes he made which helped him gain additional community buy in. Useem's take away from the case study was that personal leadership skills can inspire and energize employees ultimately positively affecting classroom achievement. This case study is especially limiting in its transferability to the average district because of the specific circumstances being examined. However, superintendents in California do operate in a standards based accountability system with the API score system. Some of the results she found could be applied by superintendents in California.

Superintendents can use test scores and achievements to show bolster reform efforts in the classroom. This study also showed that personal characteristics can inspire personnel.

Both of these studies are limiting due to the scope of the research, however, both have similar results. Contartesi (2010) found that a positive image can inspire a positive working environment, and it appears that Useem found the same in the case of Paul Vallas. Leadership qualities can be difficult to measure in the context of a regression, but acknowledging that this may be having an effect in districts in California shows some of the limits of my research.

Reward systems. While reward systems are not part of my research, reviewing the results of research in this area shows the kinds of steps districts can take to motivate teaching personnel. Driscoll, Halcoussis, & Svorny (2008) conducted ordinary least squares regression to understand the impact of financial rewards for successful teachers and administrators on reaching Academic Performance Index (API) score targets. They found that if districts want these rewards to be effective, they needed to evaluate the socioeconomic status of their district, the percent of students living in the district that opted to attend private school, and assess the initial API scores as these could all affect the final outcome or growth potential (Driscoll et al., 2008). If they did not consider these initial conditions, then they might set unachievable goals. At a 1% significance level, if a district had higher API scores at the start of the study, their gains in score growth were smaller among all grade levels. Additionally, at a 1% level of significance, each initial API point decreased a school's potential for growth in API score by 0.39 points for elementary schools, 0.28 points for middle schools, and 0.23 points for high schools. What this means is that a school whose base score was 100 points lower than a similar school would stand to gain 39 points in API scores with financial rewards in place (Driscoll et al., 2008). The result

of the study is that districts can financially motivate teachers to improve student performance; districts in financial trouble would be unable to motivate teachers using this model.

The research conducted here may have had some omitted variable bias as both ethnicity and English language learners were absent from their model leaving it underspecified and incomplete. By underspecifying their model, the results immediately come into question; a large percent of the California student population speaks English as a second language, and leaving them out appears suspect. If the results can be relied upon, the implications of these findings in terms of my research question, however, are such that if financial rewards motivate teachers and increase academic achievement, those districts that are in financial trouble will not be able to adequately motivate their staff using this model.

District size. The implications of district size on student achievement were examined by Driscoll, Halcoussis, & Svorny (2003) using ordinary least squares regression methods. They found that the size of elementary and middle school districts was negatively correlated with API scores. The results at the high school level were not significant. A 1% increase in district size yielded a -50.42×10^{-5} point decrease in API score for elementary and a -10.04×10^{-4} point decrease in API score for middle schools at 1% level of significance. Their research used student characteristics, and class, school, and district size as their controls. While these results were significant and their controls seem fairly complete, their magnitude was extremely low suggesting that district size has a very small impact on student achievement. However, the size of a district appears to have some impact, and therefore should be included in a regression model to account for any variation of API scores at the district level and avoid omitted variable bias.

Financial inputs. There is a whole body of research focused specifically on financial inputs and targeted resource allocation and its connection to student achievement. To focus my

review of this body of literature I considered the conclusions of a literature review, and only looked at articles that addressed funds at the district level. The findings here could be important because districts in financial trouble could potentially still try to target their funds in a more constructive manner toward student achievement.

Jefferson (2005) prepared a literature review of the body of research surrounding financial inputs' effects on student achievement. She found that essentially the body of literature is inconclusive, with varied research findings. However, Jefferson (2005) contended that while there does not appear to be a causal relationship between funding levels and student achievement, how money is spent affects student achievement outcomes. Her review showed that a district can have surprising and positive results with fewer resources. One of the gaps in the research is what exactly money should be spent on to make an impact. The research did show that professional growth for teachers and a positive teaching environment have an impact on student achievement levels. Teacher ability, verbal skills and exam scores, and experience seemed to have the largest impact on student achievement, regardless of salary. The take away for insolvent districts is that the promotion of a positive teaching environment can have lasting impacts on student achievement.

Huang & Yu (2002) looked at per pupil spending and district discretionary funds outside of per-pupil spending using multivariate regression analysis with panel data. The focus of this research was narrow, only examining outcomes for 8th grade math students using longitudinal data from three different years in the 1990s. The controls for this study included various financial data including state funds, and local fund allocation, as well as socio-demographic data of the districts. They had a different number of districts in each of the three years examined: 1990, 144 districts; 1992, 177 districts; and 1996 160 districts. Huang & Yu found that district discretionary

rates were not significant factors for student achievement, but current expenditures per pupil were significant at the 1% level for two of the three years. At a 1% level of significance, each additional $1000 in expenditure per pupil resulted in an increase in scores of 20.85 points in 1996, and 10.56 points in 1990 out of an average score of 2680.64 and 2540.89 respectively; the results for 1992 were not significant. This study is very limited in that it only looked at one grade level and one subject; they also looked at different numbers of districts for all three observation years making the data hard to compare. However, if there is some added benefit to increased spending per pupil in student achievement, this is something to consider in the case of fiscal insolvency.

Greenwald, Hedges, & Laine (1996), using regression analysis, examined the effects of various district and school inputs and amenities on student achievement. Their study was a meta-analysis, aggregating a number of prior research articles and their data sets from 1966 through 1993 including inputs at the district level as well as school level. While they spent time in the paper explaining the selection process for these various previous research articles, it was not possible to know the samples or individual measures for each article being used. Nonetheless, their research found that even small resource inputs can have impacts on student achievement. Greenwald et al., (1996) found that the median coefficient for per pupil expenditure across the various studies predicted a 0.15 increase of one standard deviation for every additional $500 in expenditure. Since for each of these studies they aggregated measured student achievement differently, the actual increase in individual achievement would be dependent on the measure applied.

This study had a number of flaws. While Greenwald et al., (1996) attempted to test prior research efforts, and determine the aggregate findings their results are difficult to measure or

apply. Additionally, while they acknowledge this short coming, practitioners cannot apply the results in any real world way as they did not qualify different kinds of spending, only spending generally.

I examined impacts of reward systems, district size, and financial inputs on student achievement in this section. Reward systems and additional financial inputs are not possible if a district is on the brink of bankruptcy, and these are some of the few direct impacts a district has been shown to have on student achievement. However, targeted allocation of the small amount of funding available can be possible, especially since the state has lessened some of the restrictive spending for districts over the past few years in terms of categorical funds. Additionally, when examining various impacts on student achievement, one independent variable which needs to be controlled for is district size.

Teacher Unions and Bargaining

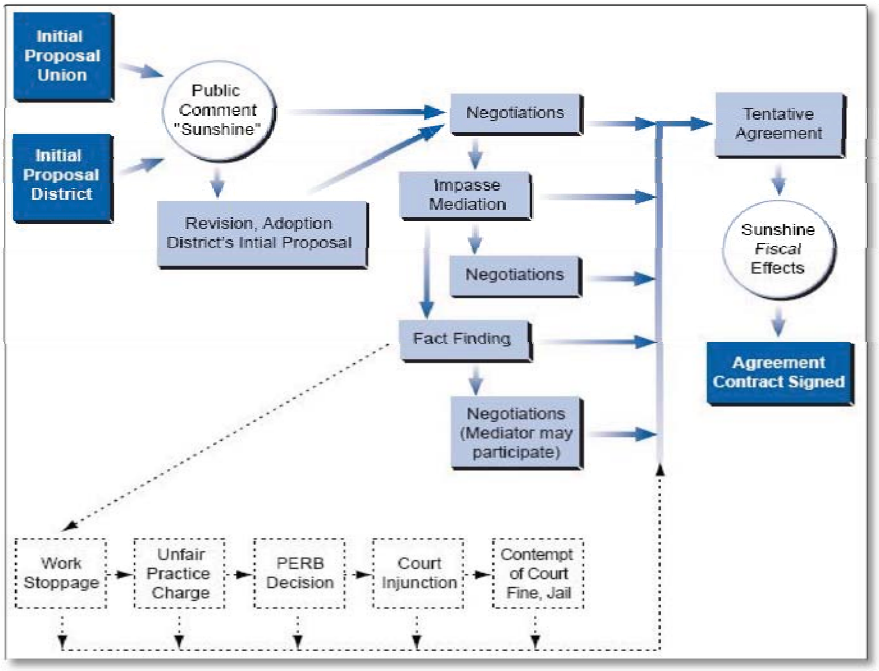
When a school district must reduce its financial obligations, one of the largest obligations it often has is the cost of its teachers. Teachers in California are unionized and operate under collective bargaining agreements. Districts spend an average of 2/3 of their general fund monies on teacher salaries and benefits ("Building the Budget," n.d.). When districts go through collective bargaining, they are essentially tying up future portions of future budgets based on the conditions they agree to. The collective bargaining process is complex, and discussed in greater detail in this section. Therefore, it is important to understand what impact this unionization has both on student achievement and a district's ability to modify its obligations in the face of insolvency.

Unions in California. Almost all school districts in California participate in the collective bargaining process with their employees (EdSource, 1999). So the question in California districts

is not whether or not there is a collective bargaining process, but how unpredictable that process is. Districts cannot make sweeping changes such as class size adjustments or teacher evaluation systems without first having the new policy approved in the collective bargaining process (EdSource, 1999). Therefore, unionized districts cannot make quick adjustments to the system to conserve funds. The process is complicated and open to public comment; if the process is hostile it can go to the point of court involvement; See Figure 4 (EdSource, 1999).

Figure 4.

The Collective Bargaining Process in California



Note. Reprinted from EdSource, 1999

Teacher unions play a large role in California students' educations (EdSource, 1999). If a union is highly restrictive in favor of teachers, student achievement suffers (EdSource, 1999; Moe, 2009; Strunk & McEachin, 2011). It appears that larger districts, which also have lower student achievement generally, may have the strongest unions (Rose & Sonstelie, 2010).

California districts are forced to participate in the collective bargaining process; sometimes the outcomes are positive, but sometimes negative (EdSource, 1999). Even in the most positive collective bargaining atmosphere, the rate of change is very slow, leaving districts' hands tied in a fiscal crisis.

Unions and Student Achievement. Strunk & McEachin (2011) studied the connection between California school district union contract restrictiveness and student achievement. This research involved a number of different equations, but the main explanatory variables were Program Improvement status, a negative student achievement status, and graduation rates. The research utilized contract restrictiveness measures, Common Core of Data, Adequate Yearly Progress Data, the Academic Performance Index, and Program Improvement data for the 2005-2006 through 2008-2009 school years. In all, their data accounted for 465 districts in California. They were interested in this connection because prior research showed that administrators need flexibility to implement program changes to meet accountability standards.

As noted earlier, their research involved a number of different equations and tests, but they had two especially significant findings (Strunk and McEachin, 2011). A one-unit increase in contract restrictiveness leads to a 7.6% increased likelihood that a district is in Program Improvement status, and a 4.8% increased likelihood that they are in a worse Program Improvement position than other districts. Essentially, what they found was that contract restrictiveness leads to an inability to meet state standards for Adequate Yearly Progress (AYP), and makes it more difficult in the future to attain AYP. The second finding was that districts with a half-unit increase in contract restrictiveness experience a 1.3% decrease in graduation rates all else equal.

Strunk et al., noted that their results did not completely explain their question because they also found that urban districts and districts with greater numbers of minorities tended to also be in Program Improvement Status. They theorize that these contracts are utilized more fully as the working environments tend to be more difficult. They also cautioned that their results did not fully explain this relationship. Finally, Strunk et al, noted that this research did not show how restrictive contracts affected student achievement; their belief was that it limited administrators' discretion, but the research did not demonstrate this fact.

Moe (2009) ran regression analysis using API data and coded collective bargaining documents to measure the impact of restrictive labor contracts on student achievement. The results of his research were that union contract restrictiveness, all else constant, negatively affected student API growth at the 1% significance level by -0.24 standard deviations for elementary school districts and -0.32 standard deviations for secondary school districts. This was especially evident in large school districts and had greater impacts on minority students. Coding can be somewhat subjective, so the criteria for a restrictive contract may not be perfect; however, the impact of these tight contracts is significant and large enough to be accounted for.

Union Flexibility and Power. Rose & Sonstelie (2010) examined the power of unions in relation to the size of the district and the union's role in allocating resources in using ordinary least squares regression analysis. Rose & Sonstelie (2010) found that unions tend to be stronger in larger districts, and teacher salaries tend to be higher in larger districts. They drew conclusions from these results that the two were interrelated; they did consider alternate rationales including the concept that there is a fixed cost to labor unionization, necessitating larger school districts. The results of the study were that a larger district has a base teacher salary 7% higher than a small district, and the experience premium increases by 11%, both at a 5% level of significance.

However, if the goal is to compare real dollar wages between districts, cost of living for each district needs to be accounted for. Additionally, it was unclear how it was determined that larger districts always have stronger unions.

Two things are clear: unions can have an impact on student achievement, and they can definitely have a large impact on the budget of school districts. While the rigidity of a union can be difficult to determine, and is somewhat outside the scope of my regression model, it is important to understand that this is the operating environment of these struggling districts. Districts, depending on their union restrictiveness, may not be able to renegotiate contracts in their fiscal favor, and therefore, may have more struggling students due to the restrictiveness of the union.

Conclusions

In this literature review I examined relevant academic literature regarding school district fiscal solvency, socioeconomic effects on student achievement, school district impacts on student achievement, and the role of teacher unions in student achievement and their flexibility. It appears that economically depressed school districts are more likely to experience fiscal insolvency as well as districts with higher than average proportions of minority students. Socioeconomically depressed school districts are also more likely to have negative student achievement results. Some of the inputs that districts can control with respect to student achievement, such as reward systems and amenities, require direct funding. However, positive leadership can benefit student achievement. It also seems that larger districts are at greater risk of insolvency while also tending to have lower student achievement generally. Teacher unions play a large role in California school district politics and decisions; they also tend to have a negative

impact on student achievement depending on how restrictive they are. Finally, for a school district in financial trouble, it may be difficult to modify a collectively bargained for contract.

Earlier in this report I noted that there is a dearth of research on the impact of school district insolvency and student achievement. These articles taken together are a good base for exploring these impacts, but there is a clear void in the research. Frazier (2006) suggested that the impact of school district insolvency on student achievement is an appropriate next step following their research. It is clear that no one has yet taken this step correlating these two variables. Drawing on this earlier research, I designed a regression model that will attempt to account for the variations found by other researchers. I predict, based on the findings of this review, as well as just common sense, that fiscal insolvency in a district will have a negative impact on student achievement. The causes of fiscal insolvency which included lack of coordination, poor leadership, and staff incompetency show that the kind of district that tends to become insolvent likely has issues in the classroom as well. Additionally, given that the only true link between district choices and student achievement appears to rely on funding and a positive atmosphere, insolvent districts likely do not fit the model for increased student performance. Finally, many districts going into insolvency are attempting to renegotiate union contracts in extremely hostile situations leading to yet more evidence that students are unlikely to excel. It is improbable that a district that lacks coordination and financial oversight and has a negative teaching environment would excel academically. This research will be one step toward understanding this relationship.

Chapter 3

REGRESSION METHODOLOGY

In this Chapter I review the methodology that is used to analyze the data for this thesis. In the next two paragraphs I discuss the content of my dependent and explanatory variables in greater detail. Following this discussion is a presentation of all the variables included in the data. First I provide a table simply defining each of the variables and their source. Second I provide tables of the data's summary statistics for each year of data studied. Third, I discuss the results of a simple correlation coefficient test; these results are presented in Appendix B to the report as they are lengthy. The final section of this chapter is a presentation of my regression model including expected coefficient direction outcomes, and justification of these expectations.

Dependent variable. The dependent variable for this regression model is the growth in API score in each of the five years examined: 2006, 2007, 2008, 2009, and 2010, in unified school districts with a student population of at least 100 or more in California. API Scores are on a scale from 200-1000 and show a school, district, or subgroup's academic achievement level (CDE, 2011). The CDE (2011) states that the API score's "… purpose is to measure the academic performance and growth of schools" (p. 4). The process by which this score is determined is a conversion of various statewide test assessment scores from a variety of academic areas into a single score on the API score scale (CDE, 2011, p. 4). The dependent variable in this regression is a district's change in API score from the previous year, or annual achievement growth. The annual achievement growth can be either negative or positive. Given that the goal of this research is to understand the change in API score in each district, this is the appropriate dependent variable.

Explanatory variable. The main explanatory variable is whether or not these school districts were under fiscal stress. Fiscal stress falls into three categories: negative certification of the district's budget, qualified certification of a district's budget, and state receivership of the district. As I explained in chapter 1 a negative certification indicates that a district *will not* be able to meet its current or subsequent year's financial obligations, a qualified certification indicates a district *may not* meet those obligations, and a district in receivership was granted a state loan and lost much of its autonomy ("Interim Status", n.d.; "State Emergency Loans", n.d.). To account for this variable, I created a dummy variable where 1 represents a district that falls into any one of these three categories, and 0 represents a district that does not have any indicators of fiscal distress.

Data

In this section, I review the variables used in these regressions for each of the five years of analysis in more detail.

Data Identification and Description. Table 3.1 shows the sources and definitions for all variables used in the model, including the dependent variable. Most variables used in this regression came from the California Department of Education's (CDE) API growth data files. The second data source was the CDE's certificated Salaries and Benefits data set for each school year. I created the main explanatory variables in this model, poor fiscal status for each budget year, from information provided by the CDE's Interim Status reports. If a district's budget was either negative or qualified certified in either of the interim status reports, or in receivership, they were categorized as in negative fiscal status.

Table 3.1.

Identification, Description, and Source for all Variables Used

Variable Name	Description	Source
Dependent Variable		
Annual Achievement Growth	Growth in API score for each Unified School District from Previous to Current Year.	California Department of Education (CDE): API Data Files
Control Variable		
Previous Year's API score	API score for each Unified School District in previous year.	CDE: API Data Files
Student Characteristics of District		
Percent African-American	Percent of African-American students in each Unified School District for each year.	CDE: API Data Files
Percent American-Indian	Percent of American-Indian students in each Unified School District for each year.	CDE: API Data Files
Percent Asian	Percent of Asian students in each Unified School District for each year.	CDE: API Data Files
Percent Filipino	Percent of Filipino students in each Unified School District for each year.	CDE: API Data Files
Percent Hispanic	Percent of Hispanic students in each Unified School District for each year.	CDE: API Data Files
Percent Pacific-Islander	Percent of Pacific-Islander students in each Unified School District for each year.	CDE: API Data Files
Percent Disabled	Percent of students in each Unified School District that had disabilities for each year.	CDE: API Data Files
Social Characteristics of District		
Percent Free Lunch	Percent of students in each Unified School District that participated in Free or Reduced Price Meal Program for each year.	CDE: API Data Files
Percent Gate	Percent of students in each Unified School District that participated in Gifted and Talented programs for each year.	CDE: API Data Files
Percent Migrant Education	Percent of students in each Unified School District that participated in migrant education programs for each year.	CDE: API Data Files

Variable Name	Description	Source
Percent English Language Learner	Percent of students in each Unified School District that were designated as English Language Learners for each year.	CDE: API Data Files
Percent Reclassified Fluent-English-Proficient	Percent of students in each Unified School District that were reclassified as Fluent-English-Proficient for each year.	CDE: API Data Files
High School	Parent education level: percent that are high school graduates.	CDE: API Data Files
Some College	Parent education level: percent that have completed some college work.	CDE: API Data Files
College Graduate	Parent education level: percent that graduated from college.	CDE: API Data Files
Graduate School	Parent education level: percent that attended graduate school.	CDE: API Data Files
District Enrollment and Personnel Characteristics		
Percent School Enrolled, Previous Year	Percent of students in each Unified School District that were counted as part of the same school's enrollment since the previous school year.	CDE: API Data Files
Percent District Enrolled, Previous Year	Percent of students in each Unified School District were counted as part of district enrollment since the previous school year.	CDE: API Data Files
Class Size*	Average class size for a number of core academic courses	CDE: API Data Files
Full Credential*	Percentage of teachers in each Unified School District that are fully credentialed.	CDE: API Data Files
Emergency Credential*	Percentage of teachers in each Unified School District that have emergency credentials only.	CDE: API Data Files
Enrollment	Number of Students in each Unified School district that were enrolled on the first day of testing.	CDE: API Data Files
Percent tested	Out of the number of students enrolled on the first day of testing, the percent that participated in the tests in each Unified School District.	CDE: API Data Files
Total FTEs	The number of Full Time Equivalent Teachers in a given school district.	CDE: Certificated Salaries and Benefits

Variable Name	Description	Source
Counselor Availability	Dummy variable for counselor availability in a district.	CDE: Certificated Salaries and Benefits
Nurse Availability	Dummy variable for nurse availability in a district.	CDE: Certificated Salaries and Benefits
Psychologist Availability	Dummy variable for psychologist availability in a district.	CDE: Certificated Salaries and Benefits
Librarian Availability	Dummy variable for librarian availability in a district.	CDE: Certificated Salaries and Benefits
Teaching Days	Number of instructional days of employment for Full Time Equivalent Teachers.	CDE: Certificated Salaries and Benefits
Teacher Working Days	Number of working days of employment for Full Time Equivalent Teachers.	CDE: Certificated Salaries and Benefits
Percent Salary Change Over Previous Year	Percent increase or decrease in salaries in a given school district year over year.	CDE: Certificated Salaries and Benefits
Minimum Teacher Salary	Minimum salary of a teacher in a given school district.	CDE: Certificated Salaries and Benefits
Maximum Teacher Salary	Maximum salary of a teacher in a given school district.	CDE: Certificated Salaries and Benefits
Elementary Principal Salary	Salary of elementary school principals in a given district.	CDE: Certificated Salaries and Benefits
Middle School Principal Salary	Salary of middle school principals in a given district.	CDE: Certificated Salaries and Benefits
High School Principal Salary	Salary of high school principals in a given district.	CDE: Certificated Salaries and Benefits
Superintendent Salary	The salary of the superintendent in each district.	CDE: Certificated Salaries and Benefits
Elementary Principal Working Days	Number of working days for elementary school principal in each district.	CDE: Certificated Salaries and Benefits

Variable Name	Description	Source
Middle School Principal Working Days	Number of working days for middle school principal in each district.	CDE: Certificated Salaries and Benefits
High School Principal Working Days	Number of working days for high school principal in each district.	CDE: Certificated Salaries and Benefits
Superintendent Working Days	Number of working days for superintendent in each district.	CDE: Certificated Salaries and Benefits
Fiscal Status		
Poor Fiscal Status, Current Budget Year	Dummy variable representing school districts whose interim financial reports were either negative, qualified, or in receivership status; all showing poor fiscal status of the district in current fiscal year.	CDE: Certifications of Interim Financial Reports

Note. The three variables followed by an asterisk are unavailable for the 2009-2010 school year. The CDE indicated that these data were not collected for that year, so they are omitted from the data set for the 2009-2010 school year only.

Summary Statistics. In the next five tables, Tables 3.2 through 3.6, I provide the summary statistics for all variables used in the model, including the dependent variable, for each year examined. Not all five years have exactly the same number of districts, but they are close to the same size. Almost all variables have the same sample size, but a few have slightly less due to missing data. Reviewing this table, the dependent variable of *Annual Achievement Growth* has both negative and positive numbers, and therefore, in running my regression I will not be able to use any log form regressions.

Table 3.2.

2009-2010 Variables: Summary Statistics

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Dependent Variable					
Annual Achievement Growth	326	11.42945	12.20087	-42	74
Control Variable					
2008-2009 Year API score	326	762.5951	64.51754	586	951
Student Characteristics of District					
Percent African-American	328	4.484756	6.641065	0	61
Percent American-Indian	328	2.125	7.427504	0	83
Percent Asian	328	6.478659	10.61847	0	66
Percent Filipino	328	1.77439	2.776763	0	21
Percent Hispanic	328	44.16159	25.51251	2	99
Percent Pacific-Islander	328	.3841463	.6626736	0	4
Percent Disabled	328	10.44512	2.705195	1	20
Social Characteristics of District					
Percent Free Lunch	328	51.57012	24.61895	0	100
Percent Gate	328	7.801829	5.537782	0	27
Percent Migrant Education	328	3.634146	6.994558	0	50
Percent English Language Learner	328	20.12195	14.4505	0	80
Percent Reclassified Fluent-English-Proficient	328	11.42378	7.539518	0	38
High School	328	24.72256	10.34419	1	58
Some College	328	25.42378	8.752474	0	62

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
College Graduate	328	18.67073	9.96054	0	46
Graduate School	328	11.875	11.88398	0	70
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	328	93.07317	3.435844	75	99
Percent District Enrolled, Previous Year	328	94.42073	3.008621	80	99
Enrollment	328	9781.082	27930.98	112	475262
Percent tested	328	99.16518	.7341585	93.18996	100
Total FTEs	308	685.2173	2009.48	11.9	33166
Counselor Availability	308	.5422078	.4990261	0	1
Nurse Availability	308	.5487013	.4984323	0	1
Psychologist Availability	308	.1818182	.3863223	0	1
Librarian Availability	308	.474026	.5001375	0	1
Teaching Days	308	180.039	.4253087	175	184
Teacher Working Days	308	184.1364	1.484198	180	188
Percent Salary Change Over Previous Year	308	.4465584	1.444819	-4.43	9
Minimum Teacher Salary	308	40397.28	4543.386	27084	55653
Maximum Teacher Salary	308	81033.55	8970.153	54115	116871
Elementary Principal Salary	303	99811.78	13281.62	59608	145191
Middle School Principal Salary♦	264	105893.8	13339.99	69575	149342
High School Principal Salary♦	294	113703.4	16319.08	70900	163175

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Superintendent Salary	306	170564.5	43567.37	80000	296768
Elementary Principal Working Days	303	210.1089	5.522802	190	247
Middle School Principal Working Days♦	264	214.0038	6.039476	193	247
High School Principal Working Days♦	294	220.6054	7.146978	190	248
Superintendent Working Days	306	225.6078	9.063879	190	249
Fiscal Status					
Poor Fiscal Status, 2009-2010 Budget Year	328	.3170732	.4660472	0	1

Note. Variables followed by a ♦ will not be included in this regression due to the large number of missing observations. These observations were missing in the original data sets.

Table 3.3.

2008-2009 Variables: Summary Statistics

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Dependent Variable					
Annual Achievement Growth	324	12.58951	10.62307	-28	56
Control Variable					
2007-2008 Year API score	324	751.2377	63.85691	580	941

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Student Characteristics of District					
Percent African-American	326	5.06135	7.014002	0	59
Percent American-Indian	326	2.45092	7.64012	0	83
Percent Asian	326	6.763804	10.73754	0	66
Percent Filipino	326	2.052147	3.230677	0	28
Percent Hispanic	326	42.53988	25.83766	2	99
Percent Pacific-Islander	326	0.478528	0.730331	0	5
Percent Disabled	326	10.41718	2.659823	0	19
Social Characteristics of District					
Percent Free Lunch	326	50.19632	23.76911	0	100
Percent Gate	326	8.726994	7.187747	0	88
Percent Migrant Education	326	4.162577	7.532164	0	46
Percent English Language Learner	326	20.71779	14.9269	0	79
Percent Reclassified Fluent-English-Proficient	326	10.42331	6.811209	0	38
High School	326	25.10736	10.93945	1	67
Some College	326	24.93865	8.685403	0	45
College Graduate	326	18.79448	10.03183	0	45
Graduate School	326	11.64724	11.74058	0	69
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	326	92.86503	3.192328	80	99
Percent District Enrolled, Previous Year	326	94.26994	2.845912	81	99

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Class Size	321	24.8567	4.943243	7	32
Full Credential	324	96.53086	3.373862	80	100
Emergency Credential	324	1.385802	1.952037	0	10
Enrollment	326	9965.644	28756.78	128	489386
Percent tested	326	99.13851	0.802676	92.74267	100
Total FTEs	308	685.2173	2009.48	11.9	33166
Counselor Availability	308	0.542208	0.499026	0	1
Nurse Availability	308	0.548701	0.498432	0	1
Psychologist Availability	308	0.181818	0.386322	0	1
Librarian Availability	308	0.474026	0.500138	0	1
Teaching Days	308	180.039	0.425309	175	184
Teacher Working Days	308	184.1364	1.484198	180	188
Percent Salary Change Over Previous Year	308	0.446558	1.444819	-4.43	9
Minimum Teacher Salary	308	40397.28	4543.386	27084	55653
Maximum Teacher Salary	308	81033.55	8970.153	54115	116871
Elementary Principal Salary	303	99811.78	13281.62	59608	145191
Middle School Principal Salary♦	264	105893.8	13339.99	69575	149342
High School Principal Salary♦	294	113703.4	16319.08	70900	163175
Superintendent Salary	306	170564.5	43567.37	80000	296768
Elementary Principal Working Days	303	210.1089	5.522802	190	247

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Middle School Principal Working Days♦	264	214.0038	6.039476	193	247
High School Principal Working Days♦	294	220.6054	7.146978	190	248
Superintendent Working Days	306	225.6078	9.063879	190	249
Fiscal Status					
Poor Fiscal Status, 2008-2009 Budget Year	326	0.220859	0.415463	0	1

Note. Variables followed by a ♦ will not be included in this regression due to the large number of missing observations. These observations were missing in the original data sets.

Table 3.4.

2007-2008 Variables: Summary Statistics

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Dependent Variable					
Annual Achievement Growth	325	10.80308	13.11739	-61	66
Control Variable					
2006-2007 Year API score	325	740.8585	67.15648	564	938
Student Characteristics of District					
Percent African-American	325	5.030769	7.046953	0	61
Percent American-Indian	325	2.36	7.354532	0	82
Percent Asian	325	6.661538	10.66331	0	66
Percent Filipino	325	2.003077	3.137289	0	27
Percent Hispanic	325	42.21231	25.79862	2	99

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Percent Pacific-Islander	325	0.464615	0.686832	0	4
Percent Disabled	325	10.23385	2.484661	0	19
Social Characteristics of District					
Percent Free Lunch	325	48.27692	23.94729	0	100
Percent Gate	325	8.384615	5.979111	0	62
Percent Migrant Education	325	4.461538	7.993587	0	45
Percent English Language Learner	325	21.33538	15.44409	0	80
Percent Reclassified Fluent-English-Proficient	325	9.427692	6.608905	0	36
High School	325	25.19077	10.67016	1	75
Some College	325	25.15692	8.505807	3	46
College Graduate	325	18.55692	9.977783	0	48
Graduate School	325	11.54462	11.59323	0	69
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	325	92.85538	3.178925	78	99
Percent District Enrolled, Previous Year	325	94.26769	2.868362	82	99
Class Size	324	24.79938	5.006485	7	32
Full Credential	325	95.77846	4.102863	73	100
Emergency Credential	325	2.378462	2.737739	0	17
Enrollment	325	10150.7	29921.71	116	509924
Percent tested	325	98.2209	1.957796	82.91077	100
Total FTEs	302	711.2374	2211.914	15	36564

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Counselor Availability	302	0.539735	0.499246	0	1
Nurse Availability	302	0.559603	0.497259	0	1
Psychologist Availability	302	0.165563	0.372305	0	1
Librarian Availability	302	0.480133	0.500434	0	1
Teaching Days	302	180.0629	0.495175	175	184
Teacher Working Days	302	184.1987	1.520709	180	188
Percent Salary Change Over Previous Year	302	2.945894	2.024536	0	17.5
Minimum Teacher Salary	302	40148.21	4600.818	27084	55646
Maximum Teacher Salary	302	80777.19	8839.935	54115	111701
Elementary Principal Salary	297	99371.52	12732.28	53838	138541
Middle School Principal Salary♦	257	105649.4	13339.95	67223	144678
High School Principal Salary♦	291	112598.9	16190.93	67315	157725
Superintendent Salary	299	168364.1	43110.08	80000	300000
Elementary Principal Working Days	297	210.1751	5.316629	184	228
Middle School Principal Working Days♦	257	213.8444	5.326736	193	232
High School Principal Working Days♦	291	220.134	6.736871	184	247
Superintendent Working Days	299	224.5485	7.74511	190	261

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Fiscal Status					
Poor Fiscal Status, 2007-2008 Budget Year	325	0.196923	0.398287	0	1

Note. Variables followed by a ♦ will not be included in this regression due to the large number of missing observations. These observations were missing in the original data sets.

Table 3.5.

2006-2007 Variables: Summary Statistics

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Dependent Variable					
Annual Achievement Growth	325	4.270769	10.98655	-56	43
Control Variable					
2005-2006 Year API score	325	735.4554	68.43084	560	940
Student Characteristics of District					
Percent African-American	325	5.036923	7.2978	0	66
Percent American-Indian	325	2.338462	7.256493	0	80
Percent Asian	325	6.584615	10.54223	0	65
Percent Filipino	325	1.935385	3.122817	0	27
Percent Hispanic	325	41.32923	25.68733	3	99
Percent Pacific-Islander	325	0.443077	0.689867	0	4
Percent Disabled	325	9.96	2.626127	0	18
Social Characteristics of District					
Percent Free Lunch	325	47.02462	23.60685	0	100
Percent Gate	325	8.307692	6.58497	0	65

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Percent Migrant Education	325	4.769231	8.216907	0	44
Percent English Language Learner	325	20.80308	15.26852	0	79
Percent Reclassified Fluent-English-Proficient	325	8.953846	6.621213	0	34
High School	325	24.76	10.34815	0	63
Some College	325	25.20923	8.471042	0	46
College Graduate	325	19.06462	10.02245	1	50
Graduate School	325	11.26462	11.27781	0	68
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	325	92.77846	3.390277	69	99
Percent District Enrolled, Previous Year	325	94.27692	2.968496	71	99
Class Size	324	25.39198	4.678261	8	32
Full Credential	325	95.84615	3.914325	76	100
Emergency Credential	325	2.670769	3.213481	0	21
Enrollment	325	10235.49	30629.22	113	523062
Percent tested	325	98.39227	1.511699	91.30371	100
Total FTEs	302	707.1703	2178.741	13	35951
Counselor Availability	302	.5596026	.4972588	0	1
Nurse Availability	302	0.582782	0.493918	0	1
Psychologist Availability	302	0.188742	0.391953	0	1
Librarian Availability	302	0.486755	0.500654	0	1

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Teaching Days	302	180.0629	0.481569	175	184
Teacher Working Days	302	184.2185	1.526702	180	189
Percent Salary Change Over Previous Year	302	5.241755	2.086673	0	18.44
Minimum Teacher Salary	302	38945.54	4312.37	27084	53826
Maximum Teacher Salary	302	78229.25	8430.443	57837	106573
Elementary Principal Salary♦	294	96286.63	11789.59	68186	131618
Middle School Principal Salary♦	262	101723.1	12957.86	70598	138563
High School Principal Salary♦	291	109097.9	15021.41	65000	145948
Superintendent Salary	297	160684.4	41396.68	72102	300000
Elementary Principal Working Days♦	294	210.2925	5.257481	190	228
Middle School Principal Working Days♦	262	213.7977	5.519828	193	241
High School Principal Working Days♦	291	220.5498	6.811762	190	247
Superintendent Working Days	296	224.9392	8.535649	190	261
Fiscal Status					
Poor Fiscal Status, 2006-2007 Budget Year	325	0.036923	0.188864	0	1

Note. Variables followed by a ♦ will not be included in this regression due to the large number of missing observations. These observations were missing in the original data sets.

Table 3.6.

2005-2006 Variables: Summary Statistics

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Dependent Variable					
Annual Achievement Growth	325	9.883077	12.04436	-45	95
Control Variable					
2004-2005 Year API score	325	724.9231	69.542	512	932
Student Characteristics of District					
Percent African-American	325	5.123077	7.638248	0	72
Percent American-Indian	325	2.353846	7.066769	0	78
Percent Asian	325	6.495385	10.39605	0	64
Percent Filipino	325	1.88	3.148741	0	27
Percent Hispanic	325	40.08308	25.63471	2	99
Percent Pacific-Islander	325	0.433846	0.697942	0	4
Percent Disabled	325	10.15077	2.512691	1	19
Social Characteristics of District					
Percent Free Lunch	325	45.78462	23.96325	0	100
Percent Gate	325	7.889231	6.431503	0	74
Percent Migrant Education	325	5.304615	9.09939	0	45
Percent English Language Learner	325	20.15077	15.27319	0	74
Percent Reclassified Fluent-English-Proficient	325	8.249231	6.328169	0	33
High School	325	25.16308	10.4799	2	62

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Some College	325	24.92923	8.541723	2	48
College Graduate	325	19.34154	10.05956	0	50
Graduate School	325	11.45846	11.27555	0	67
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	325	92.54462	3.433047	77	99
Percent District Enrolled, Previous Year	325	94.14462	2.968041	80	99
Class Size	322	25.73913	4.622203	8	33
Full Credential	325	95.28308	4.601381	73	100
Emergency Credential	325	2.849231	3.602816	0	33
Enrollment	325	10247.72	31247.11	132	534888
Percent tested	325	99.00403	1.196994	88.92617	100
Total FTEs	304	698.9323	2221.881	9.48	36863
Counselor Availability	304	0.555921	0.497682	0	1
Nurse Availability	304	0.595395	0.491625	0	1
Psychologist Availability	304	0.203947	0.403595	0	1
Librarian Availability	304	0.493421	0.500781	0	1
Teaching Days	304	180.0658	0.338333	180	184
Teacher Working Days	304	184.1711	1.551221	180	190
Percent Salary Change Over Previous Year	304	2.860033	1.80621	0	10
Minimum Teacher Salary	304	36880.06	3843.745	25922	50909
Maximum Teacher Salary	304	73695.34	7819.722	50710	99456

Variable Name	Sample Size, N=	Mean	Standard Deviation	Minimum	Maximum
Elementary Principal Salary	297	90921.4	11204.66	61622	124233
Middle School Principal Salary♦	263	96530.21	11846.32	66874	131776
High School Principal Salary♦	290	102775	13656.56	64480	138097
Superintendent Salary	302	147824.3	37945.1	77955	258750
Elementary Principal Working Days	297	210.101	6.291073	180	227
Middle School Principal Working Days♦	263	213.7871	5.263324	193	226
High School Principal Working Days♦	290	219.9379	5.615994	190	245
Superintendent Working Days	302	224.1589	8.713676	175	261
Fiscal Status					
Poor Fiscal Status, 2005-2006 Budget Year	325	0.061539	0.240686	0	1

Note. Variables followed by a ♦ will not be included in this regression due to the large number of missing observations. These observations were missing in the original data sets.

The results of these summary statistics for each year of data, led me to realize that some of the variables were missing too many data points. If one variable is missing data observations, that entire school district is eliminated from the regression. I somewhat arbitrarily set 295 as the threshold for including a variable. I chose this number because it allowed me to keep almost all the variables, and since most of the data sets contained as many as 328 observations, I only lost about 30 observations overall. The variables that were consistently missing too many

observations were *Middle School Principal Salary*, *High School Principal Salary*, *Middle School Principal Working Days*, and *High School Principal Working Days*. I indicated in the above tables if I eliminated variables. I do not think that losing these variables will greatly affect the outcome of the regression results. However, I do have concerns that losing as many as 30 observations could skew the outcome, but I also don't want to risk omitted variable bias.

Regression Model Presentation and Analysis

In this section of the chapter, I show my base regression model and then break it down by specific categories. I also predict the expected coefficient sign to be either negative or positive based on previous research. Following the break-down of each section of the model is a justification of the expected coefficient sign.

My base model for each year measured is as follows:

Annual Achievement Growth = f (Previous Year's API Score, Fiscal Status, Student Characteristics of District, Social Characteristics of District, District Enrollment and Personnel Characteristics)

Explanation and Justification of Model and Expected Signs

Each of the variables for each category are detailed below; next to each variable is an indication of their expected sign in the regression. If I expect the coefficient to be negative, I placed a (-) next to the variable; if I expect it to be positive, I placed a (+); and if the expected sign is unknown, I placed a (?) next to the variable. Justification for these variables and their expected signs follows each category of the model.

Previous Year's API score = f(Previous Year's API score (-))

Analysis of Base API score. This function in the model is simplistic because it only contains one variable. The Base API score is not meant to explain any of the change, but control

for existing score attainment. I would expect a higher base API score to indicate negative API score growth. The higher a district's API score is, the harder it is to maintain that level of achievement, and it is especially difficult to exceed it. The room for growth in districts with lower base scores is much greater (Driscoll et al., 2008).

Fiscal Status = f(Poor Fiscal Status, (-))

Analysis of Fiscal Status. The fiscal status aspect of my model is the main explanatory variable. I include a dummy variable for whether or not a district was under fiscal stress in at least one of the interim status reports in a given year. The CDE issues an Interim Status report twice a school year and rates a district as either positive certified (financially sound) or negative or qualified certified (financially unsound). If a district was financially unsound in either of these two reports that district received a "1" in the dummy variable for that school year. Only two districts were under receivership in the years examined, and they were consistently either negative or qualified certified in each of the years. I expect that fiscal insolvency, given the literature, would have a negative impact on API score growth (Frazier, 2006; Manca etal., 1999; Blevins, 2009; Sirin, 2005).

Student Characteristics of District = f(Percent African American (-), Percent American Indian (-), Percent Asian (+), Percent Filipino (?), Percent Hispanic (-), Percent Pacific Islander (?), Percent Disabled (-))

Analysis of Student Characteristics of District. Included in this function are race and ethnicity percentages, and the percent of students that are disabled. These variables will help control for differences in the populations among unified school districts. To avoid

multicollinearity, the category for "white" students was dropped from the data. Different ethnicities have been shown to have varying effects on overall student achievement. While these effects are likely related to underlying factors for each ethnicity, the research has shown these effects to be significant (Strunk & McEachin, 2011). I would expect school districts with higher percentages of African American, American Indian, Hispanic, and disabled students to have negative signs. Asian students would likely have a positive sign. Two groups are unclear from the existing research: Filipino and Pacific Islander.

Social Characteristics of District = f(Percent on Free/Reduced Lunch (-), Percent in Gifted programs (+), Percent English Language Learners (-), Percent Reclassified as Fluent-English – Proficient (?), Percent in Migrant Education Programs (-),Parent Education Level: High School Graduate (-), Parent Education Level: Some College (?), Parent Education Level: College Graduate (+), Parent Education Level: Graduate School (+))

Analysis of Social Characteristics of District. These variables are in place to help control for differences in income, parental education, and student barriers and advantages among the different school districts. The percent of students that qualify for free or reduced lunches is a measure of poverty among students in the district, and I would expect higher levels of poverty to be more likely to have negative growth in API (Blevins, 2009; Sirin, 2005). The higher the percentage of students involved in gifted programs would likely have a positive impact on API growth.

Several proxies for immigration and students whose second language is English have been included; I expect those classified as English learners or in migrant education programs

would likely have a negative impact on API growth, but I am insure about those that are reclassified as fluent English speakers.

The levels of parental education have been included as a variable; to avoid multicollinearity issues parents not finishing high school has been omitted. For parents with lower levels of education I would expect negative growth, and those with higher levels of education, positive growth. It is unclear what effect a parent with some college education might have.

District Enrollment and Personnel Characteristics = f(Percent of Students Continuously Enrolled in School since Previous Year (+), Percent of Students Continuously Enrolled in District since Previous Year (+), Average Class Size for Core Classes (-), Percent Teachers Fully Credentialed (+), Percent Teachers with Emergency Credentials (-), Number of Students Enrolled First Day of Testing (-), Percent of Students Tested (-),Total Full Time Equivalent Employees (?), Counselor Available Dummy (+),Nurse Available Dummy (+), Psychologist Available Dummy (+), Librarian Available Dummy (+), Teaching Days (+), Teacher Working Days (+), Percent Salary Change over Previous Year (?), Minimum Teacher Salary (+), Maximum Teacher Salary (-), Elementary Principal Salary (?), Middle School Principal Salary (?), High School Principal Salary (?), Superintendent Salary (?), Elementary Principal Working Days (+), Middle School Principal Working Days (+), High School Principal Working Days (+), Superintendent Working Days (+))

Analysis of District Enrollment and Personnel Characteristics. These variables help account for the differences among the teachers, atmosphere, administrative personnel, and stability of the various school districts. Measuring stability are two variables, the percent of

students enrolled continuously in the same school since the previous year, and the same district since the previous year. Stability for students should likely have a positive impact.

Larger average class sizes in core classes would likely result in a negative coefficient because students tend to learn better when they have more one-on-one attention from a teacher. For full credential teachers, I expect the coefficient to be positive because these are presumably the most qualified; likewise, higher percentages of emergency credentialed teachers should have a negative coefficient.

The number and percentage of students enrolled and taking the test controls for schools where the worst students do not take the tests; therefore, a higher percentage of test takers would likely result in a negative coefficient. A district with higher overall enrollment probably gives less individual attention to students, resulting in a negative coefficient.

The number of Full Time Equivalent (FTE) employees in a district is more of a control variable for size of district, so it could be that more FTEs in a small district would have a positive impact, but large numbers of FTEs in general do not indicate anything about the district except its size. Therefore, I do not know what impact this variable will have on student achievement. I included four dummy variables accounting for four additional specific staff availability: councilors, nurses, psychologists, and librarians. I predict that these will all have positive coefficients because districts with greater resources for their students are likely doing a better job in the classroom as well.

The number of teaching days, or instructional days, would likely have a positive impact on student achievement. A second measure in this category is the number of overall teacher working days. I predict that this will also have a positive coefficient; teachers with more days of preparation and support likely do a better job in the classroom. To account for salary change, I

included a variable for percent change over year in salaries in the district. It is unclear what kind of impact this may have. It could be that higher salary growth indicates a more positive environment for teachers and students, but districts with negative percentages may have teachers that negotiated with districts to reduce their salaries to avoid insolvency also indicating a positive environment.

I included variables for teacher minimum and maximum salaries. I think teacher minimum salaries could indicate positive growth because those districts can attract more talent, but districts with higher maximum salaries may be bloated and stagnant indicating a negative coefficient.

The last set of variables account for characteristics of administrators in a given district. Included are salaries and working days of elementary school principals, middle school principals, high school principals, and the superintendant. It is unclear what kind of effect their respective salaries may have. However, I think additional working days always indicate something positive, so working days will likely have positive coefficients.

In this section I explained the conceptual framework for my regression equation. My dependent variable of growth in API score will be accounted for with five main categories: Base API Score, fiscal status, student characteristics of district, social characteristics of district, and district enrollment and personnel characteristics. All potential factors are covered by each of the chosen variables. While there may be duplicative variables available through additional United States Census figures, they would be redundant. Additionally, United States Census figures specific to each year tested contain only one-third of the districts in the study making the data very underspecified.

Conclusion

The first half of this chapter was dedicated to examining the specific variables involved in this research. I reviewed each variable, its definition, and source. I prepared tables of summary statistics including sample size, mean, standard deviation, and minimum and maximum values for each variable in each year of data. In the second half of this chapter I thoroughly examined my model, and my hypotheses regarding the outcome. In the next Chapter of this thesis, I will review the results of this regression model including testing and correcting for multicollinearity and heteroskedasticity.

Chapter 4

REGRESSION RESULTS

In this chapter I report the regression results for each of the five regressions outlined in Chapter 3. I also examine the mean growth for each category of fiscal status to try to better understand these two variables. For the regressions, I present only the final, corrected, regression equation for each of the years, but you will find regression trials, Variance Inflation Factor results, and Szroeter heteroskedasticity test results for each year in Appendix B. Finally, I include a table of only the significant variables for each year including confidence intervals and elasticity, and discuss some of these findings. The purpose of this chapter is to test the main hypothesis that fiscally insolvent districts have lower student achievement scores, and interpret the results.

Mean Annual Achievement Growth as Measured by Fiscal Status

In order to better understand the main variables in this analysis, I ran a two-sample t-test for annual achievement growth and fiscal status. As mentioned earlier in this thesis, fiscal status of school districts was put into two categories: insolvent and solvent. Although there are three categories of insolvency, I made the variable a simple dummy variable. The results of these tests for each year of analysis can be found in Table 4.1.

Table 4.1

T-Test of Annual Achievement Growth by Fiscal Status, 2010 through 2006

Year/District Status	Observations	Mean	Standard Deviation
2010			
Solvent	222	11.491	12.989
Insolvent	104	11.298	10.375
2009**			
Solvent	253	13.106	10.536

Insolvent	71	10.746	10.800
2008			
Solvent	261	11.026	13.663
Insolvent	64	9.890	10.650
2007*			
Solvent	313	4.454	10.803
Insolvent	12	-0.500	14.811
2006*			
Solvent	305	10.095	12.049
Insolvent	20	6.650	11.789
** Indicates the difference in means was significant at the 95% level *Indicates the difference in means was significant at the 90% level			

The results for the difference in means for annual achievement growth between fiscally insolvent and fiscally solvent districts were most significant for 2009 at the 95% level of confidence. The results for 2007 and 2006 were also both significant, but at the 90% level of confidence. The results of 2009 t-test show that solvent districts' mean growth in annual achievement scores were 2.36 points higher than fiscally insolvent districts. In 2007, the difference was very pronounced with insolvent districts having a mean negative annual achievement score of -0.50. Essentially this demonstrates that in 2006, 2007, and 2009 mean growth in API scores was lower for fiscally insolvent districts, indicating that they struggled more in increasing their API scores. While this shows there is a difference between solvent and insolvent districts, it cannot possibly show what may have caused the difference, which a regression analysis does. In the rest of this chapter I present the results of the regression analyses for each of the years and interpret the significant results.

Regression Trials

For each of the five years of data I tested at least three different equations to determine which was the best fit for the data. As noted above, I could not use any log-form regressions. Therefore, I tested linear-linear regressions, some with quadratic terms and some without. The

final chosen regression equations were the most significant, and often had the highest R-Squared value indicating that they explained the variance in the data the best. However, I deferred to the data with the highest number of significant variables in my final choice. The different trials and their results are in Appendix B.

Multicollinearity

Each of the regression equations has been evaluated for potential multicollinearity. Multicollinearity is a condition that can be present in regression analysis wherein two or more variables are highly correlated with one another. In other words, when one variable moves in one direction, a correlated variable moves equally either in the same or opposite direction. In order to determine which variables may present potential multicollinearity issues for the regression analysis, I ran two tests for each regression. First, I ran a simple correlation coefficient test of all variables used in each regression. I do not include the table of results due to the large volume of information, but will provide them on request. Some of the correlations I found consistently from year to year appear to be part of natural correlations. For example, an elementary principal's salary is likely very similar to that of a teaching maximum salary. Finding a simple correlation between two variables does not necessarily indicate multicollinearity on its own. Examining these results in conjunction with the second test for multicollinearity provided me with greater insight as to the danger of these correlations.

A second test that can be run to detect multicollinearity is a Variance Inflation Factor or VIF test. As a general rule, any variable that has a VIF over five whose regression results were not significant, likely has multicollinearity issues. In Appendix B you will find that I have included VIF values for the chosen uncorrected regression equation for each year of data. The variables whose VIF values indicated multicollinearity varied across the different data sets.

Correcting for multicollinearity can be difficult. Two of the main corrections include dropping redundant variables and expanding the size of your data set. Expanding the size of the data set is outside the scope of this thesis, but a time-series or panel data set could be employed in future research. Dropping redundant variables can be problematic because if they are not entirely redundant, it could create omitted variable bias. To test the affect that the potentially collinear variables were having on the regression equations, I dropped each variable in turn to determine if the variable had a negative effect on the outcome or not. While I found in some instances that when collinear variables were dropped that other variables took on significance, the variables that were collinear, as exhibited by a high correlation coefficient, were not affected. Ultimately, I chose to retain all variables despite some multicollinearity.

Heteroskedasticity

Heteroskedasticity occurs when the variables do not have constant variance. What this means is that the calculated standard errors in a regression equation could be incorrect because the variance is not constant. I ran the Breusch-Pagan test to check for potential heteroskedasticity in my model. This test shows if the estimated variances of the standard errors are dependent on the independent variables. The resulting p-value of the test for all five years was 0.0000 indicating that there is a 99.99% chance that each year of my model has heteroskedasticity issues. I also ran the Szroeter test. This test also calculates a p-value for heteroskedasticity, but the results are individual to each variable. The results of this test can be seen in Appendix B. There are many variables in each year of data whose p-score is greater than 90% confident that there is heteroskedasticity. Therefore, the each regression was run with correction for heteroskedasticity.

Regression Results

In Table 4.2 you will find the regression results for all five years of data. In some years of analysis certain variables were found to be quadratic, while not in other years, so you will find that some boxes have "N/A" instead of a coefficient and standard error. In the 2009-2010 data, "N/A" is in the cells for *Class Size*, *Full Credential*, and *Emergency Credential* because that data was not available in that year of analysis. In the 2006-2007 data, there is also a "N/A" in *Elementary Principal Salary* space; this is because I determined not to include that variable due to a low number of observations (See Chapter 3). The main explanatory variable, *Poor Fiscal Status*, was not found to be significant in any of the years of analysis. I discuss the significant findings in the next section.

Table 4.2

Regression Results of Data Analysis using Annual Achievement Growth as the Dependent Variable: Coefficients, (Standard Errors), and Significance

Variables	2009-2010 Regression Results Coefficients (Standard Errors)	2008-2009 Regression Results Coefficients (Standard Errors)	2007-2008 Regression Results Coefficients (Standard Errors)	2006-2007 Regression Results Coefficients (Standard Errors)	2005-2006 Regression Results Coefficients (Standard Errors)
Control Variable					
Base Year API Score	-0.06771** (0.03027)	-0.05708* (0.03255)	-0.0986** (0.03941)	-0.08559*** (0.02504)	-0.11037*** (0.0338)
Fiscal Status					
Poor Fiscal Status	-0.02442 (1.21047)	-1.94019 (1.76749)	0.90988 (1.58513)	-1.76581 (2.06226)	-0.30718 (2.51924)
Student Characteristics of District					
Percent African-American	0.08437 (0.10773)	0.22035* (0.11338)	-0.14994 (0.12725)	-0.10466 (0.09501)	-0.51822*** (0.19521)
Percent African-American *Squared*	N/A	N/A	N/A	N/A	0.00744*** (0.00281)

Variables	2009-2010 Regression Results Coefficients (Standard Errors)	2008-2009 Regression Results Coefficients (Standard Errors)	2007-2008 Regression Results Coefficients (Standard Errors)	2006-2007 Regression Results Coefficients (Standard Errors)	2005-2006 Regression Results Coefficients (Standard Errors)
Percent American-Indian	-0.09885 (0.20793)	-0.17104 (0.13758)	-0.05888 (0.14145)	-0.09428 (0.11939)	0.08459 (0.12228)
Percent Asian	0.1237* (0.07445)	0.10095 (0.06912)	0.09766 (0.07049)	0.18774*** (0.0646)	0.17372** (0.07584)
Percent Filipino	0.17119 (0.25151)	-1.08536** (0.43638)	-0.12391 (0.17907)	-0.19193 (0.19533)	-0.00349 (0.20086)
Percent Filipino *Squared*	N/A	0.04478*** (0.01564)	N/A	N/A	N/A
Percent Hispanic	0.18053** (0.07331)	0.08051 (0.06405)	-0.01286 (0.06611)	0.13251* (0.06957)	0.00661 (0.06546)
Percent Pacific-Islander	0.638 (0.94657)	-1.36406 (0.87967)	-0.44821 (1.16865)	-0.37054 (1.00207)	0.48406 (1.0233)
Percent Disabled	-0.1963 (0.2863)	-2.99971** (1.51473)	-0.69534** (0.31486)	-0.05867 (0.2864)	-0.13127 (0.30085)
Percent Disabled *Squared*	N/A	0.13231* (0.07299)	N/A	N/A	N/A
Social Characteristics of District					
Percent Free Lunch	-0.16401*** (0.05926)	-0.17733** (0.07942)	-0.19832* (0.11329)	-0.12361 (0.09767)	-0.11969 (0.09891)
Percent Gate	0.27219** (0.1347)	-0.02518 (0.07855)	-0.17947* (0.10407)	0.00776 (0.10639)	0.04328 (0.0898)
Percent Migrant Education	0.04799 (0.1141)	-0.10727 (0.12775)	-0.03977 (0.16927)	-0.63799** (0.29441)	0.07451 (0.13226)
Percent Migrant Education *Squared*	N/A	N/A	N/A	0.02158** (0.00827)	N/A
Percent English Language Learner	0.03474 (0.09901)	0.0559 (0.13663)	-0.03422 (0.1229)	-0.01299 (0.1409)	-0.05455 (0.13831)
Percent Reclassified Fluent-English-Proficient	-1.04436*** (0.35783)	-0.05585 (0.16266)	0.07186 (0.14519)	0.07686 (0.13668)	-0.05952 (0.19108)

Variables	2009-2010 Regression Results Coefficients (Standard Errors)	2008-2009 Regression Results Coefficients (Standard Errors)	2007-2008 Regression Results Coefficients (Standard Errors)	2006-2007 Regression Results Coefficients (Standard Errors)	2005-2006 Regression Results Coefficients (Standard Errors)
Percent Reclassified Fluent-English-Proficient *Squared*	0.03279*** (0.01)	N/A	N/A	N/A	N/A
High School	0.09052 (0.13299)	0.15815 (0.21122)	-0.27228* (0.16393)	-0.0195 (0.19561)	-0.45911** (0.20166)
Some College	-0.13144 (0.11266)	0.92414** (0.4678)	-0.17387 (0.132)	0.21291 (0.18856)	-0.0826 (0.17671)
Some College *Squared*	N/A	-0.01565** (0.00788)	N/A	N/A	N/A
College Graduate	0.03795 (0.16379)	0.18259 (0.18126)	-0.21338 (0.16583)	-0.19075 (0.13722)	-0.0601 (0.16595)
Graduate School	0.02877 (0.13792)	0.01351 (0.17064)	-0.19353 (0.14673)	0.23544 (0.19721)	-0.15414 (0.21055)
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	-0.57923* (0.34317)	-0.13752 (0.52083)	-1.00485 (1.03456)	-0.40892 (0.29181)	0.54233 (0.4058)
Percent District Enrolled, Previous Year	0.56855 (0.51233)	0.27809 (0.62458)	0.84563 (1.24234)	0.32143 (0.31701)	-0.77351 (0.53814)
Class Size	N/A	-0.18705 (0.24957)	-0.56834** (0.27495)	0.1373 (0.30309)	-0.21544 (0.25952)
Full Credential	N/A	-0.10538 (0.28319)	-0.46053* (0.23714)	14.08334*** (4.32786)	-0.0896 (0.18994)
Full Credential *Squared*	N/A	N/A	N/A	0.07814*** (0.02381)	N/A
Emergency Credential	N/A	-0.44186 (0.45715)	-0.71061* (0.37213)	0.13153 (0.23982)	-0.07595 (0.20125)
Enrollment	-0.00001 (0.0002)	-0.00013 (0.0001)	0.00019 (0.00016)	0.0002 (0.00017)	0.00016 (0.00021)
Percent tested	1.80231 (1.16791)	-0.58116 (1.26555)	1.1709** (0.46335)	0.95985* (0.50356)	-0.01651 (0.68871)
Total FTEs	-0.00012 (0.00291)	0.00201 (0.0015)	-0.00223 (0.0023)	-0.00308 (0.0025)	-0.00264 (0.00307)
Counselor Availability	1.00974 (1.34024)	0.83606 (1.4206)	-0.80006 (1.4362)	0.47308 (1.25206)	-1.51373 (1.36667)

Variables	2009-2010 Regression Results Coefficients (Standard Errors)	2008-2009 Regression Results Coefficients (Standard Errors)	2007-2008 Regression Results Coefficients (Standard Errors)	2006-2007 Regression Results Coefficients (Standard Errors)	2005-2006 Regression Results Coefficients (Standard Errors)
Nurse Availability	0.32488 (1.47482)	1.78787 (1.42344)	1.02365 (1.66929)	-0.72008 (1.34946)	0.82989 (1.56084)
Psychologist Availability	0.34653 (1.57405)	-2.62383* (1.48092)	0.40209 (1.72526)	0.23188 (1.39002)	0.17063 (1.71146)
Librarian Availability	-0.6324 (1.25687)	-0.48703 (1.23597)	-2.37072* (1.38094)	-2.31764 (1.4305)	-0.39888 (1.41681)
Teaching Days	2.15108 (1.36735)	0.75455 (1.8974)	0.27788 (1.64281)	1.01763 (1.01698)	1.2146 (1.67694)
Teacher Working Days	-0.25768 (0.45664)	0.96424** (0.45405)	-0.55104 (0.41255)	0.44348 (0.4212)	-0.74521* (0.42876)
Percent Salary Change Over Previous Year	0.1253 (0.58473)	0.13133 (0.50998)	1.37392** (0.60289)	0.27526 (0.32898)	0.56847* (0.32164)
Percent Salary Change Over Previous Year *Squared*	N/A	N/A	-0.15375*** (0.04038)	N/A	N/A
Minimum Teacher Salary	3.33e-6 (0.00016)	-0.0003 (0.00019)	0.00006 (0.00017)	0.00016 (0.00018)	0.00318* (0.00178)
Minimum Teacher Salary *Squared*	N/A	N/A	N/A	N/A	-4.30e-8** (2.25e-8)
Maximum Teacher Salary	-0.00022 (0.00015)	0.00017 (0.00014)	-0.00003 (0.00016)	-0.00027** (0.00013)	-0.00011 (0.00015)
Elementary Principal Salary	0.00012 (0.00009)	0.00004 (0.00009)	-1.45e-6 (0.00011)		0.00008 (0.00011)
Superintendent Salary	0.00001 (0.00002)	-0.00002 (0.00002)	0.0004** (0.0002)	0.00007*** (0.00002)	0.00008** (0.00003)
Superintendent Salary *Squared*	N/A	N/A	-9.4e-10* (5.1e-10)	N/A	N/A
Elementary Principal Working Days	0.04055 (0.11425)	-0.02189 (0.10508)	-0.04789 (0.12795)	N/A	-8.37267* (4.78252)
Elementary Principal Working Days *Squared*	N/A	N/A	N/A	N/A	0.01941* (0.01128)

Variables	2009-2010 Regression Results Coefficients (Standard Errors)	2008-2009 Regression Results Coefficients (Standard Errors)	2007-2008 Regression Results Coefficients (Standard Errors)	2006-2007 Regression Results Coefficients (Standard Errors)	2005-2006 Regression Results Coefficients (Standard Errors)
Superintendent Working Days	0.03365 (0.08992)	-0.03116 (0.0633)	-0.00945 (0.07292)	-0.13083* (0.07241)	-0.04452 (0.09603)
Constant Term	-464.26	-186.0215	103.1076	373.9162	914.4515
R-Squared	0.2949	0.2155	0.2970	0.2762	0.2768
Number of Observations	300	297	296	296	293
Number of Significant Variables	7	8	12	9	9
Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater.					

Significant Variable Analysis

In Table 4.3 below I present the variables that were found to be significant from each of the five regressions including their coefficients, standard errors, elasticies, and 90% confidence intervals. To calculate elasticities, I divided the mean of the dependent variable by the mean of the independent variable and multiplied that times the coefficient for that same variable. Elasticies allow me to interpret the results in terms of percentages so that the results are compared in the same unit of measurement. In the following paragraphs I review and analyze the results for the variables whose coefficient was significant in two or more years of analysis.

Table 4.3

Regression Results of Statistically Significant Variables (90% or greater confidence in a two-tailed test): Coefficients, (Standard Errors), Confidence Intervals and Elastic Values

Variable	Regression Coefficients	90% Confidence Interval for Regression Coefficient	Elasticity Value
2010 Data Set			
2008-2009 Year API Score	-0.06771** (0.03027)	-0.11768 to -0.01775	-0.03524
Percent Asian	0.1237* (0.07445)	0.0008 to 0.2466	2.928521
Percent Hispanic	0.18053** (0.07331)	0.05951 to 0.30154	0.636672
Percent Free Lunch	-0.16401*** (0.05926)	-0.26184 to -0.06619	-0.61391
Percent Gate	0.27219** (0.1347)	0.04985 to 0.49453	2.959241
Percent Reclassified Fluent-English-Proficient	-1.04436*** (0.35783)	-1.63502 to -0.4537	-2.92145
Percent School Enrolled, Previous Year	-0.57923* (0.34317)	-1.1457 to -0.01275	-0.20753
Constant	-464.26		
R-Squared	0.2949		
2009 Data Set			
2007-2008 Year API Score	-0.05708* (0.03255)	-0.11081 to -0.00335	-0.000956567
Percent African-American	0.22035* (0.11338)	0.03316 to 0.40753	0.54808762
Percent Filipino	-1.08536** (0.43638)	-1.80576 to -0.36495	-6.658447375
Percent Disabled	-2.99971** (1.51473)	-5.50034 to -0.49908	-3.625252153
Percent Free Lunch	-0.17733** (0.07942)	-0.30845 to -0.04621	-0.044474651
Some College	0.92414** (0.4678)	0.15186 to 1.69642	0.46652258
Psychologist Availability	-2.62383* (1.48092)	-5.06865 to -0.17901	N/A
Teacher Working Days	0.96424** (0.45405)	0.21466 to 1.71382	0.065925464
Constant	-186.0215		
R-Squared	0.2155		

Variable	Regression Coefficients	90% Confidence Interval for Regression Coefficient	Elasticity Value
2008 Data Set			
2006-2007 Year API Score	-0.0986** (0.03941)	-0.16366 to -0.03353	-0.00143772
Percent Disabled	-0.69534** (0.31486)	-1.21514 to -0.17554	-0.73401702
Percent Free Lunch	-0.19832* (0.11329)	-0.38534 to -0.0113	-0.04437894
Percent Gate	-0.17947* (0.10407)	-0.35129 to -0.00766	-0.23124111
High School	-0.27228* (0.16393)	-0.54291 to -0.00165	-0.11676619
Class Size	-0.56834** (0.27495)	-1.02224 to -0.11443	-0.24757811
Full Credential	-0.46053* (0.23714)	-0.85201 to -0.06904	-0.0519438
Emergency Credential	-0.71061* (0.37213)	-1.32496 to -0.09627	-3.22764352
Percent tested	1.1709** (0.46335)	0.40597 to 1.93584	0.128784908
Librarian Availability	-2.37072* (1.38094)	-4.65048 to -0.09095	N/A
Percent Salary Change Over Previous Year	1.37392** (0.60289)	0.37864 to 2.36921	5.038406299
Superintendent Salary	0.00040** (0.0002)	0.00008 to 0.00073	2.57815E-08
Constant			
R-Squared			
2007 Data Set			
2005-2006 Year API Score	-0.08559*** (0.02504)	-0.12692 to -0.04426	-0.000497019
Percent Asian	0.18774*** (0.0646)	0.0811 to 0.29437	0.121764635
Percent Hispanic	0.13251* (0.06957)	0.01766 to 0.24736	0.01369289
Percent Migrant Education	-0.63799** (0.29441)	-1.12401 to -0.15198	-0.571311487
Full Credential	-14.08334*** (4.32786)	-21.2279 to -6.93879	-0.627533729
Percent tested	0.95985* (0.50356)	0.12856 to 1.79114	0.041662684
Maximum Teacher Salary	-0.00027** (0.00013)	-0.00048 to -0.00006	-1.49912E-08

Variable	Regression Coefficients	90% Confidence Interval for Regression Coefficient	Elasticity Value
Superintendent Salary	0.00007*** (0.00002)	0.00003 to 0.00011	1.77014E-09
Superintendent Working Days	-0.13083* (0.07241)	-0.25036 to -0.0113	-0.002483926
Constant	373.9162		
R-Squared	0.2762		
2006 Data Set			
2004-2005 Year API Score	-0.11037*** (0.0338)	-0.16617 to -0.05458	-0.001504761
Percent African-American	-0.51822*** (0.19521)	-0.84051 to -0.19594	-0.999722164
Percent Asian	0.17372** (0.07584)	0.04852 to 0.29892	0.264328111
High School	-0.45911** (0.20166)	-0.79204 to -0.12618	-0.180321102
Teacher Working Days	-0.74521* (0.42876)	-1.45308 to -0.03733	-0.0399897
Percent Salary Change Over Previous Year	0.56847* (0.32164)	0.03744 to 1.09949	1.964381605
Minimum Teacher Salary	0.00318* (0.00178)	0.00024 to 0.00611	8.51262E-07
Superintendent Salary	0.00008** (0.00003)	0.00003 to 0.00013	5.08113E-09
Elementary Principal Working Days	-8.37267* (4.78252)	-16.26849 to -0.47686	-0.393847634
Constant	914.4515		
R-Squared	0.2768		
Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater. Elasticity Number: $Coefficient_i$ * Mean X/Mean Y			

Across the five years of analysis, 26 unique variables were found to be statistically significant, and thirteen of those were found to be significant in at least two years of analysis. In Table 4.4 you can see the variable elasticities across years; I only include the elastic values for statistically significant variables and years. I did not calculate elastic values for librarian or psychologist availability because they are dummy variables, and the formula is not applicable to them. In the paragraphs following that table, I analyze the results for those variables that were

found to be significant in at least two years of analysis. I chose to do this both due to the volume of significant variables, and because those that were found to be significant more than once are consistently more influential than others.

Table 4.4

Elastic Values of Statistically Significant Variables, Shown With All Years of Significance

Variables	2009-2010 Elastic Values	2008-2009 Elastic Values	2007-2008 Elastic Values	2006-2007 Elastic Values	2005-2006 Elastic Values
Base Year API Score	-0.00106516	-0.00095657	-0.00143772	-0.00049702	-0.00150476
Percent African-American	-	0.54808762	-	-	-0.99972216
Percent Asian	0.21821925	-	-	0.12176463	0.26432811
Percent Filipino	-	-6.65844738	-	-	-
Percent Hispanic	0.04672181	-	-	0.0136929	-
Percent Disabled	-	-3.62525215	-0.73401702	-	-
Percent Free Lunch	-0.03635007	-0.04447465	-0.04437894	-	-
Percent Gate	0.39875225	-	-0.23124111	-	-
Percent Migrant Education	-	-	-	-0.5713115	-
Percent Reclassified Fluent-English-Proficient	-1.04487735	-	-	-	-
High School	-	-	-0.11676619	-	-0.18032110
Some College	-	0.46652258	-	-	-
Percent School Enrolled, Previous Year	-0.0711294	-	-	-	-
Class Size	-	-	-0.24757811	-	-
Full Credential	-	-	-0.0519438	-0.6275337	-
Emergency Credential	-	-	-3.22764352	-	-
Percent tested	-	-	0.128784908	0.0416627	-

Variables	2009-2010 Elastic Values	2008-2009 Elastic Values	2007-2008 Elastic Values	2006-2007 Elastic Values	2005-2006 Elastic Values
Teacher Working Days	-	0.065925464	-	-	-0.0399897
Percent Salary Change Over Previous Year	-	-	5.038406299	-	1.964381605
Minimum Teacher Salary	-	-	-	-	8.51262E-07
Maximum Teacher Salary	-	-	-	-1.49e-8	-
Superintendent Salary	-	-	2.57815E-08	1.77e-9	5.08113E-09
Elementary Principal Working Days	-	-	-	-	-0.39384763
Superintendent Working Days	-	-	-	-0.0024839	-

Based upon the calculated elasticities, some factors had larger effects and many had smaller effects on growth. The majority of the variables were found to have a very small effect, a one-percent increase in the variable yielded less than 1% effect on outcome, including the following variables: previous year's score, percent African American, percent Asian, percent Hispanic, percent disabled, percent free lunch, percent GATE, percent migrant education, high school, some college, percent school enrolled: previous year, class size, full credential, percent tested, teacher working days, minimum teacher salary, maximum teacher salary superintendent salary, elementary principal working days, and superintendent working days. A few of the variables were found to have a small, but not negligible effect, a 1% increase in the variable had an under 5% effect on score outcomes: percent disabled, percent reclassified fluent-English-proficient, emergency credentialed teachers, and percent salary change over the previous year for teachers. Percent Filipino had a the highest effect on final API score outcomes, a 1% increase in the variable yielded an effect of -6.65% decrease in API score. Below I discuss the variables that

were statistically significant in two or more years in greater detail, as well as Percent Filipino and emergency credentialed teachers due to the larger magnitudes of these results.

Base API Score 2010, 2009, 2008, 2007, 2006. This variable was significant in every year of data. In all five years the previous year's score was significant and indicated negative score growth, which is what I predicted in Chapter 3. This variable had an effect on API score growth; however, the effect was so small in all five years as to be almost negligible. For example, for the 2010 school year for each 1% increase in *Base API Score*, API growth would decrease by 0.001%. So while the variable is not having a zero effect, the effect is very small.

Percent African American 2009, 2006. This variable, while significant in two years of data, had inconsistent findings. In 2009 the variable was linear and had a positive effect on API score growth; in 2006 the variable was a quadratic, indicating the impact was curved, and had a negative effect. In Chapter 3 I predicted that *Percent African American* would have a negative impact based on prior research. For the data in 2009, a 1% increase in Percent African American would yield a 0.55% increase in API score growth. For 2006, a 1% increase would yield a -0.99% decrease in API score growth. This variable then is inconclusive in this data due to the inconsistent findings.

Percent Asian 2007, 2006, 2010. The findings for Percent Asian were consistent. In all three years for which *Percent Asian* was statistically significant, positive API growth was indicated. In 2010, for every 1 % increase in Percent Asian API score growth increased by 0.22% at the 90% level of significance; in 2007 for every 1% increase in Percent Asian API score growth increased 0.12% at the 99.9% level of significance; for 2006 each 1% increase in Percent Asian API score growth increased by 0.26% at the 90% level of significance. While this variable was consistent, the magnitude of the finding is so small as to be almost negligible.

Percent Filipino 2009. The percent of Filipino students, while statistically significant in only one year, had the largest magnitude of effect on final API score outcomes. An increase in 1% of Filipino students yielded a -6.66% decrease in API scores. The mean percentage of Filipino students among districts in 2009 was only 2%. Perhaps, due to the small mean percentage, the effect that this population had appears more significant than it really is.

Percent Hispanic 2010, 2007. The results of the variable *Percent Hispanic* were much the same as *Percent Asian*: the variable was significant in the same direction both years, but the magnitude of significance was so small as to be very minor. A 1% increase in *Percent Hispanic* in 2007 yielded a 0.014% increase in API growth and in 2010 a 0.05% increase at the 95% and 90% levels of significance, respectively.

Percent Disabled 2009, 2008. The coefficients for *Percent Disabled* indicated similar findings, but the magnitudes in each of the years of significance were very different. In 2009 a 1% increase in *Percent Disabled* resulted in a 3.62% decrease in API growth at the 95% level of significance, and in 2008 the decrease was only 0.73% at the 95% level of significance.

Percent Free Lunch 2010, 2009, 2008. As a variable, *Percent Free Lunch* was one of the most consistent in its significance; however, the magnitude of significance was very small. In each of the years a 1% increase in *Percent Free Lunch* yielded a decrease in API score growth by less than 0.045%. Therefore, this variable has a non-zero affect on API growth, but a very small one.

Percent GATE 2010, 2008. The *Percent GATE* variable results were mixed. The 2010 year of analysis revealed that a 1% increase in *Percent GATE* yielded a 0.40% increase in API growth at the 95% level of significance. However, the 2008 year of analysis revealed a decrease in API growth of -0.23% at the 90% level of significance. These results, while significant in their

respective years of analysis, indicate that *Percent GATE* may not have a very consistent affect on student achievement levels.

High School 2008, 2006. The regression results for percent of students whose parents complete high school were consistent among the statistically significant years. For 2008, a 1% increase in students whose parents completed *High School* only yielded a decrease in API growth of 0.12%; in 2006 the decrease was 0.18%, at the 90% and 95% level of significance, respectively. Like several of the other variables, these findings are consistent, but the magnitude is so small that it seems to be less important than other potential factors.

Full Credential 2008, 2007. The results for teachers that are fully credentialed were among the most surprising. The results in both years of analysis indicated that Full Credential indicates a decrease in API growth. In 2008 a 1% increase in *Full Credential* yielded a decrease of 0.05%; in 2007 that decrease was 0.62%. I think this variable is showing something that is actually a symptom of something else. The mean value of *Full Credential* for both these years was 96.5% and 95.77% respectively indicating that the majority of all teachers in these data sets were fully credentialed. Therefore, any natural variation in API score growth would show up in this category as well. Therefore, although these results were significant, I think they are actually the result of circumstance more than true effect.

Emergency Credential 2008. Emergency credential was one of the few variables whose magnitude was much larger than a 1% change in API score outcome. A 1% increase in emergency credentialed teachers yielded a -3.23% decrease in API score growth at the 90% level of significance. This result is interesting because it lends merit to the current credentialing requirements for permanent teachers.

Percent Tested 2008, 2007. The regression results for the percent of students tested were very mixed. In both years of statistically significant findings, a 1% increase in *Percent Tested* yielded an increase in API score growth of 0.13% and 0.042% respectively. I hypothesized in Chapter 3 that higher percentages of students tested would result in a lower API score because less motivated students were more likely to not participate. I am surprised that the result of this analysis is that a greater number of students tested yields a higher result.

Teacher Working Days 2009, 2006. The results for teacher working days were mixed. In 2009 a 1% increase in teacher working days yielded an increase in API score of 0.06% at the 95% level of significance. In 2006, however, a 1% increase yielded a decrease of -.039% at the 90% level of significance. Although these findings are contradictory, the magnitude is also very small making the finding almost negligible.

Percent Salary Change Over Previous Year 2008, 2006. The coefficients for teacher's percent of salary change over the previous year were positive in both significant years, and at higher magnitudes than most of the regression results. In 2008 a 1% increase in *Percent Salary Change Over Previous Year* yielded an increase in API score growth of 5.04% at the 95% level of significance; in 2007 the growth was 1.96% at the 90% level of significance. Compared to the results of many of the other significant variables, these magnitudes are noteworthy. The magnitudes of these results are second only to percent Filipino. Teacher pay and salary increases are controversial in a time of shrinking budgets, but these results indicate that monetary compensation of teachers can affect student outcomes.

Superintendent Salary 2008, 2007, 2006. *Superintendent Salary*, like several of the other variables was shown to have a consistently positive effect on API score growth, but had magnitudes so small as to be negligible. The magnitudes for Superintendent Salary, in fact, were

among the lowest found in this analysis. For 2008 a 1% increase in *Superintendent Salary* yielded an increase in API score growth of 0.0000000257%, and this was the highest magnitude found among the three significant years. Essentially, while *Superintendent Salary* has an effect, the effect is hardly worth noting.

In reviewing the above significant variables, most of them did not have a large effect on student outcomes. Many of the variables had magnitudes so small as to be beneath notice, and a few of them had conflicting findings from year to year. The most noteworthy findings were that emergency credentialed teachers have a large and negative effect on student achievement outcomes, and an increase in the *Percent Salary Change Over Previous Year* has a positive effect on student outcomes.

Conclusion

In this chapter I tested various regression equations for each year of data included in this research, and determined which equation was the best fit. All five years of data utilized linear-linear regressions with some quadratic variables. After I found the equation that was the best fit in each year, I reviewed for multicollinearity and heteroskedasticity. While I found multicollinearity to be present in each of the years of data, I determined it best to keep all variables in the regression equations. I found heteroskedasticity to be present in each of the years of data as well, and I corrected for it. Finally I presented the significant variables by year of analysis including confidence intervals and elastic values and analyzed these results. The most interesting finding was that the percent of salary change over the previous year for teachers as both significant and positive in its effect on API score growth. In the next chapter of my thesis I will specifically discuss the explanatory variable and theorize why *Poor Fiscal Status* did not have a statistically significant impact on *Annual Achievement Growth*.

Chapter 5

CONCLUSION

In this final chapter, I first examine the implications of the insignificance of fiscal insolvency on student API score attainment. Next I review why, despite my findings, district insolvency is an area that commands further research. The limitations of the research are then discussed. Finally I consider the possibilities for future research.

Analysis of the Fiscal Insolvency Factor

The main question I answered was whether or not fiscal insolvency of a school district impacted a school's API score. While fiscally insolvent districts generally had significantly lower growth API scores, I found that a district's fiscal insolvency did not significantly predict a school's API score in any of the years of analysis after controlling for a district's previous year's score, student characteristics of the district, social characteristics of the district, and district enrollment and personnel characteristics.

There are several possible explanations for why I did not find that poor fiscal status affected API score attainment. Frazier (2006) found in her research that districts that go into receivership were often organizationally failing in many ways prior to the final fiscal collapse. If these insolvent districts follow the same pattern that Frazier found, it is possible that many of these districts experienced a drop in test scores in the years leading up to actual insolvency. In practice, this would mean that although test scores were affected by the organizational failures, it would not be apparent in my analysis, as I controlled for previous year's test scores. Perhaps future research could use the previous year's score as the dependent variable.

In my research, fiscal insolvency was defined more broadly than just receivership, including districts whose budgets were found to be unacceptable by the CDE. So, perhaps scores may go unaffected as fiscal insolvency first sets in, and then slowly decline over time as organizational failure takes root. An analysis of this could be accomplished by averaging API score growth over a five year period following the first disapproved budget for a district.

Perhaps a district's fiscal difficulties do not impact the classroom directly. Teachers, although they may be frustrated with a disorganized administration at the district level, are still the same teachers they were before the district got into trouble. Many teachers are very dedicated to their jobs, and likely do their best to keep outside influences out of the classroom. Teacher dedication could be an explanation for why I found fiscal insolvency to be an insignificant factor.

The impact of insolvency may also be delayed as it trickles through the layers of bureaucracy. District budget offices and higher level administrators are probably aware of fiscal issues long before the information trickles out to other actors in the district. Therefore, just because a school district receives a negative certified budget for the first time, it does not necessarily mean that possible organizational issues that led to that negative fiscal outlook have already impacted the classroom. Dysfunctional higher level bureaucracy can likely take years to finally reach the classroom causing dedicated personnel to either leave the district or give up in the classroom.

Even though I found that district fiscal insolvency does not impact school API scores after controlling for previous year's scores, student characteristics of the district, social characteristics of the district, and district enrollment and personnel characteristics, this does not give policy makers license to ignore rampant insolvency around the state. If the above theory, based on Frazier's findings, is correct, and the dysfunction of bureaucracy takes years to penetrate

the classroom, dedicated teachers and lower level administrators will not stay in a dysfunctional district indefinitely. Eventually, the impacts of continued insolvency will reach the classroom. Even if insolvency really never has an impact on the classroom, having districts on the brink of receivership is bad for everyone: parents, students, teachers, administrators, local governments, and the state government.

Research Limitations

The analysis I performed in this thesis had some limitations. First, the number of observations were inconsistent between data sources leading to school districts being dropped from the analysis. Second, my R-squared value was small in each of the years of analysis, on average about 0.30, indicating that my model did not account for a lot of the variation in school API scores. Below I discuss in greater detail each of these limitations and the potential implications of these limitations and how they may have affected my research outcomes.

Observations. Three different sources for data were used to create this data set: the API data set, the Certificated Salaries and Benefits data set, and a data set I created from the Certifications of Interim Financial Reports. All three of these data sets were products of the CDE; however, the number of observations in the API data set and the fiscal insolvency data I created were greater than the number of observations in the Certificated Salaries and Benefits data set. For example, in the 2010 data set, the sample size for Annual Achievement Growth from the API data set was 326, but the sample size for Total FTEs from the Certifications of Interim Financial Reports was only 308. In this analysis, if a data point was missing for one variable, that entire observation was dropped from the analysis. For example, if District A has observations for the API data set and fiscal insolvency data set, but is missing observations from the Certificated Salaries and Benefits data set, then District A is dropped from the analysis.

In the 2010 data set, 26 observations were dropped from the API data set due to missing observations in the Certificated Salaries and Benefits data set. Examining the 2010 data set in greater detail, I found that the observations dropped from the data set had some interesting differences from the rest of the data. The missing observations had a higher mean growth, a lower mean API score from the previous year, and a significantly lower mean district enrollment. The mean fiscal status, however, was almost identical to the rest of the data set: about 30% of the districts were fiscally insolvent. You can see these means as well as those for Poor Fiscal Status in Table 5.1.

Table 5.1

2009-2010 Data Set: Comparison of Means for Complete Data Set and Missing Observations Only

	Complete 2010 Data Set		Missing Observations from 2010 Data Set Only	
Variable Name	Sample Size, N=	Mean	Sample Size, N=	Mean
Annual Achievement Growth	326	11.42945	18	14.333
2008-2009 Year API score	326	762.5951	18	718.0556
Enrollment	328	9781.082	20	1758.200
Poor Fiscal Status, 2009-2010 Budget Year	328	0.3170732	20	0.3000

It is clear that there are some significant differences among the missing districts from the rest of the data set. If these had been included, the outcomes may have been different in some way. The fact that the districts dropped from the analysis all had much lower average enrollment seems to be especially telling. Six percent of the total districts were dropped from the analysis,

and their average enrollment was eighty-two percent lower than the overall average enrollment. Smaller districts are likely very different from larger districts. On average, they will have fewer full time employees, and district employees are more likely to know one another by name. In these cases, the possible "trickle down" effect of insolvency is less likely to happen. If the district office finds that they are in fiscal trouble, it will not be long before everyone else in the district knows.

While less pronounced, the differences in the mean annual achievement growth and mean previous year's API scores likely also would have had an impact. The previous year's scores six percent lower than the entire data set. Based on my findings, and previous researcher's findings, schools will lower previous year's scores are more likely to have higher growth, which these districts also had. Starting from a lower point of achievement makes it easier to take larger strides in improvement. These districts' mean growth was twenty-five percent higher than the rest of the data set. Essentially, including these districts could have made schools with lower growth more pronounced in the final analysis than they were. Ultimately, it is difficult to know exactly what difference including these districts would have had, but it is likely that there would have been some impact.

Additionally, in Chapter IV, I calculated the difference in annual achievement growth means for solvent and insolvent districts. These t-test results found that the mean growth was significantly lower for insolvent districts by 2.36 points in the 2009 year of analysis. Although this result did not indicate growth to be negative for insolvent districts, it was lower. As I indicated in Chapter IV, this does not show causality which a regression analysis does. However, given the districts that were dropped from the analysis, it is possible that at least for 2009, I may have had different results if my data set had been more complete.

R-Squared. Another limitation of this research is the amount of variation my model accounted for in API score attainment. On average, the r-squared value was right around 0.30 among the different years, although 2009's R-squared value was only 0.25. What this means, is that, depending on the year, my model only accounts for about 30% of the variation of the dependent variable around its mean. Essentially, about 70% of the variation occurring in the model was unaccounted for by my explanatory variables. In the future, the number of variables could be increased by additional data from the CDE, or through the American Community Survey. I did not locate any additional valid data to include in my analysis from the CDE, but they may have additional data I simply did not find. I initially included American Community Survey data, but the individual years of data contained only about 100 observations on average, so I chose to drop them from the analysis. The American Community Survey however, does have data averages across three and five year periods which are more complete that could have been used to expand the data set.

The research in this these had two major limitations. First, a number of observations were dropped from each year of analysis due to a gap in data from the Certificated Salaries and Benefits data set. The missing observations had higher average growth in API score attainment, lower previous year's API scores, and much smaller enrollment than the entire data set. Second, the small r-squared found in this research indicates that there is a lot of variation my model simply does not account for.

Future Research

School district fiscal insolvency is ripe for further research. Few people have undertaken the topic of school district fiscal insolvency, and those that have utilized case studies only. The goals of those studies were not to look at the impact of the insolvency, but to understand why it

happened. Those studies also only looked at the worst-case scenario districts, those that went into receivership with the state. Understanding how a district first comes to have a disapproved budget might be a more useful tool. Prevention is critical and something that deserves further research. If a plan to prevent insolvency at the earliest stages could be implemented, it would not be necessary to understand the impacts of insolvency because most district insolvency would simply not exist.

However, it is possible that understanding some of the impacts of insolvency better might be a catalyst for prevention. Utilizing a panel data set looking at the effects of fiscal insolvency in school districts across several years would likely yield more reliable results. I did not attempt to utilize this research model in this thesis.

Another possibility for future research is comparing these results with similar research in other states. California is not the only state struggling with school funding and budget deficits; other large states, such as Florida and Texas, are in much the same position. If a similar database on student achievement is available in those states, a comparison of the two may be a useful research project. Expanding the data set with other sources such as the American Community Survey or California Longitudinal Pupil Achievement Data System (CALPADS) could yield better information about the relationship between a district's fiscal status and student achievement.

Conclusion

In this thesis I utilized the API data set compiled by the California Department of Education to determine if there is a relationship between school district fiscal insolvency and student achievement. This question is especially relevant given the increase in the number of districts that are at risk of insolvency over the past five years. I did not find that there was a

relationship between fiscal insolvency and student achievement as measured by API scores after controlling for a district's previous year's score, student characteristics of the district, social characteristics of the district, and district enrollment and personnel characteristics.

What can be learned from this research is that the topic district insolvency is in need of further study and that there are many different ways that additional research could be undertaken. Although this research did not reveal a direct relationship between insolvency and decreased student achievement, the likelihood that insolvency is having a negative impact on the classroom is very high. The cycle of insolvency is unlikely to stop on its own any time soon. Districts face an uncertain fiscal climate every budget cycle as politicians in the capital debate tax rates and funding allocations. Currently, the outlook is very poor, and it is likely that for the foreseeable future districts will continue to receive late and unpredictable funding. More research needs to be done to understand how to prevent this constant, never-ceasing catastrophe.

APPENDIX A

Review of the Literature

Table A.1: Review of the Literature

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(2009) Blevins, B.M.	PhD Dissertation: Pearson r Correlation formula analysis	Missouri, Missouri Assessment Program data set, 2007, school districts N-250	The correlation between low socio-economic status and student achievement.	Low socio-economic status, as indicated by students on free and reduced lunch program, results in lower achievement scores. The research did not include other variables, and the author notes this does not demonstrate causation, just that the two variables are related, and there is a strong negative correlation between low socio-economic status and student achievement.
(2010) Contartesi, R.A.	PhD Dissertation: Qualitative Correlational Study	School district, Northwest Pennsylvania, survey, 2010, school district employees N=874	Correlation between district leadership, communicati on, employee performance, and school climate in the context of No Child Left Behind.	Strong correlation between employee positive perception of leadership and employee success and positive school environment. The same for negative perception. The style of leadership communication dictated perception. Effective leadership and communication indicated positive teacher performances and a positive district environment. Can be achieved with limited funding.

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(2008) Driscoll, D., Halcoussis, D., & Svorny, S.	Regression Analysis, Ordinary Least Squares	California, API data set, 1999-2003; Elementary Schools N=4174, Middle Schools N=768, High Schools N=745	Reward systems for improved student achievement, and controlling for initial conditions.	An increase in test scores is positively correlated with a low base score; reward systems have diminishing returns in API score growth for schools with higher base scores. At a 1% level of significance, each initial API point decreases a school's potential for gains by 0.39 points for elementary schools, 0.28 points for middle schools, and 0.23 points for high schools. As example: An elementary school with a base 100 points lower than a school that is similar would have a growth of 39 points in API score with rewards in place (more than the California target).
(2003) Driscoll, D., Halcoussis, D., & Svorny, S	Regression Analysis, Ordinary Least Squares	California, API data set, 1999 N=5525 schools N=755 districts	Impact of size of district on student achievement.	API scores are negatively correlated with larger district size at the elementary and middle school levels; not for high school level. A 1% increase in district size yielded -50.42×10^{-5} point decrease in API score for elementary and -10.04×10^{-4} point decrease in API score for middle schools at 1% level of significance; high school results were not significant.
(1999) EdSource	Report	N/A	Role of Collective Bargaining in California	All districts are involved in collective bargaining with teacher unions in California. Experience with unions is sometimes positive, sometimes negative. Rate of change necessarily slow with unions; districts cannot implement stop-gap measures to avoid trouble.

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(2006) Frazier, C.	PhD Dissertation: Case Study, bounded collected	California (Compton Unified, West Contra Costa Unified, West Fresno Elementary Unified, Oakland Unified, and Vallejo City Unified), District profiles, Fiscal Crisis and Management Assistance Team assessments, and interviews at district, county and state levels, 1984-2006, N=5	Risk factors for district insolvency (demographic and financial conditions).	Demographically poorer school districts are more likely to become insolvent. Of students themselves, the five districts had over 80% minority students, fewer white students than state averages, and minorities were higher percentage of black and Hispanic. Four of the five districts had between 490.6-920.9% eligible for free/reduced lunch; state average is 460.8-49%; English language learner was not a significant indicator. Four of five districts received more federal revenues than state average; three of five received more from the state. However, four of five received less local revenues. All five spent more on teacher employment salaries than state averages. On Financial Crisis and Management Assistance Team Assessments, districts received failing marks in 58 out of 77 categories. Interviews revealed following high risks: ineffective leadership, staff incompetency, lack of budget oversight and accurate data.

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(1996) Greenwald, R., Hedges, L. V., & Laine, R. D.	Meta-analysis Regression Analysis, significance testing	Nationwide, aggregated data mined from numerous previous studies and their data sets, 1966-1993, N=not applicable.	Effect of various school inputs or amenities on student achievement.	Various resource inputs broadly positively correlated with student outcomes; modest spending could have large impacts on achievement. Per pupil expenditure median coefficient across studies predicts 0.15 increase of one standard deviation for every additional $500 in expenditure. Used studies that measured achievement in various ways, so results cannot be interpreted as to specific tests for achievement.
(2002) Huang, G. & Yu, B.	Regression Analysis, panel data	Nationwide – 8th grade only, National Assessment of Educational Progress (NAEP), Common Core of Data (CCD), 1989-1990, 1991-1992, 1995-1996, 1990 N=144 districts 1992 N=177 districts 1996 N=160 districts	Per pupil spending and district discretionary rates for instruction and their effect on 8th grade math student achievement.	Districts' discretionary rates for instruction spending had no effect on 8th grade math performance. Current expenditure per pupil had a small but statistically significant effect. Findings for the main explanatory variable were not statistically significant (districts discretionary rate). Current expenditure per pupil at the 1% level of significance, for each additional $1000 in spending, an increase in scores of 20.85 points in 1996, and 10.56 points in 1990 out of an average score of 2680.64 and 2540.89 respectively; the results for 1992 were not significant.

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(2005) Jefferson, A.L.	Literature Review	N.A.	Review of literature regarding the impact of money on student achievement.	Money is important, but what is more important is how the money is used. Just having money does not address student achievement gaps. The relationship is not causal. How money is spent has a greater impact than how much money is spent. Teacher professional growth shown to be important, but not necessarily monetarily motivated.
(1999) Manca, D., Noonan, D., Matranga, M.	Case Study	California (Richmond Unified, Coachella Valley Unified) and Nevada (West County Pine School District), interviews and analysis of public records, 1985-1998 , N=3	What caused insolvency and how did they become solvent again.	Common factors for all three school districts: financial issues severe, but incremental; overspent general fund revenues; budget estimates false, not true financial status; no system in place to track district assets; lack of internal controls; went into receivership with state loans; major employers in their regions; understaffed business services offices; lack of long-term financial planning; lacked communication; ignored auditors; superintendent incompetency; policies and procedures outdated.
(2009) Moe, T. M.	Regression Analysis	California, API data set, coded random selection of collective bargaining contracts, 1998-99 and 2002-2003, N=371 districts	What effect do restrictive labor contracts have on student achievement.	Contract restrictiveness has a significant impact on student achievement. Contract restrictiveness, all else constant, negatively affected student API growth at the 1% significance level by -0.24 standard deviations for elementary and -0.32 standard deviations for secondary students.

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(2008) Rorrer,A. K., Skrla, L, & Scheurich, J. J.	Literature Review	N/A	Review of literature on the role of school districts.	There is a void in school district level analysis; interested in school districts as actors for reform; four evident roles in literature: 1) instructional leadership, 2) organizational structure, 3) policy coherence, and 4) focus on equity.
(2010) Rose, H., & Sonstelie, J.	Regression Analysis, Ordinary Least Squares	California, district size, bargaining outcomes, Census, API data set, 1999-2000, N=771 districts (N=769 for API data)	Power of union ratio to size of district; its role in allocation of resources.	Teacher salary is positively correlated with district size; results for API scores were inconclusive. Unions are stronger in larger districts with little benefit to academic achievement. In a larger district, base teacher salary increases by 7%, experience premium increases by 11%, all at a 5% level of significance in a larger district.
(2005) Sirin, S.R.	Meta-Analysis	United States, studies measuring the correlation between socioeconomic status and academic achievement, 1990-2000, studies N=58	Correlation between Socioeconomic status and academic achievement	There is a “medium level” of correlation between socioeconomic status and student achievement at the student level, and a “high level” of correlation between socioeconomic status and academic achievement at the school level. The magnitude of finding depends on the socioeconomic measures, academic achievement measures, grade level, ethnicity, and school location.

Publication Date, Author	Type of Research/ Article	Location, Data Set, Years, Sample (N=)	Research Focus	Major Conclusions and Significance of Findings
(2011) Strunk, K.O. & McEachin, A.	Regression Analysis	California, contract restrictiveness measures, Common Core of Data, Adequate Yearly Progress, Academic Performance Index, and Program Improvement data, 2005-2006 through 2008-2009, school districts N=465	Relationship between collective bargaining and student achievement	Contract restrictiveness negatively affects student achievement outcomes. District Program Improvement Status Regression Results: one-unit increase in contract restrictiveness indicates 7.6% increase likely hood of negative program improvement status, and 4.8% increase in worse program improvement status; this means restrictive contracts lead to inability to meet Adequate Yearly Progress Standards, and make it more difficult to meet those standards over time. Math and Graduation Regression results: A half-unit increase in contract restrictiveness indicates a 1.3% decrease in graduation rates, all else equal.
(2009) Useem	Case Study, Superintendent of Philadelphia City Schools	Philadelphia, 2002-2007, Paul Vallas, Superintendent, utilized: district documents, articles, field notes of School Reform Commission meetings, and interviews with various stakeholders	What kind of impact can a superintend-dent have on school reform and student achievement, context of No Child Left Behind implementation	It is possible for a big-city urban superintendent to have positive tangible effects on student achievement and school improvement. In standardized test accountability environment, superintendents have new sway, power, and tools for change. Vallas used test scores to show reform was valid, and gain even more confidence from community in his efforts. Personal leadership skills and understanding of district reform can inspire and energize employees.

APPENDIX B

Regression Trials, Multicollinearity, and Heteroskedasticity

Chosen functional form and accompanying data are all highlighted on the right-hand side of every table in this appendix.

Table B.1.

Regression Results: 2009-2010

2009-2010 Unstandardized Coefficients, Significance, and (Standard Errors)

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Control Variable					
2008-2009 Year API Score	-0.06022** (0.02588)	-0.05193** (0.02553)	-0.06148** (0.02517)	8.87	0.0031
Fiscal Status					
Poor Fiscal Status, 2009-2010	0.25477 (1.33315)	-0.26578 (1.30922)	-0.05541 (1.28062)	1.22	0.0002
Student Characteristics of District					
Percent African-American	0.03694 (0.12308)	0.08686 (0.12040)	0.06210 (0.11914)	2.04	0.0000
Percent American-Indian	-0.06657 (0.10373)	-0.45248 (0.32581)	-0.67072** (0.31051)	17.12	0.0216
Percent American-Indian *Squared*	N/A	0.00592 (0.00410)	0.00828** (0.00403)	14.23	0.0216
Percent Asian	0.07466 (0.08332)	0.07576 (0.08263)	0.10738 (0.08137)	2.72	0.0006

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Percent Filipino	0.20283 (0.30821)	0.07066 (0.29694)	0.20107 (0.29586)	2.45	0.0000
Percent Hispanic	0.15684** (0.06558)	-0.06089 (0.16311)	0.13629** (0.06641)	9.54	0.2258
Percent Hispanic *Squared*	N/A	0.00192 (0.00139)	N/A	N/A	N/A
Percent Pacific-Islander	0.66567 (1.12374)	0.91281 (1.08893)	0.60035 (1.07893)	1.84	0.0002
Percent Disabled	-0.19213 (0.24967)	-0.18504 (0.25294)	-0.21938 (0.23937)	1.33	0.9074
Social Characteristics of District					
Percent Free Lunch	-0.16047*** (0.05518)	-0.28607 (0.13044)	0.60035** (1.07893)	6.32	0.0005
Percent Free Lunch *Squared*	N/A	0.00133 (0.00123)	N/A	N/A	
Percent Gate	0.22482* (0.13051)	0.27317** (0.12769)	0.29369** (0.12706)	1.66	0.0001
Percent Migrant Education	0.10537 (0.11695)	0.06556 (0.11368)	0.05889 (0.11315)	2.16	0.0012
Percent English Language Learner	-0.02542 (0.10361)	0.00361 (0.20630)	0.03787 (0.10231)	7.29	0.6726
Percent English Language Learner *Squared*	N/A	0.00103 (0.00302)	N/A	N/A	
Percent Reclassified Fluent-English-Proficient	-0.02955 (0.12917)	-0.45084 (0.36273)	-0.98188*** (0.30131)	16.21	0.7494

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Percent Reclassified Fluent-English-Proficient *Squared*	N/A	0.01743 (0.01026)	0.03169*** (0.00889)	12.41	0.7494
High School	0.05193 (0.13690)	0.21113 (0.13876)	0.08494 (0.1334)	6.24	0.0560
Some College	-0.19433 (0.12031)	-0.31701 (0.43852)	-0.15297 (0.11695)	3.38	0.1665
Some College *Squared*	N/A	0.00550 (0.00836)	N/A	N/A	
College Graduate	0.02270 (0.16324)	0.16937 (0.17962)	0.04081 (0.16202)	9.09	0.0000
Graduate School	-0.02291 (0.15296)	-0.05879 (0.15432)	0.02772 (0.1479)	10.83	0.0000
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	-0.52226 (0.42295)	-0.43385 (0.40894)	-0.55167 (0.40590)	6.28	0.0074
Percent District Enrolled, Previous Year	0.43533 (0.51306)	11.34339 (7.46252)	14.47176** (7.13436)	1384.58	0.0002
Percent District Enrolled, Previous Year *Squared*	N/A	-0.05989 (0.04081)	-0.07659* (0.03911)	1406.58	0.0002
Enrollment	0.00001 (0.00033)	0.00009 (0.00032)	0.00007 (0.00032)	293.28	0.0000
Percent tested	1.44711 (0.98252)	109.51990 (72.57031)	1.27365 (0.96211)	1.54	0.2158
Percent tested *Squared*	N/A	-0.55398 (0.37136)	N/A	N/A	N/A
Total FTEs	-0.00021 (0.00474)	-0.00155 (0.00455)	-0.00127 (0.00455)	292.21	0.6577
Counselor Availability	0.92342 (1.37228)	1.32856 (1.32130)	1.32822 (1.32484)	1.49	0.1820

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Nurse Availability	0.12145 (1.43638)	0.85605 (1.38767)	0.60088 (1.38894)	1.63	0.1785
Psychologist Availability	0.33387 (1.66308)	-0.05348 (1.60587)	0.29878 (1.60595)	1.34	0.0003
Librarian Availability	-0.62353 (1.37892)	-0.91855 (1.32376)	-0.70198 (1.32921)	1.51	0.8039
Teaching Days	2.01069 (1.86613)	2.43947 (1.82526)	2.09635 (1.78768)	1.10	0.6943
Teacher Working Days	-0.28887 (0.43836)	91.15157 (73.22222)	-0.40514 (0.4223)	1.30	0.0006
Teacher Working Days *Squared*	N/A	-0.24894 (0.19893)	N/A	N/A	N/A
Percent Salary Change Over Previous Year	0.10461 (0.44784)	0.74246 (0.65925)	0.13251 (0.43102)	1.25	0.0628
Percent Salary Change Over Previous Year *Squared*	N/A	-0.13307 (0.10549)	N/A	N/A	N/A
Minimum Teacher Salary	-0.00006 (0.00018)	-0.00001 (0.00017)	-0.00001 (0.00017)	2.03	0.0000
Maximum Teacher Salary	-0.00019 (0.00014)	-0.00020 (0.00013)	-0.00024* (0.00013)	4.56	0.0000
Elementary Principal Salary	0.00011 (0.00008)	0.00014* (0.00008)	0.00014* (0.00008)	3.86	0.0000
Superintendent Salary	0.00001 (0.00003)	0.00002 (0.00003)	0.00001 (0.00003)	4.11	0.2628
Elementary Principal Working Days	0.03558 (0.11041)	0.07070 (0.10606)	0.05206 (0.10664)	1.19	0.4848
Superintendent Working Days	0.02966 (0.07000)	-3.58818* (1.82788)	-4.39814** (1.81678)	901.11	0.4848
Superintendent Working Days *Squared*	N/A	0.00793** (0.00399)	0.00966** (0.00396)	906.52	0.0251

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Constant Term	-393.00560	-14246.20000	-505.14500		
R-Squared	0.259	0.3651	0.3311		
Number of Observations	300	300	300		
Number of Significant Variables	4	4	10		
Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater.					

Table B.2.

Regression Results: 2008-2009

2008-2009 Unstandardized Coefficients, Significance, and (Standard Errors)

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Control Variable					
2007-2008 Year API Score	-0.05730** (0.02614)	-0.05370** (0.02550)	-0.05908** (0.02523)	8.94	0.0000
Fiscal Status					
Poor Fiscal Status, 2008-2009	-2.33068 (1.55900)	-1.47802 (1.53866)	-1.39321 (1.51858)	1.35	0.0000
Student Characteristics of District					
Percent African-American	0.18887 (0.12120)	0.26022** (0.12325)	0.23701* (0.1219)	2.37	0.0019
Percent American-Indian	-0.12060 (0.10248)	-0.16397 (0.10143)	-0.14263 (0.10038)	1.92	0.1410

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Percent Asian	0.07629 (0.08433)	0.09061 (0.0825)	0.08457 (0.08144)	2.79	0.0000
Percent Filipino	-0.12488 (0.25683)	-0.99709* (0.54517)	-0.95614* (0.53815)	11.03	0.0000
Percent Filipino *Squared*	N/A	0.0431* (0.02239)	0.04104* (0.02211)	7.01	0.0000
Percent Hispanic	0.08449 (0.07082)	0.08994 (0.07096)	0.06359 (0.07065)	11.23	0.2192
Percent Pacific-Islander	-1.88086* (1.04447)	-1.47664 (1.03626)	-1.7162* (1.02612)	1.99	0.1344
Percent Disabled	-0.30113 (0.25959)	-2.74491** (1.12277)	-3.03489*** (1.11275)	26.56	0.6341
Percent Disabled *Squared*	N/A	0.12508** (0.05413)	0.14228*** (0.05376)	26.45	0.6341
Social Characteristics of District					
Percent Free Lunch	-0.16708** (0.07427)	-0.15528** (0.07446)	-0.15764** (0.07348)	10.63	0.0000
Percent Gate	-0.019489 (0.09094)	-0.03901 (0.08919)	-0.01756 (0.08835)	1.42	0.0000
Percent Migrant Education	-0.14545 (0.11706)	-0.17898 (0.11842)	-0.15701 (0.11711)	2.68	0.0002
Percent English Language Learner	0.08776 (0.10895)	0.04194 (0.10659)	0.06651 (0.10555)	8.29	0.4111
Percent Reclassified Fluent-English-Proficient	-0.021189 (0.14425)	-0.08789 (0.14100)	-0.06343 (0.13941)	3.00	0.5088
High School	0.16410 (0.14671)	0.0716 (0.15376)	0.07806 (0.15174)	8.82	0.0000

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Some College	0.17004 (0.12964)	1.01017*** (0.3914)	1.0691*** (0.38679)	37.06	0.0039
Some College *Squared*	N/A	-0.01742** (0.00774)	-0.01803** (0.00764)	36.85	0.0039
College Graduate	0.20477 (0.15893)	0.14226 (0.16724)	0.13594 (0.16504)	9.61	0.0000
Graduate School	0.01415 (0.15639)	0.00972 (0.15200)	0.00936 (0.14999)	11.08	0.0000
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	-0.16745 (0.56032)	-0.17195 (0.54462)	0.01625 (0.5416)	9.72	0.0003
Percent District Enrolled, Previous Year	0.37918 (0.60245)	0.37320 (0.58691)	0.18362 (0.5831)	8.52	0.0000
Class Size	-0.26025 (0.22048)	-0.03878 (0.22763)	-0.02836 (0.22465)	3.10	0.0000
Full Credential	-0.16840 (0.23306)	-0.08388 (0.23357)	-0.11952 (0.23083)	1.83	0.7673
Emergency Credential	-0.56493 (0.37321)	-0.42379 (0.36626)	-0.46663 (0.36173)	1.44	0.0000
Enrollment	-0.00013 (0.00017)	-0.00009 (0.00016)	-0.00009 (0.00016)	84.68	0.4263
Percent tested	-0.72686 (0.83828)	-131.02980** (60.87835)	-129.8672** (60.07339)	7800.76	0.4263
Percent Tested *Squared*	N/A	0.66869** (0.31233)	0.66355** (0.3082)	7813.01	0.0000
Total FTEs	0.00196 (0.00254)	0.00157 (0.00249)	0.00152 (0.00246)	86.28	0.3953
Counselor Availability	0.93927 (1.37029)	1.05329 (1.34295)	0.8047 (1.32814)	1.50	0.0000
Nurse Availability	2.52865* (1.44444)	1.38974 (1.43312)	1.25415 (1.41497)	1.69	0.1462
Psychologist Availability	-3.68459** (1.67745)	-2.5387 (1.65483)	-2.56109 (1.63293)	1.36	0.0054
Librarian Availability	-0.78533 (1.40939)	0.02052 (1.38574)	0.14272 (1.36808)	1.60	0.6698
Teaching Days	0.45152 (1.89865)	0.67890 (1.85263)	1.62189 (1.85897)	1.20	0.0022

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Teacher Working Days	0.82183* (0.43297)	1.05691** (0.42530)	202.6124*** (72.11857)	38326.86	0.0022
Teacher Working Days *Squared*	N/A	N/A	-0.54773*** (0.19598)	38333.86	0.3128
Percent Salary Change Over Previous Year	0.28475 (0.46881)	0.17249 (0.46046)	0.11015 (0.4549)	1.42	0.0404
Minimum Teacher Salary	-0.00032* (0.00018)	-0.00027 (0.00017)	-0.00024 (0.00017)	2.13	0.0000
Maximum Teacher Salary	0.00016 (0.00014)	0.00015 (0.00013)	0.00017 (0.00013)	4.89	0.0000
Elementary Principal Salary	0.00005 (0.00008)	0.00007 (0.00008)	0.0001 (0.00008)	4.19	0.0000
Superintendent Salary	-0.00003 (0.00003)	-0.00027* (0.00015)	-0.00029* (0.00015)	143.22	0.0000
Superintendent Salary *Squared*	N/A	6.60e-10* (3.82e-10)	6.91e-10* (3.77e-10)	116.82	0.4422
Elementary Principal Working Days	-0.04679 (0.11043)	-0.01930 (0.10777)	-0.00209 (0.10652)	1.18	0.1638
Superintendent Working Days	-0.01235 (0.06967)	-0.03106 (0.06801)	-0.03293 (0.06711)	1.22	0.0231
Constant Term	-94.81693	6175.22800	-12599.51000		
R-Squared	0.1735	0.2363	0.2594		
Number of Observations	297	297	297		
Number of Significant Variables	7	9	10		

Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater.

Table B.3.

Regression Results: 2007-2008

2007-2008 Unstandardized Coefficients, Significance, and (Standard Errors)

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Control Variable					
2006-2007 Year API Score	-0.10865*** (0.03052)	-0.09113*** (0.02975)	-0.09359*** (0.02981)	10.88	0.0000
Fiscal Status					
Poor Fiscal Status, 2007-2008	0.00396 (1.76981)	1.01619 (1.73525)	0.89366 (1.73952)	1.28	0.1161
Student Characteristics of District					
Percent African-American	-0.14411 (0.13112)	-0.15611 (0.12869)	-0.13715 (0.12861)	2.41	0.0000
Percent American-Indian	-0.08428 (0.12327)	-0.03083 (0.12079)	-0.02984 (0.1212)	2.12	0.0004
Percent Asian	0.12077 (0.09163)	0.09803 (0.08881)	0.09861 (0.08911)	2.66	0.0000
Percent Filipino	-0.09749 (0.28214)	-0.08307 (0.27346)	-0.08709 (0.27438)	2.18	0.0000
Percent Hispanic	0.03075 (0.07864)	-0.03212 (0.07825)	-0.01877 (0.07809)	10.94	0.1068
Percent Pacific-Islander	-0.55835 (1.23937)	-0.77203 (1.20566)	-0.71932 (1.20931)	1.91	0.2316
Percent Disabled	-0.62939** (0.31787)	-0.74428** (0.31147)	-0.71382** (0.31197)	1.35	0.0754
Social Characteristics of District					
Percent Free Lunch	-0.21036** (0.08465)	-0.20233** (0.08195)	-0.20517** (0.08221)	10.82	0.0375
Percent Gate	-0.18223 (0.12035)	-0.15999 (0.11675)	-0.1725 (0.11689)	1.35	0.0001

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Percent Migrant Education	-0.07272 (0.12664)	-0.07559 (0.12452)	-0.07455 (0.12494)	2.88	0.0000
Percent English Language Learner	-0.03444 (0.11967)	-0.04448 (0.11585)	-0.03327 (0.11605)	8.75	0.1301
Percent Reclassified Fluent-English-Proficient	0.03463 (0.15957)	0.07216 (0.15463)	0.06466 (0.15509)	2.76	0.5587
High School	-0.2352 (0.15859)	-0.35233** (0.15733)	-0.31406** (0.15613)	6.78	0.2409
Some College	-0.13957 (0.141)	0.40811 (0.41412)	-0.23453* (0.13984)	3.95	0.0293
Some College *Squared*	N/A	-0.01286 (0.0078)	N/A	N/A	N/A
College Graduate	-0.13569 (0.17197)	-0.28613 (0.17367)	-0.21566 (0.1689)	7.91	0.0000
Graduate School	-0.11655 (0.17049)	-0.1898 (0.16652)	-0.20895 (0.16668)	10.7	0.0000
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	-1.15822** (0.50765)	-0.92301* (0.49578)	-0.88937* (0.49704)	6.68	0.0452
Percent District Enrolled, Previous Year	0.90973* (0.51283)	20.4524** (10.08875)	22.57903** (10.03975)	2181.7	0.0000
Percent District Enrolled, Previous Year *Squared*	N/A	-0.10719* (0.05511)	-0.11885** (0.05484)	2181.8	0.0000
Class Size	-0.4264* (0.23846)	-0.5203** (0.2429)	-0.51784** (0.24372)	2.94	0.0000
Full Credential	-0.46708* (0.25368)	-0.54287** (0.25091)	-0.45481* (0.24598)	2.46	0.1405
Emergency Credential	-0.61233* (0.35739)	-0.70376** (0.34732)	-0.67396* (0.34802)	2.02	0.0850
Enrollment	0.00024 (0.00021)	0.00020 (0.00020)	0.00018 (0.0002)	111.65	0.0000

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Percent tested	1.16969*** (0.38063)	1.15302*** (0.36841)	1.15414*** (0.36965)	1.48	0.8161
Total FTEs	-0.00335 (0.00294)	-0.00235 (0.00287)	-0.00211 (0.00288)	113.32	0.0000
Counselor Availability	-0.90908 (1.46814)	-0.51998 (1.42502)	-0.51749 (1.42984)	1.4	0.3598
Nurse Availability	1.35365 (1.57005)	0.62074 (1.52694)	0.77425 (1.52925)	1.58	0.0002
Psychologist Availability	0.86081 (1.87872)	0.2488 (1.82937)	0.06705 (1.83222)	1.3	0.5655
Librarian Availability	-1.95942 (1.53533)	-2.48338 (1.5111)	-2.61637* (1.51405)	1.58	0.0000
Teaching Days	0.40299 (1.68482)	0.51408 (1.63372)	0.41269 (1.63809)	1.2	0.4152
Teacher Working Days	-0.52864 (0.47147)	-0.56698 (0.45688)	-0.6014 (0.45794)	1.31	0.0015
Percent Salary Change Over Previous Year	-0.08256 (0.35504)	1.18795* (0.60752)	1.20292** (0.60951)	4.17	0.6132
Percent Salary Change Over Previous Year *Squared*	N/A	-0.14001** (0.05276)	-0.13997*** (0.05294)	3.7	0.6132
Minimum Teacher Salary	0.00008 (0.0002)	0.00005 (0.0002)	0.00005 (0.0002)	2.15	0.0009
Maximum Teacher Salary	-0.00004 (0.00016)	-1.65e-6 (0.00015)	-3.96e-6 (0.00015)	4.87	0.0000
Elementary Principal Salary	0.00004 (0.0001)	-0.00003 (0.0001)	-0.00002 (0.0001)	4.37	0.0000
Superintendent Salary	0.00006* (0.00003)	0.00037** (0.00017)	0.0004** (0.00017)	148.56	0.0000
Superintendent Salary *Squared*	N/A	-8.64e-10* (4.49e-10)	-9.32e-10** (4.49e-10)	126.78	0.0000
Elementary Principal Working Days	-0.0265 (0.12904)	-0.06179 (0.12505)	-0.06406 (0.12547)	1.22	0.3619
Superintendent Working Days	-0.0414 (0.08501)	-0.0264 (0.08304)	-0.019 (0.08319)	1.14	0.7662

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Constant Term	113.6564	-826.428	-908.724		
R-Squared	0.2572	0.3172	0.3098		
Number of Observations	296	296	296		
Number of Significant Variables	10	13	14		
Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater.					

Table B.4.

Regression Results: 2006-2007

2006-2007 Unstandardized Coefficients, Significance, and (Standard Errors)

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Control Variable					
2005-2006 Year API Score	-0.07686*** (0.02639)	-0.06556** (0.02589)	-0.07724*** (0.02554)	10.47	0.0681
Fiscal Status					
Poor Fiscal Status, 2006-2007	-1.34248 (3.55722)	-1.59252 (3.45833)	-2.50785 (3.39213)	1.22	0.0000
Student Characteristics of District					
Percent African-American	-0.06834 (0.10991)	-0.08968 (0.10743)	-0.15438 (0.10664)	2.31	0.0000
Percent American-Indian	-0.0724 (0.13002)	-0.10658 (0.12676)	-0.13145 (0.12417)	1.94	0.0102

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Percent Asian	0.15161* (0.0804)	0.18404** (0.07873)	0.18459** (0.07700)	2.52	0.0000
Percent Filipino	-0.21949 (0.25534)	-0.05716 (0.25099)	-0.08137 (0.24557)	2.25	0.0000
Percent Hispanic	0.07784 (0.06975)	0.11565* (0.06968)	0.12082* (0.06816)	10.76	0.3935
Percent Pacific-Islander	-0.73926 (1.12471)	-0.75374 (1.09979)	-0.65759 (1.07596)	1.98	0.0000
Percent Disabled	-0.10973 (0.25472)	-0.10434 (0.24758)	-0.08925 (0.24218)	1.28	0.0165
Social Characteristics of District					
Percent Free Lunch	-0.09159 (0.07198)	-0.04912 (0.07214)	-0.0686 (0.07076)	9.93	0.0042
Percent Gate	0.04961 (0.09605)	0.05827 (0.09393)	0.02827 (0.09225)	1.34	0.0024
Percent Migrant Education	0.05957 (0.10397)	0.00413 (0.10267)	-0.80928*** (0.25025)	15.47	0.0796
Percent Migrant Education *Squared*	N/A	N/A	0.02550*** (0.00719)	11.4	0.0796
Percent English Language Learner	0.01109 (0.10213)	-0.07089 (0.10169)	-0.06414 (0.09947)	8.06	0.0166
Percent Reclassified Fluent-English-Proficient	0.01334 (0.14253)	-0.03905 (0.13969)	0.03832 (0.13835)	2.82	0.0407
High School	0.00056 (0.13282)	-0.02547 (0.13374)	-0.06800 (0.13134)	6.39	0.0812
Some College	0.19323 (0.11806)	0.76468** (0.33373)	0.85079** (0.3273)	28.4	0.5104

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Some College *Squared*	N/A	-0.01157* (0.0065)	-0.01329** (0.00638)	28.34	0.5104
College Graduate	-0.17912 (0.15347)	-0.23925 (0.15785)	-0.28174* (0.15484)	8.86	0.2277
Graduate School	0.24033* (0.14128)	0.25205* (0.13723)	0.23622* (0.13429)	8.56	0.0001
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	-0.45224 (0.3305)	-0.45019 (0.32331)	-0.37581 (0.3169)	4.18	0.2529
Percent District Enrolled, Previous Year	0.42809 (0.35211)	0.33692 (0.34523)	0.27067 (0.33815)	3.64	0.0662
Class Size	0.13361 (0.22787)	2.40117** (1.08984)	2.88292*** (1.07449)	66.45	0.0000
Class Size *Squared*	N/A	-0.05042** (0.02377)	-0.06253*** (0.02349)	68.82	0.0000
Full Credential	0.25765 (0.21857)	-14.50742*** (4.46934)	-13.71157*** (4.37684)	942.26	0.2069
Full Credential *Squared*	N/A	0.07951*** (0.02417)	0.07569*** (0.02366)	954.72	0.2069
Emergency Credential	0.05894 (0.2482)	0.17451 (0.24498)	0.08964 (0.24078)	1.87	0.0584
Enrollment	0.00031 (0.00034)	0.00045 (0.00034)	0.00041 (0.00033)	393.71	0.5257
Percent tested	1.13504** (0.44419)	1.08698** (0.43296)	1.02579** (0.42379)	1.35	0.0000
Total FTEs	-0.00459 (0.00487)	-0.00664 (0.00488)	-0.00609 (0.00477)	392.95	0.0001
Counselor Availability	0.32638 (1.34498)	0.07048 (1.31273)	0.10379 (1.2839)	1.46	0.0000
Nurse Availability	-0.38500 (1.41043)	-0.67719 (1.37569)	-0.64501 (1.34548)	1.57	0.1078
Psychologist Availability	0.59754 (1.66775)	0.96998 (1.62804)	0.65706 (1.59469)	1.42	0.0003
Librarian Availability	-1.95798 (1.3425)	-2.09164 (1.31541)	-2.08628 (1.28649)	1.48	0.2348

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Teaching Days	1.13355 (1.23168)	1.13469 (1.20017)	0.7119 (1.17982)	1.18	0.6790
Teacher Working Days	0.57364 (0.4197)	0.57055 (0.40794)	0.46000 (0.40018)	1.31	0.2880
Percent Salary Change Over Previous Year	0.20016 (0.30395)	0.23409 (0.29642)	0.23110 (0.28991)	1.33	0.0342
Minimum Teacher Salary	0.00017 (0.00018)	0.00014 (0.00018)	0.00013 (0.00017)	2.01	0.0000
Maximum Teacher Salary	-0.00022* (0.00013)	-0.0002 (0.00013)	-0.00023* (0.00013)	4.1	0.0000
Superintendent Salary	0.00006** (0.00003)	0.00006** (0.00003)	0.00007** (0.00003)	4.6	0.0569
Superintendent Working Days	-0.1165 (0.07145)	-0.12107* (0.06936)	-0.13140* (0.06790)	1.2	0.1036
Constant Term	-363.873	295.3218	368.345		
R-Squared	0.2188	0.2730	0.3073		
Number of Observations	296	296	296		
Number of Significant Variables	6	10	13		

Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater.

Table B.5.

Regression Results: 2005-2006

2005-2006 Unstandardized Coefficients, Significance, and (Standard Errors)

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Control Variable					
2004-2005 Year API Score	-0.11825*** (0.02579)	-0.56024*** (0.18993)	-0.53503*** (0.18978)	502.18	0.0003
2004-2005 Year API Score *Squared*	N/A	0.00031** (0.00013)	0.00029** (0.00013)	508.37	0.0003
Fiscal Status					
Poor Fiscal Status, 2005-2006	-0.60151 (2.86503)	-0.58469 (2.80541)	-0.50349 (2.79509)	1.18	0.5481
Student Characteristics of District					
Percent African-American	-0.13365 (0.11463)	-0.17861 (0.11245)	-0.49457** (0.21614)	7.95	0.0000
Percent African-American *Squared*	N/A	N/A	0.00672* (0.00393)	5.43	0.0000
Percent American-Indian	0.09604 (0.12637)	0.02047 (0.12713)	0.01879 (0.12665)	2.29	0.2035
Percent Asian	0.16307* (0.08582)	0.12664 (0.0854)	0.13518 (0.08522)	2.41	0.0000
Percent Filipino	-0.09446 (0.27186)	-0.05359 (0.2656)	0.01635 (0.26773)	2.23	0.0000
Percent Hispanic	-0.00105 (0.07354)	0.00896 (0.07264)	0.01592 (0.07247)	9.63	0.0050
Percent Pacific-Islander	-0.42196 (1.18155)	0.13652 (1.16515)	0.56425 (1.18736)	2.12	0.0002
Percent Disabled	-0.10043 (0.29069)	-0.04426 (0.28503)	-0.06642 (0.28424)	1.28	0.0030

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Social Characteristics of District					
Percent Free Lunch	-0.12745* (0.07323)	-0.11565 (0.07181)	-0.11601 (0.07154)	8.38	0.0002
Percent Gate	0.04018 (0.10666)	0.01645 (0.1049)	0.02061 (0.10453)	1.34	0.0000
Percent Migrant Education	0.06695 (0.10878)	0.06573 (0.10641)	0.0604 (0.10605)	2.58	0.0000
Percent English Language Learner	-0.03431 (0.11167)	-0.02974 (0.10912)	-0.04567 (0.1091)	7.76	0.0065
Percent Reclassified Fluent-English-Proficient	-0.0307 (0.15303)	0.00128 (0.14995)	-0.02654 (0.15027)	2.43	0.1256
High School	-0.46129*** (0.15083)	-0.36789** (0.15128)	-0.37933** (0.15085)	6.8	0.0015
Some College	-0.10499 (0.12737)	0.03869 (0.13466)	0.03325 (0.13419)	3.74	0.0063
College Graduate	-0.0519 (0.15445)	0.00489 (0.15288)	-0.00199 (0.15234)	6.91	0.0000
Graduate School	-0.13289 (0.16747)	-0.18035 (0.16394)	-0.18046 (0.16331)	9.74	0.0000
District Enrollment and Personnel Characteristics					
Percent School Enrolled, Previous Year	0.61037 (0.48454)	0.63964 (0.47333)	0.52345 (0.47639)	7.7	0.0921
Percent District Enrolled, Previous Year	-0.87314 (0.55392)	-0.76741 (0.54199)	-0.72111 (0.5406)	7.17	0.0049
Class Size	-0.28342 (0.2563)	-0.34077 (0.25526)	-0.27805 (0.25692)	2.8	0.0000
Full Credential	-0.04766 (0.19593)	0.09395 (0.19973)	0.04521 (0.201)	2.14	0.3743
Emergency Credential	-0.10411 (0.20634)	-0.0817 (0.20145)	-0.07815 (0.20069)	1.5	0.7340
Enrollment	0.00027 (0.00034)	0.00013 (0.00033)	0.00011 (0.00033)	344.09	0.0000
Percent tested	0.27562 (0.66939)	0.07761 (0.65493)	-0.05825 (0.65725)	1.39	0.3378

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
Total FTEs	-0.00428 (0.0049)	-0.00227 (0.00482)	-0.00193 (0.00481)	343.28	0.0000
Counselor Availability	-1.32833 (1.48928)	-1.13657 (1.45601)	-1.29086 (1.45325)	1.51	0.8736
Nurse Availability	0.33209 (1.56837)	0.78712 (1.54147)	0.97754 (1.53961)	1.66	0.0001
Psychologist Availability	-0.63899 (1.79018)	-0.45099 (1.78107)	-0.39133 (1.77461)	1.5	0.8832
Librarian Availability	0.26916 (1.48627)	-0.51363 (1.46972)	-0.70255 (1.46827)	1.57	0.0001
Teaching Days	1.1965 (1.92348)	1.12144 (1.87687)	1.13417 (1.86971)	1.21	0.0826
Teacher Working Days	-0.66933 (0.43669)	-0.79842* (0.42788)	-0.79900* (0.42624)	1.3	0.6035
Percent Salary Change Over Previous Year	0.53833 (0.37983)	0.48188 (0.37088)	0.53031 (0.37054)	1.32	0.7432
Minimum Teacher Salary	-0.00009 (0.00022)	0.00351* (0.00204)	0.00338* (0.00204)	174.86	0.0530
Minimum Teacher Salary *Squared*	N/A	-4.78e-8* (2.67e-8)	-4.6e-8* (2.7e-8)	174.68	0.0530
Maximum Teacher Salary	-0.00015 (0.00017)	-0.00012 (0.00016)	-0.00011 (0.00016)	4.4	0.0000
Elementary Principal Salary	0.00008 (0.00012)	0.00009 (0.00012)	0.00009 (0.00012)	4.92	0.0000
Superintendent Salary	0.00007** (0.00003)	0.00008** (0.00003)	0.00009** (0.00003)	4.65	0.0000
Elementary Principal Working Days	-0.29008*** (0.11016)	-6.4445** (3.00352)	-7.11763** (3.01785)	1049.94	0.1263
Elementary Principal Working Days *Squared*	N/A	0.01484** (0.00722)	0.01646** (0.00725)	1051.45	0.1263
Superintendent Working Days	-0.04097 (0.07922)	-0.05565 (0.07796)	-0.06047 (0.07771)	1.2	0.3342
Constant Term	104.3242	854.8724	941.0014		

Variables	Linear-linear	Linear-Linear Quadratic(1)	Linear-Linear Quadratic(2) – Chosen Functional Form	VIF for Linear – Linear Quadratic(2)	Szroeter's Test: P-Value
R-Squared	0.2375	0.2830	0.2913		
Number of Observations	293	293	293		
Number of Significant Variables	6	6	7		
Statistical Significance: * is 90%, ** is 95%, and *** is 99% or greater.					

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