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Fiscal Federalism

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SHARING THE BLAME? LOCAL ELECTORAL ACCOUNTABILITY AND CENTRALIZED SCHOOL FINANCE IN CALIFORNIA [*]

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ABSTRACT: While electoral accountability should be stronger when responsibilities are clearly assigned to one political office, the involvement of higher tiers of government is often associated with policies specifically designed to improve local accountability. This paper investigates the impact of centralization on local electoral accountability in the context of California's school finance system. Results show that voters are responsive to differences in dropout rates and pupil-teacher ratios, and that incumbents are less likely to be reelected when a district's degree of centralization is high. The No Child Left Behind Act of 2001 appears to have sharpened local electoral accountability.

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"... the voters of California deeply distrust Sacramento, and it is impossible to imagine that they would favor an initiative to eliminate school districts and local school boards. Yet, there are clear signs that the institutions of local governance are crumbling."

– Brunner and Sonstelie (2006)

1 Introduction

After years of timid federal K-12 education policy leaving the lion's share to state and local governments, the *No Child Left Behind Act* of 2001 (NCLB) has opened a new era of strong federal intervention in U.S. schools. At the heart of NCLB is a federally mandated full-fledged accountability system. Yet NCLB has left intact the fundamental decision-making institution of the school system: the elected school board. Local elected officials remain in charge of most strategic decisions and, crucially, of the allocation of the bulk of education dollars. And school board members remain directly accountable to their local electorates.

The 2001 federal act marks the climax of 30 years of centralization in the school finance system, sparked by the 1971 Serrano ruling in California. Across the U.S., and especially in California, centralized school finance (at the state level) has been criticized on the grounds that it impedes 'local electoral accountability' – i.e. the ability of local elections to act as a disciplining device. According to critics, centralization has transformed school board elections into meaningless disciplining devices.[1] In light of such criticisms, the further centralization in Washington caused by President George W. Bush's NCLB initiative appears to be at odds with the law's prominent objective of "increased accountability for States, school districts, and schools."[2]

This paper explores the link between school finance centralization and electoral accountability at the school board level, both before and after NCLB, in the state with the most centralized school finance system: California. Although shared expenditure responsibility between levels of government is an increasingly relevant phenomenon in both developing and developed countries, exogenous changes from tier-specific expenditure responsibility to shared responsibility are scarce in practice. Brunner and Sonstelie (2006) argue, however, that centralized school finance in California provides a rare "experiment in fiscal federalism," permitting an assessment of the accountability consequences of the growing involvement of a higher tier of government in an area previously under the primary responsibility of local governments.

The empirical framework of this paper is derived from a theoretical model related to the one developed in Joanis (2008). In this model, the growing involvement of multiple tiers of government in the provision of a public good creates a shared accountability problem. With shared responsibility, electoral accountability can be expected to worsen: Thinking about a reform featuring a move

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[1] See Timar (2006) for a critical discussion in the Californian context.
[2] U.S. Department of Education (2002).

away from a situation of complete decentralization (say, at the local level) and towards a growing involvement of higher tiers of government (say, state and federal governments), the mechanism highlighted in the theory predicts a loss in voters' ability to hold politicians accountable. However, state and federal programs are often specifically designed to improve local accountability – this is especially true of recent initiatives. The theoretical effect of an increased involvement of higher tiers of government in the provision of public education on local electoral accountability is therefore ambiguous and warrants empirical investigation.[3]

From a methodological standpoint, school board elections have desirable features as a 'laboratory' for testing the extent of electoral accountability. A key advantage of school boards is the fact that they determine the fate of politicians dealing with a single policy function, namely providing public elementary and secondary education. By contrast, the main problem with assessing the role of national elections as accountability devices is the complex array of tasks that higher tiers of government are involved with, not to mention the small sample sizes typically associated with studying national election outcomes and the many potential confounding factors.[4] Hence, local elections present a promising alternative to national elections for studying electoral accountability as they typically deal with fewer policy issues, and as a much larger number of them are held every year – California alone is divided in approximately 1,000 districts.[5]

More importantly, the institutional environment of California's school districts provides the type of variation needed to investigate the effect of centralization on local electoral accountability. The analysis exploits the heterogenous degree of school finance centralization across school districts to test whether and, if so, how the extent of school finance centralization affects the electoral accountability of school board members. The California Elections Data Archive (CEDA) provides school board election results for the period 1995-2004, allowing the analysis to capture within-district time variation in the degree of state and federal involvement at the local level, including, crucially, the variation associated with NCLB after 2001.

Despite widespread skepticism surrounding the role played by local elections in a highly centralized system such as California's, results show that the reelection probability of local incumbents is responsive to differences in dropout rates and pupil-teacher ratios.[6] Incumbents also appear less

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[3]This does not rule out the possibility of separately identifying these two opposing effects.

[4]A large body of literature has studied the prevalence of 'economic voting' at the national level, i.e. the extent to which voters reward or punish politicians for macroeconomic outcomes observed at the time of an election. See Nadeau *et al.* (2002) for a recent contribution. While the correlation between macroeconomic and electoral variables highlighted by this literature is interesting in its own right, it is quite hard to interpret this correlation as evidence of electoral accountability.

[5]The main limitation to the use of local elections data in assessing electoral accountability is the lack of comprehensive data. In the U.S., besides California's CEDA initiative, only South Carolina mandates centralized collection of school board election results – see Berry and Howell (2007) for a paper using data on the state's 85 districts for the 2000-2004 period. Municipal elections data is equally scarce. To address this limitation, Ferreira and Gyourko (2009) exploit original data from a survey that they conducted at the municipal level in the US.

[6]Rincke (2007) finds similar results using California's Academic Performance Index (API). While Rincke is also

likely to be reelected when a district's degree of centralization is high, conditional on a large set of socio-demographic district controls. Fixed effect regression results also suggest that the increased involvement of the federal government after 2001 has sharpened local electoral accountability. Together, these results do not seem to support the view that local elections are meaningless devices in a highly centralized local finance system, in addition to highlighting a potentially beneficial role for higher levels of government in fostering local accountability.

The paper contributes to three strands of literature. First, it complements the existing literature on the effect of school finance centralization by exploring its consequences *on local politics*.[7] Second, this paper contributes to the small but growing literature that specifically studies the consequences of No Child Left Behind.[8] Third, the analysis also contributes to our understanding of the political economy consequences of decentralization by studying a single public good (i.e. education), supplementing a large body of literature on decentralization that typically uses data on broad categories of spending or on total government spending.[9]

The paper proceeds as follows. Section 2 presents a simplified version of the theoretical model developed in Joanis (2008) and discusses its empirical implementation. In Section 3, I discuss the institutional environment of California's school districts and place California's experience in the context of the broader debate about school finance centralization in the United States. The data are described in Section 4. Empirical results are presented and discussed in Sections 5 and 6. First, Section 5 focuses on the extent to which voters in school board elections react to good policy outcomes by reelecting incumbents (and to bad policy outcomes by defeating them), and on how centralization affects the probability that an incumbent is reelected. Section 6 takes the investigation of the role played by centralization one step further, exploiting the variation in federal funding associated with No Child Left Behind. Some concluding remarks are collected in Section 7.

2 Theoretical Framework and Empirical Implementation

In this section, I set up a theoretical framework of voter behaviour in an environment characterized by the involvement of more than one level of government in public good provision. The model is an application of the political agency model developed in Joanis (2008), tailored to capture the key

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interested in local electoral accountability in California's school boards, he does not address the role of school finance centralization – the main focus of the current paper.

[7]Prominent papers on school finance reform include Card and Payne (2002), Hoxby (2001) and Murray *et al.* (1998).

[8]To the best of my knowledge, this is the first paper to look at the *electoral* accountability consequences of No Child Left Behind. Other accountability dimensions of the federal reform have been studied, among others, by Neal and Whitmore Schanzenbach (2007), Hastings and Weinstein (2007), Holmes *et al.* (2006), and Hanushek and Raymond (2005).

[9]A number of important papers in this literature are discussed in Joanis (2008).

electoral accountability aspects of school finance centralization.[10] This theoretical model supplies the basic relationship to be estimated.

2.1 A Simple Model of Shared Electoral Accountability

Consider a model in which the population of a local jurisdiction j – here a school district – derives utility from a local public good (O_j). In the context of this paper, O_j is best thought of as the quality of public education delivered by the local education agency (LEA).

2.1.1 Technology and Preferences

The public good, O_j, is the outcome of a combination of public 'inputs' produced by three levels of government: the LEA (g_j^l), the State (g_j^s), and the federal government (g_j^f). Assume the following technology for O_j :

$$O_j = G(g_j^l, g_j^s, g_j^f), \tag{1}$$

where G is a production function which is increasing in the quantity of its three inputs. These inputs can be interpreted as each politician's effort toward public good provision.

The representative voter in a district derives utility from the public good and from other 'goods' (denoted by the vectors $\mathbf{X}_j$ and $\mathbf{Z}_j$). Assume that she has the following linear utility function:

$$u_j = \alpha + O_j + \gamma \mathbf{X}_j + \delta \mathbf{Z}_j, \tag{2}$$

where $\mathbf{X}_j$ captures various district characteristics and $\mathbf{Z}_j$ stands for characteristics of local politicians (beside their effort toward public good provision).

2.1.2 Information, Centralization and Local Elections

Voters reelect the local incumbent if they judge that the expected utility level that they derive from his contribution to the public good (labeled Eu_j^l) exceeds the (realized) utility level associated with a random challenger:

$$\text{Reelect } l \text{ if } Eu_j^l + \xi_j \geq \bar{u}_j^l, \tag{3}$$

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[10]Other theoretical models devoted to the study of this issue include Hoxby (1999), Nechyba (2003) and Borck (2008). Hoxby's model predicts that decentralized finance can do almost as well as centralized finance. Hence, in that sense, her model provides little guidance for empirical investigation. Another issue is the absence of a political process in her model, though she recognizes that "ongoing politics are necessary." Both the present work and Borck (2008) attempt to address this concern by modeling explicitly some dimension of the political process. While I highlight the informational problems associated with the growing involvement of a second tier of government in the provision of public education, Borck (2008) focuses on the heterogeneous experiences of different income groups (with centralization being preferred by some and decentralization by others). In work that is highly related to both the theoretical work of Borck and the current empirical application, Nechyba (2003) emphasizes the important role of mobility across districts, peer effects and private school enrollment on the outcomes of school finance reforms.

where $\bar{u}_j^l$ is a random utility level, iid across districts with cdf F, and ξ_j is a district-specific shock. The probability that voters reelect the local politician in district j (denoted P_j^l) is thus given by

$$P_j^l = \Pr\left[\bar{u}_j^l \leq Eu_j^l + \xi_j\right] = F\left[Eu_j^l + \xi_j\right]. \tag{4}$$

Voters do not directly observe the quantity of public inputs produced by each level of government. Assume that voters form their expectation of the utility level associated with the actions of the local incumbent as follows:

$$Eu_j^l = \alpha + E\left[g_j^l | O_j, C_j\right] + \gamma \mathbf{X}_j + \delta \mathbf{Z}_j, \tag{5}$$

where C_j is a district's degree of centralization, defined as the share of higher levels of government (State and federal) in total spending:

$$C_j = \frac{g_j^s + g_j^f}{g_j^l + g_j^s + g_j^f}. \tag{6}$$

Hence, voters must infer the effort exerted by the local incumbent politician (l) based on a retrospective observation of O_j and their knowledge of the relative role of the local government in the production process (C_j). When forming their expectation, assume that voters receive an imperfect signal about the contribution of the local incumbent. In other words, they seek to difference out from the observed outcome (O_j) the portion that is not attributable to l's actions, but rather to state and federal intervention. Accordingly, assume that voters form their expectations according to the following 'accountability function,' which translates observed policy outcomes (O_j) into votes for the incumbent politician:

$$E\left[g_j^l | O_j, C_j\right] = (1 - C_j)\vartheta O_j, \tag{7}$$

where ϑ captures the quality of the signal that voters receive about the level of effort exerted by their local politician. Equation (7) has the following implications: if $C_j = 1$, the local politician's reelection probability does not depend on observed policy outcomes; at the other extreme, if $C_j = 0$ the voters fully attribute the observed outcomes (ϑO_j) to the local politician.

Assume further that spending by the state and federal governments can improve the quality of the signal received by voters about their LEA's performance (for example through mandated dissemination of information on O_j):

$$\vartheta = \vartheta(C_j), \tag{8}$$

where $0 \leq \vartheta(C_j) \leq 1$ and $\vartheta'(C_j) \geq 0$. If $\vartheta = 1$, voters perfectly observe O_j and attribute $g_j^l = (1 - C_j)O_j$ to the local politicians. And if $\vartheta = 0$, they do not observe O_j at all. For intermediate values of ϑ, voters take only part of O_j into consideration when assessing the local politician's performance.

Substituting in equation (8), equation (7) can be characterized by its partial and cross-partial derivatives:

$$\psi_O = \frac{\partial E\left[g_j^l | O_j, C_j\right]}{\partial O_j} = \vartheta(C_j)(1 - C_j) \geq 0, \tag{9}$$

$$\psi_C = \frac{\partial E\left[g_j^l | O_j, C_j\right]}{\partial C_j} = \left[\vartheta'(C_j)(1 - C_j) - \vartheta(C_j)\right] O_j \gtreqless 0, \text{ and} \tag{10}$$

$$\psi_{OC} = \frac{\partial^2 E\left[g_j^l | O_j, C_j\right]}{\partial O_j \partial C_j} = \vartheta'(C_j)(1 - C_j) - \vartheta(C_j) \gtreqless 0. \tag{11}$$

When observing a change of ΔO_j in the outcome variable, voters will attribute only $\Delta E\left[g_j^l | O_j, C_j\right] = \psi_O \Delta O_j$ to the local politician. The first potential role of the degree of centralization in this environment is to alter the slope of the accountability function (ψ_O). According to equation (11), the effect of centralization on ψ_O is ambiguous: On the one hand, centralization's direct effect decreases ψ_O by reducing the fraction of O_j attributed to the local government (the second term in ψ_{OC}, $-\vartheta(C_j)$); but on the other hand, centralization may improve the quality of the signal received by voters, increasing ψ_O (the first term in ψ_{OC}, $\vartheta'(C_j)(1 - C_j)$). Note that the first-order effect of centralization on $E\left[g_j^l | O_j, C_j\right]$, ψ_C, is ambiguous for the same reasons.

2.2 Empirical Implementation

Equation (4) forms the basis of the empirical strategy pursued in this paper. Substituting in equation (5), we get:

$$P_j^l = F\left[\alpha + E\left[g_j^l | O_j, C_j\right] + \gamma \mathbf{X}_j + \delta \mathbf{Z}_j + \xi_j\right]. \tag{12}$$

Exploiting the properties of $E\left[g_j^l | O_j, C_j\right]$ and linearizing, I will estimate the following equation to identify ψ_O, ψ_C and ψ_{OC}:

$$P_j^l = F\left[\alpha + \psi_O O_j + \psi_C C_j + \psi_{OC} C_j * O_j + \gamma \mathbf{X}_j + \delta \mathbf{Z}_j + \xi_j\right]. \tag{13}$$

The main parameters of interest for the analysis of this paper are ψ_O, ψ_C and ψ_{OC}. In what follows, the measurement convention will be that O_j is a public bad (e.g. a high dropout rate), that is we will expect an increase in O_j to reduce an incumbent's reelection probability. Under that measurement convention, $\hat{\psi}_O$ will be expected to be negative if local elections are meaningful accountability devices. $\hat{\psi}_C$ and $\hat{\psi}_{OC}$ will characterize the effect of centralization of school finance on incumbents' reelection probability. Negative values for both parameters will be indicative that centralization conveys information to voters about negative characteristics of incumbents, while positive values will be consistent with centralization weakening local electoral accountability.[11]

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[11] Note that alternative explanations could rationalize positive or negative values for $\hat{\psi}_C$ and $\hat{\psi}_{OC}$. For example, a high C_j could denote a local politician's strong abilities to secure state and federal funds for his LEA, consistent

To estimate equation (13), additional assumptions will be required about the distributions of ξ_j and $\bar{u}_j^l$. If $\bar{u}_j^l$ is assumed to follow a uniform distribution on the $[0,1]$ interval (which implies a normalization to unity of the maximal utility associated with a challenger) and if ξ_j is normally distributed, the parameters in equation (13) can be estimated by means of the following linear probability model:[12]

$$P_{jt}^l = \alpha + \psi_O O_{jt} + \psi_C C_{jt} + \psi_{OC} C_{jt} * O_{jt} + \gamma \mathbf{X}_{jt} + \delta \mathbf{Z}_{jt} + \xi_{jt}. \tag{14}$$

In what follows, I estimate various empirical specifications of equation (14) using detailed data at the school district level in California. The next section provides some institutional background on school finance reform in the U.S., highlighting the specificity of the Californian experience.

3 School Finance in California: A Primer

The provision of elementary and secondary (K-12) public education in California falls under the responsibility of school districts. School boards are responsible for a variety of fiscal, administrative and academic matters, including adopting the district's budget, collective bargaining and hiring the superintendent. As Moe (2006) puts it, school boards in the United States are "strong": "They build schools, select textbooks, design curricula, recruit teachers, award diplomas, set rules for discipline, and oversee a vast array of operations, plans, and policies that shape the education experiences of most American children."

While the provision of public education in the State is under the primary responsibility of school districts, both the State and to a lesser extent the federal government play an important role through a series of transfer programs and various legislative requirements. The involvement of the State government in California is especially strong, with California having the most centralized school finance system in the United States. Federal involvement has also become more prominent in recent years following the inception of No Child Left Behind in 2001.

3.1 State Programs in California

California's centralized school finance system is the result of a series of court decisions starting with the 1971 Serrano ruling, by which the historical school finance system – dominated by local taxes and local accountability mechanisms – was deemed unconstitutional and was overturned.

Serrano led to a sharp increase in the share of district revenues coming from the State. Consequently, transfers to school boards in California now amount to a large number of state and federal

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with a positive $\hat{\psi}_C$. However, a high C_j could also be associated with a required intervention by higher levels of government to punish shirking by the local politicians, consistent with a negative $\hat{\psi}_C$.

[12]If $\bar{u}_j^l$ is standard normal, equation (13) can also be estimated using a Probit regression.

programs, including both general-purpose transfers (mostly equalization) and a long list of categorical funds. The latter are the result of a complex mix of programs and historical entitlements, often unrelated to district needs.

The underlying complexity of California's transfer system is well illustrated by the case of one of the State's main categorical programs: the Economic Impact Aid (EIA). The EIA is a categorical program whose objective is "to support additional programs and services for English learners (EL) and compensatory education services for educationally disadvantaged students" (LAO, 2004). All districts can apply for these funds. This is a significant program: it awarded $973,388,000 to a total of 974 districts in 2006-2007.[13] Before 2006, EIA was determined by two main formulae. The primary formula used a "complex multistep process" based on 'needs' and poverty. A district's needs were measured by its concentration of EL, poor, and transient students.[14] The secondary formula distributed funds to districts "whose primary funding allocations would not be sufficient to serve a reasonable portion of the population of pupils from disadvantaged backgrounds" (LAO, 2004).[15]

In February 2004, the California Legislative Analyst's Office (LAO) released the following statement about EIA in its analysis of the 2004-05 budget bill:

> We find that the EIA funding formula is outdated and results in district allocations that appear arbitrary and unpredictable. We recommend the Legislature simplify the EIA formula so that district allocations are predictable and meet local needs for serving both poor and English learner students.

The empirical analysis of Section 5 will exploit such essentially exogenous variation across districts to identify the effect of centralization on electoral outcomes.[16]

3.2 California in Perspective: State Programs in Other States

The Serrano ruling opened the way to similar school finance reforms in many other states. Between 1971 and 1992, the historical school finance systems were overturned in 12 states (see Card and Payne, 2002). Card and Payne's numbers show that a key consequence of the reforms that followed these rulings has been, as expected, an increase in the state governments' contribution to

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[13] These figures are from the California Department of Education.

[14] The formula also used two measures of poverty: the enrollment of students from families receiving California Work Opportunity and Responsibility to Kids (CalWORKs) grants and poverty data from the 1990 Census.

[15] The secondary formula has two elements. (1) Per-Pupil Grant: Districts that would receive a relatively small allocation through the primary formula receive funding based solely on the number of CalWORKs and EL students. In 2003-04, approximately 600 school districts received $219 for each student in the two target groups. (2) Minimum District Grant: Districts with very low numbers of EL pupils and pupils from families receiving CalWORKs receive a minimum grant. In 2003-04, approximately 175 school districts received minimum grants.

[16] In particular, see Section 5.4 for a discussion of identification issues.

expenditures on public education. In these 12 states, the share of the state government increased from 44.5% in 1977 to 56.7% in 1992, a 12.2 percentage point increase.[17] In contrast, very limited action can be observed in the other states. For instance, in the 21 states without a court decision in 1992, the states' involvement increased by a mere 1.4 percentage point on average, and it even decreased by 0.6 percentage point in the 15 states in which school finance systems were judged constitutional. Despite a slightly lower share of the state government in states with school finance systems judged unconstitutional (44.5% vs. 46.2% in states with constitutional systems and 46.3% in states with no ruling), the three categories of states displayed remarkably similar degrees of school finance centralization in 1977.

Interestingly, the states with court-ordered reform did not experience higher growth of total per-student expenditure. In fact, the growth of spending was 3 percentage points lower in states with court-ordered reforms than in states with court decisions upholding preexisting school finance systems. Thus, in aggregate, the growing involvement of state governments did not increase aggregate support for public education in these states. This result is arguably driven to a significant extent by California, which experienced a large and puzzling decline in education spending relative to other states (Brunner and Sonstelie, 2006). This puzzle is suggestive of local accountability problems associated with centralized school finance,[18] and warrants empirical investigation of the accountability consequences of school finance centralization.

3.3 Federal Programs and No Child Left Behind

The recent years have been marked by a significant increase in the involvement of the federal government in education policy and school finance through the *No Child Left Behind Act* of 2001 (NCLB). A broad initiative, the objectives of the Act included:[19]

- Increased accountability for states, school districts, and schools;

- Greater school choice, especially in the presence of low-performing schools;

- More flexibility for states and LEAs in the use of Federal education dollars; and

- A stronger emphasis on reading, especially for the youngest children.

According to the U.S. Department of Education (2002), NCLB aimed to increase accountability in the following sense:

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[17]Those ratios are computed from enrollment-weighted averages provided by Card and Payne (2002).

[18]One potential explanation is that, knowing that they can't hold their school boards accountable as tightly as before, voters are less inclined to agree to state money being sent to (inefficient, unaccountable) school boards. Instead, they may be expected to favour other categories of public spending (consistent with California spending more than average in other spending categories).

[19]U.S. Department of Education (2002).

The NCLB Act will strengthen Title I accountability by requiring States to implement statewide accountability systems covering all public schools and students. These systems must be based on challenging State standards in reading and mathematics, annual testing for all students in grades 3-8, and annual statewide progress objectives ensuring that all groups of students reach proficiency within 12 years. Assessment results and State progress objectives must be broken out by poverty, race, ethnicity, disability, and limited English proficiency to ensure that no group is left behind. School districts and schools that fail to make adequate yearly progress (AYP) toward statewide proficiency goals will, over time, be subject to improvement, corrective action, and restructuring measures aimed at getting them back on course to meet State standards. Schools that meet or exceed AYP objectives or close achievement gaps will be eligible for State Academic Achievement Awards.

The next section describes the data used in this paper to investigate the effect of centralization on local electoral accountability.

4 Data and Variables

Four main data sources will be used in the analysis: the California Elections Data Archive (CEDA), the Census of Governments, the California Department of Education, and the 2000 Census. In what follows, I describe these data sources, discuss the variables constructed from these data, and provide summary statistics. The unit of analysis is the school district (j), and the data cover the 1995-2004 decade.

In school year 2004-05, there were a total of 979 school districts in California: 562 elementary (or primary) school districts, 88 secondary (or high) school districts and 326 'unified' districts (overseeing both primary and high schools). Maps 1 to 4 (located at the end of the paper) depict the geography of California's public school system.[20] Map 1 shows the location of all public schools in the State, highlighting the concentration of California's population in the San Francisco Bay and Los Angeles areas. Maps 2 to 4 respectively locate each of California's unified districts (Map 2), elementary districts (Map 3) and secondary districts (Map 4), featuring their total population.

4.1 Elections

Every school district is governed by an elected school board, generally composed of three, five or seven members. Typically, every two years a fraction of the board must earn reelection in non-partisan, first-past-the-post elections.[21] In collaboration with the State government, the Institute

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[20] The maps were generated using the School District Demographics System, which provides special tabulations of the 2000 US Census at the school district level.

[21] In this paper, I do not consider bond elections, which are also held on a regular basis by school districts.

for Social Research and the Center for California Studies systematically collect all local election results in California. For my purposes, the crucial feature of CEDA is that data on school district elections are readily available starting in 1995.[22]

To isolate the role of elections in holding incumbents accountable, the analysis of this paper is based on the subsample of electoral races in which the incumbent seeks reelection. Three electoral variables are constructed from these data: the percentage of incumbents reelected in year t and district j (P_{jt}^l), incumbents' average vote share, and the average number of candidates running. The latter two variables form the $\mathbf{Z}_{jt}$ vector.[23] Some districts are subdivided in election wards while others elect at-large board members. In both cases, since the analysis is conducted at the district level, these three variables are defined as district averages.

Summary statistics for the election variables are displayed in Table 1. The dataset is composed of 2,507 district/year observations, with a yearly average of 251 districts holding at least one election in which at least one incumbent ran. The annual count is higher in even years. School board elections are most often held in conjunction with other political races and even years correspond to statewide election years – for example, elections held in 1998 and 2002 were held together with gubernatorial elections. Odd years tend to be reserved for local races alone.[24]

On average, 77.8% of incumbents were reelected during the period covered by CEDA. The typical incumbent wins with 30.0% of the popular vote and is involved in a 4.6-candidate race.

4.2 Public Finance

The local elections data is merged with detailed public finance data at the school district level. These data are compiled yearly by the Census Bureau in the Census of Governments.[25] The key public finance variable of interest is the share of funding coming from the state and/or federal governments (denoted by C_{jt}).

Table 2 presents summary statistics on this variable for all districts in California. The average state share over the 1995-2004 period was 54.9%, more than 7 times higher than the average federal share (7.2%). The state share peaked in 2001 at 57.2% and declined sharply in the three years that followed. Mirroring the decline in the state share, the federal share increased steadily in the post-NCLB period (2002-2004).

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[22] These data are available from the Institute for Social Research. CEDA is housed by California State University, Sacramento.

[23] An unfortunate limitation of the California elections data is the absence of turnout data. Moe (2006) qualifies turnout in the 1997 and 1999 school board elections in nine districts located in Los Angeles and Orange counties as "downright abysmal." He estimates a 9-percent median turnout of registered voters. Turnout is higher in bond elections and for subgroups of the population with a direct stake in educational outcomes (for example, teachers or parents).

[24] Turnout tends to be lower in odd years – see Moe (2006). Note that year fixed effects will be included in all empirical specifications.

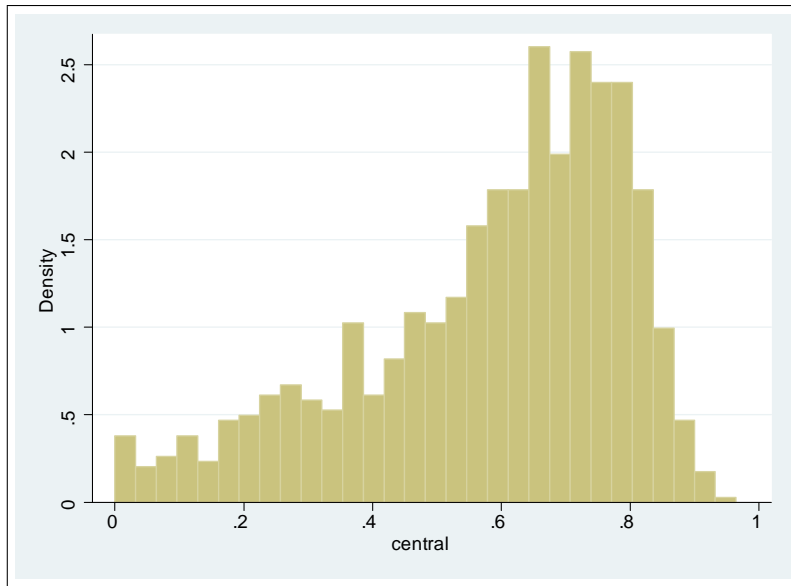[25] The data are available from the U.S. Census Bureau.

Figure 1: Histogram of the share of revenues from state and federal governments, 2004

Californian school districts vary widely with respect to the involvement of higher tiers of government, as is evident from Figure 1. At the far left of the histogram are located a small number of wealthy districts that do not receive any state funding, the 'Basic Aid Districts.' These districts rely solely on property taxes to fund public education. As we move to the right of the figure, districts are less wealthy and rely more heavily on state and federal transfers, with a large number of districts receiving more than half of their budget in transfers.

4.3   Policy Outcomes

The third source of data covers educational outcomes. Every year, the California Department of Education releases data on the activities conducted by the State's school districts.[26] In what follows, I use two 'performance measures' as policy outcomes at the district level (O_{jt}): the high school dropout rate and the pupil-teacher ratio (see Table 2 for summary statistics). As previously mentioned, the measurement convention is that an increase in O_{jt} corresponds to a worsening in performance.

A key advantage of these two performance measures is their availability for the entire period covered by the elections data, and in particular for both the pre- and post-NCLB periods.[27] Another

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[26] These data are made available through the California Basic Educational Data System (CBEDS), which supplies time-consistent data for the period covered by CEDA. CBEDS is based on annual reports by school districts to the California Department of Education.

[27] Unfortunately, CBEDS does not include test scores data. While test scores are available for some years from other sources, serious time-consistency issues limit their usefulness for the purpose of this paper.

advantage of these measures is that they supply information about two stages of the educational production process: while dropout rates are best thought of as an output of the production function, the pupil-teacher ratio is clearly an input in this process. Thus, the latter is more directly related to the allocation of resources by school boards than the former. Nevertheless, both the dropout rate and the pupil-teacher ratio are ultimately outcomes of government action, especially of school board performance, in the sense adopted in the theoretical discussion of Section 2. And crucially, information on both policy outcomes are publicly available, and can therefore be used by voters.

The average annual dropout rate in the State between 1995 and 2004 was 2.44%, with higher figures observed at the beginning and at the end of the period.[28] It is important to note that the dropout rate pertains to districts with high schools only (high school and unified districts), while the pupil-teacher ratio is available for all districts. A typical teacher had 20.17 pupils to supervise during the period of interest, with the highest ratio being observed at the beginning of the period, in 1995. Ten years later, the pupil-teacher ratio had declined by more than three students, a result of statewide efforts to reduce class size in the 1990s. It is worth noting that both outcomes appear to worsen in the post-NCLB period – Section 6 will focus on the effects of NCLB.

Additional variables constructed from the State's data are a dummy variable for primary school districts, a dummy for high school districts, the total yearly enrollment in the district, and the number of schools in the district. These form the $\mathbf{X}_{jt}$ vector, together with a series of socio-demographic characteristics extracted from the 2000 Census.

4.4 Socio-Demographic Characteristics

Finally, a broad set of socio-demographic controls are included in the $\mathbf{X}_{jt}$ vector. The variables constructed from the 2000 Census and included in the analysis are: the median family income, the age distribution, the share of immigrants, the population's educational attainments, the quality of spoken English, the share of households with children, the median rent, the median house value, the share of households renting, a poverty count, the racial composition, rent as a percentage of income, the total population, the urban population, and the median effective property tax rate.[29]

In line with the heterogeneity in the degree of centralization across districts depicted in Figure 1, districts vary widely according to their socio-demographics. For example, see maps 5 and 6 for plots highlighting district heterogeneity in racial composition (Map 5) and median house value (Map 6).

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[28] The California Department of Education does not release dropout data for 1999.

[29] The inclusion of variables which proxy for the tax bill faced by households will allow the analysis to focus on the benefit side (policy outcomes) of the cost-benefit analysis performed by voters.

5 Reelection Probability, Educational Outcomes and Centralization

The regression results presented in this section provide an initial assessment of the impact of state and federal transfers on the reelection probability of school board members. The empirical strategy involves estimating a linear probability model based on equation (14) derived in Section 2:[30]

$$P_{jt}^l = \alpha + \psi_O O_{jt} + \psi_C C_{jt} + \gamma \mathbf{X}_{jt} + \delta \mathbf{Z}_{jt} + \mathbf{Y}_t + \mathbf{D}_j + \xi_{jt}, \tag{15}$$

where $\mathbf{Y}_t$ is a vector of year effects, and $\mathbf{D}_j$ is a vector of district fixed effects.[31]

This section will, in turn, consider results from regressions where O_{jt} is measured by the change in a district's dropout rate (results in Table 3) and by the change in a district's pupil-teacher ratio (results in Table 4). Note that all regressions in this section include the level of O_{jt} as a control, and additional control variables to capture potential differences in voting behaviour between the different types of districts (unified, primary and high school districts).

Three sets of results are reported in tables 3 and 4. First, data on the full sample of districts are used (specifications (1) and (2)). Then, the sample is split into two groups based on whether districts experienced a decrease in the dropout rate (the 'positive outcome' specifications (3) and (4)) or an increase (the 'negative outcome' specifications (5) and (6)) – these results pertaining to the asymmetry between rewarding and punishing incumbents are discussed below in Subsection 5.3. For each of these three sets of results, two specifications are estimated: In specifications (1), (3) and (5), a large set of (time-invariant) census variables is included,[32] while in specifications (2), (4) and (6) district fixed effects are included.

5.1 High School Dropout Rate Regressions

Table 3 collects the estimation results with O_{jt} measured as the year-to-year change in the dropout rate. Because the dropout rate is irrelevant for primary schools, these regressions are estimated on a subset of districts including only high school and unified districts.

The first striking result of Table 3 is that school board elections do not appear to be meaningless as local accountability instruments, contrary to the critical view reported in the introduction of this paper: an increase in the dropout rate is associated with a lower reelection probability. The

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[30] I also estimated Probit models, with similar results (available upon request).

[31] Equation (15) differs from equation (14) in that it does not include the slope effect of centralization on reelection probability (ψ_{OC}). Of course, nothing precludes the inclusion of the slope parameter in the regressions conducted in this section. In unreported regression results corresponding to the ones discussed in this section (available upon request), ψ_{OC} is never significant. These results indicate no statistically significant difference in how voters react to observed policy outcomes in centralized vs. centralized districts. See Section 6 for results including the interaction effect.

[32] In these specifications, standard errors are adjusted for clustering within districts.

coefficient is significant at the 5% confidence level when fixed effects are included (Specification (2)). The level of the dropout rate is, by itself, not significant.

Unsurprisingly, the electoral controls (incumbent vote share and number of candidates) have strong explanatory power. Reelection probability is higher for dominant incumbents, those winning the election with a higher share of the popular vote. The number of candidates is also positively related to reelection probability, consistent with a divided opposition reinforcing the incumbent's position.

School politics also appear to differ in systematic ways across types of district. Reelection probability tends to be lower in high school districts, as opposed to unified districts, according to the fixed effects results. This may simply denote a stronger incumbency advantage for elementary schools – see the results for primary school districts in the next subsection.[33] District size is also related to electoral outcomes: districts with a larger number of schools tend to display lower reelection rates, but student enrollment does not have a significant effect.

Finally, key parameters of interest are the effects of centralization at the state and federal levels on reelection probabilities. According to Specification (1), centralization at the federal level seems to explain some of the variation in incumbents' reelection probabilities. The federal share variable displays a negative coefficient, indicating that the slope of the accountability function (equation (7) in Section 2) with respect to centralization, ψ_C, is negative for federal funds. This is an indication that districts where the federal government's presence is strong tend to defeat their local incumbents at a higher rate. Strong federal presence may reflect otherwise unobserved district characteristics since the coefficient on the federal share is not significant in the fixed effect regression (Specification (2)) – see Subsection 5.4 below for a discussion of some related identification issues. Note also that the state share variable is significant in neither specification.

5.2   Pupil-Teacher Ratio Regressions (All Districts)

A relatively similar picture emerges when the change in pupil-teacher ratios is used as the outcome measure. Table 4 displays those results, which now pertain to all three types of districts.

The coefficient on the change in pupil-teacher ratio is negative and significant in Specification (1). While the coefficient is also negative in Specification (2), it is not statistically significant.[34] Again, when significant, the centralization coefficients are negative. According to Specification (2), districts in which a high proportion of revenues coming from the *state* government tend to reelect their incumbents at a lower rate, controlling for district fixed effects.[35]

Two additional results from these specifications are noteworthy. First, there is evidence of a

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[33] Note, however, that the sign on the high school dummy is reversed in Specification (1), when fixed effects are not included.

[34] See Subsection 5.4 below for some remarks on identification with fixed effects in the context of this application.

[35] Note that the discrepancy between this result and the result in Table 3 can be explained by the fact that elementary school districts are now included in the sample.

stronger incumbency advantage in primary school districts, captured by the positive coefficient on the primary school district dummy (significant at the 1% confidence level in Specification (1)). Second, student enrollment is positively related to reelection probability (significant in Specification (2)), contrary to the other measure of district size (number of schools).

5.3 Punishing vs. Rewarding

Together, the results presented so far are suggestive that school board elections are playing some role as accountability devices: reelection probability tends to be negatively related to the occurrence of bad educational outcomes. Are the above results evidence that voters punish politicians for bad outcomes, that they reward them for good outcomes, or both? To explore the potential asymmetry between the punishing and the rewarding functions of school board elections, tables 3 and 4 display results for the subsample of observations for which the year-to-year variation in the outcome measure is positive (specifications (3) and (4)), and negative (specifications (5) and (6)).

Looking first at the results from dropout rate regressions (Table 3), there is some evidence that voters reward politicians for positive outcomes – the coefficient on the change in dropout rates is negative and significant in Specification (3). However, there is no significant evidence that politicians were punished for an increasing dropout rate in the 'negative outcomes' specifications.[36] It is interesting to note that the negative effect of the federal share variable found in Specification (1) appears to be especially present in the 'positive outcomes' sample.

With the larger sample size due to the inclusion of primary school districts, the coefficients from pupil-teacher ratio regressions are more precisely estimated (see Table 4). These results display evidence of both rewarding and punishing behaviour. The latter is especially clear in the results, including in the fixed effects results of Specification (6). The negative effect of the state share variable found in Specification (2) appears to be driven by the 'negative outcomes' sample.

In the remainder of this section, I discuss the identification issues underlying the robustness of the above results.

5.4 Remarks on Identification and the Peculiarities of California's Transfer System

The main challenge in estimating equations (14) or (15) comes from the fact that the extent to which a district relies on the state and the federal governments to fund its public schools (C_{jt}) is endogenous. In an ideal experiment, each district would be randomly allocated to one of two (or more) groups, one in which no funding would be received from higher tiers of government (the control group) and the other in which some funding would be provided by the state and federal governments (the treatment group). Alternatively, one could envision two or more groups

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[36]The relatively small sample size for the 'negative outcomes' specifications must be acknowledged.

with different degrees of state/federal involvement. However, the main effect of the school finance reforms enacted since the 1970s has been to boost state funding to poorer districts, increasing their aggregate financial resources and improving students' outcomes.[37] Thus, districts with a more centralized funding structure tend to differ in systematic ways from districts with a less centralized funding structure (e.g. Basic Aid Districts), the former typically being the more disadvantaged districts.

In this section, the identification strategy has involved the inclusion of a comprehensive set of socio-demographic district-level controls. These controls are constructed from the 2000 Census and, as a consequence, are treated as fixed over the period covered by the elections data. The effect of centralization at the state and federal levels have thus been identified by the variation in centralization that cannot be explained by differences in socio-demographic characteristics of districts.

While there are obvious caveats applying to this simple strategy, some of which are addressed by the empirical strategy pursued in the next section, it is reasonable to assert that the variation in the centralization variable is relatively exogenous once socio-demographic differences among districts are controlled for. The rationale for this identification strategy is related to the fact that California's school finance system is highly complex, with intergovernmental transfers being the result of a combination of a variety of state and federal programs – see Section 3 for a detailed discussion.

Identification of the effect of centralization on reelection probability in the above results has therefore relied on differences between otherwise similar districts that are treated differently by state and federal transfer programs. The inclusion of district fixed effects has also allowed for identification of these effects from within-district variation. The main drawbacks of the inclusion of fixed effects are a reduction in the number of available control variables, and the limited variation in electoral variables due to the small number of electoral cycles covered by the data. Despite these limitations, Section 6 exploits within-district variation associated with a major reform in the federal government's transfers to school districts.

6   No Child Left Behind and Electoral Accountability

This section focuses more specifically on the federal share variable, taking advantage of the sharp increase in the federal government's role associated with No Child Left Behind (NCLB) after 2001. NCLB represents a rare quasi-experiment in fiscal federalism, with the federal government significantly increasing its role in both LEA's finances and accountability. While one of the consequences of NCLB's accountability requirements is to limit local politicians' leeway – thus restricting the scope for effective local electoral accountability – the federal initiative has led to the implementa-

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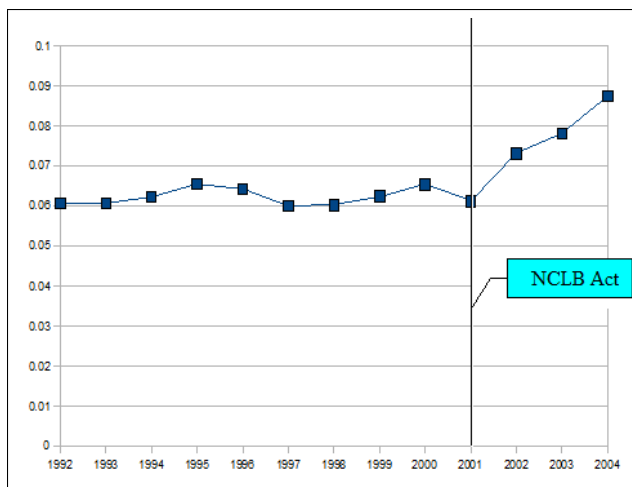
[37]See Card and Payne (2002).

Figure 2: Average share of federal spending by district

tion of a visible and uniform accountability system which puts the spotlight on local educational outcomes – the output of this accountability system now serves as a key input in school board elections.

This section explores the consequences of NCLB not on educational outcomes themselves but on local political outcomes in California. Has NCLB reinforced the trend toward a marginalisation of local governance in the education system or, on the contrary, did NCLB boost local electoral accountability by improving voters' information and choice sets?

6.1 Identification Strategy

As shown in Figure 2, the share of federal transfers in school districts' total revenues has been on the rise since 2001, following a period of remarkable stability. This sudden increase corresponds to the passage of the *No Child Left Behind Act* by the federal government in 2001. Exploiting this variation, the strategy pursued in this section is to identify the effect of centralization out of within-district differences in centralization, before and after 2001.

I estimate the following version of equation (14), which includes interaction terms with a post No Child Left Behind ($NCLB_t$) dummy:[38]

$$
\begin{aligned}
P_{jt}^l \;=\; & \alpha + \delta_1 C_{jt} * O_{jt} * NCLB_t + \delta_2 O_{jt} * NCLB_t + \delta_3 C_{jt} * O_{jt} \\
& + \delta_4 C_{jt} * NCLB_t + \delta_5 O_{jt} + \delta_6 NCLB_t + \delta_7 C_{jt} + \gamma \mathbf{X}_{jt} + \delta \mathbf{Z}_{jt} + \mathbf{Y}_t + \mathbf{D}_j + \xi_{jt},
\end{aligned}
\tag{16}
$$

where C_{jt} is the federal share variable and $\mathbf{X}_{jt}$ now includes the state share. In this specification, both the own effect of centralization and the interaction between centralization and outcomes are

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[38]The NCLB dummy is equal to one in 2002, 2003 and 2004.

allowed to change in the pre- and post-NCLB periods, as well as the effect of educational outcomes on reelection probability. The main coefficients of interest are δ_1, δ_2 and δ_4: they capture the effect of the No Child Left Behind on local electoral accountability.

6.2 Results

Table 5 presents estimation results for this empirical strategy, alternatively measuring O_{jt} as the dropout rate – Specification (1) – and the pupil-teacher ratio.[39] Two specifications are provided for the latter: Specifications (2) uses the same sample as Specification (1), i.e. excluding primary school districts, and Specification (3) uses the whole sample.

6.2.1 High School Dropout Rate

In the dropout rate regression, the effect of NCLB on the interaction of outcomes and centralization ($\hat{\delta}_1$) is significant, displaying a negative sign. The negative sign reveals that in the post-reform period centralization has tended to reinforce the link between higher dropout rates and lower reelection probabilities. In other words, this result suggests that NCLB has increased the effect of centralization on voters' reactivity to adverse educational outcomes, captured by the cross-partial derivative (ψ_{OC}) of the accountability function, equation (7). However, this effect is somewhat dampened by the positive coefficient (significant at the 10% confidence level) on the outcome variable in the post-NCLB period ($\hat{\delta}_2$).

The strongly significant negative coefficient on the NCLB dummy itself is also noteworthy, suggesting that NCLB could be associated with an overall reduction in the incumbency advantage of school board members. Consistent with the results of the previous section, the vote share and number of candidates variables are strongly significant.

6.2.2 Pupil-Teacher Ratio

While the triple interaction term ($\hat{\delta}_1$) is not significant in Specification (2), which uses the same sample of high school and unified districts as in Specification (1) but the pupil-teacher ratio to measure outcomes, both the direct effects of educational outcomes ($\hat{\delta}_2$) and centralization ($\hat{\delta}_4$) on reelection probabilities are significantly different before and after 2001. These two coefficients draw a picture of the effect of NCLB similar to the one that emerges from the dropout rate specification: In the post-reform period, the pupil-teacher ratio is more negatively correlated with reelection probability than before (as revealed by a negative $\hat{\delta}_2$), and the federal share is also more negatively correlated with the dependent variable (negative $\hat{\delta}_4$).[40] Finally, note that according to the results

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[39] In this section, the outcome variables are measured in levels. Note however that with district fixed effects included identification comes from within-district changes over time in the variables.

[40] Note that these negative coefficients are compensated to some extent by the positive estimated direct effect of the NCLB dummy.

for Specification (3) these effects do not seem to be present in primary school districts.

Overall, the results of this section suggest that NCLB is affecting local democracy in California's high school and unified districts. Interestingly, these exploratory results seem to indicate an improvement in local electoral accountability associated with the increased federal intervention characterizing the post-2001 period.

7 Conclusion

The role of the ballot box as a discipline on the providers of public goods has been an issue of longstanding interest in public economics. One requirement for the ballot box to exert an influence is that voters should be responsive to the performance of incumbents. As a consequence, the ability of voters to hold politicians accountable depends crucially on the information available to them when casting their ballot. While the extent to which voters have sufficient information to link outcomes to the politician who is responsible for them is unobservable, it is likely to vary with features of the institutional environment. And here, of primary importance is the number of levels of government being involved.

This paper has provided an empirical exploration of the effects of school finance centralization on local electoral accountability. To identify the effect of policy outcomes and centralization on the reelection probabilities of school board members, it exploited both between-district and within-district time variation associated with the peculiarities of state and federal transfer programs to school districts in California. In particular, the analysis covered both the pre-NCLB and post-NCLB periods.

Three main conclusions can be drawn from the analysis. First, somewhat surprisingly and contrary to what critics of centralized school finance often argue, some electoral accountability is apparent in California's public school boards despite the system's highly centralized nature. Second, an incumbent's reelection probability tends to be lower in highly centralized districts – a given policy outcome will deliver a lower reelection probability. This can be seen as a parallel shift down in the reward scheme of incumbents. And third, the increased involvement of the federal government after 2001 appears to have sharpened local electoral accountability.

The analysis has caveats. For example, both policy and political outcomes are measured at the district level, thus aggregating potentially diverging trends at the school level. Indeed, some schools in a district may be performing well while others are trailing. Also, outcomes are measured annually while it could be more appropriate in some instances to average them over electoral cycles. Future work should be conducted to assess the robustness of the results, chiefly by analysing a broader set of policy outcomes in California. However, the crucial need for more comprehensive datasets on local electoral outcomes must also be addressed in order to replicate the analysis in other jurisdictions with different institutional features.

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Table 1. Descriptive statistics, election variables, district averages of ward-level results, 1995-2004

Year	Elections	Incumbents reelected (share)		Incumbent vote share		Number of candidates	
	Count	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1995	216	.7923	.3319	.3108	.1415	4.68	2.20
1996	292	.7863	.3414	.3259	.1283	4.23	2.26
1997	222	.7342	.3398	.2437	.0883	5.30	1.99
1998	291	.8386	.2889	.2931	.1374	4.80	2.02
1999	195	.7419	.3537	.2984	.1167	4.54	2.01
2000	275	.7508	.3651	.3192	.1292	4.21	1.75
2001	215	.7733	.3272	.2744	.1246	4.90	2.07
2002	321	.7944	.3162	.2834	.1260	4.69	1.89
2003	195	.7697	.3439	.3054	.1266	4.41	1.88
2004	285	.7760	.3368	.3318	.1280	4.01	1.70
Total	2507	.7784	.3344	.2999	.1283	4.56	2.01

Table 2. Descriptive statistics, public finance and policy outcome variables, district averages, 1995-2004

Year	State transfers (share of total revenues)	Federal transfers (share of total revenues)	Dropout rate (%)	Pupil-teacher ratio (count)
1995	.5113	.0710	3.07	22.91
	(.1607)	(.0530)	(2.18)	(3.80)
1996	.5210	.0695	2.67	21.61
	(.1607)	(.0517)	(2.15)	(3.60)
1997	.5662	.0622	2.42	20.17
	(.1580)	(.0473)	(1.78)	(3.25)
1998	.5697	.0631	2.39	19.71
	(.1554)	(.0481)	(1.78)	(3.13)
1999	.5534	.0662	n/a	19.49
	(.1597)	(.0529)		(3.29)
2000	.5506	.0693	2.12	19.31
	(.1591)	(.0558)	(1.82)	(3.07)
2001	.5716	.0666	2.19	19.33
	(.1562)	(.0521)	(2.79)	(3.14)
2002	.5410	.0780	2.11	19.41
	(.1654)	(.0540)	(2.77)	(3.20)
2003	.5321	.0884	2.44	19.91
	(.1707)	(.0636)	(4.95)	(3.36)
2004	.4963	.0977	2.55	19.84
	(.1724)	(.0633)	(4.61)	(3.29)
Total	.5487	.0715	2.44	20.17
	(.1663)	(.0550)	(3.01)	(3.50)
N	11847	11847	3397	9524

Note: Standard deviations in parentheses.

Table 3. Dropout rate regressions, high school and unified districts only

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample		Positive outcomes		Negative outcomes	
Change in dropout rate	-.0074	-.0235**	-.0277*	-.0286	.0296	.0213
	(.0088)	(.0111)	(.0167)	(.0206)	(.0251)	(.0366)
Dropout rate	.0031	.0075	.0065	.0075	-.0121	.0023
	(.0065)	(.0117)	(.0085)	(.0196)	(.0161)	(.0262)
Federal share	-.9890**	-.2469	-1.3974**	.7467	-.4934	.1150
	(.4118)	(.8483)	(.5707)	(1.5865)	(.6561)	(1.8347)
State share	-.1004	-.2062	-.0327	-.0854	.0477	.1456
	(.1471)	(.2687)	(.2035)	(.4414)	(.2286)	(.4757)
Student enrollment	.0000	.0000	.0000	.0000	.0000	.0000
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
Number of schools	-.0033	-.0149**	.0011	.0043	-.0068*	-.0179
	(.0027)	(.0073)	(.0043)	(.0139)	(.0035)	(.0158)
High school district	.0829**	-.6058*	.1130**	-.5414	.0901	--
	(.0394)	(.3432)	(.0547)	(.3531)	(.0622)	
Incumbent vote share	1.1969***	1.9983***	1.1650***	1.8544***	1.3820***	2.4656***
	(.1636)	(.1688)	(.2051)	(.2791)	(.2087)	(.3513)
Number of candidates	.0281**	.0193**	.0170	.0220	.0518***	.0604***
	(.0133)	(.0084)	(.0153)	(.0158)	(.0143)	(.0205)
Fixed effects	No	Yes	No	Yes	No	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	No	Yes	No	Yes	No
R^2	.2085	.0466	.2650	.0187	.2385	.1102
Observations	743	882	411	490	332	392

Notes: Dependent variable: reelection probability. Constants included but unreported. Robust standard errors in parentheses, adjusted for clustering (specifications 1, 3, 5). Levels of statistical significance: 1% (***), 5% (**) and 10% (*).

Table 4. Pupil-teacher ratio regressions, all districts

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample		Positive outcomes		Negative outcomes	
Change in pupil-teacher ratio	-.0147**	-.0079	-.0158*	.0009	-.0438***	-.0626**
	(.0060)	(.0069)	(.0094)	(.0136)	(.0143)	(.0270)
Pupil-teacher ratio	.0050	.0071	.0028	.0026	.0062	.0339*
	(.0041)	(.0074)	(.0049)	(.0120)	(.0064)	(.0172)
Federal share	-.1859	.3165	-.4673*	-.0118	.2270	1.1366
	(.2052)	(.3737)	(.2394)	(.4992)	(.3202)	(1.0053)
State share	.0367	-.2808*	-.0167	-.0131	.1325	-.6057*
	(.0813)	(.1493)	(.1009)	(.2454)	(.1297)	(.3454)
Student enrollment	.0000	.0000**	.0000	.0000	.0000	.0000
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
Number of schools	-.0042*	-.0188***	-.0053*	-.0079	-.0013	.0046
	(.0024)	(.0062)	(.0027)	(.0078)	(.0042)	(.0254)
Primary school district	.1051***	.0056	.1128***	-.0669	.1031***	.3012**
	(.0200)	(.0697)	(.0250)	(.1026)	(.0296)	(.1477)
High school district	.0760**	-.6273*	.0860**	-.8576**	.0582	--
	(.0360)	(.3368)	(.0419)	(.3980)	(.0578)	
Incumbent vote share	1.4283***	2.0725***	1.3571***	1.9002***	1.6759***	1.7901***
	(.1210)	(.1045)	(.1575)	(.1526)	(.1505)	(.2356)
Number of candidates	.0437***	.0366***	.0421***	.0304***	.0528***	.0216
	(.0103)	(.0058)	(.0141)	(.0082)	(.0115)	(.0134)
Fixed effects	No	Yes	No	Yes	No	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Census controls	Yes	No	Yes	No	Yes	No
R^2	.1977	.0753	.1935	.0347	.2501	.1571
Observations	1895	2236	1155	1356	712	848

Notes: Dependent variable: reelection probability. Constants included but unreported. Robust standard errors in parentheses, adjusted for clustering (specifications 1, 3, 5). Levels of statistical significance: 1% (***), 5% (**) and 10% (*).

Table 5. Effect of No Child Left Behind on Local Electoral Accountability

	(1)	(2)	(3)
	Dropout rate	**Pupil-teacher ratio**	
	High & unified districts	**High & unified districts**	**All districts**
Outcome*Federal share*Post-NCLB	-.4436*	.2633	-.0386
	(.2399)	(.1636)	(.0939)
Outcome*Post-NCLB	.0408*	-.0402**	.0060
	(.0238)	(.0161)	(.0098)
Outcome*Federal share	.2471	.0041	-.0342
	(.1631)	(.1376)	(.0750)
Federal share*Post-NCLB	.8907	-5.4825*	.8000
	(.7277)	(3.2994)	(1.8384)
Outcome	-.0242	.0157	.0029
	(.0159)	(.0147)	(.0076)
Post-NCLB	-.2847***	.6925*	-.2777
	(.1106)	(.3614)	(.2159)
Federal share	-.4613	-.1630	.8898
	(.7547)	(2.7844)	(1.5584)
State share	.0168	.0185	-.1625
	(.2218)	(.2219)	(.1394)
Student enrollment	.0000	.0000	.0000**
	(.0000)	(.0000)	(.0000)
Number of schools	-.0133	-.0144*	-.0202
	(.0085)	(.0085)	(.0060)
Primary school district			-.0143
			(.0700)
High school district	-.3833	-.3951	-.4525
	(.3277)	(.3271)	(.3211)
Incumbent vote share	2.0487***	2.0657***	2.0766***
	(.1379)	(.1376)	(.0973)
Number of candidates	.0286***	.0294***	.0385***
	(.0069)	(.0069)	(.0054)
Fixed effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
R^2	.0615	.0717	.0829
Observations	1167	1167	2458

Notes: Dependent variable: reelection probability. Constants included but unreported. Standard errors in parentheses. Levels of statistical significance: 1% (***), 5% (**) and 10% (*).

Map 1. Public schools and counties, 2000 census

Legend	Map Details
• Public Schools • More Cities ▢ County ▢ State	**State:** California **School District:** None

Map Image

http://maps.nces.ed.gov/sddsgis
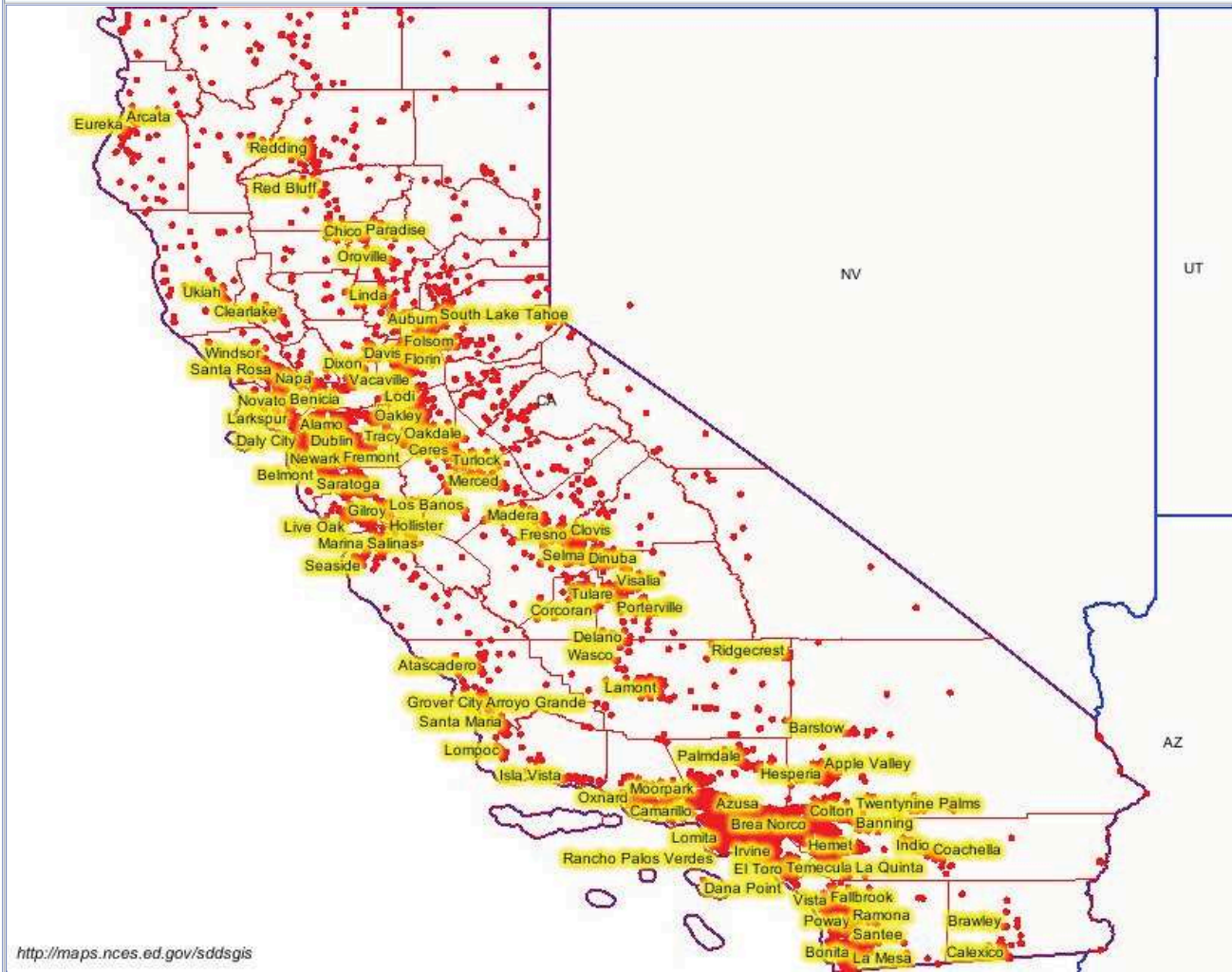
Map 2. Total district population, unified districts, 2000 census

Legend	Map Details
Total Population **Cities** **Unified** 0 - 5075 5076 - 10779 10780 - 23675 23676 - 38065 38066 - 68379 68380 - 124547 > 124547	**State:** **California** **School District:** **Unified** **Demographic Option: Total Population**

Map Image

http://maps.nces.ed.gov/sddsgis

```
Map 3.  Total district population, elementary districts, 2000 census
```

Legend	Map Details

Total Population
- Cities

Elementary

- 0 - 534
- 535 - 1428
- 1429 - 2999
- 3000 - 6530
- 6531 - 15971
- 15972 - 39835
- > 39835

State: California
School District: Elementary
Demographic Option: Total Population

Map Image

NV

UT

AZ

Sacramento

Oakland

San Jose

Fresno

Los Angeles

Anaheim
Santa Ana

San Diego

http://maps.nces.ed.gov/sddsgis
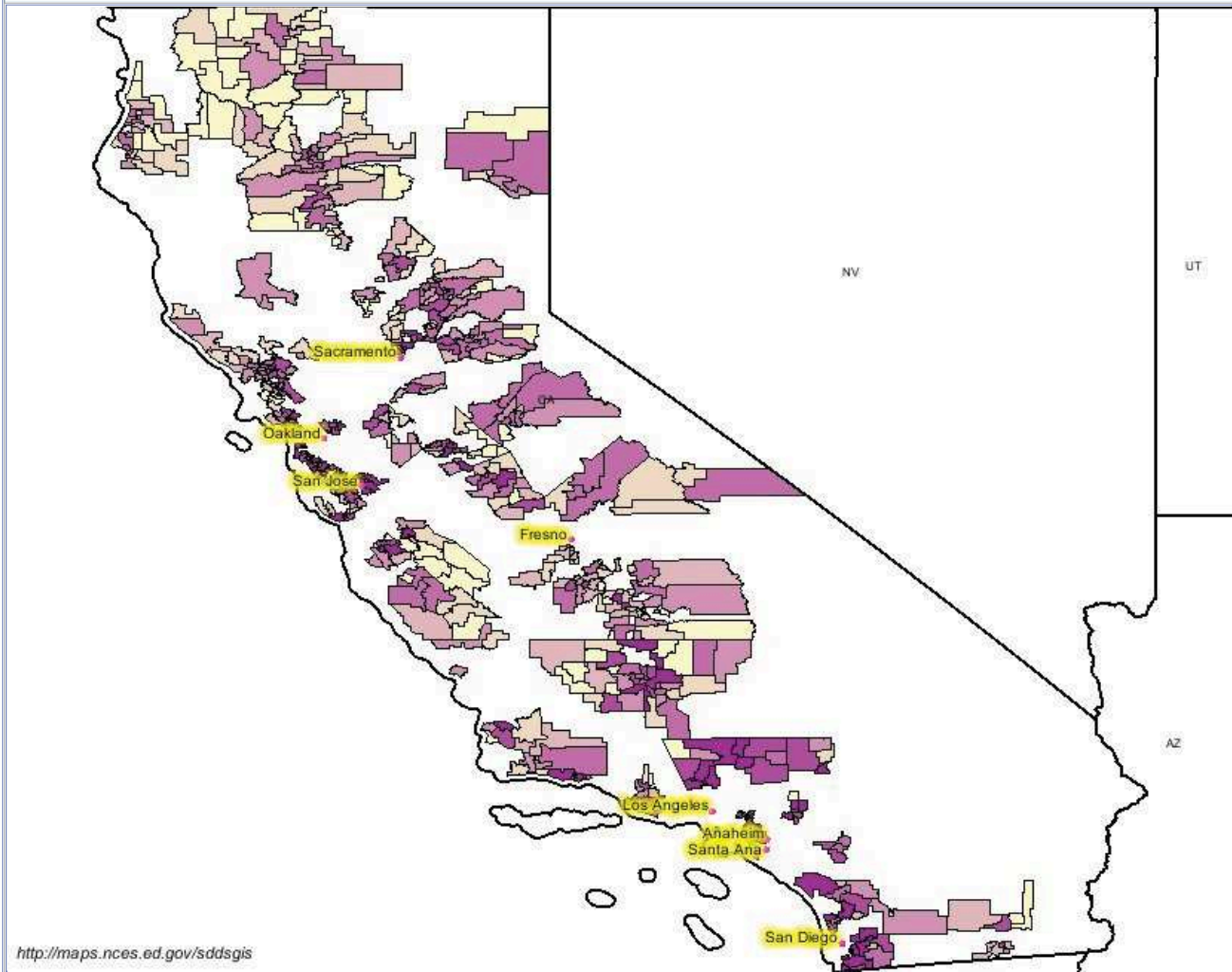
```
Map 4. Total district population, secondary districts, 2000 census
```

Legend	Map Details

Total Population
- **Cities**
  Secondary

- 0 - 8566
- 8567 - 19254
- 19255 - 41819
- 41820 - 77558
- 77559 - 137595
- 137596 - 213544
- > 213544

State: California
School District: Secondary
Demographic Option: Total Population

Map Image

http://maps.nces.ed.gov/sddsgis

Map 5. Non-white population, unified districts, 2000 census

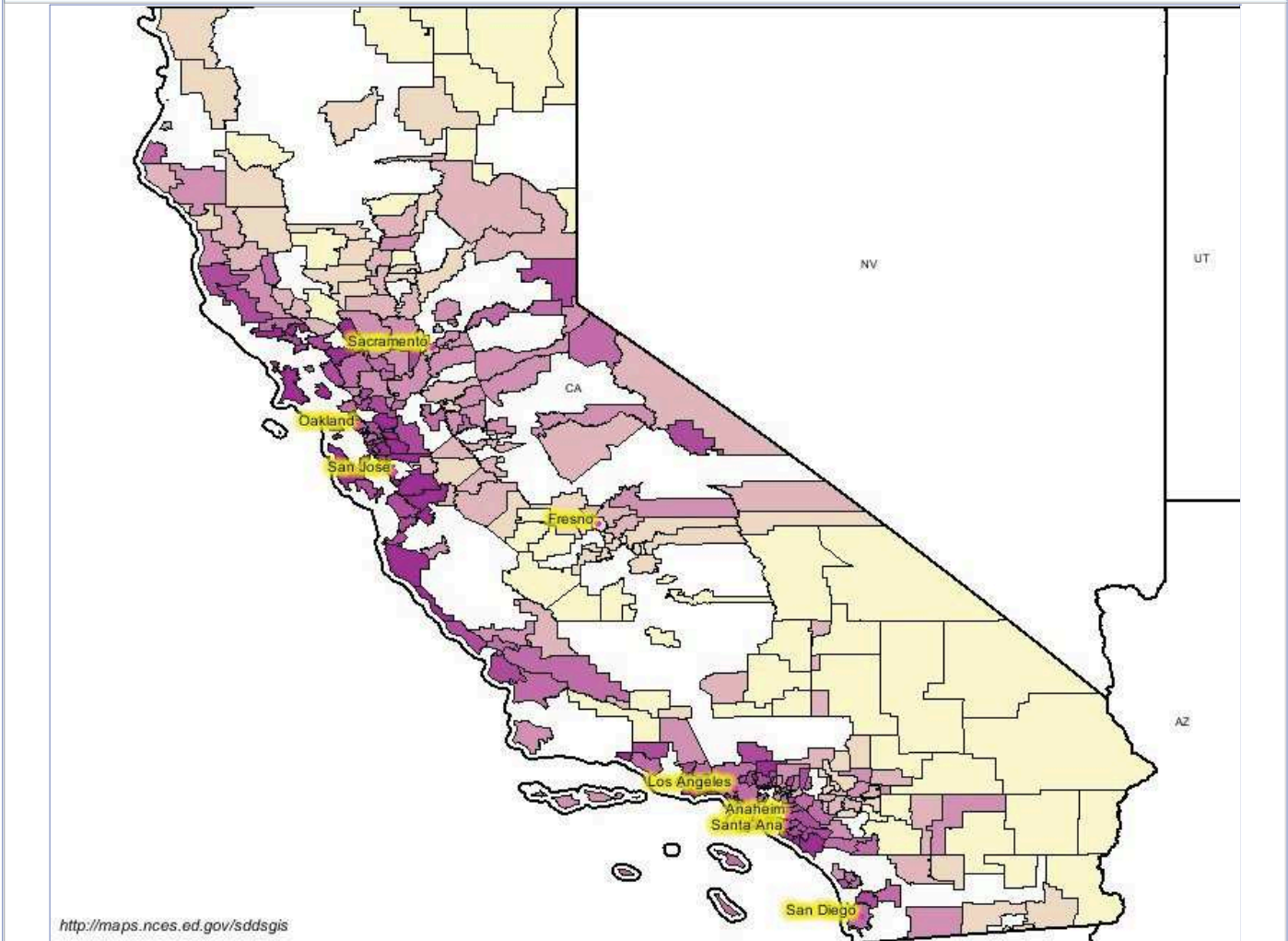| Legend	Map Details
% Non white Alone • Cities Unified ☐ 0% - 20.23% ☐ 20.24% - 27% ☐ 27.01% - 34.55% ☐ 34.56% - 44.78% ☐ 44.79% - 58% ☐ 58.01% - 71.37% ☐ > 71.37%	**State:** California **School District:** Unified **Demographic Option:** Percentage Non white Alone

<div align="center">Map Image</div>
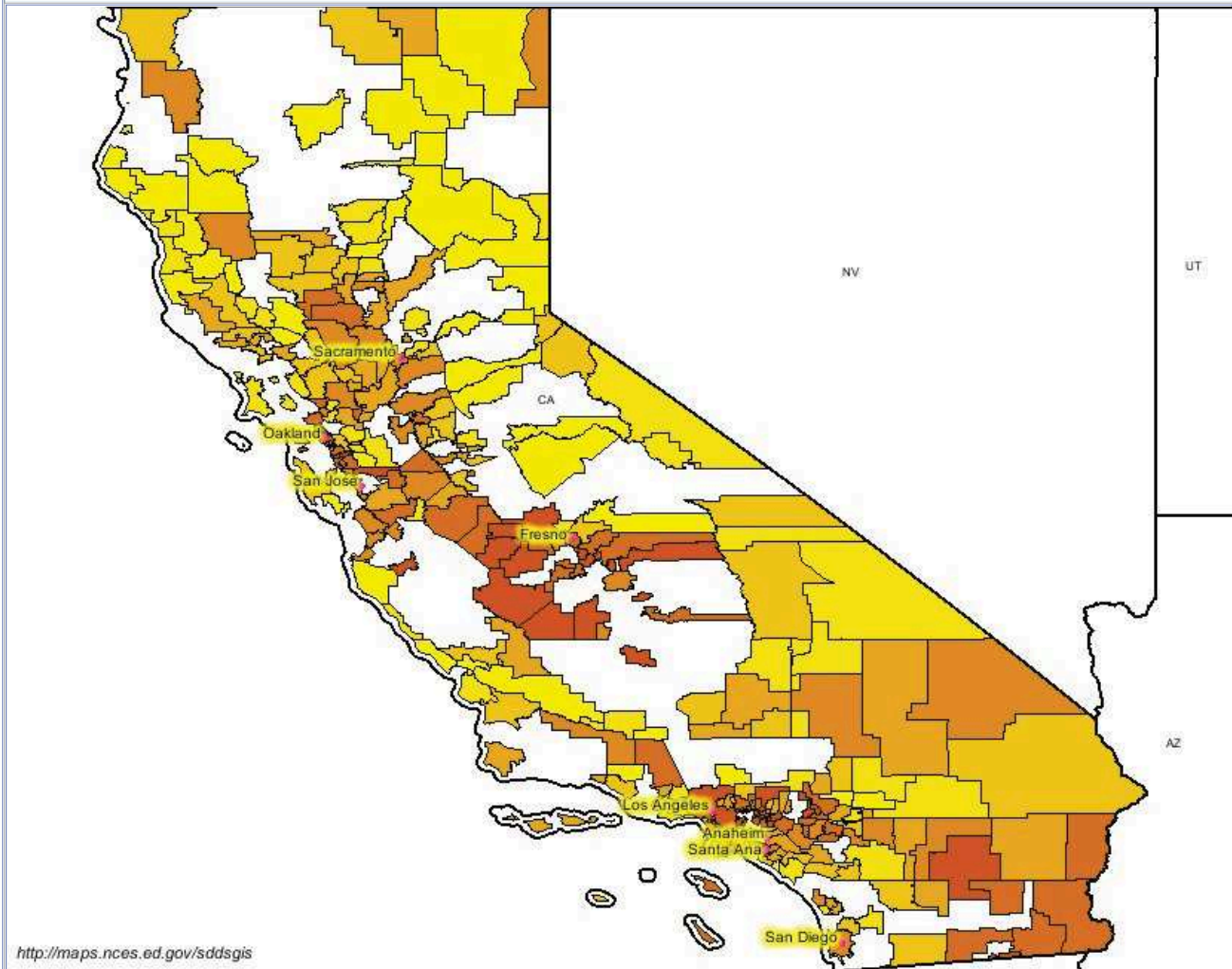
Map 6. Median house value (all owner-occupied units), unified districts, 2000 census

Legend	Map Details
Median Value **Cities** **Unified** 0 - 86600 86601 - 113100 113101 - 143900 143901 - 178800 178801 - 237300 237301 - 327400 > 327400	**State:** California **School District:** Unified **Demographic Option:** Median Value (Dollars) For All Owner-Occupied Housing Units

Map Image

http://maps.nces.ed.gov/sddsgis

2007

2007/1. Durán Cabré, J.Mª.; Esteller Moré, A.: "An empirical analysis of wealth taxation: Equity vs. tax compliance"

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2008

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