Does Local Control Increase Or Limit Districts' Ability To Exercise Market Power?

By

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CHAPTER 1

Introduction

A state's approach to school finance determines who, ultimately, has governing and decision-making authority over how funding for education is allocated. In some states, districts and schools receive funding in two forms: base funding, which is meant to cover basic costs like salaries and textbooks, and categorical funding, which can be directed towards specific programs like special education or towards policy objectives like reducing class sizes (Smith, Gasparian, Perry, & Capinpin, 2013). In a highly centralized system, state policymakers determine not only how much funding districts and schools receive, but also how this money is to be spent and what policies schools would implement using these funds. This type of system would have a high proportion of categorical funds, giving districts and communities little flexibility in determining how to allocate their resources and targeting local needs. A highly decentralized system would have few restrictive categorical funds and instead give districts and schools decision-making power over budgeting and resource allocation. A policy brief published in 2013 by the Center for American Progress found that there has been a downward trend in the number of state categorical funding programs since 2008 (Smith et al., 2013), indicating that states are moving towards more decentralized school finance programs. While critics of categorical programs would argue this to be a move in the right direction because it would allow districts the flexibility to innovate and address local needs, it could also lead some districts to allocate resources away from student needs and towards administrative expenditures.

A policy offering districts greater local control over resource allocation could work in favor of students only if district administrators feel sufficient pressure to use those resources

efficiently. Such pressure could come in the form of market pressure; the Tiebout model of public finance argues that because local governments compete for residents and their tax revenue, they are forced to allocate resources in an efficient way to match public preferences (Tiebout, 1956). School choice advocates use competition as one of their primary arguments for school choice: that traditional public schools and districts will also improve efficiency and performance when faced with competition from charter or private schools. In the absence of such competition, theory suggests that government agents are likely to pursue their own self-interests rather than those of taxpayers. Thus, monopolistic districts – that is, those that face little competition for enrollment from other nearby districts or charter schools – tend to allocate their resources inefficiently and have poorer student outcomes. This result has been documented extensively in research (e.g. Borland & Howsen, 1992; Grosskopf, Hayes, Taylor, & Weber, 2001; Hoxby, 2000; Marlow, 2000).

In addition to market competition, accountability mechanisms can also place pressure on districts to use resources efficiently. Policies and institutions can be designed to hold districts accountable in a variety of ways. The most common mechanism is through bureaucratic accountability, which is based on a hierarchical system in which the state exerts a high degree of control over districts and schools by instituting rules, procedures, rewards, or sanctions (Adams & Kirst, 1999). Since the implementation of the federal Every Student Succeeds Act (ESSA) in 2015, some states have redesigned their accountability systems to allow districts and communities greater levels of local control and governance. This study focuses on one state – California – and its recently implemented school finance and accountability system. California has been at the forefront of the shift towards local control with the passage of the Local Control Funding Formula (LCFF) in 2013. LCFF has dramatically changed the way schools are funded: it eliminates most restrictive categorical funds, giving districts a standard, per-pupil base rate

with additional funding for English learners, students receiving free or reduced-price meals, and foster youth. Importantly, the policy also requires districts to involve community stakeholders in determining school priorities and allocating resources.

There are two key aspects of local control at play under this new policy: the authority that school districts have over resource allocation, and the power the community has to exercise democratic accountability over district leaders. Because districts have even more power over resource allocation decisions under this new policy, it's possible that those that face less competition for enrollment might allocate resources away from instruction and towards administration in the form of salaries and benefits. However, because parents now have more power in determining how districts spend their money under LCFF, this could negate the effects of monopoly power that previous studies have found and force even monopolistic districts with to allocate their resources efficiently.

As such, LCFF offers a unique opportunity to test whether decentralizing school finance decision-making to districts administrators while simultaneously giving communities power to directly engage with the budget allocation process has a positive or negative effect on the relationship between market power and district expenditures. A positive change in the relationship between market power and per-pupil expenditures on salaries and benefits would imply that monopolistic districts use their new allocative authority under LCFF to engage in bureaucratic expansion and that democratic accountability does not place sufficient pressure to curb this monopolistic behavior. A negative change, on the other hand, would suggest that community control can serve as a mechanism to limit a district's ability to exercise its market power. The two research questions I aim to address in this study are:

1. To what extent did the relationship between market power and total expenditures in CA school districts change after the advent of increased local control?

2. To what extent does the change in the relationship between market power and expenditures differ when looking at instructional expenditures as opposed to staff salaries and benefits?

To answer these questions, I use panel data from 2009-10 to 2015-16 of Californian school districts and charter schools that serve grades 10, 11, and 12. Data come from the National Center for Education Statistics' Common Core of Data and the US Census Bureau's Small Area Income and Poverty Estimates. I use the Herfindahl-Hirschman Index to measure market concentration of districts that serve secondary grades within each of the 58 counties in California. I use two different OLS regression models with fixed effects to examine the impact of LCFF on the relationship between market power and district expenditures. In the first, I treat LCFF as a one-time policy shock and in the second, I allow the effect of the policy to vary over the three post-policy years. I also include controls for district size, and student demographics.

In both models, I find that all districts increase expenditures post LCFF; this is expected as funding levels increased in the years after the policy was implemented. I also find that the expenditure gap between districts in competitive markets and those in concentrated markets narrows after LCFF. For example, using the first model, I find that a one standard deviation increase in a district's Herfindahl-Hirschman Index (HHI) score is associated with a 1.8 percentage point lower increase in total expenditures. Districts in perfectly monopolistic markets increased total expenditures by 12.6% in the years after LCFF was implemented, whereas districts with an HHI score one standard deviation above only increased total expenditures by 10.8% compared to their pre-LCFF levels. The expenditure gaps also narrow over time when I allow the policy to have a variable effect in the post-policy years. By 2015, a one standard deviation increase in a district's HHI score is associated with a 3.9 percentage point smaller

increase in total expenditures. I find that the patterns for instructional expenditures and expenditures on salaries and benefits are similar; all districts increase expenditures but districts with more monopoly power increase these expenditures by less than districts without monopoly power.

These results seem to support the theory that local control can curb monopolistic behavior. The reduction in the spending gap between districts with and without monopoly power could be driven by community pressure on district bureaucrats to allocate resources more efficiently. However, it is difficult to isolate the mechanism behind these observed changes. Community and market pressure, for example, could have driven districts in competitive markets to increase per-pupil expenditures after LCFF and close the expenditure gap between districts with monopoly power and those facing competition. These districts could also have simply received more funding via LCFF than monopolistic districts, leading them to increase expenditures at greater rates than those districts.

This study is the first to examine how a policy that simultaneously decentralizes authority over resource allocation to, and theoretically increases community pressure on district bureaucrats could affect the way they exercise their market power and pursue their own bureaucratic self-interests. While the results presented in this paper cannot be used to make causal claims about the effect of LCFF on whether districts facing varying levels of competition allocate their resources differently, it lays the foundation for future studies to further examine the policy's effects. It's clear that monopolistic districts changed their spending behavior after LCFF was put into effect; future research should study the underlying mechanisms behind these observed changes.

In section II, I review the literature on school competition, bureaucracy, and democratic engagement. Section III contains an overview of my data and methodological approach. My

results are presented in Section IV and I discuss policy implications, limitations, and avenues for future research in Section V. Tables and figures follow the discussion.

CHAPTER 2

Literature Review

2.1 Bureaucracy and Competition

Economists have long posited that education can be viewed as a market that, much like a traditional market for goods, can benefit from competition (Corcoran & Cordes, 2017). Charles Tiebout's seminal 1956 paper theorized that residential mobility, or "voting with one's feet," can generate competition between neighboring governments, and that this competition leads to an efficient production of goods that meets constituents' demands (Tiebout, 1956). This view can be extended to the provision of public education; families can choose where to live based on school quality, and thus, schools and districts compete with each other for residents and their tax revenues. Niskanen's theory (1971) of bureaucracy further extends this concept of competition between bureaus by suggesting that public bureaus that face little competition or oversight from elected officials or the community allocate their resources inefficiently. Unlike private firms that seek to maximize profits, bureaucrats are motivated to maximize their budgets, because with larger budgets comes higher salaries and more power. In order for districts to maximize budgets, they must compete for student enrollment and tax revenues. When faced with competition from nearby districts, district administrators must allocate resources in a way that maximizes school quality in order to attract or retain residents and students. When districts face little competition from other nearby districts or charter schools, they have little incentive to allocate funds towards improving school quality and can instead direct those funds towards their own bureaucratic self-interest.

The literature shows that Niskanen's theories are true to some extent in the domain of public education. Borland and Howsen (1992) find a weakly significant negative relationship between market concentration and student achievement. That is, they found that districts in more monopolistic markets tended to have lower student achievement than those that face competition. Hoxby studied Tiebout choice using geographic barriers, specifically, streams, to determine the level of choice families in metropolitan areas had over which school to send their children (Hoxby, 2000). She found that increasing Tiebout choice – that is, increasing competition between districts – increases student achievement and short- and long-run outcomes while simultaneously lowering per-pupil district expenditures, implying that competition enhances allocative efficiency. She also found that productivity gains from competition are higher in states which give districts more control over finances, indicating that districts respond strongly to competition when they have more freedom to allocate their resources. These results imply the opposite case as well – that monopolistic districts tend to be more inefficient when they have a higher level of control over their resources.

Other studies have also documented similar results. Marlow found that Californian districts in concentrated markets tended to have higher per-pupil expenditures (Marlow, 2000). In another paper on districts in California, he found that monopolistic districts engage in bureaucratic expansion by hiring more administrators and teachers (Marlow, 2001). A study on Texas school districts found that competition is associated with lower allocative inefficiency (Grosskopf et al., 2001). An important result from this study was that allocative inefficiency was also lower in districts with higher levels of voter monitoring, implying that democratic accountability could limit monopolistic behaviors in districts that face little competition. A number of studies (e.g. Arsen & Ni, 2012; Cook, 2018; Duncombe, Miner, & Ruggiero, 1997) have shown that competition from private or charter schools also increases efficiency.

While these studies paint a strong picture about the relationship between market power and efficiency, none have yet to examine how this relationship changes in the context of a policy shift which could theoretically have implications on the extent to which monopolistic districts can exercise their market power. This study aims to fill that gap.

2.2 Local Control and Democratic Engagement

Local control has been a key component of the American education system throughout its history. Until the middle of the twentieth century, education had been largely left to communities to decide how their children would be educated. The state role expanded in the face of enrollment booms of the 1950s and 60s, and it was only with the 1965 passage of the Elementary and Secondary Education Act (ESEA) that the federal government stepped in to play a larger role in education (Fuhrman & Elmore, 1990). The state and federal roles expanded over the next 50 years with increasing regulations on school finance, equity, and standards reform. Some contended that local control was facing its demise in the face of these changes (Doyle & Finn, 1984). On the other hand, Fuhrman and Elmore (1990) argue that state and local control are not a zero-sum game; that is, this increase in federal and state power did not necessarily mean a decrease in power for local districts and schools. In fact, they state that "framing state-local relationships in terms of 'control' over education by either the state or local districts is neither productive nor accurate," (Fuhrman & Elmore, 1990, p. 88).

However, local control under LCFF is starkly different from the type of local control communities had up until the mid-twentieth century. While schools and districts may be allowed to shape their priorities and budgets based on local needs, they are still subject to bureaucratic accountability policies imposed by state governments, as mandated by ESSA. The recent accountability policy shift in California exemplifies this notion. The state's pre-LCFF education

policies have been characterized as “all-encompassing, removing local influence over what is taught, and taking away local authority over how much is spent,” (Picus, 2009, p. 10). The shift to LCFF and the corresponding new accountability system could be construed as a restoration of local influence and authority. However, even though “local control” is heavily emphasized in California’s new school finance and accountability policies, the state department of education has arguably ceded little control over to districts in these areas. Rather, state policymakers have placed the burden of allocating funds efficiently to meet student needs onto districts and communities in order to use their ground-level expertise on local needs. The state continues to dictate how much money districts receive and what standards are taught in classrooms, and still monitors and publicly reports school and district performance. Still, the new policies do enhance local decision-making and remove restrictions on a large portion of school funding, so it is worth questioning whether these new policies achieve their intended effects.

CHAPTER 3

Data and Methods

This study utilizes directory, enrollment, and financial data on Californian school districts from the US Department of Education Common Core of Data (CCD) and poverty estimate data from the US Census Bureau Small Area Income and Poverty Estimates (SAIPE). Data were downloaded from the Urban Institute's Education Data Portal (2019), which combines data on school districts from a variety of sources including CCD and SAIPE. Data from each of these datasets were matched based on the NCES LEA ID and school year.

The sample includes all Californian local educational agencies from the 2009-10 to 2015-16 school years which serve grades 10, 11, and 12; this includes high school districts, unified districts, and charter schools that enroll secondary students. The sample was restricted to these districts because in California, districts that serve high school grades operate in a more concentrated market than do districts that only serve elementary grades, so including all districts within a county to calculate market concentration would result in biased estimates.

The key dependent variables used in this study are total expenditures, instructional expenditures, and total expenditures on salaries and benefits. Instructional expenditures reflect expenditures allocated directly towards instruction, including teacher salaries and instructional equipment. Total expenditures on salaries and benefits reflect salaries and benefits for both instructional and administrative staff. These data are reported to the US Census Bureau by districts on the F-33 Annual Survey of School System Finances, which are then made available on the CCD.

Table 1 includes descriptive statistics of the relevant variables by school year. There are 442 unique districts in the sample, although some do not have expenditure data in some years.

Expenditures per pupil are relatively stable during the seven years included in the study. Districts spent approximately 50% of their budget on instruction and about 69% on salaries and benefits. LCFF was implemented in 2013-14 but was not fully funded in its first year because the state lacked resources to meet target funding levels (Johnson & Tanner, 2018). As depicted in the first three rows of Table 1, we observe a jump in expenditures in 2014-15 as a result of the state securing more funds to distribute to districts.

	2009	2010	2011	2012	2013	2014	2015	Total
Total Expenditures Per Pupil	12,125	11,732	11,446	11,237	11,717	12,336	13,438	12,000
	(4819.7)	(4607.1)	(4459.2)	(4393.3)	(4922.7)	(4668.2)	(5872.9)	(4884.8)
Instructional Expenditures Per Pupil	6,005	5,870	5,654	5,566	5,763	6,199	6,682	5,960
	(1882.3)	(1901.6)	(1616.0)	(1735.6)	(1778.3)	(1804.5)	(1842.6)	(1829.2)
Salaries & Benefits Per Pupil	8,373	8,168	7,905	7,799	7,999	8,515	9,173	8,273
	(2750.9)	(2821.5)	(2426.9)	(2694.7)	(2860.8)	(2704.9)	(2687.7)	(2742.1)
2-Yr Moving Average Herfindahl Score	0.257	0.256	0.252	0.253	0.253	0.248	0.248	0.252
	(0.186)	(0.182)	(0.177)	(0.181)	(0.181)	(0.181)	(0.177)	(0.181)
Total Enrollment	11,358	11,270	11,233	11,195	11,176	11,620	11,306	11,307
	(34450.7)	(34145.4)	(33792.8)	(33554.6)	(33443.7)	(33742.2)	(32981.5)	(33699.9)
% EL	23.0%	17.8%	18.6%	18.0%	18.0%	18.0%	17.8%	18.7%
	(17.45)	(16.74)	(14.36)	(13.95)	(13.70)	(13.28)	(13.42)	(14.87)
% Economically Disadvantaged	17.3%	19.6%	20.2%	21.1%	20.9%	20.2%	19.5%	19.8%
	(8.430)	(9.875)	(10.03)	(10.66)	(10.29)	(9.928)	(9.625)	(9.918)
% Special Education	9.4%	9.5%	9.6%	9.7%	9.8%	10.4%	11.6%	10.0%
	(3.224)	(3.316)	(3.322)	(3.285)	(3.584)	(2.906)	(2.634)	(3.272)
Observations	436	440	440	441	442	424	436	3,059

Standard deviations in parentheses. Expenditure variables in 2015 dollars.

Table 1: Descriptive Statistics of CA School Districts that Serve Grades 10, 11, and 12 from 2009-2015

The main independent variable used in this study is the Herfindahl-Hirschman Index (HHI), which is a measure of market concentration. It is calculated at the county level, meaning that each county is considered as a separate market and districts within each county compete only with other districts within the same county. From a public choice theory perspective, this

approach assumes that families are likely to stay within the county when considering moving to alternative school districts. Equation (1) shows the calculation of the HHI score, where d is district, k is county and t is year. Secondary enrollment is defined as total 10th, 11th, and 12th grade enrollment. 9th grade enrollment was not included in the secondary enrollment measure because there were a few elementary districts that served grade 9 which were excluded from the sample because they did not serve grades 10, 11, or 12.

$$\text{HHI Score}_{kt} = \sum_{d=1}^{D} \left(\frac{\text{secondary\_enrollment}_{dkt}}{\text{secondary\_enrollment}_{kt}} \right)^2 \quad (1)$$

The index takes on values between 0 and 1. A value approaching zero represents a highly competitive market, whereas a value of 1 represents a perfect monopoly. In order to interpret regression results, I consider the theoretical HHI score of 0 to represent a perfectly competitive market with infinite competition. According to the guidelines set by the U.S. Department of Justice and the Federal Trade Commission, an HHI between 0.15 and 0.25 represents a moderately concentrated market, and an HHI greater than 0.25 represents a highly concentrated market (US Deparment of Justice & Federal Trade Commission, 2010). Based on these guidelines, the average district in California serving secondary grades operates in just over the threshold of a highly concentrated market, as shown in Table 1. Note that the standard deviations are large relative to the means, so there is sufficient variation to ensure we are able to observe behavior of districts in markets at all levels of competition. Table 2 shows the distribution of HHI scores at the county level in each year. While the median county across all years is a highly concentrated market for public secondary education, we observe that the most counties become less concentrated markets over time. This is likely driven by charter school proliferation or districts fragmenting to serve growing populations in suburban areas or towns. Only two counties remain perfect monopolies for secondary grades from 2009 to 2015.

	2009	2010	2011	2012	2013	2014	2015	Total
Minimum	0.072	0.073	0.073	0.073	0.072	0.072	0.072	0.072
25th Pctile	0.158	0.158	0.158	0.156	0.154	0.145	0.149	0.152
50th Pctile	0.194	0.194	0.195	0.189	0.189	0.185	0.186	0.190
75th Pctile	0.310	0.308	0.302	0.296	0.302	0.292	0.301	0.302
Maximum	1	1	1	1	1	1	1	1
Mean	0.257	0.256	0.252	0.253	0.253	0.248	0.248	0.252
SD	0.186	0.182	0.177	0.181	0.181	0.181	0.177	0.181
N Counties	58	58	58	58	58	58	58	58

Table 2: Herfindahl-Hirschman Index by County

The district demographic variables included in this analysis are the shares of total enrollment that represent English Learners, Special Education students, and economically disadvantaged students. Table 1 shows that these proportions are fairly stable over time, although there is a slight increase and subsequent decrease in the share of economically disadvantaged students over the study period. Note that information on English Learner enrollment was missing for the 2010-11 school year, so this data was imputed as the average of the number of English Learners in the district in 2009-10 and 2011-12. These statistics describe total enrollment in districts included in our sample, not just enrollment in secondary grades.

I use an interrupted time series with heterogeneous effects design to model how LCFF has changed the relationship between market concentration and districts' per pupil total expenditures, instructional expenditures, and expenditures on salaries and benefits. I use the log of these three measures as the dependent variables in my models in order to reduce the influence of outliers. A district's HHI score may vary over time due to the introduction of a new competitor or due to minor changes in enrollment. Thus, market concentration is measured as the

two-year moving average HHI score for each district in each year in order to smooth these variations.

I consider two different models to estimate the effect of LCFF. Equation (2) represents the first model, in which I assume that the policy acts as a one-time shock in the year it was implemented. I use a post-LCFF dummy variable, $\mathrm{PostLCFF_t}$, which is equal to 1 for the 2013-14, 2014-15, and 2015-16 school years. I first include the post-policy dummy variable by itself in the equation to measure the effect of LCFF on school expenditures. LCFF increased the available revenue to districts which resulted in an increase in expenditures, so the coefficient on this variable captures this effect. I then include an interaction term between the post-LCFF dummy and the mean HHI score. While β_1 represents the pre-policy relationship between the $\mathrm{HHI_d}$ and $\ln(\mathrm{Exp_{dt}})$, the coefficient on the interaction term, β_3, is our coefficient of interest; it represents the post-LCFF change in the relationship between $\mathrm{HHI_d}$ and $\ln(\mathrm{Exp_{dt}})$. $\mathbf{X_{dt}}$ is a vector of district characteristics, namely, log total enrollment, percent English Learners, percent Special Ed, and percent economically disadvantaged. Finally, $\boldsymbol{\gamma_t}$ is a vector of district fixed effects.

$$\log(\mathrm{Exp_{dt}}) = \beta_0 + \beta_1 \mathrm{HHI_d} + \beta_2 \mathrm{PostLCFF_t} + \beta_3(\mathrm{HHI_d} * \mathrm{PostLCFF_t}) + \boldsymbol{\delta X_{dt}} + \boldsymbol{\gamma_d} + \varepsilon_{dt} \qquad (2)$$

In my second model, I consider the case where the policy has an accumulating effect over time. In order words, I let the effect of the policy on the relationship between the HHI score and expenditure to vary over each of the three post-LCFF years. It is reasonable to consider that the policy may have differential effects over time because of several factors. First, the state increased its funding to schools in increments over these years to target LCFF levels; thus, districts were potentially more able to respond to competition using this additional funding. Second, district administrators and communities may have gained a better understanding of the policy the longer

it was in effect, and thus may have changed their behavior accordingly over time. For example, it may have taken communities some time to learn about their ability under LCFF to engage in the resource allocation process, so district administrators in monopolistic districts may have faced different levels of pressure from the community to alter their resource allocation practices in each of the post-LCFF years. Equation (3) depicts this approach, with β_t being the set of coefficients on the interaction between each year dummy and the HHI score.

$$\ln(\mathrm{Exp_{dt}}) = \beta_0 + \beta_1 \mathrm{HHI_d} + \boldsymbol{\theta_t} + \boldsymbol{\beta_t}(\mathrm{HHI_d} * \boldsymbol{\theta_t}) + \boldsymbol{\delta X_{dt}} + \boldsymbol{\gamma_d} + \varepsilon_{dt} \qquad (3)$$

Here, $\boldsymbol{\theta_t}$ is a vector of year indicator variables. The coefficients of interest are $\boldsymbol{\beta_t}$, which are a vector of coefficients of interactions between HHI score and each year. I also include district characteristics and district fixed effects in this model.

Both models use robust standard errors clustered by district. There are a few limitations to these two models. while the percent of English Learners and economically disadvantaged students reflect population demographics to some extent, there may be additional population variables such as average level of education or proportion of the population represented by minorities which could affect the interaction between the policy and market concentration. For example, more educated populations may be more likely to engage in the district resource allocation process and thus may place more pressure on administrators to allocate resources efficiently than communities with lower levels of education. Such population characteristics are not included in my models due to the limitations of the data used for this analysis.

CHAPTER 4

Results

	(1) ln(Total Expenditures)	(2) ln(Instructional Expenditures)	(3) ln(Salaries & Benefits)
2-Yr Moving Average Herfindahl Score	0.0782	0.0925	0.0843
	(0.232)	(0.145)	(0.169)
Post-LCFF	0.148***	0.142***	0.131***
	(0.0104)	(0.0123)	(0.0105)
Herfindahl Score*Post_LCFF	-0.0998***	-0.133***	-0.108***
	(0.0227)	(0.0240)	(0.0196)
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes
Observations	3,059	3,059	3,059
Number of LEAs	442	442	442
R-squared	0.562	0.418	0.557

Clustered robust standard errors in parentheses. Expenditure variables are in 2015 dollars.
*** p<0.01, ** p<0.05, * p<0.1

Table 3: OLS Estimates of Relationship Between Market Concentration and District Expenditures - One Time Policy Shock

The OLS regression results for equation (2) are listed in Table 3. The coefficient on Post-LCFF represents the change in expenditure of a district in a perfectly competitive market after LCFF was implemented. We expect these coefficients to be positive because funding levels increased in the post-LCFF years. The coefficient on the Herfindahl index and post-LCFF interaction term represents the difference between a district in a perfectly competitive market's expenditure change and that of a monopolistic district. We observe that a district in a perfectly competitive market increased per pupil total expenditures by 14.8% after LCFF was implemented. However, a district with an HHI score one standard deviation (0.18, as reported in Table 1) above increased total expenditures per pupil only by 13%; in other words, such a district increased total expenditures per pupil after LCFF by 1.8 percentage points less than a district in a market with perfect competition. The coefficients for per pupil instructional expenditures and

total salaries and benefits per pupil indicate a similar pattern. Districts in perfectly competitive markets increased instructional expenditures by 14.2% post LCFF, whereas districts in a market with an HHI score one standard deviation above 0 only increased instructional expenditures by 11.8%, meaning that they increased spending by 2.4 percentage points less than a perfectly competitive district. Similarly, districts in a perfectly competitive market increased spending on total salaries and benefits by 13.1% after LCFF, but districts with an HHI score one standard deviation above only increased such spending by 11.2%, meaning that they increased spending by 1.94 percentage points less than a perfectly competitive district. All estimates are statistically significant at the 1% level. Note that the minor fluctuations in the two-year moving average HHI score of a district, driven by changes in enrollment or a new charter school entry, has no independent effect on district expenditures.

In order to ensure that these strong results are not driven by a single district, I conducted a jackknife analysis to see how the coefficient on the policy interaction term changes when different districts are dropped from the regression. Figures 1, 2, and 3 show jackknife estimates of this coefficient for the regressions for total expenditures, instructional expenditures, and expenditures on salaries and benefits, respectively. All three figures indicate a tight distribution of coefficient values, suggesting that these results are not shaped by any single district in the sample.

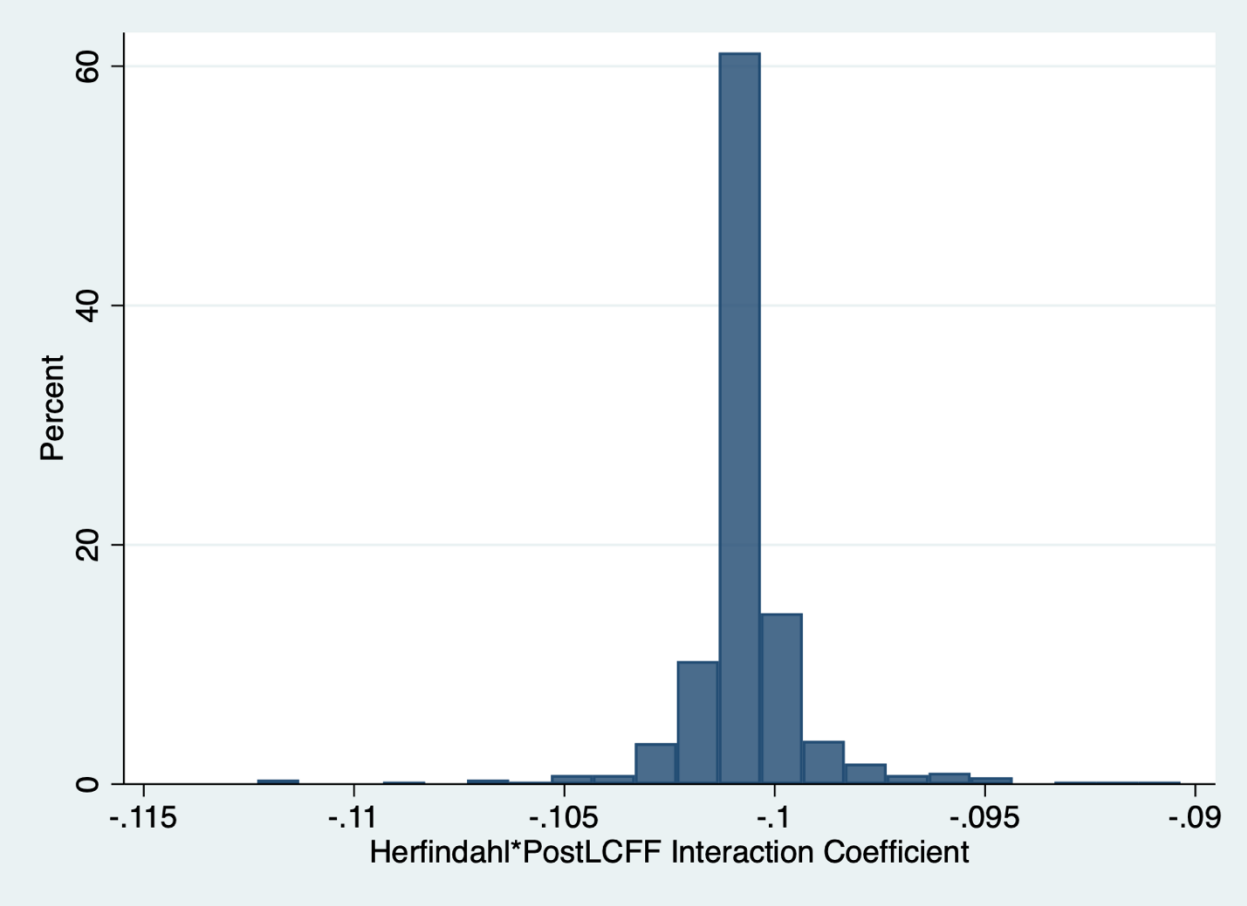

Figure 1: Jackknife Estimates of Policy Interaction Term Coefficient – Total Expenditures

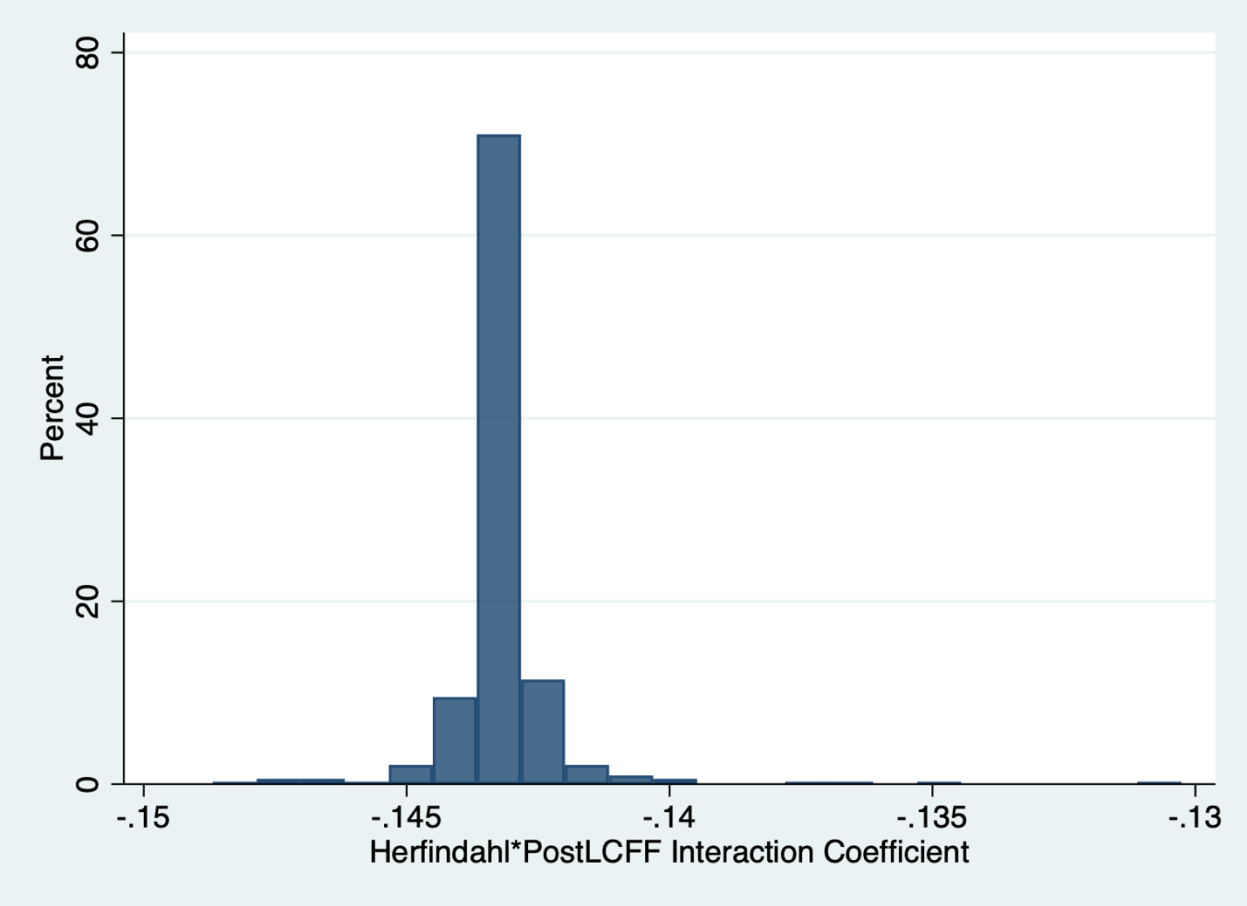

Figure 2: Jackknife Estimates of Policy Interaction Term Coefficient – Instructional Expenditures

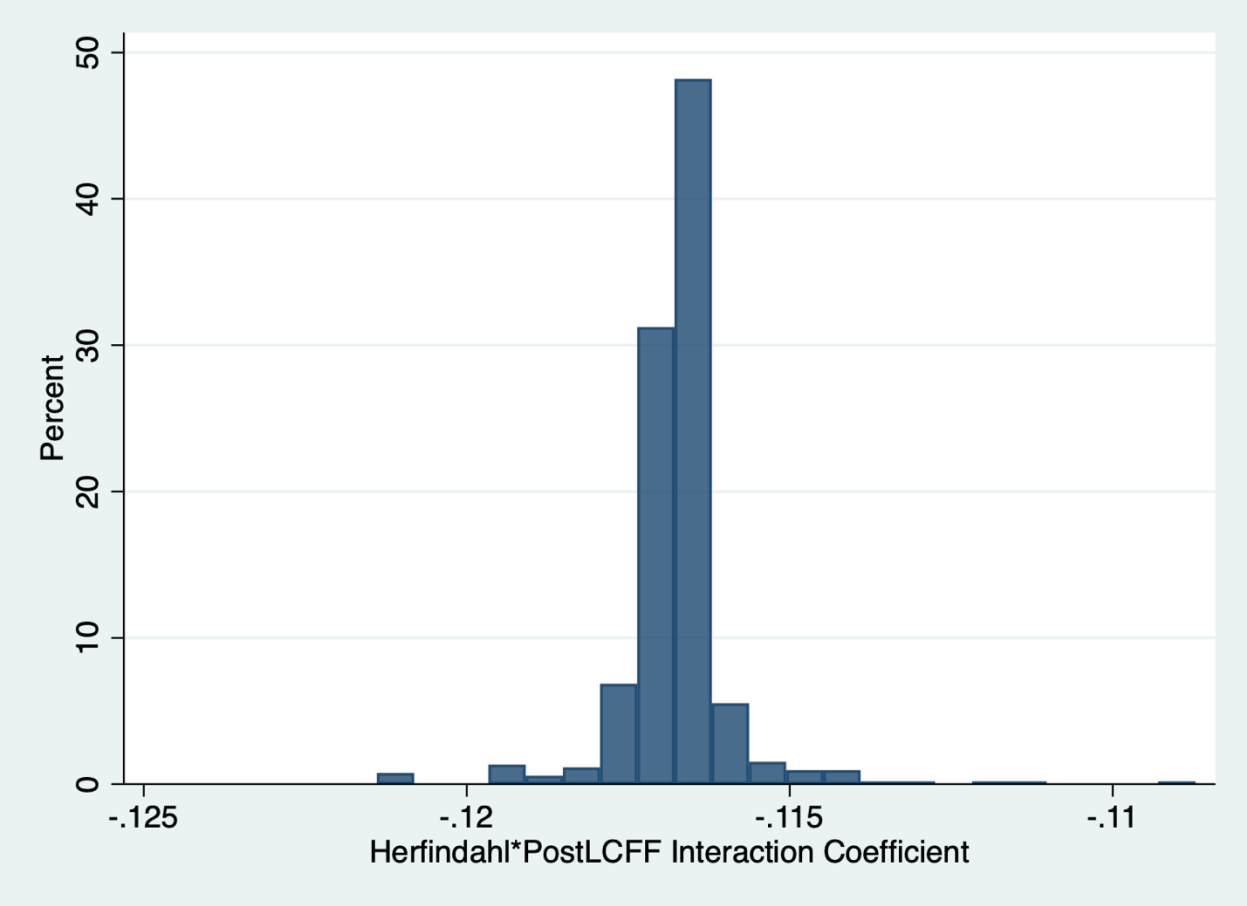

Figure 3: Jackknife Estimates of Policy Interaction Term Coefficient – Salaries and Benefits

Table 4. OLS Estimates of Relationship Between Market Concentration and District Expenditures - Variable Policy Effect Over Time

	(1) ln(Total Expenditures)	(2) ln(Instructional Expenditures)	(3) ln(Salaries & Benefits)
2010	-0.0256***	-0.0321***	-0.0299***
	(0.00615)	(0.00973)	(0.00559)
2011	-0.0416***	-0.0562***	-0.0485***
	(0.00751)	(0.00968)	(0.00708)
2012	-0.0590***	-0.0729***	-0.0654***
	(0.00961)	(0.0115)	(0.00926)
2013	-0.0162	-0.0256**	-0.0348***
	(0.0105)	(0.0112)	(0.00942)
2014	0.0717***	0.0626***	0.0475***
	(0.0110)	(0.0118)	(0.0101)
2015	0.168***	0.165***	0.151***
	(0.0124)	(0.0147)	(0.0121)
Herfindahl Score*2010	0.00329	0.0126	0.00737
	(0.0187)	(0.0268)	(0.0158)
Herfindahl Score*2011	-0.0378*	-0.0341	-0.0302
	(0.0207)	(0.0273)	(0.0197)
Herfindahl Score*2012	-0.0371	-0.0512	-0.0397
	(0.0275)	(0.0342)	(0.0272)
Herfindahl Score*2013	-0.0504	-0.0915**	-0.0644**
	(0.0317)	(0.0374)	(0.0287)
Herfindahl Score*2014	-0.124***	-0.143***	-0.122***
	(0.0309)	(0.0319)	(0.0267)
Herfindahl Score*2015	-0.185***	-0.225***	-0.189***
	(0.0360)	(0.0393)	(0.0310)
Controls	Yes	Yes	Yes
Observations	3,059	3,059	3,059
Number of LEAs	442	442	442
R-squared	0.295	0.521	0.567

Clustered robust standard errors in parentheses. Expenditure variables are in 2015 dollars.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: OLS Estimates of Relationship Between Market Concentration and District Expenditures - Variable Policy Effect Over Time

As discussed earlier, treating LCFF as a one-time policy shock may be an incomplete approach. Table 4 lists the OLS regression estimates for equation (3), in which we allow each post-policy year to independently interact with the HHI score, and the patterns observed here are starker than those in Table 3. Varying LCFF's policy effect over time shows that the gap between expenditures of competitive districts versus those of monopolistic districts is narrowing over time. In 2014, districts in a perfectly competitive market increased total expenditures by 7.2%, instructional expenditures by 6.3%, and expenditures on salaries and benefits by 4.8%, relative to 2009. However, districts with an HHI score one standard deviation above 0 only

increased total expenditures by 4.9%, instructional expenditures by 3.7%, and expenditures on salaries and benefits by 2.6% relative to 2009. In other words, districts with an HHI score one standard deviation above 0 increased expenditures by 2.2, 2.6, and 2.2 percentage points less on total expenditures, instructional expenditures, and expenditures on salaries and benefits, respectively than districts in perfectly competitive markets. In 2015, a one standard deviation increase in the HHI score is associated with spending increases that are 3.3, 4.1, and 3.4 percentage points less in total expenditures, instructional expenditures, and expenditures on salaries and benefits, respectively. What this suggests is that the expenditure gap between monopolistic and competitive districts is narrowing over time in the years after LCFF was implemented.

The coefficients on the yearly interaction terms from the second set of regression estimates are depicted graphically in Figures 4, 5, and 6. These figures show the downward trend in the relationship between market power and district spending over time (except for total expenditures in 2011), but the coefficients only become statistically significant in the post-LCFF years. There are no remarkable differences in patterns between instructional expenditures and total salaries and benefits. Figures 7, 8, and 9 also graphically depict linear predictions of log expenditures per pupil in each year for districts in four different types of markets: a perfectly competitive market and markets with HHI scores of 0.18, 0.36, and 0.54. These figures clearly show the reversal in spending patterns between more monopolistic districts and those in more competitive markets; districts with more market power outspend those with less market power in the pre-LCFF years, but actually underspend and have lower spending growth rates in the post-LCFF years.

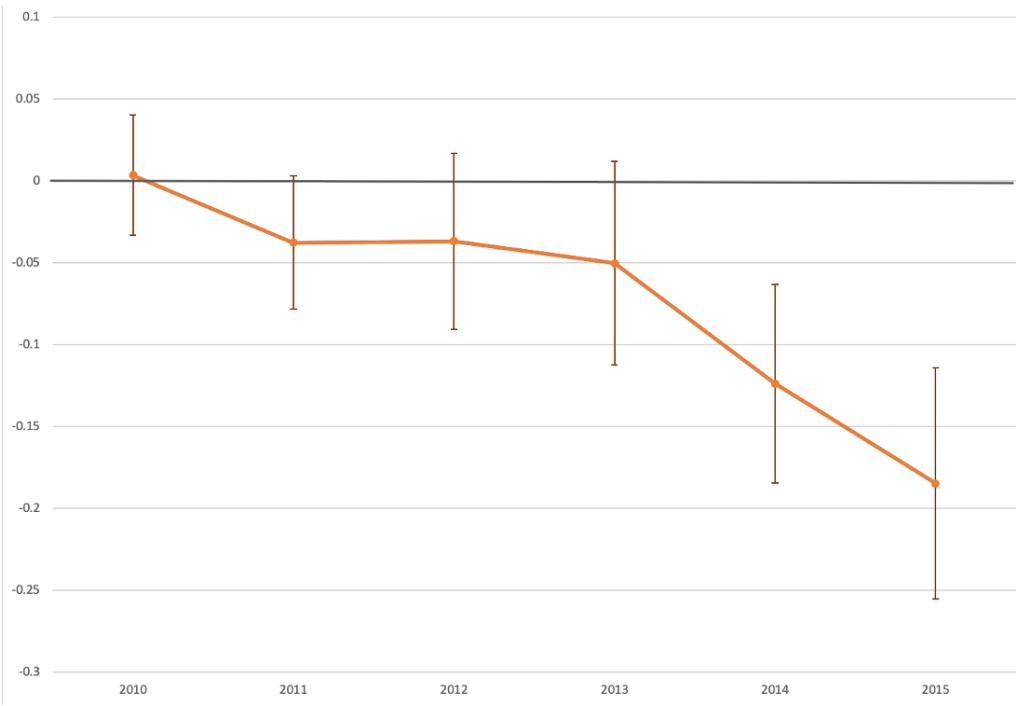

*Figure 4: HHI*Year Interaction Term Coefficient – Dependent Variable: ln(Total Exp. PP)*
Error bars depict 95% confidence intervals.

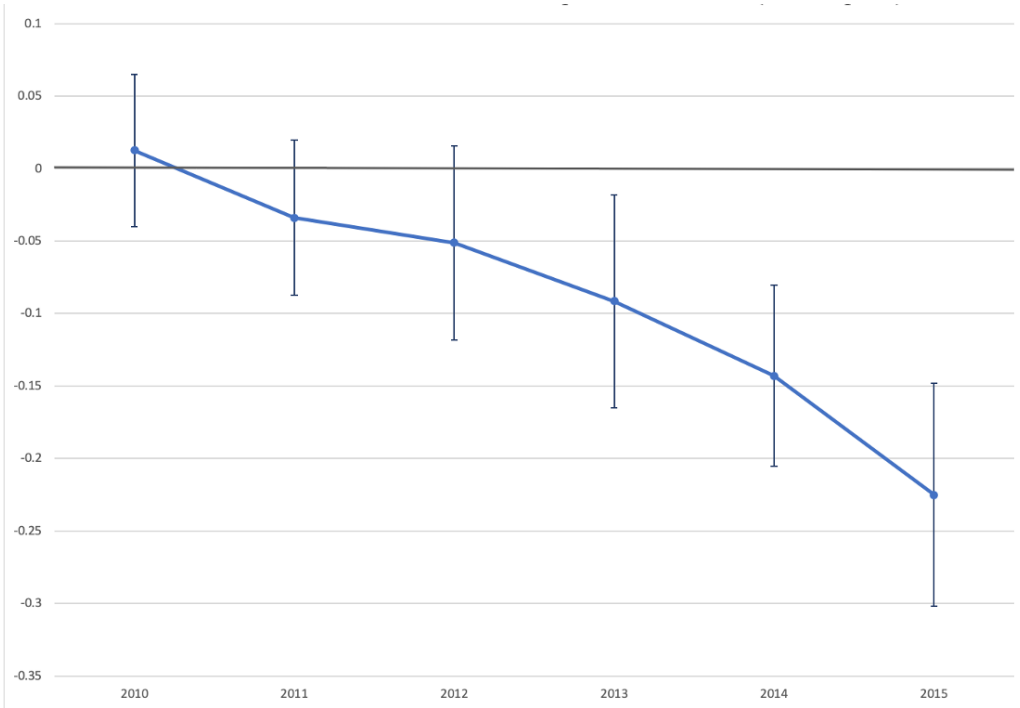

*Figure 5:HHI*Year Interaction Term Coefficient – Dependent Variable: ln(Instr. Exp. PP)*
Error bars depict 95% confidence intervals.

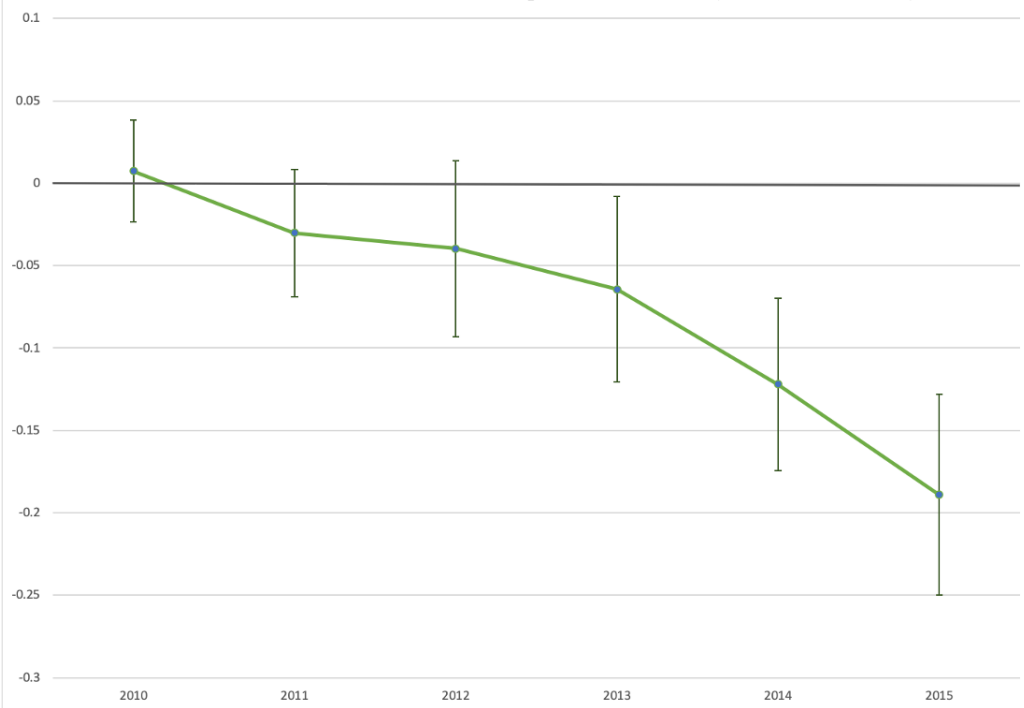

*Figure 6: HHI*Year Interaction Term Coefficient – Dependent Variable: ln(Salary+Benefits PP)*
Error bars depict 95% confidence intervals.

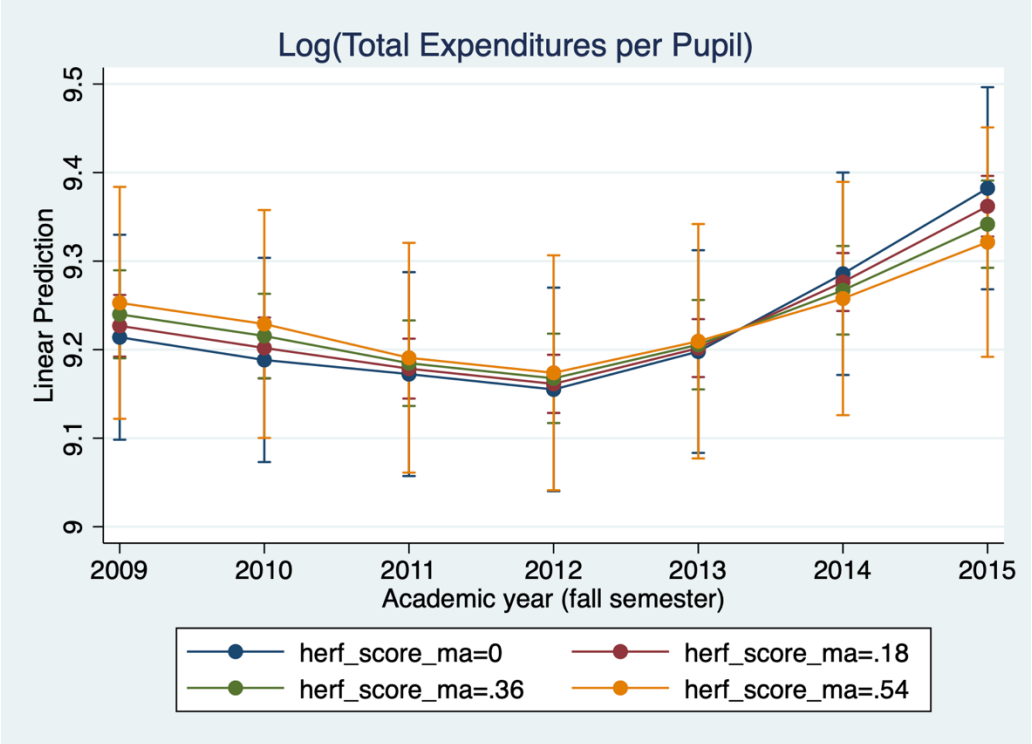

Figure 7: Linear Prediction of Log(Total Expenditures Per Pupil) by Year
Error bars depict 95% confidence intervals.

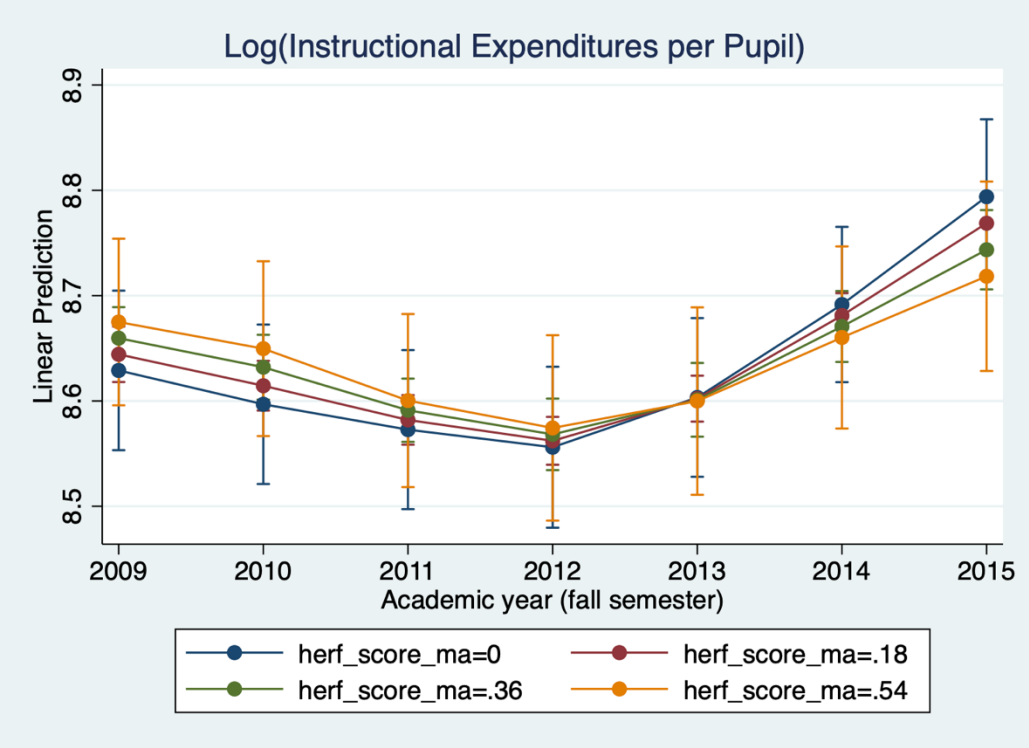

Figure 8: Linear Prediction of Log(Instructional Expenditures Per Pupil) by Year
Error bars depict 95% confidence intervals.

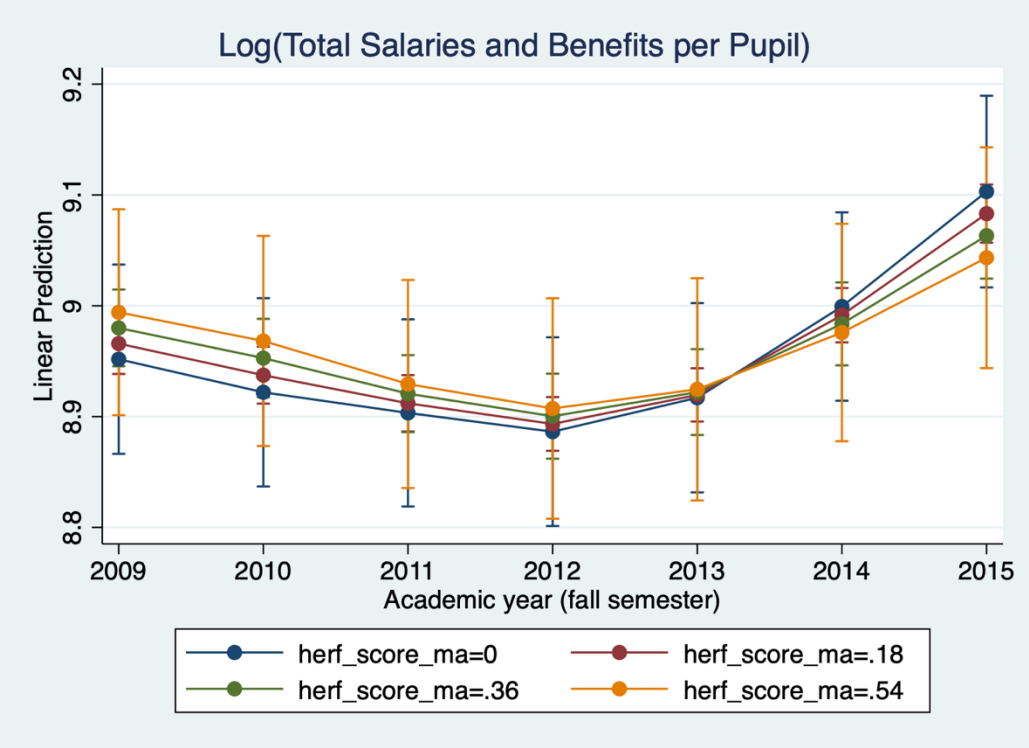

Figure 9: Linear Prediction of Log(Total Salaries and Benefits Per Pupil) by Year
Error bars depict 95% confidence intervals.

One may argue that the reason behind these spending patterns is that districts in competitive markets simply received more funding under LCFF than those in monopolistic markets. One can test this theory by simply using the log of total state funding formula revenue as the dependent variable in equation (3). Figure 10 shows the linear prediction of log state funding formula revenues for districts with four different levels of market power. This figure shows the opposite to be true: districts with more market power receive more state revenue both before and after LCFF was implemented, and revenue growth seems slightly higher for districts with more market power.

Figure 10.

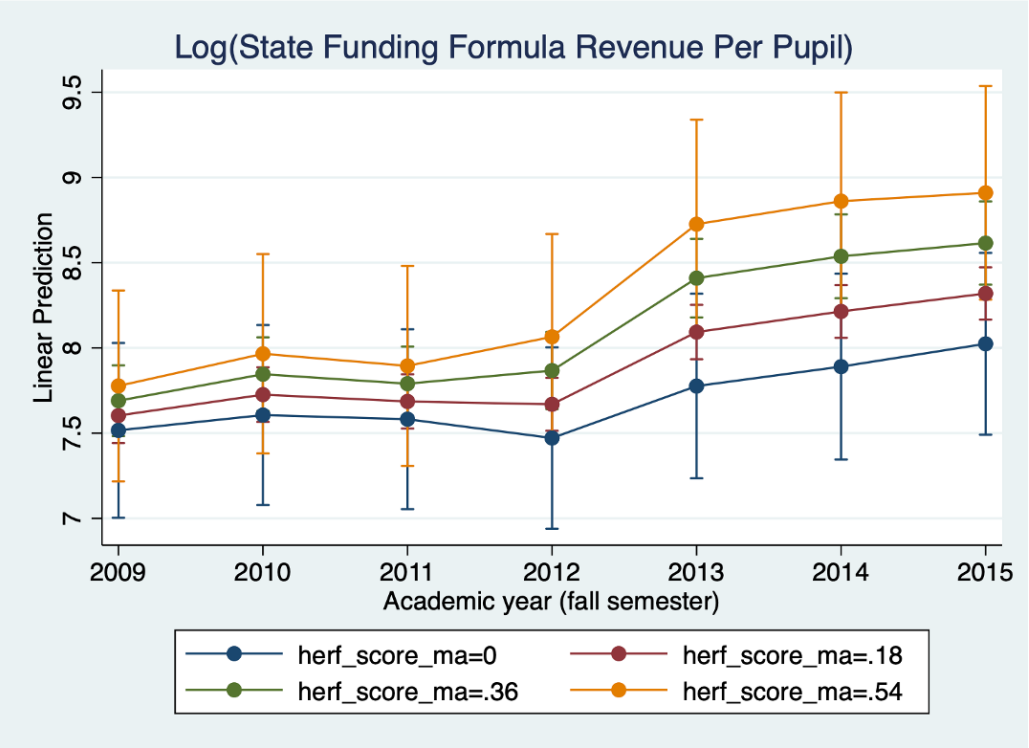

Figure 10: Linear Prediction of Log(Total State Funding Formula Revenue Per Pupil) by Year
Error bars depict 95% confidence intervals.

CHAPTER 5

Discussion

These results may lend some credence to the hypothesis that local control can curb monopolistic spending in school districts. As both sets of regression results show, the advent of LCFF is associated with a narrowing of the difference in expenditure levels between districts in competitive markets and those facing less competition. It is possible that these results are driven by community pressure to make district spending more efficient. There are two other possible explanations for these results, however. First, it is possible that this gap narrowed not because local control helped curb monopolistic spending, but rather that it stimulated districts in competitive markets to spend more than they would have after funding levels increased. If that is the case, it means that communities may exercise local control by encouraging district spending rather than by checking and limiting excess spending. The results may also reflect a combination of both decreased expenditures in monopolistic districts and increased expenditures in competitive districts, which may imply that communities use their local control for both encouraging and checking district spending. A second explanation is that because monopolistic districts already outspent those in competitive markets before LCFF, increased funding after the policy took effect did not affect their expenditures as much as it did for competitive districts. Or, increased funding boosted expenditures for competitive districts more than it did for monopolistic districts because they had more room to grow. In either of these cases, local control itself would have played no role in narrowing the expenditure gap between monopolistic and competitive districts. It is difficult to disentangle whether one of these scenarios is the true explanation, so we cannot rule them out.

A key limitation of the data used in this study is that it does not contain any measures of actual community participation in resource allocation after the introduction of LCFF. This data is necessary to draw inferences on how much democratic accountability pressure districts face and whether this pressure changes the way monopolistic districts allocate resources. As past studies on community participation and democratic engagement in California under LCFF (Marsh & Hall, 2018) indicate, mandated democratic engagement may not translate to actual democratic engagement. A 2018 policy brief by the Local Control Funding Formula Research Collaborative also found that superintendents found engaging parents and community members to be a challenge, especially those who represented the lower-income or English Learner populations (Marsh & Koppich, 2018). Marsh and Hall's (2018) finding that districts interpret the who, what, and how of LCFF's community engagement directive in vastly different ways may mean that monopolistic districts differ in the way they engage their communities than districts who face competition.

This limitation could be remedied in future studies by surveying parents and community members or gathering data on attendance at district board meetings or other events in which parents can engage in the resource allocation decision-making process. These findings could also be supplemented with a survey of district administrators which measures how much pressure they feel from communities to alter their budgeting practices under LCFF. We may be able to draw stronger inferences on LCFF's effects on the behavior of monopolistic districts if we find that district bureaucrats either do or don't face additional pressure from the community to allocate resources towards the production of education rather than towards their own self-interest.

This study can also be strengthened by the use of more detailed financial data on district expenditures. While the data from the F-33 form published in the CCD provide a fairly

comprehensive overview of school finances, studying the specific breakdown of expenditures may help disentangle differences between spending patterns of monopolistic districts and those that operate in more competitive markets. Such an analysis can be conducted using the Standardized Account Code Structure (SACS) financial data published on the California Department of Education website.

The measure of competition used in this study, the Herfindahl-Hirschman Index calculated at the county level, may also not be the ideal measure to capture the monopoly power. This measure makes several assumptions: that districts compete with every other district in the county for students; that districts do not compete with districts in other nearby counties for students; and that all districts in a county face the same level of competitive pressure. These assumptions may not be valid from a public choice perspective. Families wanting to exercise Tiebout choice may only consider alternative districts within a certain radius of their current residence or place of work. Thus, it may be beneficial to measure competition as the number of other districts within a certain radius of a district. Alternatively, families may be willing to move to a district in a neighboring county; this could be especially true in densely populated areas like the Bay Area where several counties meet. Other studies (Grosskopf et al., 2001; Hoxby, 2000) have used metropolitan statistical areas instead of counties to calculate market shares. Commuting Zones or Labor Market Areas may also be good alternatives because they better define local economies than do counties (US Department of Agriculture, 2019). Finally, the demographics of a district's constituents may also dictate the level of competition they face. Districts which serve poorer populations may feel less competitive pressure because families in these areas are less able to exercise Tiebout choice. HHI scores based on enrollment also suffers from an endogeneity problem in that the number and size of districts and charters in an area may reflect resident preferences; this problem could be rectified by using natural geographic

boundaries as an instrument for the level of choice parents have and the level of competition districts face. For example, Hoxby (2000) uses the number of streams as an instrument in her study of Tiebout choice in metropolitan areas. Such a method might allow us to make causal claims about the relationship between market power and expenditures.

From a policy perspective, these results suggest that a policy designed like LCFF, with increased local control and funding formulas based on student enrollment characteristics, can potentially serve as a policy lever to curb districts' monopolistic behavior. This study lays the foundation for future research into the underlying mechanisms of LCFF's impact on districts' resource allocation decisions.

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