The Impact of Government Contracting Out on Spending: The Case of Public Education in New Orleans

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Abstract

In this study, we start with developing a theoretical framework incorporating theories from the contracting literature and adapt them to the unusual case of non-profit charter schools, which yields several seemingly novel theoretical insights. In contrast to earlier studies, we use a quasi-experimental research design, the synthetic control group approach, to test the impact of contracting on spending for public schooling in New Orleans. Using detailed information on spending, our empirical analysis shows that contracting increases total operating spending. The additional funds were used to increase administrative spending, including both the number and salaries of administrators. Fewer resources were devoted to instruction. While the number of teachers was largely unchanged, per-teacher salaries and benefits dropped. We utilize the results to complement the theory of contracting with regard to outsourcing based on funding formulas and the mix of inputs chosen by contractors.
Introduction

Over the last several decades, a large body of research has advanced the theoretical and empirical understanding of government contracting out the provision of public services to non-governmental organizations in exchange for public funds (Bel, Fageda, and Warner 2010). Past studies focused on the determinants of government contracting, the design of contractual relationships, and the economic, social, democratic, legal, and political implications of outsourcing (Fernandez, Ryu, and Brudney 2008; Girth and Lopez 2018; Hirsch 1995; Lamothe and Lamothe 2008, 2009; Overman 2016; Petersen, Houlberg, and Christensen 2015). Others have focused on the topic of the current study: the impact of contracting on government spending (Boyne 1998; Duggan 2004; Levin and Tadelis 2010; Prager 1994; Stein 1990). Contracting advocates purport that market competition among contractors, performance-based incentives, economies of scale, and reduced red tape decrease government spending while increasing service quality (Bennett and Johnson 1981; Savas 1987, 2000).

One noteworthy example is contracting out public education in the form of charter schools, “one of the most significant developments in U.S. education” over the last four decades (Bifulco and Bulkley 2012: 425). Since the opening of the first charter school in Minnesota in 1992, 43 states and the District of Columbia have enacted charter school programs. About 2.8 million students were enrolled in 6,900 charter schools nationwide in 2016, an increase of 62 percent compared to 2011. Although only 6 percent of students nationwide are enrolled in charter schools, they serve more than 10 percent of the public school population in 190 mostly urban school districts (NCES 2016). The number of charter schools is expected to grow even more in the future as the Trump Administration supports and plans to expand the policy (DeVos 2017).
Charter schools are private, non-governmental organizations that receive public funds but control their own day-to-day operations, including curriculum and personnel decisions. In return for their autonomy, charter schools must fulfill accountability goals as specified in a contract with a government agency. This contract usually lasts for 3-10 years and must be renewed in order for the school to continue receiving public funding. Students can choose to apply for admission, almost regardless of where they live. Several charters are part of a charter school management organization (CMO) that control multiple schools. In some cases, CMOs operate schools like a school district where directives come from the central office (Bifulco and Bulkley 2012; Epplle, Romano, and Zimmer 2016).

Charter school advocates claim that traditional school districts lack the incentive to cut spending and increase performance, because their structures and processes are too political and too bureaucratic. Additionally, they imply that bureaucrats use their monopoly power to increase budgets and their own welfare. Charter schools, conversely, have greater autonomy and accountability than traditional public schools while creating competition between schools, making charter advocates believe that they can create incentives to increase student performance and decrease operating expenditure. Without rules created by elected officials and bureaucrats, costs are supposed to decline and personnel salaries should more closely align with performance (Chubb and Moe 1990; Finn, Manno, and Vanourek 2001; Hill, Pierce, and Guthrie 1997; Moe 2001).

Little research, however, provides convincing tests of these theories. Therefore, in this study, we investigate the following research questions:
• What are the theoretical mechanisms determining the impact of charter schools on education spending?
• How do expenditure levels and patterns change with the implementation of charter school programs?
• What are the implications of charter school finances for public sector contracting?

To answer these research questions, we use New Orleans as a case study, as it has a larger share of charter schools than any city in the country (Buras 2014; Kingsland 2015; Vanacore 2017). All the city’s publicly funded schools are currently charter schools and, during the time of this study, the figure was consistently above 90 percent (NAPCS 2016). As these reforms have been in place for more than a decade, New Orleans is an especially informative case that allows us to examine spending levels and patterns in a full-scale, fully-matured system. The scale of the reforms, combined with our rich data, also allow us to avoid a problem with past studies, which have relied on descriptive, correlational research designs. In contrast, we can estimate causal effects, using a synthetic control group methodology.

Our study also makes three additional contributions. First, we provide a theoretical framework that summarizes the potential changes in the level and use of resources. This framework pulls together different theories from the contracting literature and adapts them to the unusual case of charter schools; this yields several, seemingly novel, theoretical insights. Second, we develop and implement a method that decomposes changes in overall spending into numerous layers, so that we understand why the allocation of spending (e.g., between administration and instruction) changed the way it did. Finally, in contrast to earlier studies, we
consider in our analysis spending at all levels of the system: charter school, district, and authorizer.

**Charter School Spending - Theoretical Arguments and Empirical Evidence**

In this study, we examine the effect of contracting out on both the level and allocation of school spending. Therefore, we provide theoretical reviews on both topics, in addition to conceptual frameworks about contracting with for-profit and non-profit organizations and the sparse empirical evidence on charter school spending and resource allocation.

**Theories of the Level of Spending**

In contracting schemes, the level of government spending is driven by negotiations between contractors and public managers. In competitive markets, governments face prices for an additional unit of service that equal the marginal cost of providing it (Varian 2014). Conversely, markets with small numbers of providers (Brown and Potoski 2003) or vendors with large market shares create “thin markets,” without competition, that enable providers to set prices and take advantage of government agencies seeking to purchase their goods and services (Milward and Provan 2003: 10). Opportunistic behavior by contractors is more likely if the goals between contractors and governments are not aligned (Brown and Potoski 2003; Ouchi 1980) and service measurability is low (Brown and Potoski 2003; Durant, Girth, and Johnston 2009; Prager 1994), creating an opportunity for vendors to evade compliance (Jensen and Meckling 1976; Miller 1992).

Economies of scale, a decrease in average production costs while volume of output increases (Stigler 1958), is one commonly discussed factor likely contributing to the level of spending in government contracting. The more that contractors realize economies of scale, the less public managers have to pay for a given service (Donahue 1989; Savas 1987, 2000). This
leads to a tension with competition. Having more contractors reduces the possibility that any one provider captures the market, but also reduces the efficiency gains from economies of scale (Brown and Potoski 2003; Brown, Potoski, and Van Slyke 2006; Milward and Provan 2003).

Economies of scale have been shown to be relevant for providing education services, even though these findings are not commonly accepted by all scholars (Andrews, Duncombe, and Yinger 2002; Duncombe and Yinger 2008). Charter schools in many states are Local Education Agencies (LEAs) and administratively independent from the school district of their location. Consequently, charter schools need to provide central services themselves, potentially leading to greater spending for these services (Levin 2012). It may therefore be necessary to provide more funding than traditional public schools receive in order to provide the same level of service.

Missing from the prior discussion of contracting to charter schools, however, is the fact that school spending is largely driven by state and federal funding formulas, based on enrollment size and student characteristics. These formulas differ across states (Education Commission of the States 2018). Charter schools also pursue grants and philanthropic income (Baker and Ferris 2011). The fact that revenue comes from so many different sources and is largely driven by formulas means that the government agency in charge of writing contracts with charter schools has little control over the revenue that will come with the contract (see Appendix A for a detailed revenue discussion for New Orleans).

The fact that the above formulas are based on enrollment, and the fact that families get to choose whether and which charter schools they attend, means that market forces are also at play. If charter schools can attract more students, then they will receive more revenue. Moreover, note that charter schools cannot legally charge tuition, which means they are competing mainly on the
type and quality of services provided, not on cost and prices. This reduces the incentive for charter schools to cut costs (Harris, forthcoming).

**Theories of the Allocation of Spending**

Contractors are usually paid based on service levels and quality indicators (Savas 1987, 2000). So long as they meet the government’s standards, they are free to use their resources largely unencumbered. Indeed, this is a key part of the theory behind contracting—that contractors are not bound by bureaucratic rules and regulations, allowing them to provide services more efficiently and effectively (Gore 1993; Kettl 1993; Osborne and Gaebler 1992). Moreover, contracting advocates claim that this greater autonomy in service provision also allows contractors to innovate and provide services that are more suitable for their customers/service recipients (Bruce, de Figueiredo, and Silverman 2019; Grandori and Furlotti 2018). This autonomy may alter the allocation of resources across inputs.

As with spending levels, economies of scale are relevant for the allocation of resources. Small organizations have to spend a larger share of resources on administration as fixed costs are relatively greater compared to organizations of larger size. Accordingly, less funding will go toward the direct provision of services (Feigenbaum 1987). In the case of charter schools, this could mean less spending on classroom instruction.

Specific attention has been paid to transportation outlays in more recent studies on school choice (Gross 2019; Lincove and Valant 2018). As students live further away from schools, distances to school increase, potentially increasing spending for transportation. Additionally, as transportation is not centralized anymore, and schools have to provide their own bussing, economies of scale are likely lost.
The competition for students may also factor into spending allocation decisions. In this respect, charter schools have two masters: they must spend money to meet the conditions of their contracts and meet the needs of their families. Both should encourage charter schools to use their resources efficiently. Over time, as posited by Hoxby (2003), schools either make better use of their resources or they are replaced by schools that are less wasteful. Some prior evidence suggests that contracting incentives drive charter schools to meet government performance requirements; market pressures may also push schools to respond to families, but these pressures appear to be considerably weaker than contracting incentives (Harris, forthcoming).

**Theories of Contracting with Non-Profits and For-Profit Firms**

Spending levels and resource allocation might also depend on whether charter schools are non-profit or for-profit. With for-profit contractors, theory predicts that firms will try to allocate resources in a way that reduces costs and increases efficiency, enabling them to increase their profits (Varian 2014). For-profit firms are assumed to be more prone to opportunistic behavior, as they aim for profit maximization, but their desire to keep contractual relationships and competition is likely to create an incentive not to decrease spending to a level that would compromise service quality (Brown, Potoski, and VanSlyke 2006; VanSlyke 2006). Contract schools can increase profits either by increasing revenue per pupil or by reducing costs per pupil.

Non-profit organizations, in contrast, may see community welfare as their objective, and spend accordingly (Donahue 1989; Feiock and Jang 2009; Kearns 1994; Markham, Johnson, and Bonjean 1999), but there is at least some evidence that non-profits do not adjust program expenses if income increases (Kitching, Roberts, and Smith 2012). Nonetheless, non-profits can pursue surpluses to expand their services, increase their savings, or grow salaries for their members (Bowman, Tuckman, and Young 2012; Chang and Tuckman 1990). Thus, these
mission-driven organizations may behave as classic interest groups and rent-seekers, advocating for additional spending to increase their own revenue and leadership salaries (Buffardi, Pekkanen, and Smith, 2015; Fyall 2016; Lecy and VanSlyke 2013; Luksetich 2008). Rent-seeking is perhaps balanced by the desire to pursue their non-profit mission and meet the expectations of donors and service recipients (Oster 2003; James 1983).

Most charter schools are non-profit organizations that are mission-driven (NAPCS 2019), which explains at least to a certain degree large philanthropic contributions to some schools. Only 12 percent of all charter schools are operated by for-profit organizations (NAPCS 2019), with large differences between states (Dykgraaf and Lewis 1998).

To what degree non-profit charter schools are rent-seekers is somewhat unclear as the evidence is mostly anecdotal. Potential indicators of rent-seeking include charter schools and CMOs lobbying politicians and charter authorizers to receive greater funding, below-average teacher compensation, not always transparent payments to service providers, and reductions in services for high cost students (see Fitch and Hulgin 2018). Whether these arguments apply for all charter schools or only describe the behavior of some operators, as charter school proponents argue (The Center for Popular Democracy 2014), is still a matter of debate.

**Empirical Evidence on Charter School Spending and Resource Allocation**

Empirical research, comparing finances in charter and traditional public schools, is sparse and remains inconclusive. A majority of comparative studies focus on per pupil revenues, claiming that charter schools receive fewer per pupil allocations than traditional public schools and that these revenue gaps translate into systematic differences in spending levels and patterns between both school types (Batdorff et al. 2014, 2010, 2005; Miron and Urschel, 2010).
Simple comparisons between revenues for charter and traditional public schools may not be accurate, however. Some charter schools receive large additional resources from foundations or philanthropists, which are not reflected in the data on funding formulas that scholars have used for revenue comparisons (Scott 2009; Baker and Ferris 2011). Moreover, school districts often provide a range of services to charter schools including transportation, special education, or books (Bifulco and Reback 2014). Finally, research has consistently shown that student populations differ between charter and traditional schools (Epple, Romano and Zimmer 2016; Bifulco and Bulkley 2012), likely resulting in revenue variations as most state aid formulas transfer additional funds for schools enrolling high cost students (Buerger 2014).² Lower funding levels may simply correspond with lower service levels (Arsen and Ni 2012).

Investigating differences in spending levels, while controlling for student composition, Baker, Libby, and Wiley (2012) compare charter and traditional schools in in Ohio, New York City (NYC), and Texas. For NYC, they find that some charter schools spend between $2,000 and $4,000 per pupil more than traditional public schools, which Baker attributes in another publication to philanthropic revenues (Baker and Ferris 2011). Many NYC charter schools, however, spend the same or less than comparable district schools. Texas charter schools exhibited similar spending patterns compared to charter schools in NYC. In Ohio, “charters across the board spend less than district schools in the same city” (Baker, Libby, and Wiley 2012: i).

Moreover, several studies suggest that charter schools spend more on administration than traditional schools in Michigan (Arsen and Ni 2012; Izraeli and Murphy 2012). For California, Reed and Rose (2015) show that charter schools offset lower spending on instruction, not with

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² It is important to mention that charter schools in some states do not receive additional payments for educating disadvantaged students (Singleton 2019).
administrative spending, but with higher spending on capital and ancillary services\(^3\), contracts with external service providers, and greater savings. Using examples from different states, Baker and Miron (2015) also find greater administrative expenditure in charter schools than in traditional public schools. While these results vary greatly between charter networks, they are more pronounced for for-profit than for non-profit mission-driven charter schools (Weber and Baker 2018).

Comparing human resource practices in both school types, researchers demonstrate that charter school teachers are on average younger, less experienced, and less likely to have a master’s degree or to be certified (Epple, Romano, and Zimmer, 2016). Given these differences in qualifications, studies find that charter school teachers earn considerably less across the board compared to their traditional counterparts (Weber and Baker 2018; Taylor et al. 2011). Yet, some studies show that beginning salaries for charter school teachers are higher than in traditional public schools (Malloy and Wohlstetter 2003).

With regard to leadership salaries, there is some anecdotal evidence, particularly for large cities, that charter school executives earn more relative to their counterparts in traditional public schools (Cohen 2019; Singer 2014; Vaznis 2017). Nationally-representative analysis by the National Center for Education Statistics (NCES, 2019), however, shows that on average principals in charter schools earn less than principals in traditional public schools, and that this gap is greater for principals with more experience (NCES 2019).\(^4\) According to the same study,

\(^3\) The authors define operations as capital expenses such as the acquisition and improvement of land, buildings and equipment; and noncapital expenses such as rent, maintenance, housekeeping, communications, food service, legal service, and operations personnel (Reed and Rose 2015).

\(^4\) In 2017/18, the average salary for principals of all experience levels is $98,700 in traditional public schools and $93,100 in charter schools.
the variance around the average principal salary is much larger in charter schools than in traditional public schools.5

Research on spending differences between charter and traditional schools, therefore, has several shortcomings potentially leading to unreliable findings. First, many studies focus only on revenue patterns and do not consider spending (Batdorff et al. 2014, 2010, 2005). Given that school districts often provide services for charter schools and that charter schools serve different types of students, a revenue analysis is insufficient in covering all financial differences between charter and traditional public schools. Second, none of the existing research utilizes a causal research design; it is unclear whether results reflect adjustment of traditional public schools to charter schools competition6 or differences in the (unobserved) types of students charter schools serve. Third, many studies have data limitations that do not allow their author to understand the causes behind the revenue and spending changes that take place when governments contract with charter schools. These shortcomings include philanthropic income for charter schools (Miron and Urschel 2010; Baker, Libbey and Wiley 2012), information on salaries for administrators and teachers, district expenses for central services, and/or authorizer spending (Arsen and Ni 2012; Izraeli and Murphy 2012; Reed and Rose 2015). Finally, most studies focus on spending levels or resource allocation and do not investigate the mechanisms leading to differences in expenditure patterns.

To measure the impact of charter schools on district spending, we evaluate charter school spending in New Orleans. Our approach addresses the above concerns by studying the effects of the charter-based reforms, using detailed spending data, employing a causal research design, and

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5 In 2017/2018, the standard deviation for traditional public schools equals $340 and for charter schools $980 and for principals with all experience levels.

6 Several authors have found that traditional public schools change spending levels and patterns when confronted with charter school competition (Buerger and Bifulco 2019; Bruno 2019; Ladd and Singleton 2017).
analyzing the mechanisms underlying changes in both expenditure levels and patterns. We are further the first study considering all expenses incurred when governments switch from providing education to a contract system based on charter schools, summing up all spending at the charter, district, and authorizer level. The New Orleans reforms are also of independent interest because they provide evidence about how spending would differ under a full-fledged contracting system. We describe the New Orleans education system in the next section, which focuses on changes in the school district that are related to the years included in our analysis. We then describe the methods we use to analyze spending changes.

**New Orleans Background Information**

In this section, we describe the governance structure, funding formulas, and human resource practice in New Orleans after charter school policies were implemented.

**Governance Structure**

Prior to Hurricane Katrina, the Orleans Parish School Board (OPSB) operated all public schools in New Orleans. Schools were performing poorly, apart from a handful of high performing and selective admission schools, and the district was plagued by frequent financial and corruption scandals. Between 1996 and 2005, the district lost 17,200 students, about 21 percent of its enrollment (Buerger and Harris 2015). To address the problem of low performing schools, the Louisiana legislature created the Recovery School District (RSD), which started to take over failing schools in 2003.

Following Hurricane Katrina in November 2005, the legislature passed a new law automatically transferring almost all schools from OPSB to the state run RSD. The schools were chartered in the subsequent years. During 2014, the last year in our data set, the RSD oversaw 57
charter schools and directly operated 5 schools.\footnote{The Board of Elementary and Secondary Education (BESE) is overseeing the activities of the RSD and chartered itself four schools by 2014.} The RSD monitored charter schools, but provided very few central services (Buerger and Harris 2015; Perry et al. 2015). OPSB provided all central services to its directly-run schools and some services, such as accommodations for students with disabilities, to its charter schools. The district operated 6 schools directly and contracted with 14 charters in 2014 (Buerger and Harris 2015; Perry et al. 2015).

In addition to OPSB and RSD, 12 charter school management organizations (CMOs) provided instructional and administrative services to 56 schools (64 percent) in 2014. The number of charter schools under the umbrella of a CMO increased over time, resulting in smaller numbers of operators and greater market concentration (Dreilinger 2017). All CMOs and single-site charter schools in New Orleans are non-profit organizations with their own boards.

Since the beginning of the contracting reforms, authorizers have closed schools (i.e., ended contracts) for performance reasons and replaced them with other education providers (Bross, Harris, and Liu 2016). Moreover, authorizers have worked with schools to centralize the enrollment system (Harris, Valant and Gross 2015), transfers, and expulsions (Hernandez 2019).

**Human Resource Practices**

After Hurricane Katrina, the teacher union contract was allowed to expire and never replaced, essentially firing all former OPSB employees. The new system does not have collective bargaining agreements and schools have decision-making power over hiring and firing of teachers and administrators.\footnote{There have been successful and unsuccessful attempts to unionize charter school teachers that are outside the time period we are analyzing (Williams 2017). Only two schools operate under collective bargaining as of this writing.}

The number of teachers with 20 or more years of experience dropped by over 20 percentage points between 2005 and 2014, while the share of teachers with five or fewer years of experience tripled.
experience increased from 33 to 54 percent (Barrett and Harris 2015). Many of these young teachers received their training in alternative certification programs such as Teach for America and not in traditional schools of education (Vanacore 2011; Strauss 2016).

Charter schools in New Orleans still reward teachers using similar characteristics as traditional districts, but tend to pay larger premiums for degrees and experience (Lincove, Barrett, and Strunk 2016a, 2016b). Salaries for school leaders have been an object of constant debate within the city. Many CMOs prefer leaders from elite universities and with business degrees, which demand greater salaries than executives in traditional public schools (Haselle 2019). However, newspapers frequently post school and CMO leader salaries and show large variations between charter networks (Dreilinger 2016).

Pension plans are another aspect of compensation over which charter schools exercise their autonomy. Charters in New Orleans can choose between the Teachers Retirement System of Louisiana (TRSL) or defined contribution plans under 403(b). TRSL was the only available plan prior to Hurricane Katrina and has, in recent years, grown to one of the most expensive public pension plans in the country (Backes et al. 2016). Required contributions increased from 13.1 to 27.2 percent between 2003 and 2014 (Barrett and Chanin 2016). As TRSL payments rose, many charter schools opted out of the program and started to offer defined contribution plans under 403(b). By 2014, only 42 schools (roughly half of the publicly-funded schools in the city) were enrolled in TRSL (Barrett and Chanin 2016).

**Synthetic Control Group Approach, Sample, and Data**

One of the contributions of this study is to provide some of the first plausibly causal estimates of the effects of contracting on spending. A simple comparison between per pupil operating expenditures before and after the contracting reforms could lead to misleading results
if differences in spending are driven by factors other than charter schools. To address this problem, we select a comparison group that provides a counterfactual for what would have happened to education spending in New Orleans in absence of the contracting reforms. Specifically, we use the synthetic control group approach introduced by Abadie and Gardeazabal (2003) and further formalized by Abadie, Diamond, and Hainmueller (2012, 2015).

Intuitively, the goal of the synthetic control group approach is to create a synthetic New Orleans comparison group that has the same spending trend as the actual New Orleans for the time prior to the implementation of the contracting system. Given similarity in pre-trends, the synthetic New Orleans serves as a counterfactual for the time after the reform (post period). The differences between both groups in the post period represent causal estimates of charter schools on district spending. To create a synthetic New Orleans, we first select school districts in Louisiana potentially serving as a synthetic control (called donor pool) and independent variables associated with operating expenditures. The synthetic control group approach minimizes spending differences between the actual New Orleans and a composite of several comparison districts (i.e., synthetic New Orleans) for the time period prior to the contracting reforms by assigning weights to school districts and independent variables. The approach is explained more formally in Appendix B, including the procedure we use to make statistical inferences.

We selected all urban school districts in Louisiana into a donor pool because they are socio-economically similar to New Orleans and have been exposed to the same state policies, but did not implement contracting reforms. The 17 districts included in the donor pool receive weights based on how well they resemble spending trends in New Orleans for the time prior to charter schools. Note that in this process several districts will get a weight of zero and will not be included in the synthetic control group.
For all districts in the donor pool, we created a panel data set from 1990 to 2014. (These and all other references to years refer to the spring of the school year, so 2014, for example, is the 2013-14 school year.) Hurricane Katrina occurred during the 2006 school year, and hence, we drop this year from our analysis as many schools were closed and reliable data for this time period is not available. Hence, our panel includes 16 pre-reform and 7 post-reform years. We end our analysis in 2014, as the RSD started to take over schools throughout the state, exposing districts included in the donor pool to treatment effects.

The financial information for our dependent variables also come from the Louisiana Department of Education (LDOE). To ensure the reliability and accuracy of this information, we compared the LDOE data with independent audits for charter schools, OPSB, and RSD, but did not detect any relevant differences. Throughout the article, we add up spending for all publicly-funded schools in the city as they are all part of the same contracting system. Table 1 defines all financial variables we use in the analysis.

Spending may be affected by the types of students being served by schools. Measures of student composition comprise the percentage share of students with disabilities, receiving free lunch, having limited English proficiency, and being white. District size is determined by the number of students enrolled in the district and enrollment changes between consecutive years.

Information on socio-economic characteristics include the median housing value and median income measured by the U.S. Census Bureau and American Community Survey. We further added the Bureau of Labor Statistic’s unemployment rate as an explanatory variable. We imputed missing data in particular using linear interpolation between years of available data.
(Brunner and Schwegman 2017). To control for regional variations in teacher salaries, we incorporate the comparable wage index (CWI) created by Taylor and Fowler (2006).9

New Orleans received large amounts of money to rebuild the school system after Hurricane Katrina, creating a challenge for estimating the impact of charter schools on school spending. We overcome this issue with the following strategies: First, we exclude any infrastructure expenditures and focus exclusively on operating expenditures, which are less influenced by any rebuilding efforts. Second, as a robustness check, we restrict the synthetic control group to districts that were also impacted by Hurricane Katrina but did not implement contracting policies. Finally, our data set includes seven years after Hurricane Katrina and we focus on the years 2013 and 2014 in our calculations (well after the Katrina effect subsided).

Table 2 compares the average pre-reform characteristics between New Orleans and the synthetic control group, and the average of all urban school districts in Louisiana. The synthetic New Orleans resembles more closely the characteristics of the actual New Orleans for the time prior to the contracting reforms, compared to the mean of all urban districts. The school districts receiving a positive weight in the synthetic control are East Baton Rouge (0.422), Tangipahoa (0.445), and St. Charles (0.133). All other school districts in the urban donor pool are assigned a zero weight.

**Results**

**Results for Operating Expenditures per Pupil**

Looking at Figure 1, New Orleans and the comparison group have similar expenditure trends prior to Hurricane Katrina, suggesting that the synthetic control provides a sensible approximation for what would have happened to education spending in New Orleans without the

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9 The index was subsequently updated by Taylor: [https://bush.tamu.edu/research/faculty/Taylor_CWI/](https://bush.tamu.edu/research/faculty/Taylor_CWI/)
contracting reforms. Conversely, expenses show great differences between both groups from 2007 to 2009, when schools had to be reopened and only a few students had returned to the city. The disparities between the two groups are smaller and more stable in later years, indicating a difference of $1,359 (13 percent) per pupil in 2014. The result is statistically significant at the 0.001 level and robust to a series of falsification and sensitivity tests that are presented in Appendix B.

Our estimate is comparable to results found by Baker, Libby, and Wiley (2012) for NYC and Texas, which show positive spending differences between charter and traditional schools, although the gap between both school types is considerably less in New Orleans compared to the other two locations. Our result is, however, in stark contrast with studies finding that charter schools spend less compared to traditional public schools (Izraeli and Murphy 2012; Reed and Rose 2015).

How was New Orleans able to raise spending by such a large amount? We analyzed revenue patterns and present the results in Appendix A, for the sake of brevity. While state revenues and sales taxes do not show considerable changes, income from federal sources, property taxes, and donations grew by $1,000, $406, and $348 per pupil, respectively. These increases allowed the district to spend more compared to the time prior to the contracting reform and relative to the synthetic control.10

Results by Spending Function and Object Category

Breaking down operating expenditures into different spending categories (see Table 1 for definitions), we estimate a synthetic control for each category, using the same pool of control

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10 Appendix A explains all additional revenues sources in more detail.
districts as in the main specification. We present the results of the synthetic control group approach in Figures 2 and 3 and in Table 3 Column (I).

The effect of contracting on instructional expenses is statistically significant at the 0.1 level and has a magnitude of -$706 per pupil (-10 percent). The result is similar to findings for Texas, Michigan (Baker, Libby, and Wiley 2012; Izraeli and Murphy 2012), but smaller (in absolute value) compared to estimates for California, where differences between both school types amount to -$1,384 per pupil (Reed and Rose 2015).

In contrast to instruction, payments for administration grew by $699 per pupil (66 percent). The effect is driven nominally by large increases in spending at the school level, while outlays for general administration and for central services make up larger shares of the relative growth. The result is close to estimates by Arsen and Ni (2012) for Michigan, but opposite in sign to findings for California (-$163) by Reed and Rose (2015).

Support services such as transportation and other expenditures (mainly consisting of purchased services) rose by $191 and $704 per pupil, respectively. Reed and Rose (2015) also found large charter school expenses for outsourced services that are similar in size relative to our results.

**Decomposition of Instructional and Administrative Spending**

To gain a better understanding of the causal mechanisms underlying the changes in instructional and administrative expenses, we decompose spending changes into salaries, benefits, and other expenditures. Then, we focus solely on alterations in salaries and decompose them into average salaries and the number of staff per pupil.

The decompositions are based on difference-in-differences calculations that compare New Orleans with a control group created based on district weights from the previous estimation
for Instruction and Administration. We start with the following identity as the base for our first decomposition:

\[
\text{Spending}_{ij} = \text{Salary}_{ij} + \text{Benefits}_{ij} + \text{Other}_{ij}
\]  

(1)

where \(i\) denotes spending in New Orleans or the control group, and \(j\) denotes spending for either instruction or administration. Spending refers to the sum of Salary, Benefits, and Other. We divide both sides of Equation 1 by enrollment, subtract New Orleans from the control group (\(\Delta_i\)), and take the difference between three years prior to the storm and the last three years in our sample (\(\Delta_t\)). This yields:

\[
\Delta_i \Delta_t \left( \frac{\text{Spending}_{ij}}{\text{Enroll}_i} \right) = \Delta_i \Delta_t \left( \frac{\text{Salary}_{ij}}{\text{Enroll}_i} \right) + \Delta_i \Delta_t \left( \frac{\text{Benefits}_{ij}}{\text{Enroll}_i} \right) + \Delta_i \Delta_t \left( \frac{\text{Other}_{ij}}{\text{Enroll}_i} \right)
\]  

(2)

We estimate equation (2) for instruction and administration separately. As shown in Table 1, the term \(\text{Other}_{ij}\) refers to all spending that is not part of the salaries or benefits for instruction or administration and include mainly supplies and purchased services.

Recall that a key objective of this study is to understand the sources of spending change in greater depth. Therefore, we then decompose Salary, beginning with the following identity:

\[
\text{Salary}_{ij} = \overline{\text{Salary}}_{ij} \times N_{ij}
\]  

(3)

where \(\text{Salary}_{ij}\) captures the average salary for teachers or administrators and \(N_{ij}\) represents the number of staff in each category. If individual personnel works in both instruction and administration, we assume that the share in salary equals the amount of time spent for working in each area. Next, we take the natural log from both sides of the equation, divide each side of the equation by student enrollment, subtract pre- and post-reform periods, and take the difference between New Orleans and the control group. Equation 4 summarizes the final decomposition:
\[
\Delta_i \Delta_t \left[ \ln \left( \frac{\text{Salary}_{ij}}{\text{Enroll}_i} \right) \right] = \Delta_i \Delta_t \left[ \ln \left( \frac{\text{Salary}_{ij}}{\text{Enroll}_i} \right) \right] + \Delta_i \Delta_t \left[ \ln \left( \frac{N_{ij}}{\text{Enroll}_i} \right) \right]
\] (4)

While the first term on the right-hand side of Equation 4 is concerned with changes in average salaries, the second term indicates changes due to number of personnel, relative to the number of students served.

Table 3 summarizes the results for Equation (2) in Column (II) and for Equation (4) in Column (III). In the first half of Table 3, we decompose changes in instructional outlays and find that 50 percent of the $706 per pupil reduction was due to the decline in benefits (mostly pensions). To our knowledge, no other study has decomposed spending differences between charter and traditional schools, and hence, we are the first to find that decreasing benefits are an important factor explaining reductions in instructional spending. Total instructional salaries, on the other side, explain only one-third of the overall decline in instructional expenses. Of this one third, 83 percent are explained by declining average salaries.

The second half of Table 3 displays the decomposition of changes in administrative spending. Fifty one percent of the $699 per pupil increase in administrative spending is explained by changes in salaries, a finding that is in line with newspaper articles and anecdotes claiming that charter school administrators receive greater salaries than their traditional counterparts. Expenses other than salaries and benefits, such as human resource development or technology services, explain 45 percent of the increase. When we decompose administrative salaries further, we find that 62 percent of the increase in per pupil salaries is driven by an increase in average salaries and 38 percent by a rise in the number of administrators per pupil. The second decomposition provides evidence that New Orleans has lost economies of scale as
the number of administrators per student is greater than in comparable districts and the time prior to the storm.

**Discussion and Conclusions**

Drawing on literature from different disciplines and applying it to the unusual case of charter schools, our conceptual model yields two novel predictions about the impact of school choice on education spending in New Orleans. First, government agencies can only marginally influence charter school expenditure levels, as charter revenues are based on funding formulas or outside of the contracting agency’s control. The conceptual model further implied that an all-charter school district would lose economies of scale, leading to greater operational spending. In contrast to predictions made by charter school proponents, our theory predicted an increase in operational spending per pupil after the implementation of school choice. Second, theory suggested administrative spending to increase because of losses in economies of scale. Moreover, as the distance between students and schools increases, we predicted transportation outlays to increase. Spending for instruction, conversely, is expected to decrease as expenses for other spending categories increase and charter schools tend to hire less experienced and uncertified teachers. Again, this prediction is contrary to claims made by charter school advocates.

The empirical findings corroborate the first claim showing large and consistent increases in operating spending per pupil in New Orleans for the time after the implementation of the charter school reform and compared to similar school districts in Louisiana. Our empirical results also confirm the second claim, indicating sizable increases in administrative spending and large decreases in instructional spending. Increases in administrative spending are explained by losses in economies of scale, but also by greater average salaries for administrators. Expenses for
instruction decreased primarily with outlays for teacher benefits, but also because of smaller salaries per teacher. In addition to these changes, transportation outlays increased as well.

Given the increase in outcomes that went along with these changes in resource allocation (Abdulkadiroğlu, Angrist, Hull, and Pathak 2016; Harris and Larsen 2018a), perhaps the key larger implication is that arguments about how schools—traditional or charter—spend their money are not very informative about their efficiency or effectiveness. Critics have long complained about the large bureaucracies of traditional public schools (Chubb and Moe 1990). While the criticism is as much a matter of the rules and constraints that school districts imposed as the amount spent on them, the fact that large achievement gains were achieved with lower instructional spending is noteworthy given the common criticism that traditional public schools direct too few resources to instruction.

Our results have further important implications for practitioners. First, contracting for education is unlikely to decrease spending for K-12 education as revenues are mainly driven by formulas and local millage elections, which cannot be easily influenced by contracting agencies (i.e., school districts and state agencies). Second, practitioners should not expect that more resources will be directed to classrooms. Finally, contracting is likely to alter the composition of workforce, entailing lower levels of experience, certification, and experience for teachers.

For the scholarly literature, we provide a theoretical framework explaining potential changes in the level and use of resources, drawing on literature from different disciplines and applying it to the unusual case of charter schools, yielding several, seemingly novel, theoretical insights. Further, we are (to our knowledge) the first to apply a causal research design to the study of government contracting and decompose the results from our analysis into numerous layers to understand what is driving changes in resource allocation. Lastly, in contrast to earlier
studies analyzing spending patterns in charter and traditional public schools, we consider all
district spending in the analysis overcoming limitations of earlier studies.

While our results have important implications for practitioners and scholars, they come
with two caveats, demanding further research on contracting schemes involving charter schools.
First, we do not discuss the relationship between contracting reforms and student performance,
separating the role of spending as a mediator between both variables. Given that expenditure
increases were at least partially an effect of the reforms themselves, we cannot isolate the impact
of spending on performance; it is part of an entire reform package and cannot be observed
separately from other changes entailed in the contracting reforms (Harris and Larsen 2018b). The
effect of all reform elements on performance have been; however, well documented by Harris
and Larsen (2018a). Future research could focus on the relationship between performance and
spending, analyzing the efficiency of the new governance system. Second, our analysis focuses
on a single urban school district and it is not clear if the results can be transferred to other charter
school programs. As New Orleans serves as a role model for the implementation of charter
schools throughout the nation, our findings are likely present in other urban areas with charter
school programs, but could differ depending on the institutional settings. Subsequent evaluations
could analyze how differences in institutional settings between urban areas influence charter
school finances.
References


Dreilinger, Danielle. 2017. New Orleans could get 5 new charter schools, including Audubon expansion. [accessed December 23, 2019].


Figures

Figure 1: Trends in per pupil operating expenditure for actual and synthetic New Orleans

Data: LDOE Fiscal Data; LDOE Budget Letters; CWI based on Taylor and Fowler (2006), Bureau of Labor Statistics; U.S. Census

Notes: The donor pool for the synthetic control group consists of 17 urban school districts in Louisiana. School districts receiving positive weight $W$ in the synthetic control are East Baton Rouge (0.422), Tangipahoa (0.455) and St. Charles (0.133). Variables to estimate the synthetic control group are share of students with disabilities, share of students receiving free lunch, share of students with limited English proficiency, unemployment rate, median housing value, comparable wage index, and enrollment.
Figure 2: Differences between New Orleans and Synthetic Control for Spending in Instructional and Administrative Functions

(a) Instruction Expenditure
(b) Overall Administration Expenditure
(c) School Administration Expenditure
(d) General Administration Expenditure
(e) Central Administration Expenditure

Data: Same as Figure 1
Notes: Scale of the y-axis differs between some of the graphs. The donor pool is the same as in Figure 1. There is a different synthetic control for each expenditure category (see Table 2). The definitions of the dependent variables are included in Table 1.
Figure 3: Differences between New Orleans and Synthetic Control for Transportation, Maintenance, Food, and Other

Data: Same as Figure 1.

Notes: Scale of the y-axis differs between some of the graphs. The donor pool is the same as in Figure 1. There is a different synthetic control for each expenditure category (see Table 2). The definitions of the dependent variables are included in Table 1.
### Tables

#### Table 1: Spending Categories

<table>
<thead>
<tr>
<th>Spending category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating expenditure</td>
<td>Category includes the following spending categories as defined below: instruction, teacher and pupil support, school administration, general administration, central administration, transportation, maintenance, food, and other. The category excludes all capital and debt payments. RSD and OPSB charge a two percent fee from schools they oversee, based on all operating expenses. Thus, we subtract two percent from the per pupil operating expenditure to adjust for double counting of authorizer fees. Double counting occurs if the fee is considered an expenditure for charter schools and a revenue for authorizers that is spent for administrative purposes.</td>
</tr>
<tr>
<td>Instruction</td>
<td>Activities dealing directly with the interaction between teachers and students, for instance teaching inside and outside the classroom, special education programs, and co-curricular activities.</td>
</tr>
<tr>
<td>Teacher and pupil support</td>
<td>Support services are narrowly defined as assistance to pupils and staff. Pupil services consist of social work, guidance, and medical programs. Staff services are mainly trainings for teachers to improve classroom-related activities.</td>
</tr>
<tr>
<td>Overall administration</td>
<td>Category includes school and general administration, and central services as defined below.</td>
</tr>
<tr>
<td>School administration</td>
<td>Activities concerned with the administrative responsibility of a school, such as running the principal’s office.</td>
</tr>
<tr>
<td>General administration</td>
<td>Activities concerned with establishing and administering policies for operating a local education agency (LEA) as for instance board of education services or activities associated with the executive responsibility for the entire LEA. We subtract two percent of the total per pupil revenue from general administration measures to adjust for double counting of authorizer fees.</td>
</tr>
<tr>
<td>Central services</td>
<td>Activities, other than general administration, that support each of the other instructional and supporting services programs. These activities include planning, research, development, evaluation, information, staff, and administrative technology services. This category includes spending at the CMO level.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Activities concerned with conveying students to and from school, as provided by state and federal law. This function includes trips between home and school, as well as trips to school activities, including field trips.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Activities to keep grounds, buildings, and equipment in effective working condition and state of repair.</td>
</tr>
<tr>
<td>Food services</td>
<td>Activities concerned with providing food to students and staff in a school or LEA to meet the nutritional needs of children as defined in USDA child nutrition regulations. Activities may include the operation of breakfast, lunch, snacks, catering, and nutrition education</td>
</tr>
<tr>
<td>Other</td>
<td>Other spending includes all expenditure categories not included in the previous categories. These functions primarily include purchased services that were not reported for all time periods.</td>
</tr>
<tr>
<td>Salaries</td>
<td>Amounts paid to both permanent and temporary LEA employees, including personnel substituting for those in permanent positions. This expenditure includes gross salary for personal services rendered while on the payroll of an LEA.</td>
</tr>
<tr>
<td>Benefits</td>
<td>Amounts paid by the LEA on behalf of employees. These amounts are not included in the gross salary but are in addition to that amount. Such payments are fringe benefit payments and, while not paid directly to employees, are, nevertheless, part of the cost of personal services. We focus in the analysis exclusively on pension-related benefits, as other benefits are not reported for all time periods.</td>
</tr>
<tr>
<td>Other</td>
<td>All other expenses not included in salaries and benefits.</td>
</tr>
</tbody>
</table>

Note: All definitions are taken from the Louisiana Accounting & Uniform Governmental Handbook (LAUGH Guide, 2010).
Table 2: Average Pre-Reform Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Actual New Orleans (I)</th>
<th>Synthetic New Orleans (II)</th>
<th>Urban School Districts (III)</th>
<th>Weight V (IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share students with disability</td>
<td>9.59</td>
<td>10.34</td>
<td>12.5</td>
<td>0.221</td>
</tr>
<tr>
<td>Share FRPL students</td>
<td>69.69</td>
<td>65.2</td>
<td>58.01</td>
<td>0.139</td>
</tr>
<tr>
<td>Share LEP students</td>
<td>1.32</td>
<td>1.29</td>
<td>1.52</td>
<td>0.185</td>
</tr>
<tr>
<td>Share white students</td>
<td>5.63</td>
<td>44.95</td>
<td>54.99</td>
<td>0.020</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>6.23</td>
<td>6.28</td>
<td>6.37</td>
<td>0.027</td>
</tr>
<tr>
<td>Median income</td>
<td>35,851</td>
<td>38,056</td>
<td>49,154</td>
<td>0.295</td>
</tr>
<tr>
<td>Median housing value</td>
<td>146,533</td>
<td>145,524</td>
<td>115,004</td>
<td>0.022</td>
</tr>
<tr>
<td>Comparable wage index</td>
<td>0.88</td>
<td>0.82</td>
<td>1.33</td>
<td>0.009</td>
</tr>
<tr>
<td>Enrollment</td>
<td>79,129</td>
<td>21,680</td>
<td>18,723</td>
<td>0.010</td>
</tr>
<tr>
<td>Enrollment change</td>
<td>-1.57</td>
<td>-0.59</td>
<td>-0.24</td>
<td>0.080</td>
</tr>
</tbody>
</table>

Data: LDOE FISCAL DATA; LDOE Budget Letters; CWI based on Taylor and Fowler (2006), Bureau of Labor Statistics; U.S. Census

Notes: All variables are averaged for the time period prior to the reforms 1990 – 2005. The last column reports the weight $V$ each variable receives in estimating the synthetic control group. The school districts receiving a positive weight $W$ in estimating the synthetic control group are East Baton Rouge (0.41), Tangipahoa (0.45), and St. Charles (0.14).
Table 3: Results for Synthetic Control Group Models and Decomposition (Equations 3 and 5) for 2014

<table>
<thead>
<tr>
<th></th>
<th>(I)</th>
<th>(II)</th>
<th>(III)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Operating Expenditure (urban sample)</td>
<td>$1,359 (13%)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Operating Expenditure (storm sample)</td>
<td>$1,414 (14%)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Instructional Expenditure</td>
<td>$706 (10.1%)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Instructional Salaries</td>
<td>33.12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Average Salary Instruction</td>
<td>-82.64%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructors per Students</td>
<td>-17.83%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Instructional Benefits</td>
<td>-50.17%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Instructional Other</td>
<td>-16.71%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Administrative Expenditure</td>
<td>$699 (66%)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Administrative Salaries</td>
<td>51.28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Average Salary Administration</td>
<td>61.80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrators per Students</td>
<td>38.04%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Administrative Benefits</td>
<td>3.27%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Administration Other</td>
<td>45.46%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in School Administration Expenditure</td>
<td>$503 (87%)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in General Administration Expenditure</td>
<td>$282 (189%)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Central Administration Expenditure</td>
<td>$174 (120%)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher and Pupil Support Services Expenditure</td>
<td>$60 (4.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation Expenditure</td>
<td>$300 (33%)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance Expenditure</td>
<td>$11 (1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Expenditure</td>
<td>$173 (128%)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Expenditure (Purchased Services)</td>
<td>$704 (33%)***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data: LDOE Salary and Experience Information; LDOE FISCAL DATA; LDOE Budget Letters; CWI based on Taylor and Fowler (2006), Bureau of Labor Statistics; U.S. Census
Notes: P-values are indicated by *** p<0.001, ** p<0.05, * p<0.1
Appendix A: New Orleans Revenues

Revenue Sources
School funding in New Orleans, as in most other states in the U.S., has three main sources: federal revenues (26.4 percent in 2013/14), state revenues (27 percent in 2013/14), and local revenues (46.6 percent in 2013/14). Federal revenues are administered to the state and given directly to RSD and BESE schools. OPSB receives federal dollars for its direct-run and charter schools. The money is used to provide services for direct-run or charter schools.

The state calculates the revenue that a school district receives using the Minimum Foundation Program (MFP). The formula gives additional weight to students who live in poverty or have limited English proficiency, receive vocational training, have a disability, carry a gifted designation, or live in a small school district. OPSB distributes state revenues to its charter schools as a per pupil average, without considering the state’s categories for weighting. Thus, schools enrolling greater shares of students with disabilities compared to the average school receive less than what they are entitled to according to the MFP. OPSB has the discretion to determine budget allocations for its few remaining direct-run schools. RSD has its own formula for distributing state revenues to schools that distinguishes between types of disabilities but does not distribute state revenue on a per pupil basis for FRLP and gifted students¹. BESE schools receive per pupil funding according to the MFP formula.

OPSB is the only school-governing body that has the right to collect local revenues including property and sales taxes. Therefore, OPSB levies taxes for all schools in the district and then distributes revenues equally on a per pupil basis. Further, OPSB is the only entity allowed to incur debt. The district carried over a debt of $350 million from the financial periods prior to the storm including approximately $250 million from bonds issued in the 1990s. In the years after the hurricane, the OPSB levied a specific millage for this debt, and all schools operating in OPSB-owned buildings contributed revenue from this millage to debt payments (BGR, 2014; Cowen Institute, 2011).

Prior Hurricane Katrina annual tax collection showed an increasing gap between annual real estate taxes levied and collected. The gap widened from about 2 million in 1995 to 19 million in 2005 and is said to be still large after the Hurricane (Guajardo 2013). In 2004, a survey showed that of 1,674 property sales in New Orleans, some properties were under-assessed by 70 percent, a fact that has been contributed to seven different assessors used by the estimate property assessments (Public Affairs Research Council in Louisiana 2006). While the city switched to the common one assessor model, nonpartisan advocacy groups still pressure the city to be more transparent about its tax collection and allocation (BGR 2015, 2019).

Additional Revenue Sources after Hurricane Katrina
It is important to mention that New Orleans received a large number of federal lump sum block grants in addition to regular federal funding to rebuild the district after Hurricane Katrina. These grants included Immediate Aid to Restart Public Schools (RESTART), the Hurricane Educator Assistance Program (HEAP), and the Hurricane Katrina Foreign Contributions Program. For the 2008/09 school year, the Cowen Institute (2011) reports the citywide spending² of these grants: RESTART aid $3,092,570; HEAP $299,559; and Foreign Contributions Program $1,098,950³.
These numbers are based on charter school audits and are likely a lower-bound estimate. Non-profits do not have to separately report spending of federal revenues under $300,000 (OMB Circular No. A-133). Further, the numbers do not include spending at the level of the governing agency. However, the numbers show that New Orleans received relatively large amounts of one-time aid after the storm. Yet, the spending of additional federal one-time aid did not last. In the 2009/10 school year, spending from these grants decreased drastically by 91 percent for RESTART, 51 percent for HEAP, and 47 percent for Foreign Contributions Program (Cowen, 2011).

Two additional one-time aid sources came and still come from the Federal Emergency Management Agency (FEMA) and Public Charter Schools Federal Grant Program. FEMA provided a lump sum $1.8 billion grant to the RSD and the OPSB to rebuild New Orleans public school campuses (BGR, 2013). In May 2015, 33 school projects were completed, 31 were under construction, 4 were in the procurement phase, and 16 in the design phase (FEMA 2015). Further, FEMA loaned the school board nearly $60 million for operating expenses following Hurricane Katrina. FEMA subsequently forgave the entire balance of the FEMA Community Disaster Loan of $60 million (OPSB Comprehensive Financial Report 2014). The Public Charter Schools Federal Grant Program provides financial assistance for the planning, program design, and initial implementation of charter schools and for the dissemination of information on charter schools. Currently, new charter schools in Louisiana are eligible to receive funding under this program for up to 3 years at $200,000 per year.

Apart from one-time aid and regular revenue streams from federal, state, and local sources, some charter schools in New Orleans received money through grants that were won through competitive processes. Two examples are the Investing in Innovation (i3) and the NOLA Teaching Incentive Fund. The i3 grant was received by the non-profit organization New Schools for New Orleans (NSNO) and helped restart schools in New Orleans. The organization supplemented the $28 million federal i3 grant with $5.6 million in private funds. NSNO applied with RSD for resources from the NOLA Teaching Incentive Fund. Both organizations received a grant of $13.2 million to provide performance incentives and professional development opportunities to about 25 schools (NSNO, 2015).

Another source of funding is philanthropic revenues. We use audit data from 2006/07 to 2012/13 to determine the amount of philanthropic revenues that New Orleans charter schools received after Hurricane Katrina. In these years, charter schools received a total of $76,851,734 in contributions and donations. The per pupil amounts varied widely between schools. Some schools did not receive any philanthropic contributions, while others received more than $6,000 per pupil. On average, between 2006/07 and 2012/13, New Orleans schools received $732 per pupil in philanthropic revenues with a standard deviation of $1,954.

Revenue Analysis
The revenue analysis is based on estimates based on the synthetic control group (Figure A1) and difference-in-differences frameworks (Table A1). We find that the increase is due to increases in local ($500 per pupil) and federal funds ($988 per pupil). The local increase is due mostly to higher property tax revenues and the federal funds are due at least in part to competitive grants. There were essentially no private donations for either group in the time prior to the reforms. Afterwards,
New Orleans received relatively large amounts of donations leading to a difference of $350 after the reforms. In sum, all changes lead to a revenue increase of $1,669 per pupil. The per pupil revenues exceed the increase in operating expenditure by $310.

References


Endnotes
Data: LDOE FISCAL DATA; LDOE Budget Letters
Notes: Control group is based on the districts and weights of the main specification. Only federal and state revenues exclude capital spending.
<table>
<thead>
<tr>
<th>Category</th>
<th>2004-2005 Mean</th>
<th>2013-2014 Mean</th>
<th>Difference in Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Pupil Federal Revenues excl. Capital</td>
<td>Control $1,382</td>
<td>New Orleans $1,542</td>
<td>Control $1,725</td>
</tr>
<tr>
<td>Per Pupil State Revenues excl. Capital</td>
<td>Control $4,007</td>
<td>New Orleans $4,293</td>
<td>Control $4,243</td>
</tr>
<tr>
<td>Per Pupil Revenues Property Tax</td>
<td>Control $1,762</td>
<td>New Orleans $1,845</td>
<td>Control $2,328</td>
</tr>
<tr>
<td>Per Pupil Revenues from Sales Tax</td>
<td>Control $2,560</td>
<td>New Orleans $1,690</td>
<td>Control $3,258</td>
</tr>
<tr>
<td>Per Pupil Donations to Schools</td>
<td>Control $25</td>
<td>New Orleans $14</td>
<td>Control $9</td>
</tr>
</tbody>
</table>

*Data: MFP Budget Letters; LDOE Fiscal Data; Charter School Audits*

*Notes: Table calculates difference-in-differences using a control group based on the districts and weights of the main specification and New Orleans. The pre-reform measures are calculated using the mean of revenues between 2003 and 2005, and the post-reform measures are calculated using the mean of revenues between 2012 and 2014.*
Appendix B: Synthetic Control Group

The synthetic control group is estimated according to the following procedure. Let $J$ be the number of school districts in Louisiana potentially serving as the control group for New Orleans (donor pool). Define a $(J \times 1)$ vector of weights $W = (w_1, ..., w_J)'$, which are nonnegative and sum up to one. The scalar $w_j (j = 1, ..., J)$ represents the weight that each district receives in the synthetic New Orleans. Note that each change in $W$ creates a different synthetic New Orleans. Thus, it is important to choose a valid subset of school districts (also called donor pool) to create a synthetic New Orleans.

Let $X_1$ be a $(K \times 1)$ vector containing predictors of operating expenditures in New Orleans prior to the contracting reforms. Let $X_0$ be the $(K \times J)$ matrix containing the same predictors for the school districts in the donor pool. Define $V$ as a $(K \times K)$ diagonal matrix with nonnegative components representing the relative importance of each predictor. The matrix $V$ is chosen among all positive definite matrices to minimize the average squared prediction error of the outcome variable during the period prior to Hurricane Katrina (Abadie, Diamond, and Hainmueller 2010, 2015).

The vector of weights $W^*$ defines the combination of non-reform districts that best resemble New Orleans’ operating expenditure. Following Abadie, Diamond, and Hainmueller (2010, 2015), $W^*$ is chosen to minimize:

$$W^* = \arg \min_w (X_1 - X_0 W)' V (X_1 - X_0 W)$$

subject to $w_1 + \cdots + w_j = 1$ and $w_j \geq 0$, for $j = (1, ..., J)$

The causal effect of contracting is estimated in the following way. Let $Y_1$ be a $(T \times 1)$ vector whose elements are the post-contracting reform per pupil operating expenditure for New Orleans. Similarly, let $Y_0$ be a $(T \times 1)$ matrix, which contains spending for all school districts in the donor pool for the time after the contracting reform. The effect of contracting is measured by comparing spending in New Orleans and the synthetic control group for the different years in the post-intervention period, $Y_1 - Y_0 W^* = \delta_{1t}$.

Since the synthetic control group uses by definition small samples, it is not possible to use the traditional approaches of statistical inference. To overcome this problem, several scholars have recommended a procedure that conducts a series of falsification exercises or placebo studies (Abadie, Diamond and Hainmueller 2015; Galiani and Quistorff 2016; McCellend and Gault 2017). These models are based on the premise that the observed treatment effects should only be present in the place that was exposed to the treatment.

Following Galiani and Quistorff (2016), we estimate the same model on each untreated district, assuming they were treated at the same time as New Orleans, giving us a distribution of placebo effects, $\delta_{0t}$. Note that we exclude New Orleans from the donor pool to avoid any influence of the treated district on the placebo counterfactual. If many of the placebo effects are larger (or smaller) than actual result for New Orleans, then it is likely that we observed the actual treatment effect by chance. This non-parametric, exact test has the advantage of not imposing any
distribution on the errors. More specifically, the one-sided p-values (for positive effects) can be formulated as follows:

\[ p - \text{value} = \Pr(\hat{a}_{0t} \geq \hat{a}_{1t}) \]  

(2)
Appendix C: Falsification and Robustness Checks for Total Expenditures per Pupil

The idea behind the falsification tests is simple: if the results of the main specification are truly causal, then they should only hold during the relevant time period and only for New Orleans. We begin with a false intervention period starting in 1999 and ending in 2005, which allows us to observe a sufficient number of years in pre and post period, and testing for the impact of the 1999 implementation of the Louisiana accountability system on school spending. If the results of the main specification are truly causal, there should be no effect of the false intervention on per pupil expenditure. Figure C.1 shows similar trends for actual and synthetic New Orleans in the pre-period and a small effect of opposite sign for the post period.

Another falsification test recommended by Abadie, Diamond, and Hainmueller (2012, 2015) is to assign placebo treatments to all units in the donor pool and evaluate if there are considerable effects for units that did not experience treatment. Our statistical inference is based on the same logic (and shows that the results of our main specification are highly statistically significant), and hence we do not repeat this exercise here.

Our robustness checks evaluate the sensitivity of the main results to changes in the donor pool. We start by selecting districts as controls that have been impacted by Hurricane Katrina and received aid from the Federal Emergency Management Agency, but did not implement contracting reforms (see Appendix C for the location of the districts). This selection allows us to test for potential hurricane effects on operating expenditures but has the disadvantage that the districts in the donor pool are less urban and different in their socio-economic composition.

Figure C.2 demonstrates that the alternative synthetic control, consisting of Calcasieu (0.37), Jefferson Davis (0.397), and Pointe Coupee (0.232), matches the pre-intervention trend well except for 1992. The post-intervention effect is similar to the main specification and is $1,414 (14 percent) in 2014.

The next robustness check iteratively re-estimates the main specification omitting one of the districts included in the synthetic control of the main specification. Figure C.3 displays the results using grey lines for the alternative control group. Leaving out either East Baton Rouge or Tangipahoa results in a similar effect size while leaving out St. Charles increases the effect relative to the main specification.

All falsification and robustness checks confirm the results of the main specification.
Figure C.1: Falsification test using a false intervention time

Data: LDOE Fiscal Data; LDOE Budget Letters; CWI based on Taylor and Fowler (2006), Bureau of Labor Statistics; U.S. Census
Notes: Sample and variables are the same as in the main specification except that the panel was reduced to the years 1990 to 2005.

Figure C.2: Robustness check using a donor pool of storm-affected school districts

Data: LDOE FISCAL DATA; LDOE Budget Letters; CWI based on Taylor and Fowler (2006), Bureau of Labor Statistics; U.S. Census
Notes: The donor pool for the synthetic control group consisted of 15 school districts affected by Hurricane Katrina that received aid from FEMA. The school districts receiving a positive weight $W$ in the synthetic control are Calcasieu (0.37), Jefferson Davis (0.397), and Pointe Coupee (0.232). Variables to estimate the synthetic control group are the same as in the main specification.
Figure C.3: Robustness check leaving one district out of the synthetic control group out of the donor pool

Data: LDOE FISCAL DATA; LDOE Budget Letters; CWI based on Taylor and Fowler (2006), Bureau of Labor Statistics; U.S. Census
Notes: The variables and time periods are the same as in the main specification. The grey lines display synthetic control groups that leave one of the districts out that was in the main specification to create the synthetic New Orleans.

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1 Act 467, established in 2015, requires OPSB and RSD for the 2015/16 school year to come up with a common funding formula based on student characteristics.
2 Federal grants are provided on a reimbursement basis, so the spending reported in school audits reflects the actual money that schools received from the federal government. OMB Circular No. A-133 requires a differentiated audit of expenses for federal grants over $300,000.
3 All numbers are based on the Cowen Institute report “A Look at School-by-School Finances in New Orleans, 2009-2010: An Addendum to the March 2011 State of Public Education in New Orleans School Finances Report” (Cowen Institute 2011).
4 In 2014 dollars.
5 As the student population in New Orleans did not show signs of demographic change (Harris and Larsen 2018a), the federal increase is likely explained by the Charter Schools Federal Grant Program (up to 3 years at $200,000 per year for each school), and competitive grants such as Investing in Innovation (federal grant of $28 million and $5.6 million in private funds added) and the NOLA Teaching Incentive Fund ($13.2 million).