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How School District Secession Impacts the District Left Behind

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by

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A THESIS

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ABSTRACT

This is the first national analysis of school district secessions that predicts which kind of school districts are likely to have a secession attempt and measures the impact of secession on the per-pupil revenue of the district left behind. Data on school district secessions was limited prior to EdBuild's 2017 report, *Fractured*. This thesis combines data from the National Center for Education Statistics with EdBuild's data on secessions. Using a linear probability model, I find that larger districts in urban areas with more disadvantaged students receiving free and reduced-price lunch are more likely to experience a secession attempt. I then use a difference-in-difference model to predict the per-pupil revenue impact of secession on the district left behind. On average, school districts that experience a secession attempt have $1,000 less in per-pupil revenue than school districts with no attempt. After the secession, the school district left behind sees a further decline in revenue by over $1,000 per-pupil. While 28 states have policies for school district secession, these procedures vary in permissiveness. Only 9 states require a fiscal impact assessment, and only 6 states require a racial and socioeconomic impact assessment. This is surprising since the literature is replete with examples of how school district fragmentation is contributing to resegregation and economic inequality. Indeed, after a wave of school district consolidations, from 128,000 school districts in 1930 to 16,000 by 1980, we are now seeing a new trend, a fragmentation drip, as communities and municipalities seek local control of their schools. Most state funding formulas are

programmatically designed to provide equity in education funding, but my results suggest that state policies are failing to deliver on equity goals.

Keywords: School District, Secession, Fragmentation, Education Finance, Education Policy, K-12 Funding

DEDICATION

This thesis is dedicated to the educators, administrators, researchers, and policymakers who serve the cause of advancing human and social development through public schools. May our commitments contribute to education's promise of being the great equalizer.

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LIST OF ABBREVIATIONS

ACS	American Community Survey
CCD	Common Core Data
DID	difference-in-difference
DOJ	U.S. Department of Justice
FRL	free and reduced-price lunch
IEP	individualized education plan
LEP	limited English proficiency
LPM	linear probability model
NAACP	National Association for the Advancement of Colored People
NCES	National Center for Education Statistics
SAIPE	Small Area Income and Poverty Estimates

CHAPTER 1 – INTRODUCTION

No Child Left Behind was a powerful slogan for marketing education reform. No *School District* Left Behind is not as catchy, but it highlights the institutional level of analysis that future education reform will need to take if it seeks to solve the financial problems in America's public education system. Education finance is complex, combining local, state, and federal revenues. Despite multiple efforts for equity, inequality in per-pupil revenue persists. This study demonstrates how school district secession is exacerbating inequality in per-pupil revenue.

Figure 1. Gardendale flyer promoting secession

To get a sense of the impact school districts have on communities, consider Gardendale, Alabama—a northern suburb of Birmingham. In the flyer in Figure 1, a young girl looks up at the question: "Which path will Gardendale chose?" Her blond hair is in a pony tail, and her hands are clutched high on her backpack straps. The poster is urging her to make the right choice between two paths. The rhetoric is telling: Will she chose a *place* or a *community*? To *live* or *NOT*? The list of cities in each column adds a racial prejudice to the classist one: Will Gardendale secede from Jefferson County and create a mostly

white school district like Homewood, Hoover, Vestavia Hills, and Trussville? Or will Gardendale fail to support its own school district and become mostly black like Adamsville/Forestdale, Hueytown, Pleasant Grove, and Center Point/Huffman? Judge Haikal overseeing Gardendale's secession case wrote regarding the flyer (Stout v. Jefferson County Board of Education 2017):

> If pictures speak louder than words, then a flyer bearing a photograph of a white student that asks Gardendale voters if they would rather live in an affluent white city or a formerly white city that now is well-integrated or predominantly black communicates an unambiguous message of inferiority. There is no way to sidestep the harm that such a message conveys.

School district secession appeals to racial prejudice and is contributing to resegregation (Ayscue & Orfield 2014; Lichter, Parisi, & Taquino 2015). Regardless of that effect, proponents of secession deny racial motivation and defend their decision to secede as their right to local control (Haselhoff 2003; Purcell 2001). While secession can appeal to racial prejudice, the benefit-cost analysis is enough to convince others. Parents want the best education for their children, and they recognize that secession gives them more political and financial control over their children's future. Beyond the parents, the sheer market value of an independent school system incentivizes municipalities to secede as well. The creation of an independent school district allows the city to market itself as a prosperous bedroom community for commuters with school-aged children (Buendia & Humbert-Fisk 2015; DiMartino & Jessen 2018).

Purpose of Study

The primary purpose of this study is to contribute to the literature on school district fragmentation and secession by measuring the per-pupil revenue impact of secession on school districts left behind. To answer this question, I first develop a linear probability model for predicting which school districts are most likely to experience a secession attempt. My analyses predict that large, disadvantaged, and urban school districts are more likely to experience a secession attempt. I then develop a difference-in-difference model to predict the per-pupil revenue impact of school district secession on the districts left behind. My analyses depict a disparity in funding, with districts left behind experiencing a decrease in revenue post-secession.

Research Questions

This study focuses on two research questions:

- Research Question 1: Which school districts are likely to have a secession attempt?
- Research Question 2: What is the per-pupil revenue impact on school districts after secession?

I use a linear probability model (LPM) to determine the district characteristics and student demographics that predict school district secession. Then I use a difference-in-difference (DID) model to predict the impact of secession on school districts' per-pupil revenue from local, state, and federal governments.

Structure of Thesis

This introduction identifies school districts as my level of analysis and education finance as my topic of study. The thesis is organized into the following chapters:

Chapter 2: Institutional Background

Chapter 2, *Institutional Background*, provides the reader with background information on school district fragmentation by mapping and describing secessions and by examining the different state policies that govern secession procedure. This chapter also includes a brief history of secession's association with segregation in the courts. Finally, the chapter concludes by reviewing the case study of Gardendale's failed secession from Jefferson County, Alabama.

Chapter 3: Literature Review

Chapter 3, *Literature Review*, identifies three areas of focus within the literature on secession and summarizes the state of research. First, the chapter reviews trends in school district consolidation and fragmentation by describing the school district consolidation wave from 1920-1980 and a new trend, a fragmentation drip, from 1980-Present. Second, this literature review examines the political, social, and economic effects of school district secession on local control, resegregation, and economic inequality. The chapter then turns to the topic of education finance to summarize school district revenues at the local, state, and federal level. Further, the policy goal of equity in school district finance is evaluated. Finally, the chapter describes the pervasive use of

per-pupil revenue as a research proxy for successful student outcomes. The chapter closes by identifying how this study contributes to the literature.

Chapter 4: Data & Methods

Chapter 4, *Data & Methods*, details how I answer my two research questions. It begins by describing how I compiled my dataset from EdBuild's data on school district secessions with the National Center for Education Statistics (NCES). After overviewing descriptive statistics on school districts, this chapter delineates the bivariate and multivariate analyses I employ to answer both research questions. For the first research question, I develop an LPM to predict which school districts are likely to experience a secession attempt. To answer the second research question, I develop a DID model to predict the impact of secession on a school district's per-pupil revenue. Finally, I explain my empirical strategy and conclude with my empirical expectations in five hypotheses.

Chapter 5: Results

In Chapter 5, *Results*, I describe the findings from my bivariate analyses and from the LPM and DID models. I visualize this data and indicate how it supports my hypotheses. Regarding the first research question, I find that school districts that are large, disadvantaged, and urban are more likely to experience a secession attempt. Regarding the second research question, I find that school districts with secession attempts have less per-pupil revenue than districts with no attempt, and that after the secession, the school districts left behind receive even less per-pupil revenue over time.

Chapter 6: Conclusion

Chapter 6, *Conclusion*, summarizes my findings and discussion. This chapter notes the limitations of the study, namely that secession are rare events. I then suggest policy implications centered around equity in state policy. Finally, I conclude with ideas for further research.

CHAPTER 2 – INSTITUTIONAL BACKGROUND

School district fragmentation is a relatively recent phenomenon in the history of public education, so in this chapter I define fragmentation and highlight its prevalence since the 1980s. State policies are the deciding point in how secession has proliferated, so I overview these state policies and compare important aspects. Next, I recount the legal and historical context that has led to increased secessions, noting the connection of secession to racial segregation. Finally, I close this chapter by looking at the details of the secession process in the case study of Gardendale, Alabama—a northern suburb of Birmingham.

School District Fragmentation

Fragmentation and secession are often interchanged in the policy discussion and academic literature, so it is important to first parse how these are different. Fragmentation is a broader concept that includes secession. Fragmentation refers to how a metropolitan area is divided into separate school districts; the metro becomes more fragmented as more school districts are made within it. Fragmentation results from secession and other school district creations that split public education funding. Some researchers examine fragmentation through charter schools (Wells, et al. 1999; Vergari 2001; Buckley & Schneider 2007). Other researchers examine fragmentation through voucher programs

(Ford 2017) and the school choice movement (Ravitch 2016; Orfield & Frankenberg 2013). In this research, I am focused on fragmentation through secession. A school district secession is the political creation of a new, breakaway school district that fragments an existing school district (EdBuild 2017). As such, I will use the term secession throughout this thesis.

School District Secessions Over Time

EdBuild is a nonprofit dedicated to improving equity in U.S. education funding. Their report, *Fractured: The Breakdown of America's School Districts*, has catalogued 71 secession attempts since 2000. Forty-seven of these attempts have been successful (EdBuild 2017).

While school district fragmentation has occurred over the last century, only recently have these attempts been documented. EdBuild has tracked secession attempts since 2000. Figure 2 displays the number of successful and unsuccessful attempts since that time.

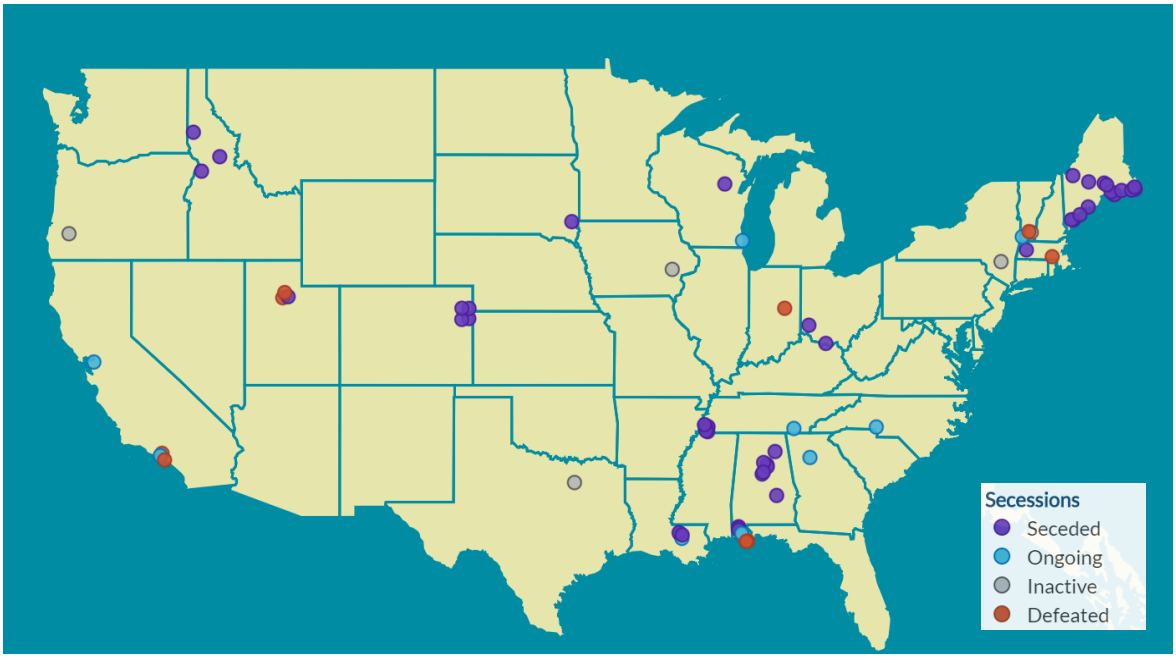

Figure 2. Map of school district secessions, U.S. 2000-2013

Figure 2 shows the locations of school district secession attempts since 2000. Secessions have been attempted in 19 states. Of note, Alabama and Maine have high rates of secession attempts because their state policies are permissive whereas other states have no provisions for school district secession at all.

State Policies Governing School District Secession

The rate of secessions is determined by state policies. While 22 states have no provisions for school district secession, the other 28 states have varying levels of permissiveness (Reeves & Joo 2018). Twenty-eight states have policies for school district secession, but the procedures these policies prescribe vary in the difficulty of the steps they require for secession. Twenty-one states require action by voters. Another twenty-one states—not mutually exclusive—require approval by a state authority. Nine states

require a fiscal impact assessment. Six states require a racial and socioeconomic impact assessment. Three states require a constitutional amendment, and one state requires action from the state legislature (EdBuild 2017).

Table 1 categorizes states by their level of permissiveness toward secession and is derived from Reeves & Joo (2018). States laws differ, requiring permissive, moderate, and/or difficult procedures for secession. Some states include policies from multiple categories.

Table 1. Permissiveness of state policies for school district secession

POLICY	TOTAL	STATES
Permissive Requiring local referendum and negotiation with sub-state entity	11 States	AL, AK, AR, ID, ME, MS, NM, TN, UT, WI, WY
Moderate Popular approval from one or both the seceding district and the district left behind	14 States	AZ, CA, CO, CT, MO, NE, NH, NJ, RI, SC, SD, TX, UT, VT
Difficult Authorization and approval from a statewide entity	19 States	AZ, AR, CA, CO, CT, ID, ME, MD, MA, MO, NE, NH, NJ, NM, OH, SC, SD, VT, WY
No Provision No policy provision for school district secession	22 States	DE, FL, GA, HI, IL, IN, IA, KS, KY, LA, MI, MN, MT, NV, NC, ND, OK, OR, PA, VA, WA, WV

States have many kinds of requirements for secession. Some states, like Alabama, are relatively permissive requiring a local referendum and negotiation with a sub-state entity. Many states require popular approval from the seceding district, but fewer states require democratic approval from both the district that is seceding and the district being

left behind. States that require moderately difficult tasks for secession often also include the need for authorization and approval from a statewide entity, a more difficult task (Reeves & Joo 2018).

There is also a wide variety in the kinds of impact assessments that states require. States may require impact assessments on inequality, segregation, education quality, district efficiency, and funding. State provisions also differ in the guidance available for how to divide property, debts, and liabilities between the new and left behind districts (EdBuild 2017).

Secession's Association With Segregation in the Courts

Contemporary advocates for secession claim the right of local control and deny racial motivation. From the perspective of the district being left behind, though, it appears that the seceding district wants to be separate and superior to the schools they leave behind. Indeed, secession has a sordid history with segregation.

Reconstruction (1863-1877) sought to transform the ex-Confederate states with the 13th, 14th, and 15th amendments (Foner 2014). Yet school segregation persisted during Reconstruction and was declared constitutional by the 1896 Plessy v. Ferguson doctrine of "separate but equal". The justification "separate but equal" was used by southern states to sidestep the new constitutional rights of equal treatment and suffrage. These southern states replaced the promise of equal treatment with the segregation of Jim Crow—a collection of statutes separating facilities and services for blacks and whites.

Desegregation had few champions in the federal government during this time; President Woodrow Wilson even segregated the federal workforce in 1913 to appease his southern cabinet members (Boyd & Chen 2018).

A correction came in 1954 with the Supreme Court's decision in Brown v. Board of Education of Topeka Kansas. Segregation through "separate but equal" was declared "inherently unequal" and overturned. The court's desegregation order was efficacious through the 1960s and early 1970s; during this period the courts refused to allow secessions that would contribute to segregation along racial and class lines (EdBuild 2016). Indeed, the 1971 ruling by the Fifth Circuit rejects municipal secessions that contribute to segregation (Lee v. Macon City Board of Education):

> The city cannot secede from the county where the effect—to say nothing of the purpose—of secession has a substantial adverse effect on desegregation of the county school district. *If this were legally permissible, there could be incorporated towns for every white neighborhood in every city*.

Desegregation orders prevented secessions for a time. In fact, Pleasant Grove, another suburb of Birmingham, was prevented from seceding from Jefferson County in 1972. The court recognized that a Pleasant Grove secession would thwart Jefferson County's court order to implement a unitary, integrated school system (Stout v. Jefferson County Board of Education).

The courts ability to maintain desegregation was weakened in 1974 by Milliken v. Bradley. Meaningful integration within the city limits of Detroit had become negligible due to white flight to the suburbs (Hertz 2014). The National Association for the Advancement of Colored People (NAACP) sued the State of Michigan to force state action on the integration of metropolitan Detroit. This case resulted in a plan to bus students across district lines in order to integrate public schools. Judge Stephen Roth

recognized the role that city and suburban borders play in maintaining segregation; his decision to use bussing to integrate metropolitan Detroit was the first of its kind. In July 1974, however, the Supreme Court ruled in a 5-4 decision to overturn Roth's bussing plan, arguing that district lines must be respected (Milliken v. Bradley):

> The notion that school district lines may be casually ignored or threatened as a mere administrative convenience is contrary to the history of public education in our country. No single tradition in public education is more deeply rooted than local control over the operation of schools.

Also in this case, the court distinguished between *de jure* and *de facto* segregation, meaning that segregation by law is unconstitutional (*de jure*), but segregation in fact (*de facto*), is an aggregate result of personal decisions and therefore is not a cause for governmental interference through interdistrict desegregation.

Milliken v. Bradley marks the decline of federal oversight of secession cases. The court became more conservative in the 1980s with libertarian appointments who favored local control (Cavanagh 2004; Goldman 1999). As desegregation lost its political impetus and court oversight, secession attempts became more likely to succeed.

School District Secession Case Study: Gardendale, Alabama

To understand how school district secessions proceed, consider the case of Gardendale's failed secession from Jefferson County. Jefferson County is one of the most segregated school districts in America (EdBuild 2016). There were five school districts in Jefferson County in 1954 when the Supreme Court made its landmark Brown v. Board of Education decision. The rise of desegregation orders might have led to a consolidation of Jefferson County's five school districts. Instead, sixty-four years later, there are now

twelves school districts in Jefferson County, and Gardendale has sought to become the thirteenth. The twelve school districts surround Birmingham and distinguish Jefferson County as one of the most fragmented metros in the nation—nearly triple the national average. This fragmentation is occurring in disregard to the fact that Jefferson County is one of 176 school districts that is still under federal oversight to integrate and prevent discrimination (EdBuild 2016).

The 1965 school desegregation case Stout v. Jefferson County Board of Education led to a 1971 order giving federal judges oversight of Jefferson County's schools to ensure racial equity. Cities seeking to secede from the County must remain under this desegregation order until they achieve unitary status; that is, an integrated, non-discriminatory system (Moore 2003).

Gardendale is a small, predominantly white suburb of Birmingham that has sought to establish an independent school system over several years (Holliday 2018). Gardendale's schools are administered by Jefferson County whose school system is majority African American. A group of advocates began a public campaign for secession in 2012 and led Gardendale to take its first step to establish its own school system in 2013 when residents voted to raise property taxes for that purpose. Gardendale city officials used this funding in 2014 to establish the Gardendale Board of Education. Gardendale's Board of Education is responsible for policy and superintendent salary, but it does not oversee schools, employ teachers, or enroll students (Brown 2016).

In 2015, Gardendale asked the U.S. District Court for the Norther District of Alabama to secede from Jefferson County and to operate its own municipal school system. This effort was challenged by the County in a joint lawsuit with the U.S.

Department of Justice (DOJ) and the NAACP Legal Defense Fund. Neither Gardendale nor Jefferson County got what they wanted from U.S. District Court Judge Madeline Haikal. Gardendale received secession approval from the Judge, but with parameters and conditions. Judge Haikal approved a three-year plan for Gardendale to start its own school system in which Gardendale would administer its elementary school. If Gardendale's Board of Education successfully managed an integrated elementary school and showed no signs of discrimination, then it would gain control of the middle school and high school. The Gardendale High School, however, was built in 2010 by Jefferson County for $50 million. This state-of-the-art facility is centrally located in the County and includes a key career-education center that services the region. Judge Haikal stipulated that Gardendale must pay Jefferson County back for this school or otherwise build their own facility.

Judge Haikal acknowledged "race was a motivating factor in Gardendale's decision to separate from the Jefferson County public schools system," and she described the city's racial motivations as "deplorable," yet she refused to reconsider her judgment (Faulk 2017). Both Gardendale and the County appealed Judge Haikal's decision. The case then went to a three-judge panel of the 11th U.S. Circuit Court of Appeals where it was overturned unanimously since the secession would prevent Jefferson County from achieving unitary status (Johnson 2018).

The federal court order for desegregation, made over fifty years ago, still binds Jefferson County from making changes without review from a federal judge. Yet while the courts have authority over secession cases, enforcement of the desegregation order is spotty. Six secessions have occurred in Jefferson County since 1970: Vestavia Hills

(1970), Homewood (1971), Midfield (1971), Hoover (1988), Leeds (2003), and Trussville (2005). The courts have not actively tracked or prevented these cases; instead, enforcement of the desegregation order is now largely dependent on local organization and civil liberties advocacy (Joondeph 1996; Landsberg 2014; Blanchett, Mumford, & Beachum 2005; cf. Giles 1975).

The case study of Gardendale v. Jefferson County details the complicated process secession takes. The following chapter builds on this background by reviewing the literature on school district secession.

CHAPTER 3 – LITERATURE REVIEW

This thesis examines two research questions. The first concerns predicting which school districts are likely to experience a secession attempt. In the previous chapter, I discussed the institutional background, policy environment, and historical context that has influenced the increase in school district secessions. In this chapter, I juxtapose fragmentation's increase with the wave of consolidation that preceded it.

My second research question concerns the financial effects of secession on the school district left behind, an analysis that no other study has considered yet. As such, in this chapter, I detail previous research on the impacts of school district secession and then provide a robust overview of how school districts have been funded. School district finance differs across and within states, so I then discuss equity in school district funding. Finally, I close by examine why per-pupil revenue matters.

Trends in School District Consolidation & Fragmentation

To understand the needs and motivations for consolidation and fragmentation, I first review the history of public education to answer the question: How did the U.S. go from 128,000 school districts in 1930 to 16,000 by 1980?

Historical Conditions for Consolidation Wave

As American's took to the frontier in the 19th century, public education often took the form of one-room schools (Apps-Bodilly 2013). At this time, public education was a mostly decentralized and local affair, but everything would change after Horace Mann, the so-called father of public education (Hayes 2006). Horace Mann, a Massachusetts politician, became the first secretary of education in 1837 (Messerli 1972). Mann led state-wide reform for common schools; that is, free and compulsory public education. The common school, modeled from the Prussian system, guaranteed a standard education for the population by advancing students through grades designed by age (Taylor 2010).

Horace Mann convinced many Americans that this new model of education could turn unruly children into virtuous citizens who would uphold the republic (Mann & Cremin 1957; Taylor 2010). Most importantly, Mann convinced policymakers in the Whig party to support his reforms (Groen 2008). At the same time, the efficiency movement symbolized by Frederick Taylor's *The Principles of Scientific Management* was reorienting how American's conducted business, and education reformers would borrow its methods. Previously, school personnel were decided through local patronage. Progressive era reformers used the principles of scientific management to establish bureaucracies and position qualifications so that education would be administered by experts to benefit students equally.

Education reformers used consolidation as a means for reorganizing the decentralized system and delivering uniform education (Cubberley 1919). The common school movement has since been criticized for promoting an anti-intellectual "factory model" of education (Callahan 1962). This criticism coheres with the sentiments of a

digital and creative 21st century economy, but at the time, industrial production was the height of technology. Common schools were indeed factory-like in their ability to raise the standard and production of education in America. In 1910, only 10 percent of youth were high school graduates, but twenty years later, in 1930, 50 percent of youth had a high school diploma (Goldin 1999).

Consolidation Wave (1920-1980)

Horace Mann and Progressive era reformers kicked off the trend in school district consolidation, but it was the Great Depression that created the need for a wave of consolidation. In public administration, scarcity is an unrelenting motivator for cost savings through consolidation (Tyack, Low, & Hansot 1987). Consolidation began in earnest in the late 1920s. Over the next fifty years, the consolidation wave would reduce 128,000 school districts by 88 percent, down to approximately 16,000 school districts by 1980 (Stephens & Perry 1991; Card & Payne 2002; Strang 1987). This wave was driven by a change in education funding. In the 1920s, local funding accounted for over 80 percent of education spending, but as the economy suffered, the states stepped in and implemented unified school districts, often in accord with Mann's recommendations (Chingos & Blagg 2017).

The wave of school district consolidations was driven largely by the need for efficiency through economies of scale (Benson & O'Halloran 1987). The more schools a district operates, the more it can spread its costs across multiple students and find efficiencies in central administration (Riew 1966; Hanson 1964). Kansas provides a clear example; in 1962 Kansas had over 3,000 school districts, but legislation for unified

school districts consolidated its rural systems, reducing Kansas's total school districts to less than 400 (Martinez & Snider 2001). Consolidation reached its saturation point at the in the 1980s with approximately 13,500 school districts (Howley, Johnson, & Petrie 2011; Meyer, Scott, & Strang 1987). States still use consolidation, but only the most rural districts have been consolidated in recent times (Bard, Gardener, & Wieland 2006). Indeed, a third of all rural school districts operate 1 or 2 schools, as in the case of Iowa (Gordon & Knight 2009). Further, nearly half of all districts (46 percent) serve fewer than 1,000 students (Maciag 2016). State policymakers often view school districts that operate few schools with low enrollment as ideal candidates for consolidation due to their potential cost-savings through economies of scale.

Fragmentation Drip (1980-Present)

Since the 1980s, a fragmentation trend has emerged. Following a wave of consolidation, we are now seeing a fragmentation drip. The metaphor of percolation is helpful here. Just as water slowly works its way through grinds and a filter to create coffee, so too the efforts for secession are strenuous, working their way through social, political, and legal frameworks to occur at the rate of drop. Seventy-one communities have attempted to secede since 2000, and 47 of these have been successful (EdBuild 2017).

School district fragmentation may be a pragmatic response to population growth. Whereas consolidation was recommended to achieve economies of scale in the 20th century, school districts operating at the county-level may now be so large as to experience *diseconomies* of scale (Howley, Johnson, & Petrie 2011). Consolidation, a

20th century policy solution, may no longer be the best fit in the 21st century. Indeed, the benefits of consolidation to operational and capital cost savings have been challenged (Duncombe & Yinger 2001). Duncombe and Yinger's surprising findings have been substantiated by further research that finds null and negative outcomes from consolidation (Berry & West 2008; Gordon & Knight 2008). Other researchers have even found that smaller districts are *more* efficient and deliver better outcomes (Verstegen 1990; Haller & Monk 1988; Hawkins 1985; Walberg & Fowler 1987). Overall, there is mixed literature on the effect of school size on efficiency and effectiveness of education spending (Berry & West 2010; Boser 2013). Nevertheless, the optimal school size appears to lie somewhere between 1,000-3,000 students (Edelman & Knudsen 1990).

Fragmentation is also motivated by racial prejudice. Desegregation reached its peak in the 1980s; since then, the U.S. has become more segregated while its school districts have become more fragmented (Orfield et al. 2014). This effect is explored in more detail in the following section.

Effects of School District Secession

School district secession has multiple political, social, and economic effects. Politically, school district secession creates a new jurisdiction for local control. This new political jurisdiction, however, reinforces the residential self-sorting processes of resegregation. Further, the combined effect of political and social segregation exacerbates economic inequality.

Local Control

School district secession is defended as local control (Purcell 2001; Siegel-Hawley, Diem, & Frankenberg 2018). The desire for local control is embedded in the American ethos of freedom, democracy, and self-determination (Haselhoff 2003; Purcell 2001). Further, local control is a prized possession because it is perceived to give a municipality an advantage in education quality and economic prospects (Buendia & Humbert-Fisk 2015). The problem, however, is that many of these arguments for school district secession do not meet the criteria for justice which includes how a secession affects the communities around it (Murray 2009).

Resegregation

The social justice problem with secession is that, intentionally or not, it is a mechanism for resegregation (Reeves & Joo 2018; Diem, et al. 2015; Frankenberg 2009; Frankenberg & Chungmei 2002; Frankenberg & Orfield 2012). This segregation expands the racial achievement gap (Borman & Dowling 2010). Further, secession challenges the notion of the public good by preempting taxes from being invested community-wide; instead political geography allows those taxes to build up one municipality to the exclusion of its neighbors (EdBuild 2017).

The negative impact of segregation is one way to look at the problem, but so too is the opportunity costs of missing out on integration. There is much to be gained from diversity in a globalized economy. Indeed, racially diverse classrooms not only narrow the achievement gap by raising minority skills and performance (Brown-Jeffy 2006;

Siegel-Hawley 2012), they also produce better academic and social outcomes for all students (Wells, et al. 2016). In fact, long-term analyses find that students from racially diverse schools achieved greater success in educational attainment, professional advancement, and civic engagement (Mickelson 2008; Orfield et al. 2014). While other studies dispute or minimize these gains, there is consensus that diversity in education breaks down stereotypes and promotes cross-racial understanding—a quality sorely needed in America (U.S. Commission on Civil Rights 2006; Kugler 2002).

Resegregation is being allowed, even though research has found that segregation harms the academic outcomes of both white students and students of color. A study of math test scores over more than 30 years finds that "increases in school segregation correspond to significant increases in the black-white and Latino-white test score gap" (Berends & Penaloza 2010). Conversely, integrated schools improve the academic performance of all students (Ayscue, Frankenberg, & Siegel-Hawley 2017). Integrated schools also improve social tolerance (Mickelson 2016) and foster social trust in a multiracial democracy (Eaton & Chirichigno 2011). Multiracial educational experiences are beneficial to white students (Siegel-Hawley & Genevieve 2012), and they show even greater benefits for black students (Linn & Welner 2007) and Latino students (Gándara & Aldana 2014).

The benefits of integration are not solely derived from exposure to diversity. Rather, the great benefit of integration is equal access to resources. Socioeconomically segregated students see improvement in performance not merely by sitting next to white students, but by the collective effect of access to complete facilities, qualified teachers, and advanced curricula (Darling-Hammond 1998).

Economic Inequality

The creation of new political boundaries intensifies economic inequality because racial and economic segregation reinforce each other (Darling-Hammond 1998; Berry 2007; Sharkey 2013). Separating districts may be a useful administrative tool, but *how* the tool is used makes the difference. For example, if the district being left behind votes to approve the secession, then there is no social justice problem since both communities have democratically consented to the change. Unfortunately, only four states require a majority vote from the community being left behind (EdBuild 2017). State policies could treat the communities being left behind more equitably by requiring a majority vote from all communities affected by the secession.

This research focuses on secession's effect on education finance, and here too I find an equity problem. Education funding is the crux in whether school districts can afford the conditions for high student performance. On average, school districts receive 10 percent of their funding from the Federal Government, 45 percent from the State, and the other 45 percent from local sources (Leachman, Masterson, & Figueroa 2017). Yet the local portion of education spending varies greatly by property values (Hoxby 1998). To protect property values, residents self-segregate and fence off their resources with political boundaries. The Mayor of Gardendale admitted this to the press; secession is about "keeping our tax dollars here with our kids rather than sharing them with kids all over Jefferson County" (Brown 2016). This study quantifies the effect of secession on per-pupil revenue and thus measures one of the causes of economic inequality.

School District Finance: Local, State, & Federal

Education finance is complex in the U.S. due to the interactions of multiple actors at each layer of government: local, state, and federal. On average, elementary and secondary education receives about 45 percent of their funding from local governments ($5,968 per student in 2015), another 45 percent from state governments ($6,358 per student in 2015), and about 10 percent from the federal government ($1,076 per student in 2015). These averages disguise wide variation though (Chingos & Blagg 2017). Compare New York, Georgia, and Alabama to the U.S. average.

Table 2. Comparing average per-pupil revenue, U.S. 2015*

	Local	**State**	**Federal**	**Total**
Alabama	$3,823 (64%)	$6,307 (99%)	$1,232 (114%)	$11,362 (85%)
Georgia	$5,094 (85%)	$5,090 (80%)	$1,124 (104%)	$11,308 (84%)
New York	$11,813 (198%)	$9,224 (145%)	$1,008 (94%)	$22,045 (164%)
U.S.	$5,968 (100%)	$6,358 (100%)	$1,076 (100%)	$13,402 (100%)

*These figures are cost-adjusted based on the salaries of college graduates in each district to account for cost differences across districts (Chingos & Blagg 2017).

This comparison of Alabama, Georgia, New York, and the U.S. average demonstrates how education funding varies from state to state. On average, Alabama is poorer than Georgia and New York, so it is not surprising that local funding in Alabama is 64 percent of the average local spending in the U.S. whereas Georgia's local contribution is 85 percent of the national average and New York's is nearly twice as large as the national average. State funding typically complements local funding, as in the case

of Georgia, but where local funding is low, the state may contribute more as in the case of Alabama. Federal funding hovers around $1,000 per student for most states with a range of $744 per student in New Jersey and $2,732 in the outlier, Alaska (Chingos & Blagg 2017).

States use different funding formulas which demarcate different incentive structures. Foundation grants are so-called because they provide an equal foundation for all districts. In this formula, the state sets a foundation or minimum funding level per student. Each district is required to contribute a certain percentage of their property tax toward education, although they may contribute more. If the district's property tax rate does not raise funding in excess of the state's minimum funding level, then the state contributes a foundation grant to bring the district's revenue up to the state's standard. The foundation grant does not make funding equal, though, because the state cannot afford to raise every district up the level of its wealthiest district. Instead, the state must decide on an adequate foundation that it can afford. This foundation may be well below the local funding of a wealthy district.

The other major funding formula states use is the guaranteed tax base, also called power equalization. In this formula, the state promises to fund the local district a certain amount for every percentage point of property tax it raises, regardless of how much that property tax actually accrues. In this case, each district's tax rate yields the same level of guaranteed funding, as if their property tax base was the same. This method resolves the inequity in the foundation grant that stems from different property values. Further, the guaranteed tax base incentivizes districts to raise their property tax since this raise will ensure a certain contribution from the state. This incentive stands in contrast to the

foundation grant system in which a property tax must be mandated by the state because there is no incentive at the local level to raise taxes when the state will raise the local level's foundation anyway.

Finally, some states use a third formula, a centralized school finance formula in which the state controls the property tax rate and guarantees a certain level of funding. This differs from the foundation grant because the district cannot raise its property tax to increase its funding. If the district has high property values, the state's mandated property tax rate may rise above the state's equalized contribution. Some states recapture the funds above this threshold from affluent districts and redistribute it to equalize funding across districts, as in the case of Texas. The practice of recapture, however, has unintended consequences. Recapture prevents the local district from spending extra money on its students, and this preemption can reduce property values. If property values go down, the state will need to lower its standard for funding and recapture property taxes from more districts in order to keep redistributing funds equally. This negative spiral can diminish property values and education funding with it (Chingos & Blagg 2017).

State education funding is still more opaque than these three formulas would lead us to believe. States can vary their formulas by adding statistical weights on student attributes. Many state formulas weight students with low-income or special needs so that they receive more dollars in the calculation. Further, state formulas can be bypassed through categorical funding and through non-formula mechanisms. Categorical funding ties dollars to specific programs or students. Non-formula mechanisms vary in their use with states like Arizona and North Carolina distributing 98 percent of their total education funding through formulas while other states like Connecticut (38 percent) and

South Carolina (24 percent) allocate a minority of their education funding through a formula. These differences raise questions about equity in school district finance.

Equity in School District Finance

State funding formulas like foundation grants and guaranteed tax bases seek to provide progressive funding for education; that is, funding that is channeled more toward low-income students. A regressive system, in contrast, channels more funding toward affluent students. While some states have become more regressive since 1995, most states have seen a slight increase in the progressivity of their education funding. Nevertheless, overall progressivity in education funding has remained relatively flat in the U.S. since 1995 (Chingos & Blagg 2017).

A state's local funding is usually regressive since poor districts outnumber wealthy districts. On the extreme end of the spectrum, the states of Connecticut and New Jersey fund students in nonpoor districts with over $3,000 more than students in poor districts. To correct for this imbalance, New Jersey and Connecticut—and 35 states in total—have introduced progressive funding formulas. Connecticut balances its regressive funding at the local level while New Jersey funds even more, making their system progressive by $1,453 per student (Chingos & Blagg 2017). Yet the reason New Jersey and Connecticut have high state revenues is because their courts have ordered them to devise more progressive systems (Orfield & Ee 2015). Indeed, court-ordered finance reforms have been found to reduce within-state inequality in education spending by 19-34 percent (Murray, Evans, & Schwab 2012). Unfortunately, most low-income families would not receive the benefit of progressive funding schemes without federal

intervention since combined local and state funding is regressive in nearly half of the states (Chingos & Blagg 2017).

Federal funding which targets low-income students and accounts for roughly 10 percent of all school district revenue provides the needed addition to make total school district funding slightly progressive in most states. Most of this federal funding comes from Title I (dedicated funding for low-incomes students) and from the U.S. Department of Agriculture's child-nutrition programs. Eighteen states that were regressive in local and state funding are made progressive by this federal addition. Only Nevada, Wyoming, and Illinois are weakly regressive after federal funding is taken into account. Ironically, economically segregated districts, like those in New York, allow policymakers to more easily target funding to low-income students whereas states like Florida and Nevada have large districts incorporating both high- and low-income neighborhoods which makes it difficult to craft progressive funding policies (Chingos & Blagg 2017).

Per-pupil Revenue

There are several criticisms of using per-pupil revenue as an indicator for student outcomes. The Coleman Report brought these criticisms to light in 1966, and the report has been used since to suggest that school resources like per-pupil revenue do not make the difference in student outcomes (Hanushek 1998). Rather than saying that per-pupil revenue does not matter; the Coleman Report had a more nuanced conclusion; namely, the report found that educational outcomes are predicted best by the larger social forces of a student's background and socioeconomic status (Coleman, Campbell, & Hobson 1966). Nevertheless, further researcher has found that per-pupil revenue does not

correlate with an increase in student performance as measured by standardized tests (Bibb & McNeal 2012). These researchers remind us that it is *how the money is spent* that makes the difference in educational outcomes. This is why we need more granular data on spending decisions at the board of education and superintendent levels (Rosa 2010).

Despite these criticisms, I am interested in per-pupil revenue because research has shown that increases in per-pupil can improve student outcomes, including more years of completed education, higher wages, and a reduction in adult poverty (Lafortune, Rothstein, & Schanzenbach 2016; Jackson, Johnson, & Persico 2016). Indeed, per-pupil revenue is a pervasive measure for equity and adequacy in education finance. Equity is commonly measured by comparing the per-pupil revenue of school districts within a state (Augenblick, Myers, & Anderson 1997). Adequacy asks: What level of spending is necessary to achieve an adequate standard of performance? The adequacy question can be answered in terms of per-pupil revenue, so several court cases have driven policymakers to focus on the significance of this metric (Corcoran & Evans 2015; Heise 1995). This research follows suit by comparing the effects of secession on per-pupil revenue.

Gap in Literature

This chapter reviews a breadth of knowledge about the political, social, and economic effects of school district secession. While much remains to be investigated about these effects, I seek to explore how school district secession has changed school district funding, a topic with no comprehensive investigation in the literature. To do this, I develop an empirical strategy to answer the following two questions.

- Research Question 1: Which school districts are likely to have a secession attempt?
- Research Question 2: What is the per-pupil revenue impact on school districts after secession?

In the next chapter, I examine data and methods for how to answer these questions.

CHAPTER 4 – DATA & METHODS

Compiled Dataset

To fill the gap in the literature I have described in Chapter 3, I will empirically investigate the probability that a school district experiences a secession attempt and how a school district's per-pupil revenue changes as a result of that attempt. While I expound on my methodological approach later in this chapter, I first describe the data that will be used in the forthcoming analyses.

I combine two datasets to conduct my analyses. My explanatory variable, secession, comes from EdBuild (2017). The other variables are drawn from the National Center for Education Statistics (NCES) and datasets that have been integrated into EdBuild's study; namely, Common Core Data (CCD), Small Area Income and Poverty Estimates (SAIPE), Decennial Census, and American Community Survey (ACS).

EdBuild: Data on School District Secessions

EdBuild is a nonprofit organization "focused on bringing common sense and fairness to the way states fund public schools" (EdBuild). They have published reports that detail what they describe as outdated, arbitrary, and segregating trends in education finance. It is this last report that informs my research: *Fractured: The Breakdown of*

America's School Districts. I use EdBuild's data on secession and update it for currency. EdBuild's stated purpose for this study is twofold:

- Highlight attempted and successful school district secessions that have occurred since the year 2000, and
- Analyze state law regarding school district secessions.

EdBuild identified secessions using three sources. First, Common Core Data shows when school district boundaries change from one year to another. Researchers use this change in status to identify new district openings. They could then cross check with two other sources to determine if these new school districts were the result of secession; namely, EdBuild used internet research and communication with state officials to confirm secession cases. There are several new districts that are not the result of secession, such as charter districts, special education districts, vocational school districts, correctional facilities, state-run districts, and non-traditional school districts. Since these new districts were not the result of secession, EdBuild did not include them in this dataset. Likewise, EdBuild did not include new districts resulting from consolidation or state-level reorganization.

EdBuild then classified the secession districts into four categories. Secessions were either successful, ongoing, inactive, or defeated/failed. All districts that successfully seceded show up in the Common Core Data. Secessions were classified as *ongoing* "if internet research suggested that the community attempting to secede is still actively discussing the proposal and/or moving through the formal secession procedure in their state" whereas a secession is considered *inactive* "if the secession was discussed by a community in the past, but there is no evidence that they entered into the formal

procedures" (EdBuild 2017). Finally, *defeated/failed* secessions refer to cases where there is evidence that the community began the formal process for secession, but the community failed to get their state's requirement such as an approval or vote.

It should be noted that EdBuild has a bias against fragmentation, but their data and methods are transparent, so EdBuild's values do not affect the results of this study.

National Center for Education Statistics

The data used for this study consists of district level characteristics collected by the National Center for Education Statistics (NCES). Over the time span of the data, the NCES collected financial information from all the districts in the U.S. through the F-33 survey. The NCES gathered other school district information through the Local Education Agency Universe Survey and the Public Elementary/Secondary School Universe Survey.

I include 16,500 unique school districts observed from SY 1994 – SY 2013. Not every district existed or reported suitable data for every year, so the dataset is an unbalanced panel. To identify school districts that experienced fragmentation, I cleaned and updated EdBuild's data and merged it with data from NCES. For every district in the NCES dataset, I denote the year of secession and that status of secession (ongoing, defeated/failed, or successful). I include inactive attempts in the failed category since my explanatory variable—secession—was still attempted in these communities.

Importantly, I needed to create a time variable to measure pre- and post-effects of secession. However, for districts that had no failed attempts, there were no "secession years" recorded, so I researched those school districts to determine when they failed or became inactive, then I replaced secession year with that date. From EdBuild's data, I was able to find 7 of the 9 failed secessions and 4 of 6 inactive secessions. For ongoing secessions, I assume 2018 as the current date.

Descriptive Statistics

I include nine variables from NCES in my descriptive statistics. A tenth variable, urbanicity, is presented in the following chapter with chi-square results (see Table 5). These variables describe school district characteristics and student demographics. School district characteristics include revenue per-pupil, total operating schools, total enrollment, student-to-teacher ratio, and urbanicity. Student demographics include percent white, percent with limited English proficiency (LEP), percent with an individualized education plan (IEP), percent with free and reduced-price lunch (FRL), and percent of school-aged population (ages 5-17). Table 3 shows the total, mean, standard deviation, median, and range for each of these variables.

Table 3. Descriptive statistics for all school districts, U.S. 1994-2013

	N	Mean	S.D.	Min	Median	Max
Revenue (pp)	278224	14340.45	6273.09	0	12627.03	81360.74
Total schools	278224	6.47	17.61	0	3	1429
Total enrollment	278224	3359.66	13592.33	1	1110	1077381
Student-to-teacher ratio	230900	14.47	5.41	0	14.3	1065.5
White (%)	232474	76.81	26.17	0	88.46	100
LEP (%)*	185494	4.25	9.61	0	0.55	100
IEP (%)	268520	13.41	6.72	0	13.10	100
FRL (%)*	201637	39.81	22.67	0	38.72	100
Population 5-17 (%)*	231579	17.11	4.18	0	17.57	77.64

*Data only available from 1999-2013

As Table 3 shows, the average school district receives $14,340 in per-pupil revenue, with 68 percent of school districts receiving between $8,067 and $20,613 per pupil. The average school district operates 6 schools and enrolls 3,359 students with 14 students to every teacher. As for student demographics, the average school district is 77 percent white, although the median is more representative at 88 percent. The average school district has a high proportion of students with FRL at 40 percent. Other forms of aid serve smaller populations such as LEP (4 percent) and IEP (13 percent).

Which School Districts Are Likely to Have a Secession Attempt?

To answer this question, I first run bivariate analyses to identify variables with a strong correlation to secession. I then employ a linear probability model using these variables as controls to predict which school districts are most likely to experience a secession attempt.

Bivariate Analyses

One way to observe which variables increase the probability of a secession attempt is to compare districts that experienced a secession attempt with those that did not. For this, I use bivariate analyses to discover the school district characteristics and student demographics that distinguish districts with a secession attempt from those without. Specifically, I estimate the means of observable characteristics for districts with and without secession attempts and then assess whether the difference of those means was statistically significantly.

Linear Probability Model

A bivariate analysis highlights the notable observable differences but is limited in its information regarding the variable's relative impact on the probability of secession. To estimate how a district's observable characteristics influence its probability of experiencing a secession, I use a linear probability model. The LPM predicts attempted secession as a function of district characteristics and student demographics. The functional form of the LPM is included below as Equation 1.

Equation 1. Linear probability model predicting school district secession attempts

$$\textbf{SecessionAttempt}_i = \alpha_1 \textbf{District}_i + \alpha_2 \textbf{Student}_i + \varepsilon_i$$

In Equation 1, **SecessionAttempt** equals 1 if school district i experienced a secession attempt at any time during the panel. As covariates, I include the same set of

observable characteristics that I used in the bivariate analysis. **District** is a vector of covariates that includes per-pupil revenue, total operating schools, total enrollment, student-to-teacher ratio, and urbanicity. **Student** is a vector of coefficients that includes percent LEP, percent IEP, percent FRL, percent white, and the percent of the population that is school aged.

Empirical Expectations

Given the literature review in Chapter 3, it appears that there are two major factors causing fragmentation. First, the size of the school district matters. Just as economies of scale encouraged consolidation, diseconomies of scale may justify fragmentation. The second driver of session is heterogeneity of stakeholders within the district. Differences between stakeholders can lead to conflicts of interest. These conflicts could be as innocent as education preferences such as the desire for an unavailable arts program. Unfortunately, race and class are the differences most likely to motivate secession attempts. I control for race with percent white, and my proxy for class is FRL.

I have broken out my expectations for the first research question into three hypotheses.

Hypothesis 1A: Larger districts are more likely to experience secession attempt

A priori, I hypothesize that districts with secession attempts are more likely to have more total operating schools and higher enrollment because a secession logically requires a larger entity to be separated from. Further, larger districts contain

heterogeneous stakeholders whose conflicts can instigate a secession attempt. I also hypothesize school districts with a higher student-to-teacher ratio are more like to experience a secession attempt as this variable is a function of school district size and scarcity of resources.

Hypothesis 1B: The more disadvantaged a school district is, the more likely it is to experience a secession attempt

I hypothesize that school districts with secession attempts will have a lower percentage of white students in inverse to their larger share of students of color. I also hypothesize that left behind districts will have a higher percentage of students with LEP, IEP, and FRL since these students are more likely to be low-income or have special needs.

Hypothesis 1C: Urban school districts are more likely to have a secession attempt than suburban, town, and rural school districts

Hypothesis 1C is related to the first two since larger and more disadvantaged school districts also tend to be urban. I hypothesize that districts with secession attempts are more likely to be urban than suburban, town, or rural. These hypotheses are premised on the size of the school district. Large districts tend to be urban where population is dense. Their size entails a larger number of operating schools. There may be an interaction between urbanicity and size in which large urban school districts are denser and probably not as likely to be seceded from compared to smaller urban districts and large suburban districts. I use LPM to differentiate these effects.

What Is the Per-pupil Revenue Impact on School Districts after Secession?

After a school district secession occurs, the school district left behind loses student enrollment, which may influence its per-pupil revenue since the denominator for that value decreases. Funding from the state and federal governments fluctuate in response to the change in local conditions. In short, a school district's revenue may change because the availability of money changes and how that funding is distributed changes. I estimate Equation 2 to capture the change in a school district's revenue that results from a secession attempt:

Equation 2. Regression model with secession as binary variable

$$\textbf{Revenues}\ (pp)_{it} = \alpha_1 \textbf{SecessionAttempt}_i + \alpha_2 \textbf{District}_{it} + \alpha_3 \textbf{Student}_{it} + \varepsilon_i$$

In Equation 2, **Revenues** represents the total per-pupil revenues observed for school district i at time t. Also included in the **Revenues** vector are the three sources of per-pupil revenues: local, state, and federal. For the analysis, I will estimate the model for the total per-pupil revenues and again for each of the separate revenue sources. Again, **SecessionAttempt** measures where school district i experienced a secession attempt over the panel, but I include it here as the main explanatory variable instead of the dependent variable (as it was used in the LPM). And again, **District** is a vector of covariates that includes per-pupil revenue, total operating schools, total enrollment, student-to-teacher ratio, and urbanicity. **Student** is a vector of coefficients that includes percent LEP, percent IEP, percent FRL, percent white, and the percent of the population that is school aged.

As noted previously, secession attempts yielded a variety of outcomes. Either the attempt failed (or is inactive), the attempt is ongoing, or the attempt was successful. The different outcomes may influence revenues in different ways, so I will augment the main explanatory variable in Equation 2 and estimate Equation 3 as the following:

Equation 3. Regression model with secession as categorical variable

$$\textbf{Revenues}\ (pp)_{it} = \alpha_1 \textbf{SecessionCategorical}_{it} + \alpha_2 \textbf{District}_{it} + \alpha_3 \textbf{Student}_{it} + \varepsilon_i$$

In Equation 3, **SecessionCategorical** represents a categorical variable measuring whether school district i experienced no attempt, a failed attempt, an ongoing attempt, or a successful attempt in year t.

Difference-in-difference Model

The problem with Equations 2 and 3 is that districts do not experience the effects of secession until *after* it has happened, so I need to measure the pre- and post-condition of the district. A difference-in-differences approach is appropriate for this kind of natural experiment. Difference-in-difference allows me to compare the "treatment" group that experienced a secession attempt to the control group that did not. And I can do so before and after the "treatment" of a secession attempt was applied. As such, I estimate the following as Equation 4:

Equation 4. Difference-in-difference model predicting per-pupil revenue after secession

$$\textbf{Revenues}\ (pp)_{it} = \alpha_1\textbf{SecessionCategorical}_{it} + \alpha_2\textbf{Post}_{it} + \alpha_3\textbf{SecessionCategorical}\ X\ \textbf{Post}_{it} + \alpha_2\textbf{District}_{it} + \alpha_3\textbf{Student}_{it} + \delta_t + \varepsilon_i$$

In Equation 4, I have added **Post** to indicate whether school district i had experienced a secession attempt yet. I then interact **SecessionCategorical** and **Post** and estimate the effect with α_3. I have also included δ_t to capture the fixed effects of time.

Difference-in-difference analysis allows me to examine the effects of secession as a natural experiment. Difference-in-difference tracks the parallel trends of school districts to see how secession changed the district's revenue trajectory. The treatment group—attempted secession—is compared to a comparison group to measure secession's effect on per-pupil revenue from local, state, and federal sources. Difference-in-difference captures the effect over time and thus resolves any potential endogeneity. Otherwise, I could not know whether revenues drive secession rather than secessions affecting revenues. Parallel trends help me solve for endogeneity issues since I can see the impact of secession on pre- and post-secession revenue.

Empirical Strategy

The key assumption in DID regression is parallel trends prior to the treatment—the event of secession in this case. In order to make valid DID comparisons, the treatment group and the comparison group must be on parallel trends before the treatment is introduced. If all school district secessions had occurred at the same time, I could simply compare the treatment group to the comparison group before and after the single point in

time. School district secession occurred at different times across the panel, though, so I must create different comparison groups for each time point that secession occurred.

To make valid DID comparisons, I must generate comparison groups with three qualities. First, the comparison group must look like the treatment group across observable district characteristics and student demographics. This will increase the likelihood that the parallel trends assumption is met. Second, school secessions are rare events, so the comparison groups must be small as to not overwhelm the empirical model. And finally, the comparison groups must be created across different years so that I have comparison groups for each time point a secession occurred. Once I create these comparison groups, I can combine them into a single comparison group that can be observed before and after secession attempts.

Samples must look like the treatment group in pre-secession parallel trend

My bivariate analysis demonstrates differences between the treatment and control groups in school district characteristics and student demographics. These differences violate the parallel trends assumption of DID, so I must generate random samples that were not different to the treatment group prior to secession. To create comparable comparison groups with parallel trends I use LPM. Regression uses continuous variables to produce fitted values. Linear probability models differ from standard regression in that Y is not a continuous variable but rather the binomial treatment (Yes or No to secession). This model gives a predictive value ($\hat{y}$) for whether a school district experienced

secession based on its X value. Based on my observables, I can find districts that were likely to experience a secession but did not. These school districts then form my comparison group in the DID model.

Samples must be small to compare rare events

Secessions are rare events, so if we compare them to districts that have not experienced a secession attempt, the sample size will be so large as to swallow and disguise the effects of secession. As noted in the previous paragraph, I am selecting school districts that had a high predicted probability of experiencing a secession attempt but did not actually experience one. To generate small, comparable samples, I select school districts with the top 10 percent of fitted values ($\hat{y}$) from the LPM. As such, I am selecting a small sample of the districts with the highest probability of being seceded from (but were not actually seceded from). This method honors the parallel trends assumption of DID in that my comparison group should be similar to my treatment group across observable variables.

Samples must vary by year to compare secessions at each interval

Finally, I need several comparison groups across multiple years so that I can compare secession attempts that occurred at different years. I cannot just look at whether a secession was attempted because I need to know the before and after effects. Since the treatment—secession—occurs at different years, I need comparable samples at each year. I generate eight different comparison groups that match secession attempts in each year.

Then I combine them into one comparison group that can be observed before and after a secession attempt, even though before and after occurred at different years. Varying my samples by year also controls for economic effects.

Empirical Expectations

A priori, I expect secession to have the largest impact at the local level because when a school district secedes, it takes its property taxes with it. Local funding for education is largely dependent on property taxes, so the secession has a major impact on the district left behind. For this reason, I hypothesize that local revenue will decrease in the district left behind.

Federal funding accounts for about 10 percent of school district revenue. This funding is targeted toward low-income students (e.g. FRL) and students with special needs (e.g. IEP, LEP). Since the seceding district tends to be more affluent and the left behind district has a higher rate of poverty, I hypothesize that federal funding will increase in proportion with the increased percentage of students with special needs or low-income.

State funding accounts for about 45 percent of school district revenue, but states vary widely in both total funding and by how that funding is allocated. State funding formulas such as foundation grants and guaranteed tax bases are designed to increase equity in school district revenues, so I hypothesize that left behind districts will see an increase in state funding to accommodate for their loss of local funding.

Hypothesis 2A: School districts with a secession attempt have less per-pupil revenue on average

I expect school districts with a secession attempt have less per-pupil revenue on average because, historically, these school districts have been poorer than school districts that did not have a secession attempt. Poorer districts are more vulnerable to secession attempts, and others may seek secession to distance themselves from poverty.

Hypothesis 2B: School districts that experience a secession attempt receive less per-pupil revenue over time

As described above, I expect that school districts will receive less per-pupil funding after a secession attempt because the secession will remove local funding from the district. I do not expect changes in state and federal revenue to make up for the loss in local funding.

CHAPTER 5 – RESULTS

The methodology in the previous chapter seeks to answer two research questions. I turn now to review the results of this research.

Which School Districts Are Likely to Have a Secession Attempt?

Bivariate Analyses

Table 4 presents descriptive statistics for the control variables noted in the previous section, but unlike Table 3, I split the sample into those school districts that experienced a secession attempt and those that did not.

Table 4. Comparing school districts with/without secession attempt, U.S. 1994-2013

		Difference of mean	Mean	S.D.	Min	Median	Max
Revenue (pp)	**None**	1165.87***	14343.52	6276.74	0.00	12628.04	81360.74
	Attempt		13177.65	4552.65	6551.77	12252.68	44561.86
Total schools	**None**	53.72***	6.33	16.09	0.00	3.00	1429.00
	Attempt		60.05	129.95	1.00	16.00	983.00
Total enrollment	**None**	-40829.74***	3252.09	12083.90	1.00	1106.00	1077381.00
	Attempt		44081.83	114901.30	205.00	7629.00	747009.00
Pupil-to-teacher ratio	**None**	-1.08***	14.47	5.42	0.00	14.30	1065.50
	Attempt		15.55	3.99	7.62	15.21	37.20
White (%)	**None**	6.13***	76.83	26.16	0.00	88.48	100.00
	Attempt		70.70	28.87	4.57	79.91	99.81
LEP (%)	**None**	-1.46***	4.25	9.62	0.00	0.55	100.00
	Attempt		5.71	9.14	0.00	1.88	44.90
IEP (%)	**None**	0.11	13.41	6.74	0.00	13.10	100.00
	Attempt		13.31	4.03	0.00	13.31	27.40
FRL (%)	**None**	-3.80***	39.81	22.67	0.00	38.72	100.00
	Attempt		43.61	21.18	0.00	44.96	89.73
Pop 5-17 (%)	**None**	0.00	17.11	4.19	0.00	17.58	77.65
	Attempt		17.11	3.25	6.21	17.50	28.12

*** p<0.01, ** p<0.05, * p<0.1

In Table 4, I include the difference of mean which was statistically significant (P<0.01) for every variable except for IEP and the percent of the district's population that was school age.

These differences of means display many distinctions between school districts with a secession attempt and those without. School districts that had an attempted secession received $13,177 in per-pupil revenue compared to $14,343 for districts with no attempted secession, a difference of $1,165 on average. School districts that had an attempted secession operated 60 schools on average compared to 6 schools for districts

with no attempted secession, a difference of 54 schools. School districts that had an attempted secession enrolled 44,082 students on average compared to 3,252 students for districts with no attempted secession, a difference of 40,830 students.

Differences are also seen in student demographics. School districts that had an attempted secession were 71 percent white compared to 77 percent for districts with no attempted secession, a difference of 6 percentage points. School districts that had an attempted secession were 44 percent FRL compared to 40 percent for districts with no attempted secession, a difference of 4 percentage points.

Differences can also be seen in urbanicity. Table 5 displays the results of my chi-square analysis.

Table 5. Chi square results of school district urbanicity

		City	Suburb	Town	Rural	Total
No attempt	n	747	3053	2443	6990	13233
	%	5.64	23.07	18.46	52.82	100
Attempt	n	10	11	3	14	38
	%	26.32	28.95	7.89	36.84	100
Total	n	757	3064	2446	7004	13271
	%	5.7	23.09	18.43	52.78	100
Pearson Chi2(3) = 33.0788 Pr = 0.000						

School districts with secession attempts are more likely to be urban with 26 percent of secession attempts occurring in cities versus 6 percent of the no attempt category occurring in cities. Secessions are approximately as likely to occur in suburbs, but substantially less likely to occur in towns and rural areas. The differences were statistically significant with a Pearson Chi2(3) = 33.0788.

Linear Probability Model

In the bivariate analyses above, I could not control for other factors, so I use LPM for predictive evidence. My results can be reviewed in Table 6. While I included the years 2000-2013 for fixed effects in the estimation, I do not present them here, but include them in Appendix A.

Table 6. Results from linear probability model

VARIABLES	SECESSION ATTEMPT
Revenues (pp)	0.00000***
	(0.000)
Total schools	0.00017
	(0.000)
Total enrollment	0.00000**
	(0.000)
St-tch ratio	0.00001
	(0.000)
White (%)	0.00007***
	(0.000)
LEP (%)	-0.00001
	(0.000)
IEP (%)	-0.00002
	(0.000)
FRL (%)	0.00004***
	(0.000)
Percentage of population that is school age (age 5 to 17)	-0.00009***
	(0.000)
Suburb	-0.00462***
	(0.001)
Town	-0.00391***
	(0.001)
Rural	-0.00316**
	(0.001)
Observations	160,638
R-squared	0.031

Robust standard errors in parentheses
*** p<0.01, ** p<0.05

It is important to note that the effects sizes are marginal. This is due to using LPM on a large sample size to predict rare events; in other words, the model is trying to fit a prediction line across a few rare events and thousands of non-events (no secessions). Nevertheless, rare events should be studied, and the statistical significance of LPM allows me to glean the direction of the effect for the probability that a school district will experience a secession attempt.

Per-pupil revenues were positively related to secession attempts. The size of the school district was also positively related and statistically significant, but only for the

total enrollment (not total operating schools). Controlling for other factors, the percentage of students who were white in the school district was positively related with the probability of a secession attempt. Interestingly, this is the opposite relationship reviewed in the bivariate analysis. The LPM found a positive relationship for FRL and the probability of school district secession. Also, as the proportion of the school district's population that was school aged increased, the probability of secession attempt decreased. Finally, town and rural school districts were less likely to experience a secession attempt than urban school districts, and this holds true for suburban school districts too when controlling for the other variables.

Hypothesis 1A: Larger school districts are more likely to have a secession attempt

The first research question asked: Which school districts are likely to have a secession attempt? Hypothesis 1A states: Larger districts are more likely to have a secession attempt, net of controls. To answer this question, I examine school district characteristics using bivariate statistics which allows me to review the unadjusted relationships. Table 4 details the results of my paired t-tests. School districts that experienced a secession attempt were larger on average than those that did not. School districts that experienced a secession attempt operated 60 schools on average compared to 6 schools for districts that did not have a succession attempt, a difference of 54 schools ($t=-83.48$, $p<0.01$). Controlling for other factors, this relationship held in the LPM where there was a positive and statistically significant relationship with total enrollment.

Hypothesis 1B: Disadvantaged school districts are more likely to have a secession attempt

The first research question asked: Which school districts are likely to have a secession attempt? Hypothesis 1B states: The more disadvantaged a school district is, the more likely it is to experience a secession attempt, net of controls. To answer this question, I examine student demographics using bivariate statistics which allows me to review the unadjusted relationships. Table 4 details the results of my paired t-tests. School districts that experienced a secession attempt had a higher percentage of students in LEP and FRL programs and a lower percentage of white students on average than those that did not.

School districts that experienced a secession attempt had, on average, 5.71 percent of their students in LEP programs compared to 4.25 percent for school districts that did not have a succession attempt, a difference of 1.45 percentage points ($t=-3.46$, $p<0.01$). School districts that experienced a secession attempt had, on average, 44 percent of their students in FRL programs compared to 40 percent for school districts that did not have a succession attempt, a difference of 4 percentage points ($t=-3.93$, $p<0.01$). School districts that experienced a secession attempt had, on average, 70.7 percent white students compared to 76.3 percent for school districts that did not have a succession attempt, a difference of 5.6 percentage points ($t=-5.78$, $p<0.01$).

Results from the LPM suggest a more nuanced relationship though. LEP and IEP were not statistically significant in the LPM. The relationship for FRL and percent white were both significantly related to the probability of secession, but in different directions. Poorer school districts (i.e. school districts with a higher percent FRL) were more likely

to experience secession as expected. Percent white, however, was positively related to school district secession, which is contrary to Hypothesis 1B.

Hypothesis 1C: Urban school districts are more likely to have a secession attempt

As expected, school districts that have a secession attempt were more likely to be urban. Suburban school districts were 0.5 percent less likely than urban school districts to experience a secession attempt. Towns were 0.4 percent less likely to have a secession attempt, and rural school districts were 0.3 percent less likely to have a secession attempt.

What Is the Per-pupil Revenue Impact on School Districts after Secession?

Difference-in-difference Model

An important assumption of DID is parallel trends; that is, to make valid comparisons between school districts that experience secession attempts and those that do not, those groups must have similar trends in the dependent variable prior to the secession attempt. Figure 3 shows the mean per-pupil revenue ten years prior and ten years after a secession attempt occurred for districts that experienced a secession attempt and those that did not. As noted in the methods chapter, I created comparison groups for each year that there was a secession and combined those comparison groups into one comparison group for this analysis. As such, I can observe the comparison group after a secession occurred. As shown in Figure 3, districts that had a secession attempt and those that did not had similar trends in per-pupil revenue, though school districts with secession attempts had lower per-pupil revenue for each year.

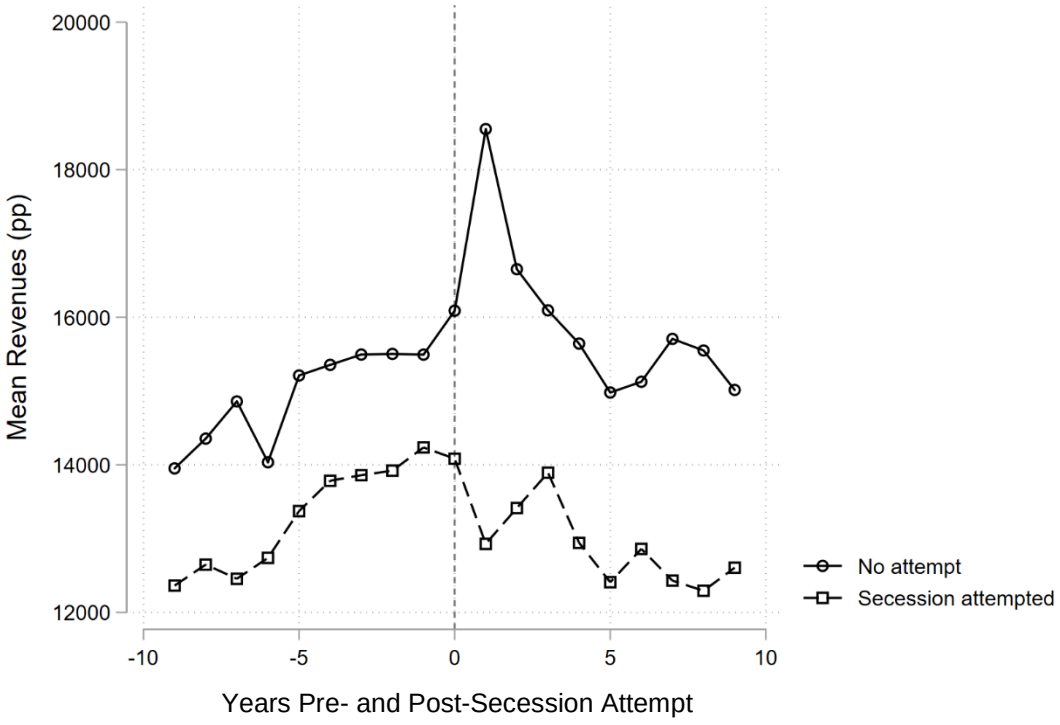

Figure 3. The impact of secession attempt on mean per-pupil revenue

I am also concerned about whether the secession failed or succeeded, so I broke out the categorical values seen in Figure 4. The parallel trends assumption holds for school districts that both successfully seceded and those that failed. While both categories of secession attempts had lower per-pupil revenues on average, they shared an upward trend in per-pupil revenue with school districts that had no attempt prior to the secession attempt.

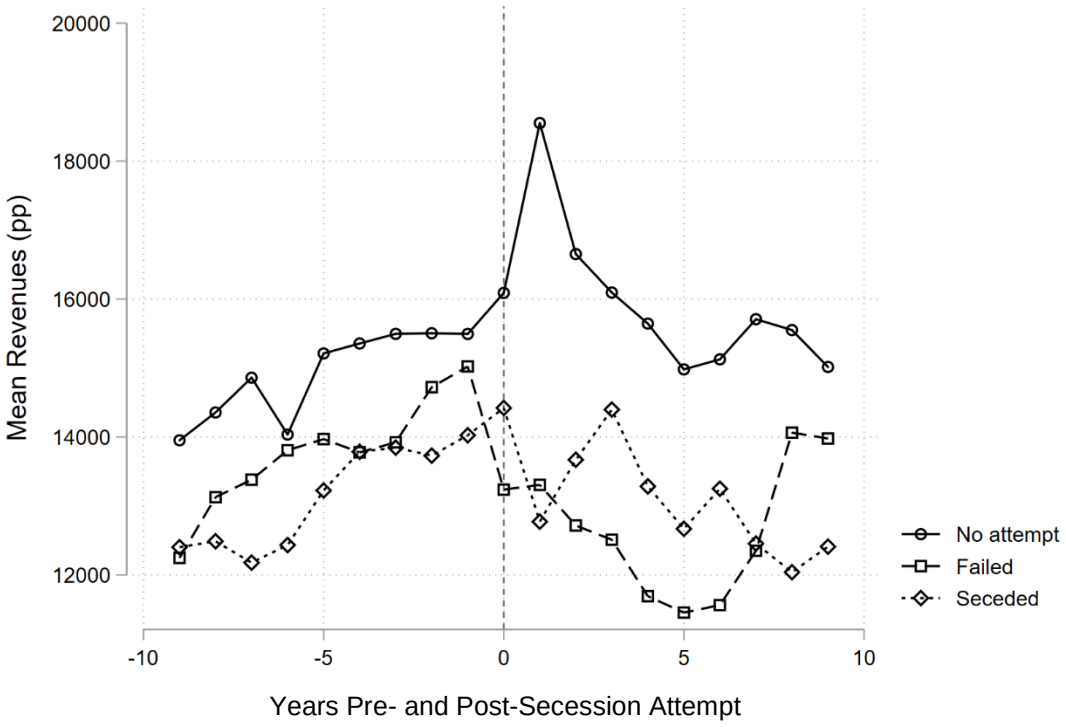

Figure 4. Mean per-pupil revenue impact of successful and failed secession attempts

Though Figures 3 and 4 suggest that a secession attempt causes revenues to decrease, I employ a DID technique to estimate the main effect of secession, controlling for other factors. Results from the DID model are presented in Table 7. Again, I include the years 2000-2013 to control for the fixed effects of time (see Appendix B).

Table 7. Results from difference-in-difference model

	Total Revenues (pp)	**Federal Revenues (pp)**	**State Revenues (pp)**	**Local Revenues (pp)**
	Std. error	Std. error	Std. error	Std. error
Compared to no attempt				
Attempt failed or inactive	-1186.453***	-227.078***	-828.746*	-130.629
	(417.970)	(56.204)	(482.097)	(433.790)
Attempt ongoing	-147.689	-68.321**	0.296	-79.664
	(227.990)	(33.537)	(212.755)	(248.172)
Attempt successful	-470.109	188.934***	-502.433**	-156.610
	(290.004)	(44.645)	(233.694)	(196.506)
Compared to pre-attempt				
After attempt	1039.593***	119.894***	423.496***	496.202***
	(139.896)	(28.152)	(102.180)	(111.602)
Interaction				
Failed x Post	1955.990*	807.660***	1938.089**	-789.758
	(1,082.829)	(210.175)	(886.799)	(537.817)
Successful x Post	-1167.054**	-194.958**	-575.994*	-396.101
	(476.978)	(80.302)	(308.871)	(366.707)
Control variables				
Total schools	-1.138	8.733***	-6.365**	-3.506
	(3.723)	(0.700)	(2.520)	(2.650)
Total enrollment	-0.010*	-0.012***	-0.002	0.004
	(0.005)	(0.001)	(0.004)	(0.003)
St-tch ratio	-347.021***	-23.342***	-98.495***	-225.185***
	(88.789)	(6.214)	(25.793)	(57.341)
White (%)	-23.967***	-4.088***	2.050	-21.929***
	(2.509)	(0.487)	(1.715)	(1.862)
LEP (%)	56.255***	13.024***	30.870***	12.361**
	(8.759)	(2.018)	(4.379)	(5.154)
IEP (%)	242.126***	24.923***	129.538***	87.665***
	(17.124)	(2.307)	(10.083)	(13.087)
FRL (%)	-46.432***	15.988***	33.336***	-95.756***
	(3.133)	(0.671)	(1.981)	(2.510)
School age population (%)	-338.130***	15.374***	-42.398***	-311.106***
	(16.102)	(2.649)	(9.983)	(11.956)
Compared to city				
Suburb	718.435***	-64.681***	711.275***	71.841
	(71.922)	(17.593)	(57.821)	(54.294)
Town	-206.713**	66.127***	346.296***	-619.136***
	(102.395)	(17.888)	(76.341)	(84.658)
Rural	2763.402***	320.763***	1770.188***	672.450***

	(210.440)	(28.877)	(95.860)	(141.916)
Observations	26,366	26,366	26,366	26,366
R-squared	0.274	0.269	0.151	0.243

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Compared to school districts that did not experience a secession attempt, school districts with a failed attempt had $1,186 less in per-pupil total revenue, on average. School districts with an ongoing or successful secession attempt also had fewer per-pupil revenues, but those differences were not statistically significant.

After a secession attempt, revenues for all school districts that did not experience a secession increased by $1,039, reflecting increases in per-pupil revenues over the span of the data. Of note, this post-secession effect holds for school districts that did not experience a secession attempt, since I observe those districts as my comparison group and can measure the effect on revenues after the treatment group's secession attempt.

The interaction of the secession categories and the post-secession attempt variable indicates the relative change in per-pupil revenues for each of the categories, before and after a secession attempt. Those districts with a failed attempt experienced a $1,956 increase in per-pupil revenues, which would be in addition to the $1,039 increase that all districts experienced. I should note this was only statistically significant at the p<0.1 level, and given the size of the standard error, this result may not be substantive.

Conversely, those districts that experienced a successful attempt saw a decrease of $1,167 in per-pupil revenue. This more than negates the $1,039 increase that school districts experience post-secession. Figure 5 displays these marginal impacts on total per-pupil revenue. As you can see, school districts that did not have a secession attempt

increased revenues and those with a failed attempt also saw an increase in revenues, but school districts with successful secessions saw a decrease in revenues. While I will not discuss each control variable individually, most were statistically significant in the anticipated direction suggesting appropriate model fit.

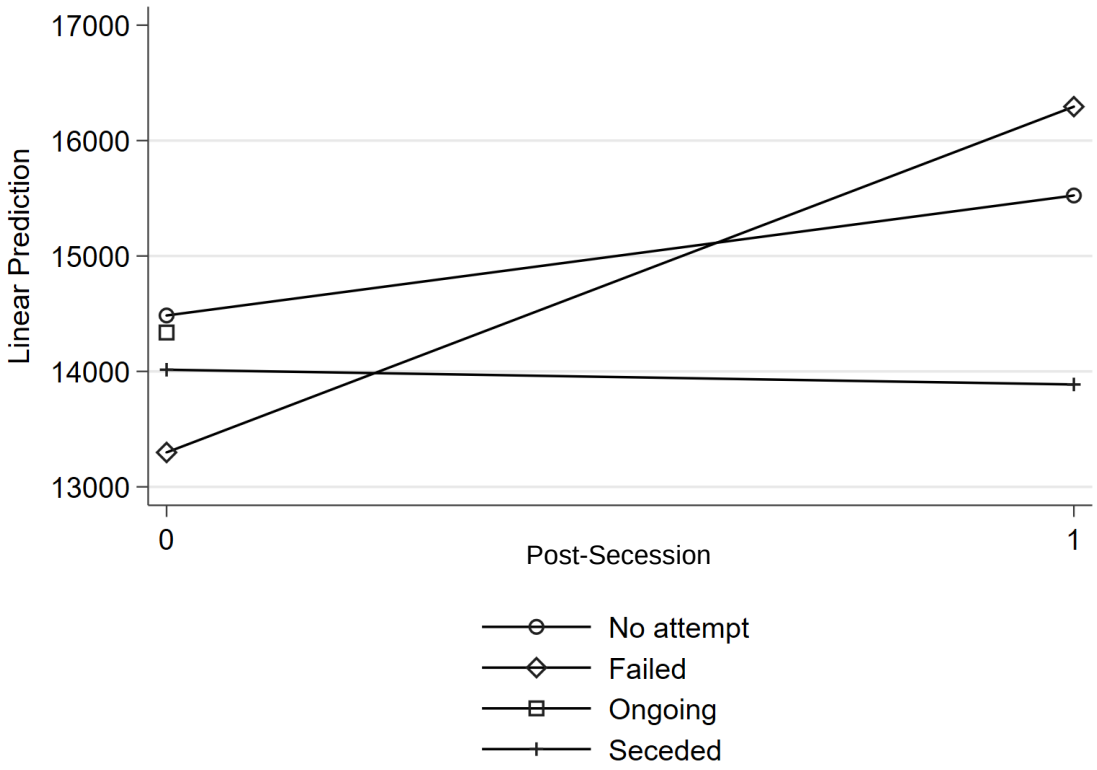

Figure 5. LPM predicting the impact of school district secession on per-pupil revenue

I also consider the effect of a secession attempt on the three main sources of per-pupil revenue for school districts: local, state, and federal. Again, the interaction of the secession categories and the post secession attempt variable indicates the relative change in per-pupil revenues for each of the categories, before and after a secession attempt. Those districts with a failed attempt experienced a $807 average increase in federal per-

pupil revenue and a $1,938 average increase in state per-pupil revenue whereas those districts with a successful secession saw a $195 average decrease from federal revenue and a $575 average decrease in state per-pupil revenue. Surprisingly, the effect on local per-pupil revenues was not statistically significant, contrary to my expectations. Combined, it appears that the change in total revenues is driven by changes in state and federal sources.

Hypothesis 2A is supported: School districts with a secession attempt have less per-pupil revenue on average

Hypothesis 2A was supported in my bivariate analysis. In order to get a more detailed picture of the effects of school district secession on per-pupil revenue, though, I use a DID model to compare school districts that did not secede to school districts that did. The DID model also enables me to examine changes in revenue over time by secession attempt and accounting for control variables. These analyses break school district secession into three categories: failed, ongoing, and seceded. Hypothesis 2A is supported since school districts that have a failed attempt have, on average, $1,186.45 ($p<0.01$) less per-pupil revenue than school districts that did not have an attempted secession. However, compared to school districts that did not have an attempted secession, there was no difference in per-pupil revenue for school districts with ongoing or successful secessions.

Hypothesis 2B is supported: School districts that experience a secession attempt receive less per-pupil revenue over time

Hypothesis 2B states: School districts that experience a secession attempt receive less per-pupil revenue over time, net of controls. This hypothesis about change over time is addressed by interacting the Post variable with attempted secession categories of failed and seceded. Hypothesis 2B is supported by the positive and significant coefficient for Post which demonstrates that revenue increased over time for school districts without a secession ($p<0.01$). Hypothesis 2B is also supported by the negative and significant interaction between Post and seceded ($p<0.05$). Together, these mean that school districts without a secession saw increasing revenues while school districts with secession attempts saw decreasing revenues.

In conclusion, I estimated bivariate and multivariate models to explore the likelihood of secession and the ensuing per-pupil revenue impacts. Explicitly, this chapter presents evidence to answer the following research questions:

- Research Question 1: Which school districts are likely to have a secession attempt?
- Research Question 2: What is the per-pupil revenue impact on school districts after secession?

Results from both bivariate and LPM analyses indicate that larger, disadvantaged, and more urban school districts had a higher likelihood of experiencing a secession attempt. Further, DID analysis indicates that school districts with a secession attempt have less per-pupil revenue, and they experience a decrease in revenue over time.

In my concluding chapter, I will summarize my findings, review the limits of this study, and suggest policy implications as well as ideas for further research.

CHAPTER 6 – CONCLUSION

The primary purpose of this study is to contribute to the literature on school district secession by measuring the per-pupil revenue impact of secession on school districts left behind. To answer this question, I first developed a model for predicting which school districts are most likely to experience a secession attempt.

School district secessions are happening more often, as catalogued in EdBuild's report, *Fractured*. Secessions are occurring most frequently in states with permissive policy structures such as Alabama and Main. Since 2000, there have been 71 attempts and 47 of these have been successful (EdBuild 2017).

While the phenomenon of secession is explained by the desire for local control and the exigencies of school district size, it is also driven by racist and classist motivations. Previous research has found that secessions are contributing to resegregation and the widening gap in economic inequality. Financially, the focus has been on the viability of the seceding district. This research adds to the literature by focusing on the financial ramifications of secession on the district left behind.

I use a linear probability model to determine the characteristics and student demographics that predict school district secession. Then I use a difference-in-difference model to predict the impact of secession on school districts' per-pupil revenue from local, state, and federal governments. My results predict that large, disadvantaged, and urban school districts are more likely to experience a secession attempt. Further, school districts

that experience a secession attempt see a decrease in funding as a result of secession, and, in fact, these districts had less revenue prior to secession too.

The effect sizes are noteworthy. School districts that experience a secession attempt have lower per-pupil revenues on average, the differences of which are over $1,000 per pupil. After these districts experience a secession attempt, those that fail see an increase of revenues equal to nearly $2,000 per-pupil which brings them up to the level of funding enjoyed by school districts without secession attempts. Unfortunately for school districts with a successful attempt, revenues decline after the secession by over $1,000 per-pupil.

Study Limitations

This study examines school district secessions which are rare events with limited sample sizes. Small samples make it difficult to fit models and establish statistical significance. Since I am trying to determine the marginal impact of school district secession on per-pupil revenue, the small sample size limits my ability to make valid comparisons. Variations within such a small sample can prevent models from fitting average effects.

Policy Implications

State policy regarding school district secession can be made more equitable. Twenty-eight states have secession policies; that is, explicit processes allowing for school district secession. Only 9 of the 28 require a fiscal impact assessment (Arizona,

California, Indiana, Nebraska, New Jersey, South Dakota, Utah, Wisconsin, and Wyoming). This research indicates that a fiscal impact assessment is likely to find a disparity in per-pupil revenue as a potential result of secession

Federal courts have been terminating desegregation orders since the early 1990s (Liebowitz 2018). The courts are supposed to uphold justice, but in some cases, they appear to be complicit in resegregation. As it is, desegregation orders are not likely to be upheld without advocates in the community and the diligence of civil rights organizations.

Further Research

State policies have explanatory power for estimating the likelihood of secession; future research can model these state policies to determine their effects on the probability of school district secession. I estimated an LPM to answer this question, but I can extend this research by including measures of these state policy variations (cf. Table 1 on permissive, moderate, and difficult state policies).

In future research, I will compare school districts that were seceded from to the newly created districts that seceded from them. This comparison will complete the picture for how the revenue system is impacted. My results suggest that school districts that were seceded from lost a $1,000 per-pupil. It could be the case that this $1,000 was shifted to the seceding district. But if the seceding district saw an increase of $2,000 per-pupil, then additional revenue must have been generated from elsewhere as a result of the secession.

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APPENDIX A

RESULTS FROM LINEAR PROBABILITY MODEL

VARIABLES	ATTEMPTED SECESSION
Revenues (pp)	<0.00001***
	(<0.001)
Total schools	0.00017
	(<0.001)
Total enrollment	<0.00001**
	(<0.001)
St-tch ratio	0.00001
	(<0.001)
White (%)	0.00007***
	(<0.001)
LEP (%)	-0.00001
	(<0.001)
IEP (%)	-0.00002
	(<0.001)
FRL (%)	0.00004***
	(<0.001)
School age population (%)	-0.00009***
	(<0.001)
Suburb	-0.00462***
	(0.001)
Town	-0.00391***
	(0.001)
Rural	-0.00316**
	(0.001)
year = 2000	0.00017
	(0.001)
year = 2001	0.00019
	(0.001)
year = 2002	0.00008
	(0.001)
year = 2003	0.00007
	(0.001)
year = 2004	0.00021
	(0.001)
year = 2005	<0.00001
	(0.001)
year = 2006	0.00014
	(0.001)
year = 2007	-0.00009
	(0.001)
year = 2008	-0.00059
	(0.001)
year = 2009	-0.00012
	(0.001)
year = 2010	-0.00003
	(0.001)
year = 2011	-0.00058
	(0.001)

year = 2012	-0.00035
	(0.001)
year = 2013	-0.00029
	(0.001)
Constant	-0.00293
	(0.002)
Observations	160,638
R-squared	0.031

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX B

RESULTS FROM DIFFERENCE-IN-DIFFERENCE MODEL

	Total Revenues (pp)	**Federal Revenues (pp)**	**State Revenues (pp)**	**Local Revenues (pp)**
	Std. error	Std. error	Std. error	Std. error
Compared to no attempt				
Attempt failed or inactive	-1,186.453***	-227.078***	-828.746*	-130.629
	(417.970)	(56.204)	(482.097)	(433.790)
Attempt ongoing	-147.689	-68.321**	0.296	-79.664
	(227.990)	(33.537)	(212.755)	(248.172)
Attempt successful	-470.109	188.934***	-502.433**	-156.610
	(290.004)	(44.645)	(233.694)	(196.506)
Compared to pre-attempt				
After attempt	1,039.593***	119.894***	423.496***	496.202***
	(139.896)	(28.152)	(102.180)	(111.602)
Interaction				
Failed x Post	1,955.990*	807.660***	1,938.089**	-789.758
	(1,082.829)	(210.175)	(886.799)	(537.817)
Successful x Post	-1,167.054**	-194.958**	-575.994*	-396.101
	(476.978)	(80.302)	(308.871)	(366.707)
Control variables				
Total schools	-1.138	8.733***	-6.365**	-3.506
	(3.723)	(0.700)	(2.520)	(2.650)
Total enrollment	-0.010*	-0.012***	-0.002	0.004
	(0.005)	(0.001)	(0.004)	(0.003)
St-tch ratio	-347.021***	-23.342***	-98.495***	-225.185***
	(88.789)	(6.214)	(25.793)	(57.341)
White (%)	-23.967***	-4.088***	2.050	-21.929***
	(2.509)	(0.487)	(1.715)	(1.862)
LEP (%)	56.255***	13.024***	30.870***	12.361**
	(8.759)	(2.018)	(4.379)	(5.154)
IEP (%)	242.126***	24.923***	129.538***	87.665***
	(17.124)	(2.307)	(10.083)	(13.087)
FRL (%)	-46.432***	15.988***	33.336***	-95.756***
	(3.133)	(0.671)	(1.981)	(2.510)
School age population (%)	-338.130***	15.374***	-42.398***	-311.106***
	(16.102)	(2.649)	(9.983)	(11.956)
Compared to city				
Suburb	718.435***	-64.681***	711.275***	71.841
	(71.922)	(17.593)	(57.821)	(54.294)
Town	-206.713**	66.127***	346.296***	-619.136***
	(102.395)	(17.888)	(76.341)	(84.658)
Rural	2,763.402***	320.763***	1,770.188***	672.450***
	(210.440)	(28.877)	(95.860)	(141.916)
Compared to year =				

1999				
year = 2000	268.624*	74.561***	241.604**	-47.541
	(159.368)	(23.179)	(113.206)	(133.866)
year = 2001	109.420	164.703***	133.375	-188.657
	(143.534)	(25.233)	(114.551)	(119.347)
year = 2002	495.537***	273.952***	120.206	101.378
	(152.359)	(27.924)	(116.199)	(125.041)
year = 2003	748.829***	350.278***	-46.966	445.517***
	(166.309)	(27.207)	(124.762)	(136.189)
year = 2004	1,012.048***	374.002***	211.408	426.639***
	(172.939)	(28.737)	(141.624)	(144.252)
year = 2005	1,587.499***	363.280***	514.500***	709.719***
	(171.793)	(24.120)	(134.283)	(142.639)
year = 2006	1,632.235***	334.638***	426.545***	871.051***
	(192.284)	(32.886)	(136.793)	(157.566)
year = 2007	1,230.387***	288.706***	244.376*	697.305***
	(186.412)	(33.125)	(129.394)	(151.061)
year = 2008	1,566.296***	428.444***	275.709**	862.143***
	(174.947)	(30.657)	(128.656)	(138.172)
year = 2009	1,988.063***	843.472***	7.953	1,136.638***
	(169.409)	(31.070)	(125.275)	(139.141)
year = 2010	2,025.969***	783.588***	30.944	1,211.437***
	(173.956)	(30.834)	(132.622)	(144.846)
year = 2011	1,542.012***	373.999***	33.731	1,134.282***
	(173.798)	(26.584)	(130.229)	(147.772)
year = 2012	1,570.309***	190.177***	-9.841	1,389.974***
	(182.269)	(29.146)	(135.198)	(147.450)
year = 2013	1,042.815***	55.229	-101.406	1,088.991***
	(218.378)	(36.364)	(162.704)	(180.597)
Constant	23,522.425***	42.483	4,972.193***	18,507.749***
	(1,609.905)	(131.010)	(529.441)	(1,061.453)
Observations	26,366	26,366	26,366	26,366
R-squared	0.274	0.269	0.151	0.243

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX C

RESULTS FROM EQUATION 2 WITH SECESSION AS BINARY VARIABLE

	Total Revenues (pp)	Federal Revenues (pp)	State Revenues (pp)	Local Revenues (pp)
Compared to no attempt				
Attempted secession	-547.347***	34.413	-451.153***	-130.608
	(196.806)	(30.257)	(173.564)	(157.176)
Compared to pre-attempt				
Post	1,036.725***	119.599***	420.684***	496.442***
	(139.824)	(28.136)	(102.108)	(111.573)
Interaction				
Attempted secession x Post	-595.127	81.266	-178.442	-497.951
	(417.607)	(74.682)	(282.858)	(305.876)
Control variables				
Total schools	-2.400	8.430***	-7.502***	-3.328
	(3.851)	(0.756)	(2.650)	(2.601)
Total enrollment	-0.008	-0.012***	-0.000	0.004
	(0.006)	(0.001)	(0.004)	(0.003)
St-tch ratio	-347.033***	-23.371***	-98.486***	-225.175***
	(88.784)	(6.221)	(25.793)	(57.329)
White (%)	-23.886***	-4.040***	2.107	-21.954***
	(2.512)	(0.487)	(1.714)	(1.862)
LEP (%)	56.296***	13.053***	30.906***	12.337**
	(8.753)	(2.019)	(4.381)	(5.147)
IEP (%)	242.431***	24.979***	129.830***	87.622***
	(17.123)	(2.307)	(10.081)	(13.083)
FRL (%)	-46.307***	16.031***	33.439***	-95.777***
	(3.136)	(0.671)	(1.982)	(2.510)
School age population (%)	-338.373***	15.464***	-42.760***	-311.077***
	(16.076)	(2.644)	(9.979)	(11.937)
Compared to city				
Suburb	709.980***	-66.185***	702.653***	73.513
	(72.225)	(17.728)	(58.075)	(54.205)
Town	-202.853**	67.743***	349.333***	-619.929***
	(102.279)	(17.904)	(76.289)	(84.619)
Rural	2,760.472***	320.570***	1,767.072***	672.830***
	(210.471)	(28.872)	(95.865)	(141.899)
Compared to year = 1999				
year = 2000	268.164*	74.285***	241.298**	-47.418
	(159.399)	(23.195)	(113.236)	(133.859)
year = 2001	109.012	164.835***	132.749	-188.573
	(143.555)	(25.245)	(114.577)	(119.340)
year = 2002	494.955***	273.913***	119.587	101.455
	(152.403)	(27.938)	(116.246)	(125.033)
year = 2003	746.934***	349.802***	-48.662	445.794***
	(166.364)	(27.224)	(124.820)	(136.179)
year = 2004	1,009.866***	373.404***	209.489	426.972***
	(173.001)	(28.759)	(141.681)	(144.239)
year = 2005	1,585.536***	362.642***	512.847***	710.047***

	(171.832)	(24.138)	(134.336)	(142.617)
year = 2006	1,631.067***	334.212***	425.600***	871.255***
	(192.267)	(32.887)	(136.805)	(157.546)
year = 2007	1,231.030***	288.656***	244.997*	697.377***
	(186.391)	(33.134)	(129.393)	(151.046)
year = 2008	1,567.014***	427.958***	276.723**	862.333***
	(174.964)	(30.667)	(128.663)	(138.159)
year = 2009	1,987.536***	843.147***	7.466	1,136.923***
	(169.395)	(31.074)	(125.257)	(139.124)
year = 2010	2,026.580***	783.693***	31.384	1,211.503***
	(173.957)	(30.842)	(132.618)	(144.830)
year = 2011	1,542.099***	373.654***	34.001	1,134.445***
	(173.804)	(26.598)	(130.223)	(147.755)
year = 2012	1,571.899***	190.374***	-8.490	1,390.014***
	(182.304)	(29.159)	(135.194)	(147.449)
year = 2013	1,046.462***	55.490	-97.928	1,088.901***
	(218.315)	(36.359)	(162.613)	(180.578)
Constant	23,512.968***	35.838	4,967.041***	18,510.089***
	(1,611.307)	(131.199)	(529.873)	(1,062.145)
Observations	26,366	26,366	26,366	26,366
R-squared	0.274	0.269	0.151	0.243

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

APPENDIX D

LINEAR PROBABILITY MODEL BY YEAR

VARIABLES	2000 Attempted secession	2003 Attempted secession	2004 Attempted secession	2005 Attempted secession	2007 Attempted secession	2008 Attempted secession	2012 Attempted secession	2013 Attempted secession
Revenues (pp)	-0.00000	-0.00000	0.00000	0.00000	0.00000	0.00000*	0.00000**	0.00000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total schools	0.00008	0.00010	0.00012	0.00025	0.00053	0.00021	0.00006	0.00077
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Total enrollment	0.00000	0.00000	0.00000	0.00000	-0.00000	0.00000	0.00000	-0.00000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
St-tch ratio	0.00003	-0.00013	-0.00015	0.00003	-0.00002	0.00011	0.00021	0.00005
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
White (%)	0.00003	0.00009***	0.00011***	0.00009**	0.00007*	0.00006**	0.00010***	0.00008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEP (%)	-0.00004	0.00001	-0.00001	0.00002	-0.00002	-0.00008	0.00005	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IEP (%)	0.00003	0.00010	-0.00005	0.00012**	-0.00019**	-0.00028**	0.00014*	0.00010
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FRL (%)	-0.00001	0.00005	0.00007*	0.00003	0.00005	0.00004	0.00006**	0.00006*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
School age population (%)	-0.00001	-0.00017*	-0.00012	-0.00013	0.00000	-0.00006	-0.00016	-0.00012
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Compared to city								
Suburb	-0.00964	-0.00420	-0.00393	-0.00340	-0.00556	-0.00342	-0.00039	0.00019
	(0.007)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Town	-0.00894	-0.00183	-0.00167	-0.00087	-0.00619	-0.00256	0.00080	-0.00058
	(0.007)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Rural	-0.00846	-0.00166	-0.00201	-0.00024	-0.00568	-0.00156	0.00183	0.00102
	(0.007)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Constant	0.00803	-0.00332	-0.00557	-0.00888	0.00015	-0.00380	-0.01739**	-0.01242*
	(0.009)	(0.008)	(0.011)	(0.010)	(0.009)	(0.007)	(0.009)	(0.007)
Observations	8,082	10,816	9,708	11,383	8,628	10,944	11,735	12,857
R-squared	0.033	0.043	0.045	0.040	0.023	0.047	0.031	0.040

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1