School Desegregation, Educational Attainment and Enrollment Patterns

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Abstract

My thesis studies the impact which school district desegregation plans had on the educational attainment of black high school students between 1960 and 1980.

The desegregation plans put in place after the landmark Brown v. Board of Education decision constitute one of the most significant social programs in the US after WWII. Because of the lack of a built-in mechanism for the evaluation of the plans, research into their effects on black enrolment patterns and graduation rates has been incomplete. My work is motivated by a paper by Guryan (2004), which finds that desegregation led to a decrease of around 3% in the dropout rate of black high school students.

First, I re-examine the findings of the paper in a difference-in-difference and fixed effects framework, and find a smaller in magnitude, though still significant, effect. Second, I present a cumulative model of educational attainment which highlights the endogeneity problems of trying to estimate the effects of desegregation plans and evaluate some of Guryan's assumptions based on this model. Third, I examine whether the counter-factual used in Guryan's approach makes sense: the paper compares the change in the dropout rate between 1970 and 1980 for students living in a district which desegregated during that decade, to the same change in the dropout rate for students living in districts which desegregated before 1970 and after 1980. Fourth, I present some data limitations in Guryan's paper: it ignores the problems of identifying school districts in terms of county groups and metropolitan areas in the US census, and the impact of the migration of black students between and within school districts. Finally, I present and discuss the mobility and enrollment patterns of black students as a response to the implementation of desegregation plans.

My data comes from two sources: the 1970 and 1980 US censuses and the Office of Civil Rights dataset used by Welch and Light (1987), prepared by the Unicon Research Corporation. Welch and Light also provide data on the timing and characteristics of the desegregation plans.

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Contents

1 Introduction

In 1954 the landmark Supreme Court case *Brown v. Board of Education* ruled that separate schools for black and white children were inherently unequal. Before this decision, many Southern states legally segregated schools by race, as a result of which black students received fewer resources. Elsewhere, housing patterns, migration and other community factors contributed to a similar pattern of segregation. The Supreme Court decision not only made segregation illegal, but also compelled school districts to take active measures to integrate US public schools. While there was no desegregation campaign organized at the national level, a number of court cases brought by civil rights groups achieved significant victories[1]. The results of these efforts were enforced by federal district courts at the local level. The desegregation plans implemented as a consequence of the court decisions constitute one of the most significant social programs in the history of the US.

Because desegregation was enforced locally, its timing varied significantly. Over the following 30 years many school districts, including some of the largest in the country, took positive actions which led to the desegregation of schools through a variety of measures, ranging from voluntary transfers to rezoning and busing programs.

The intended benefits of the desegregation plans were to expose black students to white peers and to provide them with equal educational resources, by de facto ending segregation. However, because of the specific way in which districts were integrated locally, there was no built-in mechanism for the evaluation of the effects of desegregation on the academic performance of the students. Thus research into the benefits of desegregation has been

[1] Appendix C of Welch and Light (1987) provides a bibliography for the desegregation plans in the districts considered in this paper.

incomplete and has led to different conclusions. In one of the most promising studies on the effects of desegregation on academic attainment, Guryan (2004) estimates that desegregation decreased the probability that a black student will drop out of high school by about 3 percentage points. The goal of this paper is to provide a strong critique of Guryan's methods and conclusions, and to integrate in the appraisal of desegregation my findings regarding the enrollment patterns of black students.

This paper is organized as follows. In Section 2 I review the literature on the effectiveness of desegregation plans and their impacts on academic achievement, enrollment and earnings. I focus in particular on the findings in Guryan (2004), which motivated this project. Section 3 reexamines Guryan's results. In Section 4 I present a model of the determinants of educational attainment and discuss the conceptual and empirical problems with Guryan's estimation strategy. Section 5 examines the patterns of black enrollment around the time of desegregation, and discusses how these results relate to the evaluation of desegregation plans. Section 6 summarizes the results.

2 Literature Review

Beginning with the Coleman Report (1966), a number of studies describe the extent of racial segregation before the implementation of desegregation plans and attempt to estimate the effect of racial composition of schools on the educational achievement of black students. A lot of this work focuses on desegregation within a single school district. One important early study by Crain and Strauss (1985) is based on a random assignment experiment in Hartford and finds that students who were offered the opportunity to be bused to a suburban school were more likely to work in white-collar and professional jobs about 17 years after the experiment.

Crain (1970) and Boozer et al. (1992) provide some evidence that higher white enrollment share raises years of school completed, occupational achievement, the probabilities of attending college and working in an integrated environment, and wages. However, as discussed in Rivkin (2000), neither of the studies provides compelling evidence in favor of desegregation, because they do not provide enough statistical controls for differences in socioeconomic background or prior academic preparation. Grogger (1996) finds a negative relationship between blacks' wages and the percentage of schoolmates who are black. This paper uses longitudinal data which does include information on background and academic achievement measures. However, as Rivkin (2000) argues, it is unlikely that this small number of variables will account for all the factors that are related to outcomes and school choice. In theory, a positive relationship between outcomes and the percentage of white schoolmates may be due to factors other than desegregation itself. Ultimately we would like to be able to separately identify all these different causal links between racial composition and educational and labor market outcomes.

Several meta-analyses of studies confirm that there is no agreement about the effect of integration on the educational achievement of blacks. Cook (1984), while reviewing the findings of a panel of seven experts convened by the National Institute on Education to find consensus on the subject of desegregation, concludes that desegregation had no significant effect on math skills, and "[has] little confidence that we know much about how desegregation affects reading 'on the average' and, across the few studies examined, [finds] the variability in effect-sizes more striking and less well understood than any measure of central tendency." Armor (2002) also agrees with this conclusion in his review of the early studies on desegregation and educational outcomes.

Using data from the High School and Beyond Survey, Rivkin (2000) shows that there is little support for the belief that mandatory desegregation programs will significantly increase the future earnings of black students. In fact, the evidence that such programs weaken the link between the quality of schooling experienced by blacks and non-blacks suggests that they are costly and inefficient ways to improve the quality of education of black students. Therefore a more efficient way of providing better education may be to focus on improving school quality, rather than on reassigning students among schools.

There is, however, strong evidence that school desegregation plans were effective in terms of their immediate goal, i.e. they led to a significant decrease in segregation, as documented by Welch and Light (1987). Using a very detailed annual school-level dataset, they track dissimilarity and exposure indices as measures of school segregation and conclude that the school districts in their dataset experienced a very significant decrease in segregation as a result of the plans. Furthermore, while there is general agreement that the "white flight" phenomenon existed around the time of desegregation and afterwards, it is not significant

enough in magnitude to undo the decreases in segregation resulting directly from the desegregation plans.

2.1 Guryan's Study (2004)

Little work has been done to estimate the effects of desegregation, due to the presence of significant problems of endogeneity affecting factors such as the timing of desegregation plans and the determinants of academic attainment. Guryan (2004) has conducted one of the few studies on the subject of how desegregation affects attainment. The paper uses a novel and ambitious approach to tackle the endogeneity issues and attempts to identify the impact of desegregation using data from the 1970 and 1980 US censuses.

The main result of Guryan (2004) is that desegregation led to a decrease of around 3 percentage points in a black student's probability of dropping out of high school. The study takes a sample of school districts which desegregated during the 60s, 70s and 80s and divides them into two groups – the control group consists of districts which desegregated during the 60s and 80s, while the treatment group consists of those that desegregated during the 70s. It then compares the change in the high school dropout rate in these two groups between 1970 and 1980, using US census data for these years. The motivation of this strategy is that we can reasonably infer what would have happened between 1970 and 1980 in a 70s desegregation district, if desegregation had not happened during that period, by looking at what happened between 1970 and 1980 in the 60s and 80s desegregation districts. Hence 60s and 80s desegregators provide a counter-factual dropout trend for the 70s desegregators, which can be compared to the actual dropout trend resulting from the implementation of a desegregation plan during that decade.

The US census data used in the study consists of the 1970 Form 2 Metro sample, the 1980 1% sample and the 1980 5% sample. The 15-, 16- and 17-year-olds in the 1970 and 1980 data are matched to the 125 large school districts from the Office of Civil Rights (OCR) dataset used by Welch and Light. The latter provides detailed annual school-level data on enrollment and racial composition of each school within a district, which allows the author to track the changes in the dissimilarity and exposure indices (measures of the degree of segregation) over time. The school districts in the OCR dataset are some of the largest in the US, so while the sample represents only 1% of the total number of districts, it represents approximately 20% of total enrollment in 1968.

The smallest publicly available geographic identifier in the 1970 and 1980 censuses is the county group, so each school district in the OCR dataset is matched to the smallest possible geographic area which contains the entire school district, and which can be identified in both the 1970 and the 1980 census. In many cases this means that the sample of black students from the US census data will include people who did not in fact live within the boundaries of the school districts from the OCR dataset. The benefit of this approach is that everyone who indeed lived within the boundary of a school district will be included in the census sample, and also that the geographical areas used in 1970 and 1980 are comparable.

Guryan uses difference-in-difference (DID) and fixed effects regressions to estimate the impact of desegregation on the dropout rate of black students. Guryan writes the DID framework as

$$(1) \quad \delta = \{E[D_{idt}|d = 1970\text{s}, t = 1980] - E[D_{idt}|d = 1970\text{s}, t = 1970]\} - \{E[D_{idt}|d \in (1960\text{s}, 1980\text{s}), t = 1980] - E[D_{idt}|d \in (1960\text{s}, 1980\text{s}), t = 1970]\}$$

where D is an indicator which equals 1 if a high-school-aged individual is not enrolled in school, i indexes individuals, $d \in$ (1960s, 1970s, 1980s) indexes the decade in which the individual's school system implemented a desegregation plan, and $t \in$ (1970, 1980) indexes time.

Regression specification I regresses D on a constant, an indicator which equals 1 if t = 1980, an indicator which equals 1 if d = 1970s, and an interaction of the two. The coefficient on the interaction is an estimate of the effect of desegregation on dropout rates. This coefficient is the difference between the change in the dropout rate in the treatment group and the change in the dropout rate in the control group. Specification II adds individual, family and district characteristics controls such as age indicators, family income, mother's and father's education, mother's and father's age, family size, region dummies and median income in the county group.

Guryan's more general district fixed-effect specification is given by

$$D_{ist} = \beta_t + \gamma_s + \delta T_{dt} + \pi_t X_{ist} + \varepsilon_{ist} \tag{2}$$

where s indexes school districts, X is a vector of individual and district characteristics that vary over time, π_t is a vector of coefficients that vary by t, and ε is the random error term. The regressor of interest is T_{dt}, which is equal to 1 for observations in 1980 in districts which desegregated during the 1970s. It corresponds to the interaction term in the DID specifications. The model is estimated by regressing the dropout indicator on a set of district

dummies, an indicator equal to 1 if t = 1980, the T_{dt} interaction, and the time-varying individual and district controls used in specification II.

Specification III restricts π_t to be equal across decades. Specification IV allows π_t to vary across decades. Specification V adds state-year interactions, to allow for state-specific trends in the dropout rates.

All of the results of Guryan's regressions suggest that desegregation led to a decrease of around 3 percentage points in the probability of dropping out of high school. The estimates from the five specifications are respectively -0.038 and -0.028 for the DID specifications, and -0.029, -0.030 and -0.26 for the fixed-effects specifications, all of which are significant.

3 Revisiting Guryan's Basic Results

The findings described above are significant and interesting enough to warrant a closer look at the methodology of the study, because the task of estimating the effect of desegregation plans on educational achievement is hard. However, before I can discuss the strategy of Guryan's estimation and the assumptions of his study, I will first attempt to replicate his results using the same data and regression specifications.

After correcting what appeared to be minor mistakes in assigning US census observations to school districts, I was able to approximately replicate Guryan's main findings, though my results differed to some extent. Moreover, the number of observations in my sample increased by about 40% relative to Guryan's, after carefully including all the available information from the 1980 1% and 5% census samples, and after considering those school districts which did not implement a desegregation plan during the time frame of the study. Table 3.1 lists the sample of school districts used in my regressions.

TABLE 3.1 – LIST OF SCHOOL DISTRICTS IN THE SAMPLE

School district	State	Year of desegreg.	School district	State	Year of desegreg.
NEW ORLEANS PARISH	LA	61	ROCKFORD	IL	73
NEWARK	NJ	61	INDIANAPOLIS	IN	73
HARFORD COUNTY	MD	65	PRINCE GEORGE'S COUN.	MD	73
OAKLAND	CA	66	CINCINNATI	OH	73
HARTFORD	CT	66	LAWTON	OK	73
GRAND RAPIDS	MI	68	MEMPHIS	TN	73
TACOMA	WA	68	FORT WORTH	TX	73
RICHMOND	CA	69	WACO	TX	73
BREVARD COUNTY	FL	69	RALEIGH COUNTY	WV	73
LEE COUNTY	FL	69	DENVER	CO	74
POLK COUNTY	FL	69	BALTIMORE	MD	74
VOLUSIA COUNTY	FL	69	BOSTON	MA	74
CADDO PARISH	LA	69	SPRINGFIELD	MA	74
CALCASIEU PARISH	LA	69	MINNEAPOLIS	MN	74
RAPIDES PARISH	LA	69	PORTLAND	OR	74
TERREBONNE PARISH	LA	69	JEFFERSON COUNTY	KY	75

CUMBERLAND COUNTY	NC	69	DETROIT	MI	75
NEW HANOVER COUNTY	NC	69	SACRAMENTO	CA	76
SAN ANTONIO	TX	69	NEW BEDFORD	MA	76
PITTSYLVANIA COUNTY	VA	69	OMAHA	NE	76
PINELLAS COUNTY	FL	70	JERSEY CITY	NJ	76
BIRMINGHAM	AL	70	DAYTON	OH	76
STAMFORD	CT	70	MILWAUKEE	WI	76
BROWARD COUNTY	FL	70	BUFFALO	NY	76
DADE COUNTY	FL	70	SAN DIEGO	CA	77
PALM BEACH COUNTY	FL	70	KANSAS CITY	KS	77
EAST BATON ROUGE PAR.	LA	70	KANSAS CITY	MO	77
ROCHESTER	NY	70	AKRON	OH	77
GASTON COUNTY	NC	70	FRESNO	CA	78
MECKLENBURG COUNTY	NC	70	LOS ANGELES	CA	78
CHARLESTON COUNTY	SC	70	SAN BERNARDINO	CA	78
GREENVILLE COUNTY	SC	70	NEW CASTLE COUNTY	DE	78
RICHLAND COUNTY	SC	70	PHILADELPHIA	PA	78
HOUSTON	TX	70	EL PASO	TX	78
NORFOLK	VA	70	LUBBOCK	TX	78
ROANOKE	VA	70	SEATTLE	WA	78
JEFFERSON COUNTY	AL	71	TUCSON	AZ	78
MOBILE	AL	71	CLEVELAND	OH	79
LITTLE ROCK	AK	71	COLUMBUS	OH	79
SAN FRANCISCO	CA	71	DOUGHERTY COUNTY	GA	80
DUVAL COUNTY	FL	71	ST. LOUIS	MO	80
HILLSBOROUGH COUNTY	FL	71	TOLEDO	OH	80
MUSCOGEE COUNTY	GA	71	PITTSBURGH	PA	80
FORT WAYNE	IN	71	AUSTIN	TX	80
WICHITA	KS	71	SAN JOSE	CA	81
JEFFERSON PARISH	LA	71	SOUTH BEND	IN	81
TULSA	OK	71	CHICAGO	IL	82
NASHVILLE	TN	71	ECTOR COUNTY	TX	NONE
DALLAS	TX	71	MESA	AZ	NONE
ARLINGTON	VA	71	MODESTO	CA	NONE
ORANGE COUNTY	FL	72	PUEBLO	CO	NONE
FAYETTE COUNTY	KY	72	GARY	IN	NONE
LANSING	MI	72	SAGINAW	MI	NONE
CLARK COUNTY	NV	72	ALBUQUERQUE	NM	NONE
OKLAHOMA CITY	OK	72	LAS CRUCES	NM	NONE
AMARILLO	TX	72	NEW YORK	NY	NONE
ATLANTA	GA	73	LORAIN	OH	NONE

Source: Welch and Light (1987).

As described by Welch and Light, districts were originally chosen based on the following criteria. Every district with 50,000 or more students in 1968 and 20- to 90-percent minority representation is included. Districts with 15,000 or more students in 1968 and 10- to 90-percent minority representation were chosen with sampling probabilities proportional to their size and regional representation. The remaining districts—those with fewer than 15,000 students in 1968, less than 10-percent minority representation—were excluded from the sample. The year of desegregation column reports the year the district's first major desegregation plan was implemented according to Welch and Light (1987). If the year is 1969 or earlier, the district is in the control group. If the year is between 1970 and 1979, inclusive, the district is in the treatment group. If the year is 1980 or later, the district is in the treatment group.

Summary statistics for the sample of black 15-, 16- and 17-year-olds in the specified districts are given in Table 3.2. Means are calculated separately for 1970 and 1980, and for each type of district, depending on when it was desegregated. The first row suggests that the largest decline in the dropout rate between 1970 and 1980 happened in districts which desegregated during the 1970s. However, contrary to Guryan's results, I find that the dropout rate decreased in all 4 types of districts between 1970 and 1980.[2] Given this difference, it appears less obvious that the decrease in the dropout rate can be explained by the implementation of a desegregation plan.

TABLE 3.2 – MEANS OF SELECTED VARIABLES

	60s desegregators		70s desegregators		80s desegregators		No desegregation plan	
	1970	1980	1970	1980	1970	1980	1970	1980
Dropout rate	0.099	0.080	0.106	0.071	0.091	0.082	0.081	0.069
	(0.299)	(0.272)	(0.308)	(0.258)	(0.288)	(0.275)	(0.273)	(0.253)
Total family income, in 1980 dollars	12898	15345	15173	17001	15492	17163	17061	16029
	(9751)	(12564)	(11182)	(13108)	(10808)	(13384)	(12659)	(12568)
Number of siblings	3.0	2.3	2.9	2.3	3.1	2.5	2.6	2.1
	(2.4)	(1.8)	(2.2)	(1.7)	(2.3)	(1.9)	(2.0)	(1.6)
Mother not in household	0.16	0.12	0.14	0.13	0.13	0.12	0.13	0.11
	(0.37)	(0.33)	(0.35)	(0.33)	(0.33)	(0.32)	(0.34)	(0.31)
Father not in household	0.42	0.51	0.43	0.51	0.45	0.55	0.45	0.53
	(0.49)	(0.50)	(0.49)	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)
Number of observations	1,321	8,144	5,226	38,815	1,259	8,435	1,013	8,106

Source: US Census data for 1970 and 1980. The sample consists of black 15-, 16- and 17-year-olds. Income was adjusted for inflation using the CPI-U.

[2] Guryan finds that the dropout rate increased slightly for districts which desegregated in the 60s and did not change for districts which desegregated during the 1980s.

It is interesting to compare the other variables across the different types of districts and across time, in order to determine how similar the treatment and control groups are. The characteristics of black children are fairly similar in all types of districts and change similarly over time. The obvious exception is total family income, which decreased between 1970 and 1980 for the children living in districts that never implemented a desegregation plan. In the districts that implemented a plan between 1961 and 1982, total family income increased. Demographic variables such as the number of siblings and the percentage of children growing up in a household where the mother or the father is not present are also similar across the different types of districts and across time.

Table 3.3 presents the results of the regressions when I run the five specifications from Guryan's paper on my dataset. The coefficient of interest is reported in the first row. In the DID specifications, this is the coefficient on the interaction of the treatment and year dummies (70s desegregator * 1980). In specification I, for example, it suggests that the implementation of a desegregation plan during the 70s led to a decrease of about 2 percentage points in the dropout rate of black students in the districts that desegregated during the 70s. In the county group fixed-effects regressions, the coefficient of interest is the coefficient on the T_{dt} interaction (equal to one for observations in 1980 in districts which desegregated in the 70s). In specification III, for example, it suggests that desegregation led to a 1.6 percentage point decrease in the probability that a black student in the treatment group will drop out of high school.

All of my regressions agree that there is a statistically significant decrease in the dropout rate of black students in the treatment group (70s desegregators) due to the implementation of a desegregation plan during the 70s. However, my results are different from Guryan's, whose regressions estimate the effect to be higher – between 2.6 percentage points and 3.8

percentage points. The estimates reported below are consistently between 1.4 and 1.9 percentage points.

We can conclude that if the assumptions of Guryan's model are reasonable, the implementation of desegregation plans in the treatment group led to a decline in the dropout rate of black students. Although I estimate the effect to be smaller in magnitude than Guryan's result, it is still significant.

TABLE 3.3 – THE EFFECT OF DESEGREGATION ON DROPOUT RATES

	I	II	III	IV	V
70s desegregator * 1980	-0.019** (0.008)	-0.014** (0.006)	-0.016*** (0.006)	-0.016*** (0.006)	-0.019** (0.008)
1980	-0.012 (0.006)	-0.001 (0.005)	0.001 (0.006)	0.076 (0.056)	–
70s desegregator	0.013** (0.007)	0.009** (0.005)	–	–	–
R^2	0.001	0.061	0.063	0.066	0.067
Observations			72,319		
Specification	DID	DID	Fixed effects	Fixed effects	Fixed effects
Controls	No Controls	Individual, family and district characteristics	Individual, family and district characteristics	Individual, family and district characteristics; demographic * year effects	Individual, family and district characteristics; demographic * year effects; state * year effects

Source: US Census data for 1970 and 1980 and OCR dataset (Welch and Light, 1987). The sample consists of black 15-, 16- and 17-year-olds. Columns I through V report results from the regression specifications described at the end of Section 2.1. Individual, family and district characteristics include age and sex indicators, family income, mother's and father's education, family size, region dummies and median income in the district. Standard errors, corrected for heteroskedasticity and for district*year correlation, are reported in parentheses.
** denote significance at the 5% level. *** denote significance at the 1% level.

4 Conceptual and Empirical Concerns

As Welch and Light (1987) have shown, the implementation of desegregation plans led to a decrease in white enrollment and a movement away from central city school districts, which, however, was not significant enough to undo the dramatic results of the desegregation programs. Between the 1960s and 1980s, the exposure of the average black student to white schoolmates increased significantly, as measured by the changes in the dissimilarity and exposure indices in districts which were desegregated during the period. Besides the direct benefits of going to school in an integrated environment, we might expect several other factors to benefit black students after the implementation of a desegregation plan. For instance, if reassigned to different schools, black children could benefit from exposure to better teachers and facilities, which may also help reduce the educational and employment gaps between blacks and whites.

On the other hand, desegregation plans may also have adverse effects on their intended beneficiaries. Busing students to different schools may increase their commute times, decrease parental participation in their education, or have other negative side effects. Moreover, there may be student or school efforts to limit the real extent of desegregation within a school, which could completely offset the effect of integration plans. In particular, Rivkin (2000) finds that busing programs weaken the link between the quality of schooling actually experienced by blacks and non-blacks, which suggests that such programs may be less beneficial than we think.

The existence of such conflicting factors complicates the evaluation of desegregation plans. To study their impact, we need a conceptual model of educational attainment which will bring out the effect of desegregation.

4.1 A Cumulative Model of Education

Equation (3) provides a model of the determinants of the dropout probability of a student, where *i* indexes individuals, *d* indexes districts, *s* indexes schools, *y* indexes years and *g* indexes grade in school. The probability A_{igsdy} is a function of: α_{igy}, the student's ability and motivation; *X*, a vector of family characteristics; *D*, district desegregation efforts which may have differentiated impacts on different schools; *S*, educational factors not directly related to desegregation, such as curriculum, resources, administration quality; *N*, neighborhood environmental factors such as labor market conditions; and finally, a random error term *ε*.

$$A_{igsdy} = \alpha_{igy} + \beta X_{igsdy} + \gamma D_{gsdy} + \delta S_{gsdy} + \lambda N_{sdy} + \varepsilon_{igsdy} \tag{3}$$

Measuring some of these factors will present problems. One issue is that α may be unobserved and related to D, because parents who are more committed to their child's education may be more aggressive in ensuring that the child participates in a desegregation program. Or they may be more likely to leave a highly segregated school district. Thus it would be hard to compare students who participate in busing programs to those who do not, or to compare students across school districts, because such comparisons will confound student differences with treatment effects.

Second, the measurement of D itself could pose a problem because desegregation programs differ significantly in scope and the types of measures taken. Moreover, commute times will vary across districts, as will the extent of white flight and the responses of teachers to desegregation. These differences in the impact of desegregation could also vary depending

on how long a district has been desegregated for. Thus a single indicator of desegregation will fail to capture the complex impact of these factors.

Finally, there may be a relationship between D and S, i.e. between desegregation efforts and other educational factors, such as spending and other determinants of school quality. In fact, the most active desegregation period was during the 1970s,[3] which is also when several states, including California, reformed their school finance systems.

One important feature of the model is that it explicitly allows student abilities and commitment to schooling (as captured by α) to change over time, through the grade and year subscripts. I want to recognize that such factors evolve as a response to various shocks during the student's education, and are not just a fixed result of early childhood experiences. Thus α is not taken as fixed, but is assumed to be a function of the history of personal, family, neighborhood and school characteristics over time. This means that past shocks (e.g. shocks in school quality or desegregation efforts) can have a residual effect on the student's future outcomes. In the determination of α_{igy}, such shocks could be modeled as effects which depreciate geometrically over time at a rate between 0 and 1, where 0 would mean that a shock has no residual impact in the future at all, and 1 would mean that past shocks persist into the future. We would expect this depreciation rate to be somewhere between 0 and 1 in reality.

One consequence of this framework is that a student's history of studying in a desegregated district will matter. I.e. if students have been exposed to the effects of a desegregation program over a longer period of time, there should be a bigger impact on their performance and propensity to drop out. In particular, by the year 1980 a student whose

[3] For example, in my sample of school districts about 70% are ones that implemented a desegregation plan during that decade. Approximately 60% of the observations in the sample are from 70s desegregators.

district implemented a desegregation plan during the early 70s should benefit more than a student whose district implemented one late in the 70s.

Unfortunately, the precise estimation of such a model is made impossible by our data limitations. Results such as those in Guryan (2004) have to be understood with this in mind, and their interpretation depends on how well the assumptions of the estimation conform to our conceptual model of education.

4.2 The Timing of Desegregation and Our Cumulative Model

In the context of Guryan's work and what I presented in Section 3, one could reasonably expect that longer exposure to the effects of a desegregation plan will lead to greater benefits for the students it affects, particularly if the plan achieves its immediate goal of reducing segregation. Such a finding would also conform to the cumulative model of education, because the benefits to a student of having completed earlier school years in an integrated district will persist, at least to some extent, into the future.

On the other hand, one might expect that the phenomenon of white flight could create a counter-acting negative shock. Typically, the drop in white enrollment was larger when a desegregation plan had been in effect longer. This would directly reduce the exposure of black students to white schoolmates over time, which means the impact of desegregation would be smaller. Moreover, the existence of a significant decline in white enrollment and a movement away from central city school districts confirms that there was significant local opposition at the time of implementation of the programs. An environment which was hostile to the project of integration would probably lead to substantial unrest, at least during the first year of the duration of the plan. Therefore the effects of the plan during these initial years may not be representative of its effects on students in the long run.

Given the evidence that white flight was not significant in magnitude relative to the immediate integration impact of the programs (Welch and Light, 1987), it is likely that the first argument about a negative educational shock resulting from white flight is also not significant enough to offset the benefits of more education in an integrated district. Yet the second argument stands – we cannot be sure whether the effects of desegregation plans in their first year will be representative. Hence results regarding the timing of desegregation will have to be interpreted carefully.

Table 4.1 gives the estimated effect of desegregation on black dropout rates by the year of desegregation, as well as the changes in the dissimilarity and exposure indices between 1970 and 1980, for all districts which desegregated within a given year. The effect of desegregation on dropout rates by year of desegregation is estimated similarly to Guryan's Figure 4. The dependent variable is an indicator for whether an individual is a dropout and the coefficients of interest (column 2 of Table 4.1) are the estimates on year-of-desegregation dummies. The specification includes district fixed effects, year dummies that control for demographic trends, age indicators, family size and income, parental education, and region dummies.

The exposure index is given by

(4)
$$E_d = \sum_s \left[p_{sd}^w \times \left(\frac{n_{sd}^b}{n_d^b} \right) \right]$$

where p^w is the fraction of white students, n^b is the number of black students, *s* indexes schools and *d* indexes districts. The exposure index measures the fraction of white students at the typical black student's school, calculated for a specific district and year.

The dissimilarity index is given by

(5)
$$D_d = \frac{\sum_s \left[n_{sd} \times |p_{sd}^b - p_d^b| \right]}{2 n_d \times p_d^b (1 - p_d^b)}$$

where p^b is the fraction of black students, *n* is total enrollment, *s* indexes schools and *d* indexes districts. The dissimilarity index varies between 0 and 1, with a value of 1 indicating complete segregation and a value of 0 indicating complete integration. The magnitude of the index reflects the share of blacks who would have to switch schools in order to achieve full integration within a district.

TABLE 4.1 – THE EFFECT OF DESEGREGATION PLANS BY YEAR OF DESEGREGATION

Year of implementation of first major plan	Effect on dropout rates between 1970 and 1980	Change in exposure index between 1970 and 1980	Change in dissimilarity index between 1970 and 1980
1970	-0.001	0.001	-0.101
	(0.010)		
1971	-0.002	0.168	-0.356
	(0.015)		
1972	0.018	0.173	-0.303
	(0.017)		
1973	-0.030**	0.086	-0.265
	(0.007)		
1974	0.007	0.028	-0.210
	(0.012)		
1975	-0.002	0.221	-0.396
	(0.013)		
1976	0.004	0.084	-0.248
	(0.008)		
1977	-0.037**	0.082	-0.253
	(0.007)		
1978	-0.016*	0.057	-0.175
	(0.009)		
1979	-0.058**	0.248	-0.646
	(0.011)		

Source: US Census data for 1970 and 1980 and OCR dataset (Welch and Light, 1987). The sample consists of black 15-, 16- and 17-year-olds.
Column 2 reports the coefficient estimates on year of desegregation dummies. The dependent variable is an indicator for being a dropout. The regression controls include individual, family and district characteristics such as age and sex indicators, family income, mother's and father's education, family size, region dummies and median income in the district. Standard errors, corrected for heteroskedasticity and for district * year correlation, are reported in parentheses.

The estimated effects of desegregation (column 2) are similar to those reported in Figure 4 in Guryan (2004). They suggest that programs implemented between 1970and 1976 had very small effects on the probability of dropping out of high school (in most cases they were not significantly different from 0). Moreover, programs implemented after 1976 had a much larger estimated effect. One possible explanation is that the decline in white enrollment weakened the impact of desegregation over a longer period of time. Thus in districts which implemented a plan earlier, the effect would be smaller in 1980. Such an explanation would seem likely if the gains in integration were largest for districts which desegregated late in the 1970s. In other words, if white flight is responsible for the weak effect of earlier desegregation, we would expect the increases in exposure and the decreases in dissimilarity between 1970 and 1980 to be greatest in the districts which desegregated later.

In fact, this is the opposite of what we see in Table 4.1. The exposure index increased the most in years 1971, 1972, 1975 and 1979. Apart from 1979, these are all before 1976, which means that earlier desegregators experienced the highest increase in exposure during the 1970s. The changes in dissimilarity show an identical pattern. Hence we have good reason to doubt the idea that desegregation had a smaller impact in the earlier desegregators due to white flight[4].

Moreover, students in these earlier desegregators enjoyed a longer period of increased exposure to white schoolmates, so we would expect them to benefit more from desegregation (i.e. we would expect the estimates in column 2 to be greater for the earlier desegregators). As seen in column 2, the data does not support this conclusion. The

[4] The only exception to the observed pattern is the group of districts which desegregated in 1979. However, there are only two districts which desegregated in 1979, so my estimates in the last row of columns 2, 3 and 4 are less reliable than for the rest of our sample. Moreover, there is only 1 year between 1980 and the implementation of a plan in 1979, which raises additional doubts about the estimates for 1979.

conflicting patterns from Table 4.1 raise significant doubts about the findings in Guryan (2004), particularly within the framework of our cumulative model of education, because the small effect on dropout rates in early desegregators cannot be reconciled with their large gains in terms of exposure and dissimilarity.

Furthermore, as discussed at the beginning of this section, we have good reasons to doubt that the effect of a desegregation plan in its initial years of implementation will be representative of its effect in the long run, due to the turmoil which would likely occur at the time of implementation. Hence the categorization of districts which desegregated in 1979 within Guryan's "treatment" group raises additional doubts. In general, if we classify districts which desegregated in the years just before 1980 as "treatment", and it turns out that they are the ones which show the largest benefits from desegregation, we ought to be worried about the estimates of the benefits of desegregation. The effect of desegregation plans in such districts may be less representative of the long-term effect. According to Table 4.1, the 1979 desegregators are precisely the districts driving the results in Table 3.3, which undermines the idea that the decrease in black dropout rates was explained by desegregation, rather than by another factor.

4.3 A Good Counterfactual

The above point about classifying districts which desegregated in 1979 as "treatment" relates to another general problem – determining whether the 1960s and 1980s desegregators make up a good control group for the estimations based on Guryan (2004). Although Table 3.2 suggested that they are fairly similar in terms of demographic characteristics, there are a few other factors which could potentially make these districts bad counterfactuals.

First, it is clearly somewhat arbitrary to count a 1969 desegregator in the control group, while a 1970 desegregator is counted in the treatment group. Since one would want the control group to be like the treatment group in most respects, two such districts will usually differ mostly by the fact that one desegregated a year earlier. Ceteris paribus, the changes in their dropout rates between 1970 and 1980 should be fairly similar, apart from the one-year lag. On one hand, we would like these districts to be similar, because they would be good controls. However, if 1969 desegregators are assigned to the control group, we are making the assumption that their desegregation plan had no effect on the change in dropout rates in between 1970 and 1980, which goes against the model of education presented in section 4.1.

This is a problem particularly when it comes to the make-up of the 1960s control group. There are 13 districts in the sample which implemented their first major desegregation plan in 1969. Thus about two thirds of the 1960s control group consists of 1969 desegregators (there are 20 districts in this group). It is assumed that these districts' 1969 desegregation plans had no effect on dropout rates after 1970, so two thirds of the 60s control group is selected on the basis of an assumption which does not conform to the cumulative model of education. Furthermore, there are 17 districts which desegregated in 1970 in the 1970s treatment group, so a significant proportion of the entire sample consists of districts which desegregated around 1970 and are somewhat arbitrarily separated into treatment and control. This issue will be made worse if in fact the effects of desegregation in a district occur over a period longer than a year.

Second, Guryan assigns districts to groups based on the first year in which a major desegregation plan was implemented, as classified by Welch and Light (1987). Welch and Light also report a significant number of cases in the sample where multiple major plans were implemented, or where there were smaller desegregation plans before and after the first

major plan. There are plans which are not designated as the first major plan, and yet generate a significant decrease in segregation, measured by the exposure and dissimilarity indices. Similarly, there are plans which are designated as the first major plan, but do not produce very significant results. The graphs of exposure and dissimilarity time trends presented in Appendix A provide clear evidence that many of the districts in the sample studied here and by Guryan experienced significant and persistent declines in segregation at times other than those designated as their first major desegregation plan. This raises further questions as to whether the districts designated as 1960s and 1980s desegregators provide a good counter-factual for what would have happened in the 1970s desegregators if they had not been desegregated.

This hypothesis is corroborated by Table 4.2, which reports the average change in dissimilarity and exposure between 1970 and 1980 by decade in which the first major plan was implemented (i.e. for the 1960s, 70s and 80s desegregators in Guryan's classification and for those districts which did not implement a plan).

TABLE 4.2 – MEAN CHANGES IN DISSIMILARITY AND EXPOSURE BY TYPES OF DISTRICTS

Decade of 1st major plan	Mean change in dissimilarity between 1970 and 1980	Mean change in exposure between 1970 and 1980
1960s	-0.068	-0.004
1970s	-0.228	0.081
1980s	-0.130	0.038
No major plan	-0.009	-0.064

Source: OCR dataset (Welch and Light, 1987).
Means are calculated for the sample of districts in Table 3.1 and weighted by the size of the districts.

It is not surprising that the 70s desegregators experienced the largest declines in segregation, i.e. the larges decreases in dissimilarity and the largest increases in exposure, because they implemented their designated "1st major plan" during this decade. However, it

is interesting to note that there was a substantial decrease in the dissimilarity index for the 80s desegregators, whose mean is more than half as large as that of the 70s desegregators. The 60s desegregators also experienced a noticeable decrease in dissimilarity. Furthermore, the districts which did not implement any desegregation plans present a markedly different pattern, which corroborates the finding. All of the above facts suggest that some of the districts classified within the control group also implemented effective desegregation plans during the 1970s. The pattern in the exposure index is similar – the increase in the exposure index for 80s desegregators is almost one half of the increase in the exposure index for 70s desegregators.

A third reason why the control group may not provide a good counterfactual trajectory for the dropout rate is that the 1970s were also a time of school finance reform, which presents another confounding factor. Changes in the distribution of resources within states could have directly affected school quality. Changes in school finances could also have affected the timing of desegregation plans. Either of the above would be good reasons to doubt whether the observed decline in dropout rates during the 70s is due to desegregation plans implemented during the decade. However, both of these possible complications will require further research.

To summarize, I think that 1960s and 1980s desegregators may provide a misleading counterfactual trend, mainly because significant desegregation occurred during the 70s in both of these control groups, and also because desegregation plans were often incremental in nature, i.e. they happened at multiple times and in varying magnitude over time. Furthermore, the cumulative nature of education exacerbates both of these concerns. This leaves open the possibility that the trend in dropout rates is driven by other factors, such as school finance reforms or demographic and migration patterns.

4.4 Data Limitations

The smallest geographic identifier available from the census data is the county group. As described in Section 2.1, Guryan matches each school district to a set of county groups (called "consolidated county groups") that completely cover the boundaries of the district and can be identified both in 1970 and in 1980. We follow this same strategy in Section 3.

The implication of this method is that the consolidated county groups in the census data are always larger than the area we would really want them to cover. They will usually include students who do not go to school in the school district which the county group is intended to represent. The proportion of black students who indeed belong to the school districts that carried out the desegregation plans (as given by the OCR data) are often only a fraction of the total number of black students which we identify within the consolidated county groups (from the census data). Table 4.3 shows one basic discrepancy resulting from this imperfect geographic identification. Consolidated county groups usually include suburban areas, whereas many of the school districts in the OCR sample are central city school districts, which could not be identified separately in the census. Furthermore, the OCR data focuses on public schools. Hence we observe that census data includes significantly more whites and fewer blacks as a percentage of the total population across time.

TABLE 4.3 – COMPARISON OF THE RACIAL COMPOSITION OF CENSUS AND OCR DISTRICTS

	Census data for the consolidated county groups	OCR data for public schools within the desegregating districts
White students in 1970, % of total	72%	57%
Black students in 1970, % of total	18%	33%
White students in 1980, % of total	62%	43%
Black students in 1980, % of total	22%	38%

Source: US Census data for 1970 and 1980 and OCR dataset (Welch and Light, 1987).

Another limitation of the data is that we do not know whether a student currently living in a county group attended school there, i.e. we cannot exactly identify whether he or she has or has not benefited from desegregation. This relates to the problem of migration – a student may move either after dropping out of high school, or to continue going to school elsewhere. Guryan partially addresses this problem by controlling for migration into and out of the consolidated county groups. However, the more interesting problem – whether there was systematic migration between the suburbs and the central city, correlated with the timing of desegregation – cannot be answered. In fact, one might expect such migration within the consolidated county group to be more common than migration between county groups, because the disincentive to relocate may be smaller if the distance is smaller.

Guryan suggests that the problem of geographic identification introduces attenuation bias in his regressions and may also allay some of the problems due to student mobility. However, it is very much possible that the problem could introduce more problematic biases. For example, suburban schools tend to have lower dropout rates than central city schools. Since the share of blacks living in the suburbs typically increased during the 1970s, the decrease in the dropout rate may be in part or entirely explained by the migration of blacks to the suburbs, provided the migration rate is correlated with the treatment and control groups in Guryan's study. A full answer to this problem will have to address the question of whether black migration to the suburbs was correlated with the implementation of desegregation plans.

4.5 Summary

Section 4 presented several problems with methodology and results in Guryan (2004).

First, I presented a cumulative model of the effect of schooling on educational attainment. This conceptual framework helps to highlight some of the potential problems with the estimation of the effect of desegregation on the probability of dropping out. In section 4.2 I showed that the impact of desegregation plans in terms of promoting integration between 1970 and 1980 was largest for the districts which were desegregated earlier in the decade. At the same time, most of the improvement in dropout rates which one might attribute to desegregation occurred in districts which desegregated very late into the decade. If the immediate impact of desegregation was stronger in the earlier 70s desegregators, the fact that these districts did not see a significant decline in dropout rates raises doubts about the validity of the regression estimates. In particular, this contradiction suggests that a factor other than desegregation is driving the change in dropout rates. I also raised the possibility that estimates of the benefits of desegregation based on the initial year after the implementation of a plan may not be representative of the long-term effects of desegregation.

Second, in section 4.3 I gave several reasons why the control group used by Guryan could provide a misleading counterfactual for the dropout rate in 1970s desegregators. Given the large number of districts which had plans in 1969 and 1970, their somewhat arbitrary allocation to control and treatment groups is problematic, particularly within the framework of the cumulative model of education, and also if the benefits of implementing a desegregation plan occur over more than a year. Furthermore, I provide strong evidence that 1960s and particularly 1980s desegregators reduced segregation during the 70s. Many districts implemented more than one major desegregation plan, or implemented smaller plans besides the one used by Guryan to classify the districts. Also, many desegregation plans were incremental in nature, so their effects could spread across the different decades.

Finally, the 70s were a time of school finance reform in some states, which could have a direct effect on school quality and on the timing of desegregation plans.

Finally, in section 4.4 I presented two empirical problems with Guryan's estimation strategy. Most importantly, the imperfect matching of districts to county groups does not allow us to identify which students in the census data attended school in desegregated districts. Furthermore, we cannot track migration between the suburbs and the central city. Table 4.3 showed that there are significant discrepancies between the populations described by the census and OCR datasets. In particular, if the migration of blacks to the suburbs is correlated with the allocation to treatment and control groups, i.e. with the timing of desegregation, then this factor may explain the decrease in dropout rate which Guryan attributes to desegregation efforts.

5 Patterns in the Enrollment of Black Students

As discussed in the preceding section, migration across and within county groups is an important phenomenon which can shed more light on the exact connection between desegregation efforts and changes in the dropout rate of black students. The migration of whites, and in particular white flight as a response to the implementation of desegregation programs, has been studied extensively. Welch and Light (1987) give evidence both for the existence of the phenomenon and for the systematic variation of its magnitude depending on district characteristics and the features of the plans that are implemented. It will be interesting to examine whether there is a similar "black flight" phenomenon and whether it varies systematically by district or program characteristics. Such an observation would mean that desegregation programs may have had a negative effect on their intended beneficiaries, but it would also provide evidence for the idea that desegregation efforts are correlated with migration patterns. This would suggest that selective migration is driving the larger decrease in the dropout rate of black students in 70s desegregators. A natural place to start is the question of whether the desegregation programs led to significant migration when they were implemented. Since I do not have migration data per se, I look at the enrollment of black students within districts, around the time of a desegregation plan.

I follow the strategy used by Welch and Light (1987) in their tables 19 through 22. For each district which implemented a desegregation plan, I compute a series of the changes in black enrollment and the changes in the dissimilarity index based on the OCR data. The period surrounding the plan is divided into five phases. First, I compute the average annual change in enrollment and the change in the dissimilarity index between the first year for which data is available and two years before the implementation of the first major desegregation plan (this phase is called the "more than 1 year before plan" phase). Second, I

compute the annual change in black enrollment and the dissimilarity index from two years before the plan to the year before the plan (this is the "1 year before plan" phase). Third, I compute the changes in enrollment and dissimilarity from the year before the plan to the year of implementation of the plan[5] (this is the "during implementation" phase). Fourth, I compute the changes in enrollment and dissimilarity from the implementation of the plan to the following year (this is the "1 year after plan" phase). Finally, I calculate the average annual change in enrollment and the change in dissimilarity from the year after the implementation to the last year for which data is available.

Hence for each district we have the annual change in black enrollment over 5 periods of time.[6] Analogously, we have the change in the dissimilarity index over these same 5 periods of time. Table 5.1 reports the effect of implementing a desegregation plan on the annual change in black enrollment. I regress the annual percentage change in enrollment for each of the 5 phases described above on a set of dummy variables for each phase and a set of year dummies. The "more than 1 year before plan" phase is taken as a base case, i.e. the average annual change in enrollment during the period more than 1 year before the plan is assumed to be the underlying trend in enrollment, just as in Welch and Light (1987). Thus the coefficients on the indicators for the other 4 phases estimate the deviation of black enrollment from its long-term trend for each of the phases. Of particular interest is the coefficient on "during implementation", which says that the annual enrollment of black students in a district decreased by about 2% at the time of implementation of desegregation

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[5] If the plan is implemented over a number of years, the changes are calculated from the year before the beginning of the implementation to the last year of implementation of the plan.

[6] i.e. we have the average annual change during the period more than 1 year before the plan, the annual change 1 year before the plan, the average annual change during the implementation of the plan, the annual change 1 year after the plan, and the average annual age during the period more than 1 year after the plan

plans. Moreover, the coefficients for the year before and the year after the plan are not significantly different from 0, which suggests that in these years the number of blacks was changing according to the long-term trend, calculated during the period more than 1 year before the implementation of a plan. The significant decline in enrollment in the period more than 1 year after the plan is a bit puzzling – it may for example be due to the combination of two factors: the way desegregation plans are distributed over time in our sample, and the significant demographic declines in the later part of our time frame, due to the peak of births around 1960. However, the fact that the coefficients for the years just before and after the plan are approximately 0 supports the idea that this 2 percentage point decline is due to the implementation of a desegregation plan.

TABLE 5.1 – ANNUAL ENROLLMENT CHANGES AND PLAN IMPLEMENTATION

	Annual enrollment growth
1 year before implementation	-0.005
	(0.004)
During implementation	-0.019***
	(0.004)
1 year after implementation	-0.007
	(0.004)
More than 1 year after implementation	-0.021***
	(0.004)

Source: OCR dataset (Welch and Light, 1987).
The controls include year dummies to account for the changes in demographics between 1963 and 1985. *** denote significance at the 1% level.

The next logical question is to ask which types of school districts and desegregation programs are driving the result above. To answer this question, I use Welch and Light's classification of districts and desegregation plans into different types and apply their strategy

for identifying the patterns in white flight to the problem of black enrollment. Districts are classified as large urban, medium urban, small urban, suburban, countywide and rural. Desegregation plans fall broadly into 7 categories: pairing and clustering, rezoning with pairing and clustering, pairing and clustering with magnets, rezoning, rezoning with magnets, major voluntary and other voluntary plans. Welch and Light also observe significant differences between Southern and non-Southern districts in terms of white flight. In addition, they report a significant difference between pre-1970 and post-1971 plans, due to the impact of the landmark *Swann v. Charlotte-Mecklenburg (NC) Board of Education*, which dramatically altered the nature of desegregation plans. According to Welch and Light, "this decision stated that racially identifiable schools must cease to exist, and it sanctioned the use of districtwide busing. In the 1970s, districts throughout the South implemented large-scale, involuntary plans."

TABLE 5.2 –BLACK ENROLLMENT AROUND THE TIME OF PLAN IMPLEMENTATION, BY PLAN TYPE AND DISTRICT TYPE

Number of districts	Type of district or plan	Before the plan: More than 1 year before	Before the plan: 1 year before	During the plan	After the plan: 1 year after	After the plan: More than 1 year after
53	**Southern districts**					
	Enrollment	4.02	2.60	0.88	1.83	-0.21
25	**Southern districts, post-Swann (plan after 1970)**					
	Enrollment	2.04	3.07	-1.03	1.74	-0.62
28	**Countywide districts**					
	Enrollment	8.76	2.62	1.89	2.58	0.51
34	**Districts with rezone/pair/cluster plan**					
	Enrollment	3.21	1.78	-0.68	0.20	-0.38
17	**Districts with rezoning plans, post-Swann (plan after 1970)**					
	Enrollment	-0.57	2.23	-5.22	4.27	-0.37

Source: OCR dataset (Welch and Light, 1987).

Table 5.2 reports what types of districts and desegregation plans led to the most significant decreases in black enrollment based on Welch and Light's classifications. I track the average annual percentage change in black enrollment over time for the periods described earlier (before, during and after the plan).

These results on black enrollment do not show a pattern as clear as the one Welch and Light find for white enrollment. The declines in enrollment at the time of desegregation appear to be most significant in the Southern post-Swann districts, and in districts which implemented rezoning programs after Swann, many of which are in fact in the South. Districts with a rezoning, clustering and pairing plan also experienced a decline in black enrollment. It is interesting to note that the latter type of plan is among those which also led to the largest drop in white enrollment. At the same time, Welch and Light observed that Southern countywide districts experienced a smaller decline in white enrollment, so it appears that different factors are driving black and white students' responses to desegregation in these districts.

Although the results do not provide conclusive evidence that black students moved between school districts systematically or dropped out of school as a result of desegregation programs, there is a significant number of 70s desegregators in my sample which experienced large declines in the dropout rates of black students, as well as large declines in the enrollment of black students. For example, black enrollment in Springfield, MA at the time of desegregation decreased by 4% relative to the long-term trend in enrollment, while the dropout rate of black students declined by 3.5% between 1970 and 1980. In Columbus, OH, the dropout rate fell by about 8% between 1970 and 1980, while black enrollment at the time of desegregation also fell by over 8%. Other districts with a similarly striking pattern include Columbus, El Paso, Los Angeles, San Diego and Omaha. The evidence that declines

in dropout rates could be accompanied by significant declines in black enrollment raises further doubts about the idea that desegregation improved the educational prospects of black students. In particular, it highlights the possibility the students who move across districts at the time of desegregation may also be the ones who would have been likely dropouts, had they stayed in the desegregating district.

The results reported in this section suggest that "black flight" was a more localized and smaller in magnitude phenomenon than "white flight". However, it was significant in a number of the districts considered in this study and by Guryan (2004). The evidence from districts where both black enrollment and dropout rates declined goes against the idea that desegregation directly led to a decrease in the dropout rate, corroborating my argument in Section 4.

6 Conclusions

Although Guryan's study employs a novel approach to overcome the endogeneity problems of estimating the effect of desegregation on the educational attainment of black students, I think that there are highly unreasonable assumptions behind Guryan's strategy, which cast doubt on his results.

First, the conceptual framework of Guryan's estimations is in stark contrast with any model of academic achievement whereby outcomes are determined at least partially by the history of factors such as family background, school characteristics, neighborhood environment, etc. The model which I presented in Section 4.1 challenges the assumption that ability is time-invariant and that a student's probability of dropping out of high school will not depend on the length of his or her exposure to a desegregated school environment. Moreover, my framework highlighted some of the empirical issues that arise when one tries to estimate the effects of desegregation.

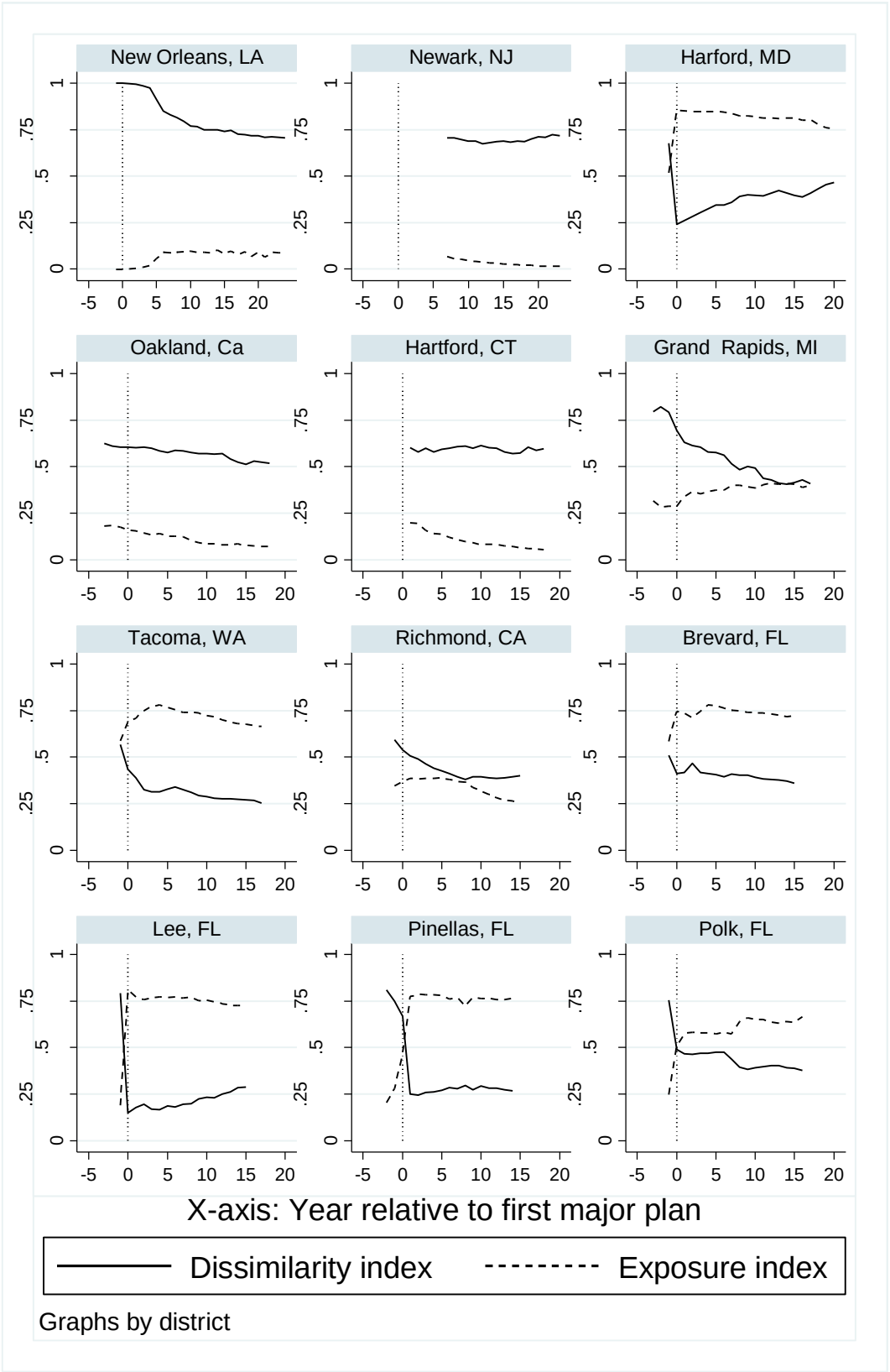
Second, I showed that the 70s desegregators which saw the greatest decrease in segregation, as measured by exposure and dissimilarity indices, were ones that implemented plans early in the decade. One would expect that because the direct impact of desegregation there was larger, these districts would also show greater gains in terms of lower dropout rates in 1980. In fact, I found the opposite results, which suggests that a factor other than desegregation led to the decrease in dropout rates during the 70s. Third, I argued that 60s and 80s desegregators provide a misleading counterfactual, because desegregation plans were incremental in nature and because many districts implemented several of them over a longer period of time.

Fourth, there are significant data limitations which raise doubts about the estimated effects of desegregation. Most importantly, it is impossible to know whether a student in the

sample has attended a desegregated school. Furthermore, I showed that census county groups and OCR districts differ significantly in their coverage of urban and suburban areas and in their racial composition. It is impossible to track migration between the central city districts and suburbs, so a decrease in dropout rates could be due to migration, rather than to desegregation.

Finally, I presented the patterns in the enrollment of black students in districts which implemented desegregation plans. While the "black flight" effect was found to be smaller in magnitude than "white flight", a number of the districts in the sample experienced both a large decline in dropout rates and a large decline in black enrollment, which corroborates my objections in Section 4.

7 Appendix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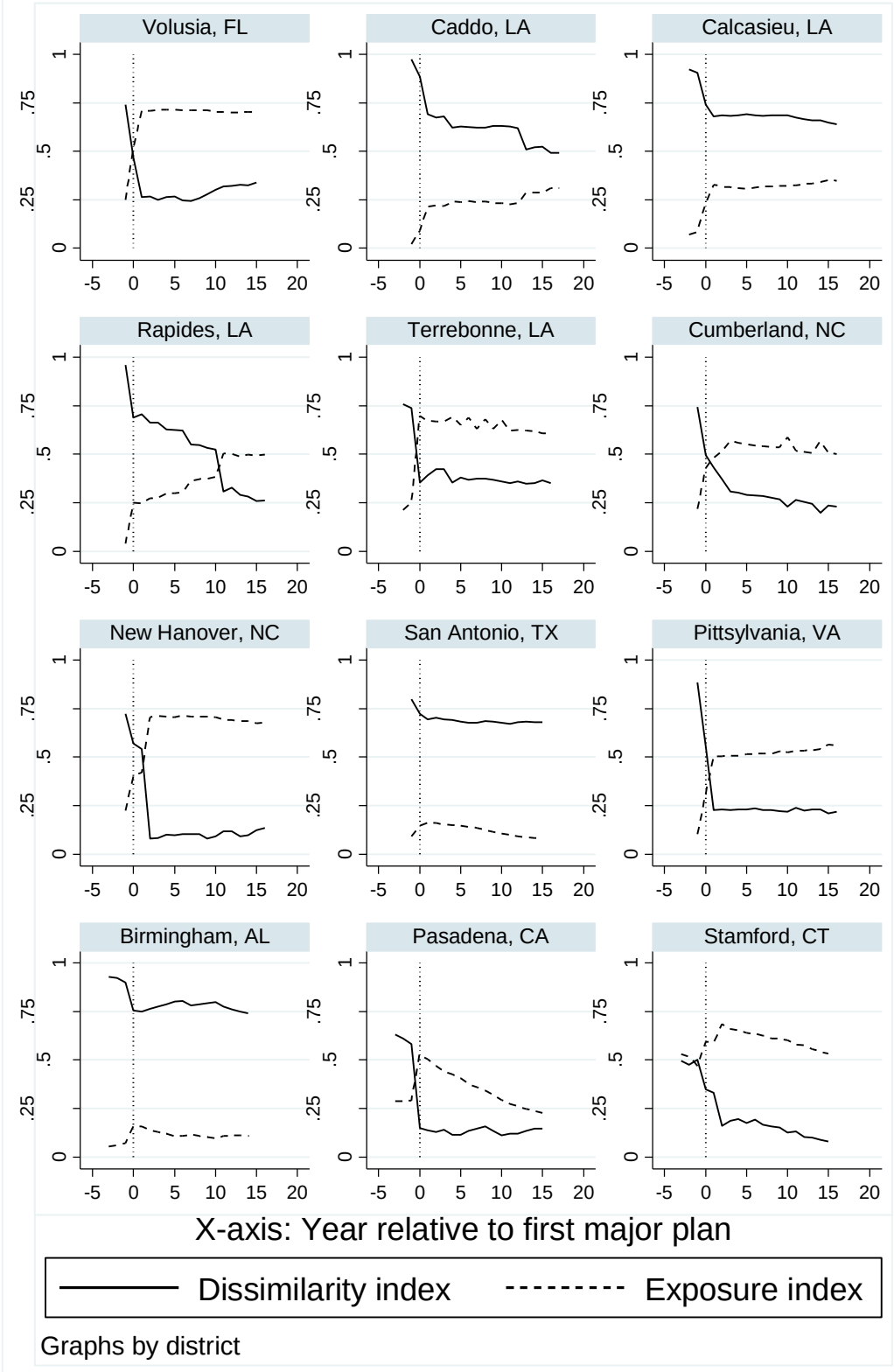
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district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Cumberland, NC
New Hanover, NC
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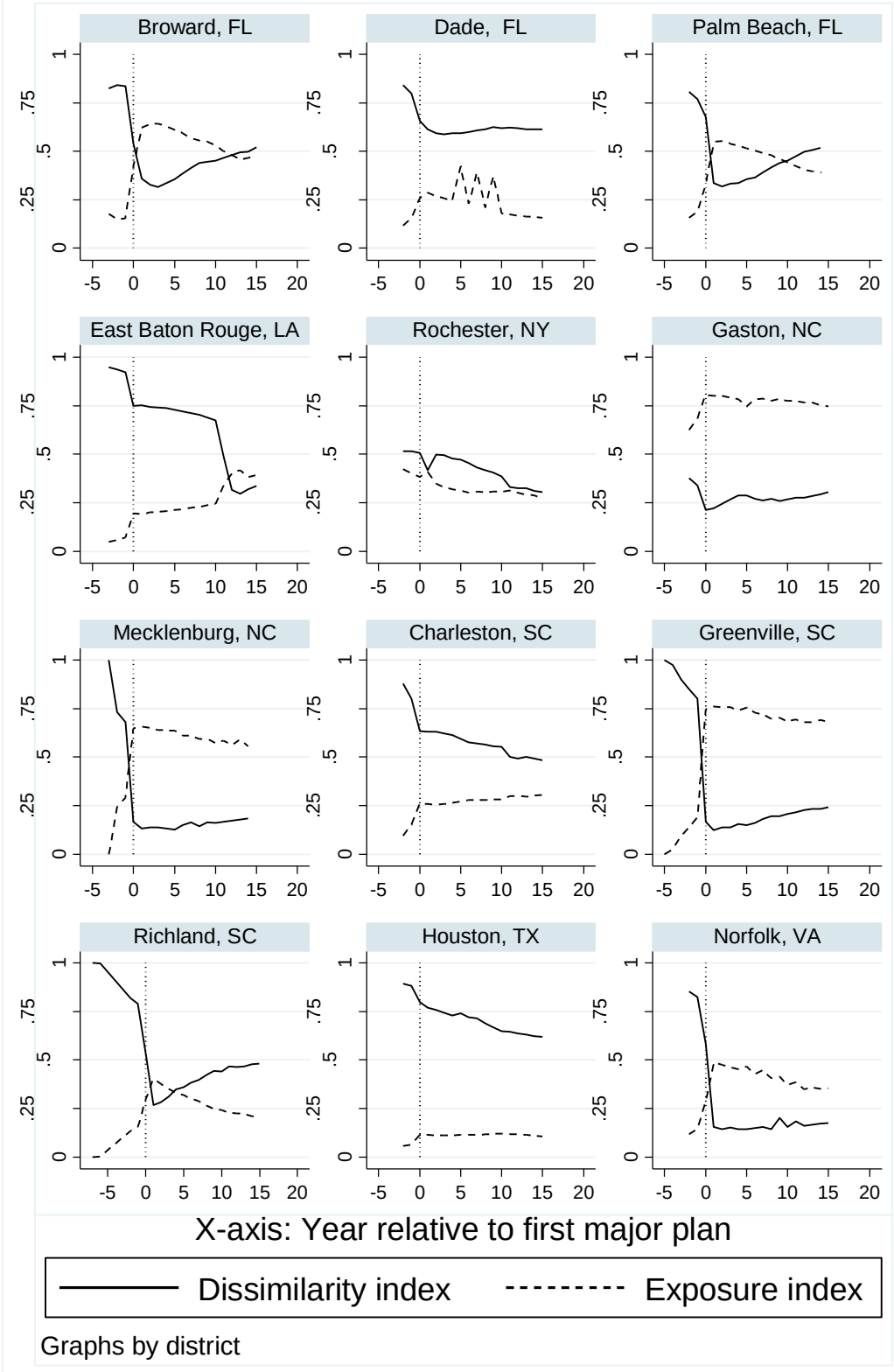
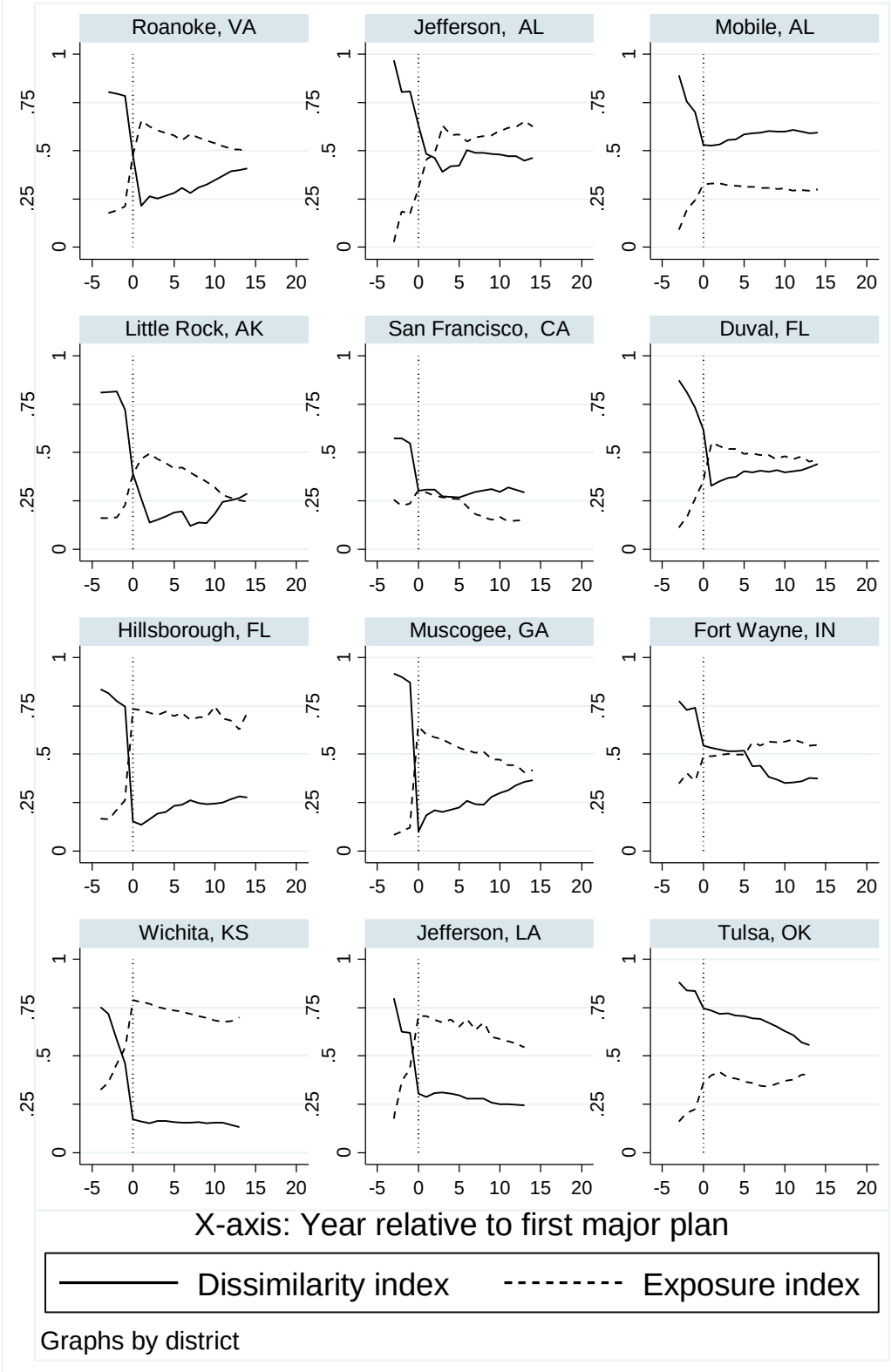
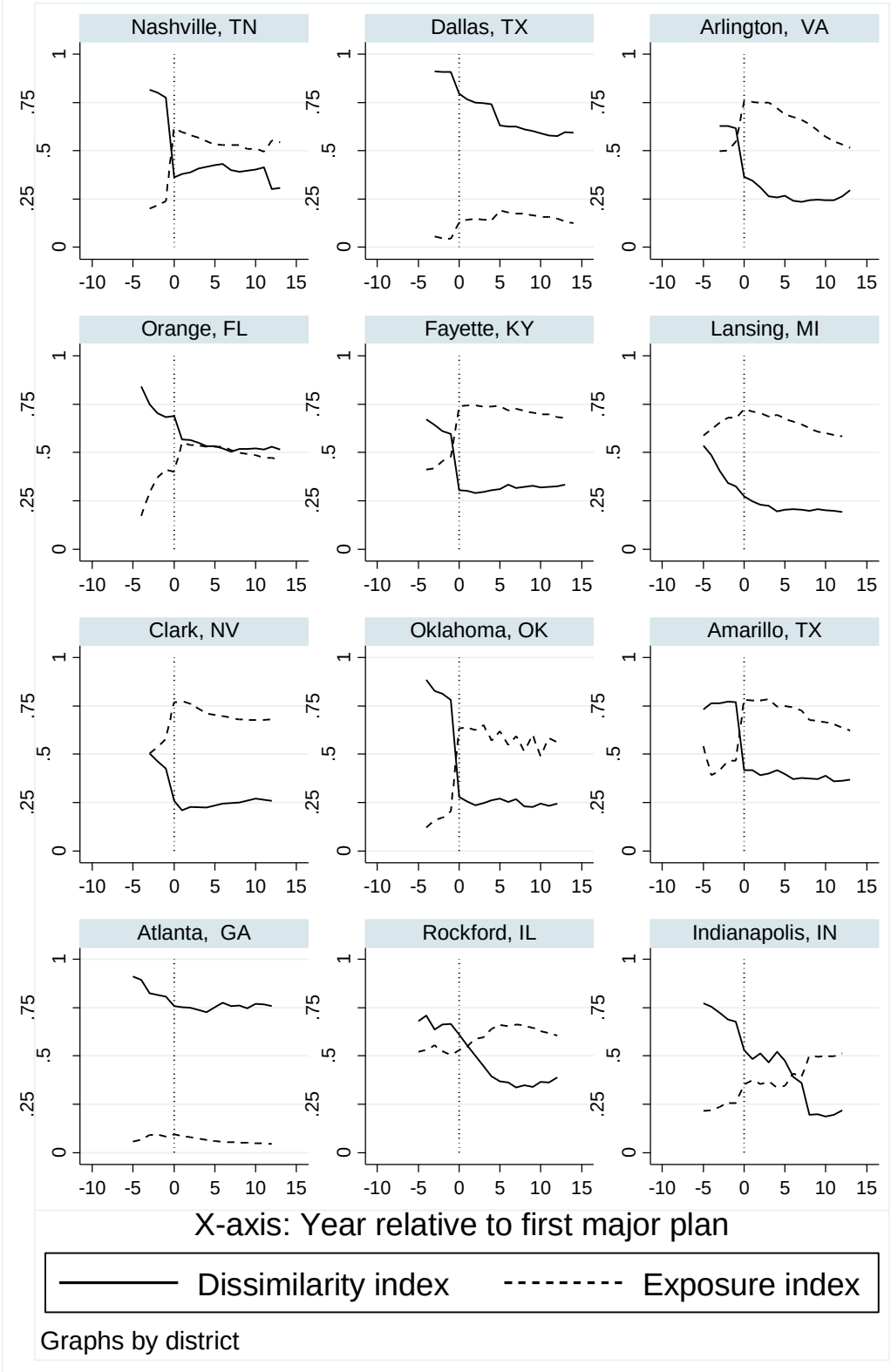
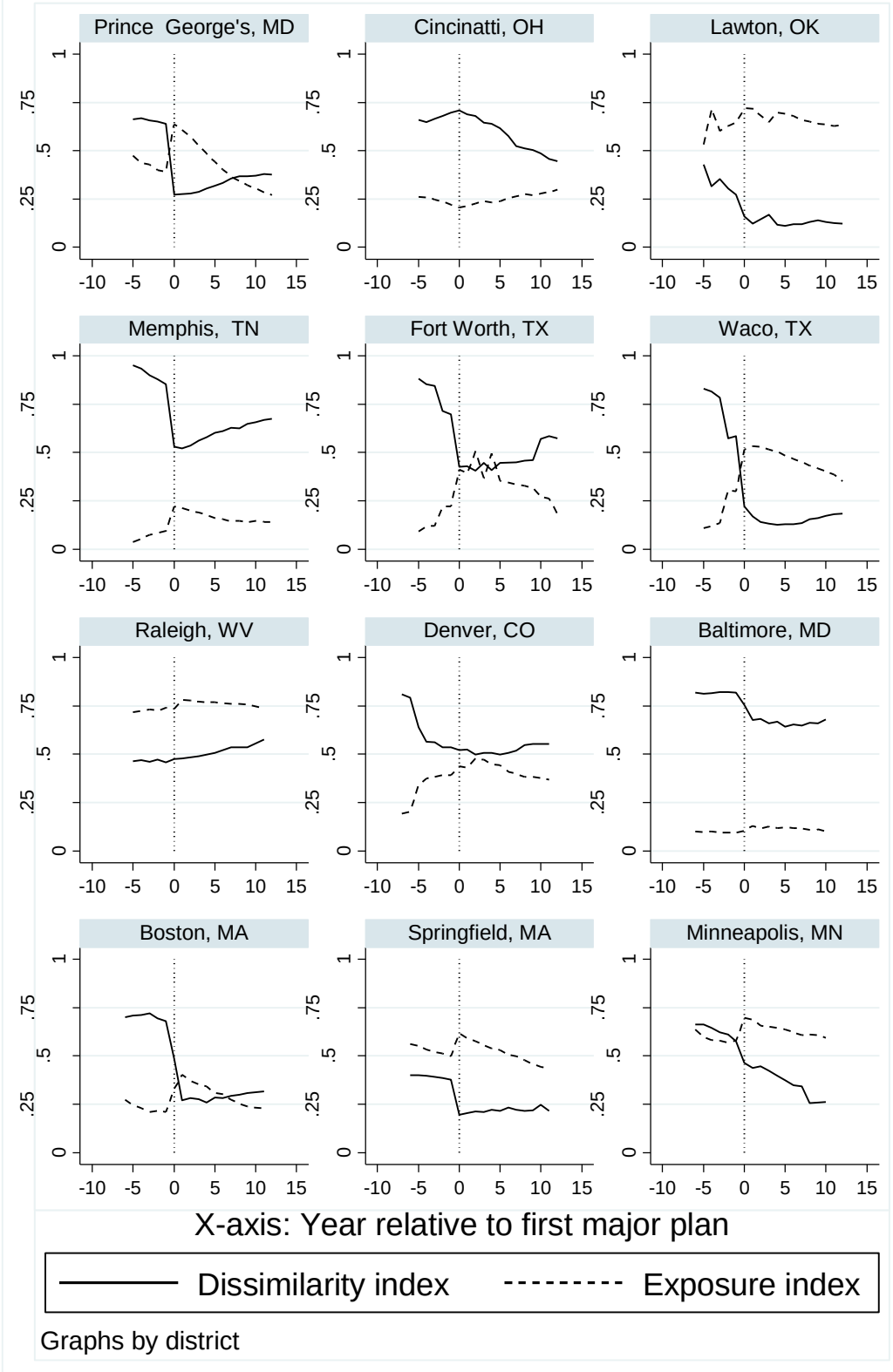
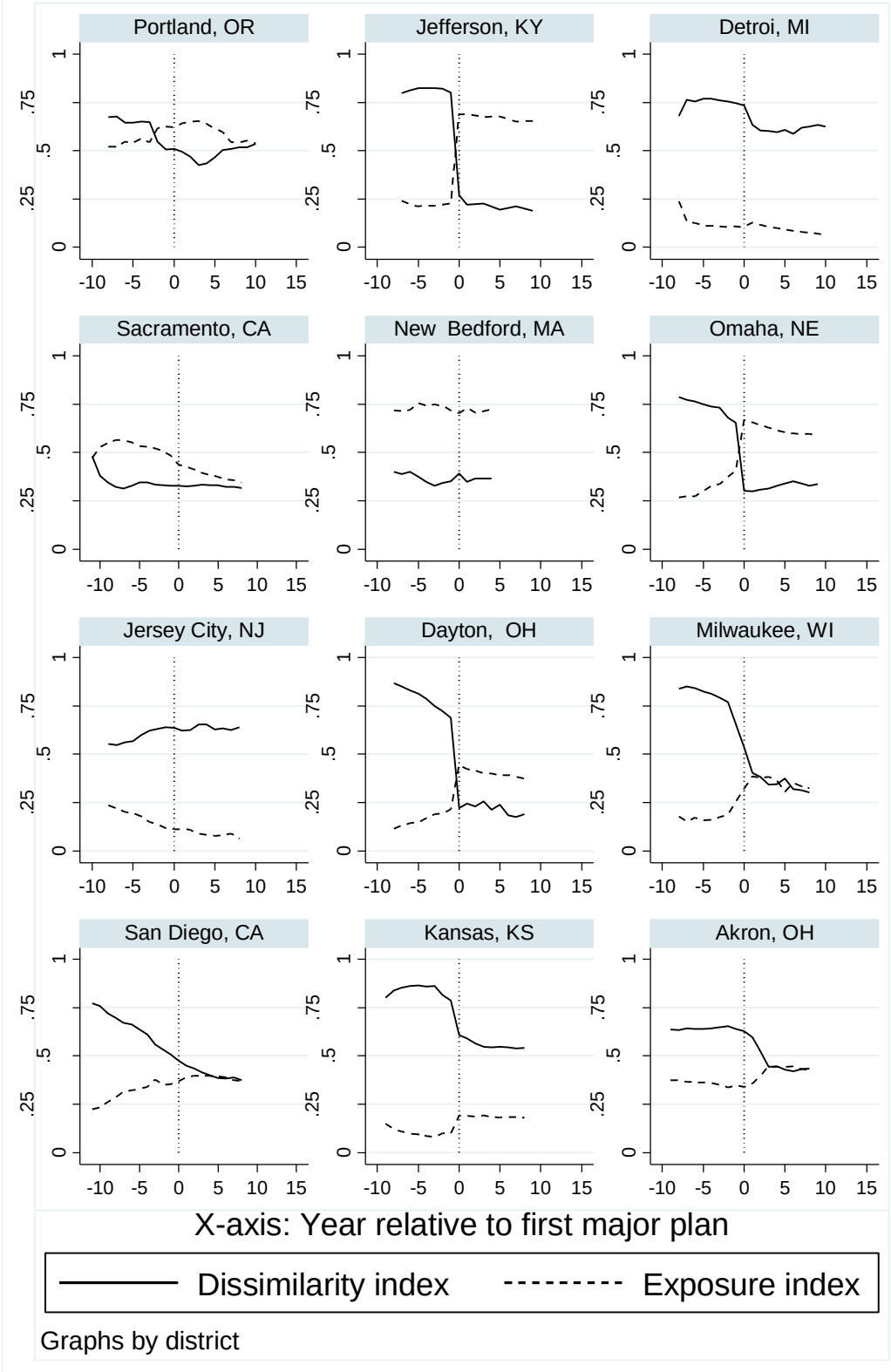
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district

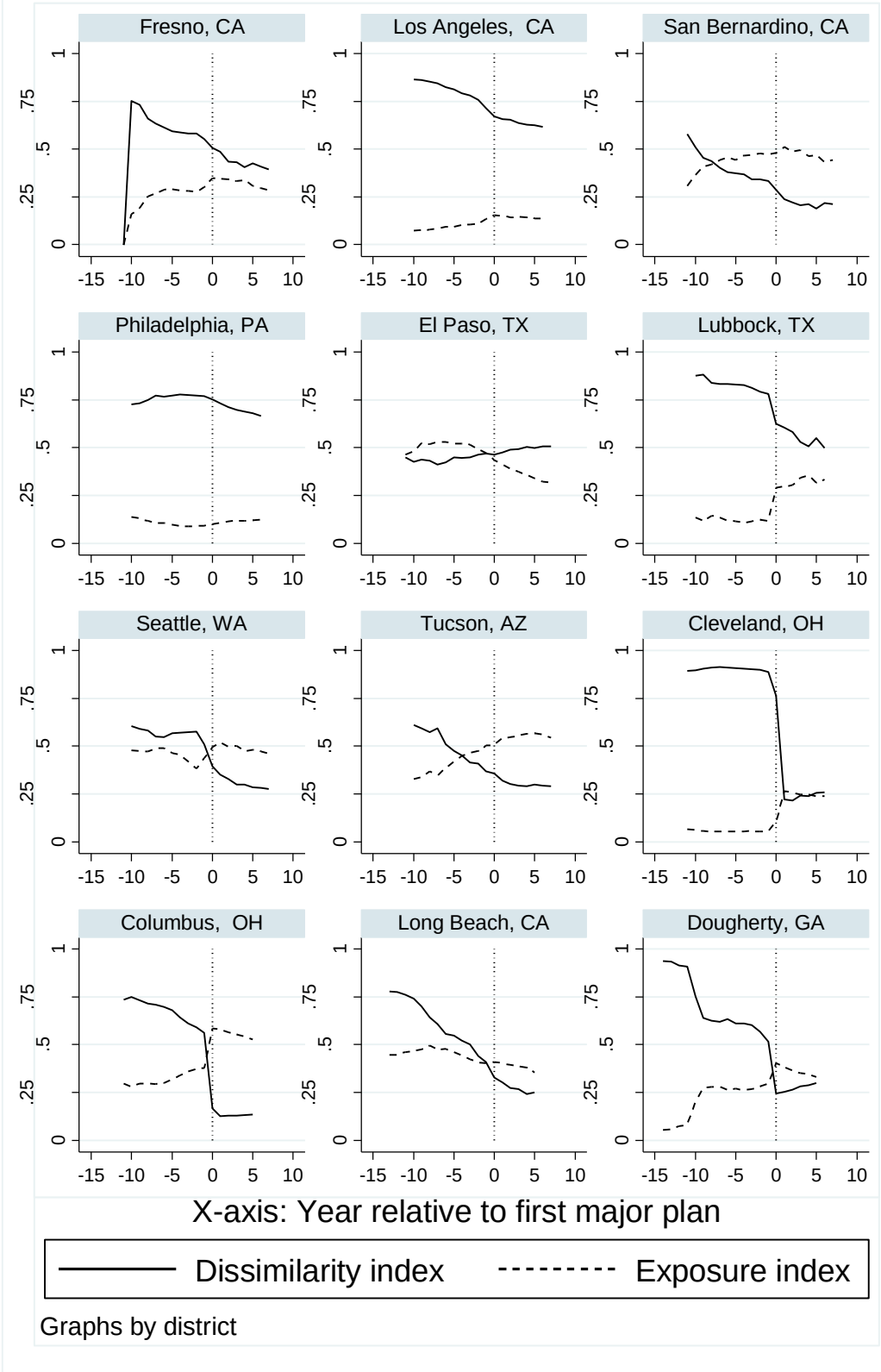

Broward, FL
Dade, FL
Palm Beach, FL
East Baton Rouge, LA
Rochester, NY
Gaston, NC
Mecklenburg, NC
Charleston, SC
Greenville, SC
Richland, SC
Houston, TX
Norfolk, VA
0
.25
.5
.75
1
-5
0
5
10
15
20
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district

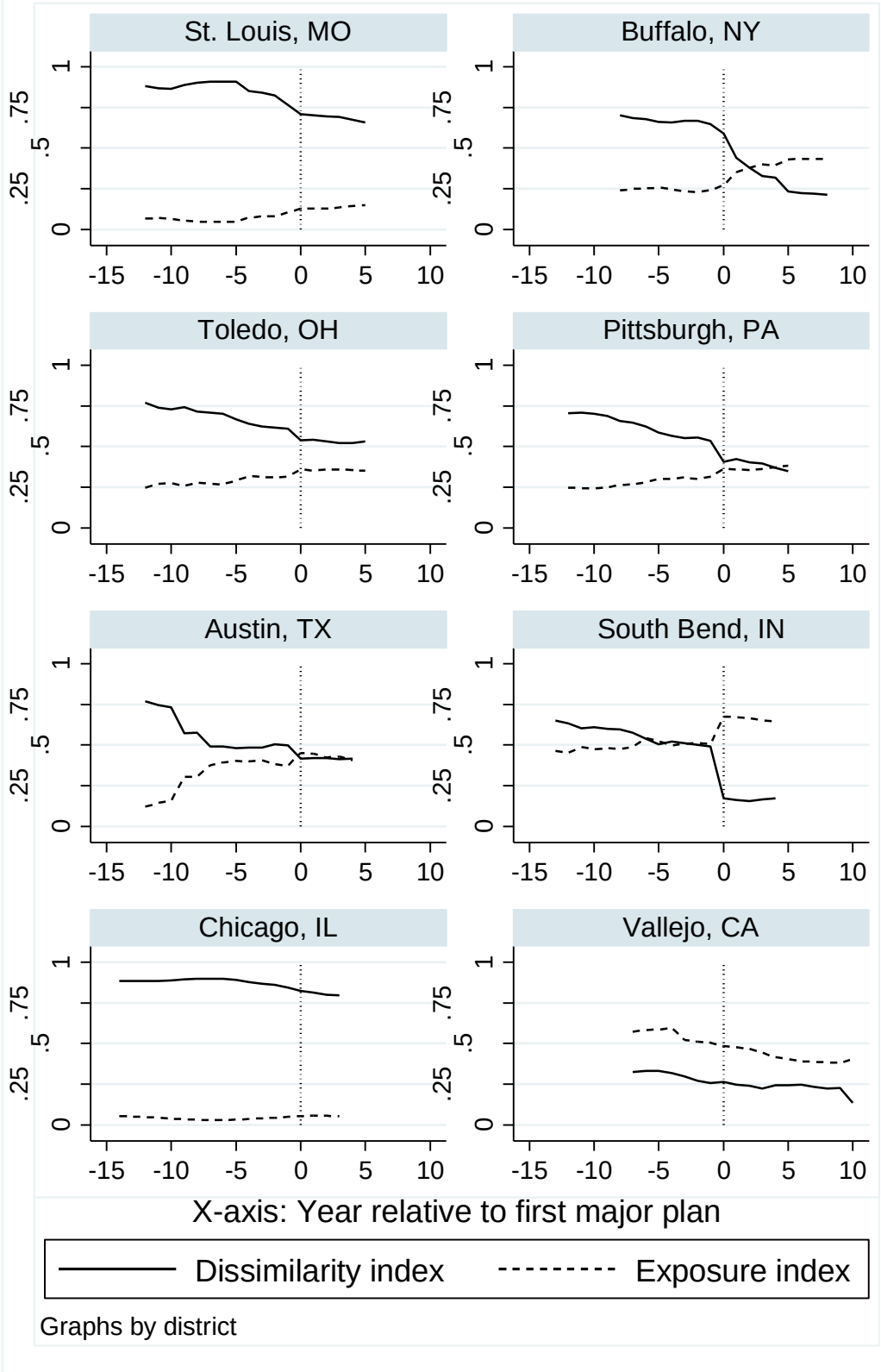

Roanoke, VA
Jefferson, AL
Mobile, AL
Little Rock, AK
San Francisco, CA
Duval, FL
Hillsborough, FL
Muscogee, GA
Fort Wayne, IN
Wichita, KS
Jefferson, LA
Tulsa, OK
0
.25
.5
.75
1
-5
0
5
10
15
20
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district


Nashville, TN
Dallas, TX
Arlington, VA
Orange, FL
Fayette, KY
Lansing, MI
Clark, NV
Oklahoma, OK
Amarillo, TX
Atlanta, GA
Rockford, IL
Indianapolis, IN
0
.25
.5
.75
1
-10
-5
0
5
10
15
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district


Prince George's, MD
Cincinatti, OH
Lawton, OK
Memphis, TN
Fort Worth, TX
Waco, TX
Raleigh, WV
Denver, CO
Baltimore, MD
Boston, MA
Springfield, MA
Minneapolis, MN
0
.25
.5
.75
1
-10
-5
0
5
10
15
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district


Portland, OR
Jefferson, KY
Detroi, MI
Sacramento, CA
New Bedford, MA
Omaha, NE
Jersey City, NJ
Dayton, OH
Milwaukee, WI
San Diego, CA
Kansas, KS
Akron, OH
0
.25
.5
.75
1
-10
-5
0
5
10
15
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district


Fresno, CA
Los Angeles, CA
San Bernardino, CA
Philadelphia, PA
El Paso, TX
Lubbock, TX
Seattle, WA
Tucson, AZ
Cleveland, OH
Columbus, OH
Long Beach, CA
Dougherty, GA
0
.25
.5
.75
1
-15
-10
-5
0
5
10
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district


St. Louis, MO
Buffalo, NY
Toledo, OH
Pittsburgh, PA
Austin, TX
South Bend, IN
Chicago, IL
Vallejo, CA
0
.25
.5
.75
1
-15
-10
-5
0
5
10
X-axis: Year relative to first major plan
Dissimilarity index
Exposure index
Graphs by district

8 References

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