The Desegregation Efficiency of Magnet Schools

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ABSTRACT

Magnet schools are an attempt to introduce market incentives into school desegregation policy. The analyses presented here assess the extent to which they have improved the effectiveness of desegregation plans in a 600 school district national sample from 1968-1991. I find that adding magnet schools to a voluntary plan does not seem to produce any more interracial exposure than a voluntary plan without magnets. Moreover, there are diminishing marginal returns to magnets. The greater the percentage of magnets in a voluntary desegregation plan, the greater the white flight and the less the gain in interracial exposure. The effectiveness of magnets also varies by structure.

The Desegregation Efficiency of Magnet Schools[1]

Magnet schools are an attempt to introduce market incentives into school desegregation policy. A magnet school is a school with a special program or theme--e.g., math/science, Montessori, creative and performing arts--and sometimes reduced class size. If the magnet is part of a desegregation plan, it will utilize racial criteria in admissions in order to insure a racially balanced school.[2] Students voluntarily enroll in these programs because they or their parents find the program or other features attractive and free transportation is provided.

Magnet schools as desegregation tools are part of a larger debate in the field of public policy over whether government will achieve its goals more efficiently and effectively if it compels persons or agencies directly to perform in some way or if it acts indirectly by establishing market or market-like incentives that make the pursuit of self-interest consistent with the public interest. As with other policy alternatives, desegregation plans can be placed on a continuum from the command and control approach--that is, direct government regulation--to the market incentives approach--indirect government regulation. Mandatory reassignment or "forced busing" plans can be thought of as the direct government regulation approach to school desegregation. Courts, federal, and state officials set standards, make findings regarding a violation, and order school boards to implement an acceptable remedy. In the pure model, students are assigned to schools without consultation or choice in order to eliminate segregation.

At the other end of the spectrum from direct government regulation is the market incentives approach, where the government's role is to provide positive, and sometimes negative, incentives in order to motivate persons and agencies to act in the desired manner. Many analysts argue that not only is government more likely to achieve the desired goal if it can harness self-interest, it will do so more efficiently than with the direct government regulation approach.

Voluntary desegregation plans with incentives, such as magnet schools and free transportation, clearly fall into the market incentives category. But as has happened in other policy areas, many desegregation planners, unhappy with the negative public response to the direct government regulation approach, have introduced limited market incentives into mandatory reassignment plans. By the late 1970s, magnet schools were not only the main engine of most voluntary plans, but they were a component of many mandatory reassignment plans as well.

Rather than forcing whites to go to black schools and finding that half or more do not show up at the school they were assigned to (Lord 1975; Raffel 1980; Pride and Woodward 1985; Rossell 1988; Rossell 1990a, 1990b; Armor 1980, 1988, 1995; Bankston and Caldas 2001), the premise of magnet schools in a desegregation plan is that providing incentives for integration will attract those whites who are willing to go to black schools under the right conditions, thus reducing white flight and producing more integration in both mandatory and voluntary desegregation plans. But is this true?

Although there is a plethora of research on the effectiveness of desegregation plans and techniques, only a few of these studies have specifically compared mandatory and voluntary desegregation plans, and most of those have small samples. The study presented in this paper, commissioned by the U.S. Department of Education (DOE) in 1990, provides us with the largest national sample and most complete data on school desegregation assembled to date. The analyses presented here address the issue of whether there is an advantage gained from adding magnet schools to a desegregation plan. These analyses should be of interest to desegregation planners and analysts wishing to maximize desegregation in the many school districts still under court order or in those where race cannot be used as a criteria for admissions because the district is no longer under a desegregation court order or because it was never convicted of intentional

segregation, but desegregation is an important implicit value in the formation of magnet schools and the principles.

THE DATA

The primary data for this study were derived from a stratified, national probability sample of 600 school districts drawn from a universe of 6,392 school districts with more than one school for at least one grade grouping.[3] The universe was stratified according to district size and racial composition. Sample sizes within strata were proportional to district size, and thus all 155 districts with very large enrollments (at or above 27,750) were sampled with certainty, while only 100 districts were sampled to represent approximately 4,800 small districts with enrollments less than 5,000. Samples of 195 and 150 districts represent large districts (10,000 to 27,750) and medium districts (5,000 to 9,999), respectively.[4]

District weights were constructed for each of the districts selected for the national sample, reflecting that district's probability of being sampled. District weights were defined as the reciprocal of the sampling probabilities assigned to each district. In general, smaller districts, because they had a lower probability of being selected, had greater weights; larger districts, because they had a higher probability of being selected, had smaller weights. Districts selected with certainty (i.e. those greater than 27,5000) were assigned weights of 1.0 (i.e., they represent only themselves in the sample) while a district selected with a probability of 1:4 would have a weight of 4 (i.e., they represent four districts within their stratum). The sum of the weights for the districts in the sample equals the total number of districts in the universe of multi-school districts (6,392). The analyses in this paper refer to the weighted N—that is the districts in the U.S. with these characteristics or outcomes--rather than the original sample size.

Two types of data--enrollment data and questionnaire data--were collected for this sample. Enrollment data by school and race were obtained from the Department of Education's

Office for Civil Rights (OCR) enrollment files for the years 1968 to 1986, [5] and from the Department's Common Core of Data files for the years 1987 to 1991.

Questionnaires were sent to 600 school districts to be completed either by self-administration or by means of a telephone interview. The questionnaires covered such areas as the number of magnet schools, the existence of a formal desegregation plan, the specific type of plan techniques used currently or previously, whether the district formerly had a desegregation plan, the year the plan started, and the source of the plan. Districts with formal desegregation plans were asked to also submit a copy of their written plan. The question regarding magnet schools was worded:

> For the purpose of this survey, a magnet school is defined as a public school whose primary purpose is to meet all three of the following goals:
> - to offer a special curricular theme or method of instruction, such as math/science, performing arts, or open classrooms, and
> - to attract at least some students voluntarily from outside an assigned neighborhood attendance zone, and
> - to improve desegregation by meeting specific race/ethnic goals (i.e. it must have some type of race/ethnic controls or targets).

Thus, a magnet program had to have racial controls or targets to qualify as a magnet. In addition, respondents were asked to list each magnet program, the school it was in, the school level, and the theme. If a school had a magnet program so defined, it was designated a magnet school.

Approximately 80 percent of districts completed the entire questionnaire. Inconsistent or incomplete questionnaire data on plan characteristics were corrected, refined, or obtained from existing data sources (e.g., Welsh and Light 1987), the extensive case files of the principal investigators, and telephone calls made by the principal investigators to school districts. Ultimately, data on key questions about the existence of magnet schools or desegregation plans and techniques were collected for approximately 87 percent of the sample.[6]

DESEGREGATION OUTCOMES

Since the 1970s, the courts have focused on racial balance as the measure of desegregation. As a result, their desegregation orders have usually (but not always) had a categorical racial balance criterion such as all, or some specified number of, schools must be within 10 or 15 or 20 percentage points of a school level's racial composition.[7] Categorical measures, such as the percentage of schools racially balanced, are not used by social scientists in comparative, statistical analyses because they miss a lot of change in desegregation and their properties are not suited for regression analysis.[8]

When social scientists analyze school racial balance, they commonly use the index of dissimilarity. This index ranges from 0 to 100 and captures the deviation of each school from the district (or school level) racial composition.[9] The problem with all racial balance measures, however, is that they ignore the proportion of whites in a district that black students are coming into contact with. For example, if a school district is 99 percent black and every school is 99 percent black, the district is perfectly desegregated according to the index of dissimilarity or any other racial balance measure, such as the percentage of schools within 10 percentage points of a school level's racial composition. Because racial balance measures ignore how many whites are in the school system, they do not adequately capture the cost of desegregation in terms of white flight nor, in the example given, portray what most people think of when they think of a desegregated school.

Another common measure of desegregation is interracial exposure, the proportion white in the average black child's school or the average proportion white in schools attended by black students. Although the measure can be used for any two groups, for the purpose described here it is a black child's exposure to whites. The measure is calculated as follows:

$$Sbw = 1/B \; \Sigma \; \underline{BiPWi}$$

where i stands for each individual school and thus Bi is the number of blacks in a particular school (i), PWi is the proportion white in the same school (i) and B is the total number of blacks in the district.[10] Hence, the number of blacks in each school is multiplied times the proportion white in the same school. This is summed for all schools and divided by the number of blacks in the school system to produce a weighted average--the average proportion white in the schools attended by black children in a district.

Since the average proportion white in a black child's school in a district increases with racial balance reassignments or transfers, but goes down as the white enrollment decreases, it yields the *net benefit* of desegregation reassignments. In other words, interracial exposure is a district level measure of the effectiveness of desegregation techniques in actually achieving desegregation in a school district—that is, a higher average percentage white in a black child's school in a district than existed prior to the plan. For this reason, most desegregation researchers (see for example, Farley 1981; Rossell 1986, 1990a, 1990b; Orfield 1988; Armor 1980, 1988; Rossell and Armor 1996; Clotfelter 1999) consider interracial exposure to be the preferred outcome when analyzing the effectiveness of different desegregation techniques.

THE PREVALENCE OF PLANS WITH MAGNETS

The 1991 survey of school districts asked about such mandatory desegregation techniques as pairing and clustering, satellite zoning, and contiguous rezoning, such voluntary desegregation techniques as M-to-M transfers and magnet schools, and about controlled choice desegregation techniques. These techniques can be divided into three main plan typologies—voluntary, controlled choice, and mandatory. When magnet schools are added to each main type, we obtain the following typology of plans, ordered by the extent of parental choice:

1) Voluntary M to M (Voluntary, no magnets)
2) Magnet-Voluntary (Voluntary with magnets)
3) Controlled choice with magnets[11]

4) Magnet-Mandatory (Mandatory with magnets)
5) Mandatory, no magnets

Thus, although attendance at magnet schools is voluntary, magnet schools can be part of a mandatory reassignment plan, a controlled choice plan, or a voluntary plan.

The first voluntary plan in the typology is an M to M (majority to minority) plan. In these plans, neighborhood schools are maintained, but a student can transfer from any school in which his or her race is in the majority to any school in which his or her race is in the minority. Typically free transportation is provided. Attendance zones for the neighborhood schools might be redrawn so as to enhance desegregation, but the new zone will still be contiguous around the school. These plans do not include magnet schools and so almost no white students participate.

In a magnet-voluntary plan, neighborhood schools are maintained, but magnet programs are placed in those that are racially imbalanced to provide an incentive for students, in particular white students, to transfer to the school. These are the only voluntary plans that result in any more than a handful of whites transferring to schools in minority neighborhoods. There may also be some contiguous rezoning of the neighborhood schools and voluntary M to M transfers.

Controlled choice plans have both mandatory and voluntary characteristics and so they are treated separately in all analyses in this paper. In a controlled choice plan, neighborhood attendance zones are eliminated and parents are asked to rank order schools. The school district tries to give parents their first choice, but it also seeks to racially balance schools and therefore some students will be assigned to schools that are not their first choice. Although all of the controlled choice plans in this sample claim to have magnet schools, they are theoretically not necessary. Competition, albeit controlled by racial balance restrictions, is supposed to make all the schools "magnetic." If a controlled choice plan has magnets they are either holdovers from a former mandatory reassignment plan (e.g., Boston and Cambridge) or created intentionally to

enhance the attractiveness of schools located in minority neighborhoods (e.g., Yonkers, San Jose) because of doubts that the school competition process itself would be sufficient.

As noted, mandatory reassignment plans in which students have no choice as to whether they must leave their neighborhood schools also began including magnet schools by the mid-1970s. The magnets are a form of educational, not desegregation, choice, since students have no choice in the latter. The 1975 Boston mandatory reassignment plan, for example, had 22 magnet schools (about 10 percent of the total) in an attempt to increase white support for the plan.

The prevalence of each plan and of all plans is presented in Table 1 according to the size of the district. The percentages and frequencies were obtained by applying district weights to the original sample to show the prevalence of plan types among districts with plans and the prevalence of plans in the U.S. In every size grouping, mandatory plans were more common than voluntary plans. In the largest districts, however, most voluntary and mandatory reassignment plans included magnet schools. Controlled choice plans were used by less than six percent of districts.

[PLACE TABLE 1 ABOUT HERE]

Desegregation plans with magnets were implemented at a later time than desegregation plans without magnets. The median year for voluntary and mandatory plans without magnets was 1970. The median year for plans with magnets was 1975 for the mandatory plans and 1978 for the voluntary plans. Controlled choice plans are the latest innovation, with a median year of 1980 for all districts, 1981 for those greater than 5,000, and 1977 for the largest districts.

THE EFFECT OF INCLUDING MAGNETS IN A PLAN

The most important issue analyzed here is whether the extent of interracial exposure varies according to whether, and how many, magnet schools are part of the plan. Four different samples are analyzed with several different desegregation variables and time periods. The first

sample is the broadest—all districts greater than 5,000. The final sample is just districts with magnet schools. The purpose of varying the samples, desegregation variables, and time periods is to further control, beyond the what the demographic variables can do, for the self-selection bias problem associated with the fact that magnets were adopted by the larger, more heavily minority school districts which typically had already adopted a desegregation plan of some sort before magnets were put in place.

- Analysis 1 (Table 2) predicts interracial exposure controlling for demographic factors,
    - in all districts greater than 5,000 and greater than 27, 500
    - from 1968-1991
    - with the 5 plan types as the desegregation variables in 1991.
- Analysis 2 (Appendix 1) predicts white flight, controlling for demographic factors,
    - in districts greater than 5,000 with desegregation plans
    - from 1978-1991
    - with the dominant plan over the time period as the desegregation variable, and
    - 1) the percentage of schools that are magnets, and 2) the percentage of schools that are magnets and its interaction with the dominant plan as the magnet variables in two separate equations.
- Analysis 3 (Table 3) predicts interracial exposure, controlling for demographic factors,
    - in districts greater than 5,000 with desegregation plans
    - from 1978-1991
    - with the dominant plan over the time period as the desegregation variable, and
    - 1) the percentage of schools that are magnets, 2) the percentage of schools that are magnets and its interaction with the dominant plan, and 3) categories of percentage of magnet schools as the magnet variables in three separate equations.
- Analysis 4 (Table 4) predicts interracial exposure,

- in districts with magnet schools,
- from 1978-1991
- with the dominant plan over the time period as the desegregation variable, and
- 1) the percentage of schools that are magnets, 2) the percentage of schools that are magnets and its interaction with the dominant plan, and 3) categories of percentage of magnet schools as the magnet variables in three separate equations.

Because of missing data, these analyses are not of annual change, but of change since 1968, the first year for which there is relatively complete data. In analysis 1 in Table 2, the desegregation variables are the five plan typology (voluntary M to M, magnet-voluntary, controlled choice, magnet-mandatory, and mandatory, no magnets) reflecting the plan in place in 1991 as determined by the questionnaire and the co-principal investigators. Although it is not possible to have more than one plan in place at a time, it is possible to have different plans over time. For the vast majority of districts with plans, determining the plan in place in 1991 was a relatively simple process, but for a few it was difficult and there may still be disagreement among experts in the field.

In the analysis in Table 2, the dependent variable is change in interracial exposure (the average proportion white in a black child's school in a district) from 1968 to 1991, controlling for 10 independent variables (see Appendix 2) that are known to be related to white enrollment change and interracial exposure. Because there was no data before 1968 to estimate a predesegregation trend for each district, the variable that controls for the underlying demographic trend is the "normal" percentage white enrollment change that occurred from 1968 to 1991 in similar districts that did not have a desegregation plan. In addition, the model also includes the percentage *non*white enrollment change occurring from 1968 to 1991, the district's 1968 percentage white, poverty level, median income, size, region, location and years since the major desegregation plan. These

variables control for the demographic change that would have occurred without a desegregation plan because they measure what the district started with, what similar districts without plans experienced, and the characteristics that are known to cause or be related to demographic change in the absence of policy. Together they do a better job of controlling for the underlying demographic change than, for example, change in the metropolitan area white enrollment, because the latter is only measured on a decennial basis and is confounded by the fact that it includes the demographic change in the desegregating school district(s) after the implementation of the plan.[12]

[PLACE TABLE 2 ABOUT HERE]

In determining the implementation year of the major desegregation plan, the major plan was defined as the first mandatory reassignment plan, or if there was no mandatory reassignment plan, the first comprehensive voluntary desegregation plan. The analysis is limited to districts greater than 5,000 in order to produce a more normal distribution of the desegregation variables. Only 12 percent of all districts had plans, but 29 percent of districts greater than 5,000 had plans. Since it is the more heavily minority, harder to desegregate districts that had plans, with the magnets usually added after several years of desegregation, this also helps reduce self-selection bias beyond what the control variables can accomplish. The omitted variable (i.e. the comparison) is districts that never had a plan.

In districts greater than 5,000, [13] magnet schools within a voluntary or mandatory desegregation plan are associated with less increase in interracial exposure compared to no plan at all than the same type of plan without them, although the disparity is greatest for the voluntary plans. A voluntary M to M desegregation plan with no magnets produces a 22 point increase in interracial exposure compared to no plan at all whereas a magnet-voluntary plan produces only

an 11 point increase compared to no plan at all. The difference between the two is also statistically significant.[14]

In the districts greater than 27,500, however, adding magnets to a desegregation plan appears to be more effective.[15] Among voluntary plans, the increase in interracial exposure is almost the same for plans with and without magnets, and among mandatory plans, the magnets are associated with a greater increase in interracial exposure than the same plan without magnets when compared to no plan at all.

In general, most plans, whether or not they had magnets, produced a greater change in interracial exposure than having no plan. The exceptions are mandatory plans with no magnets in districts over 27, 500 and controlled choice plans in all districts. But these data also suggest that the minimalist approach to desegregation policy—adopting a single set of neighborhood schools with M to M transfers—produces as much or more increase in interracial exposure as the more intrusive plans with racial balance criteria that had to be achieved in most or all schools.

MAGNET SCHOOL EFFICIENCY

The big question at this point is why magnets are not more successful? Perhaps they are not being efficiently used by school districts. Market incentives can fail if demand is not accurately assessed or if the incentives are not crafted so as to motivate demand. Is there such a thing, for example, as too many magnet schools? Is there an optimum percentage of magnet schools in a desegregation plan beyond which magnet schools become inefficient as desegregation tools? Here we will examine two important indicators of efficiency: white flight and interracial exposure—the percentage white in the average black child's school after white flight.

White flight. One possible explanation for why magnet schools did not have a more salutary effect on interracial exposure in the voluntary desegregation plans is that they may

produce some white flight of their own. As noted above, magnet schools were often associated with court orders and in this study, they had to have racial balance criterion, both disruptive factors in a school district even before they are actually implemented. When a magnet is placed in a school, there is a possibility that students will be displaced in order to make room for the program. If the magnet program is in a black neighborhood, black students are typically assigned to nearby schools to make space for the magnet, presumably in an integrative manner if the district is under court order. The change in the enrollment and the racial composition of nearby schools may prompt some white students enrolled in those schools to leave the school system. Conversely, if the magnet program is placed in a white school, the large number of black students attracted to the school may similarly produce some white flight. White flight reduces the amount of interracial exposure achieved with student transfers or reassignments.

The relationship between magnet schools and white flight is tested in the equations shown in Appendix 1 in districts greater than 5,000 that had desegregation plans. Unlike the analysis shown in Table 2 which is of all districts greater than 5,000 during the time period from 1968 to 1991, this analysis is only of those with plans during the time period when magnets were in place—from 1978 to 1991. The dependent variable is also different. Here the effect of magnets on white flight is directly tested by using as the dependent variable, the percentage white enrollment change from 1978 to 1991 (white enrollment in 1991 minus white enrollment in 1978 divided by white enrollment in 1978) when almost all of the magnets in this sample were in place and after most of the white flight associated with the initial desegregation plan had occurred.

Because this analysis begins with 1978, it is possible to use each district's pre-1978 percentage white enrollment loss to control for the underlying demographic trend independent of the magnets rather than relying on the experience of districts without plans. The other variables that control for the underlying demographic characteristics are the district's concurrent

percentage nonwhite enrollment loss, 1978 percentage white, 1980 income, 1978 enrollment (size), years since major plan, region, and location.

Rather than the five plan desegregation typology used in Table 2, I use three variables that measure the dominant plan for the entire time period in case the white flight from a mandatory reassignment plan dominates all subsequent plans. These variables are 1)ever mandatory, 2) voluntary only, and 3) controlled choice only.

Unlike the dependent variable in Table 2, this measure of desegregation is not a static variable, but a summary measure of the dominant plan over the entire time period. This is yet another attempt to control for factors other than magnets that might affect the change in interracial exposure by taking into account my suspicion that the outcome of a mandatory desegregation plan dominates all previous and future plans. The omitted desegregation variable in the equations is controlled choice only. As shown in equation 1, the percentage of schools that are magnets has a significant, *negative* impact on white enrollment among school districts that had desegregation plans. This is true even when the extent of reduction in racial imbalance, as measured by the index of dissimilarity, is controlled for.

Equation 2 in Appendix 1 includes an interaction effect between the percentage of schools that are magnets and the type of plan. As shown, the percentage of schools that are magnets is only significantly related to white flight in voluntary plans. The coefficient for the interaction between mandatory plans and the percentage of magnets is negative, but not statistically significant. In other words, magnet schools do indeed cause white flight, but primarily in voluntary plans since magnet schools would be expected to add little to the disruption that is already occurring in the mandatory plans because of racial balance reassignments.

Interracial exposure. White flight is important, but the most important aspect of the effectiveness of any desegregation tool is the extent of interracial exposure achieved after the

white flight—in short, the net integration benefit. In the analysis shown in Table 3, we return to the issue of how magnets affect interracial exposure, an outcome that is positively affected by integrative transfers but negatively affected by white flight. This analysis shows the effect of magnet schools on change in interracial exposure from 1978 to 1991 in school districts that had a desegregation plan during this time period. As in Appendix 1, the analysis is only of the period when magnets were in operation from 1978 to 1991. Again I use the dominant plan typology—ever mandatory, voluntary only, and controlled choice only. The control variable for the underlying demographic trend independent of magnets is the same as in Appendix 1--the pre-1978 percentage white enrollment loss. The other demographic control variables are also the same.

[PLACE TABLE 3 ABOUT HERE]

The omitted desegregation variable in the equations is controlled choice only. Equation 1 includes the percentage of magnets, equation 2 has the interaction effects between the percentage of magnets and the type of plan, and equation 3 includes four categories of percentage of magnets: less than or equal to 5 percent (N=33), greater than 5 up to 10 percent (N=54), greater than 10 up to 50 percent (N=92), and greater than 50 percent (N=36) compared to no magnets at all. Although the percentage of schools that are magnets is negatively related to change in interracial exposure, the effect is not large. An increment of 10 percent in magnet schools is associated with a reduction in interracial exposure from 1978 to 1991 of less than one point on a 100 point scale.[16]

The interaction effects in equation 2 indicate that the negative effect on interracial exposure of having a greater percentage of magnets is caused by their addition to voluntary plans since that is the only variable that is statistically significant. The more magnets added to a voluntary plan, the less the increase in interracial exposure even controlling for a host of demographic variables that also affect interracial exposure.

Equation 3 includes the dummy variables for categories of magnets. The omitted magnet variable in equation 3 is no magnets. As shown, the only magnet variable that has a significantly negative effect on interracial exposure, compared to districts with plans but no magnets, is more than 50 percent magnet schools. If more than 50 percent of a district's schools are magnets, it will have 4.7 points less increase in interracial exposure over this time period than a plan with no magnets, controlling for the underlying demographic factors.

Table 4 shows the change in interracial exposure for districts that adopted magnet schools as part of their desegregation plans. The purpose of analyzing only the districts that adopted magnet schools is to further control for the self-selection bias in adopting magnet schools in addition to the control variables. It is the largest, more heavily minority, school districts that adopted magnets, typically as a component of, or change in, a desegregation plan that was already in place.

[PLACE TABLE 4 ABOUT HERE]

Equation 1 shows that the percentage of schools that are magnets is still negatively associated with change in interracial exposure over this time period, and the coefficient is virtually the same as in districts with plans. Equation 2 demonstrates once again that the negative effect of more magnets is experienced by voluntary plans not by mandatory plans. Equation 3 shows the dummy variables for three categories of magnet percentages, compared to less than five percent magnets. Although all coefficients are negative, only greater than 50 percent magnets is statistically significant.

These results suggest that in voluntary plans, the greater the percentage of schools that are magnets, the greater the white flight and thus the less increase in interracial exposure. Even in mandatory reassignment plans, there is apparently no advantage either in terms of less white flight or a greater increase in interracial exposure from having more magnet schools in a plan.

One of the reasons why increasing the percentage of magnets may not have a positive effect on increasing interracial exposure in voluntary plans is that market incentives must accurately reflect demand if they are to be successful. According to Rossell (1995, 660-661), surveys conducted in school districts about to change their desegregation plan or implement a new one, show that only 10-20 percent (an average of 12 percent) of white students are willing to transfer to magnets in minority neighborhoods. Indeed, although whites are the limiting factor, black demand is only about 15 points higher. In short, the number of magnets that can be successful depends at least in part on the size of the white student population. An 80 percent minority school district with 5,000 whites may be able to support only three magnet programs in minority neighborhoods, whereas a 20 percent minority school district with 20,000 whites may be able to support a dozen magnets and completely desegregate the school system with them. Unfortunately, school districts have all too often ignored these principles of supply and demand.

Nor has the federal government been helpful in this regard. It has been funding magnet schools since the mid-1980s through the Emergency School Assistance Act, and beginning in 1984 through the Magnet School Assistance Program (MSAP). MSAP funding is not only predisposed towards the high percentage minority school districts where desegregation is most difficult to attain, but there seem to have been few limits placed initially on the number of magnets in these districts. Steel, Levine, Rossell, and Armor (1993) found only minuscule changes in interracial exposure in MSAP funded magnet schools with significant percentages having increased imbalance and reduced interracial exposure. It seems the additional goal that MSAP has of educational improvement in minority schools has often taken precedence over integration.

White demand for magnet schools is not just a function of the number of whites and the number of schools that are magnets, however, since there is no significant relationship between change in interracial exposure and the ratio of white enrollment to the number of magnets. Nor

could any specific nonlinear trend be identified. The percentage of schools that are magnets must therefore be tapping other dimensions in addition to demand, such as the location of magnets within the district and the attractiveness of the magnet structure.

With regard to location, there is strong political pressure to place magnets, particularly when there are a lot of them, in both white and black neighborhoods, that is to spread them around to all the important constituencies. This is usually an inefficient use of the magnets, however, since magnets that are desegregation tools should rarely be placed in white neighborhood schools because a) they are not usually needed there—quite a few black students will transfer to white schools without any special incentive other than free transportation--and b) they may be a disincentive for tolerant whites to transfer to magnets in black neighborhoods and an incentive for intolerant whites in the magnet school to leave the school system because of the change in their school's racial composition. Although there is no information on magnet location in this dataset, my experience has been that the more magnets there are in a district, the more likely they are to be placed in inefficient locations—that is spread around to all the important constituencies—because the magnets are a device for improving education and offering educational choice.

MAGNET PROGRAM STRUCTURE

Market incentives must also be carefully crafted so as to motivate demand. There are two important magnet structural factors that might affect demand: 1) the scope of the program within the school and 2) whether a neighborhood population is assigned. This 2 x 2 classification, shown in Figure 1, produces three types of magnet structures: the whole school attendance zone magnet shown in cell 1, the program-within-a-school (PWS) magnet shown in cell 2, and the dedicated magnet shown in cell 3. Regarding the scope of the program, the dedicated and whole-school attendance zone magnets have programs that encompass the entire student body of a

school. The PWS magnets encompass only a portion of the school. Regarding the neighborhood population, the whole-school attendance zone and PWS magnets have neighborhood attendance zones and resident students assigned to the school. The dedicated magnet has no neighborhood attendance zone and no students assigned to it because of their residence.

[PLACE FIGURE 1 ABOUT HERE]

The most common magnet structures are the PWS and dedicated magnets. In the dedicated magnet, shown in cell 3, a school is emptied of students and there is no resident attendance zone. All enrolled students have volunteered to attend. The perception is that dedicated magnets are more popular than other magnet structures. The two biggest problems with a dedicated magnet are where to put the students who once enrolled in that school so that segregation is not increased and how to attract enough students to fill a 500 to 2,000 student school to capacity. For this reason, voluntary desegregation plans tend to have few dedicated magnets (and the few that exist are usually left over from a previous mandatory reassignment plan) because they don't have enough control over student assignment to be able to empty a school out and assign the students to desegregated locations. Mandatory reassignment plans, by contrast, tend to have more dedicated magnets because they are able to empty schools out and reassign the students to desegregated locations as necessary.

The program-within-a-school (PWS) magnet, shown in cell 2, has a neighborhood school population assigned to the school, but the only children in the magnet *program* are those who volunteered for it. Although resident students are typically given first priority for the magnet program, their admission must adhere to racial guidelines for the program.

The whole-school attendance zone magnet, shown in cell 1, has a neighborhood school population assigned to it, but the program encompasses the entire school. Children of the opposite race of this neighborhood population are encouraged to transfer in from outside the attendance zone. Despite the fact that many of the resident children might not be interested in

and did not choose the particular magnet theme of their school, they and all other children in the school are enrolled in the magnet program. In addition, the classroom racial composition is whatever the school racial composition is. Whereas the PWS magnets in minority neighborhoods typically have classroom racial compositions close to 50 percent white and 50 percent minority, the whole school attendance zone magnets in minority neighborhoods usually have classroom compositions of 80-95 percent minority or even higher.

This is a problem because white willingness to enroll in magnet schools declines as the percentage minority in the program increases. The willingness of white parents to send their children to magnet schools in minority neighborhoods drops from 21% definitely willing when the program (i.e. classroom) within a school is 50% white and 50% minority to 13% definitely willing when the program (i.e. classroom) is 3/4 minority and 1/4 white. This further declines to about 5% willingness to transfer if the busing distance is 45 minutes or longer.[17]

The 600 district national survey did not ask about magnet program structure. There is data available, however, from a case study of magnets in Prince George's County, Maryland in 1996-97. Prince George's County is a large, 70 percent black countywide school district adjacent to Washington, D.C. that was declared unitary on June 25, 2002. In our desegregation plan typology, it is categorized as a mandatory reassignment plan with magnets. The school system had all three magnet structures: 1) dedicated magnets, 2) programs within schools, and 3) whole school attendance zone magnets.

Figure 2 shows the effect of program structure on the percentage black in schools more than 70 percent black (the left side) and in schools less than 70 percent black (the right side). The analysis presented here was conducted by obtaining information on how many of the students of each race were in the school only because they had transferred in to enroll in the magnet program. The actual percentage black was compared to the percentage black when these transfers were removed from the enrollment.

[PLACE FIGURE 2 ABOUT HERE]

In the black schools, the whole school attendance zone magnet programs are the least effective in both elementary schools and middle schools. The elementary schools were only an average eight points less black and the middle schools only one point less black because of the magnet transfers. In the programs within schools, by contrast, the elementary schools were an average 13 percent less black due to the magnet transfers and the middle schools six percent less black. The dedicated magnet program was the most successful. It was located in a mostly black neighborhood and if a contiguous attendance zone had been drawn around the school, it would have been 25 percent more black without the magnet program.

In the whiter schools on the right side of Figure 2, the whole school attendance zone magnets were the most successful. At both the elementary and middle school level, the schools were 19 percent more black as a result of the magnet program. The schools with programs within schools, however, were not so successful. The elementary schools were only 13 percent more black as a result of the magnet program. The middle schools were four percent more black as a result of the magnet program.

Thus, the success of a whole school attendance zone magnet seems to depend on the racial composition of the school it is in. Whole school attendance zone magnets are the least successful when they are placed in predominantly black schools because they reduce the attractiveness of the program to white parents. They are the most successful, however, when placed in schools in white neighborhoods because what is unattractive to white parents—classrooms that reflect the racial composition of the neighborhood and no separation from the neighborhood population—is apparently attractive to black parents, perhaps because it is associated with a higher quality of education.

CAN MAGNETS BE MORE EFFICIENT?

The debate over school desegregation alternatives is part of a larger debate in the field of public policy over whether government will achieve its goals more efficiently and effectively if it directly compels persons or agencies to perform in some way or if it acts indirectly by establishing market-like incentives that make the pursuit of self-interest consistent with the public interest.

Magnet schools have been viewed as an effective means of introducing market incentives into both voluntary and mandatory desegregation plans. Although magnet schools have been warmly embraced by the courts, school districts, and state and federal governments as desegregation tools, these data suggest that the more magnets in a voluntary desegregation plan, the more white flight and the less interracial exposure. The primary reason this is the case probably has to do with the fact that magnets are disruptive and the more magnets, the more disruption. This is not a significant problem for the mandatory reassignment plans because they already have considerable disruption even without magnets. It is, however, a problem for voluntary plans where there seems to be no net benefit from adding magnet schools. Indeed, the higher the percentage of magnets, the more white flight and the less interracial exposure.

But there is a problem with voluntary M to M desegregation plans with no magnets. They may produce more interracial exposure than a magnet-voluntary plan because they produce much less white flight, but they also leave more all-black schools. Although these and other data (Steel, Levine, Rossell and Armor 1993; Rossell and Armor 1996) suggest that *if* the civil rights movement had been willing to ignore all-black schools in the 1970s, more interracial exposure might have been achieved by the minimalist approach--simply allowing a single neighborhood school plan and M to M transfers--that is a big "if." It is hard to imagine the civil rights movement tolerating black schools at a time when most school districts were predominantly white and school desegregation still seemed feasible. That leaves magnet schools as the only viable voluntary desegregation technique in most school districts under court order.

This leads us back to the issue of how magnet schools can be crafted to be more efficient. There appear to be three factors—demand, location, and structure—and the way in which these factors interact in attracting whites to magnet schools that need to be considered in creating magnet schools. Having a lot of magnet schools can be inefficient from a desegregation standpoint because the magnets compete against each other, dispersing the available whites among too many schools so that no school has enough whites to attract more whites. In addition, districts that have a lot of magnet schools tend to put them in white neighborhoods which is inefficient from a desegregation standpoint and disruptive. Thus, magnets can have costs that outweigh benefits if they are not carefully crafted.

Not only should magnets not be placed in white neighborhoods, but some magnet structures are more attractive than others. More whites will volunteer for a magnet in a black neighborhood if it is a dedicated magnet than if it is a program-within-a-school magnet. The least attractive magnet in minority neighborhoods is a whole-school-attendance-zone magnet.

Why do school districts adopt a lot of magnets and spread them around the school district? One reason is that they have been ordered by a court to desegregate all of their schools and they don't consider the efficiency issue when placing magnets. What is important to them is that magnet schools are more politically acceptable than a simple mandatory reassignment plan and the court is willing to allow them as desegregation tools.

Another reason why districts might adopt a lot of magnets and spread them around is that, many years after the original court order, these school districts have come to view magnet schools as a means of educational choice and curricular diversity rather than as a desegregation tool. But, this is one of the many instances in policy analysis where one important goal conflicts with another. If one's goal is desegregation efficiency, there is such a thing as too many magnets in too many neighborhoods. If one's goal is curricular diversity and educational improvement, there is probably no such thing as too many magnets. Indeed, every school and every

neighborhood should have a magnet and it may not matter what structure is used. For the increasing number of districts that no longer care about desegregation, this approach may be reasonable. On the other hand, racial desegregation seems to be at least an implicit motivation for magnet schools in most districts, even those no longer under court order, and so the findings of this study should be relevant to all districts with magnets.

ENDNOTES

[1] I am indebted to David Armor for his collaboration in designing the 600 school district study which is the basis for the analyses presented here. Analyses of these data can be found in Chapters 5 and 6 of a final report to the Department of Education by Steel, Levine, Rossell, and Armor (1993), as well as Rossell and Armor, (1996) and Rossell (2002). I am also indebted to David Armor for the survey results presented in this paper. David Armor created the basic form of the survey in 1977 and we collaborated on most of the subsequent surveys. These surveys were funded by each of the school districts for planning purposes in connection with desegregation litigation in which he or I, or both, were consultants to the school districts.

[2] Virtually all magnets begin as a desegregation strategy and thus utilize racial admissions criteria. Although hundreds of school districts are still under court order, those that have been declared unitary, that is released from court supervision, have subsequently stopped using racial admission criteria because of recent federal district and appeals court decisions prohibiting their use where there is no constitutional violation or the original violation has been remedied.

[3] The 10,600 very small districts with only one school per grade grouping (elementary, junior high, and high) were excluded because by definition they could not be racially imbalanced.

[4] In addition, at the request of DOE, all school districts that had participated in the federal government Magnet School Assistance Program (MSAP) were also included with certainty.

[5] Because the OCR survey began sampling school districts after 1974 and even then only in even numbered years, not every year had complete enrollment data for the sample.

[6] The school districts on which there was missing data for the key desegregation variables were excluded from the statistical analyses. The districts are from 28 states and appear to represent all district sizes ranging from 33 to 170,000 with an average of 16,476 and a median of 12,237.

[7] The standard that all schools in a school level must be within 20 percentage points of the school level's racial composition means that if a district's elementary schools are 50 percent black and 50 percent white, each elementary school must be 30 to 70 percent black.

[8] See Chapter 2 of Rossell (1990b) for a discussion of desegregation measures used by the courts and by social scientists.

[9] The formula is

$$Db = \frac{1}{2} \sum \left| \frac{Wi}{W} - \frac{Bi}{B} \right|$$

where Wi is the number of whites in a school and W the number of whites in the school district, Bi the number of blacks (or any other racial group) in a school and B the number of blacks in the school district. The result of the division for one race is then subtracted, taking the absolute value, from the other's division, summed for all schools, and then divided by 2.

[10] Another way of expressing this is

$$IE_b = \frac{\sum_k Nkb\ Pkw}{\sum Nkb}$$

[11] All of the controlled choice plans in this sample have magnet schools.

[12] See also Steel, Levine, Rossell, and Armor (1993), Rossell and Armor (1996), and Rossell (2002).

[13] All regression analyses use listwise deletion of missing data so the N in each table is the number of districts in that category with complete data on all of the variables. Forced entry is used for all equations.

[14] In an equation in which magnet-voluntary is the omitted variable, a voluntary M to M plan produces significantly greater interracial exposure than a voluntary plan with magnets in districts greater than 5,000.

[15] Because of the reduction in N to 117, I reduced the number of variables in the equation from 20 to 14. Those eliminated were the least important both theoretically and statistically.

[16] The measurement unit of the variable interracial exposure in the data file is proportions--.00 to 1.0. The measurement unit for percentage of magnets is whole numbers.

[17] These data come from national surveys conducted by Christine Rossell and David Armor over the last decade in 10 school districts. The districts and the sampling strategy are described in Rossell (1995).

Table 1

Prevalence of Desegregation Plan Type[a] Among Districts with Plans and Prevalance of Plans in U.S., 1991

PLAN TYPE[b]	**All Districts With Plans**	**Districts ≥ 5,000 With Plans**	**Districts ≥ 27,750 With Plans**
Voluntary M to M	4% (31)	8% (37)	5% (5)
Magnet-Voluntary	23% (176)	21% (98)	29% (26)
ALL VOLUNTARY	**27%** (207)	**29%** (135)	**34%** (31)
Magnet-Mandatory	17% (130)	28% (130)	49% (45)
Mandatory--No Magnets	52% (399)	37% (172)	12% (11)
ALL MANDATORY	**69%** (529)	**65%** (302)	**61%** (56)
Controlled Choice	4% (31)	6% (28)	5% (5)
TOTAL	100% (767)	100% (465)	100% (91)
	ALL DISTRICTS	**≥5,000 IN SIZE**	**≥ 27, 500 IN SIZE**
DISTRICTS WITH PLANS IN U.S.[c]	**12%** (767)	**29%** (465)	**59%** (91)
TOTAL DISTRICTS IN U.S. W/>1 SCHOOL AT A SCHOOL LEVEL*	6, 392	1,604	155

[a] Plans are weighted by their district weights to show the prevalence in the U.S.

[b] The percentages for plan type are calculated by dividing the frequency for a plan type by the total number of districts with a plan in that column.

[c] The percentage having any plan is calculated by dividing the number of districts with plans by the total number of districts in the U.S. in that column.

Table 2

Relationship Between Change in Interracial Exposure 1968-1991
and School District and Desegregation Plan Characteristics

	Districts >5,000 in 1991			Districts >27,500 in 1991		
	Mean	**b**	**Beta**	**Mean**	**b**	**Beta**
Change in Interracial Exposure 1968-1991	0.001			0.066		
DEMOGRAPHIC VARIABLES						
% White 1968	82.188	-0.003 *	-0.24	72.647	-0.003 *	-0.21
South	0.327	0.074 *	0.14	0.383	a	a
Northeast	0.154	-0.060 *	-0.09	0.087	a	a
West	0.280	-0.127 *	-0.23	0.368	-0.090 *	-0.18
County District	0.333	0.049 *	0.09	0.402	0.114 *	0.24
Suburban	0.457	-0.084 *	-0.17	0.313	a	a
Urban	0.314	-0.089 *	-0.17	0.670	a	a
% Nonwhite Enroll. Change '68-'91	578.994	-9.E-06 *	-0.07	245.064	-1.E-04 *	-0.32
Normal % White Enroll. Change '68-91	23.381	5.E-04 *	0.21	5.863	0.001	0.32
% Free/Reduced Lunch 1991	30.118	-0.004 *	-0.34	38.625	-0.002	-0.15
Income 1980	20815	-1.E-05 *	-0.27	20514	a	a
Log of Enrollment 1968	4.026	0.068 *	0.10	4.735	-0.19 *	-0.28
Years Since First Major Plan	15.482	0.006 *	0.09	15.765	a	a
DESEGREGATION VARIABLES FOR CURRENT PLAN						
Formerly Had a Deseg. Plan	0.090	0.055 *	0.06	0.103	0.123	0.16
Formerly Mandatory Plan	0.035	-0.031	-0.02	0.128	0.026	0.04
Voluntary M to M	0.025	0.222 *	0.14	0.034	0.241 *	0.19
Magnet-Voluntary	0.050	0.114 *	0.10	0.171	0.215 *	0.34
Controlled Choice	0.016	0.035	0.02	0.026	0.014	0.01
Magnet-Mandatory	0.081	0.100 *	0.11	0.291	0.192 *	0.37
Mandatory, No Magnets	0.103	0.117 *	0.14	0.077	0.132	0.15
Constant		0.280 *			1.101 *	
Adjusted R^2		0.53			0.42	
N (District Weights)		956			117	

* Significant at .05 level or better.

a Eliminated from equation.

Note: -9.E-06, and similar notations in other cells, means the coefficient is -9 but the decimal point should be moved 6 digits to the left. In this case, the coefficient is -.000009.

Table 3

Relationship Between Change in Interracial Exposure 1978-1991 and the Percentage of Schools that are Magnets Controlling for School District and Plan Characteristics

		Districts > 5,000 With Plans					
		Equation 1		Equation 2		Equation 3	
	Mean	b	Beta	b	Beta	b	Beta
Change in Inter. Exposure 1978-1991	-0.07						
SOCIAL, DEMOGRAPHIC VARIABLES							
% White 1978	64.94	-0.0002	-0.04	-0.0002	-0.05	-0.0006 *	-0.05
South [vs. Central]	0.45	-0.0878 *	-0.50	-0.0889 *	-0.51	-0.0870 *	-0.53
Northeast [vs. Central]	0.16	-0.0791 *	-0.33	-0.0837 *	-0.35	-0.0608 *	-0.35
West [vs. Central]	0.18	-0.0855 *	-0.38	-0.0874 *	-0.38	-0.0622 *	-0.40
County district	0.31	0.0246	0.13	0.0268 *	0.14	0.0628 *	0.14
Suburban [vs. Rural]	0.30	-0.0433 *	-0.23	-0.0432 *	-0.23	0.0019	-0.21
Urban [vs. Rural]	0.56	-0.0743 *	-0.42	-0.0743 *	-0.42	-0.0124	-0.43
% Nonwhite Enroll. Change '78-'91	49.76	-0.0002 *	-0.27	-0.0002 *	-0.29	-0.0002 *	-0.27
% White Enroll. Change '68-'78	-0.17	-0.0112	-0.05	-0.0093	-0.04	-0.0068	-0.04
% Free/Reduced Lunch 1991	40.67	-0.0009 *	-0.21	-0.0009 *	-0.22	-0.0012 *	-0.22
Income 1980	19173	-7.E-06 *	-0.34	0.0000 *	-0.35	-5.E-06 *	-0.36
Log of Enrollment 1978	4.23	0.0025	0.01	0.0025	0.01	-0.0101	0.00
Years Since First Major Plan	16.54	-0.0033 *	-0.21	-0.0033 *	-0.21	-0.0013	-0.19
DESEGREGATION VARIABLES[a]							
Ever had a mandatory plan	0.62	0.0371 *	0.21	0.0424 *	0.24	0.0351 *	0.20
Voluntary plan only	0.14	0.0409 *	0.16	0.0583 *	0.23	0.0391 *	0.16
MAGNET VARIABLES[b]							
% of schools that are magnets	9.80	-0.0008 *	-0.17	0.0002	0.05		
% Magnets X Voluntary Plan Only	2.27			-0.0016 *	-0.20		
% Magnets X Ever Mandatory Plan	6.28			-0.0010	-0.17		
< 5 % of schools are magnets	0.09					0.0096	0.03
5-10% of schools are magnets	0.10					-0.0094	-0.03
10-50% of schools are magnets	0.20					-0.0112	-0.05
>50% of schools are magnets	0.05					-0.0467 *	-0.11
(Constant)		0.2481 *	3.43	0.2477 *	3.45	0.2628 *	
Adjusted R^2		0.36		0.36		0.34	
N (district weights)		300		300		300	

* Significant at .05 or better.

[a] The omitted variable is controlled choice only.

[b] The omitted variable for equation 3 is no magnet schools.

Note: -7.E-06, and similar notations in other cells, means the coefficient is -7 but the decimal point should be moved 6 digits to the left. In this case, the coefficient is -.000007.

Table 4

Relationship Between Change in Interracial Exposure 1978-1991 and the Percentage of Schools that are Magnets Controlling for School District and Plan Characteristics

		Districts with Magnet Schools					
		Equation 1		Equation 2		Equation 3	
	Mean	b	Beta	b	Beta	b	Beta
Change in Inter. Exposure 1978-1991	-0.08						
SOCIAL, DEMOGRAPHIC VARIABLES							
Percentage White 1978	59.26	0.0005	0.10	0.0004	0.08	0.0004	0.08
South	0.26	-0.0865 *	-0.39	-0.0914 *	-0.41	-0.0967 *	-0.44
Northeast	0.22	-0.0593 *	-0.25	-0.0606 *	-0.26	-0.0650 *	-0.28
West	0.26	-0.0546 *	-0.25	-0.0468 *	-0.21	-0.0589 *	-0.27
County district	0.16	0.0054	0.02	0.0118	0.04	0.0058	0.02
Suburban	0.14	-0.1455 *	-0.53	-0.1495 *	-0.54	-0.1354 *	-0.49
Urban	0.83	-0.1942 *	-0.74	-0.1868 *	-0.72	-0.1914 *	-0.73
% Nonwhite Enroll. Change '78-'91	34.33	-0.0009 *	-0.43	-0.0009 *	-0.43	-0.0009 *	-0.44
% White Enroll. Change '68-'78	-0.28	0.0525	0.14	0.0600	0.16	0.0615	0.16
% Free/Reduced Lunch	46.14	-0.0012	-0.20	-0.0016 *	-0.28	-0.0009	-0.16
Income 1980	19423	-9.E-06 *	-0.30	0.0000 *	-0.38	-8.E-06 *	-0.28
Log of Enrollment 1978	4.43	0.0496 *	0.21	0.0482 *	0.20	0.0512 *	0.21
Years Since First Major Plan	14.93	-0.0036 *	-0.23	-0.0035 *	-0.22	-0.0033 *	-0.21
DESEGREGATION VARIABLES[a]							
Ever had a mandatory plan	0.67	0.003	0.01	0.0224	0.11		
Voluntary plan only	0.21	0.021	0.09	0.0854 *	0.36		
MAGNET VARIABLES[b]							
% of schools that are magnets	21.95	-0.001 *	-0.206	0.0000	0.00		
% Magnets X Voluntary Plan Only	5.02			-0.0021 *	-0.35		
% Magnets X Ever Mandatory Plan	13.91			-0.0005	-0.10		
5-10% of schools are magnets	0.26					-0.0178	-0.08
10-50% of schools are magnets	0.44					-0.0199	-0.10
>50% of schools are magnets	0.10			*		-0.0595 *	-0.19
(Constant)		0.2409	1.77	0.2833 *	2.10	0.222	
Adjusted R^2		0.40		0.42		0.38	
N (district weights)		135		135		135	

* Significant at .05 or better.

[a] The omitted variable is controlled choice only.

[b] The omitted variable for equation 3 is less than 5% magnets

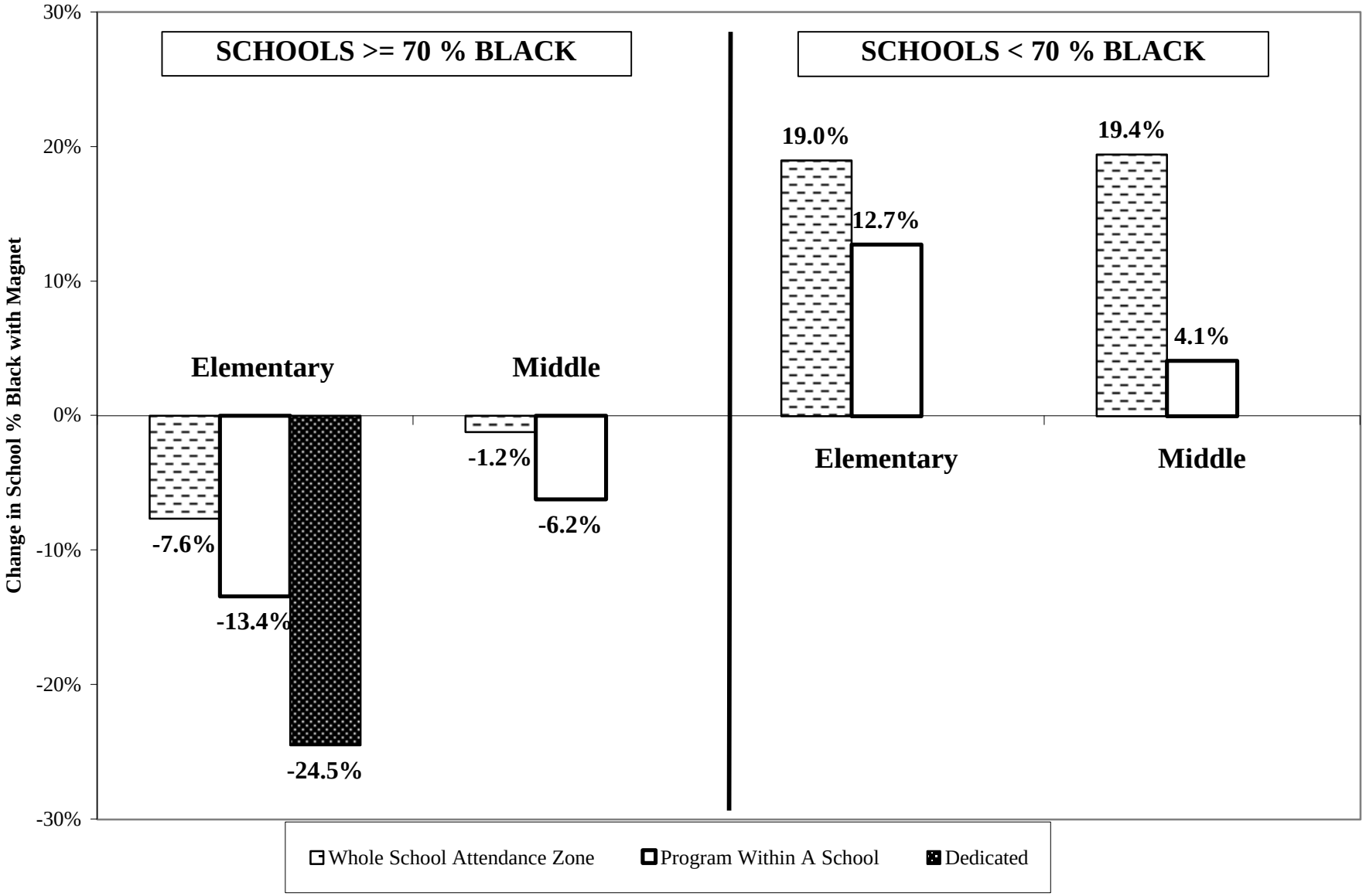
Note: -9.E-06, and similar notations in other cells, means the coefficient is -9 but the decimal point should be moved 6 digits to the left. In this case, the coefficient is -.000009.

Figure 1

A Classification of Magnet Program Structures

		SCOPE OF PROGRAM	
		ENTIRE SCHOOL	**PORTION OF STUDENT BODY**
ASSIGNED NEIGHBORHOOD STUDENTS	**YES**	Whole-School Attendance Zone Magnet 1	Program Within a School Magnet (PWS) 2
	NO	Dedicated Magnet 3	

Figure 2
Effect of Magnet Structure on School % Black in Magnet Schools in Prince George's County, Md. School District, 1996-97



Appendix 1

Relationship Between % White Enrollment Change 1978-1991 and the Percentage of Schools that are Magnets Controlling for School District and Plan Characteristics

	Districts > 5,000 with Plans				
		Equation 1		Equation 2	
	Mean	b	Beta	b	Beta
% White Enroll. Change 1978-1991	-20.52				
SOCIAL, DEMOGRAPHIC VARIABLES					
% White 1978	64.94	0.001	0.00	-0.005	0.00
South [vs. Central]	0.45	-11.220 *	-0.23	-10.993 *	-0.23
Northeast [vs. Central]	0.16	-2.694	-0.04	-3.586	-0.05
West [vs. Central]	0.18	6.180	0.10	5.922	0.09
County district	0.31	17.719 *	0.34	17.942 *	0.35
Suburban [vs. Rural]	0.30	6.345	0.12	5.336	0.10
Urban [vs. Rural]	0.56	1.429	0.03	0.790	0.02
% Nonwhite Enroll. Change '78-'91	49.76	0.038 *	0.23	0.036 *	0.21
% White Enroll. Change '68-'78	-0.17	26.241 *	0.41	26.531 *	0.42
% Free/Reduced Lunch 1991	40.67	-0.116	-0.10	-0.123	-0.10
Income 1980	19173	-0.001 *	-0.24	-0.001 *	-0.24
Log of Enrollment 1978	4.23	-9.890 *	-0.16	-9.869 *	-0.16
Years Since First Major Plan	16.54	-0.090	-0.02	-0.082	-0.02
DESEGREGATION VARIABLES[a]					
Ever had a mandatory plan	0.62	9.854 *	0.20	10.691 *	0.22
Voluntary plan only	0.14	12.516 *	0.18	17.081 *	0.25
RACIAL IMBALANCE VARIABLES[b]					
Change 1968-78	-0.33	-21.609 *	-0.21	-20.008 *	-0.19
Change 1978-91	-0.04	8.677	0.05	11.890	0.07
MAGNET VARIABLES					
% of Schools that are Magnets	9.80	-0.181426 *	-0.15	-0.003	0.00
% Magnets X Voluntary Plan Only	2.27			-0.359 *	-0.16
% Magnets X Mandatory Plan Only	6.28			-0.152	-0.10
(Constant)		37.651 *		38.313 *	
Adjusted R^2		0.58		0.59	
N (district weights)		300		300	

* Significant at .05 or better.

[a] The omitted variable is controlled choice only.

[b] Black-white index of dissimilariy.

APPENDIX 2

CONTROL VARIABLES IN EQUATIONS

1) **Reduction in Racial Imbalance.** This is used in some equations to control for the scope of the school desegregation plan as measured by the change in the black-white dissimilarity index.

2) **Formerly Had a Desegregation Plan.** This is used in the equation with a five plan typology for the 1991 plan to control for a previous plan among districts that currently have no plan.

3) **Formerly Mandatory Plan.** This is used in the equation with a five plan typology for the 1991 plan to control for a previous mandatory reassignment plan.

3) **Population and enrollment trend characteristics:**

% White 1968. Because interracial exposure--the percentage white in the average minority child's school--can be no higher than the percentage white in the school district, the pre-desegregation percentage white must be controlled for.

Region (South, Central, West, Northeast dummy variables). There are regional variations in state policies, court orders, and demographic trends that influence the desegregation outcomes.

County District (dummy variable). Controls for the possibility that countywide districts, because they include the city and the suburbs, will have less white loss and thus less decline in interracial exposure.

Area (suburban, rural, urban dummy variables). Suburban and rural districts are gaining whites, and urban districts, regardless of having a desegregation plan, are losing them.

Percentage Change in Nonwhite Enrollment, 1968-91 or 1978-1991. Interracial exposure is heavily influenced by the percentage white in the district and the percentage white in turn is influenced by two factors: change in white enrollment and change in nonwhite enrollment.

Percentage Change in White Enrollment, 1968-78. This is the control for the change in white enrollment that occurred in a district *before* magnets were implemented.

Normal Percentage White Enrollment Change, 1968-91. This variable controls for the underlying demographic trend affecting school districts independent of any desegregation. Because most school districts had no pre-desegregation trend data and no information on metropolitan trends, the “normal” demographic trend in white enrollment change was estimated by computing the mean proportional white

enrollment change from 1968 to 1991 among the districts that never had a desegregation plan for five different categories of 1968 percentage white crosstabulated by four different regions and further crosstabulated by size--above and below 27,750. This variable then became a control variable for the districts with desegregation plans in the same quintile of percentage white in 1968, the same region, and the same size category. For the non-desegregating districts, the normal demographic trend was simply their actual white enrollment change during this period.

Years Since the First Major Desegregation Plan. Although desegregation plans have the greatest single annual negative effect on white enrollment and positive effect on interracial exposure in the first few years following a desegregation plan (see Rossell, 1990a, 1990b, 1995b), the greater the number of years since the first major desegregation plan, the greater the white enrollment decline. The year of the first major desegregation plan is the year of the first mandatory reassignment plan (regardless of subsequent iterations) or, if there was no mandatory reassignment plan, the first comprehensive districtwide voluntary or controlled choice plan (regardless of subsequent iterations). For districts that never had plans, years since desegregation was set to 1976, the average desegregation year.

Enrollment 1968 (log). This an estimate of busing distance and the logistical difficulty in desegregating a school system. The greater the busing distance, the greater the white flight (Rossell, 1978, 1988).

Social Class Characteristics. The higher the social class, the greater the white flight with the implementation of a desegregation plan. (Rossell 1978; Rossell 1990a, 1990b, 1995b). The social class variables are:**% Free/Reduced Lunch, 1991**—this is a measure of the poverty of the public school children; **median Family Income, 1980**--census data aggregated up to school districts.

REFERENCES

Armor, D. J. 1980. White flight and the future of school desegregation. In School desegregation: past, present and future, edited by Walter G. Stephan and Joseph R. Feagan, 187-226. New York: Plenum Press.

Armor, D. J. 1988. School busing: A time for change. In Eliminating racism, edited by P. A. Katz, and D. A. Taylor, 259-280. New York: Plenum Press.

Armor, D. J. 1995. Forced justice: school desegregation and the law. Oxford University Press.

Bankston, C. L. and S. J. Caldas. 2001. A troubled dream: The promise and failure of school desegregation in Louisiana. Nashville, Tenn.: Vanderbilt University Press.

Clotfelter, C. T. 1999. Public school segregation in metropolitan areas. Land Economics, November, 74 (4) 487-504.

Farley, R. 1981. Final report, Nie Grant #G-79-0151. Ann Arbor, Michigan: University of Michigan: Population Studies Center.

Lord, D. J. 1975. School busing and white abandonment of public schools. Southeastern Geographer 15:81-92.

Orfield, G. 1988. School desegregation in the 1980's. Equity and Choice 4 (February): 25-28.

Pride, R. A., and J. D. Woodward. 1985. The burden of busing: The politics of desegregation in Nashville, Tennessee. Nashville, Tennessee: Vanderbilt University Press.

Raffel, J. 1980. The politics of school desegregation : The metropolitan remedy in Delaware. Philadelphia: Temple University Press.

Rossell, C. H. (1978). Assessing the unintended impacts of public policy: School desegregation and resegregation. Boston: Boston University, report to the National Institute of Education.

Rossell, C. H. 1986. Estimating the net benefit of school desegregation reassignments. Educational Evaluation and Policy Analysis 7:217-227.

Rossell, C. H. 1988. Is it the busing or the blacks? Urban Affairs Quarterly 24:138-148.

Rossell, C. H. 1990a. The carrot or the stick for school desegregation policy. Urban Affairs Quarterly 25:474-499.

Rossell, C. H. 1990b. The carrot or the stick for school desegregation policy: Magnet schools or forced busing. Temple University Press.

Rossell, C. H. 1995. The convergence of black and white attitudes on school desegregation issues during the four decade evolution of the plans. The William and Mary Law Review 36(2): 613-663.

Rossell, C. H. and D. J. Armor. 1996. The effectiveness of school desegregation plans, 1968-1991. American Politics Quarterly 24 (3): 267-302.

Rossell, C. H., D.J. Armor, and H.J. Walberg, eds. 2002. School desegregation in the 21st century. Westport, CT: Praeger Publishers.

Steel, Lauri, Roger E. Levine, Christine H. Rossell, and David J. Armor. 1993. Magnet schools and desegregation, quality, and choice. Palo Alto, CA: American Institutes for Research (Final Report to the U.S. Department of Education, May 28).

Welsh, F. and A. Light. 1987. New evidence on school desegregation. Washington, D.C.: U.S. Commission on Civil Rights.