The Integrating and Segregating Effects of School Choice

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We evaluate the integrating and segregating effects of three distinct school choice programs in San Diego. We go beyond the traditional question of racial integration and examine the integration of students by test scores, parental education levels, and language status. In addition to measuring the net integrative effects of school choice, we also examine the underlying motives behind student participation in school choice programs and the limiting influence of supply-side constraints. Two of the programs that we consider are rooted in 1970's integration-based reforms that provide public transportation for program participants. The third program is a state-mandated open-enrollment program that requires participants to find their own transportation to and from their choice schools. The two programs with underlying integrative objectives do indeed integrate the district, but the open-enrollment program segregates the district along most dimensions. Provision of busing and geographic preferences appear to be important factors in promoting integration.

School choice is a prominent policy issue among education reformers. Proponents of school choice argue that it can increase educational output by improving match quality between students and schools and exerting competitive pressure among schools. Additionally, because school assignments are generally based on residential location, proponents argue that expanding school choice can help to break the link between segregation across neighborhoods and schools. Opponents of school choice contend that it will result in a significant fraction of students, most likely the least advantaged, being left behind. Opponents argue that in leaving these students behind, school choice will further segregate schools along racial and socioeconomic lines.

This paper disentangles the effects of school choice on integration at the San Diego Unified School District (SDUSD), the second-largest school district in the state of California and the eighth-largest nationwide. The school-choice program at SDUSD involves three components – the Voluntary Ethnic Enrollment Program (VEEP), the magnet program, and the open-enrollment program. [1] The former two programs are rooted in integration-based reforms dating back to the 1970's, while the latter is a statewide program mandated in the 1990's. [2] Across the district, roughly one in five students participates in one of these three programs.

The Voluntary Ethnic Enrollment Program (VEEP) was originally designed with the explicit goal of mixing white and non-white students to make within-school student populations more representative of the district's overall diversity. Two structural aspects of the VEEP program suggest that it will apply integrating pressure to the district. First, the VEEP program

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[1] At the time of our study, charter schools provided a small but growing form of school choice, with about 5.5% of students enrolling in these schools (compared to 6.4% in VEEP, 6.6% in open enrollment, and 6.2% of students in non-resident magnet programs). We do not include charter schools in the present analysis because data on applications are not centrally available as they are for the other three programs.
[2] We briefly describe each program below. For a more detailed description with additional background information, see Zau and Betts (2005).

uses busing patterns designed to move students from schools in predominantly non-white areas of the district to schools in predominantly white areas, and vice versa. [3] Students outside of the busing patterns cannot participate in VEEP. Second, and on a related note, the VEEP program provides public transportation for participants to and from their choice schools, which should increase the accessibility of the program for disadvantaged students. Prior to 1996, race was used as an explicit criterion for admittance into the VEEP program. However, after California's passage of Proposition 209 in 1996, eligibility for the program is no longer linked to the race of the student. Although any student of any race can apply to attend any school in the VEEP busing pattern, the pattern is designed such that student-movement through the VEEP program should have a strong integrating effect on the district.[4]

The magnet program was also designed with integration as an explicit objective. At its inception, the goal of the magnet program was to attract students from primarily white areas to primarily non-white areas by offering specialized curricula and additional resources such as reduced teacher-student ratios, teaching labs, field trips, and so on. Some magnets were also located to increase flows of non-white students to primarily white areas. Currently, the magnet program uses geographic clusters, determined by socioeconomic composition, to determine program admittance. Specifically, top priority for admission is given to students who reside in the clusters that least resemble the magnet school in terms of student composition.[5] Similarly to

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[3] The district creates "allied patterns" for VEEP sending schools. Students whose local school is a sending school can apply to be bused at district expense to any receiving school in that school's allied pattern. If eight or more students apply for a given combination the district will provide busing. Each allied pattern combines schools with quite varied demographic backgrounds.

[4] Our description applies to applications to the school choice programs for fall 2001, which is the source of our data. Since that time, some minor changes have occurred, such as the use of both VEEP and magnet programs to provide school choice as required under the federal No Child Left Behind law. Our impression is that even by 2006 or 2007 NCLB Choice had done little to alter VEEP or magnet school choice or to increase participation in school choice overall. See Betts and Danenberg (2004) for a review of NCLB and its early impact on SDUSD.

[5] The district defines four geographic clusters. For some magnet schools, applications are processed in strict order by cluster. For others fixed percentages of admittees must be accepted from each cluster. Note that within any

the VEEP program, transportation is provided by the district for magnet students. While any student can apply to any magnet school, the structure of the magnet program is such that it is expected to exert integrating pressure on the district.

The open-enrollment program (known somewhat confusingly as the Choice Program) is available to students statewide and places no restrictions on student movement, conditional on space availability at the receiving school. That is, any student can apply to any school in the district through this program (or even outside of the district, although across-district applications are rare). While the open-enrollment program is the least restrictive in terms of student options, it does not provide transportation for student participants. The expected effects of the open-enrollment program on district-wide integration are unclear *ex ante*.[6] On the one hand, participants in this program may be more likely to come from families whose residential-location options are limited financially, limiting their local-school options. Students from these families could use the open-enrollment program to attend more desirable schools. To the extent that this is the case, it should increase integration district-wide as disadvantaged students relocate to schools in more advantaged neighborhoods. However, participation in the open-enrollment program may be constrained by transportation costs for some families because the program does not provide busing. If transportation costs deter disadvantaged families from participating and students from relatively advantaged families predominantly use the open-enrollment program to change schools, it could increase segregation at SDUSD.

We examine the effects of these three school choice programs on integration by race, student achievement, and English-learner (EL) status. (We also briefly touch upon integration

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given cluster all applicants are treated equally regardless of race or ethnicity. Priority depends on cluster-wide differences between the local and magnet schools.
[6] Expectations about the integrating effects of the VEEP and magnet programs are also not entirely clear. While the structures of these programs suggest that they are likely to integrate the district by race, integration along non-race dimensions, which we also consider, may or may not occur.

by parental education status but do not highlight it due to data issues.) The race measure is most often the primary target of school-choice policy, as is the case here, but the latter measures also inform the integration debate. Further, in the 2007 U.S. Supreme Court rejection of race-based preferences in school assignment decisions in Seattle and Louisville, Justice Anthony M. Kennedy suggested that districts might want to place greater emphasis on promoting integration on socioeconomic rather than racial lines. Although the Court (and the public) were sharply divided on these integration cases, both sides appear to agree that if the provision of equity in education is an objective of school-choice policy, student mixing along non-race dimensions provides important information about whether the school choice programs are successful.

In brief, the application data suggest that students are interested in using school choice to change their peer group to one with higher socioeconomic standing. Therefore, participation by minority and disadvantaged students exerts integrating pressure on the district. However, participation by advantaged students, who are also seeking to improve the socioeconomic status of their peers, exerts *segregating* pressure on the district. Overall, the VEEP and magnet programs, originating from court orders to desegregate the district, serve to integrate SDUSD by race. These programs also integrate the district by student achievement and parental-education levels, and the VEEP program integrates the district by English-learner status. However, the

We begin our analysis by describing the *demand* for school choice in San Diego using application data from the VEEP, magnet and open-enrollment programs. In many schools and grades, however, the number of applications exceeds the receiving school's supply of spaces available. We therefore examine how supply-side constraints limit the integrating effects of the school choice programs. Similarly, not all lottery winners enroll in their choice schools, so we also study how this further reduction in actual school switching affects integration.

open-enrollment program generally applies segregating pressure on the student population at SDUSD. In some cases, the segregating effects of the open-enrollment program are non-negligible in magnitude. For example, for integration by student achievement, the segregating effect of the open-enrollment program is so strong that it dominates the combined integrating effects of the VEEP and magnet programs.

I.   Literature Review

School choice has the potential to promote integration by breaking the link between neighborhood segregation and segregation in schools. However, if students with higher socioeconomic status are more likely to take advantage of school choice programs due to differences in preferences, access to information and transportation, or other factors, or if families choose to use school-choice programs to move their children to schools with similar students, school choice could *increase* segregation (Gill et al., 2001; Archbald, 2004; Bifulco, Ladd and Ross, forthcoming). Several researchers have noted that the effects of school choice on integration may depend on the structure of the particular school choice program (Gill, 2005; Teske and Schneider, 2001; Gill et al., 2001; Levin, 1999; Henig, 1999).

Numerous studies indicate that choice participants are more likely to be white and of higher socioeconomic status (see Levin, 1998; Elmore and Fuller, 1996; and Wells, 1993). In their reviews of the literature, both Henig (1999) and Levin (1999) find stronger evidence of differential participation by parental-education level than by race. Studies looking at the types of choices that families make tend to indicate that parents seek schools where the composition of the student body more closely resembles the student's own background (Henig, 1996; Levin 1999; Gill et. al. 2001). These findings suggest that choice programs may lead to segregation by socioeconomic status.

Various authors have pointed out weaknesses in the existing empirical literature, which tends to focus on differences in student composition between districts or between choice and non-choice schools. Gill et al. (2001) explain that studies that rely on a comparison of the demographic characteristics of participants and non-participants don't adequately address the issue of integration. These studies ignore the fact that participants may opt into schools that are more homogeneous than their default schools (see also, Archbald, 2004). Gill (2005) points out that the evidence on racial stratification often relies on data measured at the district level. However, school choice programs may make district-level demographics appear more balanced by drawing privileged students from private schools and other districts, but they may attract those students to homogenous schools within the district. Teske and Schneider (2001) claim that "the central issue that requires much more careful study is linking stratification to specific forms of choice" (pp. 625-626), and they state that better empirical data on the effects of choice are needed.

Our data from the San Diego Unified School District allow us to make a useful contribution to the empirical literature on the important question of how choice programs affect within-district integration. Using student-level data, we can identify both the choice and local schools of individual applicants rather than relying on comparisons between choice and non-choice schools or districts. Also, by looking at the effects of three separate choice programs within the same district, we are able to hold district characteristics constant and isolate the differential effects of each choice program. Lastly, we are able to measure separately the effects of the demand for and supply of school choice.

II. Data and the Program Selection Process

The data for this project are based on applications to the three centrally administered school choice programs at SDUSD for fall 2001, submitted to the district during the 2000-2001 school year. Our dataset includes student-level information on race, gender, parental education and English-learner status; as well as test-score achievement (from the Stanford 9 exam, when available) and information on activity in the choice programs. We also have detailed micro-level data from each school in the district which we use to assemble information on the student-body compositions of schools. This facilitates comparisons between each student's local school and choice options. It also allows us to evaluate the integrative effects of school choice relative to a counterfactual where the school-choice programs did not result in any student movement based on applications for the 2001-2002 school year.

Many of the applications to the school choice programs are missing information that we require to make inference about the integrative effects of school choice and the underlying demand for school choice. We omit these applications from our analysis. Our largest data omissions are due to students' grade levels - we omit applicants from students for kindergarten and the sixth grade. For kindergartners, who apply prior to enrollment at SDUSD, we do not have student-level demographic information, making it impossible to infer integrative effects. Applicants for the sixth grade are omitted because heterogeneity in the schooling structure at SDUSD obscures the choice sets for these students, and, more generally, confounds our ability to identify the peer-group based demand for school choice among these students. The structural issue here is that some elementary schools at SDUSD end after the fifth grade while others end after the sixth grade, and therefore, students entering the sixth grade can use school choice to alter their schooling structure (between elementary and middle school). Because we are

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interested in the integration-based motives behind the selection of choice schools, this additional dimension of demand unique to sixth-grade students would confound our analysis. In addition to omitting students applying for entry into kindergarten and the sixth grade, we also omit applications where key information is not available, including basic demographics, local schools, or grade levels, among other things.

We ultimately use about half of the total number of applications for each program in our analysis. Of the omitted applications, roughly three in five are omitted because they are for kindergarten or the sixth grade, and two in five for other reasons. The patterns of missing applications across the three programs are very similar, suggesting that comparisons across programs using our dataset will be reasonable. The primary implication of our missing data is that we will understate the net integrative effects of the choice programs for this single year. Later in the analysis, we attempt to correct for this by scaling up our estimated integrative effects based on district-wide enrollment in the school choice programs.[7]

The top panel of Table 1 provides basic demographic information for the district along with relevant program-specific summary statistics.[8] Specifically, the table shows that VEEP sending and receiving schools, and the magnet clusters, differ markedly in socioeconomic makeup (in the magnet program, this is particularly true when comparing cluster 4 to the other clusters). The structures of the VEEP and magnet programs are suggestive of their expected integrative effects - increased student mixing between VEEP sending and receiving schools, and between clusters in the magnet program, should increase integration at SDUSD. Recall that unlike the VEEP and magnet programs, the open-enrollment program is unstructured.

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[7] Detailed information about the application data omitted from our analysis is available from the authors upon request.
[8] The bottom panel of the table provides information about school-choice participants. We will discuss this information briefly below – a more detailed analysis is beyond the scope of this project.

III. Supply and Demand for School Choice

In each program, students' applications to relocate to choice schools are accepted based on space availability. If a school receives more applications than it has spaces available in a given grade, administrators admit students based on the "priority group" to which the students have been allocated, and within priority groups they use a lottery if the school has space for only some of the students in that priority group. Applicants are sorted into priority groups based on whether the student has a sibling who already attends the option school, the time of year in which the application was made (before or after the deadline), and whether the student is transferring from another school within SDUSD or (very rarely) from outside.[9] As described above, the magnet program also uses geographic clusters to determine program admittance. For some magnet schools, applications are processed in strict order by cluster and then, within-cluster, by priority group. For others, fixed percentages of admittees must be accepted from each cluster and again, the above described priority groups are assigned within-cluster.

In this section we consider the implied effects of the school choice programs on applicants' peer groups based on applications, lottery outcomes, and enrollment decisions. The application data provide the clearest picture of the *demand* for school choice. However, the application analysis ignores important supply constraints. We use information on lottery outcomes to evaluate how supply constraints reduced the effects of the school-choice programs on integration. Similarly, not all lottery winners enrolled, so we also consider how this further reduction in actual school switching affected integration. For clarity of exposition, we focus on the exposure of school-choice participants to the group that is the most socioeconomically advantaged in each case. The bottom panel of Table 1 details demographic information about

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[9] In addition the magnet program gives preference to students who are applying for continuity (i.e., the student was accepted into the magnet program in a similarly themed school in a lower grade-span in the previous year).

the composition of the applicant pool for each choice program. Demographics for lottery winners and enrollers are also detailed.[10]

Integration by Race

We first examine differences in the racial composition between applicants' local and choice schools, where local schools are determined by students' residential locations. Figure 1 illustrates the effects of the choice programs on integration between whites and non-whites at SDUSD.[11] It shows the average difference in the percentage of white students between the choice and local schools of applicants for each racial/ethnic group, based on applications, lottery outcomes, and actual enrollment decisions. (In cases for which a student applied to more than one school in a given program we took a simple average of the characteristics of these schools. School demographics are calculated based on 2000-2001 information.). For example, the first bar in each trio in the figure shows the average percentage-point change in the share of white students at applicants' schools that would be observed if all school-choice applications resulted in student movement.

The figure shows that applicants to all three of the choice programs apply to schools that have a higher percentage of white students than their local school. As discussed above, this means that integration is caused by non-whites applying to choice schools with more white students, but that this pattern is somewhat offset by whites who are also opting to apply to schools with more white students. However, because non-whites apply in greater numbers than whites, and in higher proportions than their shares of the overall student population (see Table 1,

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[10] The bottom panel of Table 1 raises many interesting questions about the choice programs. For example, some students are more likely than others to win school-choice lotteries. This is likely a reflection of heterogeneity in school-choice preferences across student types. A more detailed analysis of these data are beyond the scope of this project.

[11] For the precise calculations upon which Figure 1 is based, see Betts et al. (2006). Betts et al. (2006) also provides detailed information about mixing among non-white ethnicities.

bottom panel), on balance the three choice programs should increase integration between whites and non-whites district-wide. Notably, the percentage increase of white students from applicants' local to choice schools is especially high for the VEEP program (for applicants of all races). Because of this, and because applicants to the VEEP program are mostly non-white, the application data suggest that the VEEP program will play a large role in integrating whites and non-whites in the district.

Of particular relevance for the debate on how deeply school choice affects racial integration is the open-enrollment program, because in this program any student can apply to any school in the district, except for magnet schools. Of the three programs, this in some sense is closest to an unregulated market. Across all racial/ethnic groups, there is a clear pattern showing that applicants use the open-enrollment program similarly to the VEEP and magnet programs and apply to schools with a higher percentage of white students than their local schools. However, unlike in the VEEP and magnet programs, applicants to the open-enrollment program are disproportionately white, suggesting a segregating effect.

The application patterns do not suggest that there will be increased mixing among non-white ethnicities. While all applicants are choosing schools that would increase their exposure to white students, they are also simultaneously applying to schools that would decrease their exposure to other racial/ethnic groups. We emphasize that this does not necessarily mean that students of all races and ethnicities actively make choices based on the racial/ethnic mix of schools, as many other factors are correlated with race and ethnicity.

The application data will overstate the amount of student movement generated by the school choice programs because in many cases the number of applications exceeds the number of spaces available. To adjust our calculations for lottery outcomes, we include all students who

apply to a given choice program, but set the change in the racial mix they would experience to zero in any cases where *all* of their applications to a given program lost in the lottery process, on the presumption that students who do not gain admission stay at their local school.

In Figure 1, the first bar in each trio of bars shows the changes that would result if all applicants won their lotteries and enrolled. The second bar shows the changes in racial/ethnic mixing that would occur if only winning applicants changed schools. It shows that supply constraints in the choice programs limit student mobility and decrease the implied changes in the racial/ethnic mix experienced by the applicant group. For example, the upper left panel of Figure 1 shows that if all were accepted, black applicants to the VEEP program would experience an average change in the percentage of white students at their schools of 41.6 percent. However, the VEEP program's supply constraint reduces the implied change in the percentage of white students at the schools of these black applicants by 30.3 percentage points, down to just 11.3 percent. Because many of the applications are rejected, the average outcome experienced by the original group of applicants differs sharply from what the application data alone would suggest.[12]

Given that just under one-third of students are already in various choice programs, we find this quite remarkable: the expressed demand for school choice in this district continues to outstrip the supply of slots, and hence the integrative effects of school choice are limited.

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[12] Although supply constraints will clearly limit the programs' effects, we make two notes. First, if all applications were accepted and resulted in student movement, the peer-group change experienced by student movers would be smaller than is implied by the application data because more non-white movers would be part of each applicant's new peer group. Second, the reported counterfactual requires that the resident student populations at the choice schools would not respond to such an inflow of students. Nationally, research suggests that resident students might indeed react. For example, Fairlie and Resch (2002) provide some evidence that white students tend to "flee" to private schools in areas with large numbers of disadvantaged non-white students in public schools. In related work on residential segregation, Card, Mas and Rothstein (2007) find evidence of tipping points in terms of the percentage of the neighborhood made up of minorities. Below a certain point, changes in the percent minority has no effect but beyond a certain point whites appear to leave the neighborhood.

In some cases, focusing on lottery winners rather than on all applications results in a directional change in the implied integrating effect of a given program. For example, white applicants to the magnet program appear, weakly, to apply to schools that are "more white". However, when we focus on lottery winners, constraints based on program availability actually favor white students applying to schools that are "less white". Therefore, Figure 1 shows that white lottery winners tend to win placement into schools that marginally *reduce* their exposure to other white students, on average. In this specific case, supply-side constraints reduce segregation between whites and non-whites, consistent with the original integrative objective of the magnet program.

Finally, not all lottery winners end up accepting their offer to switch schools. The third bar in each trio of bars in Figure 1 depicts *actual* changes in racial/ethnic integration that result from school switching relative to the changes implied by the application and lottery-winner data. In this case, we set the change in the racial mix experienced by applicants to zero in any cases where they did not enroll in a school for a given choice program, regardless of lottery success. Focusing on those who actually enroll should reduce the implied change in the racial/ethnic mix compared to the lottery winner analysis.[13] Figure 1 shows that the integrating effects of the three programs are lower than those implied by both the application data and the lottery winner data when conditioning on students who actually enroll in the schools to which they applied.

Integration by Test Score Performance

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[13] Conditioning on enrollment could also magnify the changes in racial/ethnic makeup implied by the lottery-winner data. This would be the case if the students who choose not to enroll are those who win lotteries at schools where the racial/ethnic differences between their choice school and their local school are of the opposite direction of the group as a whole. We perform an auxiliary analysis that uncovers little evidence of such behavior. That is, when we drop all applications that are not accepted, and subsequently all applications that do not result in an enrollment, the implied changes in peer groups for accepted applications are very similar to those for enrolled students.

Next, we evaluate the integrating effects of the school-choice programs by student achievement as measured by test-score performance on the Stanford 9 standardized test in 2000-2001.[14] Specifically, we compare the mean percentage difference in the number of students performing above the district median at the local and option schools in the given grade. Again, we extend our analysis to look at lottery winners and students who actually enroll.

Figure 2 shows the average difference in the percentage of students whose test scores are above the median between applicants' local and option schools based on applications, lottery outcomes, and actual enrollment. (Again, in cases where a student applied to more than one school in a given program we took a simple average of the characteristics of the schools to which the student applied.) Across all programs and looking at both above- and below-median performers, Figure 2 shows that students use the choice programs to apply to schools where there is a greater proportion of above-median performers. The differences between the local and option schools are again the largest for students in the VEEP program relative to magnet and open-enrollment. When we focus on lottery winners and then on those who actually attend, the average magnitudes of the program effects decline, broadly mirroring the results presented for race and ethnicity. These changes in magnitudes show the integration-based implications of the gap between the demand for school choice and the supply of slots in receiving schools.[15]

We use the number of applications by student test group to determine whether low-scoring students are more or less likely to apply to a given program (see Table 1). For the VEEP and magnet programs, the demand for choice appears to be strongest among students who are themselves below-median performers, with 65 and 54 percent of the applicants to these programs, respectively, scoring below the median. With the open enrollment program, the

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[14] For this analysis, we focus only on applicants who have taken the Stanford 9 standardized test.
[15] Although again, with the caveats noted in footnote 13, our simple comparison here is likely to overstate the general-equilibrium magnitudes of the supply-constraint effects.

converse appears to be the case – only 44 percent of the applicants are below-median performers. That is, below-median performers are over-represented as applicants to the VEEP and magnet programs and under-represented as applicants to the open-enrollment program.

Integration by Language Status

Finally, we consider the role of the choice programs in integrating students who are and are not fluent in English. Figure 3 shows the mean percentage difference between the local and option schools of applicants in the number of students who are fluent in English, based on applications, lottery outcomes, and actual enrollment. In all cases, students apply to schools that have a lower proportion of English Learners. Figure 3 shows reductions in the magnitudes of the effects implied by the application data after adjusting first for lottery outcomes and then for students who actually enroll. When conditioning on lottery winners and then on students who enroll, the VEEP program generates the largest average difference between the choice and local schools of applicants, and the open-enrollment program produces the smallest differences.

Integration by Parental Education

Because there is a sizeable group of students in SDUSD for whom we do not have parental education data, we do not show results for this disaggregation. However, when we divided students based on whether their parents have obtained a high school diploma or less versus those with postsecondary education, the results were highly consistent with the foregoing results. In all programs, applicants apply to schools where a higher percentage of the students have more highly educated parents. The VEEP program again shows the largest implied changes for applicants of all parental-education types. As in the other cases, the effects of the choice programs implied by the application data alone are dampened considerably once we enforce the supply constraints and examine actual enrollment data.

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IV. Net Effects of School Choice on Integration

Although the analysis above is informative, it cannot by itself give information about whether school choice programs lead to greater or lesser integration, nor can it speak to the relative magnitudes of each program's integrating or segregating effects. We therefore extend our analysis to examine the effects of the three choice programs on district-wide inter-group exposure in San Diego schools. To do this, we use exposure indices. As an example, consider the exposure of black students to white students in the district. An exposure index reports, for the typical black student in the district, for example, the proportion of students in his or her school who are white. The formula for such an index is:

$$\sum_{j}^{J}\left(\frac{x_j}{X}\right)*\left(\frac{y_j}{t_j}\right)$$

Above, x_j is the number of black students at school j, X is the total number of black students in the district, y_j is the number of white students at school j and t_j is the total population at school j. Thus, the exposure index is a weighted average of the proportion of students who are white at each school, with the schools' shares of the overall black population serving as the weights.

We compare the actual district-wide exposure indices to counterfactual indices that we calculate by "undoing" all of the student movement associated with the school choice programs. The differences between the two measures indicate the single-year effects of the school-choice programs on integration.[16] Of course, we do not expect applications for a single year to change markedly the exposure of one group of students to another. It is the sum of many years of applications and subsequent school switches that determines how the overall mix of students

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[16] As discussed in Section II, our single-year effects will be understated because we are forced to omit a sizeable fraction of the application data. We make an adjustment for this below when we extend our results to evaluate the net integrative effects of school choice in San Diego.

changes. However, we use this snapshot of one year's worth of school moves because for this subset of school choice participants we know exactly where they would have gone to school if they had not enrolled in any of the choice programs.[17] This allows for the accurate calculation of the counterfactual.

Figure 4 shows district-wide changes in exposure for each of our three measures of integration as well as the net change in exposure resulting from the combination of all the programs. As in the previous section, Figure 4 shows our results for exposure to the group that is expected to be the most socioeconomically privileged in each case.[18] As suggested by the previous section, the VEEP program has the strongest integrating effects across all measures of diversity, followed by the magnet program (which integrates along all dimensions except language status). In contrast, the open-enrollment program generally has a *segregating* effect on the district, most notably along the dimension of test-score achievement.

The first panel of Figure 4 shows that the VEEP and magnet programs unambiguously increase the exposure of non-white students to white students, and vice-versa. The open-enrollment program increases the exposure of white students to Asian students but segregates whites from black and Hispanic students. Notably, Asian students at SDUSD are less likely to be disadvantaged than Hispanics or blacks and, in fact, Asian students have much higher test scores and grade-point-averages than either of these groups at SDUSD.[19] While the VEEP and magnet programs integrate disadvantaged minorities with advantaged groups, the open-enrollment program is counterproductive along this dimension.

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[17] This assumes, of course, that students would not respond to the lack of availability of school choice by changing their residential-location decisions, or attending private schools.

[18] For detailed results from all of the exposure-index calculations, see Betts et al. (2006).

[19] Furthermore, Asian participants in the choice programs also have higher grade-point-averages than whites.

Also of interest are the integrating effects of the three programs among non-whites. In an analysis we omit due to space constraints, for each race or ethnicity we calculate the initial and final levels of exposure to other groups, the changes induced by school choice applications for fall 2001, and the sources. Although the choice programs integrate whites and non-whites, they have a clear segregating effect on the exposure of non-white students to each other.

The second panel of Figure 4 shows district-wide changes in exposure based on student achievement. While the VEEP and magnet programs apply integrating pressure along this dimension, the open-enrollment program strongly segregates above- and below-median performers. Dominated by the negative effect of the open-enrollment program, the overall effect of all three programs on integration by student achievement is *negative*.

In the third panel of Figure 4, our language-status exposure indices show that the net effect of the three choice programs is a clear decrease in the exposure of English Learners to non-English Learners, dominated by the effects of the magnet and open-enrollment programs. The VEEP program results in a small increase in EL to non-EL exposure when taken alone, but this effect is overcome by the negative changes in exposure created by the other two programs.

Part of the explanation for the negative effect on exposure between EL and non EL-students lies in the program participation rates of EL students, reported in the bottom panel of Table 1. English Learners in SDUSD in 2000-2001 made up 27.4 percent of the student population. Based on the application data, the only program in which EL applications exceeded the EL share of the student population in 2000-2001 was the VEEP program, where 41.2 percent of applicants were English learners.   In both the magnet and open-enrollment programs, EL students were largely under-represented as applicants, making up just 19.5 and 17.6 percent of the applicant populations in these two programs respectively. Because all applicants use choice

programs to reduce their exposure to English Learners, the lack of participation by EL students themselves in these programs reduces their exposure to non-EL students overall.

Finally, we can extend our estimates of the effects of the VEEP, magnet and open-enrollment programs based on our sample from this single-year cohort to evaluate the net effects of the programs on the student population at SDUSD. This analysis will provide reasonable estimates of the district-wide net effects of the choice programs given two assumptions. First, our observed cohort of applicants must be similar in demographics and school-choice preferences to other applicant cohorts at SDUSD. Given the size of each cohort at SDUSD, where the district-wide population exceeds 140,000 students, this seems quite reasonable. Second, the distribution of available choice slots within each program faced by our observed cohort of applicants should be similar to the district-wide distribution of active slots. This condition would be violated if, for example, previous cohorts took up the most desirable school-choice slots prior to program entry by our cohort. In this case, our observed cohort would only be active in the choice programs along the fringes of what was left over by previous cohorts meaning that our observed cohort would be structurally restricted from responding to the choice programs in the same ways as prior cohorts.

Although this scenario cannot be entirely ruled out, it seems unlikely for three reasons. First, because the schooling process is finite, even if some of the early entrants into the school-choice programs took the most desirable slots, these students would not retain these slots indefinitely – they would graduate. Given a perpetual line of exiting school-choice participants, particularly desirable slots that were absorbed by previous cohorts should continually become available. Second, heterogeneity in preferences among students and parents over choice schools as documented by Betts et al. (2006) and Glazerman (1997) calls into question the very existence

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of a set of "clearly preferred" school-choice slots. Third, because the three choice programs have existed for several decades each, the system is roughly in equilibrium, meaning that there has not been a radical departure from typical enrollment patterns in recent years.[20]

If these two conditions are met, the net effects of the choice programs can be inferred by scaling up the estimates from Figure 4 by the district-wide numbers of students in each program. For example, let I_V denote the measured integrative effect of the VEEP program along some dimension based on student movement from our sample, N_V the number of observed movers in the VEEP program from our sample, and T_V the total number of students participating in the VEEP program at SDUSD in 2000-2001. An approximation of the total integrative effect of the VEEP program at SDUSD, I_{TV}, can be calculated as $I_{TV} = I_V * (\frac{T_V}{N_V})$. We make an analogous calculation for each program along each measured dimension of integration and report our results in Table 2. The table suggests that the choice programs have sizeable integrative (and segregative) effects on the district. For instance, actual black-white exposure in San Diego was 0.19598 and together, the VEEP, magnet and open-enrollment programs increased the exposure of blacks to whites by 0.024+0.012-0.002=0.034. Thus, these programs increased exposure by about 3.4 percentage points.[21] Similarly, the programs increased the exposure of Hispanics to whites by 4.1 percentage points. On the other hand, the programs decreased the exposure of below-median performers to above-median performers by 1.3 percentage points and of English learners to non-English learners by 1.7 percentage points.

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[20] In principle we could investigate the distribution of available slots in our cohort and compare it to the distribution of slots among all current participants. However, because we do not have reliable data on students' local schools outside of our cohort of study we cannot determine what options were available to these students, a particularly relevant problem in the VEEP and magnet programs.

[21] This is a big increase as in proportional terms it suggests that the black-white exposure index is about 21% higher than it would have been without these programs.

V. Conclusion

Students (and their families) appear to use school choice programs to change their peer groups to be of higher socioeconomic standing. With regard to race, this means that applicants use the choice programs to attend schools that are "more white". This does not mean that families necessarily make decisions based on race, because race is correlated with many other closely entwined factors. For instance, applicants also appear to use these programs to attend schools that have a higher proportion of above-median test score performers, more students who have highly educated parents, and fewer students who are English Learners. Because all students use school choice programs to attend schools with more socioeconomically advantaged peers, participation by disadvantaged students tends to increase integration while participation by advantaged students applies segregating pressure.

Across all the choice programs and grade spans at SDUSD, the demand for school choice exceeds supply. Therefore, the extent to which students are able to use these programs to alter their school-level peer groups is limited by accessibility. By focusing on the applicant group for each level of our analysis (race, student achievement and English Learner status), we show that supply-side constraints limit the intended changes in the school-level peers of applicants.

In addition to the supply shortages created by the lottery process itself, lottery winners who choose not to attend also limit the changes in the socioeconomic environments at option schools. Although it is unclear exactly why all lottery winners do not choose to attend their option schools, some simply leave the district. Interestingly, among the lottery winners who do not attend their choice school the following year, just 4.2 percent of VEEP winners and 7.3 percent of magnet winners fail to do so because they have left the district. In the open-enrollment

program, 21.0 percent of winners who did not accept the offer left the district. For the remaining groups, their motives for not attending their choice schools are unknown.

In addition to presenting evidence on the net integrative effects of the three choice programs in San Diego, we also consider their separate effects. The VEEP program has the strongest integrating effects on the district along each measure of integration that we consider. The magnet program also integrates the district; however, its effects are less pronounced. The open-enrollment program *segregates* the district's schools along most dimensions.

There are two notable differences between the VEEP and magnet programs, which integrate the district, and the open-enrollment program. First, the integrating programs both restrict student movement in patterns that are explicitly designed to promote racial integration. These patterns are also aligned such that integration along other dimensions occurs. Interestingly, the designs of these programs continue to promote integration despite the fact that neither race nor any other socioeconomic measure is used as a direct criterion for student selection into either program. Comparing the relative effects of the VEEP and magnet programs, the VEEP program is more successful as an integrative tool.

The second difference between the integrating programs and the open-enrollment program is that the integrating programs provide busing for student participants. This seems to have a large effect on the demand for school choice by disadvantaged students. For example, while 73 percent of the district was non-white in 2000-2001, just 66 percent of applicants to the open-enrollment program were non-white. In fact, using each measure of socioeconomic status that we consider, disadvantaged students are under-represented in the open-enrollment program. This under-representation is particularly peculiar because (1) these same disadvantaged students

are over-represented in the VEEP and magnet programs[22] and (2) disadvantaged students should be more likely to participate in school choice based on the evidence presented here that students use choice programs to improve the socioeconomic standing of their peers. That is, neighborhood segregation implies that structurally, advantaged students as a group should have less interest in school choice programs because they are more likely to reside in an area where the local school is socioeconomically advantaged.

We conclude with three implications for research and policy-making in this area. First, examining integration beyond the traditional focus of race can yield both supporting evidence, and in some cases, entirely new insights. For example, SDUSD's choice programs in the year we evaluate lead, overall, to greater integration between whites and other racial/ethnic groups but to slightly greater *segregation* based on student test scores and language status. Second, even in a district such as San Diego, where one quarter of students participated in the three choice programs we study, it would be a mistake to use actual participation in choice programs as a measure of the demand for school choice: student applications far outstrip supply. Third, details in the design of school choice programs appear to be crucial in determining their overall effects on integration. The disparate findings for the open-enrollment program relative to the other two programs suggest that the provision of busing and incorporation of geographic preferences do much to level the playing field in favor of the relatively disadvantaged.

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[22] For example, 95 percent of applicants to the VEEP program are non-white. However, in addition to the VEEP and magnet programs providing public transportation, this difference is also likely to be partly driven by their integrative designs. Nonetheless, it suggests that the under-representation of disadvantaged students in the open-enrollment program is not the result of a general lack of interest from these students.

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