Segregation in Public Schools Through the Lens of Tiebout Theory:

A case study of Oregon's open enrollment policy

by
Robert Backus

A THESIS

submitted to

Oregon State University

Honors College

in partial fulfillment of
the requirements for the
degree of

Honors Baccalaureate of Science in Managerial Economics
(Honors Associate)

Presented June 3, 2019
Commencement June 2019

AN ABSTRACT OF THE THESIS OF

Robert Backus for the degree of Honors Baccalaureate of Science in Managerial Economics presented on June 3, 2019. Title: Segregation in Public Schools Through the Lens of Tiebout Theory: A case study of Oregon's open enrollment policy.

Abstract approved:_____

Paul Thompson

In 2011 Oregon enacted a public education open enrollment policy that gives students and families the choice of what school to attend, regardless of district lines. Despite the lack of public information, this policy will sunset this school year unless it is further extended during legislative session. This paper attempts to discover possible negative externalities of the policy by analyzing segregation trends within Oregon and Washington for the years 2007-2017. We analyze how students sort themselves into isolated populations based on ethnic and socioeconomic factors by running an event study and multiple linear regressions. In summation, this research failed to identify a strong tie between open enrollment and segregation, but did conclude that sorting was occurring while schools also became more populated with students of low socioeconomic status. Therefore, if the policy succeeds in increasing efficiency and improves student and school outcomes, then legislators should consider extending the policy.

Key Words: Segregation, open enrollment, Tiebout Theory

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Honors Baccalaureate of Science in Managerial Economics project of Robert Backus presented on June 3, 2019.

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I understand that my project will become part of the permanent collection of Oregon State University, Honors College. My signature below authorizes release of my project to any reader upon request.

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Robert Backus, Author

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I. Introduction

Should public education focus more on equity or efficiency? Is education reform a zero-sum game that helps some students while hurting others? These questions have been asked by many policymakers, parents, and children in recent years, and while the debate over public education and reform rages on, many states and districts have pursued their own various policies and strategies. Ideas such as increasing pre-K education, charter schools, trade schools, and reshaping standardized tests are continuing to be researched and implemented as administrators and officials search for the best ways to reform education. United States Education Secretary Betsy Devos and Senator Cory Booker both have extensive history promoting charter schools, school vouchers, and other methods intending to increase choice (Russakoff, 2015; Cheng, Henderson, Peterson, and West, 2019).

School of choice policies have been examined and implemented in many different ways, Most notably, through open enrollment policies. Forty-seven states, including Oregon, currently have some variation of open enrollment, all trying to increase student performance and school efficiency[1]. Open enrollment policies either allow students to enroll in schools within the same district but outside their attendance zones (i.e., intradistrict transfer) or enroll in in schools outside of their district lines (i.e., interdistrict transfer). Eight years ago, Oregon decided to test how a voluntary interdistrict transfer policy would affect the educational landscape of the state[2]. The policy was signed into law in 2011, began in the summer of 2012, and is expected to sunset on July 1, 2019, unless it is extended further. However, a current bill aimed to extend the deadline has stalled within the Oregon legislature, and it appears nothing new will be introduced for the foreseeable future. In order to continue the debate, more research, like this study, needs to

[1] http://ecs.force.com/mbdata/MBQuestNB2n?rep=OE1801
[2] https://www.oregon.gov/ode/schools-and-districts/Pages/transfers-between-districts.aspx

be conducted in order to have a well-informed populous and make sound decisions within the legislature.

The goals of these policies are rooted in fundamental economic principles; by allowing schools to compete against each other, schools will be incentivized to improve efficiency and offer better services. However, every economic decision has tradeoffs, and open enrollment is no exception. When implementing these policies, it is important to recognize and understand the possible side effects that might arise. A key concern surrounding open enrollment and school of choice policies in general is that these policies will lead to greater segregation. Thus, a key question in regards to these policies is "what type of student is transferring and what type of student is being left behind?" A major downside to open enrollment is the idea that not every student is better off and open enrollment is a zero-sum game.

To answer these questions, this study examines a natural experiment of open enrollment policy adoption in Oregon in 2012. Using demographic data and economic proxies, this paper will analyze the possible negative externalities that have arisen in Oregon, by focusing on school segregation trends and social class isolation. This study conducts a difference-in-differences analysis examining changes in using Oregon and Washington data from the National Center for Education Statistics for the school years ending in 2007 to 2017. This analysis examines changes in White, Black, and Hispanic population ratios and a free and reduced lunch ratio using identification from the adoption of Oregon's open enrollment policy in 2012 relative to Washington where no change in open enrollment policy occurred.

Four main takeaways from this study are (1) across all schools the proportion of white students actually decrease, creating more diverse and less segregated schools. However, this means that (2) schools where the White population is in the minority, open enrollment causes

these schools to become even less White and mainly more Hispanic. (3) There is evidence that Tiebout sorting is working, specifically across suburban communities. And in general, (4) the ratio of students receiving free and reduced lunch grow in each school due to the open enrollment policy.

This paper is organized in eight sections, and the remaining sections are organized as follows. Section II is the background. Section III is the literature review. Section IV describes the data and provides descriptive statistics. Section V introduces the empirical strategy. Section VI provides the results. Section VII is a discussion on the findings and policy ramifications. Lastly, section VIII concludes the paper.

II. Background

When it comes to open enrollment, there are several different variations that each state or school district may practice. First, there is interdistrict transfer, which allows students to attend schools outside of the school district they normally would be required to attend. There is also intradistrict transfer, which allows students to attend the school of their choice, as long as it remains within the school district they are required to attend. This policy is used more frequently in larger cities where students can choose from multiple schools.

These two policies can either be voluntary or mandatory. Voluntary policies allow schools, and their districts, the choice to opt out of the transfer policy. This can either mean, voluntarily closing their doors to incoming students or voluntarily barring students from leaving. Mandatory transfer policies force schools to participate in the transfer policy outlined by their state. These mandatory open enrollment policies require schools to open their doors to incoming and outgoing students.

In 2012 Oregon passed legislation that allows schools to voluntarily participate in interdistrict transfer. For the purpose of this paper, when I use the term "open enrollment," I am referring to any form of interdistrict or intradistrict transfer. However, when it is in regards to Oregon's policy, open enrollment specifically refers to Oregon's voluntary interdistrict policy that was enacted in 2012.

When students and families are able to choose the schools they want to attend, in theory, families and students might be more inclined to choose the schools that have demographics that are more preferable for the certain student. However, this is not just a hypothetical scenario, the evidence shows that this theory has merits. In California, interdistrict transfer created the ability for White and Latino students to attend schools that better align with their tastes (Prins, 2007). Although unintentional, this led to segregation within schools. Similarly, while studying charter schools in Pennsylvania, researchers also discovered that by allowing students to attend the school of their choice, African American and Latino students chose the schools with already greater segregation (Kotok, Frankenberg, Schafft, Mann, and Fuller, 2015). Also, when the population of black residents increase for a given area, white families will choose schooling alternatives for their children that have a higher percentage of white students (Sikkink and Emerson, 2008).

Although this paper does not address the primary purpose of the policy, which is to improve educational outcomes, it is important to note the purpose of open enrollment. If schools are losing students, the idea of the policy is that schools will be motivated to improve efficiency and quality in order to attract outside students or prevent students from leaving (Corcoran, 2014). This could mean improving teaching techniques, increasing staff and faculty, introducing new or improved extra-curricular activities, cutting the programs that return only minimal benefits, or

other cost-saving and efficiency-improving measures (Hoxby, 2000). But all is not lost for the schools that lose more students than they gain; with reduced class sizes, the remaining students can still experience benefits (Krueger, 1999), such as higher teacher-student ratios and improvements in already established programs.

III. Literature Review

Economist Charles Tiebout hypothesized that individuals show their preferences for public goods by choosing the communities that fit their needs and desires, despite possibly having to pay higher housing costs or taxes. Some of these goods include public transportation, public parks, public libraries, or in the case of this paper, public education. This theory, also known as Tiebout sorting, describes how certain households are willing to relocate and pay for better services, or otherwise known as "voting with their feet" (Tiebout, 1956; Somin, 2011).

By removing certain restraints and barriers, open enrollment allows for a modified version of Tiebout sorting, where families do not necessarily have to relocate in order for a child to attend a better school. However, there are still costs involved, both opportunity and actual costs. This leads to the main assumption of the Tiebout model, that schools will become competitors and forced to improve the quality and efficiency of their services.

The idea of increasing competition is one of the main arguments for those that support open enrollment. Open enrollment is a way for public education to focus on efficiency, rather than just equity. But every economic decision has tradeoffs, and open enrollment poses three possible negative externalities: an increase in segregation, a dip in student performance, and funding inequalities. Especially because the highest rate of participation comes in areas that are more racially and economically diverse (Phillips, Larsen, and Hausman, 2015). Although equally important, this paper will attempt to analyze only the first externality, segregation.

In recent years, school segregation has been increasing throughout the United States (Orfield and Frankenberg, 2014). And studies show that attending racially diverse schools are important for minority students' short-term and long-term success (Mickelson and Heath, 1999; Willms, 2010; Bohrnstedt, Kitmitto, Ogut, Sherman, and Chan, 2015; Chetty, Hedren, Jones, and Porter, 2018; Johnson, 2019). So, there is no question that school administrators and officials should want to integrate their schools as much as possible. By allowing or creating scenarios where schools can become more segregated, educational success and healthy behaviors become at risk of decline.

Despite school administrators and officials knowing that integration is vital for efficient and equitable educational outcomes, many different policies have been recently introduced in attempts to increase efficiency often without regard to possible segregation. In an attempt to increase choice, one of the largest trends is the introduction of charter schools. Although charter schools have shown the ability to increase student learning (Hoxby, Muraka, Kang, 2009) or at least the perception of enhanced student learning (May, 2006), they have also been met with wide ranging criticism, from a public funding standpoint to the lack of evidence charter schools truly work (Fabricant and Fine, 2012; Au and Ferrare, 2014).

Although Oregon does have 127 charter schools, the state has managed to stay out of the debate for the most part, and instead, opted to follow another popular trend, open enrollment within all public schools. This is another attempt at increasing choice for consumers and increasing competition for producers. In this sense, the consumers are the children and families and the producers are the schools. By allowing parents to choose what schools for their kids to attend, this policy is a direct attempt at creating an environment where Tiebout sorting can play a role in improving schools, students, and educational outcomes.

Whether this policy is achieving its goals is publicly unknown at this point, and as it stands, the policy is set to sunset following the 2018-2019 school year, unless it is further extended during the 2019 state legislative sessions, which appears will not be the case. However, Oregon policymakers understand that the state needs severe educational reform in order to accomplish the many ambitious goals the state has put forward. Currently, Oregon ranks 29th nationally in funding per student and has fallen considerably in the last 30 years. So, it is no surprise that in 2016 Oregon ranked in the bottom third for chance of success, school finance, and K-12 achievement. However, although Oregon might be behind the curve, United States' childhood education is far behind in the international arena, as well (Bybee, McCrae, and Laurie, 2006; Herman, Post, and O'Halloran, 2013), and the decline of qualified educators will only add to the problem (Bradley, Herzenberg, and Price, 2005; Darling-Hammond, 2009). Therefore, if policymakers and administrators can figure out ways to enhance learning, without severely increasing total costs, it could possibly be a win for everybody involved.

However, politics play a huge role in the battle over public education. The trend of increasing school choice in the US has been met with a trend of decreasing state spending on public education (Tandberg, 2010) and although there is some evidence that increasing school funding does not necessarily produce better outcomes (Hanushek, 1989), it is now common knowledge throughout any professional field, that an increase in education leads to an increase in output, performance, and success for the student, school, and society (Leslie and Brinkman, 1988; Heckman, 2011; Bowen, 2018). Likewise, the debate and partisan divide over financing public education is stronger than it has ever been (McLendon, Hearn, and Mokher, 2016). This comes at a time when the Secretary of Education, Betsy DeVos, proposed multiple funding cuts

to academic and after school programs, while promoting private school and charter school access (Meckler, 2019).

Public education has already appeared to be a main talking point for any democratic challenger in the 2020 presidential election. Ideas over how to properly fund and allocate resources to pre-kindergarten education, K-12 education, charter schools, trade schools, and higher-level scholarships, grants, and financial aid will continue to be debated. But until more definitive and current research is conducted on the return-of-investment for all of these areas, states and school administrators will continue to find ways to increase efficiency and effectiveness, without hurting taxpayers. This paper attempts to discover whether Oregon's open enrollment policy does just that, by returning marginal benefits with little cost and should be extended beyond 2019.

IV. Data and Descriptive Statistics

For this study, we collected Oregon and Washington data from the National Center for Education Statistics for the school years ending in 2007 to 2017. The variables collected include the school location, total enrollment, and White, Black, Hispanic, and free and reduced lunch student counts. In total, we collected data from 4,167 public schools across the states of Oregon and Washington. From there, we created dummy variables to indicate if Oregon's open enrollment policy is in effect and whether the school is located in four locales: city, suburb, town, and rural. We also created student population ratios based on their ethnicities and total enrollment. We then ran an event study and multiple linear regressions with the dependent variables being White, Black, and Hispanic population ratios and a free and reduced lunch ratio.

Although we were able to collect valuable data for our study on segregation and Tiebout sorting, there are a few limitations that surfaced. First, when it comes to analyzing open

enrollment, it is important to know what type of students are participating and what type of students are not. The data we collected did not give us the number or description of the students that schools allowed to leave or accept. Also, when a student chooses to change schools, one school's loss is another school's gain. And unfortunately, when looking at averages, the change in one school's demographics can be erased by the change of another school, making it appear no changes have occurred at all. However, we were able to categorize and stratify the data, while holding many other variables constant, minimizing these effects.

Also, we were unable to gather significant data on student outcomes, which is the main focus of open enrollment. We were unable to study the relationship between open enrollment and improvements in standardized testing or graduation rates. We were also unable to match schools with their funding and spending habits. This is another key factor to study, because open enrollment can create the possibility of funding disparities and inefficient spending practices.

From the fall of 2006 to the spring of 2017 we can make a few generalized observations. Table 1 shows us that although Washington state does appear to be more diverse than Oregon, the averages are relatively similar. It is important to note that the data from one school for a given school year equals one observation, and that Washington's school count is nearly twice that of Oregon.

Table 1

Oregon before implementing the policy:

Population	Observations	Mean	Standard Deviation
White Population	7,695	70.35%	19.65%
Black Population	7,695	2.57%	6.51%
Hispanic Population	7,695	16.91%	16.98%
Free and Reduced Lunch	7,516	48.94%	23.25%

Oregon after implementing the policy:

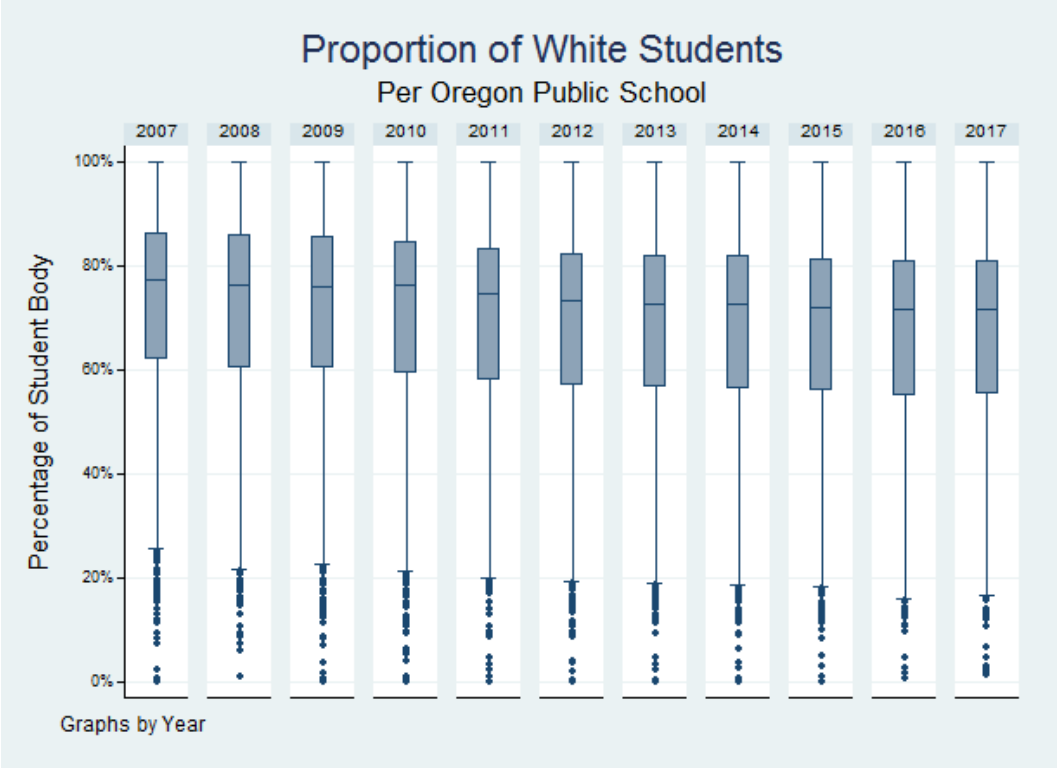
Population	Observations	Mean	Standard Deviation
White Population	6,821	66.40%	20.18%
Black Population	6,821	2.16%	5.52%
Hispanic Population	6,821	20.65%	18.37%
Free and Reduced Lunch	6,312	55.56%	21.00%

Washington for all years:

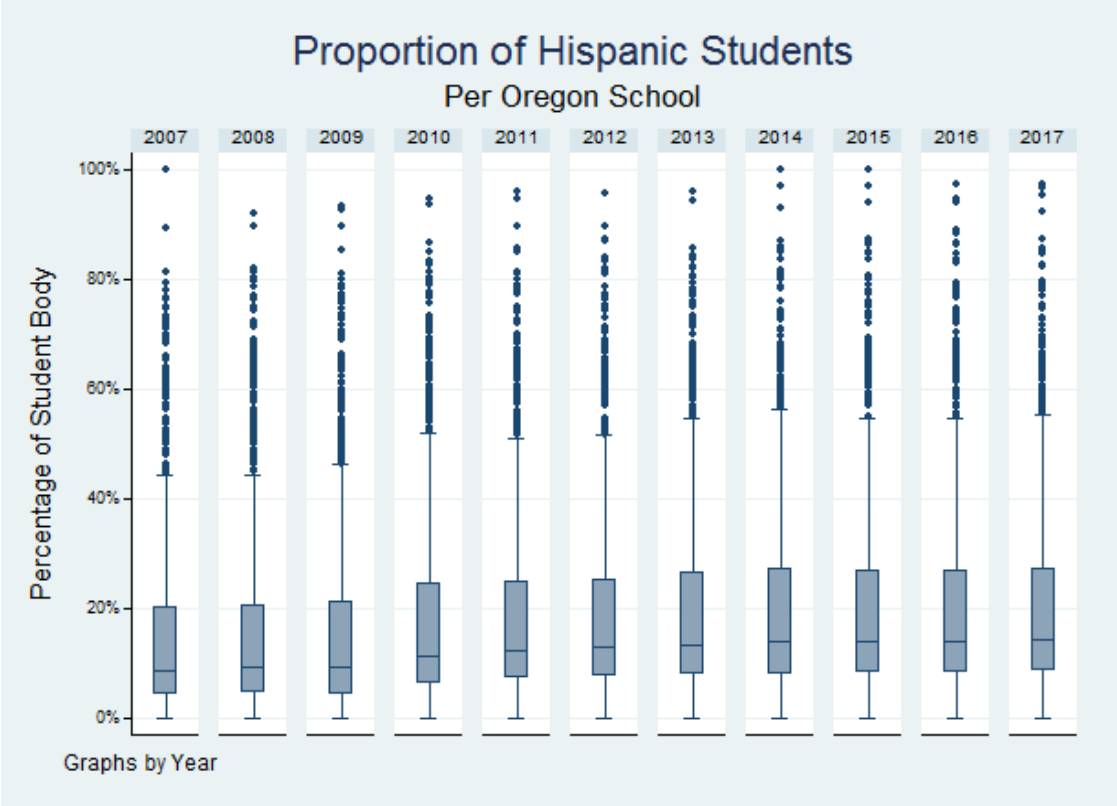
Population	Observations	Mean	Standard Deviation
White Population	27,240	62.48%	24.18%
Black Population	26,967	4.63%	8.09%
Hispanic Population	27,228	18.57%	20.19%
Free and Reduced Lunch	26,266	44.39%	25.07%

Note how the Oregon White student population ratio appears to have decreased in the years before and after implementing open enrollment, while the Hispanic ratio increased. Although these averages make it appear there is a large difference, this trend has actually been consistent over the 11 years of this study and can be seen in Graph 1 and Graph 2. Moreover, this trend is also consistent with US census data (Graph 3), in the fact that the White population has actually decreased in absolute terms and as a ratio of the national population, while almost all ethnic populations increased from the years 2010 to 2017.

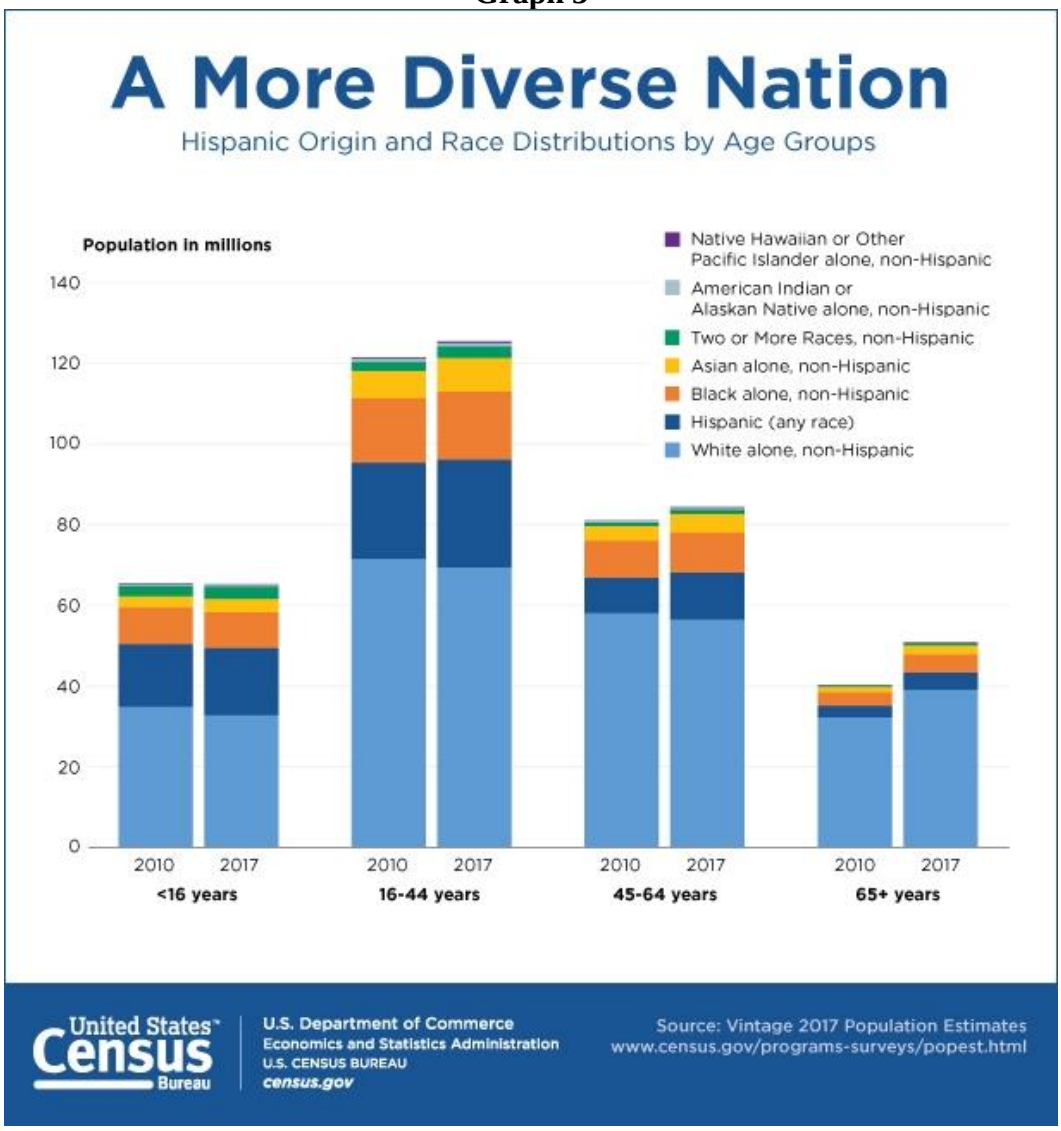
Graph 1



Graph 2



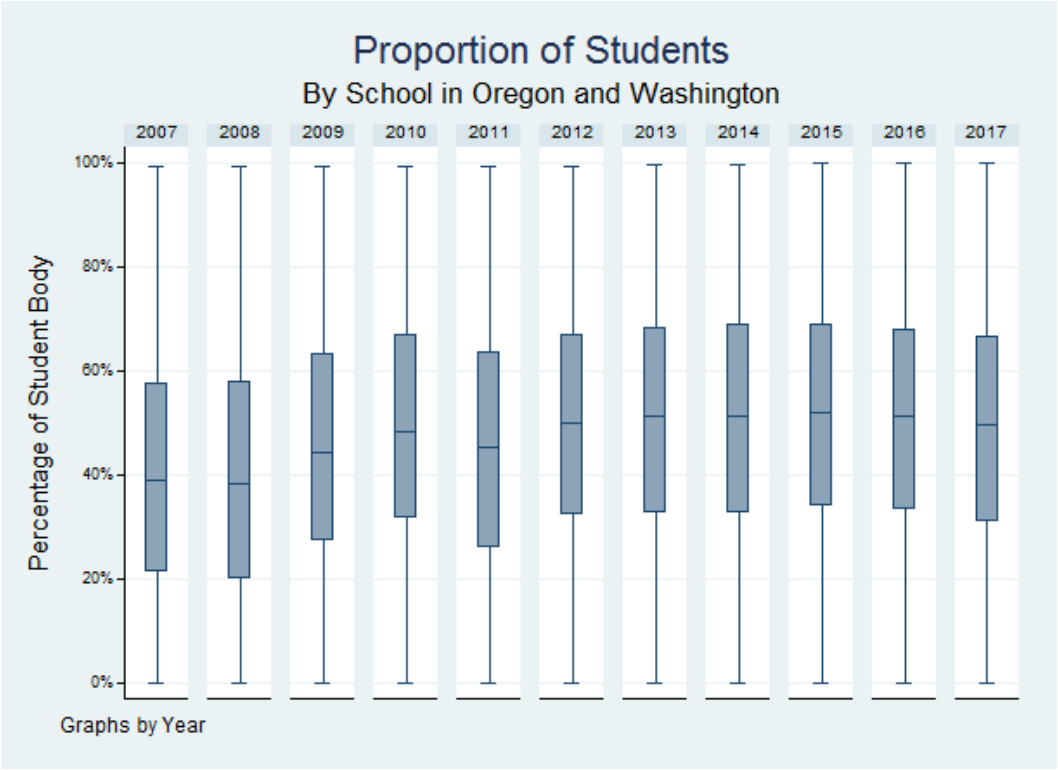
Graph 3



Lastly, it is important to mention the economic factor that we will test in this paper. Students that qualify for free and reduced lunch through the United States Department of Agriculture's National School Lunch Program varies slightly over the years and between both states, but the average hovers around 50%. However, when we separate the data between each school year, we can see that the number of students receiving free and reduced lunch began to

rise following the 2007-2009 recession, peaked in 2015, and then relatively flattened out (Graph 4).

Graph 4



V. Empirical Strategy

Although these general graphics and data can give us some idea of the demographic landscape in the Pacific Northwest during the time of the study, the point of this paper is to analyze whether Oregon's open enrollment policy creates scenarios where some demographics and populations are worse off than others or treated differently. Another key purpose of this study is to determine if open enrollment causes Tiebout sorting to occur. To do this, we must separately analyze the differences between geographic location, ethnic densities, and socioeconomic determinants.

The linear regression equation that we will use to analyze the results is as follows:

$$Y_{st} = \beta_0 + \beta_1 Policy_{st} + \delta X_{st} + \lambda_s + \theta_t + \varepsilon_{st}$$

where the dependent variable *Y* includes the fraction of White, Black, Hispanic, or free and reduced lunch students. The $Policy_{st}$ variable is a dummy variable, and will equal 1 for Oregon schools after the year 2012 and 0 if otherwise. The X_{st} variable will also vary for each regression, depending on what we are analyzing: locale, state, ethnic density indicators, etc. The λ_s and θ_t variables serve as a school and school year fixed effects, respectively. While the ε_{st} is the error term.

Because the demographics of each state are evolving every year, we use dummy variables and fixed effects in order to analyze the difference-in-differences for segregation and population ratios. This model helps us predict how large of an effect Oregon's policy actually has on school populations and diversity. However, another limitation is that we do not have the complete state demographic records. Therefore, we can not compare school populations to the populations of the entire community or state.

In addition to analyzing these effects across all districts, we also decided to run three regressions each with different stratification techniques. First, we ran regressions for schools in each of the four locales: city, suburb, town, and rural. Although it could happen, students that participate in open enrollment are rarely able to change between locations due to time and resource restrictions. Also, if Tiebout sorting does occur, we should see large disparities of change for the suburb category, where more choices are available, and less change in rural areas where choice is sparser.

The second regression separated the schools by their white population densities. The three categories included high white density (>66.66% of student body), medium white density (33.33 - 66.66% of student body), and low white density (<33.33% of student body). This

regression can easily show us how predominately White schools might become more segregated after the Oregon policy is enacted, while non-white schools become even less white.

Lastly, we stratified each school into three categories based on their socioeconomic status. Schools with a high ratio of students that qualify for free and reduced lunch (>66.66%), medium ratio (33.33 - 66.66%), and low ratio (<33.33%) marked the three categories. These regressions show us how students might change schools based on economic factors rather than demographic factors.

Table 2 displays the results from an event study consisting of the two years predating the policy change and the two years following the change. As one can see, although the policy intensifies the change, the ratio of White students was already slowly decreasing even before the policy went into effect. Likewise, the proportion of Hispanic students was slowly increasing as well. This is another possible limitation to this study. There is no significant trend in Black and free and reduced lunch students before the policy is enacted. It appears that White and Hispanic students are better able to participate in open enrollment than Black and free and reduced lunch students. This may be a function of resource constraints or information asymmetry.

Because the changes between race and socioeconomic demographics are minimal, but still significant, one could argue that the parallel trend assumption might not be met. Suggesting that the coefficients in this table may disrupt finding an effect in the main difference-in-differences results.

Table 2

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy (t-2)	-0.00424**	0.000378	0.00293*	-0.0142***
	(-2.79)	(0.70)	(2.12)	(-6.15)
Policy (t-1)	-0.00392**	-0.00181**	0.00391**	0.00607*
	(-2.69)	(-3.17)	(3.15)	(2.30)
Policy	-0.00639***	0.000197	0.00391***	0.00177
	(-4.67)	(0.42)	(3.61)	(0.64)
Policy (t+1)	-0.00992***	-0.000795*	0.00627***	0.0304***
	(-8.85)	(-2.14)	(7.30)	(7.37)
Policy (t+2)	-0.0154***	-0.00214***	0.0212***	0.0230***
	(-9.44)	(-5.55)	(17.52)	(5.60)
R-squared	0.9444	0.9133	0.9498	0.9056
N	24812	24812	24812	23567

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

VI. Results

First, we ran a regression on how the policy dummy affects White, Black, Hispanic, and free and reduced lunch populations for the four different locales. Table 3 shows the results from this regression.

The White student ratio is negatively affected by the policy dummy for all four locales, with reductions in the White student ratio ranging from 2.8 to 4.9 percentage points. These results suggest that despite what type of community a school resides in, after open enrollment went into effect, that school's ethnic composition became less White, ceteris paribus. The results are similar when looking at the Black student population as well. The ratio of Black students in a given school decrease after the policy went into effect, across all four locales. However, because

Oregon already has a small number of Black residents, the ratio of Black students only decreased by less than one percentage point, and most notably in City locations.

The Hispanic student ratio behaved much differently, however. The ratio of Hispanic students per school increased by 2.9 to 4.2 percentage points over all four locales due to open enrollment, holding other factors constant. The ratio of students receiving free and reduced lunch, reacted similar to that of the Hispanic population, although with greater intensity. Schools affected by the open enrollment policy experienced a rise in the proportion of students on free and reduced lunch, by between 3.8 and 6.5 percentage points, ceteris paribus.

The above findings suggest that the student composition is changing due to an increase in choice, but does Tiebout sorting explain the heterogeneity in the sizes of the effects across different locales? In most cases, suburban communities and towns consists of small school districts. Rural locations consist of large school districts where transportation between schools is either costly or unavailable, while urban settings might only have one large public school district to choose from. Therefore, we should see a larger magnitude of change in demographics among schools located in suburbs and towns. Table 3 supports this assumption that must be met for Tiebout sorting to occur (Corcoran).

Across White, Hispanic, and free and reduced lunch populations, the open enrollment policy affected suburban schools at a greater rate than any other setting. Because the frequency is higher in suburbs, this proves that families and students likely do "vote-with-their-feet." These families spend extra money, time and resources for their children to attend schools that they believe are a better fit for their specific interests. Leading to a larger change in school demographics, where White students might decide to leave ethnically diverse schools or Hispanic students decide to group together in Latino schools.

Table 3

Panel A: City locations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0281***	-0.00954***	0.0341***	0.0381***
	(-8.53)	(-5.20)	(13.64)	(9.09)
R-squared	0.8852	0.8790	0.8798	0.8432
N	11277	11259	11274	10923

Panel B: Suburb locations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0490***	-0.00164**	0.0415***	0.0651***
	(-16.11)	(-2.59)	(16.03)	(13.42)
R-squared	0.8755	0.8210	0.8729	0.8718
N	11461	11428	11459	11142

Panel C: Town locations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0377***	-0.00147***	0.0328***	0.0614***
	(-13.72)	(-3.83)	(14.17)	(12.88)
R-squared	0.9435	0.7080	0.9559	0.7982
N	6879	6832	6880	6658

Panel D: Rural locations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0328***	-0.000735	0.0286***	0.0551***
	(-9.46)	(-1.04)	(11.67)	(9.70)
R-squared	0.8776	0.4967	0.9069	0.7543
N	9196	9021	9188	8707

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Although we can take a lot from how populations within similar urban settings behave, it is also important to look at how schools of different ethnic compositions are affected by Oregon's open enrollment policy. Table 4 shows the results from a regression analysis stratified into three different categories defined by the density of the school's White population.

Table 4

Panel A: High White populations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0299***	-0.00259***	0.0252***	0.0617***
	(-20.23)	(-7.46)	(24.82)	(19.61)
R-squared	0.7213	0.6940	0.7345	0.8160
N	22976	22820	22969	21885

Panel B: Medium White populations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0350***	-0.00439**	0.0367***	0.0353***
	(-12.37)	(-3.22)	(15.15)	(8.10)
R-squared	0.7313	0.8728	0.8947	0.8517
N	12745	12694	12743	12364

Panel C: Low White populations only

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0215***	-0.00584	0.0305***	0.0169*
	(-4.99)	(-1.52)	(5.62)	(2.04)
R-squared	0.8183	0.9341	0.9377	0.7346
N	4889	4823	4886	4750

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Panel A consists of the schools in which the ratio of White students is greatest, panel B includes the schools in the middle third, and panel C lists the schools with the lowest White population.

Main takeaways from these regressions are that White student ratios appear to decrease across all categories. For schools with a high percentage of White students, the population ratios are more inclined to fluctuate when a non-White student moves into the school rather than a White student. Therefore, it is not surprising that when the policy dummy is applied to White student ratios, it has a negative value for schools with a high density of Whites. Also, when a school's White population is below 33%, by introducing open enrollment, the percent will decrease by more than two percentage points. This makes sense, because if a White student is a minority in their own school, research shows that by increasing choice, they will choose to move to a school with more similar peers. This makes the original school less White than it was before.

For the same reasons mentioned above, it is also no surprise that the Hispanic population ratios are positive. When a school is heavily populated with White students, every single additional minority has a positive effect on the percentage of total minority students. Also, when the percentage of White students is small, if White students decide to leave, the ethnic majority of the schools they are leaving behind grows.

Finally, the last factor worth analyzing is free and reduced lunch. Although all effects are positive, the policy has a greater impact for the schools with a higher percentage of Whites. The reason for this might be because students coming from lower social status might be motivated to move to Whiter public schools that offer better programs and have a better record of academic success (Condron and Roscigno, 2003). Therefore, increasing choice, motivates those who are

economically disadvantaged to move to better schools in order to break out of the cycle of poverty.

In order to further analyze the role and effects of social status in Oregon's open enrollment policy, we look to Table 5, where the regressions are stratified into three categories based on the density of poor students per school.

Table 5

Panel A: High free and reduced lunch ratio

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0328***	-0.00200	0.0298***	0.0120***
	(-11.24)	(-1.70)	(11.98)	(4.28)
R-squared	0.9232	0.9253	0.9311	0.6345
N	10946	10855	10938	9329

Panel B: Medium free and reduced lunch ratio

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0340***	-0.00302***	0.0326***	0.0408***
	(-17.64)	(-5.48)	(22.11)	(17.95)
R-squared	0.9154	0.9255	0.8795	0.6746
N	17848	17728	17846	17851

Panel C: Low free and reduced lunch ratio

	(1) White Ratio	(2) Black Ratio	(3) Hispanic Ratio	(4) Free/Reduced Lunch Ratio
Policy Dummy	-0.0310***	-0.00420***	0.0206***	0.0243***
	(-8.97)	(-4.34)	(10.24)	(6.43)
R-squared	0.8225	0.7267	0.7712	0.7521
N	11816	11754	11814	11819

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 shows that the proportion of White students decreases by about 3% throughout all types of schools when the open enrollment policy is in effect. While the proportion of Hispanic students per school increases. Again, this shows that segregation is actually not occurring due to open enrollment, rather, schools are becoming more diverse due to open enrollment.

However, the proportion of students receiving free and reduced lunch also increases per school, ranging from 1.2 to 4.1 percentage points. That means schools that already have a higher population of poor students, see an increase in the ratio of students from a lower social class. The best explanation for this increase is because students that are economically better off, might decide to move to a school that has more students similar to their social status. Leaving the composition of the student body poorer.

The increase in poor students, however, is felt greatest in schools in which about half the student body qualifies for free and reduced lunch. This is because not only do wealthier students leave for wealthier schools, but students from low socioeconomic backgrounds might try and break out of poor schools by moving to a school slightly better off. Schools that have the wealthiest student body also see an increase in the proportion of students in poverty. This is solely because when given the choice, students of low social status will choose the wealthier and more successful school, increasing the proportion of the receiving school's poor population.

VII. Discussion

There are three main takeaways from this study, that can be used to make more informed policy decisions in the future. First, Oregon's open enrollment policy actually decreased racial segregation. Second, the open enrollment policy increased access to "better" or "Whiter" schools

that receive more funding than those that are less White[3]. Lastly, there was statistically significant movement between schools and school districts, particularly in areas of greater choice, similar to the movement hypothesized by Charles Tiebout.

Whether the policy has successfully accomplished its purpose, of increasing competition in order to increase efficiency, is beyond the scope of this study. However, if the policy has had a positive impact on academic outcomes and school efficiency, and because this policy lacked the large consequence of segregation, politicians might want to consider extending the policy beyond its current expiration date.

A positive outcome of this policy that is evident from this study, is that the policy increased the amount of options and access to different and possibly better schools. Whether the school is better because it is located closer to a parent's work, the student body and faculty associate more with the student's preferences, or because the school is just wealthier and Whiter do not matter as long as the policy increases freedom of choice rather than suppresses it. On the surface, increasing freedom and choice should be viewed as positives.

Also, an important note for the policymakers, is that because these findings are consistent with Tiebout sorting, some basic underlying assumptions can be made, or at least should be further tested. Without Oregon's open enrollment policy, and subsequently Tiebout sorting, private school enrollment would increase, productivity would decrease as investments in education would fall, and centralized education controlled by the state would eliminate the competitive pressure provided by voting-with-your-feet (Somin).

Therefore, this study is only one piece of the puzzle as to the effects of open enrollment. Having now completed seven years of open enrollment in Oregon, more research should be

[3] https://edbuild.org/content/23-billion

devoted to the effectiveness and consequences this policy has on the state. As of now, I believe there is nothing that proves that this policy negatively effects the many stakeholders involved in Oregon's public education, and extending the policy before allowing it to expire is a viable option.

VIII. Conclusion

In summation, after analyzing Table 3, 4, and 5, we can assume that a modified form of Tiebout sorting does occur within Oregon public schools. Rather than families being forced to relocate in order to choose the public goods they wish to consume, Oregon's open enrollment policy allows for families to choose schools outside of their lawful district. The families that wished to participate still faced many costs however, both actual costs and opportunity costs.

Also, it is important to note that when the policy is implemented not every students' experience is similar. Some families have the opportunity to choose what school to attend, while some families do not have the resources or flexibility to do so (Plus, their school might not participate in the voluntary open enrollment policy). Also, when one student chooses to leave the district or when that student chooses to stay, his decision also affects the experiences of the students around him. Through this study, we can conclude that Oregon's interdistrict transfer policy has created a scenario where Oregon public schools in general have become more ethnically diverse, but also more concentrated among social class.

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