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DISCUSSION PAPER SERIES

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ABSTRACT

Which Colleges Increase Voting Rates?

We study how colleges shape their students' voting habits by linking millions of SAT takers to their college-enrollment and voting histories. To begin, we show that the fraction of students from a particular college who vote varies systematically by the college's attributes (e.g. increasing with selectivity) but also that seemingly similar colleges can have markedly different voting rates. Next, after controlling for students' college application portfolios and pre-college voting behavior, we find that attending a college with a 10 percentage-point higher voting rate increases entrants' probability of voting by 4 percentage points (10 percent). This effect arises during college, persists after college, and is almost entirely driven by higher voting-rate colleges making new voters. College peers' initial voting propensity plays no discernible role.

JEL Classification: I23, I26, D72

Keywords: college choice, returns to college, civic engagement, voting

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I. Introduction

Mass participation in elections is vital to the health of electoral democracy (e.g., Downs, 1957; Dahl, 1973; Wolfinger and Rosenstone, 1980; Verba et al., 1995; Galston, 2004; Cascio and Washington, 2014; Gentzkow, 2006; Washington, 2006), and institutions of higher education may play an important role in the democratic process by shaping the lifelong voting habits of college-educated adults. In the United States, college-educated adults are 50 percent more likely to vote than those with only a high school diploma (Ahearn et al., 2023; Ma and Pender, 2023), and some of this disparity is causal (e.g., Dee, 2004; Doyle and Skinner, 2017). Indeed, creating civically engaged citizens is a core mission of higher education and a central aim of public education policy (e.g. Colby et al., 2010; Holbein and Hillygus, 2020).

Yet, while an abundant literature has explored the voting effects of college enrollment and degree completion (e.g., Dee, 2004; Tenn, 2007; Kam and Palmer, 2008; Sondheimer and Green, 2010; Berinsky and Lenz, 2011; Henderson and Chatfield, 2011; Mayer, 2011; Mettler, 2005), scholars know less about how the *type* of college one attends shapes the voting decision (Mendelberg et al., 2021; Thomas et al., 2021; Firoozi, 2022). This is unfortunate, as American colleges vary widely in attributes thought to underpin their voting effects, from student composition and instructional quality to labor-market returns (e.g. Clotfelter, 2017; Hoxby, 2009). How does the college one attends affect one's chances of voting?

We study this question by assembling one of the largest and richest datasets to date linking students through high school and college to administrative voting records. We connect the universe of PSAT, SAT, and AP takers in the high school graduating cohorts of 2004 to 2012 to college enrollment data from the National Student Clearinghouse (NSC). The testing data include students' high school, demographics, SAT scores, and a proxy for their college applications, while NSC data capture the colleges in which they enrolled. We further link these education data to validated voting records indicating whether students voted in each general election between 2004 and 2016.

The millions of students in our data allow us to unearth voting rates at thousands of colleges across the U.S. by cohort and election. We document that colleges' relative voting rates are highly stable across cohorts and elections and vary systematically by institution characteristics: Relatively selective colleges, including R1 universities and liberal arts colleges, have the highest voting rates while two-year colleges have the lowest. These institutional characteristics do not explain all the variation in college voting rates, however. Thus, two students considering academically similar colleges might end up at colleges with significantly different voting rates.

We estimate the effect of initially enrolling in a higher voting-rate college on

a student's probability of voting in their mid- to late twenties.[1] Our identification strategy relies on two important and unique controls, in addition to control variables commonly used in studies of college choice and voter turnout. First, we control for whether students voted in their first eligible election, before entering college. We do so by limiting our analytic sample to students who were old enough to vote in high school during an election year—the oldest 25 percent of students in odd-year graduation cohorts. This powerful control allows us to make comparisons between individuals who have similar voting histories even before college entry. Second, we control for students' college application portfolios, following Dale and Krueger (2002) and others (e.g. Ge et al., 2022; Mountjoy and Hickman, 2021). In doing so, we leverage comparisons among students who apply to similar colleges but enroll in colleges with historically different voting rates. In robustness tests, we also layer on sibling fixed effects.

We find that initially enrolling in a college with a voting rate 10 percentage points higher than the alternative increases students' probability of voting in the 2016 presidential election by 4 percentage points (10 percent). We estimate turnout effects of similar magnitude (in percent terms) in the 2012 presidential election and the 2010 and 2014 midterm elections. Using the same methods, we also estimate that enrolling in an R1 university or liberal arts college increases entrants' voting probability by 3-4 percentage points (7-10 percent) relative to a two-year college. In part, this reflects the correlation between college selectivity and college voting rates, but both selectivity and college voting rates independently predict colleges' voting effects.

Next, we find little evidence that college peers' voting propensity is a prominent mechanism. We proxy college peers' voting propensity using the pre-college voting rates of enrollees who were eligible to vote in a presidential election held during their senior year of high school. Our null result echoes findings from studies that leverage random roommate assignment to estimate peer effects on post-college turnout (Klofstad, 2015) and more broadly contributes to literature on peer effects in educational settings (Epple and Romano, 2011; Sacerdote, 2011; Carrell et al., 2009) and in voting (Rosenstone and Hansen, 1993; Ajilore and Alberda, 2017; Fafchamps et al., 2020).

We then test a second mechanism—whether high voting-rate colleges activate new voters or re-mobilize previous voters. We find that high voting-rate colleges' turnout effects are almost exclusively driven by students who did not vote in their first eligible election. For students who voted in their first eligible election, attending a higher voting-rate college has no discernible voting effect. In other words, high voting-rate colleges increase turnout by activating new voters rather than by re-mobilizing previous voters. This aligns with prior research showing that turnout behavior is persistent (Coppock and Green, 2016; Fujiwara et al., 2016).

[1]This quantity of interest is analogous to that in Brown et al. (2023), which considers how county environments shape young adults' political behavior.

Finally, we find that the voting effects of enrolling in a high voting-rate college arise quickly—by the time students in our sample are 20 and typically beginning their second year of college. Moreover, those effects persist and may even grow over time. This suggests that many years of college enrollment are not required to increase voting rates.

Our findings make broad contributions to three literatures. First, we add to a longstanding literature in political science, education, and economics that considers the role of education in individuals' voting habits (e.g. Dee, 2004; Doyle and Skinner, 2017; Wolfinger and Rosenstone, 1980; Sondheimer and Green, 2010; Smets and Van Ham, 2013; Verba et al., 1995; Willeck and Mendelberg, 2022). This research estimates the impacts of additional years of schooling or educational attainment on voting, leveraging matching methods, distance instruments, and changes in state laws for identification. Studies find that an additional year of late-secondary schooling increases individuals' voting probability by 7-9 percentage points (Dee, 2004), while attending college increases turnout by 12-18 percentage points (Dee, 2004; Ahearn et al., 2023; Heckman et al., 2018), with incremental effects over each year of college (Doyle and Skinner, 2017) and an additional boost for college completion (Heckman et al., 2018).[2] We add to this literature by considering how education's voting effects vary *within* levels of educational attainment, demonstrating in particular that the voting effects of college attendance vary widely by institution type. While not our primary focus, we also leverage new data and a novel identification strategy to estimate that college attendance boosts voter turnout among students interested in higher education by 13 percentage points.

Second, we add to the vast literature on the consequences of college choice (e.g. Long, 2004; Hoxby, 2007, 2009; Smith, 2013; Mountjoy and Hickman, 2021; Lovenheim and Smith, 2022). This literature focuses almost exclusively on the impacts of college choice on degree completion and earnings (Lovenheim and Smith, 2022). Although many authors have discussed the potential effects of college choice on non-pecuniary outcomes, to date research in this area has been primarily descriptive (e.g., Ma and Pender, 2023). Drawing methodologically from college-choice studies that identify colleges' returns by matching students on application and/or admission portfolios (Dale and Krueger, 2002, 2011; Smith, 2013; Ge et al., 2022; Mountjoy and Hickman, 2021; Chetty et al., 2023), we estimate college voting effects that vary significantly by institution, showing how college choice affects one foundational civic behavior. This enterprise has great value given the foundational role that schools can, should, and (sometimes) do play in ensuring active participation in democracies.

Finally, our findings add to a growing body of scholarship that specifically considers how campus environments shape young adults' political behavior (e.g.

[2]Although some studies estimate small or null effects (e.g. Tenn, 2007; Kam and Palmer, 2008; Berinsky and Lenz, 2011; Persson, 2015), the bulk of this literature finds that college attendance increases voter turnout.

Firoozi, 2022; Mendelberg et al., 2017, 2021). Descriptive research in this vein shows that undergraduates' voting rates vary systematically by institution type (Thomas et al., 2021),[3] while causal studies find that attending certain types of colleges influences students' policy preferences and voting behavior (Firoozi, 2022; Mendelberg et al., 2017, 2021). We extend both strands of literature by recovering college voting rates—and college voting effects—across a much wider swath of higher education and shedding new light on the mechanisms at play. In particular, our results cast doubt on the importance of peer socialization in cross-college turnout disparities, contributing to a related stream of research on the role of campus norms and college peers in students' political behavior (Bergan et al., 2021; Klofstad, 2009, 2010, 2011, 2015; Strother et al., 2021; Shulman and Levine, 2012; Glynn et al., 2009).

The remainder of the paper proceeds as follows. The next section introduces our data sources and describes how we constructed our sample datasets. Section III defines college voting rates and describes how they vary by student- and college characteristics. Section IV discusses our theoretical framework and empirical strategy. In Sections V and VI we report our main results and additional results, respectively. Section VII concludes.

II. Data, Matching, and Samples

A. Data

This study primarily uses three datasets: (1) testing data covering the universe of PSAT, SAT, and Advanced Placement (AP) takers in the high school graduation cohorts of 2004-2012; (2) college enrollment data from the National Student Clearinghouse (NSC); and (3) national voting records. We describe each in turn.

B. Testing Data

The base data for this study are individual-level administrative records for all PSAT, SAT, and AP takers from the 2004-2012 high school graduating cohorts (21.3 million students). The analytic sample is limited to SAT takers. The SAT is one of two college entrance exams considered in admissions and program placement by thousands of colleges across the U.S. Approximately 1.3 million students per cohort take the exam. The SAT is scored between 400 and 1600—200 to 800 its math and verbal sections. Upon registration, students complete a questionnaire that captures their name, date of birth, and demographic characteristics such as gender, race/ethnicity, and parental income/education. SAT data also capture which high school students attend and their SAT scores on all attempts.

[3]The Institute for Democracy & Higher Education calculates student voting rates by college and selected student- and institution characteristics and shares these statistics with participating campuses. These data are not typically available to researchers and contain far less granular information than our dataset does.

The SAT data also include a record of students' SAT score sends, which indicate the set of colleges students are considering applying to and serve as a proxy for their college applications (Pallais, 2015; Smith, 2018). Score sends are official documentation of a student's SAT score frequently used in college admissions. When registering for the SAT (and just prior to receiving a score), students receive four free score sends. After students receive their SAT scores, each additional score send costs between $10 and $15, depending on the year. We observe up to 30 score sends per student.

The PSAT is an exam taken prior to the SAT. It qualifies students for scholarships and college outreach and is the qualifying exam for the National Merit Scholarship. It has broader reach than the SAT and is usually taken sophomore and/or junior year of high school. Students take AP exams at the end of a school year, typically after taking a corresponding AP course. Performing well on the exams can earn students college credit while still in high school.

C. College Enrollment Data

National Student Clearinghouse data are a near-census of college enrollment spells in the U.S. They include enrollment dates for each student in each college for approximately 98 percent of all enrollees in the U.S.[4] Our analyses focus on the first college in which students enrolled, but the data follow students if they attend multiple colleges. The data also record whether students earn a degree and, if so, the date, type (i.e. AA or BA), and field of study. NSC and SAT data are matched six years after students' high school graduation (e.g. NSC data on the 2006 high school graduation cohort record students' college enrollment history through the 2011-12 academic year).[5]

D. Voting Records

In the United States, each state collects and reports its own voting data, but all states publicly detail whether (but not for whom) each registered voter votes. We obtained nationwide voting data from the Data Trust, LLC—one of the many vendors in this space. The Data Trust combines and standardizes data from each state's election governing body on the tens of millions of people who vote in biannual national elections from 2004 to 2016.

The data primarily consist of state, name, date of birth (DOB), and whether a person votes in an election (primary and general). Thus, for someone who was 18 years of age by November 2004, we observe their voting history between 2004 and 2016.[6] We collapse the voting records into a single observation per person—as

[4]NSC data's biggest deficiency is for-profit colleges, despite including some of the largest ones.

[5]NSC data for the 2004 cohort tracks students for eight years.

[6]Voters can be removed from a state's records. Removals vary over time and by state but do not impact most voter records. Our analyses focus on recent elections where voters have not had a chance to be removed.

opposed to a single observation per person-state—based on name and DOB. This process is detailed in Appendix B.

E. Matching

We match the education records to the voting records using students' name and date of birth (DOB). We limit the dataset to individuals who live in the 50 states or D.C., so we remove international test takers, students from U.S. territories, and the very small number of students missing a DOB.

We start by matching unique name and DOB combinations from each dataset and then employ a series of fuzzy matching methods, as described in Appendix B. We also create a series of first-name, last-name, and first-and-last name identifiers for potential false matches (and non-matches) that we later use in robustness tests, including common names, partially missing DOB in the voting records, and females, who are more likely to change their last name. In a series of validation exercises in Appendix B, we show that the patterns of voting rates in our matched dataset follow those of nationally available statistics by age, race/ethnicity, and election.

F. Full Sample and Analytic Sample

The fully matched dataset includes all PSAT, SAT, and AP takers in the 2004-2012 high school graduation cohorts who attended high schools in the 50 states and Washington, D.C. (21.3 million students).

Our primary analytic sample comprises domestic SAT takers who satisfy two conditions. First, they were eligible to vote in a general election held during their senior year of high school. This age condition includes only the oldest 25 percent of students who graduated high school in the spring of 2005, 2007, 2009, and 2011, but it gives us valuable information about students' pre-college voting behavior. Second, students must have a score-send portfolio that includes at least one college that reports its first-year enrollees' 25th and 75th percentile SAT scores to IPEDS, which is important for our identification strategy, described later in Section IV. This leaves 843,158 students.

Appendix Table A1 summarizes the demographic characteristics, SAT performance, score-send portfolios, and voting histories of students in the full sample, SAT score senders, and students in the analytic sample. Students in the analytic sample are generally very representative of SAT score senders, but students in the analytic sample skew male, have slightly lower SAT scores, and are (unsurprisingly) 6-7 months older on average. They also exhibit higher turnout in their first eligible election, likely because this election took place during high school rather than college. Accordingly, in 2016 their turnout rate is similar to the turnout rate among all SAT score senders.

III. College Voting Rates

A. Constructing Voting Rates

Using the full sample of 21.3 million PSAT, SAT, and AP takers, we construct "college voting rates" by calculating the voting rate of each college's voting-age entrants by cohort and election. For example, we calculate the fraction of College A's entrants from the 2004 high school graduation cohort who voted in the 2004, 2006,..., and 2016 elections. That means each college's 2004 cohort has voting rates across seven elections.

We do the same for subsequent cohorts, but only for elections held after high school graduation.[7] For example, we calculate the fraction of College A's entrants from the 2006 cohort who voted in the 2006, 2008,..., and 2016 elections. Those six elections yield one fewer statistic than for the 2004 cohort. For the 2012 cohort, the last cohort we focus on, we only construct college voting rates in the 2012, 2014, and 2016 elections. Our main analyses focus on the 2016 election, which occurred after all cohorts had time to complete four years of college.[8]

Table 1 describes colleges' voting rates by cohort and presidential election. Data in each cell summarize voting rates for over 2,000 colleges. The top panel tabulates mean college voting rates by cohort and election. It shows that mean college voting rates increased across the 2004-2016 presidential elections, with smaller differences across cohorts within each election.

B. Variation in College Voting Rates

In this subsection, we show that college voting rates vary substantially, even within the same cohort and election (i.e. across institutions). We also show that this variation is correlated with several institutional characteristics (e.g. Carnegie Classification) but there remains meaningful variation in voting rates within institution type and among institutions with similar characteristics.

We first demonstrate the variation in college voting rates in the bottom panel of Table 1. For each cohort and presidential election, we calculate the ratio of voting rates for colleges at the 90th and 10th percentile of the distribution of college voting rates. We find that all 90-10 ratios are between two and three. In other words, the voting rates of colleges at the 90th percentile of the distribution are two to three times those of colleges at the 10th percentile of the distribution. These correspond to voting-rate disparities of 20-30 percentage points.

Figure 1 illustrates the variation in college voting rates by cohort and election graphically. The ridge plots show a wide distribution of college voting rates within

[7] Throughout all analyses, we also suppress voting rates for college-cohorts with fewer than 100 voting-age student observations.

[8] Since voting rates vary more by election than by age or cohort, we generally prefer to estimate voting probability in particular elections (pooling data across different-age cohorts) rather than pool across elections to estimate students' voting probability at a particular age.

every cohort and election, frequently including voting rates as low as 10 percent and as high as 60 percent. There is also variation across cohorts and elections.

Colleges' voting rates also vary by institutional characteristics. Figure 2 shows bivariate correlations between several college characteristics and the college voting rates of the 2004 cohort in the 2016 election, when most students were 30 or 31 years old. For example, the top left panel shows a correlation of 0.53 between colleges' average SAT score and voting rates. On the other hand, the bottom right panel shows a negative correlation of -0.37 between the share of Pell grant recipient enrollees (a measure of financial need) and voting rates.

Table 2 shows that the bivariate relationships depicted in Figure 2 hold for a broader set of cohorts and conditional on a host of other college characteristics. Specifically, we regress college-cohorts' voting rates in 2016 on college characteristics, with fixed effects for cohort and college state. Column 1 shows that R1 Universities have average voting rates 14.5 percentage points higher than Associate's Institutions (the omitted category). Institutions in all of the other mutually exclusive Carnegie Classifications also have higher average voting rates than Associate's Institutions, but to varying degrees. For example, Liberal Arts Colleges have average voting rates 13.9 percentage points higher than Associate's Institutions, but Other Bachelor's Institutions have voting rates only 5 percentage points higher than Associate's Institutions (an 8.9 percentage-point disparity).

Columns 2-4 show that even after controlling for Carnegie Classification, colleges with higher average SAT scores or graduation rates exhibit higher voting rates. Column 5 shows that colleges that serve more students, fewer in-state students, fewer Pell grant recipients, and more Black students have relatively higher voting rates.

The R^2 of the previous regressions are relatively high, around 75 percent. An important contributor to the explanatory power are the state fixed effects, since states' turnout rates differ in predictable ways. However, the 25 percent of unexplained variation in voting rates is something we exploit in our main analyses.[9] This implies that two students who attend similar colleges on many of the dimensions of selectivity and quality used in previous research may still attend colleges whose entrants vote at very different rates in early adulthood.

Lastly, in the Appendix, we show that colleges' relative voting rates are fairly stable across cohorts and elections. High or low voting-rate colleges remain as such regardless of the cohort, which suggests our results will not be sensitive to our choice of which cohort's college voting rate to use. Evidence of stability can be seen in Tables A2 and A3 and Figure A2.

[9]Figure A1 displays this variation by plotting the distribution of residuals from column 5 in Table 2. It shows that college voting rates vary meaningfully for every cohort, even after controlling for differences in basic institution characteristics.

C. Sorting into Colleges

In this section, we examine how students sort into colleges with different voting rates. Whether and how students sort into the many colleges across the U.S. is the subject of many studies (e.g. Long, 2004). We are unaware of any studies that examine how students sort into colleges based on the voting rate of the college. Beyond this contribution, it also helps us understand the variables that are important controls in our main specifications.

Table 3 displays results from a regression of the college voting rate of the college in which the student enrolls on student characteristics. The first column includes cohort fixed effects and the second column includes high school-by-cohort fixed effects.

Results in column 1 indicate that females enroll in colleges with voting rates similar to males. Black students enroll in colleges with voting rates about 3.5 percentage points higher than students from most other races, including those of unknown race (the omitted category). Differences in college voting rate by parental income and education are modest.

Table 3 also shows that both students' SAT math and verbal scores are positively associated with initially enrolling in higher voting-rate colleges. Finally, students who vote in their first eligible election enroll in colleges with voting rates 1.3 percentage points higher than those who do not vote in their first eligible election. This result underscores the value of initial voting behavior as a control in our empirical strategy.

Column 2 adds high school-by-cohort fixed effects. The gain in R^2 indicates that students' high school predicts about 40 percent of variation in college voting rates even after accounting for students' demographics and SAT scores, consistent with the finding that colleges' voting rates vary widely by place independent of their selectivity.

IV. Theoretical Framework and Methodology

A. Theoretical Framework

In this section we develop a general framework for understanding how colleges' voting effects vary by institution attributes, including the college-average voting rate.

To begin, let $V_{ij}(t)$ represent the propensity to vote of person i, who attends college j, in year t,[10] as described below:

$$V_{ij}(t) = f(X_i(t), Z_j(t)) \tag{1}$$

f has two arguments. The first, X_i, is endowed to people prior to college entry.

[10]For simplicity, assume an election and year are the same.

It can include sex, race, parental circumstances, high schooling experiences, etc. It is also a function of t because people with different attributes or endowments can have different propensities to vote as they age and in different elections.

The second argument that determines the propensity to vote is Z_j, which can be considered experiences at place j the first few years after high school. In this context, we focus on experiences at the first college attended, but Z_j could include workplace experiences for those who do not enroll in college.

To start, we assume both linearity and additive separability between the two arguments such that we can re-write someone's propensity to vote as:

$$V_{ij}(t) = g(X_i(t)) + h(Z_j(t)) \tag{2}$$

Here, $g(X_i(t))$ captures a person's latent voting propensity before college entry, while $h(Z_j(t))$ represents the college's value-added on their voting propensity. Furthermore, we can express a person's pre-college voting propensity as:

$$g(X_i(t)) = \sum_k \alpha_k * x_{ik}(t) \tag{3}$$

where α_k are the weights on each of the k attributes in X. This yields one of our first key equations:

$$V_{ij}(t) = \underbrace{\sum_k \alpha_k * x_{ik}(t)}_{\substack{\textit{Pre-College Voting} \\ \textit{Propensity}}} + \underbrace{h(Z_j(t))}_{\textit{College Value-Added}} \tag{4}$$

The first part of the equation captures the influence of pre-college attributes on voting. The second part of the equation is the college value-added. Although a college could exert differential effects depending on a student's pre-college attributes, we will simply model the college effect as a homogeneous, college-specific effect on entrants' propensity to vote that may vary over time.

As noted earlier, colleges can influence a student's propensity to vote in a variety of ways. Therefore, we can further catalogue the college's contribution to the propensity to vote into the attributes of a college that influence voting:

$$h(Z_j(t)) = \sum_l \beta_l * z_{jl}(t) \tag{5}$$

In this equation, β_l are the weights on each of the l attributes in Z. In our context, the attributes z describe a college j. They can include, for example, the college's

selectivity, level of instruction (two-year or four-year), curriculum, location, etc.

One college attribute of particular interest is the voting propensity of a student's college peers (e.g. Firoozi, 2022; Klofstad, 2011, 2015; Mendelberg et al., 2017, 2021; Shulman and Levine, 2012; Strother et al., 2021). We express this attribute by disaggregating $h(Z_j(t))$ further:

$$h(Z_j(t)) = \frac{\beta_{l'}}{I-1} * \sum_{-i} g(X_{-i}(t)) + \sum_{l} \beta_l * z_{jl}(t) \tag{6}$$

This decomposition of the college value-added separates the contribution of non-peer college attributes $z_{jl}(t)$ from the peer effects of college j.[11] Following the peer effects literature, we consider the average pre-college voting propensity of the peers (excluding person i) from college j that has I students, all scaled by a parameter $\beta_{l'}$.

Putting equations 4 and 6 together yields our second key equation:

$$V_{ij}(t) = \underbrace{\sum_{k} \alpha_k * x_{ik}(t)}_{\substack{\textit{Pre-College Voting} \\ \textit{Propensity}}} + \underbrace{\frac{\beta_{l'}}{I-1} * \sum_{-i} g(X_{-i}(t))}_{\textit{Peer Effects}} + \underbrace{\sum_{l} \beta_l * z_{jl}(t)}_{\substack{\textit{Effects of Non-Peer} \\ \textit{College Attributes}}} \tag{7}$$

The first part of the equation captures the influence of pre-college attributes on voting. The second part of the equation captures peer effects, defined as the voting effects of college peers' pre-college voting propensity. The third part captures the voting effects of all other attributes of the college.

Next, we aggregate the above individual-level voting propensities to the college level to show how college-average voting propensities relate to colleges' voting effects. Averaging across all students in college j, equation 2 yields:

$$\bar{V_j}(t) = \underbrace{\overline{g(X_i(t))}}_{\substack{\textit{Mean Pre-College} \\ \textit{Voting Propensity}}} + \underbrace{h(Z_j(t))}_{\textit{College Value-Added}} \tag{8}$$

Equation 8 shows that the mean voting propensity of a college's entrants consists of entrants' mean pre-college voting propensity and the college's voting effect. Barring strongly negative selection, we can therefore expect the mean voting propensity of a college's entrants, $\bar{V_j}(t)$, to positively predict its voting effect, $h(Z_j(t))$.

As shown above, the college voting effect itself includes voting-propensity peer

[11] For succinctness, we use the term "peer effects" to reference the voting effects of college peers' voting propensity, but it is possible that other college-peer attributes could influence voting.

effects. Disaggregating $h(Z_j(t))$ as in equations 6 and 7, equation 8 therefore becomes:

$$(9) \quad \bar{V_j}(t) = \underbrace{\overline{g(X_i(t))}}_{\substack{\textit{Mean Pre-College} \\ \textit{Voting Propensity}}} + \underbrace{\beta_{l'} * \overline{g(X_i(t))}}_{\textit{Peer Effects}} + \underbrace{\sum_l \beta_l * z_{jl}(t)}_{\substack{\textit{Effects of Non-Peer} \\ \textit{College Attributes}}}$$

which simplifies to:

$$(10) \quad \bar{V_j}(t) = (1 + \beta_{l'}) * \underbrace{\overline{g(X_i(t))}}_{\substack{\textit{Mean Pre-College} \\ \textit{Voting Propensity}}} + \underbrace{\sum_l \beta_l * z_{jl}(t)}_{\substack{\textit{Effects of Non-Peer} \\ \textit{College Attributes}}}$$

Equations 9 and 10 show that the mean pre-college voting propensity of a college's entrants influences $\bar{V_j}(t)$ both through sorting effects and peer effects. The sole component of $\bar{V_j}(t)$ that is not determined by entrants' mean pre-college voting propensity is the portion of colleges' voting effects arising from non-peer college attributes rather than voting-propensity peer effects. Once we separate the mean pre-college voting propensity out of the mean voting propensity, we are therefore left with the voting effects of non-peer college attributes. In our empirical strategy, we will leverage this relationship to estimate the role of peer effects versus non-peer mechanisms in colleges' voting effects.

Measuring Propensities to Vote

Our above framework suggests that there are several different voting propensities we need to measure at the individual and college level. We do not observe voting propensities, but rather, we observe whether individuals vote in several elections. These data lend themselves to an empirical framework in which an individual's propensity to vote is measured by their probability to vote:

$$(11) \quad V_{ij}(t) = Prob(Voted_{ij}(t) = 1)$$

At the college level, we extend equation 11 to a student's college peers by averaging across enrollees:

$$(12) \quad \bar{V_j}(t) = \frac{1}{I} \sum_i Prob(Voted_{ij}(t) = 1)$$

This is the same as the college-average voting rate. Our data allow us to consider

variants of equation 12 with different cohorts and elections. By doing so, we make headway in disentangling determinants of college value-added, such as peer political engagement versus other college attributes.

In our primary specifications, we use a post-college voting rate to proxy the average post-college voting propensity of each college's entrants, $\bar{V}_j(t)$. Specifically, we employ the voting rate of each college's entrants from the 2004 high school graduation cohort in the 2012 election.

By contrast, to proxy the average pre-college voting propensity of each college's entrants, $\overline{g(X_i(t))}$, we calculate the pre-college voting rate of the subset of entrants in the 2005 and 2009 high school graduation cohorts who were old enough to vote in the 2004 and 2008 presidential elections, which occurred during November of their senior year of high school.[12] This college-level measure captures college peers' propensity to vote prior to any college experience (i.e., the treatment).

We acknowledge that these measures of college voting rates include some measurement error, something we address in robustness tests. First, we only observe students who interacted with a College Board assessment. Some college students do not take any of these exams. Second, colleges can be large and varied, and the peer group most likely to influence a student's future turnout is not obvious. Finally, our matching process was imperfect. The noisiness of these proxies motivates some of our robustness tests.

With our college-level measures of propensities to vote, we are left with the following equation describing students' propensity to vote:

$$Prob(V_{ij}(t) = 1) = \sum_k \alpha_k * x_{ik}(t) + \sum_l \beta_l * z_{ijl}(t) + \bar{V}_j(t') + \epsilon_{ij}(t) \tag{13}$$

$\bar{V}_j(t')$ is some college-average voting rate measured at a time t', which is before time t. Lastly, $\epsilon_{ij}(t)$ is an error term.

B. Empirical Strategy

We examine how the first college a student attends impacts their probability of voting in subsequent elections. We begin by estimating variations of the empirical analogue to equation 13. Specifically, we use OLS to estimate the following regression:

$$y_{ije} = X_i'\mathrm{A} + \alpha PastVote_i + AppPort_i + Z_j'B + \beta VotingRate_j + \epsilon_{ije} \tag{14}$$

y_{ije} indicates whether student i who initially enrolls in college j votes in election

[12]For this subsample, we pool student observations across the two cohorts and recover colleges' relative voting rates from a regression of initial voting on college- and election dummies. This measure captures cross-college differences in the pre-college voting rates of entrants who were old enough to vote in the 2004 and 2008 presidential elections as high school seniors.

e. Our main analyses consider voting in the 2016 election—the latest election we observe—which occurred after all sample students had time to complete four years of college, but we also test the robustness of our results in other elections.

The first three right-hand side terms, X, $PastVote$, and $AppPort$, include pre-college attributes that capture students' pre-college propensity to vote in election e, as detailed in equation 4. X includes demographics (sex, race/ethnicity, parental income and education, cohort), academics (SAT math and verbal scores), and high-school fixed effects.

$PastVote_i$ indicates whether student i voted in the election held in November of their senior year of high school. (We limit the analytic sample to students who were eligible to vote in such an election.) This is typically the first election in which the student is eligible to vote and, for college goers, the last election before college entry.[13] Students' pre-college voting behavior is an intuitively appealing proxy for their pre-college propensity to vote in election e, and it predicts their later voting quite well: in 2016, when 39 percent of sample students voted, the 22 percent of students who voted in their first eligible election were more than twice as likely to vote (68 percent) as the 78 percent of students who did not (31 percent). In practice, we interact $PastVote$ with cohort fixed effects to account for cohorts facing different elections and circumstances.

Following related work (e.g. Dale and Krueger, 2002; Mountjoy and Hickman, 2021; Ge et al., 2022), equation 14 also includes student i's college application portfolio, $AppPort_i$.[14] This is a useful control because students' college application portfolios contain valuable information about their academic achievement, college ambitions, and lifestyle interests not captured in their demographic characteristics or SAT scores. College-application behavior may also reflect non-cognitive skills relevant to the voting process, like students' ability to complete a sequence of time-sensitive administrative tasks.

We implement the application portfolio control in two ways. In our most demanding specifications, we include separate indicators for each distinct portfolio of college applications, leveraging comparisons among students who apply to the exact same set of colleges but ultimately enroll in colleges with different characteristics. This approach powerfully and flexibly controls for a multidimensional array of unobserved student characteristics, but it necessarily excludes students with unique application portfolios from the regression sample.[15] For this reason, our preferred specifications instead follow Dale and Krueger (2002) by controlling for relevant characteristics of students' application portfolios—specifically, the number of colleges in the portfolio and the minimum, mean, and maximum of their average freshman SAT scores. This enables us to control for key differences in students' academic achievement and college aspirations while employing an

[13] We call this (somewhat loosely) students' first election or first eligible election.

[14] Unlike prior work (e.g. Mountjoy and Hickman, 2021), we do not observe admissions outcomes and thus cannot control for students' *admissions* portfolios.

[15] This disproportionately excludes students with larger application portfolios and those who apply to private and out-of-state institutions.

analytic sample that is generally representative of college applicants.

The final two sets of variables, Z and $VotingRate$, describe the college's contribution to student i's voting propensity, as detailed in equations 4 and 5. These two variables take various forms in our analyses, which sometimes omit one or the other, leading to different interpretations. Regressions with Z include indicators for Carnegie Classifications (e.g., liberal arts, R1 university, etc.) or measures of selectivity, such as average freshman SAT score and graduation rates. We also include an indicator for students who do not enroll in college.[16]

Regressions with $VotingRate$ include a measure of the college voting rate.[17] As noted above, our main analyses use the college voting rates of the 2004 cohort in the 2012 election. Using college voting rates in the 2012 election allows us to use a voting rate from an election prior to our main election (2016) that took place when members of the 2004 cohort were out of college and about the same age as the average sample student was in 2016.[18]

Finally, some of our regressions separate peer effects from the influence of other college attributes, as detailed in equations 7 and 10. In these regressions, we include a measure of peers' pre-college voting rate, sometimes in addition to entrants' post-college voting rate. These alternative measures include independent variation that can be used to disentangle peer effects from the effects of other college attributes, as outlined in equation 10.

C. Identification

We aim to identify the average causal effect of attending various types of colleges on entrants' probability of voting in their mid- to late twenties. The primary inferential challenge is overcoming students' sorting into colleges on unobserved characteristics correlated with their later voting behavior. Earlier results show evidence that students sort into college based on observables related to voting, so concern about the threat of unobservables is warranted.

We therefore assess the likely extent of imbalance on unobservables using a covariate balance test that assesses conditional balance in predicted outcomes by college characteristics, following Mountjoy and Hickman (2021). The idea is to construct a reasonable proxy for students' (unobserved) pre-college voting propensity and estimate how much imbalance in that proxy measure remains after controlling for our preferred control variables. Specifically, we run a two-step procedure. First, we predict students' probability of voting using an extensive set of pre-college characteristics: gender, race/ethnicity, parental education, parental income, SAT verbal score, and fixed effects for students' specific high school and

[16]Including non-college goers in the analytic sample helps identify the coefficients on key control variables. We dummy out continuous college attributes for these students.

[17]We also include a dummy variable for students who enroll in colleges where we observe fewer than 100 voting-age students and cannot accurately asses the true voting rate.

[18]As noted previously, the stability of college voting rates over time implies that our measure and results are largely unchanged when using alternative measures of college voting rates.

cohort. The equation is:

$$y_{ije} = \chi_i'\gamma_1 + Cohort_i + \epsilon_{ije} \tag{15}$$

where χ_i includes all student attributes in X_i apart from SAT math scores. Fitting this model allows us to predict each student's voting probability, $\hat{y}_{ije}$. We then regress students' covariate-predicted voting probabilities on college voting rates, controlling for cohort fixed effects and four key controls: students' SAT math scores, application portfolio measures, initial voting, and high school state:

$$\begin{aligned}\hat{y}_{ije} = \delta_1 VotingRate_j + \delta_2 SATMath_i + \delta_3 PastVote_i + AppPort_i \\ + HSState_i + Cohort_i + \epsilon_{ije}\end{aligned} \tag{16}$$

We are interested in δ_1, which indicates whether students who enroll in higher voting-rate colleges have characteristics associated with voting in early adulthood, conditional on these four attributes. Ideally, we cannot reject the null hypothesis that $\delta_1 = 0$, which would indicate that these control variables sufficiently control for student sorting into high voting-rate colleges by voting propensity.

Appendix Table A4 presents balance test results by college voting rate. Results in column 1 indicate large unconditional imbalances in voting propensity by college voting rate: they show that attending a college with a 10 percentage-point higher voting rate is associated with a 7.2 percentage-point higher covariate-predicted voting probability.[19] After applying our four key controls in column 2, this imbalance attenuates 81 percent to 1.4 percentage points. In column 3 we find similarly modest imbalance when controlling for portfolio fixed effects rather than portfolio summary statistics. Column 4 adds sibling fixed effects to the model in column 2 and reports 0.2 percentage points of conditional imbalance in covariate-predicted voting probability.[20]

Table A5 presents analogous balance test results by three other college attributes: Carnegie Classification, average freshman SAT score, and graduation rate. As in Table A4, we find sizable unconditional imbalances, but our four controls attenuate those imbalances considerably, often by two-thirds or more. To address the remaining imbalances, our main specifications include controls for the full set student characteristics that were imbalanced, χ_i. Between the small amount of imbalance and the additional controls in χ_i, any bias in our results due to unobservables is likely quite small.

[19] For comparison, a measure of 2016 voting probability predicted from all our preferred controls indicates an unconditional imbalance of 7.6 percentage points. Two other pieces of evidence suggest this covariate-predicted probability is a reasonable proxy for students' pre-college voting propensity: First, it predicts 2016 voting nearly as well as initial voting does—with an R^2 of 0.08 vs. 0.10. Second, a measure of covariate-predicted *initial* voting probability constructed from the same covariates emulates imbalances in initial voting by college voting rate: a 10 percentage-point increase in college voting rate is associated with a 5.8 percentage-point increase in initial voting probability and a 4.7 percentage-point increase in this covariate-predicted initial voting probability.

[20] In the portfolio fixed-effects subsample used in column 3, the unconditional imbalance is 0.076. In the sibling fixed-effects subsample used in column 4, the unconditional imbalance is 0.077.

Finally, Appendix Tables A6 and A7 present results from a second, alternative set of balance tests. These tests employ students' pre-college voting as a proxy for their pre-college propensity to vote in 2016. They then assess imbalance in students' pre-college voting conditional upon all of our preferred control variables apart from initial voting itself. In most cases, these controls attenuate about two-thirds of the imbalance in students' initial turnout by college type. Since initial voting is among our most powerful controls, these tests are quite conservative; the reported imbalances represent an upper bound on the imbalances in voting propensity that remain after applying our full set of controls.

V. Main Results

A. Impact of Attending a Higher Voting Rate College

We begin our analysis by examining the impact of attending a higher voting rate college on students' probability of voting in the 2016 election, when most sample students are 24-30 years old. In Table 4, column 1 only controls for students' cohort and shows that the unconditional relationship between college and student voting rates in early adulthood is almost one-to-one. That is, attending a college with a 10 percentage-point higher voting rate predicts a 9.9 percentage-point higher probability of voting in 2016. Sample students who did not enroll in college are 19.8 percentage points less likely to vote than those who did enroll in college.

Column 2 adds controls for typical student observables—gender, race/ethnicity, parental education, parental income, and SAT math and verbal scores—as well as high school fixed effects. Our coefficient of interest falls to 4.9 percentage points in the presence of these controls. This coefficient then holds steady at 4.8 percentage points in column 3, which adds controls for characteristics of students' college application portfolios.

Column 4 reports results from our primary specification, which corresponds to equation 14. It includes initial voting-by-cohort fixed effects in addition to controls for student characteristics, high-school fixed effects, and portfolio characteristics. We find that enrolling in a college with a 10 percentage-point higher voting rate increases students' probability of voting by 4.1 percentage points.

This estimated effect is statistically and practically significant. Sample students' 2016 voting rate is 39.4 percent, so a 4.1 percentage-point voting effect constitutes a 10 percent increase in voting probability. Notably, this estimated effect size is about 40 percent of the unconditional partial correlation reported in column 1, which suggests that student sorting into colleges explains most of the correlation between college voting rates and student voting. Still, college voting effects play an important role: Accounting for the increased standard deviation in college voting rates in 2016 (8.8 percentage points) compared to 2012 (6.4 percentage points), this result implies that colleges' voting effects drive 30 percent of the variation in college-average turnout among college-educated adults aged

24-30 ($4.1/8.8 * 6.4/10 = 0.30$).

The model in column 4 also estimates that non-college goers are about 13 percentage points (31 percent) less likely to vote than the average college goer. This result is roughly in line with other estimates in the literature (e.g. Dee, 2004) but arises from a different identification strategy.[21]

Columns 5 and 6 test the robustness of these results to two sets of additional controls. Column 5 includes portfolio indicators in place of portfolio summary statistics, implementing fixed effects for each of more than 37,000 distinct score-send portfolios. Doing so subsets the sample to students with non-unique scores-send portfolios. Nevertheless, the coefficient of 3.9 percentage points is statistically indistinguishable from that in our preferred specification.[22]

Finally, column 6 reports results from a model that includes sibling fixed effects.[23] This specification leverages comparisons among siblings who attend different colleges, controlling for unobserved family attributes that bear on students' voting propensity and college choice.[24] To implement this control, we need to narrow the sample to only 32,826 students who have at least one sibling who also meets the sample criteria. Despite this adjustment, the coefficient of interest (0.046) is similar to that reported in column 4 (0.041), which suggests that our main finding is robust to this alternative identification strategy.[25]

B. College Voting Effects by Institution Characteristics

Table 5 examines how other institution characteristics predict colleges' voting effects, fitting variants of Equation 14. Column 1 estimates the voting effects of enrolling in different types of institutions. On average, attending an R1 University boosts entrants' voting rates 2.7 percentage points more than attending an Associate's Institution (the omitted category). Other Doctoral and Master's Universities exert average voting effects 1.7 percentage points greater than two-year institutions. Liberal Arts Colleges increase their entrants' voting probability 4.0 percentage points more than two-year colleges, while Other Bachelor's Institutions increase their entrants' voting rates no more than two-year colleges (0.0 percentage points). The coefficient on Other Institutions is 2.4 percentage

[21] Dee (2004) uses a distance to two-year college campus instrument and finds that college attendance increases voter participation by 17 to 22 percentage points.

[22] In this sample, the unconditional partial correlation between college voting rates and voting in 2016 is 0.102, statistically indistinguishable from the coefficient reported in column 1.

[23] Siblings are identified from previous work with these data. Generally speaking, they are defined as students with the same last name, home address, and high school. See Goodman et al. (2015) for more details and limitations.

[24] One drawback of this approach is that siblings might influence each other's voting behavior after college entry, with college voting effects spilling over from one sibling to another. In this case, controlling for siblings' voting behavior would control away some of the college's influence, downwardly biasing estimates of the college effect. We find no evidence of this problem, however.

[25] In this sample, the unconditional partial correlation between college voting rates and voting in 2016 is 0.103 and the coefficient from a specification like that reported in column 4 is 0.040. These coefficients are statistically indistinguishable from those reported in columns 1 and 4, respectively.

points.[26] All of these coefficients are much larger than the estimate for non-college goers, which indicates that forgoing college rather than attending an Associate's Institution reduces students' voting probability by an average of 10.9 percentage points.

Columns 2 and 3 show that colleges' average freshman SAT score and graduation rates—two common measures of college selectivity and quality—both positively predict their voting effects. On average, attending a college with an average SAT score 100 points higher than the alternative increases a student's probability of voting by 0.9 percentage points. Similarly, attending a college with a graduation rate 10 percentage points higher than the alternative increases a student's probability of voting by 0.7 percentage points.

Finally, columns 4-6 show that these patterns do not fully attenuate after controlling for college voting rates. This implies that there is something about these college types that influences students' voting probability independent of their correlation with college voting rates. Conversely, the association between colleges' voting rates and -voting effects attenuates only slightly after controlling for these institution characteristics, despite the strong correlations between institution characteristics and college voting rates (Table 2). Collectively, these results show that several distinct institutional attributes independently predict colleges' voting effects, which suggests that the specific college in which a student enrolls can have important effects on their voting behavior.

C. Robustness Tests

We conduct a series of robustness tests on the main results reported in Tables 4 and Table 5. First, to address measurement error in our measure of college voting rates, we instrument college voting rates in 2012 with the 2004 cohort's college voting rates in the 2014 election. These highly correlated measures help alleviate attenuation bias from our noisy measures of college voting rates and accordingly yield larger effect estimates, reported in Appendix Tables A8 and A9.

Second, we confirm that our results are robust to controls for college-state fixed effects (Appendix Tables A10 and A11). A college's political geography can be considered a part of its treatment, but any effect of enrolling in a college's state may not be specific to the institution. By controlling for state fixed effects, we remove any turnout effects attributable to the college's state itself.

Third, we confirm that our results are robust to alternative measures of our treatment variable—college voting rates. In Appendix Table A12, we find similar results when using college voting rates of the 2004 cohort in every election year between 2008 and 2016.

Fourth, we employ alternative samples, and fifth, we use alternative functional forms (squared and non-parametric quartiles of college voting rate) to examine whether colleges' average voting effects are a linear function of their college voting

[26]These institutions are predominantly art schools and specialized technical colleges.

rates. Appendix Tables A13 and A15 show that these alternative specifications yield similar results.

Finally, in Appendix Table A14 we fit models that include all 8.5 million score senders in the 2005-2012 high school graduation cohorts but do not control for students' initial voting behavior. For comparison, we also fit these models in our analytic sample. Results from these specifications are very similar across both the 8.5 million-student sample and our analytic sample, indicating that our main results are not particular to our analytic sample.

VI. Additional Results

A. Mechanisms

In this section, we investigate how high voting-rate colleges increase their entrants' post-college turnout.

Peers

First, we test whether peer effects drive high voting-rate colleges' turnout effects. The first two models in Table 6 test whether college peers' pre-college voting propensity is an attribute of a college that influences a student's voting probability, as discussed in section IV.

Column 1 shows that the pre-college voting rate of a college's entrants positively predicts its voting effects: on average, attending a college that enrolls students with a 10 percentage-point higher initial voting rate increases a student's probability of voting by 1.9 percentage points. In standardized terms, this coefficient is statistically indistinguishable from the coefficient on post-college voting rate in Table 4 column 2.

However, we find that this relationship is confounded by other college attributes, not indicative of peer effects. The specification reported in column 2 includes both the post-college voting rate and college peers' pre-college voting rate. As shown in equation 10, this isolates the component of colleges' voting effects that arises independent of voting-propensity peer effects. If voting-propensity peer effects play a role in colleges' voting effects, the coefficient on post-college voting rates should therefore fall below its value of 0.041 in our main specification (Table 4 column 4), while the coefficient on pre-college voting rates should be positive and statistically significant. Instead, we find that controlling for peers' pre-college voting rates leaves the coefficient on the post-college voting rate statistically indistinguishable from its value in our main specification, while the coefficient on college peers' pre-college voting rate attenuates to a statistically insignificant 0.2 percentage points. This implies that college peers' mean pre-college voting propensity plays no causal role in colleges' voting effects.

New or Persistent Voters?

The third model in Table 6 explores whether high voting-rate colleges' documented turnout effects operate mainly by activating new voters who had not previously voted or by re-mobilizing those who voted while in high school.

The coefficient on the interaction term between college voting rate and students' turnout behavior in their first eligible election are opposite signed and nearly equal to the uninteracted treatment effect. This suggests that students who voted at their first opportunity are not affected by attending colleges with high voting rates. They are equally inclined to vote again, regardless of the voting rate of their college. This aligns with prior research showing that voting behavior is persistent (Coppock and Green, 2016), so we might not expect people who voted at the first opportunity to change their habits much.

Conversely, students who did not vote before college are more likely to vote if they attend a higher voting-rate college. This result implies that high voting-rate colleges increase turnout by creating new voters. It also suggests that the features of higher voting-rate colleges that increase turnout substitute for rather than complement the determinants of pre-college turnout. This might be the case, for instance, if high voting-rate colleges increase turnout mainly by helping students surmount one-time barriers to voting—such as the voter registration process—rather than by increasing students' level of political interest.

B. Heterogeneous Effects

Table 7 explores whether the effect of attending a higher voting-rate college varies by student attributes. We focus on attributes in which there are known voting disparities (e.g., demographics and SAT score) but also on some post-matriculation behaviors (e.g., out-of-state status and graduation status).

The first six columns of Table 7 show results for models that interact college voting rates with student demographic and academic characteristics. First, we find that the turnout effect of attending a higher voting-rate college is larger for females than males, and slightly smaller for Asian and Black students than for others, but we do not observe heterogeneous effects by Hispanic status. Similarly, we find no evidence that the effect of attending a higher voting-rate college is larger for students whose parents earned at least a bachelor's degree, but the effect is slightly larger for students with higher SAT scores.

Turning to post-matriculation behaviors, we find slightly larger effects for out-of-state students. Finally, in column 8, we see that the effect of attending a higher voting-rate college is about 50 percent larger for students who graduate college, but still substantial for those who do not.

C. Midterm Elections

Thus far, we have examined how attending a higher voting-rate college influences students' probability of voting in the most recent election available to

us—the 2016 presidential election. However, midterm elections have much lower turnout than presidential elections. For example, the turnout in our sample is 39.4 percent in the 2016 election but just 12.4 percent in 2014—a threefold difference. Therefore, colleges' voting effects may differ between presidential and midterm elections.

In Table 8, we present analogous estimates for alternative elections, including two midterm elections (2010 and 2014) and one additional presidential election (2012).[27] The coefficients on college voting rate in the presidential elections—3.8 percentage points and 4.5 percentage points—are similar in size and represent 13 percent and 11 percent increases in turnout probability over the sample mean in 2012 and 2016, respectively. However, the estimated effects on midterm turnout are smaller in magnitude: 1.2 percentage points (10 percent) and 1.3 percentage points (10 percent) for the 2010 and 2014 elections, respectively. Thus, while the effects of attending a high voting-rate college are roughly the same in percent terms across midterm and presidential elections, the magnitude of the coefficients remain much lower in midterms. This suggests that higher voting-rate colleges increase their entrants' electoral representation similarly across midterms and presidential elections but do not reduce the gap in turnout between election types.

D. Time Path of Voting Effects

Table 9 examines how the effect of attending a higher voting-rate college evolves as students age. It focuses on sample students in the 2005 and 2007 cohorts, for whom we observe turnout behavior across six consecutive elections, from ages 20 to 28. The results in column 1 indicate that attending a higher voting-rate college increases students' voting probability by 2.0 percentage points in their second election, which occurs when they are 20 years old (sophomore year of college for most sample college goers). Results in columns 2-6 show that the estimated effect persists and even grows across subsequent elections, reaching 3.0 percentage points in students' sixth election, which occurs when sample students are 28 years old.[28] (Because each indicated election was a midterm for half of the sample students and a presidential election for the other half, coefficient magnitudes fall between those shown for midterms and presidential elections in Table 8.) Together, these results indicate that the effect of attending a higher voting-rate college manifests while students are still enrolled in college and persists thereafter.[29] This implies that high voting-rate colleges' turnout effects do not operate solely through post-college outcomes such as labor-market returns, consistent with findings in Ahearn et al. (2023).

[27] For comparability, we limit each regression sample to cohorts that were of comparable age (24 years old) in each election and had time to complete four years of college beforehand.

[28] Appendix Table A16 reports analogous estimates for the 2005 cohort, for which we observe voting across seven elections. These specifications yield substantively similar results, though the coefficient magnitudes fluctuate according to whether the focal election was a presidential or midterm election.

[29] The models in Table 9 produce nearly identical results in the subsample of students who graduated college.

E. College Voting Effects by Student Characteristics

In the final section of our analysis, we examine how colleges' voting effects are distributed by student characteristics, revealing how the sorting of students into colleges with varied turnout effects shapes the composition of the college-educated electorate.

We do so in two steps. First, we estimate a variant of Equation 14 that includes college fixed effects, which distinguish college-specific voting effects from students' pre-college voting propensities. (Appendix Figures A3 and A4 plot the estimated college voting effects.) Using results from this model, we then characterize how students' pre-college voting propensities and colleges' voting effects differ across subpopulations of college goers in our analytic sample. We do so by regressing the estimated voting propensities and college voting effects on selected student attributes, implementing separate regressions for each outcome (pre-college voting propensities, college voting effects) and student attribute (e.g. race/ethnicity).

Figure 3 plots the results of this analysis. It shows how pre-college voting propensities and college voting effects in the 2016 election vary by six student characteristics: sex, race/ethnicity, parental education, parental income, SAT score, and initial turnout. For each student population, the darker bar segments extending leftward indicate the mean pre-college voting propensity of sample college goers; the lighter segments extending rightward indicate the mean voting effect of the colleges these students attended. The full length of each bar represents each group's predicted turnout in the 2016 election. For example, among all college goers in the analytic sample, the average estimated pre-college voting propensity is 28.4 percent and the average estimated college voting effect is 12.6 percentage points.[30] The sum of these quantities matches the 2016 turnout rate of college goers in the analytic sample: 41.0 percent.

Two patterns are striking. First, college voting effects vary less by student characteristics than pre-college voting propensities do—for most subpopulations, the mean college voting effect is close to the overall mean of 12.6 percentage points.[31] This means that student sorting into colleges tends to maintain rather than markedly amplify or compress turnout disparities between demographic subgroups of college goers.

Nevertheless, the results indicate that students with higher SAT scores tend to sort into colleges with larger voting effects, amplifying initial disparities in voting propensity by academic achievement. For example, students in the highest SAT quintile attend colleges with mean voting effects of 14.3 percentage points, while students in the lowest SAT quintile attend colleges with mean voting effects of 11.4 percentage points. Student sorting into colleges by SAT score therefore increases the turnout gap between these groups from 11.2 percentage points to

[30]Students' pre-college voting propensities are their counterfactual probability of voting in the 2016 election if they had foregone college.

[31]At the student level, the standard deviation of the estimated voting propensities is 18.2 percentage points; the standard deviation of the estimated college voting effects is 4.8 percentage points

14.1 percentage points (26 percent). This is consistent with our finding that colleges with higher freshman SAT scores exert larger turnout effects.

Overall, we conclude that student sorting into colleges mostly maintains turnout disparities between demographic subgroups of college goers, but student sorting into colleges by SAT score modestly widens turnout disparities by SAT score, increasing the representation of high-SAT students in the college-educated electorate.

VII. Conclusion

In this paper, we have studied American colleges' voting effects using administrative data covering more than 21 million students. Across more than 2,000 institutions, we have shown that college goers' voting rates vary widely by college and that enrolling in a higher voting-rate college increases an enrollee's probability of voting in their mid- to late twenties. On average, attending a college with a 10 percentage-point higher voting rate increases young adults' chances of voting in 2016 by about 4 percentage points (10 percent). This effect arises during college, persists after college, and operates by activating students who did not vote at the first opportunity.

These findings have several implications for our understanding of colleges' turnout effects. First, our estimates suggest that virtually all colleges increase their entrants' post-college voting probability (Figure A3). Although associate's institutions exert smaller voting effects than other college types, for example, they still boost entrants' voting rates by an average of 11 percentage points relative to non-attendance. The college one attends matters when it comes to voter turnout, but not as much as attending college itself.

Second, colleges' voting effects nevertheless vary substantially. The average liberal arts college exerts voting effects 4 percentage points greater than the average community college, for example, while colleges with a 90th-percentile voting rate (38.5 percent) exert average voting effects 6.7 percentage points greater than colleges with a 10th-percentile voting rate (22.2 percent). Indeed, our estimates imply that colleges' effects drive 30 percent of the cross-college variation in the turnout of adults ages 24 to 30.[32]

Third, multiple institution attributes independently predict colleges' voting effects. Thus, colleges with similar academic profiles can exert meaningfully different voting effects, and, conversely, dissimilar colleges can exert similar voting effects. This strongly suggests that colleges' voting effects operate through multiple mechanisms, such as those associated with college selectivity and college-state turnout, which each predict colleges' voting effects but are weakly correlated.

[32]By comparison, Brown et al. (2023) estimate that county environments drive 48 percent of variance in the first-election turnout of young adults who spent their entire childhoods (ages 0 to 19) there. They further estimate that spending 2 to 6 of one's teenage years (ages 13 to 19) in a county with a 10 percentage-point higher voting rate increases young adults' first-election turnout by 33 percentage points.

Fourth, our finding that colleges' voting effects arise during college and among non-graduates implies that colleges' turnout effects vary at least in part due to differences in students' experiences during college, not just due to differences in colleges' effects on post-college outcomes (e.g. labor-market returns). The factors behind these increased voting rates, particularly within the initial year or so of enrollment, pose a question for future research.

Fifth, we find that college peers' mean pre-college voting propensity plays no role in colleges' voting effects. Although this result does not rule out all patterns of peer influence—asymmetrical peer effects, offsetting peer effects within colleges, turnout effects of other peer attributes, or peer effects on other political behaviors or dispositions—it does suggest that the turnout effects of college peers' political engagement are generally minimal.[33] This is somewhat surprising in light of prior evidence that college peers can influence students' political ideology (Mendelberg et al., 2017; Strother et al., 2021) and other forms of political participation (Klofstad, 2009, 2010, 2011, 2015). Nevertheless, it aligns with findings from Klofstad (2015), who found no evidence of peer effects on post-college turnout in a study that leveraged random campus-housing assignments to estimate the effects of college peers on several forms of political participation.

Sixth, differences in colleges' voting effects could matter politically because colleges' voting effects are not uniformly distributed throughout the college-going population. In particular, we show that the college choice process sorts higher-SAT students into colleges with larger voting effects, modestly amplifying initial disparities in voting propensity by academic achievement.

Finally, our findings have two policy implications for those seeking to improve young adults' turnout. Our research indicates that colleges with high voter turnout rates make new voters. This suggests that if the college selection process places less emphasis on the initial likelihood of voting, it may enroll more individuals who didn't vote initially into these high turnout colleges. As a result, this approach could potentially lead to a slight increase in overall voter turnout among college entrants over the span of a decade.[34] In practice, this might mean encouraging high voting-rate colleges to place less weight on students' history of political and civic engagement in the recruitment and admissions process.

More broadly, our results show that colleges play a formative role in their students' voting habits. This suggests that institutions of higher education, which enroll nearly 70 percent of 18-19 year olds, can play an important part in efforts to boost young adults' turnout.

[33]For example, Strother et al. (2021) find that political-ideology peer effects among college roommates partially offset within colleges. And although it is possible that college peers' pre-college turnout is a poor proxy for their political engagement—particularly given that young voters' turnout may not reflect their level of political interest (Holbein and Hillygus, 2020)—we find that pre-college turnout varies widely by institution and strongly predicts post-college turnout.

[34]Our null peer-effect result implies that enrolling more initial non-voters would not necessarily undermine high voting-rate colleges' turnout effects.

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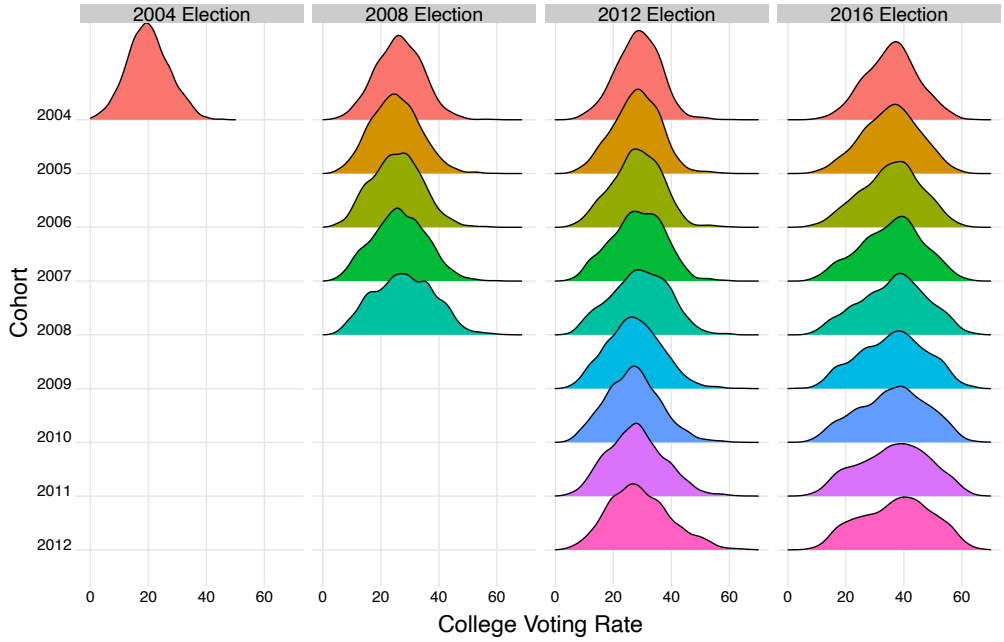
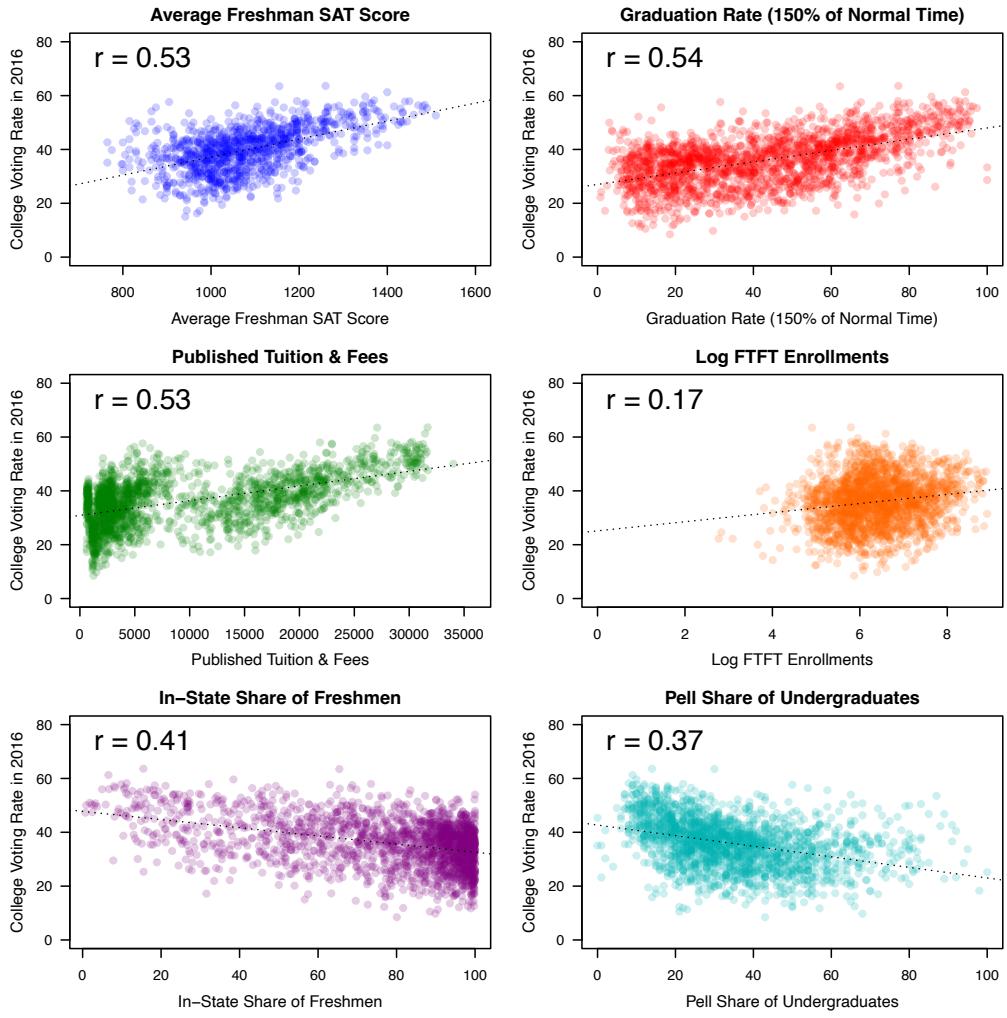
Figure 1. Distribution of College Voting Rates by Election and Cohort.



Note: Each plot shows the distribution of voting rates of over 2,000 colleges by cohort and presidential election. Voting rates are calculated as a fraction colleges' first-time enrollees. Voting rates based on fewer than 100 voting-age student observations are suppressed.

Figure 2. College Voting Rates in the 2016 Election by College Characteristics - 2004 Cohort.



Note: Each observation represents a college's entrants from the 2004 high school graduation cohort. College characteristics are constructed from IPEDS data for Fall 2004 entrants. Voting rates based on fewer than 100 voting-age student observations are suppressed.

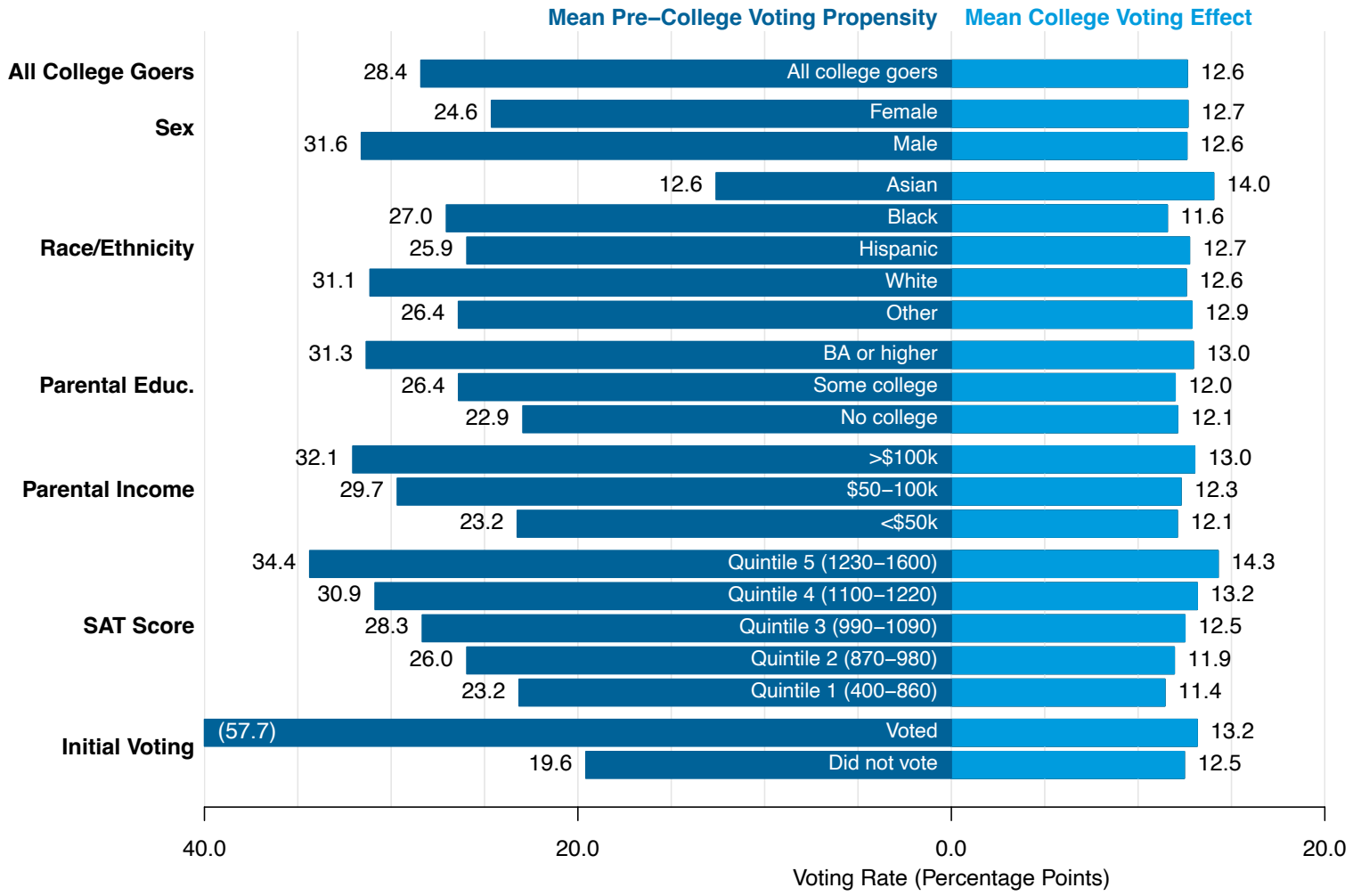


FIGURE 3. MEAN PRE-COLLEGE VOTING PROPENSITY AND COLLEGE VOTING EFFECTS IN THE 2016 ELECTION AMONG COLLEGE GOERS BY STUDENT CHARACTERISTICS

Table 1—College-Cohort Voting Rates by Presidential Election, 2004-2016.

	Mean college-cohort voting rates by election (%)			
Cohort	2004	2008	2012	2016
2004	20.0	26.4	28.6	35.9
2005		25.2	28.0	35.6
2006		25.5	28.1	35.6
2007		26.5	28.4	35.7
2008		28.0	29.1	36.4
2009			27.3	36.2
2010			26.9	36.1
2011			27.9	36.6
2012			29.2	37.4

	90-10 ratio of college-cohort voting rates by election			
Cohort	2004	2008	2012	2016
2004	2.7	2.3	2.0	2.0
2005		2.5	2.2	2.1
2006		2.6	2.4	2.3
2007		2.7	2.5	2.4
2008		2.9	2.7	2.5
2009			2.6	2.6
2010			2.6	2.7
2011			2.6	2.7
2012			2.7	2.7

Note: Each statistic is calculated from college-by-cohort-level data. Sample is limited to college-cohorts with at least 100 voting-age student observations. 90-10 ratios divide the 90th percentile college voting rate by the 10th percentile college voting rate.

Table 2—Institutional correlates of college-cohort voting rates in the 2016 election.

	Dependent variable:				
	College-cohort voting rate in 2016				
	(1)	(2)	(3)	(4)	(5)
Carnegie Classification *(ref.=Associate's Inst.)*					
R1 University	14.50***	7.16***	6.22***	4.63***	1.71***
	(0.46)	(0.58)	(0.60)	(0.64)	(0.66)
Other Doctoral	10.35***	6.68***	4.92***	4.42***	2.07***
	(0.38)	(0.47)	(0.47)	(0.53)	(0.49)
Master's Univ.	7.58***	5.15***	3.15***	3.02***	1.82***
	(0.27)	(0.39)	(0.37)	(0.46)	(0.43)
Liberal Arts College	13.90***	8.97***	7.24***	6.48***	5.06***
	(0.49)	(0.58)	(0.57)	(0.61)	(0.54)
Other Bachelor's	4.96***	3.30***	1.52***	1.50***	0.93**
	(0.36)	(0.43)	(0.40)	(0.47)	(0.41)
Other Institution	9.24***	6.80***	4.30***	4.44***	4.10***
	(1.01)	(0.95)	(0.92)	(0.94)	(0.89)
Avg. freshman SAT *(1sd=134)*		2.80***		1.59***	1.33***
		(0.18)		(0.22)	(0.20)
150% graduation rate *(1sd=23pp)*			3.45***	2.18***	2.12***
			(0.20)	(0.24)	(0.23)
Log FTFT enrollment *(1sd=0.89)*					0.77***
					(0.11)
Percent in-state *(1sd=24pp)*					−0.32*
					(0.17)
Pell share of students *(1sd=18pp)*					−2.02***
					(0.14)
Percent Black *(1sd=18pp)*					2.22***
					(0.13)
Cohort FEs	Y	Y	Y	Y	Y
College-state FEs	Y	Y	Y	Y	Y
Observations	17,763	17,763	17,763	17,763	17,763
R^2	0.72	0.75	0.76	0.76	0.79

Note: Data are college-cohort observations for college entrants from the 2004-2012 high school graduation cohorts. Sample is limited to college-cohorts with at least 100 voting-age student observations. All continuous predictors are standardized. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table 3—Student Sorting: College Voting Rate in 2012 by Student Characteristics

	Dependent variable: College voting rate	
	(1)	(2)
Female	0.208***	0.217***
	(0.015)	(0.012)
White	-0.951***	-0.436***
	(0.048)	(0.037)
Black	2.731***	2.127***
	(0.052)	(0.042)
Asian	0.210***	0.308***
	(0.053)	(0.042)
Hispanic	-0.875***	0.117***
	(0.052)	(0.042)
Other race	-0.129**	0.079*
	(0.061)	(0.047)
Parental education: No college	-0.430***	-0.170***
	(0.034)	(0.026)
Parental education: College, no BA	-0.826***	-0.185***
	(0.033)	(0.026)
Parental education: BA or higher	-0.255***	0.157***
	(0.030)	(0.023)
Parental income <$50k	-0.458***	-0.111***
	(0.022)	(0.017)
Parental income $50-100k	-0.519***	-0.127***
	(0.020)	(0.016)
Parental income >$100k	-0.077***	0.011
	(0.022)	(0.017)
SAT Math score (100s)	0.554***	0.632***
	(0.010)	(0.008)
SAT Verbal score (100s)	0.530***	0.502***
	(0.010)	(0.008)
Voted in 1st eligible election	1.329***	0.285***
	(0.018)	(0.014)
Constant	31.504***	30.776***
	(0.046)	(0.036)
Cohort FEs	Y	Y
High school FEs		Y
Observations	756,591	756,103
R^2	0.056	0.471

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. Robust standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table 4—College Voting Rate Effects on Probability of Voting in the 2016 Election

	Dependent variable: Voted in 2016					
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2012 (10pp)	0.099***	0.049***	0.048***	0.041***	0.039***	0.046***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.011)
Non-college goer	-0.198***	-0.147***	-0.147***	-0.126***	-0.128***	-0.079***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.013)
Cohort FEs	Y	Y	Y	Y	Y	Y
High school FEs		Y	Y	Y	Y	Y
Student characteristics		Y	Y	Y	Y	Y
Portfolio summary statistics			Y	Y		Y
Initial voting x cohort FEs				Y	Y	Y
Portfolio FEs					Y	
Sibling FEs						Y
Observations	843,158	843,158	843,158	843,158	315,173	32,826
R^2	0.028	0.087	0.087	0.164	0.289	0.645

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student characteristics include: categorical indicators of gender, race/ethnicity, parental education, and parental income; and linear terms in SAT math and verbal scores. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. In column 5, the regression sample is further limited to students who had a non-unique score-send portfolio. In column 6, the regression sample is limited to students in the analytic sample who had a sibling in the analytic sample. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table 5—College Entrants' Probability of Voting in the 2016 Election by College Characteristics

	Dependent variable: Voted in 2016					
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2012 (10pp)				0.039***	0.038***	0.036***
				(0.002)	(0.002)	(0.002)
R1 University	0.027***			0.011***		
	(0.004)			(0.004)		
Other Doctoral	0.017***			0.003		
	(0.003)			(0.003)		
Master's University	0.017***			0.007***		
	(0.003)			(0.002)		
Liberal Arts College	0.040***			0.018***		
	(0.004)			(0.004)		
Other Bachelor's	-0.000			-0.007*		
	(0.004)			(0.004)		
Other Institution	0.024***			0.021***		
	(0.007)			(0.006)		
College avg. freshman SAT score (100s)		0.009***			0.006***	
		(0.002)			(0.002)	
College 150% grad. rate (10pp)			0.007***			0.004***
			(0.001)			(0.001)
Non-college goer	-0.109***	-0.132***	-0.129***	-0.121***	-0.131***	-0.130***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
High school + cohort FEs	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.163	0.163	0.163	0.164	0.164	0.164

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table 6—Mechanisms: Effects of College Peers' Pre-College Voting Rate and Effects of College Voting Rate By Initial Voting Behavior.

	Dependent variable: Voted in 2016		
	(1)	(2)	(3)
College peers' pre-college voting rate (10pp)	0.019***	0.002	
	(0.001)	(0.002)	
College voting rate in 2012 (10pp)		0.039***	0.051***
		(0.003)	(0.002)
College voting rate x			-0.047***
Voted in 1st eligible election			(0.004)
Non-college goer	-0.125***	-0.126***	-0.127***
	(0.001)	(0.001)	(0.001)
High school + cohort FEs	Y	Y	Y
Student controls	Y	Y	Y
Portfolio summary statistics	Y	Y	Y
Observations	843,158	843,158	843,158
R^2	0.163	0.164	0.165

Note: OLS regressions. College peers' pre-college voting rates are an average of the pre-college voting rates of entrants from the 2005 and 2009 cohorts in the 2004 and 2008 elections. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table 7—Heterogeneous Effects of College Voting Rate

	Dependent variable: Voted in 2016							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
College voting rate in 2012 (10pp)	0.032***	0.042***	0.044***	0.040***	0.040***	0.041***	0.038***	0.026***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
College voting rate x ...								
Female	0.018***							
	(0.003)							
Asian		-0.017***						
		(0.004)						
Black			-0.014***					
			(0.004)					
Hispanic				0.006				
				(0.004)				
Parental ed.: BA or higher					0.001			
					(0.002)			
SAT score (100s)						0.002**		
						(0.001)		
Out-of-state student							0.007**	
							(0.003)	
Graduated college								0.015***
								(0.002)
Non-college goer	-0.126***	-0.127***	-0.127***	-0.127***	-0.126***	-0.126***	-0.130***	-0.081***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High school + cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y	Y	Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.168

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table 8—Alternative Outcomes: College Entrants' Probability of Voting by College Voting Rate and Election

	Dependent variable:			
	Voted 2010	Voted 2012	Voted 2014	Voted 2016
	(1)	(2)	(3)	(4)
College voting rate in 2012 (10pp)	0.012***	0.038***	0.013***	0.045***
	(0.002)	(0.002)	(0.002)	(0.003)
Non-college goer	-0.031***	-0.109***	-0.028***	-0.147***
	(0.001)	(0.002)	(0.001)	(0.002)
High school + cohort FEs	Y	Y	Y	Y
Student controls	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y
Sample cohorts	2005	2007	2009	2011
Observations	211,162	215,612	207,586	200,708
R^2	0.206	0.192	0.165	0.187

Note: OLS regressions. In these regressions, the outcomes are binary indicators of voting in the 2010 midterm election, 2012 presidential election, 2014 midterm election, and 2016 presidential election, respectively. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the indicated high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

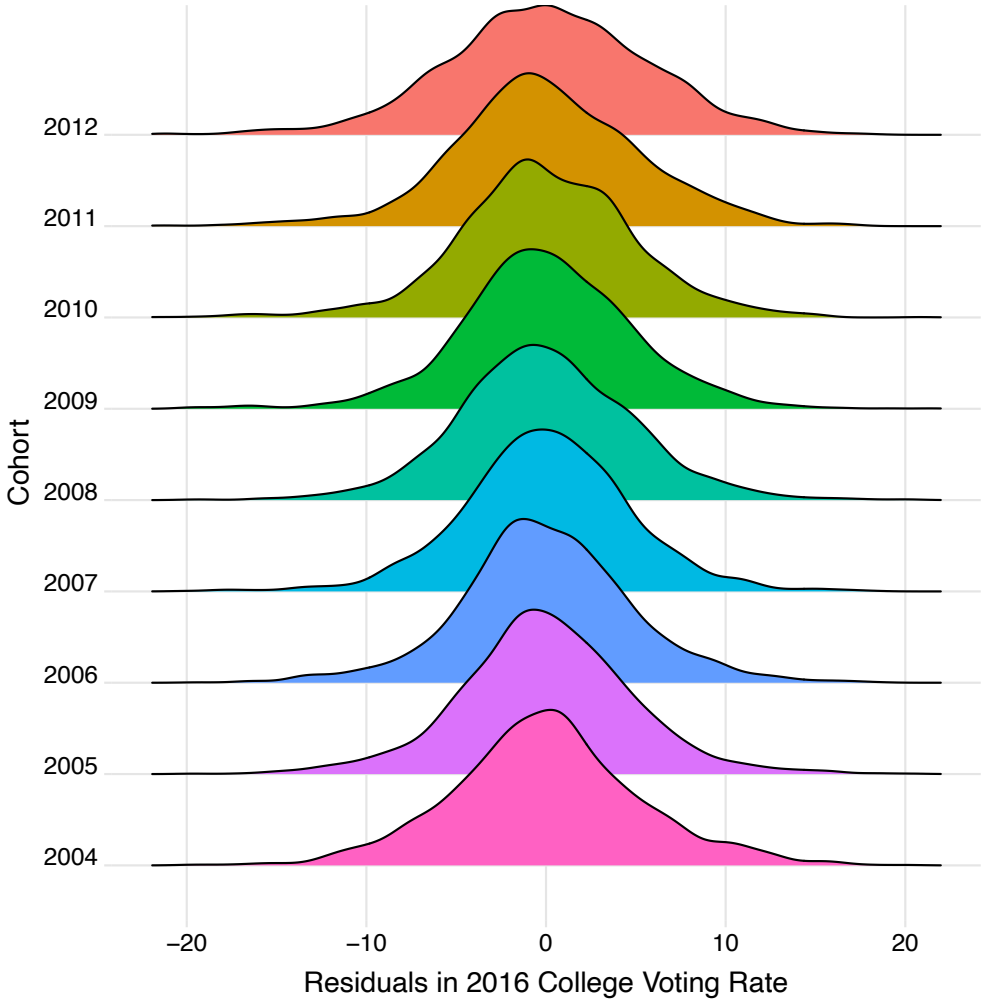
Table 9—Time Path of College Voting Rate Effects

	Dependent variable: Voted in...				
	2nd Election (Age 20)	3rd Election (Age 22)	4th Election (Age 24)	5th Election (Age 26)	6th Election (Age 28)
	(1)	(2)	(3)	(4)	(5)
College voting rate in 2012 (10pp)	0.020***	0.015***	0.026***	0.023***	0.030***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Non-college goer	-0.051***	-0.048***	-0.069***	-0.065***	-0.086***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
High school + cohort FEs	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y
Sample cohorts	2005, 2007	2005, 2007	2005, 2007	2005, 2007	2005, 2007
Observations	429,509	429,509	429,509	429,509	429,509
R^2	0.250	0.310	0.206	0.235	0.199

Note: OLS regressions. In these regressions, the outcomes are binary indicators of whether students voted in their 2nd, 3rd, 4th, 5th, and 6th eligible elections. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the indicated high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

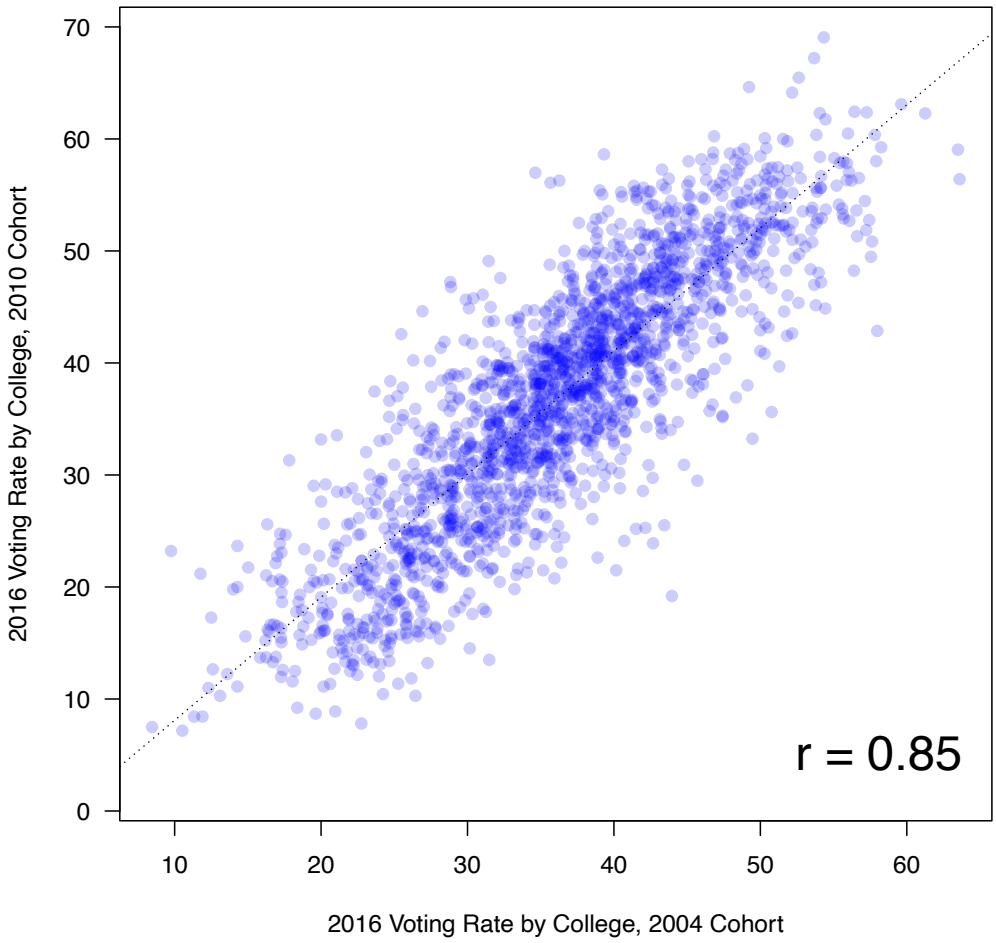
Appendix A - Additional Results

Figure A1. Unexplained Variation in College Voting Rates in the 2016 Election, by Cohort.



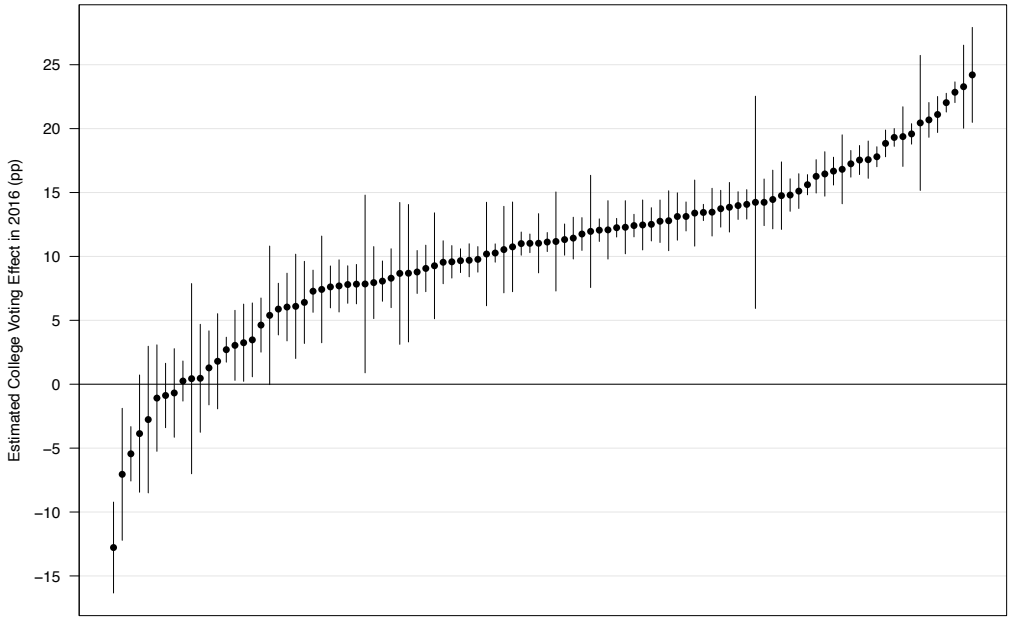
Note: Each plot represents the distribution of each cohort's residuals from the regression in Table 2, Column 5. The residuals represent the unexplained variation in voting rates by college in the 2016 presidential election. Voting rates calculated as fraction of first-time enrollees at a college, with at least 100 students.

Figure A2. 2016 Voting Rates by College – 2004 vs. 2010 Cohorts.



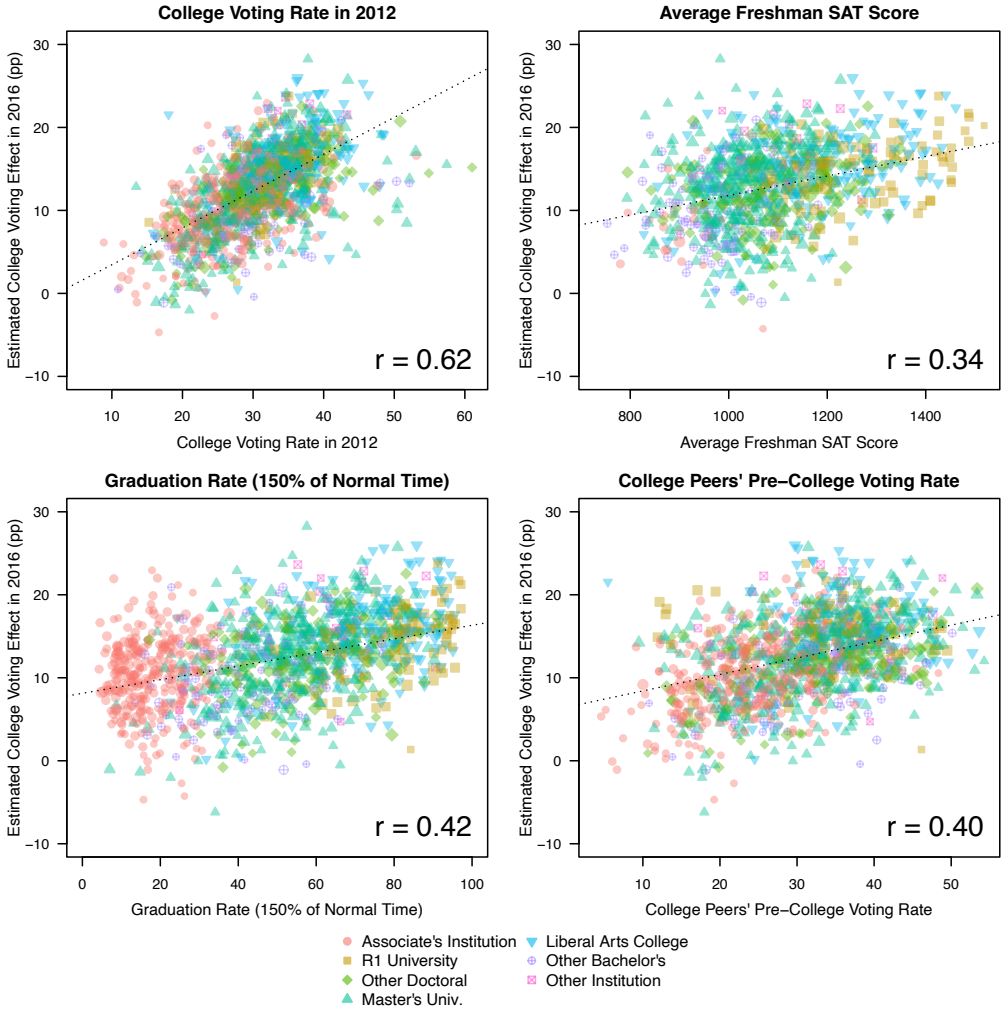
Note: Each observation represents a college. Voting rates based on fewer than 100 voting-age student observations are suppressed.

Figure A3. Estimated College Voting Effects in the 2016 Election for 100 Randomly Selected Colleges



Note: This figure depicts estimated voting effects for 100 randomly selected colleges. Vertical lines are 95 percent confidence intervals.

Figure A4. Estimated College Voting Effects in the 2016 Election by College Characteristics



Note: This figure arrays colleges' estimated voting effects by four college characteristics of interest. Each observation represents a college. Estimates based on fewer than 100 student observations are suppressed. Pearson correlations are student-weighted.

Table A1—Sample summary statistics.

	Full sample		SAT score senders		Analytic sample	
	Mean	SD	Mean	SD	Mean	SD
Sex						
Female	0.526	0.499	0.547	0.498	0.456	0.498
Male	0.474	0.499	0.453	0.498	0.544	0.498
Race/Ethnicity						
Asian	0.067	0.250	0.095	0.293	0.088	0.283
Black	0.140	0.347	0.121	0.327	0.106	0.308
Hispanic	0.153	0.360	0.120	0.326	0.103	0.304
White	0.572	0.495	0.608	0.488	0.640	0.480
Other race	0.041	0.198	0.040	0.196	0.035	0.183
Missing race	0.027	0.163	0.016	0.125	0.029	0.167
Parental education						
No college	0.112	0.316	0.169	0.375	0.177	0.382
College, no BA	0.130	0.336	0.205	0.404	0.193	0.394
BA or higher	0.287	0.452	0.520	0.500	0.536	0.499
Missing	0.470	0.499	0.105	0.307	0.094	0.292
Parental income						
<$50k	0.133	0.340	0.212	0.409	0.224	0.417
$50-100k	0.135	0.342	0.229	0.420	0.233	0.423
>$100k	0.101	0.301	0.184	0.387	0.194	0.395
Missing	0.631	0.483	0.375	0.484	0.348	0.476
SAT performance						
Total score	1,022.159	208.561	1,047.609	204.475	1,025.947	212.859
Math score	515.957	113.070	529.299	111.061	519.542	115.805
Verbal score	506.202	110.675	518.310	108.949	506.405	114.321
Score-send portfolio						
Number of score sends	4.015	3.143	4.543	3.128	4.435	3.139
Mean SAT of colleges	1,130.484	116.452	1,135.761	115.904	1,131.711	114.802
Voting						
First eligible election	0.112	0.315	0.127	0.333	0.223	0.417
2016 election	0.338	0.473	0.423	0.494	0.394	0.489
Age on Election Day 2016	26.526	2.618	26.678	2.636	27.257	2.286
College characteristics						
Non-college goer	0.212	0.408	0.061	0.240	0.082	0.275
College avg. freshman SAT	1,114.939	128.980	1,117.880	132.233	1,116.771	130.044
College graduation rate	48.095	25.781	56.878	23.938	55.590	24.511
College voting rate in 2012	29.792	6.860	31.215	6.517	30.834	6.448
N Students	21,310,591		9,592,269		843,158	

Note: The full sample includes all PSAT, SAT, and AP takers in the 2004-2012 high school graduation cohorts living in one of the 50 states or Washington, D.C who were of voting age by the 2016 election. SAT score senders are the subset of these students who took the SAT and had a qualifying score-send portfolio. The analytic sample includes domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio.

Table A2—Cross-cohort correlations in 2016 college voting rates, 2004-2012 Cohorts

	Cohort								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
2004	1.00								
2005	0.91	1.00							
2006	0.91	0.93	1.00						
2007	0.90	0.93	0.94	1.00					
2008	0.89	0.92	0.93	0.95	1.00				
2009	0.87	0.90	0.92	0.94	0.95	1.00			
2010	0.85	0.89	0.91	0.93	0.94	0.95	1.00		
2011	0.84	0.88	0.90	0.92	0.93	0.95	0.96	1.00	
2012	0.81	0.84	0.87	0.89	0.91	0.92	0.94	0.95	1.00

Note: Pearson correlation coefficients calculated from college-by-cohort-level data. Each coefficient gives the correlation between the college-average voting rates of entrants from the indicated high school graduation cohorts in the 2016 election. Sample is limited to college-cohorts with at least 100 voting-age student observations.

Table A3—Cross-election correlations in college voting rates, 2004 Cohort

	Election						
	2004	2006	2008	2010	2012	2014	2016
2004	1.00						
2006	0.66	1.00					
2008	0.80	0.55	1.00				
2010	0.50	0.57	0.68	1.00			
2012	0.66	0.47	0.90	0.77	1.00		
2014	0.30	0.38	0.46	0.69	0.65	1.00	
2016	0.53	0.38	0.74	0.73	0.86	0.67	1.00

Note: Pearson correlation coefficients calculated from college-by-cohort-level data. Each coefficient gives the correlation between the college-average voting rates of entrants from the 2004 high school graduation cohort in the indicated elections. Sample is limited to college-cohorts with at least 100 voting-age student observations.

Table A4—Conditional imbalance in covariate-predicted 2016 voting probability by college voting rate.

	Dependent variable:			
	Covariate-predicted probability of voting in 2016			
	(1)	(2)	(3)	(4)
College voting rate in 2012	0.072***	0.014***	0.010***	0.002**
	(0.003)	(0.001)	(0.002)	(0.001)
Non-college goer	-0.067***	-0.043***	-0.025***	-0.001
	(0.002)	(0.001)	(0.001)	(0.001)
Cohort FEs	Y	Y	Y	Y
HS state FEs		Y	Y	Y
SAT math score		Y	Y	Y
Portfolio summary statistics		Y		Y
Initial voting x cohort FEs		Y	Y	Y
Portfolio FEs			Y	
Sibling FEs				Y
Observations	843,158	843,158	315,173	32,826
R^2	0.121	0.372	0.507	0.938

Note: OLS regressions. The outcome is students' covariate-predicted 2016 voting probability, which comes from a regression of whether a student voted in the 2016 election on: categorical indicators of gender, race/ethnicity, parental education, and parental income; a linear term in SAT verbal score; high school FEs; and cohort FEs. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A5—Conditional imbalance in covariate-predicted 2016 voting probability by College Characteristics

	Dependent variable:					
	Covariate-predicted probability of voting in 2016					
	(1)	(2)	(3)	(4)	(5)	(6)
R1 University	0.073***	0.020***				
	(0.009)	(0.004)				
Other Doctoral	0.050***	0.022***				
	(0.008)	(0.003)				
Master's University	0.042***	0.019***				
	(0.006)	(0.002)				
Liberal Arts College	0.085***	0.037***				
	(0.006)	(0.004)				
Other Bachelor's	0.014*	0.013***				
	(0.007)	(0.002)				
Other Institution	0.038***	0.007				
	(0.008)	(0.005)				
College avg. freshman SAT score (100s)			0.025***	0.007***		
			(0.002)	(0.002)		
College 150% grad. rate (10pp)					0.016***	0.005***
					(0.001)	(0.001)
Non-college goer	-0.020***	-0.027***	-0.075***	-0.050***	-0.067***	-0.046***
	(0.005)	(0.002)	(0.003)	(0.001)	(0.002)	(0.001)
Cohort FEs	Y	Y	Y	Y	Y	Y
HS state FEs		Y		Y		Y
SAT math score		Y		Y		Y
Portfolio summary statistics		Y		Y		Y
Initial voting x cohort FEs		Y		Y		Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.053	0.373	0.078	0.374	0.092	0.374

Note: OLS regressions. The outcome is students' covariate-predicted 2016 voting probability, which comes from a regression of whether a student voted in the 2016 election on: categorical indicators of gender, race/ethnicity, parental education, and parental income; a linear term in SAT verbal score; high school FEs; and cohort FEs. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A6—Conditional imbalance in initial voting by college voting rate.

	Dependent variable:			
	Voted in first eligible election			
	(1)	(2)	(3)	(4)
College voting rate in 2012	0.058***	0.020***	0.019***	0.013
	(0.003)	(0.001)	(0.003)	(0.009)
Non-college goer	-0.106***	-0.059***	-0.063***	-0.034***
	(0.003)	(0.002)	(0.003)	(0.011)
Cohort FEs	Y	Y	Y	Y
High school FEs		Y	Y	Y
Student characteristics		Y	Y	Y
Portfolio summary statistics		Y		Y
Portfolio FEs			Y	
Sibling FEs				Y
Observations	843,158	843,158	315,173	32,826
R^2	0.121	0.372	0.507	0.938

Note: OLS regressions. The outcome is a binary indicator of whether students voted in their first eligible election, which occurred in November of their senior year of high school, before college entry. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student characteristics include: categorical indicators of gender, race/ethnicity, parental education, and parental income; and linear terms in SAT math and verbal scores. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A7—Conditional imbalance in initial voting by College Characteristics

	Dependent variable:					
	Voted in first eligible election					
	(1)	(2)	(3)	(4)	(5)	(6)
R1 University	0.062***	0.014***				
	(0.010)	(0.004)				
Other Doctoral	0.058***	0.014***				
	(0.008)	(0.003)				
Master's University	0.036***	0.011***				
	(0.005)	(0.002)				
Liberal Arts College	0.084***	0.031***				
	(0.006)	(0.003)				
Other Bachelor's	0.032***	0.010***				
	(0.007)	(0.003)				
Other Institution	0.037***	-0.002				
	(0.010)	(0.006)				
College avg. freshman SAT score (100s)			0.016***	0.005***		
			(0.002)	(0.001)		
College 150% grad. rate (10pp)					0.012***	0.004***
					(0.001)	(0.000)
Non-college goer	-0.062***	-0.048***	-0.114***	-0.063***	-0.106***	-0.062***
	(0.004)	(0.002)	(0.004)	(0.002)	(0.003)	(0.001)
Cohort FEs	Y	Y	Y	Y	Y	Y
HS state FEs		Y		Y		Y
SAT math score		Y		Y		Y
Portfolio summary statistics		Y		Y		Y
Initial voting x cohort FEs		Y		Y		Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.072	0.147	0.073	0.147	0.073	0.147

Note: OLS regressions. The outcome is a binary indicator of whether students voted in their first eligible election, which occurred in November of their senior year of high school, before college entry. Student characteristics include: categorical indicators of gender, race/ethnicity, parental education, and parental income; and linear terms in SAT math and verbal scores. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A8—College Entrants' Probability of Voting in the 2016 Election by Instrumented College Voting Rate (2014)

	Dependent variable: Voted in 2016				
	(1)	(2)	(3)	(4)	(5)
College voting rate in 2012 (10pp)	0.129***	0.056***	0.054***	0.045***	0.046***
	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)
Non-college goer	-0.199***	-0.147***	-0.148***	-0.127***	-0.128***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
Cohort FEs	Y	Y	Y	Y	Y
High school FEs		Y	Y	Y	Y
Student characteristics		Y	Y	Y	Y
Portfolio summary statistics			Y	Y	
Initial voting x cohort FEs				Y	Y
Portfolio FEs					Y
Observations	843,158	843,158	843,158	843,158	315,173
R^2	0.026	0.032	0.032	0.114	0.114

Note: Instrumental variable regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election instrumented with college-average voting rates of entrants from the 2004 cohort in the 2014 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A9—College Entrants' Probability of Voting in the 2016 Election by Instrumented College Voting Rate (2014)

	Dependent variable: Voted in 2016					
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2012 (10pp)				0.040***	0.037***	0.033***
				(0.003)	(0.003)	(0.003)
R1 University	0.027***			0.011***		
	(0.004)			(0.004)		
Other Doctoral	0.017***			0.003		
	(0.003)			(0.003)		
Master's University	0.017***			0.007***		
	(0.003)			(0.002)		
Liberal Arts College	0.040***			0.017***		
	(0.004)			(0.004)		
Other Bachelor's	-0.000			-0.007*		
	(0.004)			(0.004)		
Other Institution	0.024***			0.021***		
	(0.007)			(0.006)		
College avg. freshman SAT score (100s)		0.009***			0.006***	
		(0.002)			(0.002)	
College 150% grad. rate (10pp)			0.007***			0.005***
			(0.001)			(0.001)
Non-college goer	-0.109***	-0.132***	-0.129***	-0.121***	-0.131***	-0.130***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
High school + cohort FEs	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.163	0.163	0.163	0.114	0.114	0.114

Note: Instrumental variable regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election instrumented with college-average voting rates of entrants from the 2004 cohort in the 2014 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A10—College Voting Rate Effects on Probability of Voting in the 2016 Election, with Controls for College State

	Dependent variable: Voted in 2016				
	(1)	(2)	(3)	(4)	(5)
College voting rate in 2012 (10pp)	0.074***	0.042***	0.041***	0.034***	0.036***
	(0.004)	(0.002)	(0.002)	(0.002)	(0.004)
Non-college goer	-0.137***	-0.108***	-0.108***	-0.095***	-0.109***
	(0.012)	(0.011)	(0.011)	(0.011)	(0.022)
College-state FEs	Y	Y	Y	Y	Y
Cohort FEs	Y	Y	Y	Y	Y
High school FEs		Y	Y	Y	Y
Student characteristics		Y	Y	Y	Y
Portfolio summary statistics			Y	Y	
Initial voting x cohort FEs				Y	Y
Portfolio FEs					Y
Observations	843,158	843,158	843,158	843,158	315,173
R^2	0.032	0.088	0.088	0.165	0.289

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student characteristics include: categorical indicators of gender, race/ethnicity, parental education, and parental income; and linear terms in SAT math and verbal scores. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. In column 5, the regression sample is further limited to the subset of these students who had a unique score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A11—College Entrants' Probability of Voting in the 2016 Election by College Characteristics, with Controls for College State

	Dependent variable: Voted in 2016					
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2012 (10pp)				0.028***	0.029***	0.027***
				(0.002)	(0.002)	(0.002)
R1 University	0.033***			0.020***		
	(0.004)			(0.004)		
Other Doctoral	0.023***			0.011***		
	(0.003)			(0.003)		
Master's University	0.019***			0.011***		
	(0.002)			(0.002)		
Liberal Arts College	0.044***			0.028***		
	(0.004)			(0.004)		
Other Bachelor's	0.008**			0.001		
	(0.003)			(0.003)		
Other Institution	0.038***			0.033***		
	(0.008)			(0.006)		
College avg. freshman SAT score (100s)		0.008***			0.006***	
		(0.002)			(0.001)	
College 150% grad. rate (10pp)			0.007***			0.005***
			(0.001)			(0.001)
Non-college goer	-0.044***	-0.095***	-0.096***	-0.067***	-0.105***	-0.106***
	(0.012)	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
College-state FEs	Y	Y	Y	Y	Y	Y
High school + cohort FEs	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.164	0.164	0.165	0.165	0.165	0.165

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A12—College Entrants' Probability of Voting in the 2016 Election by Alternative Measures of College Voting Rate

	Dependent variable: Voted in 2016					
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2008 (1sd=7.4pp)	0.024***					
	(0.001)					
College voting rate in 2010 (1sd=3.7pp)		0.021***				
		(0.001)				
College voting rate in 2012 (1sd=6.5pp)			0.026***			
			(0.001)			
College voting rate in 2014 (1sd=4.3pp)				0.019***		
				(0.001)		
College voting rate in 2016 (1sd=7.7pp)					0.031***	
					(0.001)	
Avg. college voting rate over 2008-2016						0.027***
						(0.001)
Non-college goer	-0.125***	-0.127***	-0.126***	-0.127***	-0.130***	-0.128***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High school + cohort FEs	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y
Observations	843,158	843,158	843,158	843,158	843,158	843,158
R^2	0.164	0.164	0.164	0.163	0.164	0.164

Note: OLS regressions. College voting rates are standardized values of the college-average voting rates of entrants from the 2004 cohort in the 2008-2016 elections. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A13—Alternative Samples: College Entrants' Probability of Voting in the 2016 Election by College Voting Rate

	Dependent variable: Voted in 2016						
	College goers	Exact matches	Females	Males	High-coverage colleges	High-coverage states	Matched-turnout states
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
College voting rate in 2012 (10pp)	0.040***	0.041***	0.038***	0.039***	0.040***	0.041***	0.040***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Non-college goer		-0.112***	-0.115***	-0.134***		-0.124***	-0.133***
		(0.002)	(0.001)	(0.002)		(0.001)	(0.001)
High school + cohort FEs	Y	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y	Y
Observations	773,583	710,772	382,720	457,309	772,659	657,543	640,328
R^2	0.154	0.198	0.199	0.170	0.154	0.156	0.147

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. In columns 1-7, respectively, the samples are further limited to: college goers; exact matches to the voting data; females; males; colleges where at least 70 percent of first-time undergraduates are represented in the education data; states where at least 70 percent of first-time undergraduates are represented in the education data; and states where the 2016 turnout rate in the matched data falls within 10 percentage points of the 2016 turnout rate among 18-24 year-olds in Census data. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A14—Alternative Specifications: College Entrants' Probability of Voting in the 2016 Election by College Voting Rate - All Score Senders, Without Controls for Initial Voting

	Dependent variable: Voted in 2016					
	All Score Senders			Analytic Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2012 (10pp)	0.108***	0.048***	0.039***	0.099***	0.048***	0.046***
	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Non-college goer	-0.183***	-0.150***	-0.159***	-0.198***	-0.147***	-0.151***
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Cohort FEs	Y	Y	Y	Y	Y	Y
High school FEs		Y	Y		Y	Y
Student characteristics		Y	Y		Y	Y
Portfolio summary statistics		Y			Y	
Portfolio FEs			Y			Y
Observations	8,540,684	8,540,684	3,965,852	843,158	843,158	315,173
R^2	0.027	0.063	0.158	0.028	0.087	0.218

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student characteristics include: categorical indicators of gender, race/ethnicity, parental education, and parental income; and linear terms in SAT math and verbal scores. Score-send portfolios are the set of colleges to which students sent their SAT score. In columns 1-3, regression samples are limited to domestic SAT takers in the 2005-2012 high school graduation cohorts who had a qualifying score-send portfolio. In column 3, the regression sample is further limited to students who had a non-unique score-send portfolio. In columns 4-6, regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. In column 6, the regression sample is further limited to students who had a non-unique score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A15—Alternative Functional Forms: College Entrants' Probability of Voting in the 2016 Election by College Voting Rate

	Dependent variable: Voted in 2016			
	(1) Squared	(2) Quartiles	(3) 2-years	(4) 4-years
College voting rate in 2012 (10pp)	0.040***		0.035***	0.042***
	(0.002)		(0.003)	(0.002)
College voting rate in 2012^2	-0.009***			
	(0.002)			
College voting rate quartile 2		0.034***		
		(0.003)		
College voting rate quartile 3		0.051***		
		(0.003)		
College voting rate quartile 4		0.065***		
		(0.003)		
Non-college goer	-0.130***	-0.089***	-0.116***	-0.128***
	(0.001)	(0.002)	(0.002)	(0.001)
High school + cohort FEs	Y	Y	Y	Y
Student controls	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y
Observations	843,158	843,158	218,409	691,185
R^2	0.164	0.164	0.205	0.169

Note: OLS regressions. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the 2005, 2007, 2009, and 2011 high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses (*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$).

Table A16—Time Path of College Voting Rate Effects: 2005 Cohort

	Dependent variable: Voted in...					
	2nd Election (Age 20)	3rd Election (Age 22)	4th Election (Age 24)	5th Election (Age 26)	6th Election (Age 28)	7th Election (Age 30)
	(1)	(2)	(3)	(4)	(5)	(6)
College voting rate in 2012 (10pp)	0.002	0.022***	0.012***	0.030***	0.015***	0.038***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Non-college goer	-0.012***	-0.060***	-0.031***	-0.083***	-0.037***	-0.110***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
High school + cohort FEs	Y	Y	Y	Y	Y	Y
Student controls	Y	Y	Y	Y	Y	Y
Portfolio summary statistics	Y	Y	Y	Y	Y	Y
Sample cohorts	2005	2005	2005	2005	2005	2005
Observations	211,162	211,162	211,162	211,162	211,162	211,162
R^2	0.225	0.368	0.206	0.268	0.152	0.221

Note: OLS regressions. In these regressions, the outcomes are binary indicators of whether students voted in their 2nd, 3rd, 4th, 5th, 6th, and 7th eligible elections. College voting rates are the college-average voting rates of entrants from the 2004 cohort in the 2012 election. Student controls include: categorical indicators of gender, race/ethnicity, parental education, and parental income; linear terms in SAT math and verbal scores; and initial voting x cohort FEs. Score-send portfolios are the set of colleges to which students sent their SAT score. Regression samples are limited to domestic SAT takers in the indicated high school graduation cohorts who were of voting age by the general election held in November of their senior year of high school and had a qualifying score-send portfolio. College-clustered standard errors in parentheses ($*p < 0.1$; $**p < 0.05$; $***p < 0.01$).

Matching Process

In this appendix, we discuss the process of matching the education records with the voting records and then we assess match quality by comparing the matched data against a nationally representative dataset on voting rates. Since this study employs the same base data as Bell et al. (2022), material in this appendix is largely reproduced from Appendices A and B of Bell et al. (2022) with the authors' permission.

B1. Preparing the Education Data

The College Board data initially consists of 39.6 million observations across cohorts graduating high school between 2004 and 2018. We then restrict the sample to students who attended high school in one of the 50 states or Washington, DC, and those who have complete information on birth date (i.e. month, day, and year). This leaves over 37.6 million observations that serve as the base sample. Our analyses focus on the 21.3 million observations in the 2004 to 2012 cohorts.

B2. Preparing the Voting Data

We begin with a dataset that keeps voters with a birth year after 1984 to be consistent with the education data. We also keep voters where their year of birth is missing, leaving us with 52,921,628 observations.

With this initial voting dataset, the goal is to get one observation per person. Getting one observation per person presents two challenges relative to the education data. First, the DOB may be partially incomplete and in rare cases, entirely missing.[35] In the education data, we removed those observations from the base sample. We cannot drop those voting records because someone with missing DOB may be a match to the education data. The supposed match in the education data will look as if they never voted if we remove those voting observations. Second, the same person can show up more than once across states if they move (and potentially within the same state if a state's records are inexact and/or missing a piece of the birth date).

To address the above issues, we first go from one observation per person per state to one observation per person across states. This involves finding exact matches and then fuzzy matches using name and DOB, all while making sure there is no overlap in the same election, which is indicative of this being more than one person. We also create a series of flags, which we use in robustness tests, when there are common names or missing information on the DOB.

[35] 4.5 percent had a missing birth year, 14.6 percent had a missing birth month, and 21 percent had a missing birth day.

B3. Identifying Voters That Are Not Duplicates

We first identify all voter observations across all states that do not need to be deduplicated and set them aside to what will be the final dataset of deduplicated voters. To do so, We start with all observations with a unique first and last name combination across all states. At the end of this step, 34.4 percent of the voter data are considered unique observations.

With the set of voters with non-unique first and last name combinations, we identify all observations that were unique by first name, last name, and birth year. After this step an additional 21.8 percent of the voter data are considered unique observations. We then identify all observations that were unique by first name, last name, birth year and birth month. At the end of this step, an additional 20.4 percent of the voter data are considered unique observations. Then we do the same by adding birth day, producing an additional 10.9 percent of the voter data considered unique. We do the same thing again with the addition of middle initial. After this step an additional 3.8 percent of the voter data are considered unique. Along each step, we remove the "unique" voter but generate a flag that describes how the uniqueness was determined.

At the end of this process, 91.3 percent of the voter data are considered unique observations.

B4. Identifying Duplicate Voters

With the remaining 8.7 percent of voting data, we identify the observations with the same DOB information, the same exact first and last name, but differing voting history (e.g. one observation voted in an election in 2010 but did not vote in 2012 and the observation with the same name and DOB information had the opposite voting pattern). The vast majority of these observations were collapsed into a single observation and we retained whether we collapsed two or three (Less than 1.1 percent of these observations were unable to be collapsed into a single observation). Almost all were initially two observations that we collapsed into one.

This deduplication process accounted for roughly 7.3 percent of the original voting observations, leaving just 1.5 percent of original voting observations. We take these observations and place them with the uniquely identified and deduplicated observations and treat them as unique.

From here, we created our final dataset to use in the matching to the College Board data. It contains each dataset that from each round of deduplication to identify unique observations and the remaining observations that were not uniquely identified. In all, we created a dataset with 50,975,728 observations of voting history.

After each de-duplication round, in which observations were uniquely identified, we created a flag to identify all the observations that we determined were uniquely identified for that round to use in a series of robustness tests.

B5. Exact Matching

We start by using exact matching of the education data to the voting data. An exact match required perfect agreement between the first name, last name, middle initial, and date of birth (DOB), none of which could be incomplete in either dataset for this step. We identified 14,175,803 unique matches.[36] This implies that 35.5 percent of the education sample was found in the voting records through exact matching.

B6. Fuzzy Matching

After removing any observation that was exactly matched from both the education and voting datasets, we implement a fuzzy matching algorithm, in three broad steps.

First, we use College Board's 23 step fuzzy matching algorithm - a process they use in other applications. The algorithm starts by very slowly loosening the exact matching criteria. Specifically, it starts with exact matches on first name, last name, and DOB but one or both of the datasets are missing a middle initial, everything matches exactly but for one edit to one name, and everything matches but the first and last name are swapped. The most relaxed criteria - the 23rd step - matches exactly on first name, DOB, and gender but one of the two last names from the two datasets is a suffix of the other and only one of the middle initials is missing. After each step, the matched observations are not replaced for additional matches. We also retain each step in which the observations are matched for robustness tests. This process generates 6,547,716 additional matches, which is an additional 16.4 percent of the education observations.

Second, we used the data linkage method (also known as the editing distance method) employed by Dusetzina, Tyree, Meyer, Meyer, Green, & Carpenter (2014). The method calculates a probability that two strings are a match with the following formula:

$$\text{(B1)} \qquad \sum_{i=1}^{2}[1-(length(name_i)*spedis(name_i,name_{-i}))/2400)]/2$$

The two names from each dataset, indexed by i, are compared in both character length and also "spelling distance" (i.e. *spedis*). Spelling distance is a common function in statistical software that compares the letters in the name.[37]

We consider any value greater than 0.95 a high enough probability to be a match. We first do this for first names, maintaining an exact match on last name

[36] 83,652 students were matched to multiple voting records (usually two), creating 193,986 observations. In our main analyses, we randomly choose one of these matches but our results are entirely insensitive to alternatives analyses, largely because this impacted such a small fraction of the sample.

[37] Documentation for *spedis* in SAS, the statistical software we used, can be found here: https://support.sas.com/resources/papers/proceedings/proceedings/sugi25/25/cc/25p086.pdf.

and DOB, and then again for last name. These generate an additional 27,557 matches (one percent of the education data).

Third and finally, we slightly loosen the criteria on birth date by using exact matches on everything previously described but the voting data has a missing birth day or birth month, but not both and not missing year, so there is no conflicting information. This generates 635,344 additional matches (nearly two percent of the education data).

In total, we matched approximately 27.7 million observations, accounting for almost 53.6 percent of the education sample.

Assessing Match Quality

Next, we assess the quality of our match. To do so, we compare voting rates in our matched data for different groups and different elections to reported voting rates in the Voting and Registration dataset from the U.S. Census Bureau.[38] These data come from a supplement to the Current Population Survey. We focus on the voting rates among 18-24 year olds in the 2012 and 2016 elections, a time period that our matched data covers well.

In Appendix Tables B1, B2, and B3, we compare voting rates in the two datasets by election, age, race, sex, state, and sometimes combinations of those variables. Generally speaking, we find lower voting rates in our matched data than in the Census data, but the patterns across subgroups follow one another. The lower voting rates is expected, because our matching process is imperfect and somewhat conservative. And it is reassuring that the relative voting rates across subgroups generally match.

Appendix Table B1 shows voting rates in the two datasets by age and sex. The table shows that the voting increases with age (in both elections), according to the Census. Our matched data show a similar pattern, although at lower rates.

Appendix Table B1 also highlights the differences between the two samples by sex. Similar to the Census data, older males vote more than younger males in the matched data. However, this is not true for females, especially in the 2012 election. This is likely because we had difficulty matching to women who change their last name. This also explains why females vote at higher rates than males in both datasets for the youngest cohorts, before women typically get married and change their last name, but not so for older cohorts. For older cohorts, Census data suggest females are more likely to vote than males, but the matched data does not. These facts motivate some robustness tests that focus on males and recent cohorts.

Appendix Table B2 shows voting rates in the two datasets by race and sex, The table shows that Black people are the most likely to vote in 2012 in both elections and Asian people are least likely. Similarly, White people are most likely to vote in 2016 in both datasets and Asian people are the least likely. These similar

[38] https://www.census.gov/topics/public-sector/voting.html

patterns between the datasets is comforting.

Finally, voting rates in the two datasets are compared by state. It is immediately clear that our matched sample reflects the voting rates of the Census in some states better than others. This is partially because College Board has relatively low coverage in some states, like Mississippi. However, in states where College Board has substantial coverage, such as Virginia, the two voting rates are well aligned. This motivates a few additional robustness tests, including only using states where College Board has substantial coverage and only using states where the voting rates between these two datasets are well aligned.

Table C1—Comparison of voting rates in Census data and matched data in 2012 and 2016 elections, by age and sex.

		Voted in 2012 (Percent)			Voted in 2016 (Percent)		
	Census Age (in years)	High School Cohort	Census	Matched Data	High School Cohort	Census	Matched Data
Overall	18	2012	31.3	25.2	2016	32.3	30.0
	19	2011	33.9	25.2	2015	36.9	30.9
	20	2010	39.7	24.7	2014	40.1	31.0
	21	2009	37.5	24.8	2013	38.8	31.5
	22	2008	41.0	26.9	2012	41.4	33.0
	23	2007	40.0	26.7	2011	41.6	33.1
	24	2006	41.5	26.6	2010	43.8	33.5
Male	18	2012	27.8	23.2	2016	30.5	27.1
	19	2011	30.4	22.8	2015	34.4	27.2
	20	2010	34.4	22.7	2014	37.4	27.3
	21	2009	34.3	23.3	2013	35.8	27.9
	22	2008	38.3	26.3	2012	36.3	29.7
	23	2007	39.3	27.1	2011	38.5	30.4
	24	2006	37.1	28.2	2010	41.9	31.6
Female	18	2012	34.8	27.2	2016	34.3	32.8
	19	2011	37.5	27.5	2015	39.5	34.4
	20	2010	44.7	26.5	2014	42.7	34.5
	21	2009	40.9	26.2	2013	42.0	35.0
	22	2008	43.7	27.5	2012	46.1	36.3
	23	2007	40.8	26.4	2011	44.8	35.8
	24	2006	46.0	25.1	2010	45.8	35.2

Note: The U.S. Census data are a nationally representative sample, accessed online here: https://www.census.gov/topics/public-sector/voting.html. The matched data includes College Board test-taker data linked to Data Trust, LLC's national voter records. High school cohort is the year of graduation, comes from College Board data, and is an approximation of age.

Table C2—Comparison of voting rates in Census data and matched data in 2012 and 2016 elections, by race and sex.

	Voted in 2012 (Percent)		Voted in 2016 (Percent)	
	Census	Matched Data	Census	Matched Data
Total	38.0	25.7	39.4	31.8
Male	34.7	24.7	36.5	28.7
Female	41.3	26.7	42.4	34.9
Asian	20.1	17.2	25.2	25.9
Black	45.9	33.5	40.2	29.1
Hispanic	26.7	20.1	27.2	26.8
White	37.8	26.8	41.1	36.4
Male + Asian	18.1	15.3	21.2	21.8
Male + Black	41.4	26.5	36.5	22.1
Male + Hispanic	24.0	17.7	21.8	22.5
Male + White	34.6	28.0	38.3	34.9
Female + Asian	22.1	19.1	29.5	30.0
Female + Black	50.2	39.6	43.7	35.4
Female + Hispanic	29.7	22.3	32.7	30.7
Female + White	41.0	25.7	43.9	37.8

Note: Census voting rates are for 18-24 year-olds; 2012 voting rates in matched data are for the 2006-2012 high school graduation cohorts; 2016 voting rates in matched data are for the 2010-2016 high school graduation cohorts. The U.S. Census data are a nationally representative sample, accessed online here: https://www.census.gov/topics/public-sector/voting.html. The matched data includes College Board test-taker data linked to Data Trust, LLC's national voter records. High school cohort is the year of graduation, comes from College Board data, and is an approximation of age.

Table C3—Comparison of voting rates in Census data and matched data in 2012 and 2016 elections, by state.

	Voted in 2012 (Percent)		Voted in 2016 (Percent)	
State	Census	Matched Data	Census	Matched Data
Mississippi	62.4	17.3	46.1	18.1
Minnesota	57.0	21.4	49.6	22.5
Wisconsin	53.3	24.7	45.6	21.2
Colorado	52.5	23.0	43.1	25.8
South Carolina	51.3	28.4	42.7	33.9
New Hampshire	50.0	17.8	*	21.1
Oregon	47.6	25.7	45.2	26.4
Iowa	46.6	41.1	35.5	52.9
Massachusetts	45.6	33.5	39.9	42.8
Rhode Island	45.2	27.2	*	35.9
North Carolina	45.1	16.8	44.8	18.5
Ohio	44.7	38.1	39.6	43.1
Michigan	43.5	17.1	36.1	22.3
Maine	42.8	13.7	48.8	14.3
Missouri	42.5	33.2	45.9	43.5
Maryland	42.1	33.3	48.0	40.1
Virginia	42.0	37.1	54.6	42.9
Montana	40.7	33.3	*	40.2
Delaware	40.5	21.0	*	22.0
Louisiana	40.4	11.6	49.2	14.9
Arizona	40.0	12.3	35.8	17.8
Pennsylvania	39.9	27.1	48.7	40.5
Nevada	38.2	27.3	37.6	32.3
Washington	38.2	33.7	42.2	38.7
Georgia	37.9	17.1	40.5	15.6
Kentucky	37.1	28.7	51.1	40.3
New Mexico	37.1	11.3	37.8	12.3
Connecticut	36.9	27.9	37.0	37.7
Florida	36.8	32.0	33.1	36.9
California	36.5	23.0	37.5	33.9
Nebraska	36.2	30.7	50.1	45.2
Indiana	35.7	24.8	40.8	31.9
Alabama	35.3	34.0	41.4	40.0
New York	35.0	27.1	34.6	33.2
New Jersey	34.9	32.4	35.9	38.4
Utah	34.8	28.2	41.6	38.3
Tennessee	34.0	26.9	29.9	32.7
South Dakota	32.7	12.3	*	16.6
Illinois	32.2	29.1	45.3	41.6
Kansas	30.1	26.5	33.8	36.1
Idaho	29.8	9.2	40.7	13.3
Oklahoma	27.2	21.9	32.4	34.2
Arkansas	24.3	26.0	33.1	30.9
West Virginia	22.6	28.1	32.2	38.0
Texas	22.5	19.1	27.3	24.1
Hawaii	22.1	8.0	20.4	10.1
District of Columbia	*	19.9	*	20.9
North Dakota	*	15.0	*	19.2
Alaska	*	12.4	*	15.1
Vermont	*	11.3	*	14.9
Wyoming	*	9.2	*	16.5

Note: Census voting rates are for 18-24 year-olds; voting rates in matched data are for the 2006-2012 high school graduation cohorts. The U.S. Census data are a nationally representative sample, accessed online here: https://www.census.gov/topics/public-sector/voting.html. The matched data includes College Board test-taker data linked to Data Trust, LLC's national voter records. High school cohort is the year of graduation, comes from College Board data, and is an approximation of age. *indicates that Census data are not available.