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The Test-Optional Movement at America's Selective Liberal Arts Colleges: A Boon for Equity or Something Else?

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The test-optional movement in the United States emerged largely in response to criticism of standardized admissions tests as inadequate and potentially biased measures of postsecondary promise. Although anecdotal reports suggest that test-optional policies have improved campus diversity, empirical research has not yet confirmed this claim. Consequently, this study employs quasi-experimental techniques to assess the relationship between test-optional policy implementation and subsequent growth in the proportion of low-income and minority students enrolling at adopting liberal arts colleges. It also examines whether test-optional policies increase institutional standing through greater application numbers and higher reported Scholastic Aptitude Test (SAT) scores. Results show that, on average, test-optional policies enhance the perceived selectivity, rather than the diversity, of participating institutions.

Keywords: *test-optional, admissions, longitudinal studies, administration, policy analysis*

When the first Scholastic Aptitude Test (SAT) was administered in 1926 (Gambino, 2013), advocates promoted the test as a measure of intellect and a mechanism of educational and social opportunity. At a time when access to higher education was largely determined by status, the SAT aimed to distinguish academic aptitude from "accidents" of birth and fortune and to identify talented students who would otherwise have gone unnoticed (Lemann, 1999). With the arrival of the SAT, a new meritocratic system emerged, one that promised to sort students into college on the basis of academic potential rather than social status (Jencks & Riesman, 1968; Karabel, 1984; Katz, 1978). Over the next 30 years, use of the SAT at U.S. colleges and universities increased dramatically, and by the late 1950s, the test was being administered to more than half a million high school students annually. In 2012, the number of students taking the SAT and/or American College Testing (ACT) exceeded 1.6 million in 2012, with many students taking both exams and taking the SAT and/or ACT more than once to increase scores (Lewin, 2013). Currently, most 4-year colleges and universities use standardized test scores as one factor in making admissions decisions.

Given their role in the college admissions process, standardized tests have been the subject of extensive research, and many studies have attempted to measure the predictive validity of these increasingly influential exams. Some research suggests that the SAT, coupled with high school grade point average (GPA), provides a better prediction of a student's future academic performance than high school GPA alone (Sackett

et al., 2012; Shaw, Kobrin, Patterson, & Mattern, 2012). However, other studies have challenged the SAT as a reliable predictor of future college success (Crouse & Trusheim, 1988; Geiser & Studley, 2002; Rothstein, 2004), and have highlighted the persistent and positive relationship between standardized test performance and socioeconomic background as well as disparities in performance by race (Blau, Moller, & Jones, 2004; Camara & Schmidt, 1999; Fischer et al., 1996; Freedle, 2003). This latter body of research has prompted some colleges to question whether reliance on standardized testing has reinforced the exact college-related barriers that initial proponents of the SAT intended to eradicate (Epstein, 2009).

Consequently, support for the SAT, ACT, and similar standardized tests has waned at a small, but growing number of institutions, and a "test-optional movement" has emerged, particularly among liberal arts colleges, many of which have sought to eliminate or de-emphasize the use of standardized tests in the admissions process. Today, more than 50 selective liberal arts colleges have adopted test-optional admissions policies, along with approximately 800 other institutions across the United States (FairTest, 2013).

Despite public claims that test-optional policies have improved socioeconomic and racial diversity, some have questioned the motives of test-optional colleges and believe that test-optional admissions policies constitute yet another strategy to raise an institution's rank and admissions profile (Diver, 2006; Ehrenberg, 2002; Hoover, 2010). In this article, we explore both the generally stated goals of test-optional policies—expanding college opportunity and diversity—and the criticism that these policies are implemented merely to promote greater institutional standing. More specifically, we employ a difference-in-differences (DiD) analytical approach to examine whether test-optional admissions policies have achieved a commonly stated objective of increasing low-income and minority student enrollment, and also whether such policies have led to increased institutional status in the form of greater application numbers and higher reported test scores. To that end, our study addresses four research questions:

Research Question 1: Do colleges enroll significantly more (or less) low-income students (measured by Pell Grant recipient enrollment) after adopting test-optional admissions policies?

Research Question 2: Do colleges enroll significantly more (or less) underrepresented minorities after adopting test-optional admissions policies?

Research Question 3: Do colleges experience a significant rise (or decline) in freshman year applications after adopting test-optional admissions policies?

Research Question 4: Do colleges report significantly higher (or lower) average test scores after adopting test-optional admissions policies?

Literature Review

Although standardized tests assume a conspicuous role in the current college landscape, they were not widely used by postsecondary institutions until the mid-20th century, when the GI Bill of 1944 and subsequent growth in the 18- to 24-year-old population prompted an unprecedented rise in the demand for postsecondary education. Between 1950 and 1970—commonly referred to as the era of "college massification"—enrollment in U.S. higher education grew nearly fivefold (Gumport, Iannozzi, Shaman, & Zemsky, 1997). As college applications surged across the United States, selective colleges, in particular, were compelled to adopt new screening methods to sort through larger, more competitive, and increasingly heterogeneous applicant pools (Alon & Tienda, 2007; Lemann, 1999; Posselt, Jaquette, Bielby, & Bastedo, 2012); and many such institutions began to rely on standardized testing as one admissions screening mechanism.

Although the SAT and ACT originally were designed to promote college access—specifically, by identifying academically talented students, regardless of background—there has been much debate surrounding the predictive validity of these exams. Previous research has revealed a positive correlation between SAT scores and postsecondary GPA, and has also indicated that standardized test scores, in conjunction with high school GPA, serve as a better predictor of

first-year academic performance than high school GPA alone (Kobrin, Patterson, Barbuti, Mattern, & Shaw, 2008; Sackett et al., 2012). However, other research contends that standardized tests have become proxies for privilege and have perpetuated class and race divisions within postsecondary education (e.g., see Grodsky, Warren, & Felts, 2008, for review of educational testing and social stratification). Several studies have cited a strong positive correlation between standardized test achievement and socioeconomic status (SES; Blau et al., 2004; Camara & Schmidt, 1999; Fischer et al., 1996; Freedle, 2003; Rothstein, 2004), and also between standardized test achievement and White racial status (Camara & Schmidt, 1999; Rothstein, 2004); while other research has suggested that standardized test scores lose much of their ability to predict postsecondary success (i.e., first-year GPA) when student SES (Geiser & Studley, 2002) and high school racial and socioeconomic diversity (Rothstein, 2004) are considered. These findings may be attributed, at least in part, to the fact that socioeconomically advantaged students are more likely to purchase test preparation materials, enroll in test preparation classes, hire a tutor, and engage in other activities that are likely to boost test scores (Buchmann, Condron, & Roscigno, 2010; Park, 2012). Finally, other critiques suggest that test scores—when compared with other measures of academic achievement, such as high school GPA or class rank—are insufficient gauges of motivation, inquisitiveness, and other qualities that contribute to learning and success (Atkinson & Geiser, 2009; Hoffman & Lowitzki, 2005).

Despite extensive research challenging the predictive validity of standardized tests, there are several recent studies indicating that the SAT and ACT continue to predict academic performance, even when background is considered (e.g., Bettinger, Evans, & Pope, 2011; Sackett, Kuncel, Arneson, & Waters, 2009; Sackett et al., 2012). For example, Sackett and colleagues (2012) found in an analysis of three large-scale datasets that the association between SAT scores and first-year academic performance decreases only slightly when socioeconomic background is considered, suggesting that the SAT remains a useful predictor of future academic achievement. In addition, Bettinger et al. (2011) discovered that ACT subscores in English and mathematics are highly predictive of first-year and second-year college GPA, even after controlling for race, gender, and (college) campus fixed effects.

While education researchers debate the merits of standardized testing, the overwhelming majority of selective colleges and universities continue to hold firm to their standardized testing requirements and use standardized test scores, among other academic and extracurricular factors, in making admissions decisions. In fact, many selective institutions have become more reliant on standardized testing in recent decades. Alon and Tienda (2007), for example, used data from two nationally representative studies to discover that, on average, America's most selective schools ascribe more weight to test scores than grades when evaluating applicants. Alon and Tienda attribute increased dependence on test scores to the perceived need for a standardized metric that is able (or that claims to be able) to identify the "aristocracy of talent" among an ever-growing pool of qualified applicants; however, they and others (Ehrenberg, 2002; Epstein, 2009) also attribute increased reliance to the rising prominence of college rankings systems, such as those released by *U.S. News & World Report*. Although contributing a relatively small percentage to the magazine's ranking formula (7.5% to 8.125% in recent years), average institutional SAT/ACT score is the largest predictor of *U.S. News* rank (Webster, 2001), and its influence may be subsumed within other measures that *U.S. News* uses to determine an institution's rank score, such as academic reputation (as reported by college administrators and high school counselors).

Indeed, enrollment managers and admissions officers face increasing pressure to enroll classes with stronger academic credentials each year. These institutional pressures have resulted in several recent cases of institutional test scores being misrepresented or deliberately manipulated for institutional purposes (e.g., Fuller, 2012; Hoover, 2012a; Supiano, 2012) Consequently, given their influence and the "elasticity of admissions data" (Hoover, 2012b), standardized test scores have been assigned considerable, and perhaps undue, emphasis in the admissions process, especially by institutions seeking to improve their standing in the rankings hierarchy.

While selective colleges, in general, have exhibited a stronger commitment to standardized

testing over time; there is a growing minority of competitive institutions, primarily within the liberal arts sector, which has decided to de-emphasize or eliminate the use of standardized test scores in the admissions process. Interestingly, the test-optional "movement" among liberal arts colleges began in earnest after the speech of a university president, University of California's (UC) Richard Atkinson, who declared to the American Council on Education that overreliance on the SAT was "distorting educational priorities and practices" (Atkinson, 2001). Although UC never implemented Atkinson's recommendation that the university system abandon its SAT I admission requirement, Atkinson's speech prompted the College Board to redesign the SAT, which featured a new writing section and de-emphasized assessing student aptitude in favor of testing student preparation (Epstein, 2009). The speech also prompted scores of selective liberal arts colleges to abandon or de-emphasize standardized testing requirements in their admission processes (Epstein, 2009). Over the past decade, and despite the release of a revised SAT, more than 50 liberal arts colleges identified by Barron's *Profile of American Colleges* as "very competitive," "highly competitive," or "most competitive" have adopted test-optional policies that allow applicants to choose, without penalty, whether or not to submit their SAT or ACT scores.

In addition to expressing concerns about the biases and validity of standardized assessments, test-optional colleges commonly report that test-optional policies enhance the ethnic and economic diversity of their respective campuses without compromising the academic quality or performance of their student bodies (Bates College, 2004; Jaschik, 2006; McDermott, 2008). Espenshade and Chung's (2011) simulation study supports such claims, suggesting that test-optional policies would lead to an increase in the percentage of Black, Hispanic, and low-SES students at adopting institutions; however, it relied on predicted probabilities of admission to make assertions about *yield*, even though acceptance does not necessarily result in enrollment, especially in the case of underrepresented populations (Smith, Pender, & Howell, 2013).

To date, few studies have assessed the relationship between test-optional policies and campus diversity. Moreover, we know little about whether the implementation of test-optional policies leads to benefits that are less altruistic and more institution-specific. Several higher education leaders and reports have argued that colleges adopt test-optional policies to increase institutional status and selectivity (Ehrenberg, 2002; Epstein, 2009; Yablon, 2001), specifically through higher application numbers and reported standardized test scores. Case studies examining individual institutions' test-optional policies provide some evidence that the adoption of these policies results in increased applications from students who might otherwise not have applied (e.g., Bates and Providence colleges; Epstein, 2009). One such study of Mount Holyoke College revealed that students "underperforming" on the SAT were more likely to withhold their results from the test-optional college (Robinson & Monks, 2005), leading to higher institution-reported SAT scores. However, there have been no broad studies (i.e., studies focusing on multiple colleges) examining the effects of test-optional adoption. Thus, we know little about how the test-optional movement as a whole has influenced the admissions and enrollment profiles of participating colleges.

Conceptual Framework

To conceptualize how test-optional policies might influence admissions and enrollment at liberal arts colleges, we consider the overt and less overt intentions of test-optional adoption. To do so, we draw upon Merton's influential understanding of the manifest and latent functions of social action (e.g., Merton, 1957). Merton's approach allows us to examine the intended (manifest) and unintended (latent) functions of social policies, and how these functions serve to maintain and reinforce the current social structure and its existing inequalities (Merton, 1936, 1957).

Manifest functions refer to the intended and recognized purposes of test-optional policies. These manifest functions are institutions' commonly stated goals for adopting policies that de-emphasize or eliminate the use of test scores. Institutions that have adopted test-optional policies often cite efforts to improve diversity and to "level the playing field" for groups of students who, on average, tend to be disadvantaged by higher education's reliance on standardized

testing, (Cortes, 2103; Epstein, 2009; Espenshade & Chung, 2011). By encouraging a more holistic review of applicants, test-optional admissions policies are intended to reduce the inequalities in college access that standardized test scores arguably promote. Analyzing the manifest functions of test-optional policies thus allows us to determine whether these policies have achieved a commonly stated goal of increasing postsecondary opportunity through enhancing campus economic and ethnic diversity—at liberal arts colleges specifically.

Although previous research often focuses on the recognized outcomes of test-optional policies, we extend our understanding of these policies by considering the unintended or unrecognized outcomes, or latent functions, that test-optional policies fulfill. As Merton (1957) suggested, the analysis of latent functions provides a particularly interesting area of sociological inquiry by considering how less overt outcomes enable institutions to maintain their current social position. Although test-optional admissions policies largely are hailed as efforts to expand access at selective institutions, it is also possible they serve a less noted purpose of increasing institutional status and perceived selectivity.

In a 2006 op-ed to the *New York Times*, former president of Reed College, Colin Diver, called attention to possible ulterior motives behind test-optional adoption. In his piece, Diver (2006) suggested that under test-optional policies, low-scoring students would choose not to submit their test scores, and as a consequence, test-optional colleges would increase their average institutional test scores and standing in the *U.S. News* rankings. Diver and others (e.g., Ehrenberg, 2002) also argued that institutions adopting policies that de-emphasize the use of standardized test scores encourage more applications from students who may otherwise have not applied on the basis of a test requirement or average test score.

Finally, and as Diver (2006) and Epstein (2009) noted, institutions may be aware of the implications that test-optional policies have for both enrollment and status. It is possible that college administrators may consciously adopt these policies with an eye toward increasing diversity *and* appearing more selective. If so, what may seem latent to others may actually be a manifest function and motivating factor that shapes the admissions policies administrators choose to adopt. That is, test-optional admissions policies may constitute a "double play" strategy (Bourdieu, 1996, p. 271) institutions use to promote social aims and subtly influence institutional standing. If this assessment proves accurate, test-optional policies may ultimately reaffirm the position of selective institutions, and their role in maintaining and reproducing stratification within higher education and society more broadly (Bourdieu, 1993; Bourdieu & Wacquant, 1992).

Hence, in this analysis, we examine the possibility that although test-optional policies overtly seek to expand educational opportunity, they may also result in better institutional position through increased numbers of applications and higher reported SAT/ACT scores for use in institutional rankings. Thus, in Merton's account, even if test-optional policies fail to achieve their manifest functions, institutions may still adopt or continue these policies because they fulfill a desirable latent function of increasing institutional standing.

Data and Sample

To assess how test-optional policies shape diversity and admissions profiles at liberal arts colleges, we collected time-series, cross-sectional (i.e., panel) data on 180 selective liberal arts colleges in the United States. Our panel spans nearly two decades, from 1992 to 2010, and includes annual institution-level data on several outcomes of interest, namely, the percentage of students receiving a Pell grant (any dollar amount), the percentage of students identifying as an underrepresented minority (African American, Hispanic, or Native American), the number of freshman applications submitted to an institution, and an institution's average reported SAT score (25th percentile, critical reading, and math combined). Our primary independent variable is dichotomous and indicates whether colleges in the sample possess a test-optional admissions policy during a given year. We assign test-optional status only to those colleges that have made the submission of *all* test scores optional for *all* students, *and* that do not penalize applicants who wish to withhold their test scores. For example, several liberal arts colleges have adopted test-flexible admissions policies—that

do not require SAT scores, but that still require applicant scores from one or several other standardized tests (e.g., ACT, Advanced Placement [AP], or SAT subject tests)—and/or have made the submission of test scores optional for only a small subset of high-achieving students. These colleges cannot be considered test-optional in a definitional sense and are designated as "test-requiring" for the purposes of this study.

In addition to our dependent and primary independent variables, we also include controls for several time-variant variables that are likely to influence the diversity and admission profile of a liberal arts college, specifically full-time enrollment (FTE), annual tuition and fees, institutional grant award per FTE, education and related expenditures per FTE, admission rate, and a dichotomous variable indicating whether an institution adopted a no-loan financial aid policy in a given year. Financial measures are adjusted for inflation using the Consumer Price Index to reflect 2010 dollars and are logged to ease interpretation and provide a more normal distribution to the data.

Data incorporated into the panel come from multiple postsecondary data sources, including the U.S. Department of Education, the Integrated Postsecondary Education Data System (IPEDS), the Delta Cost Project, and the College Board's (2011) *Annual Survey of Colleges*. The data encompass years before and after test-optional "treatment," thereby providing a suitable data space within which to employ DiD modeling.

A quasi-experimental technique, DiD, employs a fixed-effects strategy to isolate group- or aggregate-level changes resulting from a particular intervention or policy. Specifically, DiD exploits time-induced variation to control for potential observed and unobserved differences that exist across treated and control groups and which may obscure effects that are attributed to the treatment itself (Gelman & Hill, 2006). In this study, DiD allows us to assess whether test-optional colleges experienced significant changes in the above-mentioned outcomes after adoption of their respective policies, controlling for potentially confounding time trends and pre-existing differences between test-optional and test-requiring institutions.

To reduce bias and meet identifying assumptions of the DiD model (discussed further below), we limit our sample to liberal arts colleges that *Barron's* Admissions Competitive Index categorizes as "competitive," "very competitive," "highly competitive," or "most competitive." Institutions at which standardized tests are not likely to figure prominently in the admissions process are excluded from the analysis, specifically institutions that are classified by *Barron's* as "less competitive," "non-competitive," or "special"—all of which have relatively high acceptance rates (more than 85%), admit applicants with low standardized test scores, and/or admit applicants largely on the basis of non-academic credentials. In addition, we focus our analysis on liberal arts colleges, in particular, because, during the period of our study, test-optional policies were adopted primarily by institutions in this sector.[1] Table 1 lists the test-optional liberal arts colleges within our panel and the academic year (ending) in which test-optional policies were adopted.

Analytic Technique

In cross-sectional evaluations of test-optional initiatives, estimated effects may confound policy-related gains in diversity and admissions profile with unobservable, institution-level attributes, which may also contribute to these outcomes, such as a college's culture or academic environment. Likewise, a pure time-series analysis may uncover a significant post-policy effect, but the effect may be spurious due to time trends that move most or all colleges to experience a change in their Pell rates or reported SAT scores, for example. In contrast, DiD controls for enrollment trends *and* pre-treatment differences between institutions, in effect, using both as baselines against which to compare the after-intervention outcomes of test-optional and test-requiring schools. This enables us to distinguish whether, and to what extent, post-implementation effects are attributable to the test-optional policy itself. The DiD model is formally expressed as

$$Y_{cy} = \beta_0 + \beta_1 T_c + \beta_2 A_{cy} + \gamma \mathbf{X}_{cy} + \delta_1 T_c A_{cy} + \varepsilon_{cy}, \quad (1)$$

where Y_{cy} is an outcome of interest; T_c is a dichotomous measure indicating whether a college, c, received the test-optional "treatment" during any year in the panel, y, and captures pre-treatment differences between optional and non-optional schools; A_{cy} is a dichotomous measure

TABLE 1
Sample Liberal Arts Colleges Adopting Test-Optional Policies

College (City, State)	Year of Adoption (Ending)
Wheaton College (Wheaton, MA)	1993
Dickinson College (Carlisle, PA)	1995
Hartwick College (Oneonta, NY)	1996
Muhlenberg College (Allentown, PA)	1997
Mount Holyoke College (South Hadley, MA)	2002
Pitzer College (Claremont, CA)	2004
Sarah Lawrence College (Bronxville, NY)	2005
Chatham University (Pittsburgh, PA)	2006
College of the Holy Cross (Worcester, MA)	2006
Knox College (Galesburg, IL)	2006
Lawrence University (Appleton, WI)	2006
St. Lawrence University (Catnon, NY)	2006
Susquehanna University (Selinsgrove, PA)	2006
Bennington College (Bennington, VT)	2007
Drew University (Madison, NJ)	2007
Eckerd College (St. Petersburg, FL)	2007
Franklin & Marshall College (Lancaster, PA)	2007
Gettysburg College (Gettysburg, PA)	2007
Guilford College (Greensboro, NC)	2007
Gustavus Adolphus College (St. Peter, MN)	2007
Hobart and William Smith Colleges (Geneva, NY)	2007
Juniata College (Huntingdon, PA)	2007
Lake Forest College (Lake Forest, IL)	2007
Lycoming College (Williamsport, PA)	2007
Union College (Schenectady, NY)	2007
Augustana College (Rock Island, IL)	2008
Denison University (Granville, OH)	2008
Wittenberg University (Springfield, OH)	2008
Albright College (Reading, PA)	2009
Goucher College (Towson, MD)	2009
Marlboro College (Marlboro, VT)	2009
Smith College (Northampton, MA)	2009

equaling "1" in years during and after implementation of a test-optional policy and captures changes in our outcomes of interest that may have occurred in the absence of a test-optional policy; $\mathbf{X}_{cy}$ indicates a vector of relevant covariates described above; and δ_1, the coefficient of interest, interacts with the intervention and time indicators and represents the DiD estimate, where

$$\delta_1 = (Y_{Treat(after)} - Y_{Treat(before)}) - (Y_{Control(after)} - Y_{Control(before)}), \quad (2)$$

which represents the difference in outcomes between the pre- and post-policy time periods, while controlling for pre-existing differences in outcomes between test-optional and test-requiring institutions.

Given the standard ordinary least squares (OLS) formulation of the above model, it is necessary to account for characteristics of our data and sample, which could lead to bias and/or inefficient estimates, even within the DiD framework. First, given that colleges instituted test-optional policies in different years, the simplified model in Equation 1 may over- or underestimate the effect of test-optional intervention as it assigns treatment to colleges that did not yet implement a test-optional policy. As a corrective measure, we incorporate institution- and year-fixed effects to specify the exact year in which a participating school received intervention and, in contrast to the simplified model in Equation 1, to account for variation in the duration of "treatment" among test-optional colleges (Bertrand, Duflo, & Mullainathan, 2004; Dynarksi, 2004). In particular, we estimate the following revised model, which should provide more refined evidence of test-optional effects:

$$Y_{cy} = \alpha A_c + \beta B_y + \gamma \mathbf{X}_{cy} + \delta_1 T_{cy} + \varepsilon_{cy}, \quad (3)$$

where A_c and B_y are fixed effects for colleges, c, and years, y, respectively; $\mathbf{X}_{cy}$ represents a vector of included covariates; ε_{cy} is an idiosyncratic error term; and δ_1 is our coefficient of interest and equal to "1" in any academic year when an institution's incoming class of students benefitted from a test-optional admission policy. For example, if a college adopted a test-optional admissions policy during the 2004–2005 academic year for the incoming class of 2005–2006, the institution is first indicated as a test-optional college in the 2005–2006 academic year, as 2005–2006 is the first year in which test-optional policies may affect institutional indicators, such as Pell rates, minority rates, average test scores, and *reported* application numbers.[2]

In addition, given that our analysis encompasses multiple years before and after test-optional "intervention," we also conduct a series of Durbin–Watson tests, which yield evidence of serial correlation in the simple and revised

models (Equations 1 and 3, respectively) for all outcomes. To correct for possible Type 1 error, we incorporate cluster-robust standard errors into each of our models (White, 1980), which adjust the estimated variance–covariance matrix to account for correlated residuals within clusters (i.e., colleges) and which should provide for efficient estimates of a test-optional effect, especially given that our sample has a *N* greater than 50 (Bertrand et al., 2004).

Finally, after estimating both models, we explore whether our DiD design meets the assumption of parallel trends. To yield unbiased estimates, DiD models must meet the strong assumption that treated and control groups would exhibit parallel trends in the absence of intervention (Angrist & Pischke, 2009)—which, according to Abadie (2005), "may be implausible if pre-treatment characteristics that are thought to be associated with the dynamics of an outcome variable are unbalanced between the treated and untreated group" (p. 2).

Potentially, there are differences between test-optional and test-requiring colleges not accounted for by Equation 3, and which may influence selection into "treatment," as well as the direction and rate at which outcomes among the two groups change. While pre-intervention data and the aforementioned covariates control for at least some of these differences, there may be other influential variables omitted from our models, which could potentially preclude accurate estimation of a test-optional effect.

Causal inference via DiD requires that we construct an appropriate counterfactual scenario where treated units (i.e., test-optional colleges) are instead assigned to the control group (i.e., test-requiring colleges), and vice versa—because any unit can be observed under only one of two conditions. To infer a causal effect of test-optional intervention, we must adequately approximate the outcomes of a "treated" college under control conditions (i.e., if it did not participate in test-optional admissions). If we can construct this counterfactual condition or "what if" scenario for treated units in our sample, we can *estimate* the average treatment effect of the test-optional policy: $E[Y_{1c} - Y_{0c}]$. Doing so, however, requires that we compare test-optional schools with "control" schools, which, given their characteristics and context, would exhibit similar trends in the absence of test-optional "treatment." If treated and control colleges within our sample differ on particular unobservables that lead to diverging outcomes, regardless of intervention, we cannot determine whether or which portion of a potential test-optional effect is attributable to the policy itself or to another difference, policy change, or event that is not accounted for by our model and that may also influence selection into treatment or our outcomes.

Although the parallel trends assumption is not formally testable, we adopt three techniques to examine whether parallel trends criteria have been met. First, and as indicated previously, we estimate each model on a disaggregated sample of colleges that share similar institutional characteristics and that are most likely to adopt test-optional policies, namely selective, liberal arts colleges. Restricting our sample to institutions of the same sector and similar selectivity levels should provide sufficient overlap (i.e., a range of common support) between test-optional and test-requiring schools, and consequently, allow us to extrapolate counterfactual outcomes via a DiD regression.

Second, we add an institution-specific trend to our set of covariates (Angrist & Pischke, 2009), which controls for the possibility that test-optional and test-requiring schools may have experienced different admissions- and campus-related trends prior to policy implementation. Trend variables are created by regressing each dependent variable on year, for each institution, using data from 1992 to 1995, the period before all but one institution in our dataset adopted a test-optional policy.[3] The trend variables incorporated into our models multiply the resulting coefficients by year and are unique for each institution-year, and as such, allow institutions to follow a different trend throughout the panel. If estimated effects are robust, the inclusion of institution-specific trends should not alter the magnitude or significance of the coefficients of our test-optional indicator.

Finally, after estimating our models, we conducted a series of placebo tests to confirm that effects are evident only after policy implementation and are not the result of some other factor unaccounted for by Equation 3 (Bertrand et al.,

2004). To carry out placebo testing, we estimate models for each outcome, including only panel data for years before test-optional intervention (1992–1995), and then assign test-optional "treatment" to colleges in all years after 1992. We anticipate that placebo models indicating treatment in 1993, 1994, and 1995 will yield insignificant effects of a test-optional policy, because policy implementation is synthetic and never actually occurs. However, if our test-optional indicator is significant, we must consider that effects attributed to the outcome being modeled are spurious (and possibly null), and that changes in the outcome, if any, are due to other unobservable measures.

Limitations

Despite the application of several bias-reducing techniques, this study is still limited in three important ways. First, there are several colleges for which we were unable to collect pre-adoption data. Five colleges, namely Bard, Bates, Bowdoin, Hampshire, and Lewis and Clark, implemented test-optional policies before 1992 and as early as 1965. While efforts were made to collect data prior to 1992, inconsistencies in IPEDS reporting (for grant awards and minority enrollment) and missing College Board data (for SAT scores and freshman applications) prevented us from expanding our panel to earlier years. Although "early-adopting" colleges constitute a small percentage of all test-optional colleges, and adopted policies prior to, and irrespective of, the test-optional movement, their influence could shed light on the long-term influence of test-optional initiatives. With this in mind, additional research might explore other techniques to examine test-optional-related changes among this unique group of institutions.

Second, while our fixed-effects identification strategy controlled for time-invariant omitted variables that may confound the institution-related effects of test-optional policies, it did not control for variables that change over time, which were not incorporated into our models and which may ultimately confound our estimates. For example, given the inconsistencies in endowment reporting during the period of our study, we were unable to include a variable for each college's annual institutional endowment—a potentially important indicator of campus diversity and admissions competitiveness. Although we collected data on an adequate proxy, institutional grant award per student, there may still be other elements of endowment that contributed to our outcomes of interest, above and beyond what is used for financial aid. In addition, a measure indicating the percentage of students submitting test scores may have provided for finer distinctions between test-optional programs and a more nuanced discussion on the relationship between test-optional "participation" and our dependent variables; however, reliable data for this indicator were not available.

Finally, several variables have missing data, specifically those for Pell rate (0.85%), reported SAT score (1.81%), applications (2.31%), and acceptance rate (2.31%). As a robustness check, we imputed missing values using chained equations and compared the results of our models with imputed data against our original models (with missing data). Our results remained the same; however, our findings may still be susceptible to non-response bias, especially because the majority of missingness occurs within a particular time frame, namely the first 5 years of our panel.

Results

The graphs in Figure 1 illustrate changes in institutional diversity and admissions profile during the period of our study for both test-optional and test-requiring colleges. Graphs A and B show, respectively, that test-optional colleges enrolled a lower proportion of Pell recipients and underrepresented minorities, on average, than test-requiring institutions—during all years of the panel. Furthermore, and somewhat to our surprise, Graphs A and B reveal that test-optional colleges did not make any progress in narrowing these diversity-related gaps after they adopted test-optional policies. In contrast, Graphs C and D suggest that test-optional adopters did achieve relative gains on certain admissions-related indicators. For example, while test-optional institutions reported higher average SAT scores in initial years of the panel, their margins increased in later years, by approximately 25 points on average, as Graph C shows.[4] Graph D also depicts steadily increasing margins in application totals between test-optional and test-requiring

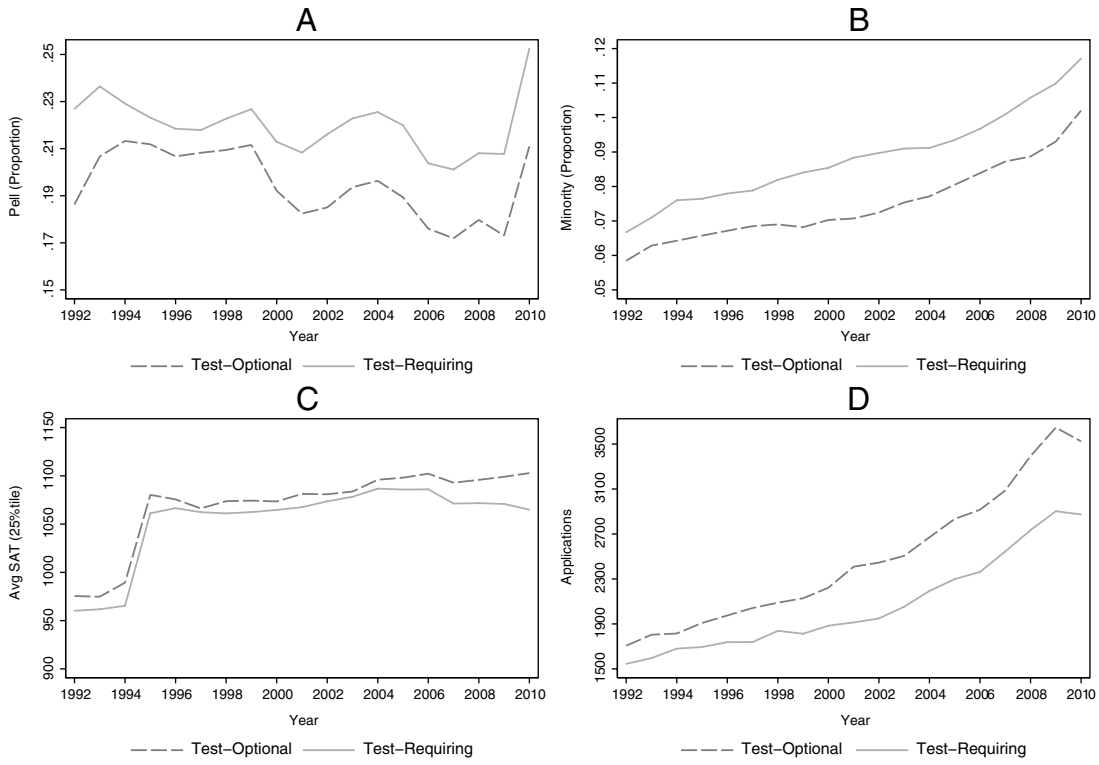

FIGURE 1. *Institutional diversity and admissions profile: Averages for test-optional and test-requiring colleges (1992–2010).*
Note. SAT = Scholastic Aptitude Test.

schools. In the first year of our panel, (eventual), test-optional colleges received 150 more applications, on average, than their test-requiring counterparts; by the end of our panel, test-optional colleges were receiving approximately 550 more applications.[5]

While the graphs in Figure 1 illuminate changes in our outcomes of interest, they cannot communicate the magnitude and significance of such changes, especially given that additional factors, besides test-optional policy implementation, may have contributed to differences in diversity and admissions-related trends between test-optional and test-requiring institutions. Indeed, the descriptive statistics in Table 2 reveal substantial growth in other institution-level indicators, which may have contributed to diverging outcomes between the two groups. For example, Table 2 shows that institutional grant dollars per FTE at test-optional colleges more than doubled in constant dollars over the course of our panel, and averaged more than US$13,000 per student by 2010, which may explain relative gains in the number of applications received at these schools. In addition, test-optional colleges experienced greater increases in tuition and fee prices in constant dollars during the period of our study, which may have prevented optimal numbers of low-income and/or minority students from applying, and consequently, may have suppressed the positive effects that test-optional policies might have otherwise had on the diversity of adopting institutions. If tuition remained constant, would test-optional policies have contributed to increases in low-income and minority enrollment—as many test-optional colleges have claimed, and despite what the graph in Figure 1 indicates? Can diverging application totals be attributed to test-optional polices, increased grant aid, or both? Results from our DiD models address these and other such questions.

Table 3 displays our regression results, which appear to confirm what the graphs in Figure 1 suggest—that test-optional admissions policies

TABLE 2
Means (and Standard Deviations) of Independent Variables (Test-Optional vs. Test-Requiring Colleges)

Variable	Minimum	Maximum	Test-optional (1992)	Test-optional (2010)	Test-requiring (1992)	Test-requiring (2010)
Independent						
No-loan policy	0.00	1.00	0.00	0.03	0.00	0.11
Undergraduate enrollment (FTE)	59.61	7,686.76	1,541.36 (640.57)	1,951.56 (607.10)	1,489.35 (869.12)	1,750.80 (1,059.47)
E&R expenditures (per FTE)	6,744.15	97,196.20	22,861.79 (5,226.24)	29,151.73 (7,712.33)	19,753.82 (6,870.28)	27,946.33 (11,922.24)
Tuition & fees	3,124.96	45,895.54	22,682.09 (3,226.14)	35,477.97 (4,008.84)	17,397.40 (5,361.74)	28,909.37 (7,604.14)
Institutional grant award (per FTE)	3.26	21,933.67	6,308.39 (1,667.48)	13,358.18 (3,079.46)	4,592.59 (2,214.47)	11,494.75 (4,588.02)
Admission rate	0.15	1.00	0.71 (0.10)	0.59 (0.15)	0.72 (0.17)	0.60 (0.20)
Dependent						
Proportion Pell	0.03	0.82	0.19 (0.08)	0.21 (0.08)	0.23 (0.12)	0.25 (0.12)
Proportion minority	0.00	0.56	0.06 (0.03)	0.10 (0.05)	0.07 (0.05)	0.12 (0.07)
Applications	23	10,068	1,706.16 (927.05)	3,524.38 (1,545.08)	1,544.91 (1,215.49)	2,980.06 (2,121.63)
Reported SAT score (25th percentile)	600	1,440	975.48 (73.30)	1,102.90 (97.44)	960.22 (129.75)	1,062.25 (142.60)
Institutions (*N*)			32	32	148	148

Note. FTE = full-time enrollment; SAT = Scholastic Aptitude Test.

do not increase the diversity of policy-adopting liberal arts colleges, on average. In particular, when controlling for unobserved heterogeneity (via institution- and year-fixed effects) and other time-varying characteristics, test-optional policies failed to effect a positive change in the proportion of low-income and minority students enrolling at test-optional institutions. This finding contradicts simulated analyses of test-optional programs (Espenshade & Chung, 2011) and is also counter to the reports of several test-optional colleges (Bates College, 2004; Jaschik, 2006; McDermott, 2008). Yet, given the descriptive nature and narrow focus of these past studies—previous reports consisted mostly of case studies focusing on one or a small number of institutions—and the quasi-experimental nature of our own study, we are confident that results yielded from our models are robust and provide some evidence that test-optional policies overall have not been the catalysts of diversity that many have claimed them to be.

Despite their seemingly non-significant impact on racial and economic diversity, test-optional policies appear to benefit adopting colleges in other, more institution-promoting ways. As indicated in the third set of columns in Table 3, implementing a test-optional admissions policy appears to exert a positive and significant influence on the number of applications a college receives. Specifically, after controlling for fixed effects, institution-specific trends, and other influential covariates, our results suggest that liberal arts colleges receive approximately 220 more applications, on average, after adopting a test-optional policy. This constitutes a substantial increase, especially given that colleges in our sample enroll only 400 first-year students annually, on average; however, the statistical significance of our finding may have

TABLE 3
Estimating the Effects of Test-Optional Policies

Outcome	Proportion Pell			Proportion minority			Applications[a]			Reported SAT score		
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Test-optional policy	−0.009	−0.006	−0.012	−0.003	−0.004	−0.003	300.643*	234.023*	221.331*	25.664**	27.184***	25.674**
	(0.010)	(0.009)	(0.009)	(0.004)	(0.005)	(0.005)	(134.250)	(112.853)	(107.781)	(7.903)	(7.974)	(7.792)
No-loan policy		0.008	0.004		0.008	0.009		563.741***	610.153***		21.418***	23.257***
		(0.007)	(0.008)		(0.005)	(0.005)		(157.404)	(166.925)		(4.780)	(5.129)
Undergraduate FTE (ln)		−0.041	−0.041		0.026	0.026		789.916*	1,118.951**		34.410	35.541
		(0.041)	(0.043)		(0.019)	(0.017)		(405.044)	(364.396)		(20.379)	(21.243)
E&R expenditures (ln)		−0.025	−0.026		0.000	0.002		541.808*	693.587**		57.086**	59.039**
		(0.030)	(0.031)		(0.015)	(0.014)		(265.210)	(251.308)		(17.671)	(18.345)
Tuition & fees (ln)		0.002	0.008		−0.008	−0.007		291.776	220.377		22.082	15.015
		(0.020)	(0.018)		(0.008)	(0.007)		(201.747)	(179.190)		(18.054)	(18.426)
Grant/FTE (ln)		0.010	0.011		0.006	0.006		−37.337	−50.833		2.646	2.029
		(0.006)	(0.006)		(0.003)	(0.003)		(52.192)	(55.039)		(3.933)	(3.992)
Admission rate		0.020	0.026		0.003	−0.003		−2,611.427***	−2,578.454***		−63.434***	−69.176***
		(0.019)	(0.019)		(0.011)	(0.011)		(334.937)	(336.692)		(17.688)	(17.612)
Observations	3,389	3,269	3,262	3,418	3,292	3,292	3,339	3,292	3,269	3,356	3,243	3,182
R^2	.893	.891	.898	.846	.851	.854	.908	.928	.932	.917	.920	.922
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution-specific trend	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Placebo effect[b]	—	—	—	—	—	—	No	No	No	No	No	No

Note. Robust standard errors clustered at the institution level are reported in parentheses. SAT = Scholastic Aptitude Test; FTE = full-time enrollment.
[a]Models incorporating the square-root transformation of applications produce positive yet insignificant results.
[b]We test for placebo effects in models where the test-optional coefficient is significant.
*$p < .05$. **$p < .01$. ***$p < .001$.

more to do with our data than our test-optional indicator. Indeed, normality tests (Jarque & Bera, 1987; Royston, 1991) offered some evidence that our variable for applications was positively skewed. To partially correct for non-normality, we re-estimated our model using the square-root transformation of our "applications" measure, and found that effects for test-optional adoption were still positive but no longer significant.[6] As such, our analysis provides interesting, yet inconclusive, results on the relationship between test-optional policies and application numbers.

Finally, test-optional policies also appear to be associated with an increase in reported test scores. Consistent with the claims of past reports (Ehrenberg, 2002; Yablon, 2001), liberal arts colleges that implement test-optional policies experience a subsequent rise in their reported SAT scores, by approximately 26 points, on average, all else equal. Furthermore, the magnitude and significance of these test-related effects remain consistent across models, even after controlling for trends, other potential confounders, and possible placebo effects—suggesting that results with respect to this outcome are quite robust. In sum, findings from our analyses indicate that test-optional policies enhance the appearance of selectivity, rather than the diversity, of adopting institutions.

Discussion

Our findings suggest that test-optional admissions policies, as a whole, have done little to meet their manifest goals of expanding educational opportunity for low-income and minority students. However, we find evidence that test-optional policies fulfill a latent function of increasing the perceived selectivity and status of these institutions. In doing so, these policies may serve to reproduce and maintain the current social structure—and its inequalities—within U.S. higher education.

While this study provides evidence of how test-optional admissions policies shape diversity and admissions profiles, more broadly, it serves as a reminder of the values that are reflected in the process of selecting students into liberal arts colleges.

The SAT and other standardized tests were initially adopted to sort students according to academic ability rather than status and background. This sorting mechanism, however, favored wealthy students and reinforced their disproportionate presence at the nation's most selective institutions. In a way, the SAT became an adaptive mechanism that upper-class families used to secure their future social status (Alon, 2009)—which, in part, may explain why the SAT continues to predominate the selective college admissions process. While selective institutions have become increasingly open to considering SAT alternatives, other standardized assessments—including the ACT, Advanced Placement, International Baccalaureate (IB), and SAT subject tests—are vulnerable to the same inequities. For example, affluent students and families can often "buy" their way to improved scores on any standardized test by hiring a private tutor, enrolling in a test preparation course, and/or registering for several administrations of the same exam (Lemann, 1999; Lewin, 2013; Vigdor & Clotfelter, 2003). Previous research shows that one or more of these costly strategies usually results in improved standardized test scores and better admissions prospects at selective colleges and universities (Buchmann et al., 2010).

Despite the clear relationship between privilege and standardized test performance, the adoption of test-optional admissions policies does not seem an adequate solution to providing educational opportunity for low-income and minority students. In fact, test-optional admission policies may perpetuate stratification within the postsecondary sector, in particular, by assigning greater importance to credentials that are more accessible to advantaged populations. Without access to standardized test data for every applicant, test-optional colleges rely more heavily on school-specific measures, such as strength of curriculum or involvement outside the classroom, to draw comparisons between prospective students; however, several studies reveal that the availability of advanced (AP, IB, and honors) courses and extracurricular opportunities is unequally distributed across socioeconomic groups (Espenshade & Radford, 2009; Iatarola, Conger, & Long, 2011; Klugman, 2013; Perna et al., 2013), and that low-SES students face greater obstacles to participating in the classes

and activities that facilitate selective college enrollment (Klugman, 2012). As a result, test-optional colleges may be inadvertently trading one inequitable policy for another—a troubling notion given that 11 additional selective liberal arts colleges have adopted test-optional polices in the past 2 years alone,[7] advancing what Diver (2006) referred to as a "new front in the admissions arms race."

Although implications for policy and practice are not entirely clear, our study reveals that eliminating or de-emphasizing standardized tests in the admissions process has not reduced educational inequalities, on average. These results indicate that the connection between social status and college admission is deeply embedded (Thacker, 2005), and perhaps more than the test-optional movement could have predicted. Our study also indicates that selective institutions cannot be relied upon, at least solely, to stem disparities in postsecondary access, which is not entirely surprising, given that most selective colleges and universities rely on a host of external resource providers that place significant emphasis on institutional position and rank (e.g., students, families, government, industry, etc.; Bastedo & Bowman, 2011; Meredith, 2004).

Nevertheless, if test-optional and other selective colleges are sincere in their desires to increase access and enroll more underrepresented students, they might consider acknowledging the SAT and other similar tests as imperfect yet useful indicators of academic achievement, as Diver (2006) and Epstein (2009) suggested, while learning to more appropriately situate a student's test score within his or her particular context.

Test-optional and other selective institutions might also consider reexamining their recruitment strategies. A wave of recent research on postsecondary "undermatch" reveals that a majority of high-achieving, low-income students fail even to apply at selective colleges and are generally unaware of the admissions requirements and benefits associated with selective higher education (Belasco & Trivette, in press; Hoxby & Avery, 2012; Smith et al., 2013). These findings are likely related to current recruitment practices at many selective colleges, which pay inadequate attention to the places where underrepresented students live and learn, largely ignoring geographically remote areas and/or low-income schools in favor of more cost-effective or "fruitful" locales (Hill & Winston, 2010; Stevens, 2007). Arguably, institutions that fail to reach a majority of underrepresented students, through recruitment or other outreach initiatives, will find it difficult to improve diversity in meaningful and significant ways, regardless of their admissions criteria. If test-optional and other selective colleges genuinely aim to become more inclusive, they must meet underrepresented students where they actually are, instead of where they "should be."

However, as intimated previously, achieving a more equitable approach to student recruitment and applicant evaluation will likely depend on the extent to which selective colleges can meet their market-related needs. To that end, it is important that selective institutions collaborate with other stakeholders to devise *and promote* new measures of excellence within higher education that could include the extent to which institutions enroll and graduate underrepresented students, the amount of resources institutions allocate to public service, average student debt load, and other indicators of postsecondary outcomes that demonstrate what colleges do, rather than whom they accept. Until U.S. higher education learns to distinguish excellence from prestige, institutions across all sectors will remain prone to prioritizing status over equity—merely to survive, at least.

Finally, it is important that selective institutions be more transparent and forthcoming about the extent to which they can accommodate disadvantaged populations. Most undermatch studies examining the lack of high-achieving, low-income students at selective institutions fail to discuss how selective colleges would respond to an influx of low-income applicants, for example. In this scenario, would Amherst or Pomona adjust its enrollment strategy to accommodate a significantly greater number of financially needy students? Or, is it more likely that a greater number of needy students would be competing for (roughly) the same number of seats? How would a similar scenario play out at Dickinson or Denison? Although answers to these questions may prompt contempt among the general public or lead to politically unpopular proposals—such as those recommending significant increases to federal and/or state aid for low-income students—they would propel

discussion on what is really required to improve diversity at America's most competitive colleges, compelling all parties to deal in reality rather than ideals.

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Notes

1. A review of the Fairtest newsletter archives (www.fairtest.org) and various college websites revealed that 37 of 44 competitive institutions (as defined by Barron's) adopting test-optional policies before 2010 were liberal arts colleges.

2. The College Board commonly reports an institution's application numbers for the prior academic year. For example, application data in College Board's *Annual Survey of Colleges* labeled 2010 indicate the number of applications submitted in 2009.

3. Trend indicators for Wheaton College (Massachusetts), which adopted a test-optional admissions policy in 1993 (academic year ending), were created using data from 1992 and 1993 only, the 2 years before the institution could have experienced any "test-optional effects."

4. All colleges experienced sharp increases in their reported Scholastic Aptitude Test (SAT) scores after the College Board re-centered score scales in 1995 to provide easier performance comparisons among the contemporary test-taking population.

5. Growth in Pell rates and declines in application totals after 2009 are likely attributed to the Great Recession, and its negative influence on demand for liberal arts education.

6. Normality tests, along with descriptive statistics and histograms, show that a square-root transformation performs better than a log-transformation in allowing for more normal distribution. However, skewness and kurtosis tests still detect some non-normality within our transformed variable.

7. Including Agnes Scott College, Connecticut College, Earlham College, Furman College, Illinois College, Manhattanville College, Moravian College, St. Leo College, University of the South, Ursinus College, and Washington and Jefferson.

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