High-Stakes Testing and the Rise of the GED*

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Between 1980 and 2009 the General Educational Development (GED) Testing Service issued 23.4 million GEDs, constituting nearly one-sixth of all high school-leaving credentials in the United States (GED Testing Service 2010). Although a GED certificate may benefit certain portions of the population, most social scientists agree that the credential is not a profitable alternative to standard high school diplomas for the majority of youth and young adults (Cameron and Heckman 1993; Heckman and LaFontaine 2006; Heckman, Humphries, and Mader 2011). Given the comparatively modest return to the GED, why has the test become such a popular route to high school completion?

In this chapter, we consider whether the growing prominence of state-mandated high school exit examinations (HSEEs) has contributed to the rise in GED testing over the past three decades. Many states have adopted HSEEs in recent years, and existing HSEEs have become increasingly challenging. Sound empirical evidence shows that exit exams reduce graduation rates (Holme et al. 2010), but few studies explore their consequences for rates of GED testing. To remedy this situation, we use state-level data from the GED Testing Service, the American Community Survey (ACS), and various

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other sources to estimate the effect state HSEE policies have had on rates of GED testing since the early 1980s.

The rest of this chapter is divided into three main parts. In the section that follows, we provide our rationale for linking trends in GED test taking with the movement toward increased student accountability. Next, we describe the data, measures, and modeling techniques that we use in our analysis. Finally, we present our results and discuss their implications for education research and policy.

Background

Many states use high-stakes achievement tests to hold students, schools, and school districts accountable for meeting state-mandated academic content standards. Exit exams are one type of high-stakes test. In states with HSEE policies, students must pass an exam before they can receive their high school diploma. The exams are usually administered during the 10th or 11th grades, depending on the state, and range in difficulty from "basic skills" tests to more challenging tests aligned to high-school based standards. Most include multiple-choice assessments of students' reading and math skills, although some also contain writing and/or other components. If students are unable to score above the passing threshold on their first attempt, they are typically able to retake the exam (or the portion of the exam that they failed) in subsequent academic years.[1]

Increasingly, states are using HSEEs to verify that students have acquired certain knowledge and skills before they finish high school. As shown by the black line in Figure 1, the number of states requiring students to pass

[1]The number of retake opportunities that students are allowed varies considerably from state to state. Some states, like Alabama, give students four chances to meet the required score before completing the 12th grade. Other states, like Mississippi, give students five chances per year. Neither of these numbers are hard caps, however, as students are generally given an unlimited number of retests once they have completed all of their other graduation requirements.

HSEEs before graduating rose sharply over the past three decades, to the point that nearly three out of every four public high school students are now subject to a binding HSEE policy (see, e.g., Center on Education Policy 2010; Dee and Jacob 2007; Warren and Kulick 2007). Barring unexpected changes, this figure should continue to grow for the foreseeable future, as states that are currently in the process of phasing-in HSEEs begin to withhold diplomas based on students' results (for the most recent projections and implementation timetables see Center on Education Policy 2010).

During the same time period, the number of individuals seeking to obtain a "second chance" credential like the GED also grew substantially (Heckman et al. 2010). As Humphries (2011) demonstrates in chapter 8, much of this growth can be attributed to growth in test-taking rates among high-school-aged individuals. Within the 28-year period from 1974 and 2002, the number of test takers between the ages of 16-19 more than doubled, rising from a low of 180,000 examinees per year to a high of just over 400,000 (see the grey line in Figure 1). Because of this increase, teenagers now make up nearly 40% of all test takers nationwide, putting them ahead of 20-24 year olds as the most frequently tested age group (GED Testing Service 2010).[2]

In many respects, it makes sense to think that these two time trends are related. By design, HSEEs serve as a barrier to high school completion. Students must demonstrate mastery of various skills in order to satisfy state-mandated standards. The failure to do so can produce feelings of anxiety and discouragement (Heubert and Hauser 1999), particularly among students from socially and economically disadvantaged backgrounds (Reardon et al. 2010). As students run out of retest opportunities, they must confront the possibility that a conventional diploma is unobtainable (Dee and Jacob 2007; Griffin and Heidorn 1996; Martorell 2004; Ou 2010; Papay et al. 2010). With few other choices available, non-traditional pathways to high school

[2]According to the GED Testing Service, 20-24 year olds made up 25% of all test takers in 2009.

completion may become increasingly appealing.

Non-traditional pathways may also be appealing from the school's perspective. Teachers and school administrators typically face strong external pressure to raise pass rates on HSEEs (and other state-mandated tests). In the era of No Child Left Behind, salaries, job security, and even local control of schools can depend, in part, on the results. As others have suggested, the nature of this incentive structure may prompt some schools to "push out" low-performing students whose scores are unlikely to exceed the required threshold (Heilig and Darling-Hammond 2008), thereby removing them from the denominator of the exam-passing rate.[3] In some cases, these difficult-to-educate students may be channeled toward alternative testing programs like the GED—a practice that often enables schools to count them as "transfers" rather high school dropouts (Sipple et al. 2004).[4]

On the other hand, the recent expansion of the GED testing program might be *unrelated* to state HSEEs. First, students who face the highest risk of failing HSEEs tend to have lower levels of motivation, less self regulation, and weaker reading, writing, and math skills (Holme et al. 2010). Pursuing a GED could increase the amount of marketable skills that these individuals possess, but the costs required of them in terms of effort and initiative could also be substantial. Having already experienced failure within the context of HSEEs, potential candidates who find themselves in this position may determine (rightly or wrongly) that the benefits of obtaining a GED are small relative to the amount of the time and effort they would have to expend. This discouragement may lead them to avoid the testing program altogether.

[3]This practice contributed to the so-called "Texas miracle" in Houston, which recorded a dropout rate of 1.5 percent in the 2000-01 school year. An audit of administrative records in Houston later showed that the district had substantially understated the actual dropout rate (Schemo 2003).

[4]The new federal guidelines on measuring graduation rates explicitly forbid this kind of "gaming" practice. Under the new rules, which are scheduled to take effect in 2012, states are not allowed to count students who enroll in GED testing programs as anything other than high school dropouts.

Second, the bar set by HSEEs—especially those with easier standards for passage—may simply be too low to affect rates of GED test taking in anything more than a superficial way (Reardon et al. 2010; Warren et al. 2006). A report by the Ohio Department of Education (1999), for instance, showed that in the fall of 1990 only 33 percent of ninth graders passed the state's ninth-grade proficiency test; ninth graders in the fall of 1990 were the first cohort required to pass the test as a requirement for graduation. Although two-thirds of students initially failed the exam, 97 percent had passed it by the spring of 1994, their nominal graduation date. That figure rose to 99 percent for subsequent cohorts, leaving few students in need of an alternative means to high school completion.

Unfortunately, prior research provides little guidance as to which of these stories is most accurate. Due to data constraints, most researchers seeking to understand the effects of state HSEEs on high school completion have classified all individuals who did not receive a diploma as dropouts, regardless of whether they earned or were working toward earning a GED (Dee and Jacob 2007; Ou 2010; Marcotte 2011; Papay et al. 2010; Reardon et al. 2010). In his study of exit exams and high school persistence, for example, Jacob (2001) defined dropouts as any student who left school and did not re-enroll prior to their senior year and non-dropouts as any student who remained in school. No exceptions were made for "dropouts" who went on to obtain a GED or for "non-dropouts" whose eventual high-school leaving credential was not a traditional diploma.

The few studies that have distinguished GEDs from other outcomes have tended to use data particular to specific states (Warren and Jenkins 2005), time periods (Bishop and Mane 2001; Bishop et al. 2001; Warren and Edwards 2005), or both (Martorell 2004), often leading to inconsistent and contradictory results. One exception is recent work by Warren, Kulick, and Jenkins (2006), who used state-level data to model the relationship between HSEEs, high school completion statistics, and GED test taking rates among

high-school-aged youth. Their results suggest that exit exam policies are associated with lower graduation rates—particularly in states with harder tests, larger minority populations, and more poverty—and higher rates of GED test taking.

In the present study, we update and extend Warren et al.'s (2006) research in a variety of ways. In addition to expanding our time series to include data on more recent graduating classes, we also use a conceptually and technically improved measure of GED test taking that allows us to better differentiate between students in adjacent cohorts who (may or may not have) faced different HSEE testing regimes. With this measure, and with the database of states' HSEE policies that we introduce in the next section, we are able to (1) estimate the impact of exit exams on rates of GED testing among high-school aged individuals; and (2) consider the degree to which such effects depend on the difficulty of the HSEE and/or the sociodemographic characteristics of the students who must pass it.

Data and measures

In this section, we describe our measure of states' HSEE policies, our indicator of GED test taking, and various other covariates that we include in our models. We then outline our basic research design. Throughout, our unit of analysis is state-years, which we constructed by cross-classifying 50 states and the District of Columbia by the 28 years from 1981 to 2008. Note that our use of the term "years" refers only to graduating classes, not calendar years. Thus, when we say that Minnesota had an HSEE in 2002, we mean that the graduating class of 2002 was subject to that policy in that state.

State high school exit exams

To estimate the effect of state HSEE policies on rates of GED test taking, we began by compiling a record of which states made passage of an exit exam a prerequisite for graduation and in which years. We obtained this

information from a combination of sources, including public records, legal archival resources, and personal communications with officials in state education agencies (see Warren and Kulick (2007) for more details). With this data, we were able to determine whether an HSEE policy was in effect for a given class, and whether the HSEE was a "minimum competency" test or a "more difficult" examination. If any component of the HSEE assessed materials that are typically introduced during or following the ninth grade, we categorized the exam into the latter category. All other state HSEEs were classified as minimum competency.[5]

Figure 2 provides a graphical representation of our HSEE data. For the graduating class of 1980, only one state (New York) required its students to pass an exit exam (the Regents Competency Test). By 2000, this figure had grown to 18, and by 2009 there were 24 states with active HSEE policies and at least five more with policies scheduled to soon take effect (Center on Education Policy 2009; 2010). Until the late 1980s these exams mostly assessed minimum competencies in the basic skills of reading, writing, and arithmetic. However, beginning in the early 1990s—and particularly after a prominent 1991 Department of Labor report (The Secretary's Commission on Achieving Necessary Skills 1991)—some states shifted to more challenging tests aligned to higher curriculum standards; these states are shown in dark gray.[6]

GED testing

To create our measure of GED test taking, we collected annual state-level data on (1) the number of GED tests taken by 17-19 year olds and (2) the

[5]Although rudimentary, this two-tiered approach has proved useful in prior research. Warren et al. (2006) and Dee and Jacob (2007), for example, showed that the negative association between more difficult HSEEs and the completion of high school is stronger than the association between the same outcome and minimum-competency exams.

[6]Members of Tennessee's graduating class of 2008, for instance, had to pass exams in English, algebra, geometry, biology, chemistry, and U.S. history.

number of high-school aged youth by single year of age.[7] We then used this information to construct a yearly, graduating class-specific indicator of GED test-taking rates for each state:

$$\frac{TT(\text{age } 17)_{s,t-1} + TT(\text{age } 18)_{s,t} + TT(\text{age } 19)_{s,t+1}}{POP(\text{age } 18)_{s,t}}, \tag{1}$$

where s indexes states; t indexes years; TT denotes counts of test takers of different ages; and POP represents an estimate of how many students graduate in each class.[8] Conceptually, this measure represents the share of students in each graduating class who took the GED test during or immediately following their high school years.[9]

The benefit of this approach is that it allows us to calculate test-taking rates across individuals who were all subject to the same HSEE policy (because they were all members of the same graduating class). This is an improvement over previous state-level analyses (Warren et al. 2006), which group individuals from different cohorts into a single test-taking category under the assumption that they all faced identical graduation requirements. The downside is that state-level data on test takers by single year of age are not available prior to 1990; for these years, the GED Testing Service combined information on 16 and 17 year old test takers into one category and 18 and 19 year olds into another. To circumvent this problem, we calculated the average ratio of 16 to 17 year old test takers and 18 to 19 year old test takers for each state during the *post*-1990 period. Using these ratios, we then allocated the aggregated *pre*-1990 counts provided by the GED Testing

[7] We exclude individuals ages 16 and under from our analysis because, in some states, such individuals are not eligible to take the GED test.

[8] For the years between 1980 and 1999, we obtained annual state-level population estimates by single year of age from the U.S. Census Bureau's Population Estimates Program. For the years between 2000 and 2009, these data come from the decennial census and the ACS.

[9] Because a small fraction of examinees take the GED test more than once before turning 20, the cohort-based estimates produced by Eq. (1) may be slightly inflated.

Service into single year of age categories.[10]

Other covariates

Although our main interest is the relationship between HSEE policies and rates of GED testing, we also include a set of time-varying covariates in our analysis to reduce the possibility that the observed associations are spurious. As we describe below, we employ state and year fixed effects models that account for (1) variables that remain constant over time but vary across states, and (2) variables that are constant across states but vary over time. This means that the only variables that could induce spuriousness are those that vary both across states and over time. Table 1 presents a list of measures that fit this description, provides the source of information for each, and gives descriptive statistics for all of the variables in our analysis.

Our first set of time-varying covariates includes a series of state education policy variables (other than state HSEE policies). Based on evidence that course graduation requirements affect dropout rates (Lillard and DeCicca 2001), we include a measure of the number of Carnegie units that states require students to complete in order to graduate. Because some states have only recently adopted mandatory course requirements, we also include a dummy variable that indicates whether state-years have a minimum course policy in place; when they do not, the value of the Carnegie unit variable is set to 0. In addition, we include a measure of states' maximum compulsory age of school attendance and an indicator that reflects the difficulty of states' GED passing standards.[11] Together, these two variables allow us to control

[10]This technique requires us to assume that the ratio of 16 to 17 year old test takers and 18 to 19 year old test takers remained relatively stable over time within states. As a rough check of this assumption, we examined within-state changes in each of the respective ratios between 1990 and 2009. In both cases, the mean difference between the two years (0.22 for 18 to 19 year olds and 0.11 for 16 to 17 year olds) was centered near 0 with a relatively tight distribution. Although not definitive, these results give us confidence that our allocation procedure produces valid estimates of test takers by single year of age.

[11]Our measure of GED difficulty was derived from GED Examiner's Manuals (various

for some of the structural barriers that young people must consider when evaluating the feasibility of different high-school leaving options.

The second set of covariates allows us to adjust for state-level sociodemographic characteristics that are known to influence the likelihood of HSEE adoption (Warren and Kulick 2007). Using data from the U.S. Census Bureau, we include annual state poverty rates, which are highest in states with "more difficult" HSEEs and lowest in states with no HSEEs. Using data from the U.S. Bureau of Labor Statistics, we include measures of per capita income (expressed in thousands of constant 2000 dollars), state unemployment rates, and the percentage of jobs in each state that are manufacturing. Finally, using data from the March CPS and the ACS, we construct state-year specific measures of the percentage of 14- to 21-year-olds who are non-Hispanic Black and of the percentage of 14- to 21-year-olds who are Hispanic. As noted above, prior work has shown that these two indicators moderate the association between HSEE testing policies and states' high school completion rates. Whether the same is true for rates of GED testing is a question that we shall return to later.

Research design

To identify the "GED effect" attributable to HSEE testing policies we examine changes in such policies within states over time. The basic estimating equation that we use can be written as:

$$Y_{s,t} = \alpha + \mathbf{H}_{s,t}\beta + \mathbf{X}_{s,t}\lambda + \boldsymbol{\gamma}_s + \boldsymbol{\nu}_t + \varepsilon_{s,t}, \tag{2}$$

where $Y_{s,t}$ represents GED test-taking rates in state s and year t; $\mathbf{H}$ is a matrix of variables describing states' HSEE policies in a given year; $\mathbf{X}$ is a matrix containing the time varying covariates described earlier; $\boldsymbol{\gamma}_s$ and $\boldsymbol{\nu}_t$

years), which include information on each state's requirements for GED receipt. See the description included in chapter 8 for more details.

are state and year fixed effects, respectively; α, β, and λ are parameters to be estimated; and $\varepsilon_{s,t}$ is a random error term that is assumed to be correlated within states.

The state fixed effects specified in Eq. (2) account for all unmeasured, time-constant differences that exist between states; the year fixed effects account for changes in GED test taking rates in a given year that are common across states (including those that resulted from the introduction of a new testing policy in 2002). This modeling approach is motivated by the fact that it is impossible to explicitly measure all aspects of particular states or of particular years that might confound our estimates of the association between HSEE policies and rates of GED test taking. To fit the models, we estimate a series of least squares regressions, in which indicator variables are introduced for each of the i-1 states ($i = 1 \ldots 51$) and for each of the t-1 years ($t = 1 \ldots 28$). Observations are weighted by population size, where population size is set equal to the size of the graduating cohort in that year.

Results

Our first set of results is presented in Table 2, which shows point estimates and standard errors from a series of models predicting GED test-taking rates.[12] The models vary in terms of how HSEEs are operationalized and whether year, state, or year and state fixed effects are included.[13] The findings are consistent across specifications. In Models 1-4, the estimates indicate that the presence of a HSEE policy significantly increased rates of GED test taking among graduating cohorts (coefficients that are at least twice their standard error are shown in bold), with effect sizes ranging from 0.55 to 1.04

[12]For the sake of parsimony, we do not present estimates for the time-varying covariates listed in Table 1. Results for these variables are available in the online appendix to this book.

[13]In other models (not shown), we included a state-specific linear time trend in addition to state and year fixed effects. The results are substantively identical to those reported in Table 2.

percentage points depending on model specification. Given that the mean test-taking rate among cohorts was approximately 7.2 percent during the time period under consideration, these estimates imply relative increases in test-taking rates of between 7.6 and 14.4 percent.

Do the effects associated with state HSEEs vary depending on their difficulty? To answer this question, we replaced the generic HSEE measure that we used in Models 1-4 with indicators of whether the exit exam was designed to assess minimum competency skills or more difficult curricular material. Here, the results are more variable across specifications. In Model 5, which does not include controls for unobserved state- or year-specific factors, there appears to be little difference between the two types of exam: both show significant and positive effects of roughly equivalent magnitude. Once we enter the state and year fixed effects, however, the story changes. In our fully specified model (Model 8), the point estimate associated with "more difficult" exams is twice as large as the estimate for "minimum competency" HSEEs, suggesting that harder tests lead relatively more students to seek alternative credentials like the GED.

How big are these effects in terms of scale? Using the measure described in Eq. (1), we calculate that for the graduating classes of 1981 through 2008, there was a cumulative total of 6,995,521 GED examinees between the ages of 17 and 19. Assuming everything else remained unchanged, what do our estimates imply would have happened had no states implemented HSEEs? Using the coefficients obtained from Model 8 and annual state-level data on the number of GED test takers, we computed the expected number of examinees under the counterfactual situation in which no states implemented HSEE requirements. Using this procedure, we estimate that a cumulative total of 319,009 fewer young people in the graduating classes of 1981 through 2008 would have taken GED tests *had there been no state HSEEs*. This is a reduction of about 4.6 percent in the total number of GED test takers.

Falsification test

To evaluate the robustness of the findings reported in Table 2, we repeated our analysis using a slightly different population of GED test takers: adults between the ages of 25 and 29. Because these individuals may or may not have been subject to the same exit exam policy (either because the policy was not in effect when they were in high school or because they were living in a different state at the time), and because there is little reason to anticipate lagged effects, we would expect to observe a substantially weaker relationship between high school exit exams and rates of GED test taking for this age group. Evidence to the contrary (e.g., non-zero effects) would suggest that factors other than state HSEEs are at least partially responsible for the "HSEE effects" that we observed in the previous section.

The results are displayed in Table 3, with coefficient estimates again arranged into eight columns according to model specification. As expected, the empirical association between exit exams and rates of GED test taking is severely attenuated in each of the models. Adults between the ages of 25 and 29 are, statistically speaking, no more or less likely to take the GED test if they reside in a state that requires its *high school students* to pass an exit exam, regardless of the test's level of difficulty. As we mentioned, this is a reassuring finding for our purposes, as it lessens the possibility that our inferences about high school aged individuals are being driven by a spurious association between state-mandated HSEEs and unmeasured (time varying) GED testing policies and/or more general test-taking trends.

Heterogeneity in HSEE effects

The results that we have presented to this point provide information about the average effect of enacting an HSEE policy during the years following implementation. To augment these findings we fit a series of interactive models to evaluate the degree to which these effects vary across states with

different sociodemographic profiles. Building on our fully specified model in Table 2, we entered interactions between states' HSEE policies and poverty rates, and states' HSEE policies and their racial/ethnic composition. For these analyses, we have mean centered our measures of exit exams, poverty rates, and percentage minority. To ease interpretation, we only consider whether the passage of a HSEE was required for students to obtain a high school diploma; no distinctions are made concerning the exam's difficulty.

We summarize the results in Table 4. Consistent with prior research on high school dropout, the effect of HSEEs on rates of GED test taking appears to be larger in states with more poverty and greater shares of racial/ethnic minorities, as indicated by the positive and significant interactions in columns 2 and 3. A four percentage point increase in the state poverty rate (roughly one standard deviation), for example, leads to a quarter of a percentage point increase in the expected effects of implementing a state HSEE on the GED test-taking rate. Likewise, a ten percentage point increase in the share of state residents who are Hispanic (roughly a standard deviation) leads to about a third of a percentage point increase in the expected effects of implementing a state HSEE on the GED test taking rate. Although we can only speculate, we suspect that these findings reflect the state-specific proportions of students who are both "at risk" of being prevented from obtaining a diploma and also sufficiently motivated to pursue GED credentials. State HSEEs may matter more for GED test-taking rates in state-years with more disadvantaged and (non-black) minority students because a greater fraction of students in those state-years are "on the bubble," achieving at a low enough level to experience HSEEs as a real obstacle but sufficiently talented to view the GED as a viable alternative.

Discussion

We began this chapter by asking whether increases in GED test taking over the past three decades can be explained, in part, by the proliferation of

state-mandated high school exit exams. Based on the evidence that we just presented, the answer appears to be a decided "yes." All else equal, high-school aged individuals who live in states with binding HSEE requirements have a higher likelihood of seeking out an alternative high-school leaving credential like the GED. Our results indicate that this effect is felt most strongly in high poverty states with more demanding tests and larger racial/ethnic populations. As shown in the previous section, these inferences are robust to a variety of model specifications and are supported by a falsification check.

To what underlying mechanisms should we attribute these findings? While our analyses do not allow us answer this question directly, we believe that at least two factors are at play. In some cases, the requirements imposed by HSEEs may cause students on the margins to re-evaluate their chances of obtaining a regular diploma. Already facing other barriers to high school completion, these individuals may come to view the GED as a less taxing, more realistic way to obtain a high school degree. In other cases, a desire to manipulate their state's accountability system may drive educators to remove low-scoring students from their school's high-stakes testing pool. As we discussed earlier, one increasingly easy way to do this is to recommend that they transfer to a GED program.

Regardless of which of these explanations carries the most weight, exit exams almost certainly divert at least some students' educational pathways, rerouting them away from conventional classroom settings and toward alternative testing programs like the GED. The costs associated with this shift should not be borne lightly. By now it is well-established that the GED has low economic returns and little influence on most recipients' post-secondary educational attainment (Heckman et al. 2011), especially when compared to a conventional high school degree. If it is true that high-stakes testing policies increase the attractiveness of the GED vis-à-vis more traditional routes to high school completion, as our results clearly suggest, then these policies may actually be doing harm to a large number of students.

Whether this harm is justified is beyond the scope of our analysis, although most existing evidence suggests that it is not. Prior work has consistently shown that HSEEs, as currently implemented, have no effect on students' academic achievement, college preparedness, college completion, or workforce productivity (Bishop and Mane 2001; Dee and Jacob 2007; Holme et al. 2010; Reardon et al. 2010; Warren et al. 2008; Warren and Grodsky 2009). At the same time, the direct costs to taxpayers of developing, implementing, scoring, and sustaining HSEEs, as well as the indirect costs of denying conventional high school diplomas to thousands of otherwise eligible students each year, are potentially quite large (Bhanpuri and Sexton 2006). That a subset of these students later go on to take the GED test does little to balance the equation.

To investigate the questions that we raised in this chapter further, future work should proceed in at least two directions. First, it would be instructive to model HSEE effects on rates of GED *certification*, not GED testing. Such analyses would allow researchers to provide a fuller accounting of the effect HSEE policies have on students' educational attainments. Are the students who leave the school system due to high stakes tests successful in their attempts to obtain an equivalency degree? Or do they fare as poorly on the GED as they did on their exit exam? Unfortunately, we were unable to answer these types of questions in the present study because the GED Testing Service did not report state-by-age counts of GED recipients for many of the state-years under consideration. These tabulations may be available, however, through GED administrators in individual states.

Second, it would be useful to know whether the consequences of HSEEs depend on how they are administered. Within the past few years, comprehensive exit exams have begun to give way to end-of-course tests designed to gauge student learning at the completion of specific classes. Flexible scoring systems, remediation programs, and alternative forms of assessment have also become more common. And many states now award alternative diplo-

mas to students who are able to satisfy some graduation standards but not others. With access to more recent data, researchers will be able to determine whether these policy modifications help to mitigate any of the negative effects that we observed in our analysis. In our view, this is an important next step in clarifying the relationship between states' high-stakes testing policies, schools' responses to those policies, and students' eventual educational outcomes.

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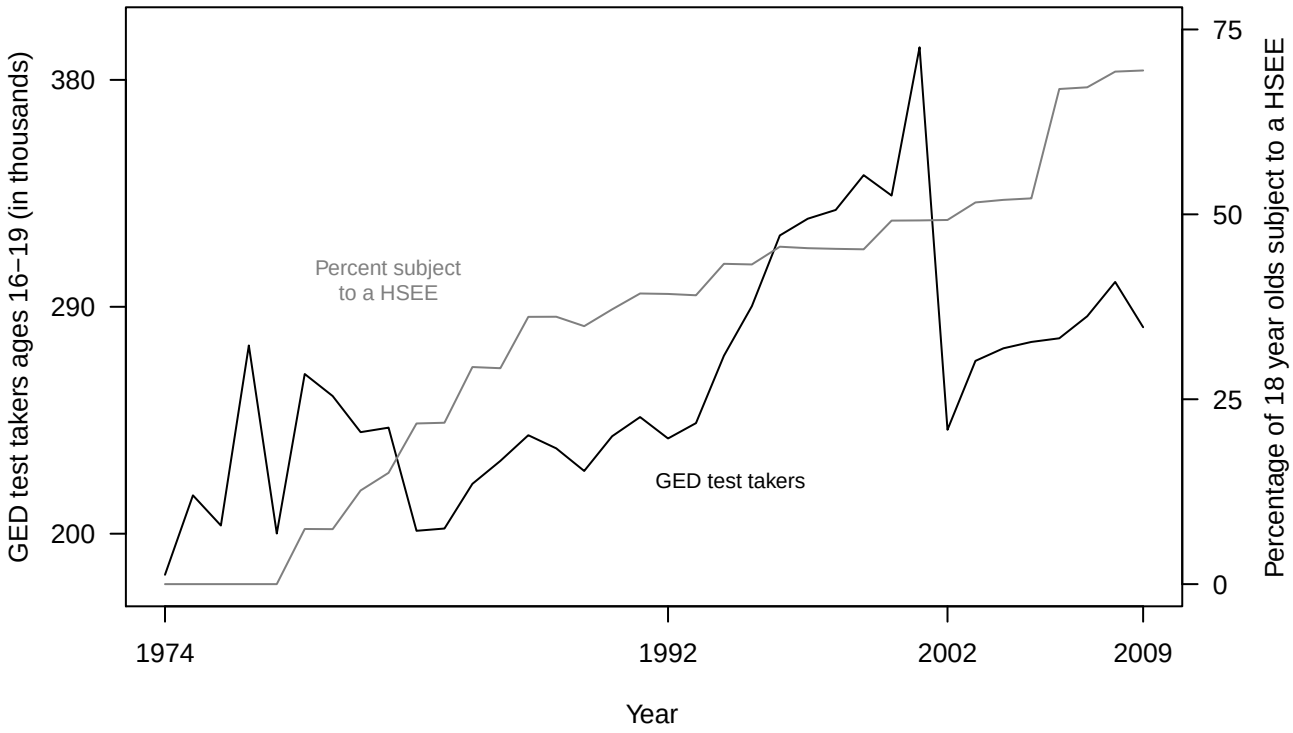

Figure 1: GED test takers and the proliferation of state-mandated high school exit exams (HSEE), 1974-2009. Data on GEDs were obtained from the American Council on Education's *Annual Statistical Reports* (various years). Data on state HSEEs were obtained from public records, legal archival resources and personal contacts with official in state education agencies and legislative archives. See text for further details.

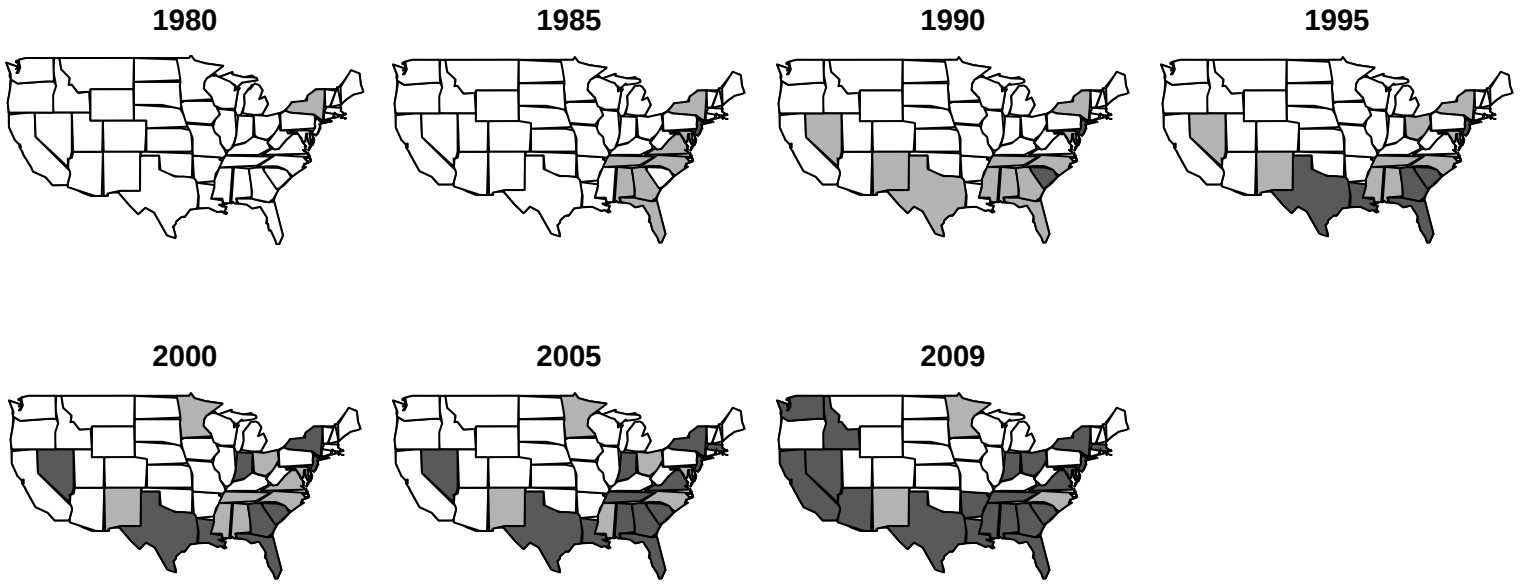

Figure 2: Timeline of state high school exit examination policies, 1980-2009. White corresponds to states without an exam, light gray corresponds to states with a "minimum competency exam", and dark gray corresponds to states with a "more difficult" exam aligned to high school-based standards. See text for further details.

Table 1: Source and description of dependent and independent variables

Variable[a]	Source	Min	Max	No high school exit exam ($n = 998$) Mean	(SD)	Minimum comp. exam ($n = 243$) Mean	(SD)	More difficult exam ($n = 171$) Mean	(SD)
Dependent variable									
Percent of cohort taking the GED	American Council on Education; U.S. Census Bureau	1.23	17.12	6.95	(2.51)	7.89	(2.93)	7.58	(2.52)
Time-varying covariates									
Poverty rate	March Current Population Survey	2.87	27.75	12.96	(4.02)	14.20	(4.39)	13.62	(3.73)
Unemployment rate	U.S. Bureau of Labor Statistics	2.30	17.40	5.88	(2.21)	5.63	(1.50)	5.21	(1.11)
Percent manufacturing	March Current Population Survey	1.60	33.76	15.51	(6.53)	14.74	(7.33)	13.02	(5.29)
Percent non-Hispanic black	March Current Population Survey; American Community Survey	0.00	87.70	9.76	(13.98)	20.53	(12.25)	22.63	(11.73)
Percent Hispanic	March Current Population Survey; American Community Survey	0.00	51.89	6.00	(8.15)	8.16	(12.57)	13.67	(12.55)
Per capita income (in 1000s of 2008 dollars)	U.S. Bureau of Economic Analysis	18.28	68.12	31.85	(6.73)	32.40	(5.79)	36.35	(6.36)
Compulsory age of school attendance	National Center for Education Statistics	14.00	18.00	16.55	(0.86)	16.62	(0.87)	16.67	(0.78)
Carnegie units required for graduation	National Center for Education Statistics	12.00	24.00	18.54	(2.66)	20.31	(1.93)	22.18	(1.27)
GED difficulty (estimated pass rate among seniors)	GED Examiner's Manual	51.00	81.00	66.88	(4.51)	67.03	(4.16)	62.68	(4.81)

[a]The data set used to generate these estimates was created by cross-classifying 50 states and the District of Columbia by 28 years. Due to missing data on GED test taking, we were forced to drop 16 of these state-years from our analysis, resulting in a final sample size of 1,412. For the years between 1980 and 1999, our measures of percent non-Hispanic black and percent Hispanic represent four-year moving averages generated using data from the CPS; in all subsequent years we created these variables using annual data from the ACS.

Table 2: Effects of state HSEEs on GED test taking among graduating cohorts

	Percentage of graduating cohort that took the GED test[a]							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exam of any difficulty	**0.979**	**1.103**	**0.675**	**0.659**	–	–	–	–
	(0.146)	(0.135)	(0.136)	(0.114)	–	–	–	–
Min. competency exam	–	–	–	–	**0.926**	**1.062**	**0.463**	**0.393**
					(0.158)	(0.146)	(0.149)	(0.125)
More difficult exam	–	–	–	–	**1.090**	**1.187**	**0.952**	**1.007**
					(0.192)	(0.178)	(0.158)	(0.133)
Constant	**15.176**	**21.527**	3.398	**13.505**	**15.222**	**21.543**	3.509	**13.274**
	(2.079)	(2.026)	(2.173)	(1.985)	(2.080)	(2.027)	(2.165)	(1.967)
State fixed effects?	*No*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*
Year fixed effects?	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*
R-Squared	0.399	0.512	0.759	0.839	0.399	0.512	0.761	0.842

[a]Our analysis file was created by cross-classifying 50 states and the District of Columbia by 28 years (corresponding to the graduating classes of 1981-2008). Standard errors are shown in parentheses below each point estimate; bolded coefficients are at least twice their standard error. Although not shown, all models include time-varying covariates indicating state unemployment rate, state poverty rate, percent of jobs that are manufacturing, percent non-Hispanic black, percent Hispanic, the state's compulsory age of school attendance, the number of Carnegie units required for graduation, and the difficulty of the state's GED pass requirements. See text for further details.

Table 3: Effects of state HSEEs on GED test taking among 25-29 year olds

	Percent of 25-29 year olds who took the GED test[a]							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exam of any difficulty	0.012	0.007	0.035	0.020	–	–	–	–
	(0.011)	(0.010)	(0.019)	(0.011)	–	–	–	–
Min. competency exam	–	–	–	–	0.023	0.022	0.032	0.019
					(0.012)	(0.011)	(0.018)	(0.013)
More difficult exam	–	–	–	–	-0.008	-0.023	0.041	0.021
					(0.015)	(0.014)	(0.025)	(0.014)
Constant	**0.709**	**1.134**	**-0.436**	**0.478**	**0.739**	**1.169**	**-0.442**	**0.476**
	(0.147)	(0.157)	(0.189)	(0.181)	(0.148)	(0.157)	(0.189)	(0.181)
State fixed effects?	*No*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*
Year fixed effects?	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*
R-Squared	0.176	0.341	0.587	0.697	0.178	0.346	0.587	0.697

[a]Our analysis file was created by cross-classifying 50 states and the District of Columbia by 28 years (corresponding to the graduating classes of 1981-2008). Standard errors are shown in parentheses below each point estimate; bolded coefficients are at least twice their standard error. Although not shown, all models include time-varying covariates indicating state unemployment rate, state poverty rate, percent of jobs that are manufacturing, percent non-Hispanic black, percent Hispanic, the state's compulsory age of school attendance, the number of Carnegie units required for graduation, and the difficulty of the state's GED passing requirement. See text for further details.

Table 4: Alternative model specifications

	Model[a]		
	(1)	(2)	(3)
Exit exam of any difficulty	**0.635**	**0.564**	**0.468**
	(0.150)	(0.153)	(0.160)
Exit exam by poverty rate interaction	–	**0.058**	–
	–	(0.023)	–
Exit exam by percent non-Hispanic black interaction	–	–	0.012
	–	–	(0.011)
Exit exam by percent Hispanic interaction	–	–	**0.033**
	–	–	(0.010)
Constant	**6.262**	**6.633**	**5.961**
	(2.333)	(2.333)	(2.347)

[a]Our analysis file was created by cross-classifying 50 states and the District of Columbia by 28 years (corresponding to the graduating classes of 1981-2008). Standard errors are shown in parentheses below each point estimate; bolded coefficients are at least twice their standard error. All models include state and year fixed effects, as well as time-varying covariates indicating state unemployment rate, state poverty rate, percent of jobs that are manufacturing, percent non-Hispanic black, percent Hispanic, the state's compulsory age of school attendance, the number of Carnegie units required for graduation, and the difficulty of the state's GED passing requirement. See text for further details.