High School Exit Examinations and State-Level Completion and GED Rates, 1973-2000

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We investigate the extent to which high school exit examinations are associated with state-level high school completion rates in the United States. To do so, we estimate a series of state and year fixed effects models using a new measure of state-level high school completion rates and archival information about states’ high school exit examinations between 1973 and 2000. We find that high school exit examinations --- particularly “more difficult” examinations that have recently been implemented in some states --- are associated with lower high school completion rates and higher rates of General Educational Development (GED) test taking. Furthermore, we find that the association between high school exit examinations and high school completion is stronger in states with higher poverty rates.
**High School Exit Examinations and State-Level Completion and GED Rates, 1973-2000**

Until the late 1970s most high school students in the United States needed only to pass a series of courses to satisfy state high school graduation requirements. By 2003, high school students in 19 states were also required to pass high school exit examinations. The details of states’ exit examination practices vary, but in general students are given a test in 9th or 10th grade that assesses their mastery of 8th or 9th grade-level curricular materials (although sometimes the standards are higher). If they fail, students can generally retake exit examinations several times before their scheduled graduation date. Pass rates --- at the state, school district, and school level --- are highly publicized, and there are often serious consequences for teachers, principals, and school administrators whose students do not pass at high rates.

Whether these policies have serious (positive or negative) consequences for students is still an open empirical question. Critics of high school exit examination policies contend that these policies reduce rates of high school completion, particularly for race/ethnic minorities and for economically disadvantaged students. In this paper we consider the extent to which high school exit examinations are associated with students’ chances of completing high school. We find that such policies are associated with lower rates of high school completion and higher rates of General Educational Development (GED) test taking, but these findings should only be considered in conjunction with other findings about potential positive consequences of high school exit examinations.

**HIGH SCHOOL EXIT EXAMINATIONS IN THE UNITED STATES, 1973-2000**

The policy shift toward exit examinations in the U.S. has been driven by the widespread sentiment that holders of high school diplomas frequently lack basic academic skills and that low
standards, watered down curriculum, and “social promotion” are responsible for a lack of job skills and college preparedness among high school graduates (Bond and King 1995; Gordon 2000; Heubert 2000; Jaegar 1982; Reardon and Galindo 2002). This sentiment was reinforced by unfavorable Cold War-era comparisons of U.S. students’ achievement in core curricular areas to the achievement of students in other countries, and it was crystallized in A Nation at Risk (National Commission on Excellence in Education 1983: 1). This report began with the assertions that “the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation” and that “more and more young people emerge from high school ready neither for college nor for work.” It concluded by recommending that “standardized tests of achievement … should be administered at major transition points from one level of schooling to another and particularly from high school to college or work.”

Many states responded quickly to this recommendation. The top panel of Figure 1 shows the number of states with mandatory high school exit examination policies in effect for the graduating classes of 1973 through 2000. In 1980 only one state (New York) had a high school exit examination. This figure grew to 14 in 1990 and to 18 in 2000; it is sure to continue to grow as other states’ planned exit examination policies take effect (American Federation of Teachers 1999; Center on Education Policy 2002; Center on Education Policy 2003; National Research Council 2001). Note that Figure 1 is based on our own archival research, but is supported by evidence from a variety of other sources (Bond and King 1995; Catterall 1989; Catterall 1990; Jacob 2001; National Governors Association Center For Best Practices 1998; U.S. Department of Education 2003).

Until about 1990 states’ high school exit examinations typically consisted of multiple-
choice measures of minimum competencies in the basic skills of reading, writing, and arithmetic. There were calls for tests of higher-order, more complex skills, but the basic skills were more clearly defined and relatively easier to test (Bond and King 1995; Linn 1995). However, beginning in the early 1990s --- and particularly after a 1991 Department of Labor Report (The Secretary's Commission on Achieving Necessary Skills (SCANS) 1991) --- some states moved to more challenging tests that were aligned with higher curriculum standards (American Federation of Teachers 1997; National Research Council 1999).

HIGH SCHOOL EXIT EXAMINATIONS AND HIGH SCHOOL COMPLETION

Theoretically, it makes sense that high school exit examinations should lead to lower rates of high school completion. Unless every student has mastered basic academic skills, then surely some students will be prevented from obtaining diplomas by virtue of having to demonstrate their mastery of those skills on an exit examination. This logical issue aside, there are concerns about the consequences of these policies for students’ educational motivations. Madaus and Clarke (2001), for example, argue that “some students immediately dismiss the examination because they feel they lack the ability to do what is necessary to pass” (pp. 97) and that “students who may not be motivated to pursue examination success … are likely to become alienated from both the examinations and the whole educational project” (pp. 99).

On the other hand, there are a number of reasons to suppose that high school exit examinations have relatively little consequence for high school exit examinations. First, some argue that most states’ tests are simply too easy to pose a real threat to students’ chances of completing high school. For instance, in January of 2004 the Ohio Department of Education issued a press release concerning their (out-going) Ninth Grade Proficiency Tests. They noted that 94% of seniors had already passed all five components of the exit examination, and that the...
remaining 6% had two more chances to retake the test before their scheduled graduation date. Elsewhere they report that between 1994 and 2000 the cumulative percentage of student who eventually pass all components of the exit examination ranged from 98% to 99%.

Second, if they matter at all for high school completion, exit examinations likely matter primarily for the small subset of students whose chances of graduating are low, but not so low that graduating is impossible. Students who are practically certain to graduate --- or not to graduate --- will likely not be affected by additional requirements like exit examinations. If exit examinations only really matter for a small subset of students, then it is conceivable that teachers and schools successfully focus their energies and resources on helping this group of student pass exit examinations.

A third reason that exit examinations might not matter for high school completion has to do with the consequences of exit examination pass rates for teachers, schools, and school administrators. High school exit examinations are “high stakes” tests for students, but they are also highly consequential for the people who are supposed to educate them. Teachers, schools, and administrators face strong external motivation to raise pass rates on high school exit (and other) examinations; salaries, job security, and even local control of schools often rest in part on test results. At the same time, states often allow exemptions from exit examination requirements for students with learning disabilities or with limited English language proficiency --- and they leave individual decisions about student exemptions to local administrators and teachers. Consequently, it is reasonable to suppose that some teachers and administrators disproportionately exempt those students who are likely to be most affected by high school exit examination requirements. To give a sense of the potential magnitude of this issue, Warren and Jenkins (2004) recently showed that during the 1990s only about 80% of students eligible to take
Florida’s high school exit examination actually did so.

PRIOR RESEARCH

At first glance there appears to be powerful support for the assertion that high school exit examinations are independently associated with rates of high school completion. Completion rates (however measured) are simply much lower in states with exit examinations. For example, for the graduating class of 2000 the median state high school completion rate (as defined below) was 73% for states with no exit examination but only 61% in states with exit examinations; in fact, the inter-quartile ranges of the two distributions only slightly overlap.

However, it is not the case that a random subset of states has elected to implement high school exit examinations. As shown in the bottom panel of Figure 1, states with high school exit examination requirements are principally located in the southern and southeastern United States. Many of these states have long been among the most economically disadvantaged in the nation, many have traditionally fared poorly on national assessments of achievement, and many contain high proportions of race/ethnic minorities and/or urban residents. Given these factors, it is not surprising that states that require high school exit examinations have lower high school completion rates. Consequently, it is incumbent upon researchers to take into account the geographic, demographic, socioeconomic, and academic characteristics of states and their students in order to understand the independent association between high school exit examinations and rates of high school completion.

Early efforts to understand the independent association between high school exit examinations and high school completion often required readers to make strong and often unwarranted assumptions or contained important methodological or data-related problems (Archer and Dresden 1987; Catterall 1989; Coates and Wilson-Sadberry 1994; Griffin and
Heidorn 1996; Kreitzer, Madaus, and Haney 1989). Beyond their methodological shortcomings, all of this early research focused on the types of exit examinations administered before the mid-1990s when some states moved toward assessing more rigorous standards in their high school exit examinations.

Most recent, methodologically sound analyses of the association between high school exit examinations and high school completion have relied on data from the National Educational Longitudinal Study of 1988 (NELS-88) --- a detailed national longitudinal study of a large sample of students who were enrolled in 8th grade in spring 1988. Researchers using NELS-88 data have found effects of 8th-to-9th grade promotion examinations on early high school dropout (Reardon 1996; Reardon and Galindo 2002), but have failed to find effects of high school exit examinations on high school completion, dropout, or GED completion rates (Jacob 2001; Muller 1998; Muller and Schiller 2000; Warren and Edwards 2004) except perhaps among low-achieving students (Jacob 2001). While analyses of NELS-88 data have been instructive, they tell us nothing about the association between high school exit examinations and high school completion in cohorts that should have graduated after (or even before) 1992.

Warren and Jenkins (2004) recently asked whether high school exit examinations are associated with high school dropout and/or race/ethnic and socioeconomic inequalities in high school dropout in Florida and Texas. Using data from the 1968 through 2000 October Current Population Surveys (CPS), they first considered the classes of 1971 through 2000 and used as their outcome variable a measure of whether students left school without obtaining a diploma or GED. They next considered the classes of 1991 through 2000 and used as their outcome variable a measure that classifies GED recipients as dropouts. In neither case did Warren and Jenkins (2004) find evidence that high school exit examinations increase dropout rates or exacerbate
inequalities in dropout rates. However, their analyses are limited to just two states; although these particular states’ exit examination policies are perhaps among the most litigated and highly publicized, it is not obvious whether Warren and Jenkins’ (2004) results are generalizable to other states. What is more, for reasons described below and in the Appendix, their reliance on CPS-based high school dropout measures raises questions about the validity of their findings even in Texas and Florida.

Other researchers have used more recent data to investigate the association between high school exit examinations and high school completion. Their analyses are based on annual state-reported data on enrollments and completion counts. Using this information, these researchers have estimated state-level high school completion rates by dividing the number of completers in a particular year by the number of 9th graders three years earlier (Haney 2000), the number of 8th graders four years earlier (Haney, Madaus, Abrams, Wheelock, Miao, and Gruia 2004), or the total enrollment in secondary schools (Amrein and Berliner 2002). Combined with information about which states had mandatory high school exit examinations, these researchers typically conclude that high school exit examinations lower high school completion rates. For example, in their analyses of data from the 1990s Amrein and Berliner (2002: 47) concluded that “high school graduation exams increase dropout rates, decrease high school graduation rates, and increase the rates by which students enroll in GED programs.” An exception is recent work by Carnoy and Loeb (2002), who use a conceptually similar measure but conclude that students in “high accountability” states in the 1990s do not experience lower completion rates.

As described in more detail elsewhere, all of this recent work shares serious

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1 This data is collected and disseminated by the National Center of Education Statistics as part of the Common Core of Data.
First, the state-level completion rate measures used in these analyses are conceptually and technically flawed, and are empirically biased (often quite severely) by grade retention and particularly inter-state migration (Warren 2004). Second, with the exception of the work by Carnoy and Loeb (2002), none of this research statistically accounts for factors that may induce spuriousness in the observed bivariate association between states’ exit examination policies and their high school completion rates. As noted above, states with high school exit examinations also tend to have higher poverty rates, higher proportions of race/ethnic minority students, and lower levels of academic achievement. Indeed these states had lower high school completion rates prior to the implementation of any high school exit examinations in the United States. Analyses like those presented by Amrein and Berliner (2002) or Haney and colleagues (2000; 2004) tell us nothing about whether high school exit examinations are associated with high school completion rates net of these covariates.

In the end there are two main sources of information about the independent association between high school exit examinations and high school completion. First, there is reasonably sound information from analyses of data from NELS-88 --- which can tell us nothing about what has happened to more recent graduating classes as high school exit examinations have become more challenging. Second, there is information from analyses of more recent data on high school completions and enrollments --- but this work has serious methodological shortcomings. In the present paper we employ a conceptually and technically improved measure of high school completion and multivariate regression techniques to understand the independent association between high school exit examinations and high school completion between 1973 and 2000. We also ask whether the association between high school exit examinations and high school
completion varies by states’ socioeconomic characteristics.

**DATA AND MEASURES**

In the next sections we describe our measures of high school completion, states’ high school exit examination policies, and other key covariates. Throughout, our unit of analysis is state-years --- constructed by cross-classifying 50 states and the District of Columbia by the 28 years between 1973 and 2000 to yield 1,428 state-years. Note that “years” refer to graduating classes, not to calendar years. For example, when we say that North Carolina had a high school exit examination in 2000, we mean that the graduating class of 2000 was subject to the exit examination requirement in that state.

**High School Exit Examinations**

For each state and in each year we have obtained information about whether high school students were required to pass one or more examinations as a pre-requisite for graduation. In some state-years students were required to take --- but not necessarily pass --- examinations, and in other state-years students received non-standard diplomas (but diplomas nonetheless) if they did not pass the mandated examination. In neither case is receipt of formal diplomas contingent on passage of exit examinations, so we do not count these state-years as having high school exit examinations.

Information about whether particular states made passage of an exit examination a high school graduation requirement is available from published sources for a limited number of years (e.g., American Federation of Teachers 1997; Amrein and Berliner 2002; Bond and King 1995; Jacob 2001; National Research Council 1999; U.S. Department of Education 2003), and with highly varying degrees of accuracy. The bulk of our information about high school exit examination requirements --- and about the attributes of those exit examinations --- was derived
from state education agency web sites, scrutiny of contemporaneous newspaper articles, and personal communications with officials in state education agencies.

Our most basic measure expresses whether or not passage of a high school exit examination was a requirement for obtaining a diploma. However, it is reasonable to suspect that “easier” exit examinations have fewer consequences for high school completion than “more difficult” exit examinations. Based on information about the grade level of proficiency to which exit examinations were aligned, we have crudely classified states’ exit examinations as either “minimum competency” examinations or “more difficult” examinations. Briefly, if any component of an exit examination assessed mastery of any curricular material that is first presented to students during the high school years --- 9th grade and beyond --- we classify the exit examination as “more difficult.” All other examinations are classified as “minimum competency” examinations. For example, Florida’s exit examination between 1983 and 1995 required mastery of 8th grade-level curriculum, whereas revised examinations administered since 1996 have required mastery of 10th grade-level curriculum. The former examinations are classified as “minimum competency,” while the latter are classified as “more difficult.”

High school students in New York in the graduating class if 1979 were the first to face a high school exit examination requirement for graduation. As shown in Panel A of Figure 1, the number of states with high school exit examinations has increased steadily, such that 18 states mandated high school exit examinations for the graduating class of 2000. Only six states --- Florida, New Jersey, New Mexico, New York, South Carolina, and Texas --- had “more difficult” exit examinations in 2000; no state had a “more difficult” examination prior to 1990. Of the 1,428 state-years in our analyses, 260 had any high school exit examination and 43 of those had “more difficult” examinations.
**State-Level High School Completion and GED Rates**

We use three conceptually distinct measures of high school completion in our analyses. As we will demonstrate below, this gives us leverage to better understand the consequences of high school exit examinations for whether --- and how --- young people obtain high school credentials. The first measure is based on October Current Population Survey (CPS) data and represents the state-level percentage of 16 to 19 year olds in a particular calendar year that are not enrolled in school and that have obtained neither a diploma nor a General Educational Development (GED) certificate. This is a status dropout measure that conceptually treats high school diplomas and GED certificates as equivalent outcomes. The second measure, developed by Warren (2004), is based on Common Core Data (CCD) and represents the cohort-specific, state-level percentage of incoming 9th graders who complete high school. This measure does not count GED recipients as high school completers, and approximates longitudinal completion rates. The third measure is based on data from the GED Testing Service of the American Council on Education (ACE), and represents the state-level percentage of 16 to 19 year olds in a particular year who take the GED examination. In the Appendix we describe the CPS and CCD data in more detail; below we describe our technique for constructing these three measures.

As described in the Appendix, CPS-based state-level high school dropout rates have serious conceptual and technical problems. However, the ubiquity of their use at both the state and national levels leads us to include a CPS-based dropout measure in our analyses. We construct a status dropout rate for each state-year that represents the percentage of 16 to 19 year olds in a state in a particular calendar year that are not enrolled in school and that have obtained neither a diploma nor a GED. Unlike commonly reported status dropout rates that are based on
16 to 24 year olds, we restrict our measure to 16 to 19 year olds to minimize biases induced by state-to-state migration. To improve the reliability of our measure, we construct three year moving averages. In the end our measure parallels that used by the Annie E. Casey Foundation in its annual *Kids Count* report (Annie E. Casey Foundation 2004).  

As reported in the first row of Table 1, our CPS dropout rate ranges from 1.5% in Connecticut in 1995 to 21.2% in North Carolina in 1977. The mean dropout rate across state-years is highest (10.4%) in state-years with “minimum competency” high school exit examinations.

The National Center for Education Statistics (NCES) produces a CCD-based four-year high school completion rate using counts of high school dropouts and completers in each state and in each academic year. Beyond conceptual and technical problems with this measure (Warren 2004), the NCES-recommended four-year completion measure is only available for 36 states and the District of Columbia in 2000, and is not available at all prior to 1996. A number of researchers have proposed alternate CCD-based state-level high school completion rates that are based on a comparison of the number of high school completers --- not counting GED recipients --- in one year to the number of students enrolled in some prior years (e.g., Greene and Winters 2002; Haney et al. 2004; Swanson 2003). Such measures have the virtue of being available for all states and the District of Columbia and for a sufficient number of academic years. Unfortunately, as reviewed by Warren (2004), these measures are conceptually and technically flawed and empirically biased in serious ways (also see Kaufman 2001; Pallas 1990).

In our analyses we use the “Estimated Completion Rate” (ECR), a new CCD-based state-level high school completion rate developed by Warren (2004). This measure represents the percentage of incoming 9th graders in each state and in each academic year who go on to

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2 Except that they use data from the CPS Outgoing Rotation Groups.
complete high school --- except via GED completion. The measure is based on a comparison of
the number of high school completers in one academic year to the number of enrolled 9th graders
three academic years earlier after accounting for inter-state migration of students and grade
retention. Warren (2004) demonstrates in a series of simulations that this measure produces
valid estimates of state-level high school completion rates. As reported in the second row of
Table 1, the ECR ranges from 50.4% in South Carolina in 2000 to 103.4% in Hawaii in 1987.3
The mean high school completion rate across state-years is highest (77.3%) in state-years with
no exit examination and lowest (64.4%) in states with “more difficult” exit examinations.

Finally, the GED Testing Service of the American Council on Education produces annual
reports (e.g., American Council on Education 2002) of the number of individuals who take the
GED examination and of the number who receive GED certificates. These counts are reported
by state, and in recent years they are also cross-classified by age. Unfortunately, state-level
counts of GED certification are available by state and age beginning only in 1989, and are not
available for some states even in recent years. Consequently, our measure begins with counts of
the number of 16 to 19 year olds in each state and in each calendar year who took the GED
examination; this information is available beginning in 1980, and is available annually for all
states. By combining these counts with estimates of the total number of 16 to 19 year olds living
in each state in each calendar year between 1980 and 2000 (U.S. Bureau of the Census 2001a;
U.S. Bureau of the Census 2001b), we compute the percentage of 16 to 19 year olds in each state
and in each calendar year who took the GED examination. As reported in the third row of Table
1, the percentage of 16 to 19 year olds taking the GED ranges from 0.3% in various state-years to

3 Of course it is impossible to have a completion rate in excess of 100%. The estimate for
Hawaii in 1987 is the only state-year estimate of the 1,428 estimates to exceed 100%.
5.0% in Alaska in 1980. The mean rate across state-years is lowest (1.9%) in state-years with no exit examination and highest (2.6%) in states with “more difficult” exit examinations.

Time-Varying Covariates

Although we are principally interested in the association between high school exit examinations and high school dropout and completion, we also include a series of covariates in our models to reduce the possibility that observed associations are spurious. As described below, we employ fixed effects models that completely account for (1) variables that remain constant over time but vary across states (e.g., geography, historical legacies, and structures of state education agencies) and (2) variables that are constant across states but vary over time (e.g., national education and economic policies, advances in education technology, and international competition and conflict). This means that the only covariates that could induce spuriousness in associations between high school exit examination policies and high school dropout or completion rates are those that vary both across states and over time. That is, we must account for variables that (1) vary across states and over time, (2) are associated with states’ decisions to implement high school exit examination policies, and (3) are associated with high school completion and dropout rates.

First, we include a series of state education policy variables (besides exit examination policies). Per pupil total education expenditures are measured in constant 2000 dollars, and are obtained from various years of the Digest of Education Statistics (e.g., U.S. Department of Education 2003). To ease interpretation, we express this measure in hundreds of dollars. As shown in Table 1, levels of per pupil expenditures vary widely across states, but are typically highest in states with “more difficult” exit examinations. Based on recent 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. In practice, we use a series of dummy variables to indicate whether students were required to complete more than 21 Carnegie units, 17 to 21 Carnegie units, or fewer than 17 Carnegie units. Finally, we include a measure of states’ maximum compulsory age of school attendance. We operationalize this as a dummy variable indicates whether the compulsory age is less than 17. Information about course graduation requirements and compulsory ages of school attendance is obtained from various years of the Digest of Education Statistics and other sources. As shown in Table 1, course graduation requirements and compulsory ages of school attendance are highest in states with “more difficult” exit examinations and lowest in states with no exit examinations.

Second, we include a series of measures of states’ economic circumstances. Based on data from the Southern Regional Education Board, we include separate measures of the percentage of states’ non-farm jobs that are in manufacturing or mining, construction, services, and government. Using data from the U.S. Census Bureau we include annual state poverty rates, which are highest in states with “more difficult” exit examinations and lowest in states with no exit examinations. Finally, using data from the U.S. Bureau of Labor Statistics we include measures of per capita income (in constant 2000 dollars and expressed in thousands of dollars) and unemployment rates. Per capita incomes are highest and unemployment rates lowest in states with “more difficult” exit examinations.

Third, we include measures of states’ race/ethnic compositions. Based on data from the October CPS we construct three-year moving averages of the percentage of 16 to 19 year olds who are black and of the percentage of 16 to 19 year olds who are Hispanic. As described in Table 1, these percentages are highest in states with “more difficult” exit examinations and lowest in states with no exit examinations.
RESEARCH DESIGN

We are interested in estimating the association between high school exit examination policies and high school completion and dropout rates --- all of which vary across states and over time. For each of our three outcome measures --- CPS-based status dropout rates, Warren’s (2004) CCD-based high school completed rates, and rates of GED test-taking --- we employ state and year fixed effects models which can be written as:

\[
Y_{it} = \alpha + \beta \text{Exit Exam Policy}_{it} + \sum_{n} \lambda_n X_{ni} + \sum_{i} \text{State}_i + \sum_{t} \text{Year}_t + \epsilon_{it} \tag{1}
\]

where \(Y_{it}\) represents the outcome variable in state \(i\) in year \(t\); \(\beta\) expresses the association between the outcome and exit examination policies that vary over state and year; \(\alpha\) is a constant; \(n\) indexes the several time-varying covariates \(X\) described above; \(\lambda_n\) represents the coefficients for these \(n\) covariates; \(\text{State}_i\) and \(\text{Year}_t\) are state and year fixed effects, respectively, and \(\epsilon_{it}\) is a disturbance term. The state fixed effects in Equation 1 conceptually account for all aspects of states that remain constant over time but vary across states. The year fixed effects conceptually account for all aspects of years that are constant across states but vary over time. This technique is built on the recognition that it is impossible to explicitly measure all aspects of particular states or of particular years that might bias our estimate of the association between high school exit examination policies and our outcomes. To estimate the model in Equation 1, we use the least-squares dummy-variable approach, in which dummy variables are introduced for each of the states (minus 1) and for each of the years (minus 1).

RESULTS

High School Exit Examinations and High School Completion

Model 1 in Table 2 reports the results of models that include no time-varying covariates.
The first two columns have as their dependent variable CPS-based status dropout rates for 16 to 19 year olds. The final two columns have as their dependent variable CCD-based high school completion rates as computed by Warren (2004). For each outcome, we first estimate a model that includes measure of whether states mandated passage of any high school exit examination. We then estimate a model that includes measures of whether states mandated passage of “minimum competency” exit examinations or “more difficult” exit examinations. The results of Model 1 suggest that there is no association between exit examination policies and CPS-based status dropout rates, even before including time-varying covariates in the model. However, we observe statistically significant associations between exit examination policies and Warren’s (2004) CCD-based high school completion rates. Before adjusting for time-varying covariates, high school completion rates are about 1.5 percentage points lower in states with any high school exit examination, 1.3 percentage points lower in states with “minimum competency” exit examinations, and almost 2.5 percentage points lower in states with “more difficult” exit examinations.

Next, Model 2 in Table 2 adds time-varying covariates. Measures of compulsory age of school attendance, of the percentage of jobs in manufacturing and mining, construction, and services, and of the percentage of 16 to 19 year olds who are Hispanic are all significantly associated with CPS-based status dropout rates. Measures of the number of Carnegie units required for graduation, of the percentage of jobs in construction, and of the percentage of 16 to 19 year olds who are black are all significantly associated with Warren’s (2004) CCD-based high school completion rates. However, the addition of time-varying covariates to the model leaves the coefficients for high school exit examination policies virtually unchanged. High school exit examination policies are not associated with CPS-based status dropout rates, but they are
associated with Warren’s (2004) CCD-based high school completion rates. After adjusting for time-varying covariates, high school completion rates are about 0.9 percentage points lower in states with “minimum competency” exit examinations and about 3.1 percentage points lower in states with “more difficult” exit examinations.

Why might we observe discrepant results across these two seemingly similar outcomes? That is, why do high school exit examinations appear to matter for rates of high school completion but not for rates of high school dropout? Part of the answer may lie in the technical and conceptual weaknesses of the CPS-based status dropout measures; these are described in the Appendix. However, we suspect that the discrepant results are also driven by the way that GED recipients are treated by these two measures. The CPS-based status dropout measure explicitly treats GED recipients as high school completers (or more precisely, as “non dropouts”), while Warren’s (2004) CCD-based high school completion measure explicitly treats GED recipients as non-completers. If this difference in the treatment of GED recipients accounts for the discrepant findings, then we would expect to find that high school exit examination policies are significantly (and positively) associated with the rate at which students take the GED.

**High School Exit Examinations and Rates of GED Test Taking**

The first two columns of Table 3 present results from models with the rate of GED test taking among 16 to 19 year olds as the dependent variable. Because this measure is unavailable prior to 1980, our analyses are restricted to the 1,071 state-years between 1980 and 2000. For the sake of comparability, Table 3 also includes models with CPS-based status dropout rates and CCD-based high school completion rates as dependent variables after restricting the data to these same 1,071 cases.

The rate at which 16 to 19 year olds attempt the GED is statistically significantly higher
in states with any high school exit examination; this association appears to be driven by states with “more difficult” exit examinations. Rates of GED test taking among 16 to 19 year olds is 0.28 percentage points higher --- or about a third of a standard deviation higher --- in states with “more difficult” high school exit examinations. The results in Table 3 for models with CCD-based high school completion rates as the dependent variable parallel those in Table 2. However, after restricting the data to 1980 and beyond we observe that CPS-based status dropout rates are significantly higher in states with high school exit examinations. For the period 1980 to 2000, high school dropout rates are about 1 percentage point higher in states with any high school exit examination, about 1 percentage point higher in states with “minimum competency” exit examinations, and more than 1 percentage point higher in states with “more difficult” exit examinations. Together these results imply that high school exit examinations --- particularly “more difficult” exit examinations --- are associated with higher dropout rates, higher rates of GED test taking, and consequently lower high school completion rates.

Alternate Model Specifications

We next ask whether our results are robust to the assumptions of the linear regression model. After performing a series of regression diagnostics and making necessary corrections, we re-estimated the models with CCD-based completion rates and GED test taking rates as dependent variables; the results of these models are presented in Table 4. First, to meet the assumption of linearity we transformed the unemployment rate measure --- taking its natural log --- and dropped observations for Alaska in 1975 and 1976. Second, we dropped cases whose standardized residuals were greater than 2.5 in absolute value; this affected 31 state-years in our analyses of CCD based completion rates and 16 state-years in our analyses of GED test taking rates. Third, we considered leverage and Cook’s D values to identify overly influential
observations. This led us to drop 8 additional cases in our analyses of CCD based completion rates and 6 additional cases in our analyses of GED test taking rates. After transforming the unemployment rate variable and deleting these cases, the assumptions of normality and homoskedasticity were met. Finally, after examining tolerance values we decided to drop our employment sector and racial composition variables in order to avoid collinearity.

The first column of results in Table 4 demonstrate that our findings about the association between high school exit examination policies and rates of high school completion remain unchanged after making these modifications. The second column of results demonstrate that our findings about the association between high school exit examination policies and rates of GED test taking also remain unchanged.

**Differential Associations by Poverty Rate**

As noted above there is concern that the consequences of high school exit examinations for rates of high school completion are more severe for race/ethnic minority students and for students from disadvantaged socioeconomic backgrounds. To consider this possibility we re-estimated our preferred model of CCD-based high school completion rates after adding interaction terms between states’ high school exit examination policies and poverty rates. We are unable to estimate similar models with interactions between exit examination policies and race/ethnic composition of states because of collinearity in the race/ethnic composition measures. The third column of results in Table 4 support the hypothesis that high school exit examinations — and particularly “more difficult” exit examinations — are especially consequential as poverty rates increase. The numeric results of this model are difficult to interpret, and so we offer Figure 2 as a depiction of the way association between high school exit examination policies and rates of high school completion change as a function of states’ poverty rates. As shown in Figure 2,
our results imply that high school completion rates are actually higher in states with “more difficult” exit examinations when the poverty rate is very low --- below about 5%. As the poverty rate rises, however, the results imply that rates of high school completion grow increasingly disparate between states with different high school exit examination policies.

**Consistency with Prior Results**

The results presented thus far appear to contradict prior evidence on the association between high school exit examinations and high school completion. First, as noted above, Warren and Jenkins (2004) found that exit examinations in Texas and Florida have not raised dropout or GED completion rates in those states in recent years. However, we hasten to reiterate the problems associated with CPS-based measures of dropout and of GED receipt. We also wonder whether small sample sizes prevent Warren and Jenkins (2004) from detecting effects that are fairly small in magnitude; in Table 3 we found that “more difficult” exit examinations raised CPS-based status dropout rates by only about 1 percentage point. Finally, we note that Warren and Jenkins’ (2004) research design --- separate time-series analyses of two states --- puts them in a weaker methodological position to detect the sort of results that we have presented.

Second, we argued above that the most methodologically sound nationwide evidence about the association between high school exit examinations and high school completion has come from analyses of data from NELS-88. Observers using NELS-88 data have consistently found no significant relationship between exit examination policies and high school dropout or GED completion rates (Jacob 2001; Muller and Schiller 2000; Warren and Edwards 2004). How do we reconcile these findings with our own results? The final two columns of results in Table 4 are based on our preferred model specifications and restrict the sample of state-years to the
period 1973 to 1992 --- that is, the data stop at the point that the NELS-88 cohort should have graduated from high school. Because there were so few “more difficult” exit examination in this period, we estimate the association between our outcomes and whether states had any exit examination requirement. As shown in Table 4, we find no significant associations between high school exit examination policies and either CCD-based high school completion rates or rates of GED test-taking when we restrict our data in this manner. We conclude that high school exit examinations are associated with lower rates of high school completion and higher rates of GED test taking, but that these associations emerged only in the period after 1992. That is, the consequences of high school exit examinations have changed in important ways since the NELS-88 cohort moved through the secondary education system.

**DISCUSSION**

Critics of high school exit examination policies contend that these policies reduce rates of high school completion, particularly for race/ethnic minorities and for economically disadvantaged students. In this paper we document the extent to which high school exit examinations are associated with students’ chances of completing high school and we consider the extent to which this association varies by states’ poverty levels. We find that high school exit examinations are associated with lower rates of high school completion and higher rates of General Educational Development (GED) test taking. Under our preferred model specification, and after adjusting for time-varying covariates, high school completion rates are about 1.2 percentage points lower in states with “minimum competency” exit examinations and about 3.2 percentage points lower in states with “more difficult” exit examinations. We also find that the association between high school exit examinations and rates of high school completion are more pronounced when poverty rates are high.
Previous researchers have approached these same questions with limited data and/or methodology. Methodologically sound analyses of data from NELS-88 have shown quite clearly that high school exit examinations were not associated with high school dropout or GED certification for the graduating class of 1992. We replicate these results in our (very different) analyses, but go on to show that the same results do not hold for post-1992 cohorts. Less methodologically sophisticated analyses of more recent data (e.g., Amrein and Berliner 2002) also tend to conclude that high school exit examinations reduce high school completion rates, but the validity of such results is highly questionable. We offer the present analyses as the first that consider the entire modern history of high school exit examinations (at least through 2000), the first that use a conceptually and technically sound measure of state-level high school completion rates, and the first to consider both high school completion and GED test taking as outcomes in analyses of multiple cohorts of students.

Nonetheless, our analyses are not without limitations, and our results should be considered a starting point for future work. First, we have only considered a few rudimentary characteristics of states’ high school exit examination policies --- whether they exist, and (if they exist) how difficult the test is supposed to be. We should certainly like to consider more rigorous measures of test difficulty and content, including information about the curricular areas covered, the breadth and depth of mastery of that material that is required to pass, and the percentage of students who pass the test (both on the initial test administration and cumulatively). All of these things may well matter for high school completion, since easy tests are unlikely to deter as many students from completing high school as more difficult tests. Beyond the content coverage and difficulty level of examinations, we can imagine that other characteristics of exit examinations might also matter for high school completion. These include, but are not limited to, the levels of
financial and other resources that schools and teachers receive to help students prepare for exit examinations and to provide remediation for students who initially fail the exit examination; the leniency and degree of local control of policies for exempting some students from the exit examination requirement; and the year and semester in high school in which exit examinations are administered (which may practically serve as a proxy for how many times students can realistically re-take exit examinations).

A second obvious limitation of our analyses is that we do not (as of March 2004) have sufficient data on high school completion for graduating classes beyond 2000. Our analyses demonstrate that the association between high school exit examinations and high school completion changed after 1992; it may well have changed again after 2000. We expect to update our analyses through 2002 in the near future as data become available.

A third limitation is that we are only able to model rates of GED test taking, not rates of GED certificate receipt. This is not a problem which is readily solved. Data on GED test taking or certification by age and state can only come from the CPS or from the GED Testing Service. CPS data on GED certification have known problems, not the least of which is that no information is available at all until relatively recently. The GED Testing Service does not provide state-by-age counts of GED certification until relatively recently, and then only for some states. A final limitation of our analyses is our inability to consider the hypothesis that the association between high school exit examination policies and rates of high school completion vary by states’ race/ethnic composition. We think that our results pertaining to states’ poverty rates are instructive, but we are unable to explore the race/ethnic issue because of collinearity.

Looking beyond these limitations, the conclusion that high school exit examinations are associated with lower rates of high school completion is likely to be interpreted by some as
evidence that such programs should be abandoned or substantially modified. We think this is premature and encourage readers to base judgments about whether to abandon or modify these policies on the weight of the evidence concerning both the potential problems with high school exit examinations and the potential benefits of those policies. Are high school exit examinations associated with lower rates of high school completion? We believe that they are. But are high school exit examinations also associated with other problems --- like teacher “burnout” or an excessive narrowing of the curriculum to which students are exposed? The evidence to date suggests that high stakes testing policies may inhibit “authentic” teaching and lead teachers to “teach to the test” (e.g., Madaus and Clarke 2001; McNeil 2000; Wideen, O'Shea, Pye, and Ivany 1997), but our reading of the literature is that substantially more research needs to be done in this area. On the positive side, are high school exit examinations associated with (their intended) positive outcomes, like higher rates of student achievement, improved college preparedness, and greater workforce productivity? Recent evidence suggests that high school exit examinations may have these desirable consequences (Bishop and Mane 2001; Bishop, Mane, and Bishop 2001; Bishop, Mane, Bishop, and Moriarty 2001; Carnoy and Loeb 2002; Jacob 2001; Raymond and Hanushek 2003), but again the research literature is thin and much more work needs to be done. It is only when we have sound answers to these sorts of questions that informed policy decisions can be made about whether the costs of high school exit examinations are outweighed by their benefits.
References


external peer review. Minneapolis, MN: Department of Sociology, University of Minnesota.


APPENDIX

The Current Population Survey (CPS) is a monthly survey of more than 50,000 households and is conducted by the Bureau of the Census for the Bureau of Labor Statistics. Households are selected in such a way that it is possible to make generalizations about the nation as a whole and, in recent years, about individual states and other specific geographic areas. Individuals in the CPS are broadly representative of the civilian, non-institutionalized population of the United States. In addition to the basic demographic and labor force questions that are included in each monthly CPS survey, questions on selected topics are included in most months.

Since 1968 the October CPS has included a school enrollment supplement. Published national estimates of high school dropout have historically been based on October CPS data. CPS-derived event dropout rates report the percentage of students in a given age range who leave school each year without first obtaining a diploma or GED. CPS-derived status dropout rates report the percentage of people within an age range --- typically ages 16 to 24 --- who are not enrolled in school and who have not obtained a diploma or GED.

As reviewed in more detail by Warren (2004), there are a number of conceptual and technical problems with CPS-based measures of high school dropout, particularly when computed at the state level. First and foremost, the sample sizes for some states are not large enough to produce reliable estimates of rates of high school completion or dropout (Kaufman 2001; U.S. Department of Education 2000). Second, until 1987 it was not possible to distinguish high school completers from GED recipients, and there are serious concerns about the quality of the GED data collected since 1988 (Chaplin 2002; Kaufman 2001). Third, as noted by Greene (2002: 7), “[status] dropout statistics derived from the Current Population Survey are based on young people who live in an area but who may not have gone to high school in that area.” To the
extent that young people move from state to state, CPS-based state-level high school dropout rates --- particularly status dropout rates based on 16 to 24 year olds --- may be of questionable validity. Fourth, some observers have expressed concern about coverage bias in the CPS sample, particularly for race/ethnic minorities. Finally, substantial changes over time in CPS questionnaire design, administration, and survey items have made year-to-year comparisons difficult (Hauser 1997; Kaufman 2001).

The Common Core Data (CCD), compiled by the National Center for Education Statistics for the U.S. Department of Education, is the federal government’s primary database on public elementary and secondary education. Each year the CCD survey collects information about all public elementary and secondary schools from local and state education agencies. One component of the CCD --- the State Nonfiscal Survey --- provides basic, annual information on public elementary and secondary school students and staff for each state and the District of Columbia. Data from the State Nonfiscal Survey includes counts of the number of students enrolled in each grade in the fall of each academic year and the number of students who earned regular diplomas, who earned other diplomas, and who completed high school in some other manner in the spring of each academic year. Although the State Nonfiscal Survey has collected counts of public school dropouts since the 1991-1992 academic year, many states have not provided this information or have provided it in a manner inconsistent with the standard CCD definition of dropout (U.S. Department of Education 2000).
Table 1. Source and Description of Dependent and Independent Variables

<table>
<thead>
<tr>
<th>Source</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean (s.d.)</th>
<th>Mean (s.d.)</th>
<th>Mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>% Age 16-19 Who Are Dropouts</td>
<td>Oct. Current Population Surveys (CPS), 3-Yr Moving Avg.</td>
<td>1.5 CT in '95</td>
<td>21.2 NC in '77</td>
<td>10.0 (3.7)</td>
<td>10.4 (3.1)</td>
</tr>
<tr>
<td>Estimated Completion Rate</td>
<td>Common Core of Data (CCD), as per Warren (2004)</td>
<td>50.4 SC in '00</td>
<td>103.4 HI in '87</td>
<td>77.3 (8.1)</td>
<td>69.6 (8.6)</td>
</tr>
<tr>
<td>% Age 16-19 Taking GED, 1980-2000</td>
<td>American Council on Education (ACE), GED Testing Service</td>
<td>0.3 Various</td>
<td>5.0 AK in '81</td>
<td>1.9 (0.7)</td>
<td>2.0 (0.6)</td>
</tr>
<tr>
<td><strong>Time-Varying Covariates</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Pupil Expend. x 100 (2000 Dollars)</td>
<td>Digest of Educational Statistics (Various Years)</td>
<td>22.5 AK in '74</td>
<td>143.2 MD in '74</td>
<td>56.9 (18.6)</td>
<td>56.9 (17.2)</td>
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<tr>
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<td></td>
<td></td>
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</tr>
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<td>% of Jobs in Manufacturing or Mining</td>
<td>Southern Regional Education Board, On-Line Data Library</td>
<td>1.8 DC in '00</td>
<td>39.7 NC in '73</td>
<td>19.7 (7.3)</td>
<td>16.1 (7.5)</td>
</tr>
<tr>
<td>% of Jobs in Construction</td>
<td>&quot;</td>
<td></td>
<td></td>
<td></td>
<td>13.6 (4.4)</td>
</tr>
<tr>
<td>% of Jobs in Services</td>
<td>&quot;</td>
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<td></td>
<td></td>
<td>22.3 (5.4)</td>
</tr>
<tr>
<td>% of Jobs in Government</td>
<td>&quot;</td>
<td></td>
<td></td>
<td></td>
<td>19.3 (5.3)</td>
</tr>
<tr>
<td>Poverty Rate (% People Poor)</td>
<td>U.S. Census Bureau, Historical Poverty Tables</td>
<td>2.9 CT in '89</td>
<td>31.6 MS in '73</td>
<td>13.6 (4.4)</td>
<td>13.9 (4.1)</td>
</tr>
<tr>
<td>Per Capita Income x 1000 (2000 Dollars)</td>
<td>U.S. Bureau of Economic Analysis</td>
<td>13.3 GA in '75</td>
<td>41.4 MA in '99</td>
<td>22.5 (4.5)</td>
<td>24.4 (4.5)</td>
</tr>
<tr>
<td>Unemployment Rate (% Unemployed)</td>
<td>U.S. Bureau of Labor Statistics</td>
<td>2.2 CT in '00</td>
<td>18.0 WV in '83</td>
<td>6.3 (2.2)</td>
<td>5.8 (1.6)</td>
</tr>
<tr>
<td>% Black among 16 to 1</td>
<td>Oct. Current Population Surveys (CPS), 3-Yr Moving Avg.</td>
<td>0.0 Various</td>
<td>80.9 DC in '73</td>
<td>10.3 (13.2)</td>
<td>22.1 (10.9)</td>
</tr>
<tr>
<td>% Hispanic</td>
<td>&quot;</td>
<td></td>
<td></td>
<td></td>
<td>50.7 (7.4)</td>
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</tbody>
</table>

Note: Sample includes 1,428 state-years created by cross-classifying the 50 states and the District of Columbia by the 28 years between 1973 and 2000. See text for a description of dependent and independent variables. Observations are not weighted.

*Sample sizes pertain to analyses that include data from 1973 through 2000. Models predicting the percentage of 16 to 19 year olds taking the GED are restricted to 1980 through 2000.
Table 2. Fixed Effects Models of the Association Between High School Exit Examination Policies and High School Completion, 1973-2000

<table>
<thead>
<tr>
<th>Exit Exam: None (Omitted Category)</th>
<th>Exit Exam: Any Exit Exam Required</th>
<th>Exit Exam: Minimum Competency</th>
<th>Exit Exam: More Difficult</th>
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</thead>
<tbody>
<tr>
<td>Model 1: State and Year Fixed Effects, No Time-Varying Covariates</td>
<td>Model 2: State and Year Fixed Effects with Time-Varying Covariates</td>
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<tr>
<td>Exit Exam: None (Omitted Category)</td>
<td>Exit Exam: Any Exit Exam Required</td>
<td>Exit Exam: Minimum Competency</td>
<td>Exit Exam: More Difficult</td>
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<tr>
<td>Exit Exam: Any Exit Exam Required</td>
<td>0.11 0.48</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Exit Exam: Minimum Competency</td>
<td>--- 0.10 0.42</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Exit Exam: More Difficult</td>
<td>--- 0.14 0.33</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Per Pupil Expenditures x 100 (2000 Dollars)</td>
<td>0.00 0.00</td>
<td>0.00 0.00</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>Carnegie Units Required for Graduation: &gt;21</td>
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<td>-0.43 -1.13</td>
<td>-1.51 -2.12</td>
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<td>Carnegie Units Required for Graduation: 17 to 21</td>
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<td>-0.32 -1.30</td>
<td>-0.56 -1.22</td>
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<tr>
<td>Carnegie Units Required for Graduation: &lt;17</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Compulsory Age of School Attendance: 17 or 18</td>
<td>-1.08 -4.49</td>
<td>-1.08 -4.48</td>
<td>0.57 1.28</td>
</tr>
<tr>
<td>Compulsory Age of School Attendance: &lt;17</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>% of Jobs in Manufacturing or Mining</td>
<td>0.29 5.37</td>
<td>0.29 5.27</td>
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</tr>
<tr>
<td>% of Jobs in Construction</td>
<td>0.62 6.26</td>
<td>0.62 6.26</td>
<td>-0.60 -3.28</td>
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<td>% of Jobs in Services</td>
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<td>0.22 2.80</td>
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<td>Poverty Rate</td>
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<td>0.05 1.53</td>
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<td>Per Capita Income (2000 Dollars)</td>
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<td>0.00 0.07</td>
<td>0.03 1.07</td>
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<tr>
<td>Unemployment Rate</td>
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<td>0.06 1.23</td>
<td>-0.04 -0.42</td>
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<tr>
<td>% Black</td>
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<td>-0.04 -1.46</td>
<td>-0.14 -3.11</td>
</tr>
<tr>
<td>% Hispanic</td>
<td>0.08 3.64</td>
<td>0.08 3.59</td>
<td>-0.03 -0.78</td>
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</tbody>
</table>

Note: Sample includes 1,428 state-years created by cross-classifying the 50 states and the District of Columbia by the 28 years between 1973 and 2000. See text for a description of dependent and independent variables.

* = p < 0.05; ** = p < 0.01
Table 3. Fixed Effects Models of the Association Between High School Exit Examination Policies and GED Test Taking and High School Completion, 1980-2000

<table>
<thead>
<tr>
<th>Exit Exam: None (Omitted Category)</th>
<th>Exit Exam: Any Exit Exam Required</th>
<th>Exit Exam: Minimum Competency</th>
<th>Exit Exam: More Difficult</th>
<th>Per Pupil Expenditures x 100 (2000 Dollars)</th>
<th>Per Capita Income (2000 Dollars)</th>
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<th>Unemployment Rate</th>
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<th>% Hispanic</th>
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</tr>
<tr>
<td>0.11</td>
<td>2.34 *</td>
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<td>---</td>
<td>0.07</td>
<td>1.41</td>
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<td>---</td>
<td>0.84</td>
<td>2.79 **</td>
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<td>-0.02</td>
<td>-0.32</td>
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<td>-2.41 *</td>
<td>-1.08</td>
<td>-2.41 *</td>
<td>-0.69</td>
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<td>1.30</td>
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<td>-0.48</td>
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<td>1.92</td>
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<td>0.26</td>
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</tr>
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<td>-0.05</td>
<td>-1.22</td>
<td>-0.11</td>
<td>-1.52</td>
</tr>
<tr>
<td>0.00</td>
<td>-0.61</td>
<td>-0.01</td>
<td>-1.00</td>
<td>0.08</td>
<td>1.97 *</td>
<td>0.07</td>
<td>1.84</td>
<td>0.15</td>
<td>2.30 *</td>
</tr>
</tbody>
</table>

Note: Sample includes 1,428 state-years created by cross-classifying the 50 states and the District of Columbia by the 28 years between 1973 and 2000. See text for a description of dependent and independent variables.

* = p < 0.05; ** = p < 0.01
### Table 4. Alternate Specifications of Fixed Effects Models of the Associations Between High School Exit Examination Policies and GED Test Taking and High School Completion

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b b/se</td>
<td>b b/se</td>
<td>b b/se</td>
<td>b b/se</td>
<td>b b/se</td>
</tr>
<tr>
<td>Exit Exam: None</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Exit Exam: Minimum Competency</td>
<td>-1.16 -3.06 **</td>
<td>0.07 1.27</td>
<td>1.14 1.08</td>
<td>-0.67 -1.60</td>
<td>0.01 0.24</td>
</tr>
<tr>
<td>Exit Exam: More Difficult</td>
<td>-3.21 -4.84 **</td>
<td>0.24 3.01 **</td>
<td>7.66 3.53 **</td>
<td>b</td>
<td>b</td>
</tr>
<tr>
<td>Per Pupil Expenditures x 100 (2000 Dollars)</td>
<td>0.00 0.83</td>
<td>0.00 -1.00</td>
<td>0.01 1.01</td>
<td>0.00 0.67</td>
<td>0.00 0.00</td>
</tr>
<tr>
<td>Carnegie Units Required for Graduation: &gt;21</td>
<td>-1.32 -2.12 *</td>
<td>-0.04 -0.52</td>
<td>-1.03 -1.66</td>
<td>-2.33 -2.77 **</td>
<td>-0.05 -0.59</td>
</tr>
<tr>
<td>Carnegie Units Required for Graduation: 17 to 21</td>
<td>-0.72 -1.77</td>
<td>0.06 1.14</td>
<td>-0.61 -1.50</td>
<td>-0.22 -0.41</td>
<td>0.03 0.43</td>
</tr>
<tr>
<td>Carnegie Units Required for Graduation: &lt;17</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Compulsory Age of School Attendance: 17 or 18</td>
<td>0.35 0.88</td>
<td>0.01 0.16</td>
<td>0.46 1.17</td>
<td>-0.14 -0.30</td>
<td>0.05 0.61</td>
</tr>
<tr>
<td>Compulsory Age of School Attendance: &lt;17</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Poverty Rate</td>
<td>-0.05 -0.99</td>
<td>0.00 -0.67</td>
<td>-0.01 -0.15</td>
<td>-0.32 -4.64 **</td>
<td>0.00 -0.38</td>
</tr>
<tr>
<td>Per Capita Income (2000 Dollars)</td>
<td>0.05 2.16 *</td>
<td>0.00 1.00</td>
<td>0.05 2.26 *</td>
<td>0.01 0.46</td>
<td>0.00 -0.33</td>
</tr>
<tr>
<td>ln(Unemployment Rate)</td>
<td>1.32 2.69 **</td>
<td>-0.01 -1.00</td>
<td>1.40 2.87 **</td>
<td>0.96 1.88</td>
<td>0.00 -0.27</td>
</tr>
<tr>
<td>Minimum Competency E.E. X Poverty Rate</td>
<td>---</td>
<td>---</td>
<td>-0.15 -2.17 *</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>More Difficult E.E. X Poverty Rate</td>
<td>---</td>
<td>---</td>
<td>-0.68 -5.25 **</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

* = p < 0.05; ** = p < 0.01

Note: Sample includes 1,428 state-years created by cross-classifying the 50 states and the District of Columbia by the 28 years between 1973 and 2000. See text for a description of dependent and independent variables.

^a In these models a number of outlying or overly influential cases have been omitted, the unemployment rate variable has been logged, and a number of time-varying covariates have been omitted because of high collinearity. See text for details.

^b Between 1973 and 1992 no states administered "more difficult" exit examinations; all exit examinations were minimum competency examinations.
Figure 1. High School Exit Examinations in the United States, 1977-2000

A. Number of States with High School Exit Examinations, by Year

B. States with High School Exit Examinations in 2000
Figure 2. Predicted High School Completion Rate by Poverty Rate and High School Exit Examination Requirements