

# State High School Exit Examinations and Post-Secondary Labor Market Outcomes\*

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## **State High School Exit Examinations and Post-Secondary Labor Market Outcomes**

### **ABSTRACT**

Since the late 1970s an increasing number of states have required students to pass statewide high school exit examinations (HSEEs) in order to graduate. States have usually adopted HSEEs in response to the perception that substantial numbers of graduates lack skills required for success in the modern economy. What do these education reforms mean for students' post-secondary economic and labor market prospects? The central hypothesis of this research is that state HSEE policies have the effect of widening gaps in labor force status and earnings between young people who have high school diplomas and those without them. To test this hypothesis we model the association between state HSEE policies and these labor market outcomes using data from the 1980 through 2000 U.S. Censuses and the 1984 through 2002 Outgoing Rotation Groups of the Current Population Survey. We find no evidence that state HSEEs positively affect labor force status or earnings, or that the connections between state HSEE policies and these outcomes vary by students' race/ethnicity or the level of difficulty of state HSEEs.

## State High School Exit Examinations and Post-Secondary Labor Market Outcomes

Since the late 1970s a growing number of states have required students to pass statewide<sup>1</sup> high school exit examinations (HSEEs) in order to earn high school diplomas. Although state HSEEs have traditionally been minimum competency tests of basic skills, many states have recently moved to more challenging tests of higher-order skills. Members of the class of 2006 faced state HSEE requirements in 22 states; other states are currently implementing new state HSEE requirements. Because many larger states have adopted these policies, about two thirds of all American high school students now face state-mandated HSEE requirements (Warren 2007).

States have generally adopted HSEEs in response to the perception that large numbers of high school graduates lack the skills required for success in the “new economy” and that requiring students to pass a high-stakes test that assesses their mastery of basic skills will make the high school diploma more meaningful to employers. Particularly motivating was a much-publicized report by The National Commission on Excellence in Education (1983), which began:

Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the United States and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation...

Among the commission’s recommendations was 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.”

The sentiments expressed in *A Nation at Risk* continue to influence educational policy today, and states have invoked similar concerns about economic prosperity to motivate their

HSEE policies. For example, in a booklet describing Florida's HSEE, the Florida Department of Education (2001) noted that "students are increasingly expected to display high-level learning and perform complex problem solving. Today, the job market requires people who are proficient in advanced mathematics and who can read and construct meaning from difficult and technical texts." Likewise, in a pamphlet explaining the new state HSEE that will take effect for the class of 2008, Washington's State Board of Education (2003) warned that "every day, job prospects and opportunities dwindle for high school graduates unable to do basic reading, writing and math tasks." Elected officials have voiced similar sentiments. For example, Vito Gagliardi, Commissioner of Education for the state of New Jersey, asserted that New Jersey's revised HSEE "will prepare [students] for successful futures in ... the working world" (New Jersey Department of Education 2001). More recently the California Superintendent for Public Instruction, Jack O'Connell (2006), asserted that the "high school exit exam measures absolutely the least our students must know as they move on to their next step in learning and earning."

The logic of these claims seems compelling and, as we discuss below, is grounded in widely embraced economic models of signaling and human capital formation. Proponents of state HSEE policies assert that technological change and industrial restructuring have produced a labor market that requires more highly skilled workers than secondary schools currently produce. They argue that state HSEEs will certify that graduates possess the skills necessary to compete in this new economy and will force schools not producing such graduates to improve the quality of their instruction. Yet despite the popularity of state HSEEs as a policy lever, relatively little research is available to support or refute the central claims of state HSEE proponents.

In fact, we do not know whether employers are aware of state HSEEs, value the skills that state HSEEs assess, or believe that the skill thresholds required to pass state HSEEs are

adequate to improve the informational value of the high school diploma. Given the occupations held by most high school graduates who fail to go on to college, it seems at least reasonable to wonder whether academic skills have any bearing on employee productivity or employer hiring and compensation decisions whatsoever. Some work in sociology (discussed below) suggests that the skills that state HSEEs seek to measure are not the skills required by those who employ high school graduates, undermining the utility of implementing such policies. In fact, among those aged 18-24 who completed high school or a GED between 1974 and 1990, some of the most commonly held occupations require relatively limited academic skills.<sup>2</sup> Furthermore, although the simple logic behind state HSEE policies is appealing, the political realities of implementing such policies can be daunting. Policymakers must weigh the perceived benefits of a rigorous state HSEE against the political, economic, and social costs of denying large numbers of students a high school diploma.

In this paper we situate state HSEE policies in the theoretical debate between human capital and signaling theorists on the one hand and credentialists on the other. In our empirical analyses we estimate the effects of state HSEE policies on labor force status and earnings among 20 to 23 year olds with no post-secondary schooling. We contend that if state HSEE policies improve employment prospects and expected earnings as supporters suggest, then the effects of such policies should be most evident in the differences in expected labor market outcomes between those who do and do not complete high school. State HSEE policies are less likely to directly affect the labor market value of college degrees, though they may affect labor market outcomes indirectly by inducing more students to attend college. Employers who hire college-educated workers are much less likely to be concerned with the literacy and numeracy skills taught at the secondary level and more concerned with advanced skills, knowledge, or training.

## **THEORETICAL BACKGROUND**

Proponents of state HSEE policies often invoke popular versions of two economic theories—*human capital theory* and *signaling theory*—to justify the utility or even necessity of these policies. Both theories would predict that state HSEE policies lead to increases in the labor market success of high school diploma recipients. In contrast, *credential theory* would predict no independent association between diploma recipients' labor market outcomes and state HSEE policies.

Human capital theory—commonly associated with the work of Gary Becker ([1964]1993), Jacob Mincer (1958) and Theodore Schultz (1961)—is most closely aligned with policy makers' justifications for state HSEE policies. Human capital theory contends that people with greater knowledge and skills are more productive in the workplace and thus are more richly compensated by their employers for their labor. Although both general and firm specific skills contribute to worker productivity, schools are primarily implicated in the level of general skills workers have, particularly relatively inexperienced workers. State HSEE requirements ostensibly compel students to exceed some threshold of knowledge and skill in order to earn a high school diploma. As we discuss below, this threshold can vary across states and within states over time. Assuming that the knowledge and skills assessed by state HSEEs enhance worker productivity as supporters claim, we would expect to find that differences in the labor force statuses and earnings of high school graduates and non-completers<sup>3</sup> are greater in states with HSEEs than in states without HSEEs. Furthermore, gaps in productive skills—and thus labor market outcomes—should be greatest in states with more demanding HSEEs.

If groups of students differ in the average levels of human capital with which they leave secondary school—whether due to disparate backgrounds, home environments or educational

opportunities—human capital theory would also anticipate that state HSEEs lead to a reduction in group differences in employment and earnings. By truncating the skill distribution of high school graduates, state HSEE policies reduce mean differences between groups of students. For example, assume that African American high school seniors have average levels of academic achievement one standard deviation below those of white high school seniors. If one were to truncate both distributions at the African American 10<sup>th</sup> percentile, the average difference between groups would decline to 0.85 of a standard deviation, a reduction of 15%. Given what we know about differences in academic achievement by race/ethnicity (Hedges and Nowell 1999; Neal 2004), human capital theory would predict that state HSEEs reduce earnings differences between African American, Hispanic and white high school graduate with greater reductions in states with more demanding HSEEs as a result of the more substantial truncation higher competency HSEEs would impose on the distribution of student skill.<sup>4</sup>

At a micro level, state HSEE policies should increase human capital by increasing the costs of failure for both students and schools. Faced with the possibility of failing to achieve a diploma—or in the case of schools, faced with the possibility of having large numbers of students fail to achieve a diploma—schools should increase the quality of their instruction and students should apply themselves with greater diligence to learning the material assessed on the state HSEE. This increase in instructional resources and student effort should lead previously low-performing students to improve their skills to at least the level needed to pass the exam. At a macro level, this shift in skills of previously lower performing students should manifest itself as a mean increase in the human capital of high school graduates. Lacking data on academic achievement for individual students, we can only identify these macro effects in this paper.

Like human capital theory, signaling theory (Spence 1973) also anticipates a positive

relationship between state HSEE policies and the labor market advantages that high school graduates enjoy over those who fail to complete high school. Although it is notoriously difficult to distinguish between the empirical implications of these two theories in practice (Frazis 2002), —and we do not attempt to do so in this paper—signaling theory differs from human capital theory in a few important respects. First, signaling theory does not necessarily equate schooling with *achieved* skills and knowledge. Rather, signaling theory leaves open the possibility that educational achievement merely distinguishes those who are endowed with characteristics attractive to employers (such as cognitive ability, persistence, and interpersonal skills) from those who are not. *Unlike human capital theory*, signaling theory does not take as a foregone conclusion that education adds value to students’ productive skills. Second, signaling theory suggests that education matters to employers not because more educated workers are *necessarily* more productive, but because information in the labor market is scarce. Employers attach a probability distribution to the potential productivity of each job applicant. They may assign more narrowly bounded and somewhat higher probability distributions to the productive potential of applicants who have a certificate like a high school or a college diploma.

Some economists have invoked signaling theory to argue that employers engage in “statistical discrimination,” favoring members of one group (whites or males) relative to other groups (African Americans, Hispanics or females) based on assumed differences in the ability distributions of these groups. Aigner and Cain (1977) suggest two possible interpretations of signaling theory under statistical discrimination. One interpretation, based on Phelps (1972), holds that different groups have different mean levels of productive skills. Given their uncertainty about the productive capabilities of individual workers, employers prefer to hire workers from the distribution with the higher mean and reward them more for their labor. An

alternative view, advocated by Aigner and Cain (1977), asserts that even absent mean differences, groups differ in the variance of their skill distributions. Employers prefer to hire workers from the skill distribution with narrower variance and hence less uncertainty.

If state HSEEs operate as supporters claim they do, they will truncate the lower end of the skills distribution, increasing the mean and reducing the dispersion of skills among high school graduates. Consequently, signaling theory would predict a positive marginal association between state HSEE policies and labor market outcomes and an association greater in magnitude for states with more demanding HSEEs. The explanation for these effects from a signaling perspective, however, is quite different from those offered by human capital theory. Even if we find that state HSEE policies have the anticipated effects on labor market outcomes, we must be cautious in attributing these effects to increases in the productivity of high school graduates.<sup>5</sup>

In addition to marginal differences in outcomes, the theory of statistical discrimination (based on signaling theory) would anticipate greater payoffs to state HSEEs for members of groups with lower means (Phelps 1972) and/or greater dispersion in their skill distributions (Aigner and Cain 1977). Since HSEEs ostensibly truncate the skill distribution among high school graduates, they should both reduce group mean differences and differences in dispersion. By doing so, state HSEEs should reduce disparities in the employment outcomes and earnings of African American and Hispanic high school graduates on the one hand and white high school graduates on the other.

In contrast to human capital theory and signaling theory, Randall Collins' theory of credentialism (1971; 1979) posits that employers achieve no productive ends by hiring employees who hold a high school diploma or bachelor's degree. Instead, they secure employees whose status cultures match their own and who will conform to organizational norms.

Employers are engaged in an act of social closure whereby the ‘other’—those lacking the status distinction that school is equipped to provide—is denied access to positions of power and prestige. According to Collins, the failure of schools to impart technical knowledge is unimportant. The main activity of schools is not to impart such knowledge, as is commonly believed, but instead “to teach particular status cultures, both in and outside of the classroom” (1971: 1010). State HSEE policies are not designed to measure status culture; they generally measure skills in mathematics and reading at fairly low levels of proficiency. Since credential theory views academic achievement as epiphenomenal to schooling and of relatively little consequence in the labor market, it would not anticipate any association between state HSEEs and labor market outcomes.

Human capital theory, signaling theory, and credential theory are all intended to account for the effect of education on labor market returns across the entire distribution of educational attainment. However, we focus on a narrow range of the educational distribution in this paper: those with a high school education or less. The labor market value of educational attainment and academic achievement for contemporary workers with a high school education or less is the subject of some debate in the literature. Before discussing previous empirical work on state HSEEs, we review some of what we have learned about low-wage work.

### **The Market for Academic Skills among Less Educated Workers**

Researchers generally agree that cognitive skills are associated with earnings in the labor market (Murnane and Levy 1996; Murnane et al. 2001), but they disagree about the strength of this relationship (Cawley, Heckman, and Vytlačil 1999; Farkas et al. 1997). It is particularly difficult to tell the extent to which skill differences influence labor market outcomes among the less educated. For example, Cameron and Heckman (1993) find no difference in expected

earnings between GED recipients and high school dropouts, implying limited returns to cognitive skills among such wage earners. Tyler, Murnane, and Willet (2000a), however, find evidence that cognitive skills continue to matter even at this level, leading to differences between the earnings of dropouts who fail the GED and those who pass it. In other work, they find that cognitive skills account for only a modest portion of the payoff to the GED; much of the payoff is in achieving the certificate itself, consistent with credentialing theory (Tyler, Murnane, and Willett 2000b).

Though scholars generally assume that skills are rewarded because they increase worker productivity, there is relatively little research on the demand side of the equation to support this assumption. Using data from the Multi-City Study of Urban Inequality (MCSUI) employer surveys, Holzer (1998) and Moss and Tilly (2001) provide evidence of increasing employer demands for cognitive skills. According to Holzer, most new jobs require literacy and numeracy skills, as well as typing and rudimentary computer skills. The skill requirements are substantial, even when only a high school diploma is required of workers. Moss and Tilly (2001) echo Holzer's (1998) findings, emphasizing that the demand for skills is not restricted to technical jobs alone. Over 40% of employers who responded to the MCSUI survey indicated that the skills they require of workers had increased over time.

These cognitive skills are skills that could, in principle, be measured by state HSEEs. If employers are aware of state HSEE policies and believe that they effectively discriminate between individuals who do and do not have the skills they seek, we would expect to find an association between state HSEE requirements and educational differences in labor market outcomes. The magnitude of these differences depends heavily on the importance employers attach to the skills that state HSEEs measure *relative to other attributes that employers desire in*

*their workers*. If employers place substantially more weight on attributes and skills that are *not* measured by state HSEEs than they do on academic skills in making their hiring and promotion decisions, then state HSEEs may have negligible effects on labor market outcomes.

There is a solid empirical basis from which to question the salience of academic skills to employer evaluations of workers. Research on the earnings of high school graduates (Sewell and Hauser 1975) and adults in general (Cawley, Heckman, and Vytlačil 2001) consistently shows that background characteristics, including cognitive ability, account for less than 10% of the variance in earnings. Even of this 10%, a substantial portion is attributable to what are generally referred to as “noncognitive skills,” or skills and attitudes unrelated to the abilities tested by achievement tests. Bowles and Gintis (2002), in a meta-analysis of 25 studies, estimate that only about 20% of the effect of years of education on earnings is accounted for by measured cognitive skills. The other 80%, they suggest, largely reflects attitudes, behaviors, and personality characteristics.

There is a substantial body of work that shows that employers are quite explicit in the value they place on non-cognitive worker attributes (for reviews of this literature, see Bills (1988; 1992), Cappelli (1995) and Farkas (2003)). Cappelli (1995), for example, finds that employers value character and attitude above all else in their hiring decisions. Other characteristics they look for include responsibility, discipline, pride, and enthusiasm. Likewise, Rosenbaum (2001) finds that the employers of the high school graduates that he and his team interviewed stress the importance of attendance, deportment and other ‘soft skills’ over the academic skills they also value. Bills (1988) suggests that personality is about as important to employers as formal education. More recently, Moss and Tilly (2001) found that employers of high school graduates are less concerned with cognitive skills than they are with things like

dependability and interpersonal communications.

If Moss and Tilly (2001) and Rosenbaum (2001) are correct, then we should not expect state HSEEs to have an appreciable effect on labor market outcomes. Empirically, state HSEEs would fail to widen the gaps in labor market outcomes between high school graduates and those who fail to complete high school. State HSEEs do not purport to measure attitudes, dependability, or interpersonal communication skills. The propensity of employers to consider such characteristics in hiring and compensation decisions, moreover, is less consistent with human capital theory than it is with credentialing or signaling theory. If we find that state HSEE policies have limited or no effects on labor market outcomes, it may be because employers who are willing to hire applicants with no college education and limited employment experience do not particularly value the skills that state HSEEs measure or are unaware of state HSEE policies.

### **Effects of State HSEEs on Labor Market Outcomes**

A handful of studies have tried to infer the effects of state HSEEs on labor market outcomes. Using data from the 1990 U.S. Census, Dee (2003a; 2003b) estimated a series of fixed effects models of the impact of course graduation requirements and minimum competency testing policies—of which state HSEEs are a part—on educational attainment, unemployment, and earnings of individuals who turned 18 at some point between 1980 and 1988. Dee found that these education policies “sometimes reduced educational attainment but also generated some improvements in the probability of employment.” The effects on employment probabilities were largely restricted to black males, and there were no effects on earnings.

Dee’s (2003a; 2003b) findings are limited in three important respects that bear directly on the research questions that we address. First, he did not isolate the effects of state HSEE policies from the effects of other state policies. Second, because of the sample restrictions described

above, his results pertain only to members of the high school graduating classes of 1980 through 1988. Dee's results tell us nothing about the consequences of minimum competency tests on labor market outcomes for students who should have graduated after 1988. For the class of 1980, only one state (New York) had an HSEE requirement; by the class of 1988 this figure had risen to 12 states, but many other states have implemented HSEE policies for post-1988 graduating classes. Furthermore, the level of difficulty of state HSEEs has increased in several states over time.

The only research to date that has explicitly focused on the impact of state HSEE policies (as opposed to minimum competency testing policies in general) on labor market outcomes has been by Bishop and colleagues (e.g., Bishop and Mane 2001b; Bishop, Moriarty, and Mane 2000) and by Dee and Jacob (2006).<sup>6</sup>

Bishop, Moriarty, and Mane (2000) report analyses based on nationally-representative data for high school seniors in the 1980 High School and Beyond (HSB) study and the 1992 National Educational Longitudinal Study (NELS); they restricted their analyses to students who graduated after the completion of their senior year. Seniors in HSB were followed up two, four, and six years after graduation, and those in NELS were followed up two years after graduation. The authors regressed wage rates on HSEE requirements and a long list of student-level covariates. The HSB results presented by Bishop, Moriarty, and Mane (2000) suggest that HSEE requirements had no effect on men's wages in the early 1980s, but had large effects on women's wages, such that female graduates who faced HSEE requirements earned an average of 5.1% more per year than those who did not. Unfortunately, their measure of whether or not students were subject to a HSEE was based on student reports. Because of concern about the accuracy of such reports (described below), Bishop and Mane (2001a) reanalyzed the HSB data

using principals' reports of HSEE policies. In revised analyses they found that HSEE requirements had positive effects on the wage rates and earnings of male and female members of the graduating class of 1980.

In the more recent NELS data, Bishop, Moriarty, and Mane (2000) found substantial positive effects of HSEE requirements on men's and women's wages in each of the two years following graduation. Bishop and Mane (2001a; 2001b) expanded the analyses of NELS data presented by Bishop, Moriarty, and Mane (2000) by exploring the ways in which the effects of HSEE requirements on labor market outcomes vary by sex, grade point average, socioeconomic status, racial/ethnic group, and prior test scores.

Although studies by Bishop and colleagues support the human capital and signaling arguments, those studies are limited in several respects. First, state HSEE policies are endogenous to both fixed and time varying characteristics of states that are associated with low levels of student achievement. As demonstrated by Warren and Kulick (2007), states' economic conditions and racial/ethnic compositions are closely connected to states' decisions about whether to implement HSEE policies. Although Bishop and Mane (2001a) include measures of states' unemployment rates and mean earnings in manufacturing and retail in their analyses of NELS data, there are a number of other time-varying state characteristics—including other state education policies—that might account for the observed association between state HSEE policies and wages in the NELS data. Furthermore, unobserved and time invariant attributes of states may influence both HSEE policy adoption and student achievement. Since the NELS data are limited to a single cohort of students and were not designed to support state-level analyses, they are ill-equipped to accommodate both state fixed effects and time effects. As a result, it

may be that the apparent effect of HSEE requirements on wages is simply an artifact of unobserved state characteristics.

A second and more serious limitation of this work is the manner in which state HSEE requirements are measured and operationalized in their analyses. Bishop and colleagues are not clear about whether they are estimating the effects of “state HSEE requirements” or HSEE requirements more generally (which may be required by school districts or schools acting on their own). Beyond this conceptual issue, NELS school administrators’ reports of state HSEE requirements are inaccurate and unreliable (Jacob 2001; Warren and Edwards 2005). Using restricted data on the state in which NELS respondents’ schools were located, it is possible to consider within-state variability in school administrators’ reports of state policy. In no large state is there unanimity about state policy; in most states 30 to 40 percent of school administrators indicated that a state HSEE was required for graduation when no such policy was in place (or vice versa). Jacob (2001), Warren and Edwards (2005) and others have used other information, external to the NELS, to measure state HSEE policies in their analyses of the effects of these policies on high school dropout; we will do the same.

Dee and Jacob (2006) used data from the 2000 U.S. Census to estimate the impact of state HSEEs on employment status and weekly wages among non-Hispanic whites, Hispanic and non-Hispanic Blacks who turned 18 between 1980 and 1998. They found that “exit exams (particularly the more difficult ones) tended to reduce the subsequent earnings of white and Hispanic students while increasing those of Black students” (p.24).<sup>7</sup> Their analyses utilized high-quality measures of state HSEE policies and state and cohort fixed effects to account for time-invariant aspects of states and state-invariant aspects of cohorts. However, they include only a limited set of time-varying aspects of states. What is more, we wonder about the utility of

estimating models using data on older workers (as old as age 38), many of whom completed at least some post-secondary schooling. As we argue above, it seems most plausible to us that if state HSEEs matter for labor market outcomes then such effects are most likely to be observed among young workers who have completed no post-secondary schooling. Finally, Dee and Jacob's (2006) model specification is such that they really address the impact of state HSEEs on overall labor force outcomes within states; their analyses are not designed to explicitly test the hypothesis that state HSEEs enhance the labor market value of high school diplomas. In our analyses we utilize data on young people who completed no post-secondary schooling and our models are specified in such a way that we observe the impact of state HSEEs on labor force outcomes *as well as* the impact of those policies on differential returns to high school completion.

Finally, an especially important limitation of much of the work reviewed above—with the exception of Dee and Jacob (2006)—is that the research pertains only to the 1980s and very early 1990s, a period in which state HSEE policies were substantially different from those at present. Until about 1990 states' HSEEs 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). Our analyses will overcome many of the conceptual and technical shortcomings of the work reviewed above, but perhaps more importantly will join only

Dee and Jacob (2006) in offering an empirical assessment of the labor market consequences of state HSEE policies for students in graduating classes beyond 1992.

Putting aside the empirical and methodological limitations of the research reviewed above, findings presented by Bishop and colleagues and Dee and Jacob lead to contradictory conclusions with respect to theories of human capital, signaling and credentialism. On the one hand, Bishop's findings of positive effects of state HSEEs on earnings are consistent with human capital and signaling. Dee and Jacob's results, on the other hand, are inconsistent with both economic theories in that they show that state HSEE's actually *reduce* the earnings of white and Hispanic workers. However, consistent with human capital and signaling theories, Dee and Jacob find that state HSEEs increase the earnings of African Americans (and therefore implicitly reduce black/white earnings inequality). The impact of state HSEEs on labor market outcomes and inequalities, and especially the impact of more demanding state HSEEs, thus remains an open question.

## **RESEARCH DESIGN AND DATA**

In this paper we model the independent association between state HSEE policies and labor market outcomes using two sources of data: (1) the 1980 through 2000 U.S. Census 5% Public-Use Microdata Samples (PUMS) and (2) the 1984 through 2002 Outgoing Rotation Groups of the U.S. Current Population Survey (CPS-ORG). The most important difference between these two sources of data is that the CPS is representative of the civilian, non-institutionalized population of the United States whereas the Census data are representative of the entire U.S. population. While the CPS provides a finer-grained picture of temporal change in outcomes than the decennial census, the CPS is more limited in statistical power. More importantly, the CPS does not include individuals who were incarcerated at the time of each

survey. This is an important omission in models of racial/ethnic differences in the wages of high school graduates and non-completers shortly after their expected date of high school graduation. We evaluate results of models from both data sources in order to replicate findings across these somewhat different samples.

In our analyses of labor force status and wage rates we focus only on young adults between the ages of 20 and 23 who have attended no post-secondary schooling. Confining our attention to this population provides a strong test of the *direct* effects of state HSEEs on labor market outcomes. From the human capital perspective, both general and firm-specific labor market experience can substitute for or add to the general skills students acquire in school, thus increasing their productivity and earnings, while from the signaling perspective employer uncertainty about workers' productive skills declines with worker tenure. Furthermore, state HSEEs may increase the likelihood that the marginal student attends college, another indirect pathway by which state HSEEs can improve labor market outcomes. We observe students early in their labor market careers to avoid conflating the effects of state HSEEs on further education, employment and earnings.<sup>8</sup> To address the plausibility of long-run indirect effects of state HSEEs on wages, we estimate separate models of the effects of these policies on postsecondary schooling and labor force participation.

For reasons described below, we also restrict our analyses to Hispanics, non-Hispanic Whites, and non-Hispanic Blacks. We further restrict our analyses of Census data to individuals who were living in one of the 50 states or D.C. during the typical high school years and who were either born in the U.S. or who immigrated prior to the typical ages of high school entry. Finally, we exclude a trivial number of observations (less than 0.005% of all observations) from the Census analyses for which we are missing information about immigration status. Our

resulting analysis samples include almost 1.9 million individuals in the 1980 through 2000 U.S. Census and more than 339,000 individuals in the 1984 through 2002 CPS-ORG. Because of changes across enumerations in measures, record layout, and other technical matters, we utilize the Minnesota Population Center's Integrated Public-Use Microdata Series (IPUMS; see Ruggles et al. 2004) files for our analyses of Census data and the Unicon Corporation's harmonized CPS-ORG files for our analyses of CPS data.

In the Census analyses we have measures of the state in which these 20 to 23 year olds lived five years prior to their enumeration—when they would have been 15 to 18 years of age, the prime ages of high school attendance. We assume that students last attended high school in the state in which they lived five years prior to their enumeration. In our CPS-ORG analyses we are forced to assume (like Dee (2003b) and Dee and Jacob (2006)) that young people still live in the state in which they attended high school. In analyses of both data sets we assign individuals to graduating classes on the basis of their age in order to determine the graduation requirements that each individual faced.<sup>9</sup> To the extent that we are wrong about the state in which respondents last attended high school or about the graduating classes to which individuals belonged (or should have belonged), our estimates of the differences in outcomes for high school graduates and non-completers, as well as the effects of state HSEE policies, are biased toward zero.

### **State High School Exit Exam Measures**

We have recently completed collecting key data on each states' HSEE policies since the mid-1970s. This information is available to the public at <http://www.hsee.umn.edu/> (Warren 2007). Consequently, we have information about whether students were required to pass a state HSEE as a pre-requisite for graduation for each state and for each graduating class between 1977 and 2003. In some cases, students were required to take—but not necessarily pass—a state

HSEE, and in other cases students received non-standard diplomas (but diplomas nonetheless) if they did not pass the state HSEE. In neither case is receipt of formal diplomas contingent on passage of a state HSEE, so we do not count these cases as having state HSEE policies. Information about whether particular states made passage of an HSEE a graduation requirement was collected from published sources for a limited number of years (e.g., American Federation of Teachers 1997; Amrein and Berliner 2002; Bond and King 1995; Center on Education Policy 2004; Jacob 2001; National Research Council 1999; Toye et al. 2007; U.S. Department of Education 2003), but with highly varying degrees of accuracy. The bulk of our information about state HSEE requirements—and about the administrative details of these policies—is derived from state education agency web sites, scrutiny of newspaper archives, personal communications with officials in state education agencies, and archival research.

Our most basic measure expresses whether passage of a state HSEE was a requirement for obtaining a diploma. However, human capital theory would predict that easier state HSEEs are less strongly related to labor market outcomes than more difficult ones. Based on information about the grade level of proficiency to which state HSEEs were aligned, we have classified states' HSEEs as either "minimum competency" or "higher competency" examinations. If *any* component of a state HSEE assessed mastery of *any* curricular material that is typically introduced *during* or following 9<sup>th</sup> grade we classify the state HSEE as "higher competency." All other state HSEEs are classified as "minimum competency." Although rudimentary, this classification has proven useful. For example, Warren, Jenkins, and Kulick (2006) and Dee and Jacob (2006) have each demonstrated that the negative association between "higher competency" state HSEEs and high school completion is stronger than the association between "minimum competency" state HSEEs and that outcome.<sup>10</sup>

## **Dependent Variables**

Descriptive statistics for each of our dependent and independent variables are presented in Table 1 (for the Census data) and Table 2 (for the CPS-ORG data).<sup>11</sup> In each table we present separate descriptive results for cases included in our analyses of the impact of state HSEE requirements on post-secondary schooling, for the cases included in our analyses of labor force status, and for the cases included in our analyses of wage rates. Our measures of labor force status are derived from a series of items that indicate whether or not respondents were part of the labor force—working or seeking work—in the preceding week and, if so, whether respondents were currently employed or unemployed. In the Census analyses our dependent variable classifies respondents as (1) employed; (2) unemployed; (3) out of the labor force because of institutionalization;<sup>12</sup> or (4) out of the labor force for other reasons. Because institutionalized individuals are excluded from the CPS by design, in the CPS-ORG analyses our dependent variable classifies respondents as (1) employed; (2) unemployed; and (3) out of the labor force.

We derive our measure of hourly earnings by dividing respondent's total pre-tax wage and salary income—that is, money received as an employee in the form of wages, salaries, commissions, cash bonuses, and tips—for the calendar year preceding their enumeration by the number of weeks respondents worked over that same period of time and then by the number of hours that respondents usually worked per week. Wages are expressed in 2000 dollars in the Census analyses and in 2002 dollars in the CPS-ORG analyses. In each case we log hourly wages to enable us to report the effects of state HSEE policies in percentage terms.

## **Individual-Level Covariates**

As shown in Tables 1 and 2, our central individual-level covariate expresses whether or not respondents completed secondary school. We are unable to distinguish between graduates

who completed schooling via a GED instead of a regular diploma, so we are counting as graduates some individuals who left high school without obtaining a diploma.<sup>13</sup> In both the Census and CPS-ORG data, the dropout rate is slightly higher in states with HSEEs. In both samples we have access to a limited set of other individual-level covariates, including indicators of sex, race/ethnicity,<sup>14</sup> marital status, and number of children in the household. In our Census analyses we also have measures of immigration status<sup>15</sup> and disability status; in our CPS-ORG analyses we also have a measure of union membership.

### **State-Level Covariates**

Recent work by Warren and Kulick (2007) makes clear that a state's decision to implement an HSEE policy is endogenous to state economic conditions and racial/ethnic composition. Because youth living in such states may experience poor labor market outcomes independent of state HSEE policies, we also include in our models a series of time-varying state-level covariates. Most of these time-varying state-level covariates are estimated as moving averages across the four calendar years in which respondents should have been enrolled in high school; the exception is the education policy measures, which are specific to graduating classes.

Based on data from the March CPS 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. State education policy variables include per pupil total education expenditures in thousands of real (2000) dollars, and pupil-teacher ratios are estimated by dividing the number of secondary school teachers in particular state-years by the number of 9<sup>th</sup>-12<sup>th</sup> graders in that state and in that year. Based on evidence that course graduation requirements affect dropout rates (Dee 2003a; Lillard and DeCicca 2001), we also include a measure of the number of Carnegie units that states require students to complete in order to graduate. Because

some states have not always mandated course graduation requirements, we include in our multivariate models a dummy variable that indicates whether state-years do not have state course graduation requirements; in those cases, the value of the Carnegie Unit variable is set to zero. We also include a measure of states' maximum compulsory age of school attendance. Finally, we include measures of per capita income (in real 2000 dollars) and unemployment rates for the entire civilian population.

Our analyses proceed in three steps. First, we conduct preliminary analyses of the impact of state HSEE requirements on rates of postsecondary schooling. These analyses are necessary in order to rule out the possibility that our exclusion of respondents with any post-secondary schooling from our labor force status and wage rate models biases the results of those models. They are also of some substantive interest; we find that state HSEEs do not affect young people's rates of postsecondary schooling. Second, after restricting the analysis samples to 20 to 23 year olds with no post-secondary schooling we model the impact of state HSEE requirements on respondents' labor force status. Third, we model the impact of state HSEE requirements on wage rates among employed respondents; because we find no impact of state HSEEs on the chances that respondents are in any labor force status other than "employed," the exclusion of non-employed respondents from our wage rate models does not bias the substantive results of these models.

In addition to the independent variables discussed above, we also adjust each model for state and cohort fixed effects. Fixed effects account for (1) variables that remain constant across graduating classes 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 graduating classes (e.g., national education and economic policies, nationwide recessions,

advances in education technology, and international competition and conflict).

Throughout our presentation of results we confine our discussion to coefficients with  $t$ -statistics larger than those generally treated as important (e.g., 1.96) because of our very large sample sizes. Raftery (1995) offers a Bayesian approach to assessing evidence for the significance of a coefficient that accounts for sample size. He recommends using  $\sqrt{\ln(n)}$  to compute the absolute value of  $t$  at which there is at least weak evidence for the significance of a coefficient. In Table 3, for example, with a sample size of 1,882,102 for the Census analyses we need to obtain a  $t$  statistic of 3.80 in order to reasonably make the case that a coefficient is statistically significant. Coefficients that we consider statistically significant are bolded in our tabular presentation of regression results.

Our decision to utilize the more conservative Bayesian approach instead of the “frequentist” approach to determine the statistical significance of our regression coefficients is consequential. As shown below, many of our regression parameters are at least 1.96 times as large as their standard errors in absolute value, but are not  $\sqrt{\ln(n)}$  times as large as those standard errors. Our choice to use the more conservative BIC standard instead of traditional “frequentist” standards for making decisions about statistical significance affects our analyses in two important respects. First, on the basis of BIC we conclude that the exclusion of individuals with post-secondary school experience from our labor force participation models does not induce bias in those models; likewise, on the basis of BIC we conclude that the exclusion of individuals who were out of the labor force from our wage models does not induce bias in those models. In both cases, were we to use traditional “frequentist” standards (e.g.,  $|t| > 1.96$ ) we would come to different conclusions. To determine whether this methodological decision drives our substantive results we have estimated supplementary models that employ techniques to account for sample

selection (Heckman 1979) bias; the results of these models are available upon request. Where appropriate we note the results of these supplementary models below.

Second, our use of BIC leads us to conclude that coefficients are not statistically significant when traditional “frequentist” approaches would lead us to conclude otherwise. Using BIC, we conclude below that state HSEEs are *not* independently associated with post-secondary schooling, labor force status, or wages. Were we to reject null hypotheses on the basis of conventional statistical criteria (i.e.,  $|t| > 1.96$ ) we would generally conclude that state HSEEs have *negative* consequences for these outcomes. That is, we would conclude that state HSEEs *deter* post-secondary schooling and *reduce* young peoples’ chances of being employed; their effects on wages are less clear, because the wage equations we present do not account for the selectivity induced by state HSEEs’ consequences for labor force status. An important point—which we make below where appropriate—is that from neither hypothesis testing perspective would we conclude that state HSEEs have positive consequences for the outcomes under consideration (except in a few instances which are highlighted below).

We prefer the more conservative conclusions generated by relying on BIC for reasons described in detail in recent statistical and methodological discussions (e.g., Hauser 1995; Raftery 1986; Raftery 1995; Raftery 1999; Weakliem 1999). Standard thresholds for establishing statistical significance are, we believe, simply too liberal when sample sizes are as large as ours. As Lindley (1957) demonstrates, the probability of rejecting *any* null hypothesis approaches unity as the sample size increases. However, the reader should keep in mind that were we to rely on these conventional hypothesis testing thresholds we would (in general) conclude that the labor market consequences of state HSEEs differ even more radically from their intended consequences. Using BIC we find that state HSEEs do no good; using more

conventional standards for establishing statistical significance we would find that they are (in general) harmful.

## **RESULTS: POST-SECONDARY SCHOOLING**

In Table 3 we present results from logistic regression models in which students' post-secondary schooling status—whether people age 20 to 23 have completed a single year of post-secondary schooling—is expressed as a function of state HSEE policies, individual-level covariates, and state-level covariates. Model 1 includes only main effects, while Model 2 also includes interactions between race/ethnicity and state HSEE policies. The first two columns pertain to 1980-2000 Census data and the second two columns pertain to 1984-2002 CPS-ORG data. In these models—as in all of the models shown below for labor force status and wage rates—we account for within-state clustering, report robust standard errors, use sampling weights, and include the fixed effects described above.

As shown in Table 3, we find no evidence—in either sample—that state HSEE policies are positively associated with the odds that these 20 to 23 year olds have completed any post-secondary schooling after adjusting for individual- and state-level covariates. The association between state HSEE policies and post-secondary schooling also does not vary by race/ethnicity, as reflected by the coefficients in Model 2. There appears to be no evidence to support the claim that HSEEs increase the likelihood of postsecondary participation, and thus no evidence for an indirect effect of HSEEs on human capital through college attendance.<sup>16</sup> Consequently, estimates of the effect of state HSEEs on labor force participation and earnings are unbiased by the exclusion of individuals who have completed any post-secondary schooling; selection into the analysis samples for the labor force status and wage rate models is not dependent on state HSEE policies. Although not directly related to our central research questions, it is nonetheless

interesting to note that state HSEEs have no statistically distinguishable bearing on young people's rates of postsecondary schooling.<sup>17</sup>

## **RESULTS: LABOR FORCE STATUS**

Tables 4 and 5 present results of models predicting labor force status for the Census sample and the CPS-ORG sample, respectively. In both cases we have estimated multinomial logistic regression models, with employed individuals in the omitted reference category. Results for a given independent variable express the impact of that variable on the log odds of being in a category other than “employed.” If employers (1) perceive individuals who were subject to state HSEE requirements to be more productive than those who were not (human capital) or (2) believe that state HSEEs assess a set of skills important to their firm (signaling), we would expect state HSEEs to have a negative effect on the likelihood of each alternative relative to employment. Specifically, we would expect the coefficients interacting high school dropout status by state HSEE policy to be positive and statistically significant. We would also expect the absolute magnitude of the state HSEE effect to be greater for Hispanic and African American students than for white students.

The top five rows of results in both tables yield three very clear findings. First—and consistent with other research—high school dropouts in these data fare worse in the labor market than their peers who complete high school. Dropouts are less likely to be in the labor force and less likely to be employed if they are in the labor force; the Census results also indicate that dropouts are more likely to be institutionalized—which in this age group typically means incarcerated. Second, state HSEE policies are not independently associated with labor force status among 20 to 23 year olds. Third—and most important for our purposes—coefficients for the interactions between high school dropout status and state HSEE requirements are never

statistically significant.<sup>18</sup> Our results offer no support for either human capital or signaling rationales for state HSEE policies, as state HSEEs appear to have no bearing on labor force status among people in this age group. If anything, the difference between the employment prospects of high school completers and those who fail to complete high school is less pronounced in cohorts subject to higher competency state HSEEs (Table 5), although evidence for this is not consistent across datasets.

While results for Model 1 in Tables 4 and 5 address the issue of whether state HSEE policies are independently associated with labor force status, they provide no evidence about potential racial/ethnic differentials in the associations between state HSEE policies, high school completion status, and labor force status. In Model 2 of these tables we add interaction terms between (1) race/ethnicity and state HSEE requirements; (2) race/ethnicity and high school dropout status; and (3) race/ethnicity, high school dropout status, and state HSEE requirements. For our purposes, the latter three-way interactions are most interesting because they allow us to test the hypothesis that the relationship between state HSEE requirements and labor market status varies by race/ethnicity. However, few of the coefficients for these three-way interactions are statistically significant and those that are significant do not tell a consistent substantive story. We thus conclude—contrary to expectations based on human capital and signaling theory—that the association between high school dropout status and state HSEE policies does not vary by race/ethnicity. Holding a high school diploma does not appear to matter more (or less) for labor force status when a state HSEE was required to obtain that diploma, and these results do not appear to vary by race/ethnicity.

## **RESULTS: WAGE RATES**

In Table 6 we present results for OLS regression models in which log wage rates are the

dependent variable. In most contexts, analysts who use wages (or income or earnings) face serious selection problems. Because a segment of the population of interest is either unemployed or out of the labor force, it is impossible to observe the wages that those people would have received had they been employed. Researchers have shown that estimating models on only people whose wages are observed can lead to biased coefficients (Heckman 1976; Neal 2004). However, because we are only interested in isolating the impact of state HSEE policies on wages, and because Tables 4 and 5 show clearly that state HSEE policies are orthogonal to labor force status, we are able to estimate an OLS regression model with no correction for selection into the population of employed 20 to 23 year olds. That is, our restriction of the wage models to employed respondents does not bias our assessment of the independent association between state HSEE policies and wage rates, although it does bias other coefficients.<sup>19</sup>

The results in the first five rows of Table 6 show that (1) high school dropouts earn lower wages than high school graduates, as previous research has demonstrated; (2) state HSEE policies are not independently associated with wages among employed people; and most importantly (3) state HSEE policies do not exacerbate (or reduce) wage disparities between high school graduates and dropouts. Model 1 for each data source includes only main effects, while Model 2 also includes interactions between (1) race/ethnicity and high school dropout status; (2) race/ethnicity and state HSEE policies; and (3) race/ethnicity, state HSEE policies, and high school dropout status. As with labor force status, we find no evidence that state HSEE policies affect the wage returns to high school diplomas in different ways for different racial/ethnic groups. In short, Table 6 makes clear that the wage returns (and racial/ethnic disparities in returns) to high school completion are not improved (or worsened) by a policy that makes passage of state HSEE a requirement for obtaining a high school diploma. The meaning that

employers attach to the high school diploma appear to be unaffected by state HSEE policies, contrary to human capital and signaling but consistent with credential theory.

## **DISCUSSION**

State HSEE policies are typically motivated by the desire to ensure that recipients of high school diplomas have at least the basic academic skills required to be productive workers in the modern labor market. Human capital theory and signaling theory each would predict that employers would respond to state HSEEs by increasing their preferences for high school graduates relative to those who have failed to complete high school and by reducing their preferences for white workers over African American and Hispanic workers. State HSEEs might also indirectly affect the employment prospects and earnings of young adults by increasing the likelihood that they attend and successfully complete college. In this paper, we investigated the impact of these education reforms for the post-secondary labor market outcomes of young people without post-secondary schooling—the group whose labor markets outcomes we hypothesize would be most affected by state HSEE policies.

Using a Bayesian approach to hypothesis testing we found no evidence that state HSEEs are independently associated with post-secondary schooling, labor force status, or wages, or that state HSEE policies widen gaps in labor force status or wages between high school graduates and non-completers. We found no evidence that the impact of state HSEE policies on these outcomes depends on individuals' race/ethnicity. If we had used conventional hypothesis testing procedures—which specify less conservative criteria for rejecting null hypotheses given our large sample sizes—we would have concluded that state HSEEs actually *deter* post-secondary schooling (particularly for African Americans) and *reduce* the value of the high school diploma with respect to young people's chances of being employed. For statistical reasons spelled out in

detail elsewhere, we prefer the more conservative BIC-based hypothesis testing procedures; these procedures lead us to conclude that state HSEEs have no bearing on the labor market value of the high school diploma. Were we to utilize Heckman (1979)-type selection models and more traditional “frequentist” approaches to establish statistical significance we would generally conclude that state HSEEs do more harm than good. From either methodological perspective it is clear that state HSEEs do nothing to positively enhance the labor market value of the high school diploma.

Our results are potentially biased by a few limits of the data at our disposal. First, we must infer the year in which respondents should have graduated based on their age, leading us to misclassify a small number of high school graduates as subject to or not subject to a state HSEE. Those who were scheduled to graduate from high school in the first year in which a state HSEE was implemented but who graduated early may not have been subject to the state HSEE. Given the very small number of students to which this condition would apply, we believe this measurement error poses little threat to our inferences. Second, we must (at least in the CPS-ORG) make assumptions about the state in which respondents attended high school. This assumption will be incorrect for students who migrated across state lines following their departure from high school, either with or without a diploma. This source of error will be limited in part by the geographic concentration of states with HSEEs; many students moving to neighboring states would have been exposed to a state HSEE requirement in either place. We are also reassured by the fact that our results are consistent across two different samples of data, each of which has its own strengths and weaknesses.

Another potential source of bias in our analyses concerns the influence of state HSEEs on rates of high school dropout and completion. We are convinced by the work of Warren, Jenkins,

and Kulick (2006) and Dee and Jacobs (2006) that state HSEEs modestly suppress high school completion rates. If substantial numbers of students who would obtain diplomas and who would then go on to hold paid jobs and earn good wages are prevented from doing so because state HSEE policies prevent them from obtaining high school diplomas, then our results may be biased toward finding no (or weaker) effects of state HSEEs on the labor market returns to high school diplomas. However, we suspect that students who do not obtain diplomas solely as the result of state HSEEs tend to be lower-achieving students who may tend to resemble other high school non-completers in important respects. This suggests that the magnitude of this bias may be small. Our finding that state HSEEs do not positively affect rates of post-secondary enrollment further supports our hypothesis that the students who are prevented from obtaining high school diplomas by state HSEEs tend to be relatively low-achieving students who, on average, would tend to be relatively unsuccessful in the labor market even if they had earned their high school diplomas.

A more serious potential threat to the validity of our findings is our inability to distinguish between individuals holding a high school diploma and those holding a GED. Warren, Jenkins and Kulick (2006) report that high school completion rates decline by around one percentage point and GED test-taking rates increase by around a tenth of a percentage point in states that have adopted an HSEE policy. This means that, at least for later cohorts, a small portion of those whom we believe to be high school graduates are in fact GED recipients who were denied a diploma as a result of their failure to pass a state HSEE. Although this misclassification biases estimates of state HSEE effects towards 0, the proportion of misclassified students is low enough that we do not believe this poses a serious threat to the validity of our findings.

Although we acknowledge these potential flaws in our research design, we do not believe that any are serious enough to alter our basic conclusions. Contrary to human capital and signaling theory, but consistent with credentialing theory, state HSEE policies appear to have no positive effects on labor market outcomes. How could such popular and sweeping changes in educational policy have failed to alter the meaning of the high school diploma?

The most likely reason, we believe, rests with the enduring and institutionalized meaning of the diploma itself. First, with continued increases in postsecondary attainment, the value of the high school diploma has been in decline for some time. Whether a result of pure credential inflation (Collins 1979) or increased technological and skill demands in the labor market (Autor, Levy, and Murnane 2003) the high school diploma is not viewed as a strong indicator of skills. Rather, holding a high school diploma—but no post-secondary credential—may signal some kind of limited cultural attainment. Whatever the high school diploma means to employers specifically and to the public more generally, its meaning derives more from a deeply held logic of confidence in schooling than from any objective sense of the cognitive or productive skills that high school graduates possess (Meyer and Rowan 1978). Despite rhetoric to the contrary, people's beliefs about the meaning of the high school diploma may simply be unresponsive to modest or even more consequential changes in what students must do to earn it.

Before dismissing human capital and signaling theories concerning the effects of state HSEEs on labor market outcomes, however, we need to consider the micro-behavioral processes that these theories suggest would lead to HSEE effects. Both theories implicate employers as a critical mechanism by which skill differences translate into differences in employment prospects and earnings. In order for state HSEEs to affect worker outcomes, employers must (1) be aware of state HSEE policies; (2) believe that the skills they seek are measured by state HSEEs; and (3)

believe that those who meet state HSEE requirements possess the skills that they seek (i.e. that the passing threshold is high enough). These conditions lead to three alternative explanations for the *lack* of state HSEE effects on labor market outcomes. First, employers may simply be unaware of the fact that high school graduates in their state are required to pass a state HSEE. In the short term, such ignorance on the part of employers would dampen the labor market effects of the state HSEE. However, over the long term employer knowledge of the state HSEE should become irrelevant. Employers should be able to observe larger skill gaps between those with and without a high school education even if they are unaware of the presumed mechanism (the state HSEE) that produced these differences.

Second, employers—at least those who hire 20 to 23 year olds without post-secondary schooling—may not place much value on the cognitive and academic skills assessed on typical state HSEEs relative to the value they place on other cognitive or non-cognitive skills. Consistent with credentialing theory, employers may be more concerned with finding workers that possess the right sort of status culture or who are likely to comply with organizational norms. Such attributes are not tested by high school exit exams. This would be consistent with the substantial empirical evidence on the importance of soft skills relative to academic skills in the portion of the labor market most likely to be inhabited by those whose formal education ends with a high school diploma (Moss and Tilly 2001; Rosenbaum 2001).

Third, it may be that employers do highly value the types of cognitive and academic skills assessed on state HSEEs, but the level of skills required to pass HSEEs does not induce employers to prefer high school graduates to non-completers. Most state HSEE policies are designed to assess mastery of skills that are learned in or before the 9<sup>th</sup> grade. Earlier work has suggested that the ultimate failure rate on state HSEEs is quite modest, indicating either that

students were learning much more than we thought they were or, more likely, that we were asking relatively little of students in terms of the skills assessed by the HSEE (Catterall 1989; Jacob 2001). While we are not aware of any research that details the evolution of state HSEE exam passing thresholds, the case of California may be instructive on this point.

The California High School Exit Exam (CAHSEE) was originally scheduled to go into effect for the graduating class of 2004. However, only 81% of students passed the English/language arts portion of the CAHSEE and only 62% passed the mathematics portion by January of 2003 (Wise et al. 2003: 64). An independent audit of the CAHSEE in 2003 suggested that California raise the pass rate on the exam. To pass the mathematics portion at the time, students had to answer 55% of the items correctly. As the auditors noted, “[i]t may not be credible to lower this rate further.” Another approach the auditors recommended was “eliminating sections giving the current students the most difficulty” (Wise et al. 2003: iv).

In the summer of 2003, the state Board of Education voted 9-0 to postpone implementing the CAHSEE until the graduating class of 2006. At that time only 48% of the class of 2004 had passed both parts of the exam (Lindelof 2003). The Board also opted to revise the CAHSEE, making the mathematics portion of the exam easier to ensure that the failure rate was lower (Crump 2004).

Note that the CAHSEE is what we would classify as a “higher competency” exam; it purports to test English/language arts material at a 10<sup>th</sup> grade level, although its mathematics assessment is targeted at an 8<sup>th</sup> grade level. Nonetheless, standards on this “higher competency” assessment of student skills appear to have been substantially compromised by the political necessity of achieving a palatable failure rate. Thus, consistent with concern raised by Catterall (1989) and Jacob (2001) about an earlier generation of tests, it may be that most state HSEEs

simply do not impose a high enough threshold to matter to employers under either the signaling or human capital models.

Although our empirical analyses do not speak to this point, it is conceivable that, consistent with human capital and signaling theory, state HSEE policies could be amended to have their desired consequences for post-secondary labor market outcomes. If the problem is the threshold of skills between which state HSEEs adjudicate, or the sorts of skills they test, then state HSEEs might be improved by better connecting test standards to employers' needs. Doing so would also make the state HSEE a stronger test of the human capital, signaling, and credentialist theories. On the other hand, if employers really are looking for compliance and status culture homogeneity among their less educated workers, there is little we could do to improve the utility of state HSEEs. Under credentialism, these exams must be seen as a colossal waste of educational and human resources, harmful to those whose educational attainments are curtailed by failing the exam and of little use to those who pass. Worse still, the burden of failure may be born disproportionately by those students who historically have confronted the most serious barriers to educational attainment. For example, among those in California's high school class of 2006, 2% of white students were denied a diploma due to their failure to pass the CAHSEE, compared to 13% of Latinos, 14% of African Americans, 22% of English language learners, and 13% of those classified as economically disadvantaged by the state.

Even in states with more difficult HSEEs, political realities are such that states are hesitant to fail large percentages of students on their exams or to withhold diplomas from large numbers of would-be graduates. Consequently, states tend to lower passing thresholds—regardless of the level of academic skills being assessed—in order to yield politically acceptable passing rates. This may seriously compromise the value of state HSEE policies as signals of the

productive capacity of individuals or groups for employers. If state HSEEs set the threshold for passage at a higher level and thus prevented much larger numbers of lower-achieving students from obtaining diplomas, we might observe increased labor market returns to high school completion.

The long-term goal of our work—in this article and others—on state HSEEs is to provide empirical evidence that can facilitate sound policy decisions. Proposals to implement or amend state HSEE policies are often grounded in an economic argument that should be questioned by sociologists. Do those who employ high school educated workers care enough about the kinds of skills state HSEEs measure to make them useful policy tools? While some evidence suggests that employers do care about such skills, other evidence suggests that it is the noncognitive skills and cultural repertoires of workers in which employers may be most interested. We cannot respond conclusively to this question, but can situate state HSEE policies in this broader context. Discussions about the utility of state HSEEs result in heated debates about the efficacy and fairness of these policies. Unfortunately, such debates usually take place in the absence of sound empirical evidence about the positive and negative consequences of state HSEE policies. We hope that the evidence we provide in this paper will help advance these arguments.

Judgments about whether to implement, abandon, or modify state HSEE policies should be firmly based on the weight of the evidence concerning both the potential problems with state HSEE policies and the potential benefits of those policies. Are state HSEEs associated with lower rates of high school completion? The best and most recent evidence suggest that they are (Dee and Jacob 2006; Warren, Jenkins, and Kulick 2006). On the positive side, are state HSEE policies associated with (their intended) positive outcomes, like higher rates of student achievement, improved college preparedness, and greater workforce productivity? Recent

evidence suggests that state HSEE policies may have desirable consequences for student achievement (Bishop, Bishop, and Mane 2002; Bishop and Mane 2001a; Bishop, Moriarty, and Mane 2000; Carnoy and Loeb 2002; Jacob 2001; Raymond and Hanushek 2003), but the research literature is thin and much more work needs to be done. In any case, the present results make clear that state HSEE policies have no positive impact on the post-secondary schooling, labor market statuses, or wages of young people.

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## ENDNOTES

<sup>1</sup> In this paper we are solely interested in statewide, state-mandated high school exit examinations. It may be that district- or school-mandated high school exit examinations have different consequences than state high school exit examinations for labor market outcomes.

<sup>2</sup> Among the top 50% of occupations held by such youth during this period, 32% were in the following occupations: operatives and kindred workers (11.2%), laborers (6.8%), cashiers (4.5%), salesmen and sales clerks (4%), cooks (except private household, 2.6%) and waiters and waitresses (2.6%). Of the remaining 18%, 5.6% were enrolled in the armed forces.

<sup>3</sup> By “non-completers” we mean individuals who either began high school without subsequently completing it or who never enrolled in high school (e.g., individuals who dropped out prior to entering high school and immigrants who come to the U.S. at an early age but who do not enroll in U.S. schools).

<sup>4</sup> We discuss the distinction between minimum and higher competence state HSEEs in the data section below.

<sup>5</sup> Dee and Jacob (2006) argue that, from a signaling perspective, state HSEEs also serve to increase the quality of those who fail to complete high school, possibly making such workers more appealing to employers. While mathematically it is true that state HSEE policies would enhance the skill distribution among noncompleters, we are not aware of any evidence that employers are eager to hire dropouts of higher quality. To the contrary, the rationale for state HSEEs is that employers require workers with stronger skills than those possessed by high school graduates. Theory and empirical observation suggest that it is the signal above the threshold, not below, that matters to employers.

<sup>6</sup> Martorell (2004) finds that failing Texas' state HSEE has a negative impact on students' earnings in the years after high school, but this is a different question. His analyses are focused on the impact of doing poorly within a given state HSEE regime, not on the impact of the regime itself.

<sup>7</sup> If one applies a Bayesian approach to assessing statistical significance (i.e., BIC) to their findings, these counterintuitive results turn out not to exceed the threshold for statistical significance.

<sup>8</sup> As described below, in the Census analyses this age restriction also allows us to infer the state in which respondents lived during the years in which they most likely attended high school.

<sup>9</sup> Given the age selection we employ and the frequency of the census, this means that in our Census analyses we have individuals in our sample who were members of the graduating classes of 1976, 1977, 1978, 1985, 1986, 1987, 1988, 1995, 1996, 1997, and 1998. In the CPS analyses we have members of each of the graduating classes between 1979 and 2000.

<sup>10</sup> All of the analyses presented below utilize this distinction between "minimum competency" and "higher competency" state HSEEs. We have also re-estimated all of our models using a simpler specification in which we do not distinguish between the two types of state HSEEs. All key empirical results and substantive conclusions remain the same.

<sup>11</sup> Tables 1 and 2 are based on weighted data, where the weights have been divided by their means in order to base the analyses on the actual sample size and not on the size of the populations from which they were drawn.

<sup>12</sup> The vast majority of institutionalized individuals in our sample of 20 to 23 year olds were incarcerated. A small number of other institutionalized respondents were in places like hospitals or mental institutions.

<sup>13</sup> This may be an important limitation of our work given Warren, Jenkins, and Kulick's (2006) findings that state HSEEs increase the rate at which 16 to 19 year olds attempt to obtain GED credentials. However, the effect of state HSEEs on GED test-taking rates as identified by Warren, Jenkins, and Kulick (2006) was less than a quarter of a percentage point. Given the small magnitude of this effect, and given that not all of these additional GED test-takers will actually obtain that credential, we do not believe that state HSEEs raise the rate at which young people obtain GED credentials by enough to substantially bias our results.

<sup>14</sup> Because of small cell sizes in three-way interaction terms involving race/ethnicity, high school dropout status, and state HSEE requirements for young people who are anything other than non-Hispanic White, non-Hispanic Black, or Hispanic, we restrict our analyses to members of these three racial/ethnic groups.

<sup>15</sup> Recall that we exclude from our Census analyses those respondents who immigrated to the U.S. in the five years preceding their enumeration. This restriction increases the likelihood that immigrants participated in the formal education system in the U.S.

<sup>16</sup> If we were to use conventional hypothesis testing criteria, we would conclude that state HSEEs exert a modest negative influence on young people's (and particularly young African-Americans') chances of completing at least one year of college. Census data would suggest that

this detrimental effect is limited to minimum competency exams, while CPS data would suggest that the effect is limited to higher competency exams.

<sup>17</sup> Because a small percentage of individuals complete post-secondary schooling at older ages, a more thorough investigation of the impact of state HSEE policies on post-secondary schooling would need to include individuals outside the age ranges 20 to 23.

<sup>18</sup> Coefficients that are statistically significant using conventional hypothesis testing criteria indicate that state HSEEs actually reduce the gap in labor force outcomes between young high school dropouts and young high school completers. This runs counter to human capital and signaling theory, and contradicts the stated goals of most state HSEE policies.

<sup>19</sup> Just to be sure, we re-estimated the models in Table 7 using a two-stage Heckman selection procedure. There, we first estimated a selection-into-employment model, and obtained inverse Mills ratios. Then, we estimated wage equations that included those inverse Mills ratios. The results of these models are substantively the same as the simpler OLS models, and so we do not present them here.