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WORKING PAPER SERIES

Enrollment, Attendance and Engagement → Achievement: Successful Strategies for Motivating Students - Evidence of Effectiveness from Comparisons of 50 States and 45 Nations

John H. Bishop

Working Paper 04 – 17



Enrollment, Attendance and Engagement → Achievement: Successful Strategies for Motivating Students – Evidence of Effectiveness from Comparisons of 50 States and 45 Nations

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Abstract

The purpose of the educational enterprise is LEARNING. Engagement is essential to achieving this purpose. How do we increase the proportion of our young people who enroll in and attend school while simultaneously setting high standards and inducing them to become engaged and effective learners? This paper proposes an agenda of reform to achieve these two goals. Each of proposal has a research literature behind it that makes a good case that the policy simultaneously raises the achievement of existing students and encourages them to stay in school or alternatively achieves one of these goals without sacrificing the other.

Strategy # 1 says “Do a better job of convincing adolescents that learning and schooling pays off big time.” Strategy # 2 proposes a variety of ways of making secondary schools both more attractive and more effective. Expand the offerings of and access to career-technical education. Stop building large high schools. Create a new set of small high quality schools of choice: KIPP Academies and Career Academies.

In Strategy # 3 I propose that end-of-course exams [not minimum competency exams or standards based exams] be the primary mechanism (along with teacher grades) for signaling student achievements to colleges and employers and for holding high schools accountable. High quality end-of-course exams that reliably measure achievement over the entire A to F range would need to be developed. Exam grades would appear on the student’s transcript, be part of the final grade in the course and be factored into college admissions and placement decisions. The exam would be a spur for everyone in the class to try harder, not just those who are struggling to pass the course. This strategy brings the interests of students, parents and teachers into alignment, encourages a pro-learning culture in the classroom and makes it easier for teachers to be rigorous and demanding. Universal curriculum-based external exam systems—as they are called--work remarkably well in Europe, Canada, North Carolina and New York and there is every reason to expect them to be equally successful when implemented in other SREB states.

Enrollment, Attendance and Engagement → Achievement: Successful Strategies for Motivating Students - Evidence of Effectiveness from Comparisons of 50 States and 45 Nations

The purpose of the educational enterprise is LEARNING. Engagement is essential to achieving this purpose. Students must come to school, pay attention, do homework, engage with the subject and construct their new knowledge in ways that allow them to retrieve it later. How are students induced to do all this hard work? Teachers try to make their subject interesting, but sixty-one percent of American students, nevertheless, say they “often feel bored.” Additional motivators---diplomas, grades, exit exams, college admissions, etc.—are therefore essential. We assess each student’s learning, we honor it in ceremonies and signal (describe) it to parents, employers and colleges expecting them to reward the learning in their own way. The prospect of these rewards strengthens incentives for students to enroll in and attend school, participate in class and become engaged in learning.

I was asked to address the following question: **How do we increase the proportion of our young people who enroll in and attend school while simultaneously setting high standards and inducing them to become engaged and effective learners?** Many argue there is an inherent conflict between these goals. I examined the research literature on exit exams to see whether these claims are supported by the weight of the evidence. I concluded that policies that push teachers to set higher standards by establishing tougher and tougher high school graduation requirements often do have the side effect of reducing enrollment and graduation rates and focusing instruction on test preparation. There are, however, other ways of skinning the cat [inducing students to put more time, effort and engagement into learning] and I present a number of them below grouped together under three general strategies. Each of these proposals has a research literature behind it that makes a good case (some of which I present in the text or the appendix) that the policy simultaneously raises the achievement of existing students and encourages them to stay in school or alternatively achieves one of these

goals without sacrificing the other. Thus by implementing a mix of these policy initiatives we are able to improve participation and achievement at the same time. I have left out of my discussion policy proposals that have been shown to have no effect or where evidence of efficacy is absent.

Strategies

1. Convince Students that the Benefits of Staying in School are Huge

- >> Advertise on Television
- >> Recruit mentors at local colleges and use college aspirations as a motivator

2. Make High School more Attractive to At Risk Students

- >> Offer a Variety of Quality Career-Technical Programs at Convenient Locations
- >> Never Expand an already large high school. New high schools should be small.
- >> Create more middle school magnets like the KIPP Academies
- >> Create a Career Academy at each of your state's Vocational Technical Centers

3. Exit Exams should Create Moderate Stakes for Everyone, not High Stakes for Just a Few

- >> Base Accountability for High School Students on End-of-Course Exams
- >> Create Additional Graduated Rewards for Doing Well on State Tests.
- >> Reform the Admissions Policies of State University Systems

Strategy # 1 says “Do a better job of convincing adolescents that learning and schooling pays off big time.” Strategy # 2 proposes a variety of ways of making secondary schools both more attractive and more effective. Expand the offerings of and access to career-technical education. Stop building large high schools. Create a new set of small high quality schools of choice: KIPP Academies and Career Academies. Note there was a reason why I did not propose a general liberalization of charter school regulations. We do not know the impact of charters on student achievement. Nor do we know which charter school model works best of

all. It will probably take a decade to find out, so I limit my recommendations to the two models—KIPP Academies and Career Academies—for which there is good evidence.

In Strategy # 3 I propose that end-of-course exams [not minimum competency exams or standards based exams] be the primary mechanism (along with teacher grades) for signaling student achievements to colleges and employers and for holding high schools accountable. High quality end-of-course exams that reliably measure achievement over the entire A to F range would need to be developed. Exam grades would appear on the student's transcript, be part of the final grade in the course and be factored into college admissions and placement decisions. The exam would be a spur for everyone in the class to try harder, not just those who are struggling to pass the course. This strategy brings the interests of students, parents and teachers into alignment, encourages a pro-learning culture in the classroom and makes it easier for teachers to be rigorous and demanding. Universal curriculum-based external exam systems—as they are called--work remarkably well in Europe, Canada, North Carolina and New York and there is every reason to expect them to be equally successful when implemented in other SREB states.

Strategy # 1----Convince Students the Benefits of Staying in School are Huge

1.1 Advertise the Facts-- Schools need to make sure that students are aware of the disastrous consequences of not graduating from high school. Completing high school increases earnings by 30 to 40 percent. A GED will raise earnings, but by a lot less. The benefits of finishing high school are particularly large for those who take three or more advanced CTE courses during the final two years of high school. Shortly after they graduate from high school, they earn 50 percent more than drop outs. Another benefit of finishing high school is the opportunity to go to college. Each year of college adds an additional 15 to 20 percent to annual earnings. The payoff to college is just as high for CTE concentrators as for academic concentrators. High school CTE courses do not lose value when the student completes an Associates or Bachelors degree. They continue to add to earning power.

I would get this across by creating a series of one or two-minute public service television ads targeted at teens and pre-teens in which successful individuals who rose from disadvantaged backgrounds tell their own true story directly into the camera. The theme of these vignettes would be “There were no short cuts. I worked hard in school and it paid off.” Some of the time career-technical programs would be featured. Contests should be sponsored to solicit ads from students in television production classes and independent television production companies. Focus groups of teenagers should be the judges in some of these contests.

1.2 Use college aspirations as motivators. Almost all secondary school students aspire to go to college—even those with poor basic skills. Unfortunately, many of them fail to realize that the academic foundation they begin to develop in middle school is critical to later success in college. Even though 75 percent of the students in the bottom quartile on achievement tests say they want to go to college, only 3 percent of graduates from the bottom quartile have obtained a Bachelors degree ten years later and only 4 percent have gotten Associates degrees. Students in the top quartile were twenty times more likely to get a bachelors degree (National Center for Education Statistics, *Digest of Education of Statistics*, 1998 p. 329).

Once students are made aware of just how important it is to develop a high level of skills, they will be motivated to take more demanding courses and to study hard. Schools should build on this motivation by taking students on trips to local colleges, informing parents about financial aid options, and inviting former students to talk about college life and the importance of studying in middle and high school. Teachers can help by persuading student leaders to set demanding personal goals for college, make studying a norm, and encourage other students to raise their academic aspirations and commitment.

The Foundation for Excellent Schools has been helping schools partner with local colleges to enhance college aspirations through a program called The Century Program (TCP). Each TCP partnership targets at least 100 underserved students—youth who might not

graduate from high school but, through TCP intervention, will graduate and attend and succeed in college. Designated “TCP Scholars,” these students benefit from four core practices that have proved effective in raising aspirations and student performance in FES schools nationwide: mentoring, goal setting, early college awareness, and community service. TCP will help these students improve academic performance and attendance, develop personal and academic goals, and ultimately ensure that they graduate from high school and go on to and graduate from college. All TCP Scholars participate in high-impact activities that incorporate four core practices:

1. **Mentoring:** All TCP Scholars have a mentor, either a college student, older high school student, and/or community member.
2. **Early College Awareness:** Colleges offer activities for TCP Scholars and their parents/caregivers to help them understand how to access and succeed in college.
3. **Goal Setting:** College students help TCP Scholars to identify short- and long-term, as well as “dream,” goals.
4. **Community Service:** All TCP Scholars participate in service activities that enable them to give back to their schools and communities.

For more information go to <http://www.fesnet.org/tcpmain.cfm>

Strategy # 2---Make High School more Attractive to At Risk Students

2.1 Offer a Variety of Career-Technical Education Programs at Convenient Locations--Allowing students to start preparation for their chosen career in upper secondary school increases the share of young people who choose to stay in school when they are no longer required to attend. People have diverse interests, diverse talents and diverse learning styles. The labor market is similarly diverse in the skills and talents that are sought. A "one size fits all" upper secondary education is bound to fail many students. Students should not be forced to take CTE courses, but neither should they be forced to take only academic courses. The Report of the Advisory Committee for the National Assessment of Vocational Education states the case well:

Career and technical education empowers students by providing a range of learning opportunities that serve different learning styles. CTE relies on a powerful mode of teaching and learning that cognitive scientists call “contextual” or

“situated” learning, both in classrooms and in workplaces. For many students, applying academic and technical skills to real-world activities, using computers and other tools, and being able to see how their learning is related to the world of work make CTE classes more interesting and motivating, and more educationally powerful than standard academic classes. A career focus often gives students a sense of direction and motivates them to achieve and to stay in school....This is especially important for young people who learn best by doing, a group that includes disproportionate numbers of disadvantaged and special education students. Just having the option of being able to concentrate in CTE in high school results in more young people staying in school because more individually relevant choices are available to them. (Advisory Committee for the National Assessment of Vocational Education 2003. p. 2.)

Evidence of Efficacy: High school CTE teaches technical skills that are highly valued by employers. A program of four high school CTE courses increases earnings by \$1347.00 immediately after graduation and by \$1993.00 eight years later. The instructional cost of such a program is less than \$5000, so real rates of return exceed 30% per year (Bishop and Mane 2004). This is one of the reasons why high school students interviewed in 1997 who said they were doing a “career major” were less likely to drop out and more likely to graduate in the next three to four years (Mertens et al. 1982).¹

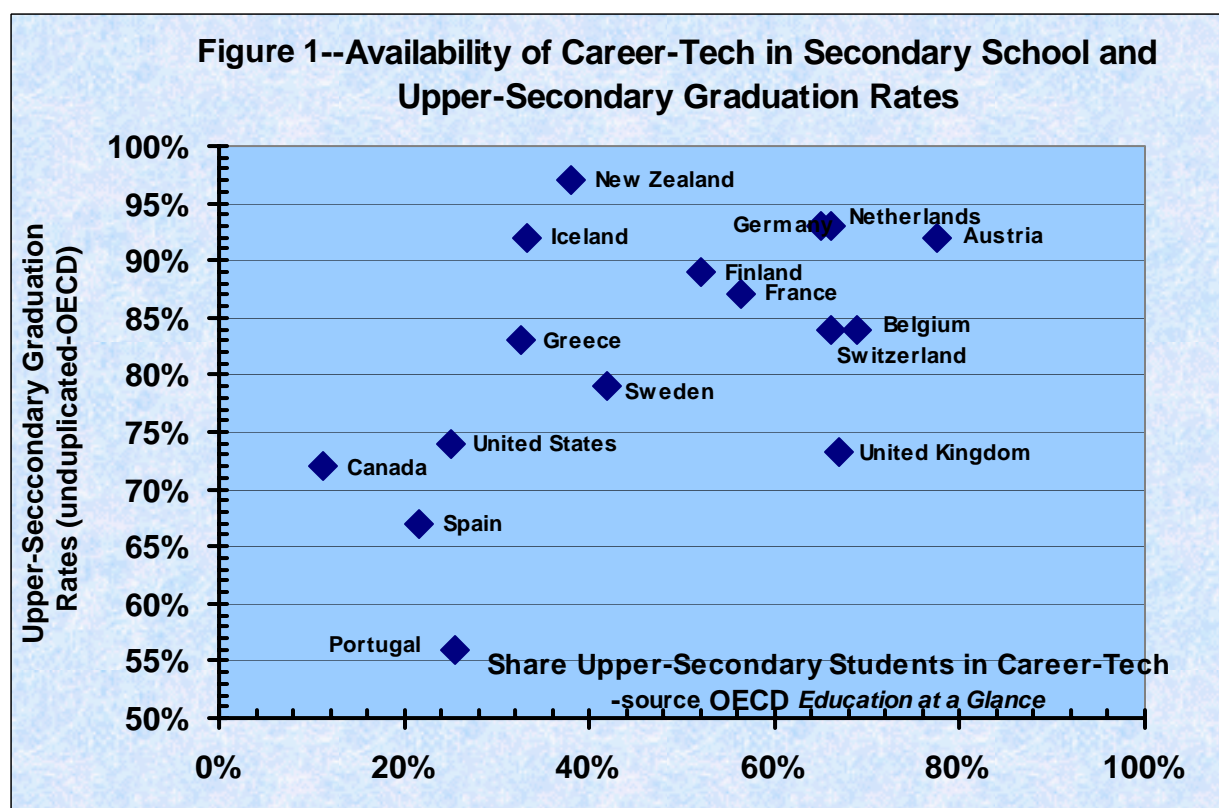
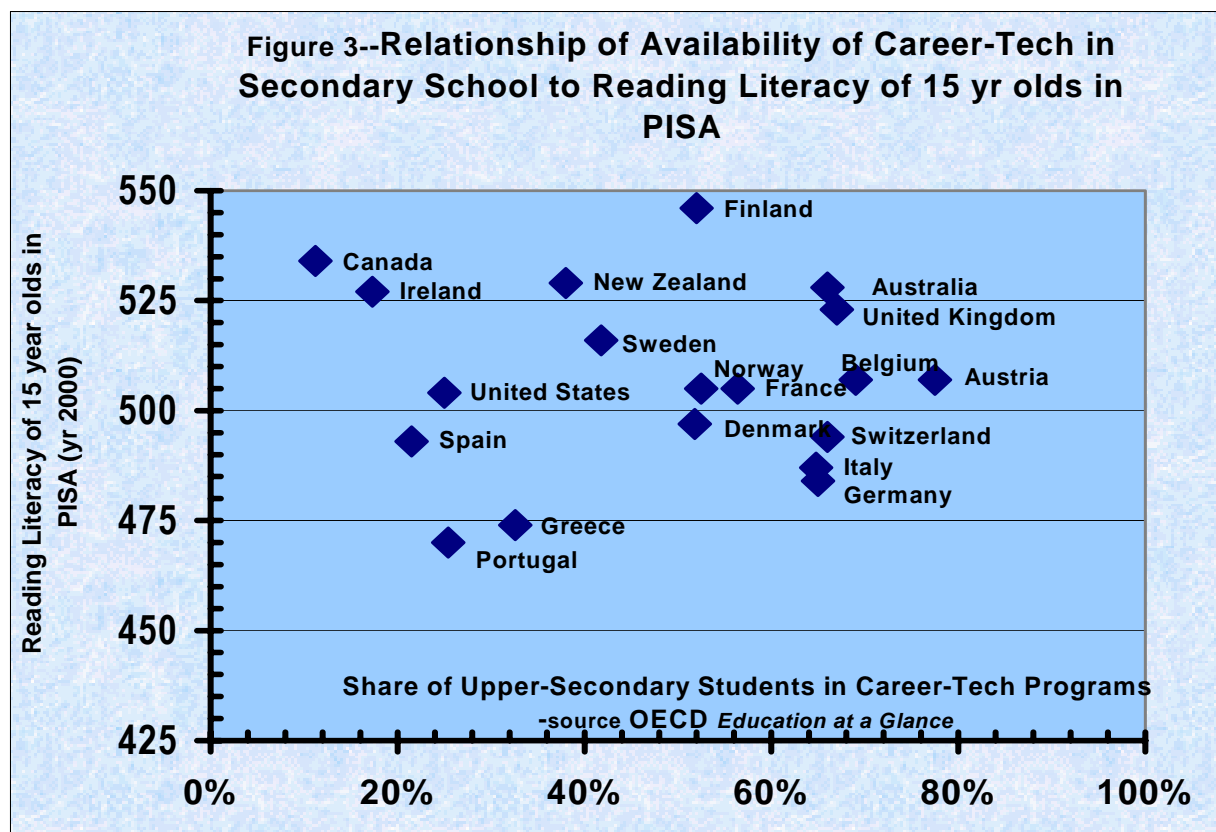
The best way of assessing the effect of the CTE option on high school completion rates is to study what happened when the option was first introduced. In country after country, introducing CTE options at the secondary level helped spur expansions of secondary school attendance. At the beginning of the twentieth century, Latin was a required subject, vocational classes were unknown and only 6 percent of the age cohort got a diploma. By 1927/8 vocational courses were three times more popular than Latin and 27 percent of the age cohort was graduating from high school. Many historians explain the growth of vocational education as a response to public pressure to open upper-secondary education to children from immigrant and working class families. They argue that very few immigrant and working class children would have made it into and through high school if a vocational option had not been available.

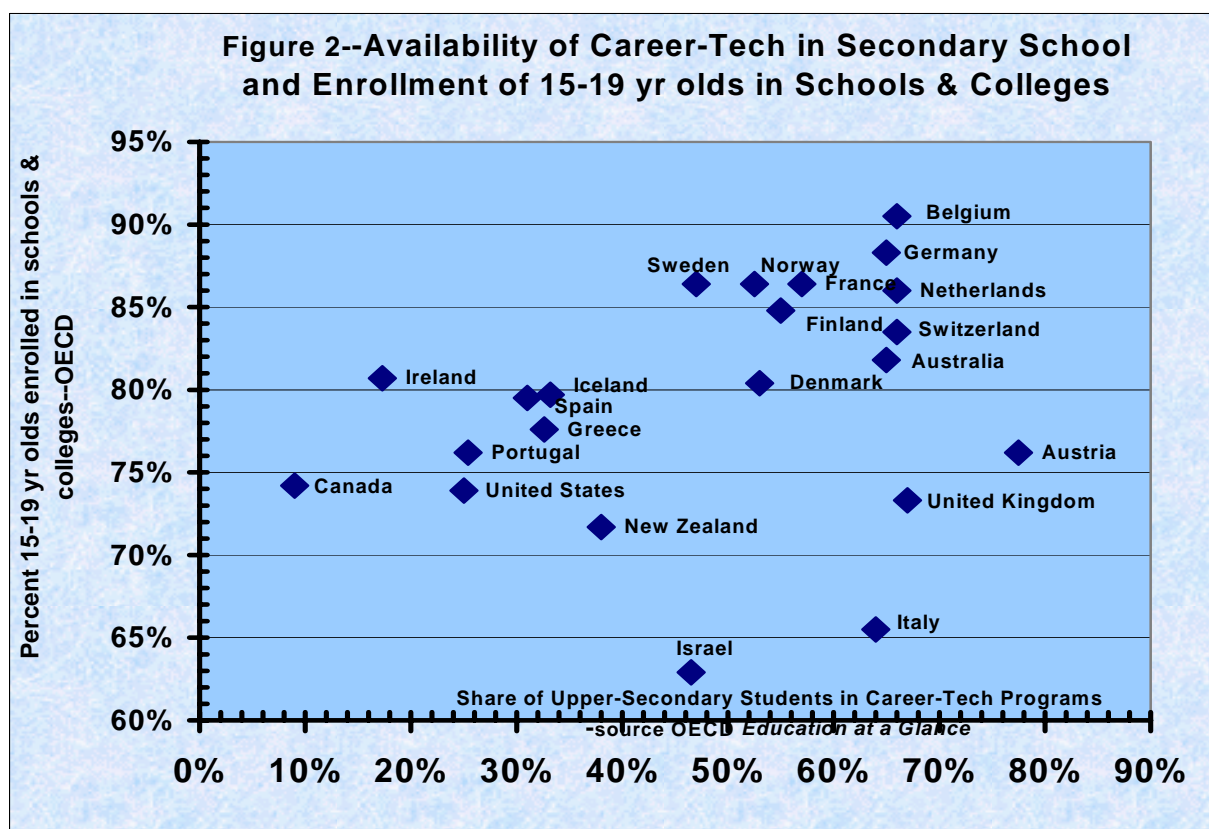
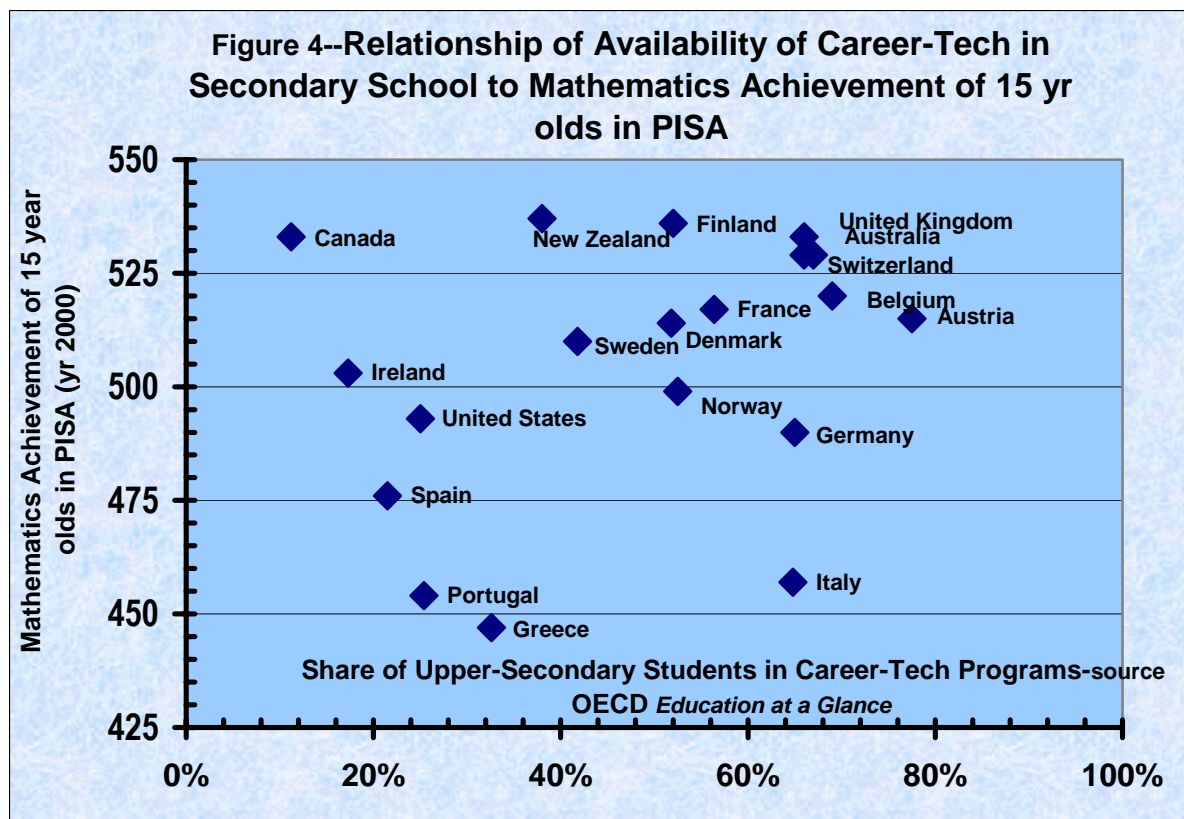
A recent study by Claudia Goldin and Lawrence Katz has found that career-technical education generated far larger payoffs than academic education at the beginning of the

twentieth century. Adult males in Iowa who had spent a year or so at proprietary business schools teaching typing, shorthand, bookkeeping, real estate and other commercial subjects earned 34 percent more in 1915 than people who had gotten a purely academic education of the same length. Unmarried females who had attended these schools earned 47 percent extra (Goldin and Katz, 2000, p. 37-39, 43). Public schools added typing, stenography and bookkeeping to their curriculum because their students wanted to be able to get these new high paying jobs and local employers wanted access to a supply of well trained workers. If public high schools had remained purely academic, their graduates would have soon had difficulty getting good jobs and secondary enrollment would have grown more slowly.

Further evidence of the positive effects of the CTE option on school attendance comes from comparing nations. Figures 1 and 2 present Organization of Economic Cooperation and Development (OECD) data on graduation rates and school attendance rates in Europe, Australia and North America and how they correlate with the vocational share of upper-secondary enrollments. The four countries--the US, Canada, Spain and Portugal--that emphasize CTE the least have significantly lower proportions of 15 to 19 year olds in school and lower graduation rates from upper secondary school.

Note also that the countries that emphasize CTE do not have lower reading and mathematics achievement on the age 15 PISA assessments in 2000 and 2001 (see Figure 3 and 4). Multi-variate analysis of these data confirm these conclusions.





2.2 Never Expand an already large high school; New high schools should be small

There is overwhelming evidence that small high schools graduate a larger share of their students than large high schools. The state level analysis presented in the appendix concludes that doubling the mean size of the public high schools in a state from 500 to 1000 lowers the enrollment rates of seventeen year old by 2 percentage points, lowers public high school graduation rates by about 6 percentage points and lowers overall graduation rates by 4.6 percentage points. Studies that use high schools rather than states as observations also conclude that size is the school policy that has the biggest effect on graduation rates. I am not aware of any conclusive evidence showing that breaking up large high schools into smaller units through house plans consistently lowers dropout rates.

2.3 Create more middle school magnets like the KIPP Academies

The KIPP (Knowledge is Power Program) Academies are the nation's most successful middle school model for students from disadvantaged backgrounds. KIPP academies are non-selective schools of choice that run from 8:00 AM to 5:00 PM during the normal 180 day school year, have compulsory Saturday enrichment programs three times a month and a three week summer school. During the summer prior to entering middle school for the first time, new students spend a couple of weeks in skills building exercises, learning the KIPP culture and bonding with their future classmates and teachers. KIPP academies are islands of discipline and caring and demanding teachers in a sea of chaotic schools led by dispirited adults. Parents queue for a chance to enroll their child in one of these very demanding schools. Achievement gains are remarkably large and have been replicated in new implementations of the model. At present there are only thirty-eight of these schools. We need to establish many more [contact the KIPP foundation about bringing one of these model schools to your area]. They succeed because of their dedicated teachers and distinctive culture. KIPP teachers take over normative

leadership of the school and make working hard the norm. The Dean of Students at the KIPP

DC: Key Academy described the system this way:

The cool kids in our school are kids who work hard, because we as adults have made sure that to be "in" you have to work hard. We have an extensive system of rewards and consequences that every teacher in every grade administers the exact same way. The consistency from classroom to classroom and across grade levels is the key, and it has helped us to establish that culture of hard work. We are all working together and have been successful because, to be frank, we haven't allowed kids, who in the past may have gotten away with not doing any work or who may have put other kids down for being nerdy or too studious, the opportunities to become "cool" or "in." Our discipline is firm; if you don't work hard you don't get to sit with your friends at lunch, go on field trips, participate in gym class, attend special events, etc., and we, the adults, are all on the same page with this. It's hard to set the norms when you are not the one participating. On the flip side, if you do work hard, then you will be rewarded in fun ways—pizza parties, skating trips, things like that. So, to have fun and fit in, kids must adapt, they must work hard. You're probably saying to yourself that this doesn't sound like your traditional middle school and why would any kid want to put in such hard work. But the kids love it here, because they are discovering that great things happen to people who work hard. And they want to be included... (Dean of Students of KIPP DC: KEY Academy, 2002).

2.4. Create a Career Academy at each of your state's Area Vocational Technical Centers

The MDRC evaluation of the impacts of Career Academies used a powerful random assignment methodology. It found that the students who won the lottery and were admitted to career academies earned significantly more after high school than the students who did not win the lottery and were assigned to attend a regular high school. The self-contained career academies were more successful than the academies that mixed academy students with non-academy students in some classes (Kemple et al, 1994).

Therefore, all newly created career academies should be a self contained all day Tech-Prep magnet schools with a career theme. Each one should have a distinctive philosophy, its

own disciplinary system, its own program of extra curricular activities lasting until 5:30PM and field trips to work sites. Students choosing to join the school would have to sign a contract agreeing to abide by and support its distinctive disciplinary and educational philosophy [Visit a KIPP Academy and try to adapt some of their strategies to your circumstance]. Students would be told that they must live up to their contract to stay at the school. Because of their strict rules and consistent discipline KIPP academies have achieved much lower turnover rates and much higher achievement than other schools serving disadvantaged students in their city. Teachers of core academic subjects, foreign languages and some of the CTE teachers would be full time in the academy and would be responsible for enforcing the school's disciplinary code. A variety of electives could be offered by arranging for specialist teachers from a nearby high school or experts from the community to teach part time at the career academy. Some advanced CTE courses would be taught by regular AVT teachers who also teach the students who commute to the AVT for afternoon classes. This way the specialized CTE facilities would be used all day, not just in the afternoon. The school should be kept small—probably less than 120 students per grade. Excess demand for places makes the students feel special, builds school spirit and makes it easier for teachers to be academically demanding.

Strategy # 3--- Exit Exams should Create Moderate Stakes for Everyone, not High Stakes for Just a Few

Public schools in the United States are pursuing three contrasting student accountability strategies.

- **Minimum competency exams** (MCE) or **standards-based exams** (SBE) that must be passed to receive a regular high school diploma. Six states use minimum competency exams (MCEs) focusing on basic skills below the high school level. Eleven states use Standards Based Exams (SBEs) that are aligned with state standards and assess high school level skills.
- **Voluntary Curriculum-Based External Exit Exams** (VCBEEE) such as Advanced Placement, International Baccalaureate, California's Golden State exams and pre 1996 New York State Regents exams.

- **Universal Curriculum-Based External Exit Exam Systems (UCBEEES)** such as those found in Australia, Britain, Denmark, Finland, France and the Netherlands and the systems established in North Carolina and New York in the late 1990s and now under development in Virginia, Maryland and some other SREB states.

All of these exit exams:

1. **Produce signals of achievement that generate important rewards for students who do well on the exit exams:** For MCEs and SBEs the reward is a regular high school diploma. For CBEEES the nature and the magnitude of the rewards vary. In North Carolina, New York and Canada, CBEEE grades are averaged with teacher assessments to generate final grades for specific courses. In Europe and East Asia, CBEEE results influence employer hiring decisions and university admissions decisions (serving the function that the SAT-1 and ACT serve in the U.S.). CBEEES sometimes make one eligible for a more prestigious diploma, a scholarship or confer rights to enroll in higher-level post-secondary institutions. While some stakes are essential, moderate stakes appear to be sufficient to generate significant improvements in learning.
2. **Define achievement relative to an external standard, not relative to other students in the classroom or the school.** Students are no longer engaged in a zero-sum competition with their classmates. Since everyone in the class can be successful, peer norms will be more favorable to learning. Achievement of students at different schools can be compared, so students will stop pressuring teachers to “go easy” and parents will push for the hiring of more qualified teachers.²
3. **Are controlled by the education authority that establishes the curriculum for and funds K-12 education.** When a national or provincial ministry of education sponsors an external exam, it is more likely to be aligned with the national or provincial curriculum and to be used for school accountability; not just for student accountability. Curriculum reform is facilitated because coordinated changes in instruction and exams are feasible. The school system as a whole must be made to accept responsibility for how all students do on the exams. This is one of the primary reasons why SAT-1 and ACT tests are of little value for holding K-12 education accountable.

In other respects, universal and voluntary curriculum-based external exit exam systems are different from MCEs and Standards Based Exams. The CBEEES have the following additional characteristics:

4. Assess a major portion of what students are expected to know and be able to do.

Studying to prepare for an exam (whether set by one's own teacher or by a state department of education) should result in the student learning important material and developing valued skills. Some MCEs, SBEs, CBEEES and teacher exams do a better job of achieving this goal than others. External exams cannot assess every instructional objective, so teacher grades continue to have an important role.

5. Are collections of End-of-Course Exams (EOCE). Since they assess the content of specific sequences of courses, alignment between instruction and assessment is maximized and teacher accountability is enhanced. This feature also aligns the interests of teachers, students and parents. Teachers become coaches helping their team do battle with the national or provincial exam. Parents and students should be less likely to pressure teachers to lower standards. Grades on EOCEs should be part of the overall course grade further integrating the external exam into the classroom culture.

6. Signal multiple levels of achievement in the subject. If only a pass-fail signal is generated by an exam and passing is necessary to graduate, the standard will almost inevitably be set low enough to allow almost everyone to pass after multiple tries. The bulk of students who can easily pass the test are not induced to work harder (Kang 1985; Becker and Rosen 1992; Costrell 1994; Betts and Costrell 2001). CBEEES signal achievement levels, so all students, not just those at the bottom of the class, have an incentive to study hard.³ Consequently, CBEEES should have a more pervasive effect on classroom culture than MCEs and SBEs.

7. Assess more difficult material. Since CBEEES signal the full range of achievement in the subject, they contain more difficult questions and problems. This induces teachers to spend more time on cognitively demanding skills and topics. MCEs (and SBEs to a lesser extent) are designed to identify which students have failed to surpass a minimum standard, so they tend not to ask difficult questions. If regular instruction focuses on preparing students for a MCE, the majority of the students who are not at risk of failing will be getting a diluted and undemanding curriculum.

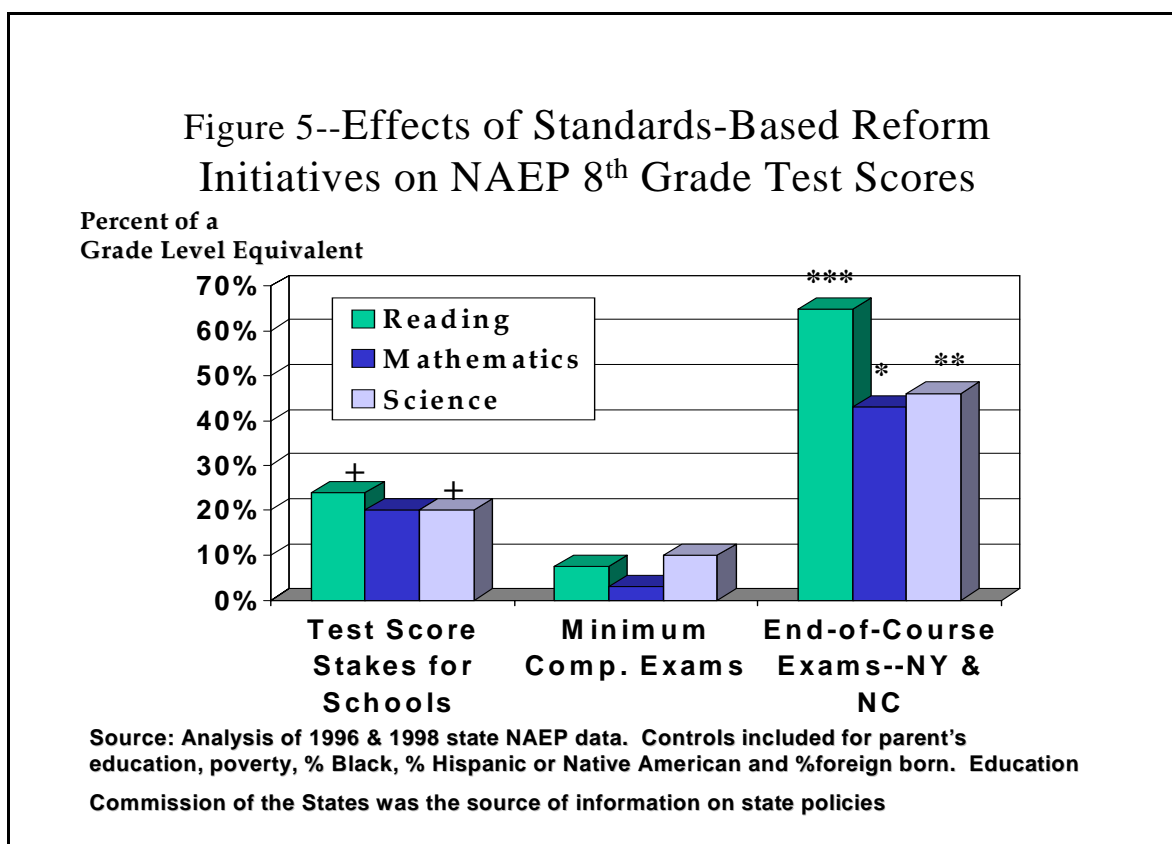
Voluntary Curriculum-Based External Exit Exams (VCBEEEs) are taken by self-selected students who have chosen to take more rigorous programs of study. Exams for a set of elite schools, advanced courses (AP Exams & NYS Regents exams prior to 1996) or applicants to elite colleges (SAT-2s) will raise standards at the top of the vertical curriculum, but probably have little effect on the rest of the students. Achievement gaps between high and low ability

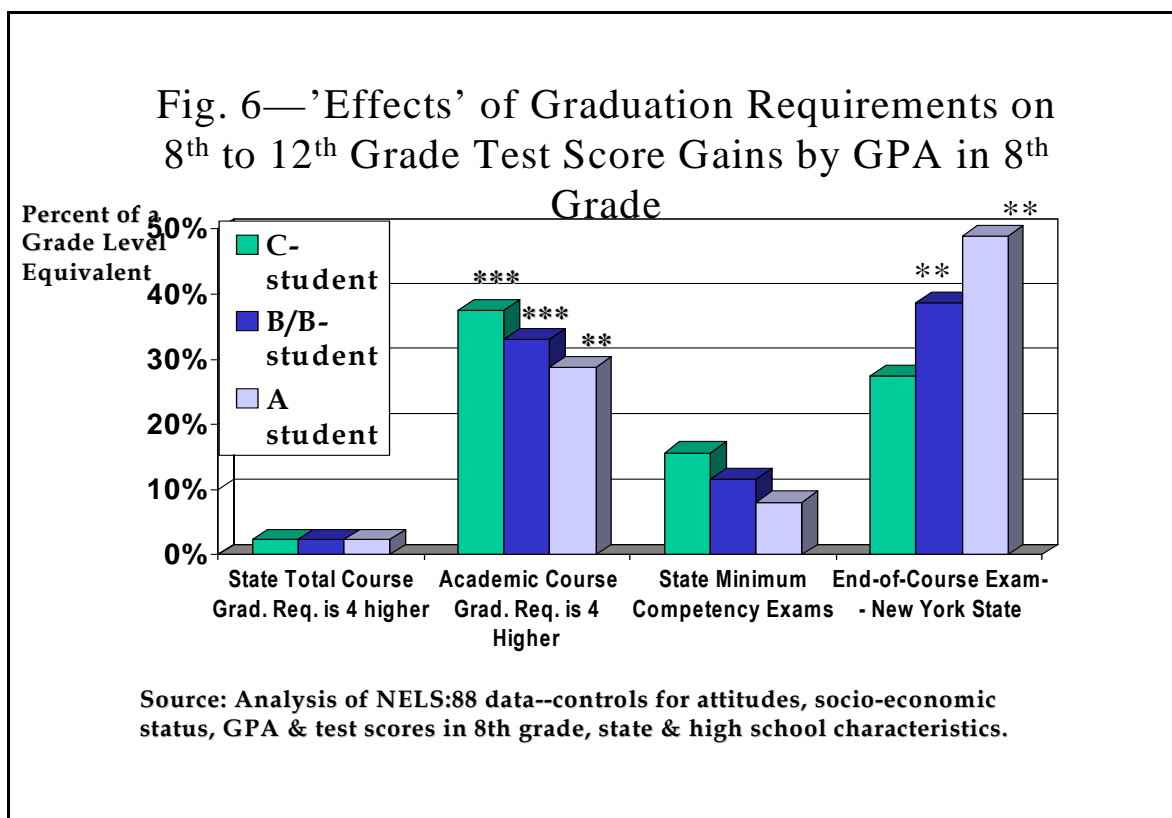
students and high and low SES students will increase. By contrast, universality implies that all students are required to take external exams though not necessarily the same set of exams. Many nations (e.g. Netherlands, Germany, Ireland, Scotland, France, England) allow students to choose which subjects to be examined in and offer high and intermediate level exams in the same subject.

Evidence that Exit Exams Increase Learning: Universal curriculum-based external exit exam systems are found all over the world, so many studies have examined their impacts. The nations and provinces that use UCBEES (and typically teacher grades as well) to signal student achievement have significantly higher achievement levels than otherwise comparable jurisdictions that base high stakes decisions on college admissions tests and/or teacher grades. Students from countries with UCBEES systems outperform students from other countries at a comparable level of economic development by **1.0 to 1.5** grade level equivalents (GLE) in mathematics, science and reading.⁴ Analysis of PISA data collected in 2000-01 finds that Universal CBEEES increases reading, mathematics and science literacy of native-born students by 1.0 to 1.5 grade level equivalents (see rows 1, 2 and 3 of Appendix Table 3).

Other studies compare students living in different provinces/states in Germany, Canada and the United States. Wößmann found that the German Lander with centralized UCBEES had significantly higher scores on the PISA literacy assessments. Students attending school in Canadian provinces with UCBEES were a statistically significant one-half of a U.S grade level equivalent ahead in math and science of comparable students living in provinces without CBEEES (Bishop 1997, 1999a). In 1990 New York State's Regents exam system was the only example of a voluntary curriculum-based external exit exam system in the United States. Graham and Husted's (1993) analysis of 1991 SAT test scores in the 37 states with reasonably large test taking populations found that New York State students did much better than students of the same race and social background in other states. By the middle of the 1990s another state, North Carolina, had established a UCBEES. Controlling for ethnicity, social background and other standard's

based reform policies, 8th graders in New York and North Carolina in 1996-98 were about one-half of a GLE ahead of comparable students in other states in reading, math and science. (see Figure 5, Bishop, Mane, Moriarty and Bishop 2001). Bishop, Mane, Moriarty and Bishop (2001) found that New Yorkers entering high school in 1988 learned about a half a GLE more between 8th grade and 12th grade than comparable students in other states (see Figure 6). MCE/SBEs had small (about 10 percent of a grade level equivalent) statistically insignificant effects on learning.





What is the primary mechanism by which CBEEES increase student achievement? Do they induce school districts to hire more qualified teachers, to devote more time to teaching core subjects, to assign more homework etc? The impacts of UCBEEES on school policies and instructional practices have been studied in the TIMSS data, in PISA data and in the Canadian International Assessment of Educational Progress data. UCBEEES are not associated with higher teacher-pupil ratios nor greater spending on K-12 education. They are, however, associated with higher minimum standards for entry into the teaching profession, higher teacher salaries, a greater likelihood of having teachers specialize in teaching one subject in middle school and a greater likelihood of hiring teachers who have majored in the subject they will teach. Teacher satisfaction with their job appeared to be lower, possibly because of the increased pressure for accountability that results from the existence of good signals of individual student achievement. Schools in UCBEEES jurisdictions devote more hours to math and science instruction and build and equip better science labs (Bishop 1997, 1999b).

Fears that UCBEES have caused the quality of instruction to deteriorate appear to be unfounded. Students in UCBEES jurisdictions were less likely to say that memorization is the way to learn the subject and more likely to do experiments in science class. Apparently, teachers subject to the subtle pressure of an external exam four years in the future adopted strategies that are conventionally viewed as "best practice," not strategies designed to maximize scores on multiple-choice tests. Quizzes and tests were more common, but in other respects UCBEES jurisdictions were no different on a variety of indicators of pedagogy. Students were more likely to get tutoring assistance from teachers after school. They were just as likely to enjoy the subject and they were more likely to believe that science is useful in every day life and more likely to talk with their parents about schoolwork (Bishop 1999b).

Another way to assess the effects of exit exams and standards-based reform is to compare achievement gains in states that have recently introduced exit exams to gains in states that have not. Studies making these comparisons have concluded that scores rise more rapidly in the states introducing test-based accountability. Norman Fredrickson (1994) found that states introducing "high stakes" testing systems achieved larger gains on NAEP mathematics questions between 1978 and 1986. Martin Carnoy and Susanna Loeb (2003) found that 4th and 8th grade math achievement gains from 1996 to 2000 were significantly larger in states with strong test-based accountability. Effects were particularly strong for Blacks and Hispanics and remained large when adjustments were made for changes in exclusion rates. Barak Rosenshine (2003) excluded states with big increases in exclusion rates and then compared four-year NAEP test score gains of the remaining high-stakes states to the gains in states with no stakes. He concluded "that students in the clear high-stakes states were, indeed, learning mathematics and reading that was beyond the specific content of the statewide tests (p. 3)." Henry Braun (2004) study of gains between 1992 and 2000 concluded: "For each grade, when we examine the relative gains of states over the period, we find that the comparisons strongly favor the high-stakes testing states. Moreover, the results cannot be accounted for by

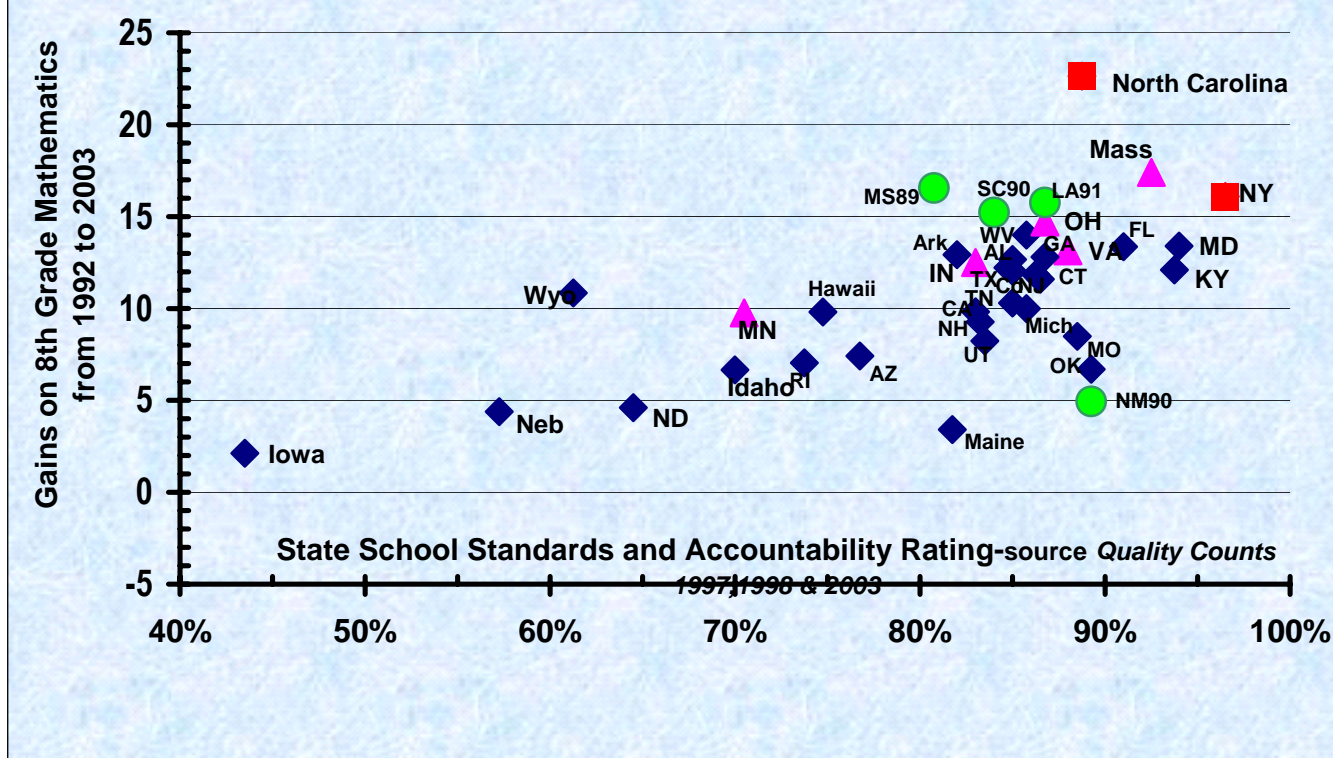
differences between the two groups of states with respect to changes in the percent of students excluded from NAEP over the same period (p. 2)."

Plans for new high school graduation tests are announced many years in advance of actual implementation. These announcements start a change process that affects elementary as well as secondary school teachers. Consequently, it will typically be a "half a generation" (CEP, 2004 p. 26) before students exhibit the full effects of a new MCE, SBE or UCBEEES.⁵ This implies that statistical power is maximized by measuring change over a period that runs from the announcement date to many years after the new graduation requirements are imposed.

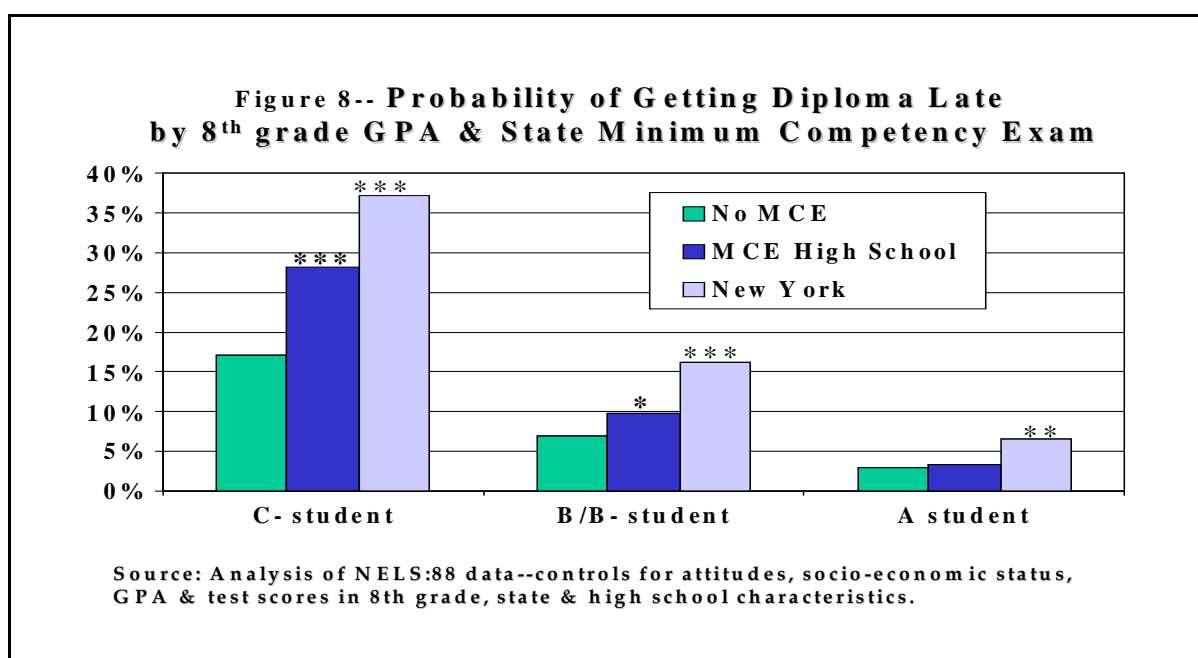
Figure 7 plots the gains from 1992 to 2003 gains on 8th grade NAEP math tests (adjusted for the effects of changes in exclusion rates) against Education Week's overall rating of the quality of each state's standards and school accountability system for 1996, 1997 and 2002. School accountability systems were not well developed in 1992, so the positive relationship visible in Figure 5 suggests that the introduction of standards-based reform and school accountability systems during the 1990s had positive effects. The graph also suggests that the states that introduced new student accountability systems during this period had particularly large gains. The two states—North Carolina and New York, represented by squares—that established UCBEEES during the 1990s had much larger gains on the NAEP tests than would be predicted by their Education Week accountability rating. So did the five states—Indiana, Massachusetts, Minnesota, Ohio and Virginia represented by triangles---that introduced standards-based exit exams between 1992 and 2003 and the three SREB states—Louisiana, Mississippi and South Carolina represented by circles—that introduced MCE/SBEs between 1989 and 2001. Multivariate regressions found that test score gains were about 60 percent of a grade level equivalent higher in states introducing a UCBEEES and about 30 percent of a GLE higher in states introducing MCE/SBE between 1992 and 2003.

In sum, MCE/SBE graduation exams appear to increase student achievement by 10 to 30 percent of a grade level equivalent. By contrast, high stakes UCBEES such as the GCSE and A levels in England and the BAC in France increase student achievement by more than a grade level equivalent, an effect that is five or six times bigger than the mean for studies of the effects of MCE/SBEs. The effects of low and moderate stakes UCBEES—eg. North Carolina, Canada, the Netherlands, New York prior to 2000-- where grades on external exams are only one component of the course grade and passing the test is not necessary to graduate appear to lie between the two extremes.

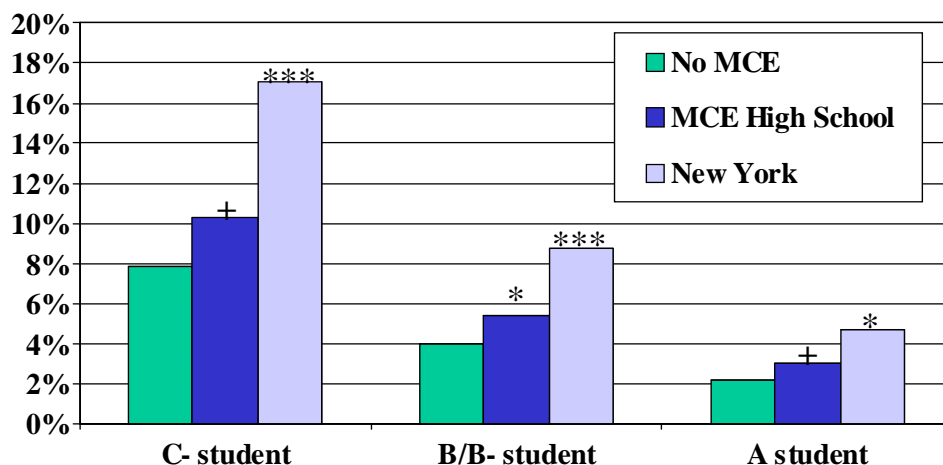
Fig. 7--State Standards and Accountability Rating and 1992 to 2003 Gains on NAEP 8th grade Math--Adjusted for Exclusions



Evidence on the Effects of Exit Exams on Dropouts and Completion rates: What effects do high stakes MCE/SBE exams and curriculum-based external exit exam systems have on high school enrollment rates and college attendance? Analyses of U.S. state cross section data presented in Appendix Table 1 and 2 conclude the MCE/SBEs had no significant effect on aggregate enrollment rates or graduation rates during the 1990s. The total number Carnegie units required to graduate, however, was negatively related to enrollment rates and graduation rates (Bishop and Mane 2000; Lillard and DeCicca 2001). The longitudinal NELS-88 data set allows a more refined look at the distributional effects of CBEEES and MCEs on high school completion. Students with low or average GPAs in 8th grade were significantly more likely to get their diploma late or to get a GED when they were from New York or a state with an MCE (see figure 8 and 9). The proportion of 8th graders who eventually got either a regular diploma or a GED was no different in New York but significantly lower for low GPA students from other MCE states (see figure 10, Bishop, Mane, Moriarty and Bishop 2001). As in Europe, fast paced instruction and high standards for getting an academic diploma results in some students taking longer to get the diploma and other students switching over to less demanding programs of study.

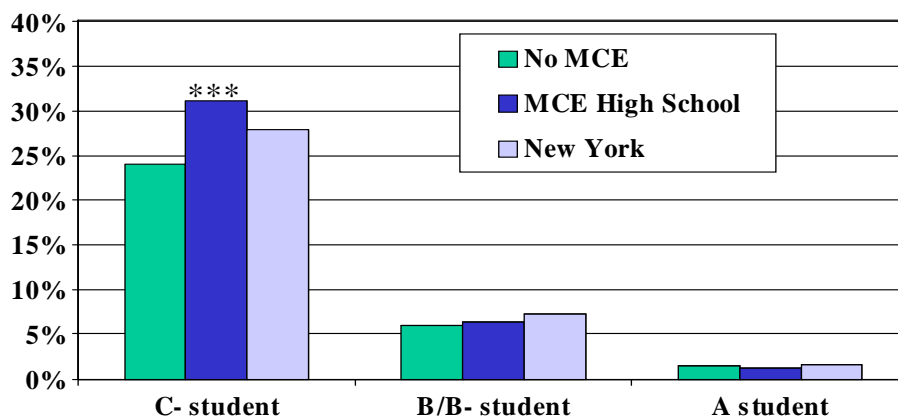


**Figure 9-- Probability of Getting GED
by 8th grade GPA & State Minimum Competency Exam**



Source: Analysis of NELS:88 data--controls for attitudes, socio-economic status, GPA & test scores in 8th grade, state & high school characteristics.

**Figure 10-- Probability of Not Getting a Diploma or GED
by 8th grade GPA & State Minimum Competency Exam**



Source: Analysis of NELS:88 data--controls for attitudes, socio-economic status, GPA & test scores in 8th grade, state & high school characteristics.

International comparisons are the best way to assess the effects of Universal Curriculum-Based External Exit Exam Systems on enrollment rates and completion rates. I analyzed OECD data on school enrollment rates of 15 to 19 year olds, upper-secondary graduation rates and years spent in school [summed net-enrollment rates of people from age 5 to 65] (OECD 2000, Table C1.1). Regressions predicting these variables are presented in rows 4, 5, 6 and 7 of Appendix Table 3. The statistically significant predictors were per capita GDP, the adult unemployment rate and the share of upper-secondary students in pre-vocational and career-technical educational programs (Bishop and Mane 2004). **UCBEEES did not reduce school enrollment rates for 15-19 year olds and had a significant tendency to increase the share of the age cohort graduating from upper-secondary school. This is a remarkable finding. Some how UCBEEES are able to substantially increase academic achievement without decreasing school enrollment and graduation rates.** By contrast, minimum competency graduation requirements--the student accountability system most popular in the U.S.--appears not to be able to simultaneously achieve high achievement and high participation.

How do the European UCBEEES accomplish these twin objectives.? First, UCBEEES signal the full range of student achievement to universities and to employers, so all students get increased rewards-- better jobs and access to preferred university programs—if they study harder. An MCE, by contrast, focuses all of its high stakes incentive effects on a few low achieving students who were already at high risk of dropping out. Most students pass the MCE on the first try. Once they pass, the stimulus to studying and paying attention in class generated by the MCE goes away. Only in the minority of very troubled schools where the majority of students are at risk of failing the MCE is student culture likely to be changed by the high stakes test. Raising the bar is politically difficult because many perceive it to be unfair to, in Gary Orfield's words, “punish” students whose low test scores are the result [at least in part] of attending under funded poorly staffed schools.

Second, doing poorly on a European UCBEEE means you graduate with a record of **modest accomplishment**. It does not prevent you from graduating altogether. Employers and universities take that record into account when they make their decisions. Students with poor exam grades are able to enter less prestigious forms of postsecondary education.

Thirdly, UCBEEES pressure individual teachers to improve their teaching. Their colleagues will know how their students do on the exam. Since the stakes for the students are high, parents and school administrators encourage them to set high standards. They do not criticize them for being tough graders as often happens in the U.S (Figlio and Lucas 2001). MCEs, by contrast, typically cover material studied in many different courses taught by different teachers. They are often first administered in the fall. Under these circumstances, individual teachers are not considered responsible for how students in their class this term do on the MCE test. **When everyone is responsible for student performance, no one is responsible.** The formal systems of high school accountability being implemented in many states are much less effective than UCBEEES.

Fourthly, the end-of-course exams that make up a European UCBEEES are more challenging and higher in quality than the MCE and SBE exams that dominate student accountability in the U.S. Taken over a period of two weeks or more, individual exams are about three hours long and require students to write long essays, do experiments and show how they solved multi-step problems. This promotes good teaching. While many MCEs and SBEs contain a writing section, the questions on the other exams generally employ a multiple choice format and are targeted at a lower level that is typical in Europe. There is a danger that teaching to such a test may 'dumb down' the curriculum for the majority of students who are not at risk of failing.

How to introduce UCBEEES style Accountability to the United States

3.1. High School Student Accountability should be based on End-of-Course Exams

The regression analysis of international data, state NAEP test scores and dropout rates summarized above found that end-of-course exams had more positive effects on learning and retention than high stakes MCEs and the no/low stakes end-of-grade exams. Why? Because:

- a. **Responsibility for student performance on a particular exam is focused on just one or a small group of teachers.**
- b. **The classroom culture is improved because everyone is taking the same exam and it will be part of the student's grade in the course.** EOCEs signal the full range of achievement in the subject; so everyone has an incentive to study harder in order to do better on the test; not just the students at risk of failing the course.
- c. **Student attitudes towards that teacher are improved** because she becomes a coach who helps the class succeed on the state exam. Her role shifts from being a judge towards being a mentor. New York State has an EOCE system. Connecticut, Massachusetts and New Jersey do not. Contrasting NY and its neighbors allows us to test this assertion. Surveys of 35,000 students in these states by the Educational Excellence alliance found that attitudes toward teachers were more positive in New York. When students were asked what motivated them to study hard, New Yorkers were 30 percent more likely to respond "to please or impress my teacher," 17 percent more likely to say 'my teachers encourage me to work hard.' and 14 percent more likely to say "the teacher demands it." New York students were also significantly more likely to say "my teachers grade me fairly", "my teachers maintain good discipline in the classroom" and that classes are "interesting."
- d. **Student peer support for studying and classroom engagement increases. Peer support of disruptive students decreases.** New York students were 10 percent more likely to say, "My friends think it is important for me to do well in [science, math, English] at school." They were nearly 25 percent more likely to be annoyed when "other students talk or joke around in class" or "try to get the teacher off track." In addition New York students were significantly more likely to say they were motivated by a desire to learn the material and more likely to report they were interested in what they were studying and more likely to talk with their friends outside of class about what they were studying. The better attitudes translated into better behavior. New York students spent significantly more time studying for history

exams, more time doing homework and did a larger share of the homework that was assigned. They also paid closer attention in class and contributed to class discussion more frequently.

e. **EOCEs assess more difficult material.** Since EOCEs are supposed to measure and signal the full range of achievement in the subject, they contain more difficult questions and problems. This induces teachers to spend more time on cognitively demanding skills and topics

f. **Students take the course when they are ready for it.** Alignment between instruction and the exam is maximized.

g. **Teachers grade the exam.** Grading exams with essays and other constructed response questions is a very effective form of professional development. In NY, teachers participate in the grading of their own student's exams, so they get good feedback on where their teaching failed.

3.2 Graduated Rewards for Doing Well on State Tests. The rewards should not be large amounts of money for exceeding a cutoff. They should be graduated and based on absolute performance, not performance relative to the other students in the school. All of these ideas have already been implemented by a few states.

- **Scores on state tests should be part of the final grade in the course.** This will require that state tests be quickly graded before the end of the school year.
- **Scores on state tests should be on the high school transcript**
- **Differentiated diplomas or honors certifications on the existing diploma.** Student eligibility for honors diploma certifications should depend on their performance on external exams and the rigor of the courses being taken. They should not depend solely on an unweighted GPA. If a MCE is in place, students who fail the MCE but get the requisite number of Carnegie units should get a certificate of completion.
- **Merit Scholarships should be based in part on the state's curriculum-based examinations.** Many SREB states have established merit scholarship programs based on grade point average and SAT-1/ACT scores. Students in the states with merit scholarships try harder in high school and are more likely to go to and complete college (Henry and Rubenstein 2002; Dynarski, 2000; Cromwell, Mustard and Sridhar 2003).

States that have EOCs or standards based exams that reliably and validly measure the full range of achievement in a subject should consider using scores on these exams as one of the criteria together with GPA for awarding the scholarships. SAT-1 and ACT scores would either be dropped or become a supplementary factor. The standard for receiving a scholarship should be such that a third or more of the state's graduates meet it. As achievement rises the proportion of the graduating class getting the scholarship would grow. The scholarships should be awarded at assemblies attended by parents. The size of the award could depend on financial need.

- **Recruit and publicize employers who promise to pay students with the honors certifications a higher wage.** Connecticut has done this.
- **Persuade State Colleges and Universities to announce that they use grades on state tests in admission and placement decisions for in-state students.**

3.3 Reform the Admissions Policies of State University Systems-- America's premier high stakes tests, the SAT-I and ACT, are not comprehensive measures of learning during high school. The energy that students devote to cracking the SAT-1 would be better spent reading widely and learning to write coherently, to think scientifically, to analyze and appreciate great literature and to converse in a foreign language. These are the true objectives of a high school education. The high stakes attached to the SAT-1 and the ACT, however, tend to direct student energy away from developing these important skills and weakens the ability of teachers to set high standards themselves.

State university systems should redirect the energy of their state's high school students towards our true educational objectives by using high quality state sponsored curriculum-based end-of-course exams—eg. New York State's Regents exams, North Carolina's EOCs—or national subject specific achievement exams like the SAT-2, Advanced Placement and International Baccalaureate exams as important criteria for admission and placement. Minimum competency exams cannot be used for this purpose, so better exams will need to be developed. State departments of education should work with their state university and community college systems to develop appropriate exams and methods of using them for admissions and placement

purposes. The SAT-1 and ACT would continue to be used for evaluating out-of-state students. Changing admissions criteria in this way will help persuade students, parents and school administrators that better teaching, more challenging courses and higher achievement will be perceived and rewarded by the colleges and universities.

**Special Study Appendix on:
Effects of Graduation Requirements and School Size on High School Completion Rates**
by Michael Bishop and John H. Bishop

In this short note we analyze state cross-section data on enrollment rates, public school graduation rates and overall high school graduation rates during the 1990s. The dependent variables were:

- the enrollment rate of 17 year olds in April 1990 (source the 1990 Census),
- Public High School graduation ratio--The ratio of public high school diploma's awarded in 1998 to the number of 8th graders in public schools in the Fall of 1993 (adjusted for growth of public school enrollment)⁶ and
- Overall graduation ratio--The high school graduation ratio in 1989, 1992, 1993, 1994, 1997, 1998 and 1999 (the ratio of the number of regular high school diplomas awarded by public and private schools in the state to the number of 17 year olds).⁷

The control variables characterizing the demographic background of the state's high school age youth were as follows:

- a parents' education index equal to the average of the percent of parents with a high school diploma and the percent of parents with a university degree,
- incidence of poverty for children under 18.
- percent population foreign born.
- percent of public school students African American.
- percent of public school students Hispanic or Native American⁸.

Information on each state's compulsory school attendance laws and high school graduation requirements—minimum competency exams and the number of Carnegie units required to graduate both academic and total--were taken from various issues of the Digest of Educational Statistics and by contacting accountability staff in states with ambiguous data. The policy variables included:

- The total number of courses (Carnegie units) the state requires for graduation from a public high school.

- The minimum number of academic courses (Carnegie units) the state requires for graduation from a public high school.
- A dummy variable equal to one if the state has no minimum course graduation requirements
- Compulsory attendance laws--In the models predicting graduation rates, the compulsory attendance variable equals one if compulsory attendance lasts through age 17 and equals two if it lasts through age 18 (or graduation). For the model predicting 17 year old enrollment rates, the variable is equal to one if the state requires 17 year olds to attend school.
- An index of state rewards or sanctions for schools that depend on test scores of students and on dropout rates or graduation rates (available only for the period since 1995). The index is a sum of four zero-one dummy variables. The first 0-1 variable equals one when the state sanctions schools/districts with low scores on state tests that fail to improve. The second 0-1 variable equals one when the state rewards districts that significantly improve their scores on state tests. The third 0-1 variable equals one when the state bases ratings of districts in part on drop out or graduation rates. The fourth variable equals one when the state rewards districts in part on the basis of dropout or graduation rates.
- The average size of public high schools in the state.

The results of the regression analysis predicting school enrollment rates of 17 year olds and public high school graduation rates is presented in Table 1. The analysis of data on the proportion of 17 year olds getting a high school diploma in the state is presented in Table 2. The estimated effects of each of the state policies are graphed in Figure 1 and 2. The statistical significance of the coefficients is indicated by the number of asterisks (***) to the right of the coefficient and above or below the bar.

Carnegie Unit Graduation Requirements: Consistent with previous studies we find that increases in total course graduation requirements have a significant tendency to increase dropout rates and decrease graduation rates. Total course graduation requirements had a significant negative effect on 1970 enrollment rates and on high school graduation rates in all

seven of the years analyzed. Since academic course graduation requirements were also included in the models, the coefficient on the total course graduation requirement variable is an estimate of the impact of an increase in non-academic or elective course requirements. States that required two additional elective courses to graduate had enrollment rates that were 0.54 percentage points lower and high school graduation rates that were 1.36 percentage points lower for public schools and 1.16 points lower overall.

What about the effects of academic course graduation requirements? Do they, as some have hypothesized, have bigger effects on dropout rates than elective course requirements? Since total course requirements are included in the model, the coefficient on academic course requirements provides a direct test of the hypothesis that the two types of course requirements have equal effects. The bigger effects hypothesis predicts that the coefficient on academic requirements will be positive (and significant) in dropout regressions and negative (and significant) in graduation rate and enrollment rate regressions. This hypothesis was decisively rejected. In all nine of the regressions, the sign of the estimated effect of academic requirements was the opposite of what is predicted by the 'bigger effects' hypothesis. Indeed, the opposite hypothesis, that academic requirements have smaller effects than elective requirements is accepted in four of the fourteen regressions.

The sum of the two coefficients is an estimate of the effect of increasing academic requirements while holding elective requirements constant. This sum is never significantly different from zero and point estimates of the sum are negative for all six years of event dropout rate data and positive for five of six years for which we were able to model overall graduation rates. Our coefficients imply that states requiring two extra academic courses to graduate had event dropout rates that were 0.17 percentage points lower on average, public high school graduation rates that were .50 percentage points lower and overall graduation rates that were .40 percentage points higher on average. Non-enrollment rates were unaffected by higher academic course requirements. In other word, **the regressions are telling us that higher**

academic course graduation requirements were not associated with higher dropout rates and lower graduation rates in the 1990s. Rather it was higher elective and non-academic course graduation requirements that appears to have increased drop out rates and reduced graduation rates.

Minimum Competency Exams: Estimates of the impact of Minimum Competency Exams are generally statistically insignificant. The analysis of enrollment rates and provides no support for the conventional wisdom that, enrollment rates are not lower in MCE states. Point estimates are negative as hypothesized in the seven graduation rate models but the coefficient is significantly (at the 10 percent level) negative in only one year, 1993. Effects seem to be particularly small (-0.5 percentage points) during the last half of the 1990s.

Compulsory school attendance laws: School attendance laws requiring 17 year olds to be in school appear to influence enrollment rates in the expected direction. In 1990 enrollment rates of 17 year olds were a significant one percentage point higher in states that required 17 year olds to be in school. However, compulsory attendance laws do not appear to raise graduation rates. Three of the seven coefficients on this variable were negative--implying that tough laws were associated with lower graduation rates—and none were statistically significant.

Stakes for Schools Rewards and Sanctions: Our tests of the effect of making dropout rates and graduation rates one of the criteria for evaluating school districts for sanctions or rewards suggests that the dropout rates reported by schools may be lowered by such a policy. States that both rate schools on their ability to retain students and reward them for success in lowering dropout rates and increasing test scores had significantly lower event dropout rates at the end of the 1990s.

There is reason, however, to be skeptical because school officials collect the data on event dropout rates and report them to the state education departments. State accountability systems that include dropout rates in school ratings generate incentives for school

administrators to try extra hard to track down students who have moved and to classify as many as possible as having entered some other school (eg. a GED program). We might be looking at a reporting effect, not a real effect. Graduation rates are therefore a better criterion for evaluating the effects of school stakes policies. Here we get no support for the hypothesis that stakes for schools raise graduation rates. Two of the four coefficients on the school stakes variable are negative and none are close to statistical significance. More data and better quality data are necessary before definitive conclusions can be drawn regarding effects of school stakes policies and MCEs on high school graduation rates.

Size of High Schools: The school policy with the strongest impact on dropout rates and graduation rates was the size of public high schools. States with larger schools had higher dropout rates and lower graduation rates. The mean of the high school size variable was 676 with a standard deviation of 250. Our models predict that doubling the mean size from 500 to 1000 lowers seventeen year old enrollment rates by 2 percentage points, and lowers public high school graduation rates by 6.5 percentage points and lowers overall graduation rates by 4.6 percentage points.

Table 1
Determinants of Enrollment Rates and Graduation Rates

	Percent of 17 yr olds Enrolled in School	Public H. S Graduation Rate
	1990 Census	1998
Total Courses required to graduate by state	-.26** (.10)	-.68* (.38)
# of Academic Courses Required to Graduate by state	.23 (.21)	.43 (.78)
No State Carnegie Unit Grad. Requirement	-2.21 (2.80)	5.92 (10.56)
State Minimum Competency Test ⁵	.93 (.73)	-.26 (2.68)
State School Evaluation Sanctions./Rewards Index		-.23 (.99)
Yrs of Attendance Required after age 16	.96* (.50)	.27 (.16)
Average Size of Secondary Schools	-.0039** (.0015)	-.0130** (.0015)
Parents Education Index ¹	.24** (.10)	.133 (.412)
% in Poverty - under 19 yrs old ²	-.001 (.076)	-.574 (.447)
% Foreign Born ³	-.054 (.090)	.705* (.377)
% Public School Students Black ⁴	-.059** (.022)	-.131 (.094)
% Public School Students Hispanic or Native Amer. ⁴	-.056* (.032)	-.397*** (.137)
Adj R Squared	.585	.512
RMSE	1.55	5.77
# of Observations	50	49
Mean: Dep. Variable	88.8	74.1

+ Statistically significant at the 10% level one a one tail test * Statistically significant at 5% level on a one tail test

** Statistically significant at 5% level on a 2 tail test *** Statistically significant at 1 % level on a 2 tail test

¹ Average of the percent of parents obtaining a secondary high school diploma and the percent of parents obtaining a university degree. Education in States and Nations. National Center for Education Statistics. 1991. Pg. 139.

² Education in States and Nations. National Center for Education Statistics. U.S. Department of Education. 1991. Pgs. 49, 129, 119.

³ 1990 Census of Population. Social and Economic Characteristics U.S. Pgs. 174-79. No LA.

⁴ Digest of Education Statistics. National Center for Education Statistics. 1993. pgs. 61 & 76.

⁵ Columns 1 and 2 regressions use a competency exam (MCE) variable for 1991-93 in which VA =0, NC = 1 and EOCE = NY. For columns 3, 4, 5 and 6 the EOCE variable is NY and NC and the stateMCE variable adds Ohio and Virginia to the MCE category and subtracts NC.

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**Appendix Table2:
Determinants of High School Graduation Rates**

	1992	1993	1994	1997	1998	1999	99-Incl. Other Grads
Total Courses required to graduate by state	-.48+ (.32)	-.61** (.29)	-.55* (.31)	-.65** (.31)	-.69** (.32)	-.53+ (.34)	-.50* (.29)
# of Academic Courses Required to Graduate	.46 (.65)	.67 (.59)	.93+ (.62)	1.01+ (.65)	.91 (.66)	.67 (.69)	.70 (.58)
No State Carnegie Unit Grad. Requirement	-3.88 (8.83)	-2.47 (8.02)	1.68 (8.61)	-1.83 (8.77)	-2.07 (8.93)	-2.50 (9.38)	-.80 (7.94)
State Minimum Competency Test⁵	-2.84 (2.28)	-3.23+ (2.07)	-1.31 (2.08)	-.46 (2.13)	-.54 (2.23)	-.45 (2.32)	.69 (1.97)
State School Evaluation Sanctions./Rewards Index	—	—	—	.17 (.81)	-.13 (.84)	.40 (.88)	.36 (.74)
Yrs of Attendance Required after age 16	-1.50+ (1.03)	-1.43 (.94)	-.80 (.96)	.26 (.95)	.10 (.91)	.48 (1.02)	.67 (.87)
Average Size of Secondary Schools	-.0033 (.0050)	-.0042 (.0045)	-.0114** (.0048)	-.0142*** (.0045)	-.0111** (.0047)	-.0106** (.0049)	-.0090** (.0041)
Parents Education Index¹	1.15*** (.33)	.73** (.30)	.81** (.32)	.66** (.32)	.60* (.34)	.69* (.35)	.69* (.30)
% in Poverty - under 19 yrs old²	.14 (.30)	-.03 (.28)	-.01 (.29)	.03 (.36)	.03 (.37)	.02 (.39)	.10 (.33)
% Foreign Born³	.03 (.28)	-.05 (.26)	.29 (.27)	.51* (.28)	.23 (.28)	.16 (.30)	.07 (.26)
% Public School Students Black⁴	-.04 (.070)	.03 (.063)	-.06 (.069)	-.11+ (.076)	-.14* (.079)	-.19** (.083)	-.19*** (.070)
% Public School Students Hispanic or Native Amer.⁴	-.30*** (.10)	-.24*** (.09)	-.31*** (.09)	-.37*** (.09)	-.35*** (.10)	-.36*** (.10)	-.38*** (.09)
Adj R Squared	.596	.612	.598	.616	.607	.595	.638
RMSE	4.86	4.41	4.64	4.70	4.88	5.12	4.33
# of Observations	50	50	50	50	50	50	50
Mean: Dep. Variable	73.8	72.8	71.0	69.9	71.7	71.4	72.4

+ Statistically significant at the 10% level one a one tail test

* Statistically significant at 5% level on a one tail test

** Statistically significant at 5% level on a 2 tail test

*** Statistically significant at 1 % level on a 2 tail test

¹ Average of the percent of parents obtaining a secondary high school diploma and the percent of parents obtaining a university degree. Education in States and Nations. National Center for Education Statistics. 1991. Pg. 139.

² Education in States and Nations. National Center for Education Statistics. U.S. Department of Education. 1991. Pgs. 49, 129, 119.

³ 1990 Census of Population. Social and Economic Characteristics U.S. Pgs. 174-79. No LA.

⁴ Digest of Education Statistics. National Center for Education Statistics. 1993. pgs. 61 & 76.

⁵ Columns 1 and 2 regressions use a competency exam (MCE) variable for 1991-93 in which VA = 0, NC = 1 and EOCE = NY. For columns 3 and 4 the EOCE variable is NY and NC and the state MCE variable adds Ohio and Virginia to the MCE category and subtracts NC.

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**Appendix Table 3—Academic Achievement in Nations with and without
Curriculum-Based External Exit Examination Systems:
Program for International Student Assessment 2000 Data**

	<i>Curriculum- Based External Exit Exam</i>	<i>Log GDP/ Pop 1995</i>	<i>East Asia</i>	<i>Adult Unemp. Rate</i>	<i>Share Upper Secondary Students in CTE</i>	<i>Adj R² RMSE</i>	<i># of Obs</i>
Native Born Students							
Mathematics—15 Yr Olds	39.9*** (12.1)	84.9*** (7.9)	36.6** (16.7)			.764 32.7	41
Science—15 Yr Olds	32.4*** (9.9)	71.3*** (6.5)	29.7** (13.9)			.756 27.1	41
Combined Reading Literacy —15 Yr Olds	25.2*** (8.8)	76.6*** (5.6)	15.7 (11.9)			.828 23.1	41
School/College Enroll. of 15-19 yr olds (percent)	-2.6 (4.7)	22.0*** (5.0)	10.4 (10.6)	1.27** (.57)	.18* (.10)	.434 10.1	28
School/College Enroll. of 20-29 yr olds (percent)	2.2 (3.2)	10.3*** (3.4)	4.4 (7.3)	.62+ (.39)	-.02 (.07)	.155 7.0	28
Expected FTE Yrs of Schooling: 5-65	-.11 (.47)	2.51*** (.40)	.27 (.73)		.020* (.010)	.700 1.10	32
Upper-Secondary Graduation Rate	10.4* (5.4)	26.3*** (5.9)	15.3+ (8.8)	1.19+ (.70)	.26* (.12)	.582 11.0	23

Source: Data on PISA is from OECD, *Literacy Skills for the World of Tomorrow: Further Results From PISA 2000*, 2003. Upper-secondary graduation rates, enrollment rates and expected FTE years of schooling are from OECD, *Education at a Glance 2000 and 2001*. The full-time equivalent number counts part-time enrollment as 0.5 years. Data on unemployment rates in OECD countries in the United Nations' *Human Development Report 2001*. The model predicting the share of 15-19 and 20-29 year olds in school included: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France Germany, Greece, Hungary, Iceland, Ireland, Italy, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Poland, Spain, Switzerland, Sweden, Turkey, United Kingdom and the United States.

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Endnotes

¹ Studies that attempt to measure the effect of CTE by comparing the dropout rates of vocational students and other students find it very difficult to control for aspirations and motivation. One cannot evaluate the effect of having an option to take CTE by randomly assigning students to take a CTE course. Indeed CTE advocates would predict that forcing a student to take a particular course would increase the risk of their dropping out. Some students do not like academic courses or have been unsuccessful in them and are at high risk of dropping out. This “I dislike academics” (IDA) characteristic cannot be controlled for. When the option of taking CTE courses is presented to all students, the “I dislike academics” (IDA) students will be significantly over represented among CTE course takers. Let us assume that taking a CTE course has no effect on the very high graduation rates of non-IDA students but a substantial positive effect on IDA students. Assume further that the graduation rates of IDA students remain low because they are still being required to take some academic courses. Now let’s hire a statistician to compare the subsequent drop out rates of students who do and do not take CTE courses controlling for all available background characteristics. Taking a CTE course is still a marker for being an IDA student and regression coefficient on the CTE variable will tend to be biased in the negative direction.

² When grading standards vary across high schools, across classrooms within the school and over time, employers and universities are not able to place applicants for jobs or admission on a common scale and reward them for their accomplishments. This generates incentives to inflate grades and lower standards. Costrell’s (1994a) analysis of the optimal setting of educational standards concluded that more centralized standard setting (state or national achievement exams) with a local option to set even higher standards results in higher standards, higher achievement and higher social welfare than decentralized standard setting (ie. teacher grading or schools setting their own graduation requirements).

³ Costrell’s analysis of optimal standard setting concluded: “The case for perfect information [making scores on external examinations available rather than just whether the individual passed or failed] would appear to be strong, if not airtight: for most plausible degrees of heterogeneity, egalitarianism, and pooling under decentralization, perfect information not only raises GDP, but also social welfare (1994, p. 970).”

⁴ In most studies of the effect of CBEEES, national mean test scores (for an age group or a grade) were regressed on per capita gross domestic product deflated by a purchasing power parity price index, a dummy for East Asian nation and a dummy for CBEEES. Analyzing 1994-95 Third International Math and Science Study (TIMSS) data, Bishop (1996, 1997) found that 13 year old students from countries with medium and high stakes CBEEE systems outperformed students from other countries at a comparable level of economic development by 1.3 U.S. grade level equivalents (GLE) in science and by 1.0 GLE in mathematics. Analysis of data from the 1990-01 International Association for the Evaluation of Educational Achievement’s study of the reading literacy study of 14 year olds in 24 countries found that students in countries with CBEEES were about 1.0 GLE ahead of students in nations that lacked a CBEEES (Bishop 1999). Analysis of data from both waves of TIMSS data collection also implies that CBEEES have highly significant effects (of about 1.5 GLEs) on the math and science achievement in 8th grade (Bishop 2003).

⁵ This is one of the reasons why Amerein and Berliner’s (2002) interrupted time series approach to measuring the effects of high stakes tests is flawed. The other weaknesses of the study are errors in dating the introduction of high stakes tests in many states, the use of national average scores as a comparison rather than states that did not implement high stakes testing and the arbitrary way of handling changing rates of exclusion.

⁶ Source of data on the adjusted ratio of diplomas awarded in 1998 to 8th grade public school enrollment in Fall 1993 was Jay Greene, *High School Graduation Rates in the United States*, November 2001, Manhattan Institute, 1-22. Between 8th and 12th grade some students move across state lines or transfer into or out of the private school sector. Consequently, simply dividing diplomas awarded in year *t* by 8th graders in *t*-4 produces inaccurate measures of public high school completion rates. Without adjustments, rapidly growing population will inflate the state’s graduation rate indicator; falling population will depress the indicator. Jay Greene used public school enrollment growth from 1993 to 1998 to correct for differential population growth rates.

⁷ Data on diplomas awarded by public high schools and private high schools are from various issues of the Digest of Education Statistics and Public School Student, Staff and Graduate Counts by State, School Year 1999-2000, NCES 2001-326r, May 2001. Students who received certificates of completion from their high school or passed the Graduate Equivalency Diploma (GED) test were not counted as a regular graduate. The population of 17 year olds is the base rather than 18 year olds because the number of 18 year olds may be effected by out-migration and in-migration of college students and military personnel. The Census Bureau's estimates of state populations for years 1991 through 1999 become increasingly inaccurate as one moves away from 1990. To test the accuracy of Census Bureau estimates for intercensal years, I added one additional year of population growth to their published estimate for 1999 and then compared it to actual counts from the April 2000 Census. For 17 year olds, Census extrapolations were 5.5 percent below the actual for Connecticut, 4.0 percent below for Florida, 4.4 percent below for New Jersey and 4.6 percent below for New York. Some of the over predictions were even larger: 7.2 percent for Kansas, 8.2 percent for Alaska and Wyoming, 4.5 percent for Kentucky and Washington. Following the advice of Census personnel, I assumed that the year 2000 error had grown in equal increments over the decade. The resulting estimate of the error for each year was then added to the original Census estimate of 17 year olds in the state to create the 'corrected' estimates of 17 year old population that were used in the analysis.

⁸ The sample included 49 states plus the District of Columbia. Hawaii was not included because we could not control for the effects of Pacific Islander ethnicity. The majority of Hawaiian students report Pacific Islander ethnicity and these students are significantly more likely to drop out than local Whites and Asians.