POLICY BRIEF:

Investigation of STEM Course-Taking Patterns and College Readiness as a result of HB5 of 2013

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SUMMARY

HB5 of 2013 eliminated many end of course exams and lowered the course-taking requirements for many high school students. What were the main consequences?

College readiness as measured by high school exams dropped precipitously. However high-school course-taking patterns were largely unchanged. Students continued to take Algebra 2 and Physics, for example, at the same rates as before although they were no longer required. There was no surge of enrollment in developmental education in community colleges. This may be because of a surge of enrollment in dual credit courses in high school.

Texas should avoid changes to high school graduation requirements and focus on improving the quantity and quality of STEM courses available to high school students, particularly in computer science.

Study Overview

Context and Importance of Problem

HB5 of 2013 (Texas Education Agency, 2013) canceled many end of course exams at high school and changed high school graduation plans (Marder, 2015). Instead of a Recommended High School Plan that made college preparatory coursework the default for students, students could choose a Foundation + Endorsement plan, or a Distinguished plan that was similar to the previous Recommended High School Plan. Two of the end of course exams that were no longer mandatory, Algebra II and English III, had been supposed to establish college readiness for most high school students.

Because these exams were no longer mandatory, the number of college-ready students from Texas high schools dropped sharply in 2015-2016 (Texas Higher Education Coordinating Board, 2019, p. 16). Courses such as Algebra II, Physics and Chemistry that used to be required became optional. Substantial drops in college readiness seemed able to threaten ambitious Texas plans to prepare a more educated workforce by 2030(Texas Higher Education Coordinating Board, 2015).

Statement of Research

The goal of this project was to explore consequences of high school graduation requirement changes because of HB5 of 2013 for Texas students. Some of the specific questions to be addressed were

- How did high school College Readiness change in Texas as a result of HB5?
- How did Texas high school course-taking patterns in STEM changing as a result of HB5?
- In particular, how did enrollment change in Algebra II, which technically became optional?
- How did it change in Chemistry and Physics, which became optional?
- How did it change in Statistics, Computer Science, and Robotics, provided as examples of STEM courses which students might wish to pursue as part of STEM Endorsements?
- How did enrollment in developmental courses at Texas colleges change as a result of HB5? In particular, did the drop in TSI college readiness recorded in 2015-2016 next lead to increased numbers of students enrolling in developmental education in community college?

Key Findings

College Readiness as measured by Texas in high school fell dramatically after passage of HB5 and remained low (Marder, 2018). This finding is summarized in Figure 1.

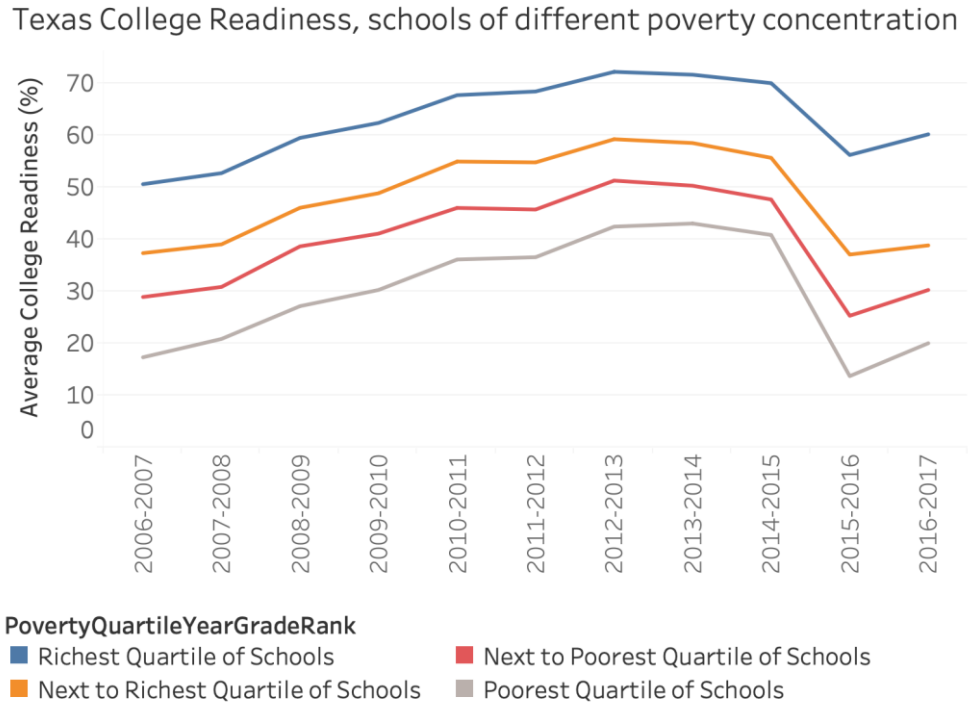

Figure 1: College Readiness as measured in high school by the Texas Education Agency.

College Readiness is the name for a particular college readiness measure that the Texas Education Agency prepares for every Texas high school graduate as part of the Texas Success Initiative (Texas Higher Education Coordinating Board, 2017).

For students who entered high school prior to 2011, there were several ways to be certified College Ready. They could get scores above a cutoff on the mandatory TAKS exams their junior year. They could get above 1110 on the SAT or 24 on the ACT. Or they could complete a college course or receive honorable discharge from military service. Far and away the most likely way to get the certification was through scores on the mandatory state tests.

The story behind the rising rate of College Readiness from 2007 until 2014 in Figure 1 is that more and more students successfully met a benchmark on the exit-level TAKS. When Texas transitioned from TAKS to STAAR in 2011, the exams designed to take over the college certification task were Algebra II and English III. Under HB5, Algebra II and English II became optional for districts to offer, they disappeared from the annual testing calendar, and only a trickle of results from them have been reported since 2012–2013.

Schools were encouraged to have students take the Texas Success Initiative Assessment while still in high school. However, students were not required to take it and it had no impact on graduation, and this is the main reason that College Readiness rates plummeted.

STEM course-taking was essentially unaffected by HB5, despite the fact that challenging courses such as Algebra II and Physics became optional (Marder, 2018). *This finding is summarized in Figure 2.*

Each panel shows the percentage of students in a high school cohort who ever enrolled in a particular class. The results are disaggregated according to eligibility for free and reduced lunch.

We refer to students not eligible for free and reduced lunch as “well off” and those eligible as “low income.” Between the class graduating in 2011 and the class graduating in 2017 we see

a. The percentage of well-off students taking Algebra I in high school dropped from 70% to 60%. This is because these students take Algebra I in middle school instead, and does not reflect failure to complete the course.
b. Participation in Geometry dropped slightly for both well-off and low-income students, but remained near 90% for both.
c. Participation in Algebra II remained essentially flat for well-off students. It had dropped by 5% prior to passage of HB5, but then recovered. Thus the provision of HB5 prohibiting requirement of Algebra II was followed by a slight rise in the percentage of students taking it.
d. Pre-calculus and calculus saw slight increases in the percentage of students enrolled. Gaps between percentage of well-off and low-income students taking these classes increased slightly.

e. The percentage of well-off students taking statistics dropped towards 50%, while the percentage of low-income students taking it rose towards 50%.
f. The percentage of students taking Biology and Chemistry remained around 90%, and was essentially unchanged after HB5.

g. Enrollment in computer science rose slightly for well-off students, was flat for low-income students, and remained below 10% for both groups. Around three times as many well-off as low-income students took computer science, and this gap slowly increased.
h. Enrollment in physics had been rising and reached 80% for well-off students and 70% for low-income students. After HB5 the enrollment no longer increased, but it did not decline. Similarly enrollment in Integrated Physics and Chemistry, which dropped rapidly before HB5, remained constant at a low level afterwards.
i. Robotics rose rapidly before and after HB5, but around a baseline of around 1%.

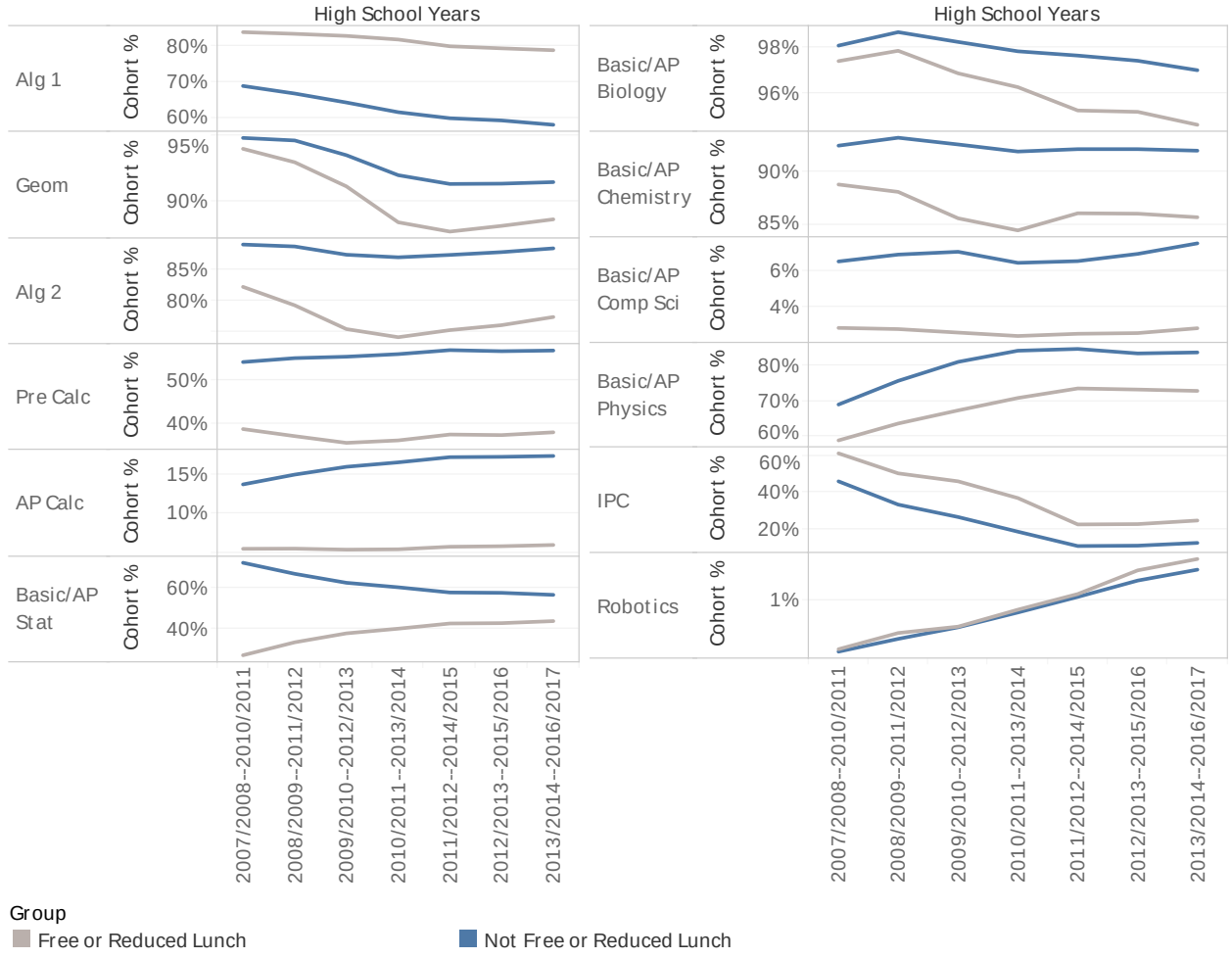

Figure 2: Well-off and Low-Income students taking courses in high school, classes of 2011 through 2017. Note that the graphs are drawn with very different vertical scales to bring out detail.

The number and percentage of students in developmental education in community colleges has not dropped as expected based on declines in high school College Readiness as shown in Figure 3. It is possible that a rapid rise in dual credit coursework and improvements in record-keeping were more important effects; see Figure 4.

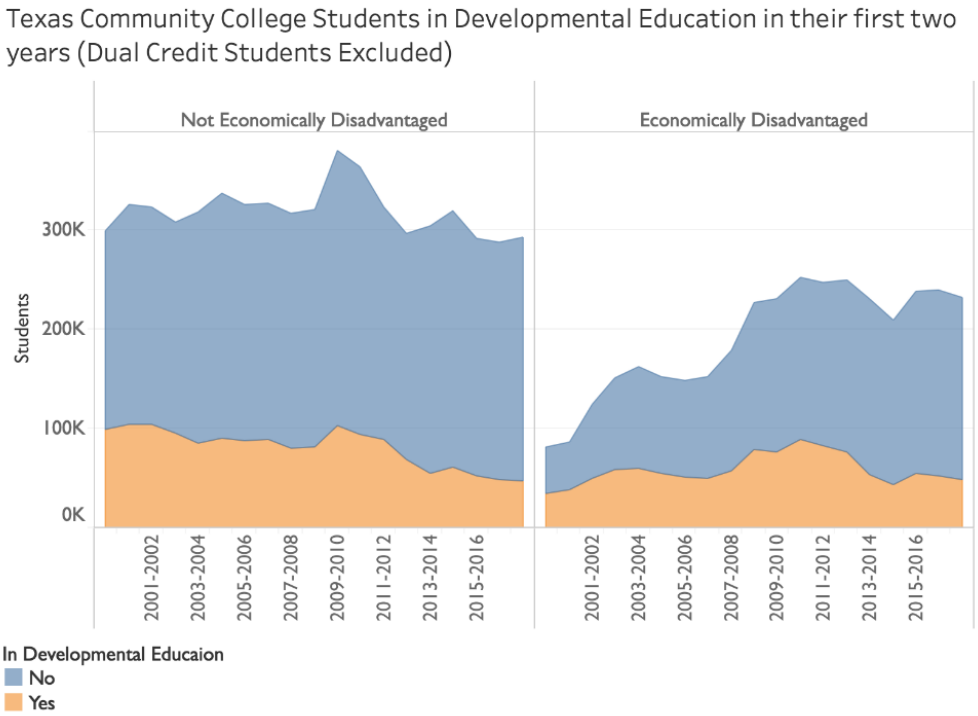

Figure 3: Community college students in developmental education, broken down by those eligible or not eligible for free or reduced lunch.

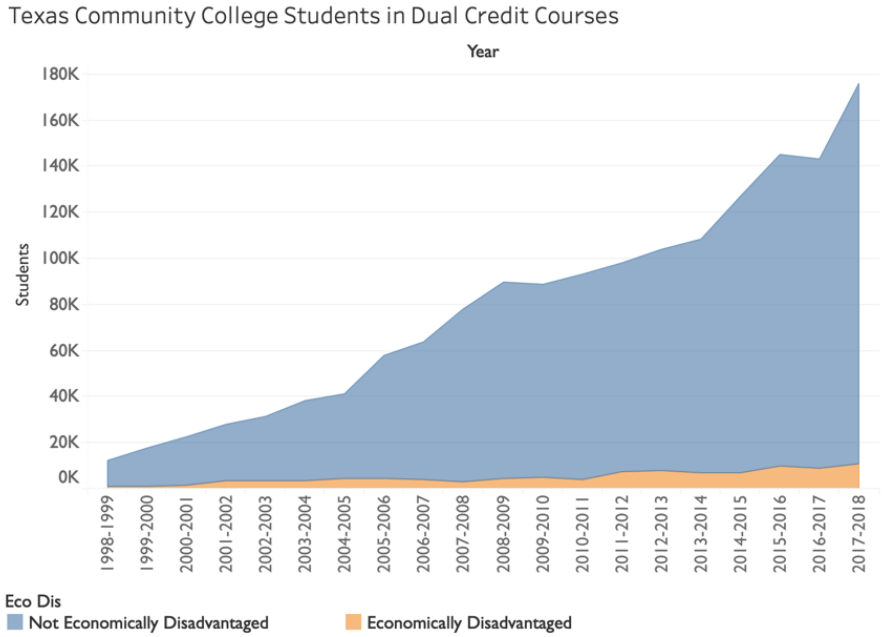

Figure 4: High school students obtaining community college credit in dual-enrolment courses.

Policy Recommendations

The high school cohorts graduating between 2011 and 2014 demonstrated positive change. College readiness rose, and the fraction of low-income students taking college-preparatory STEM courses such as physics and statistics rose by around 20%. After the passage of HB5, the state measure of college readiness dropped substantially, but course-taking patterns were comparatively static. This suggests that so long as students have the option to choose rigorous coursework they will do so.

Thus, rather than continuing to modify the graduation requirements for high school students, emphasis should be placed upon offering high-quality options from which students can choose. For example, only around 5% of each cohort takes a computer science course. In 2018-2019, around half of Texas high schools did not offer a computer science course and only a quarter offered three computer science courses or more. By contrast, the percentage of students taking physics eventually reached around 80% when all schools offered it. Computer science might follow a similar trajectory if it were made sufficiently available.

What could have been a dramatic expansion of remedial coursework in community colleges due to elimination of exams measuring college readiness may have been forestalled by the dramatic expansion of dual credit coursework. If this is to be Texas' primary mechanism to prepare students for college, then the most urgent matter is to ensure the quality and appropriateness of the dual credit and dual enrollment coursework the state makes available.

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