Abstract Title Page

Title: Measuring the Impact of the Michigan Merit Curriculum and Promise Scholarship: MCER a Collaboration in Progress

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Abstract Body

Background / Context:

This project represents the beginning of a partnership between the State of Michigan and researchers at the University of Michigan and Michigan State Michigan. The partnership is formalized as the Michigan Consortium for Educational Research (MCER). The goal of MCER is to engage key stakeholders and experts in high quality education research for the benefit of public education in Michigan and nationwide. The consortium seeks to answer contemporary education policy questions. The first project to come from MCER will investigate the impact of the Michigan Merit Curriculum and the Michigan Promise Scholarship on student outcomes.

In spring 2006, Michigan adopted one of the most comprehensive sets of high school graduation requirements in the country, known as the Michigan Merit Curriculum (MMC). The new requirements are meant to ensure that students have knowledge and skills to succeed in college and the workplace. At the same time, Michigan enacted a new merit-based scholarship program, the Michigan Promise Scholarship (MPS), to help students afford to enroll in and complete college. Students in the graduating Classes of 2007, 2008, and 2009 who meet certain academic standards were eligible for up to $4,000 toward college. This project investigates the effectiveness of these state-wide reforms to increase postsecondary and workplace success.

By establishing a statewide set of required courses, the MMC creates a minimum floor that might raise expectations and achievement for students. This reform draws on a small but growing body of research, suggesting that certain core courses, especially those in math and science, can have significant effects on students' long-term labor outcomes (Goodman, forthcoming; Levine & Zimmerman, 1995; Rose & Betts, 2004). The intervention might also positively influence students' educational aspirations by standardizing high school course-taking around requirements for a post-secondary education (Bryk, Lee, & Holland, 1993; Lee, 2002).

Michigan is not alone in its efforts. Since 2004, 18 states plus the District of Columbia report having raised graduation requirements to meet the American Diploma Project's college- and career-ready curriculum (Achieve, 2008). An evaluation of the MMC is critical not only because of its importance to Michigan and the fact that it resembles many other state reforms on the books or anticipated, but also because the evidence on high school graduation requirements is quite mixed. While there is some evidence that increased course-taking has positive effects on student performance and high school completion rates (Achieve, 2009; Balfanz & West, 2009), there is also evidence that increased course requirements are associated with decreases in high school completion rates (Lillard & DeCicca, 2001). Moreover, there is substantial evidence that mandatory high school graduation exams, a closely related policy reform, increase dropout rates, particularly among low-income students (Jacob 2001; Warren, Jenkins, & Kulick, 2006; Dee and Jacob 2007) and little evidence that they improve student achievement (Grodsky Warren, & Kalogrides, 2009; Dee and Jacob 2007).

The literature on financial aid and schooling decisions provides more compelling evidence that the MPS may increase educational attainment. Since the early 1990s, more than a dozen states have established broad-based merit aid programs. The typical program waives tuition and fees at public colleges and universities in one's home state. Unlike traditional, elite merit programs, such as the National Merit Scholarship, these programs require relatively modest academic credentials and annually fund hundreds of thousands of students.

Dynarski (2000) and Cornwell et al. (2006) conclude that the Georgia HOPE scholarship increased college attendance by 4-6 percentage points per $1000 in grant aid. Dynarski (2004) finds that a dozen states' scholarship programs have had similar, but slightly smaller effects. Abraham and Clark (2006) and Kane (2007) evaluated the DC Tuition Assistance Grant program, which allowed DC residents to pay in-state tuition at public schools across the country. They find that the fraction of DC residents that attended Maryland and Virginia schools more than doubled, and estimate an impact on overall enrollment of 3-4 percentage points per $1000 of effective tuition reduction. Notably, two large-scale randomized trials have offered financial incentives to encourage academic effort among college students and have found positive effects both in terms of GPA, credits earned and persistence (Angrist, Oreopoulos, & Lang, 2009). The literature suggests that grants in general, and state merit scholarship programs in particular, can increase educational attainment.

While these twin reforms (the MMC and the MPS) have some empirical support, it is far from clear that they will be effective. For example, a recent IES-funded evaluation of a similar reform in the Chicago Public Schools (College-Prep-for-All) found disappointing results (Allensworth, Nomi, Montgomery, & Lee, 2009). And while there is evidence that merit scholarship programs increase college enrollment in general, there is considerable variation in the design of programs, which seems to be related to their effectiveness (Dynarski, 2004, 2008; Scott-Clayton, 2008).

Purpose / Objective / Research Question / Focus of Study:

This project evaluates the impact of the MMC and the MPS on student outcomes. The primary objective of the project is to determine whether the MMC and/or the MPS have significantly altered: course-taking, student achievement, high school graduation rates, and postsecondary attendance. The analysis pays particular attention to whether these reforms affect students differentially based on their socioeconomic status, gender, race and geography.

Setting:

Policymakers have mandated the full implementation of the MMC throughout Michigan public schools. The MPS was available statewide to Michigan high school graduates in 2007, 2008, and 2009.

Population / Participants / Subjects:

The first cohort of students bound by the MMC's requirements entered 8th grade in 2006 and are expected to graduate high school in 2011. The MPS was available statewide to the graduating Classes of 2009, 2008, and 2009. In order to compare those exposed to these policies and those not exposed, our sample includes the 2000-2001 8th grade student cohort through the 2009-2010 8th grade student cohort. Our access to student-level administrative data will allow us to examine effects by student race, gender, 8th grade achievement, geography, school- or district-level demographics or baseline course-taking and a host of other policy relevant groupings. Moreover, we explicitly examine effects for more complicated interactions, such as low-achieving students in high-income schools.

Intervention / Program / Practice:

Starting with the Class of 2011, the MMC requires all high school students to pass a set of 16 rigorous academic courses, including Algebra I, Geometry, Algebra II, Biology, and Chemistry or Physics. Students must complete an end-of-course assessment that measures understanding of the subject's state-defined content expectations. While the state has offered detailed curricular and assessment guidelines to districts, they have substantial latitude in shaping course content and course assessments. We therefore expect considerable variation across the state in the fidelity with which the curriculum is implemented and, therefore, in the impact of the MMC on student learning.

The MPS, signed into law in 2006, provides graduates who meet certain academic standards with up to $4,000 for college. Students can qualify for the MPS in one of two ways, described below. Both routes to eligibility require that students sit for the Michigan Merit Exam (MME) in 11th grade, graduate high school or earn a GED, and enroll in an approved postsecondary institution within two years of high school.

(1) Earn a qualifying score on the Michigan Merit Exam or ACT –Students who meet these criteria receive $1,000 in the fall of their first and second years of college and an additional $2,000 after completing a two-year degree, a two-year vocational certificate or half the requirements of a BA.
(2) Complete two years of college with a GPA of 2.5 – This includes a two-year degree, a two-year vocational certificate or half the requirements of a BA with a cumulative GPA of 2.5 or above. Students who meet these criteria receive $4,000 *after* completing these two years of postsecondary schooling.

Research Design:

This project uses quasi-experimental methods to capture effects of both the MMC and the MPS. Relying upon the rich and detailed longitudinal student database we use an interrupted time-series design to identify the impact of the MMC on student outcomes. Controlling for student and school characteristics, including individual students' prior achievement as well as events and policies whose implementation is coincident with the MMC, the ITS design compares the trends in student outcomes of six pre-MMC cohorts to the trends in student outcomes for four post-MMC cohorts.

To identify the effect of the MPS on college entry, choice, and completion, we exploit the discontinuous MPS eligibility requirement. Eligibility for the initial MPS award is determined by whether or not a student's MME score is greater than the arbitrary cut-score. The regression discontinuity design compares the outcomes of students just above and just below the MME cut-score.

Data Collection and Analysis:

Data Collection

We are in the process of assembling a rich and detailed student longitudinal dataset from a variety of sources. Our dataset will include information on ten cohorts of 8th graders, who enter 8th grade in the fall of 2000 through fall 2009. These data sources fall into three distinct categories: data held by the state (i.e. standardized test scores, student demographics, school identifiers and teacher characteristics), data held by other entities (i.e. National Student

Clearinghouse reports on students' postsecondary enrollment, comparison state student information), and data to be collected (i.e. transcript course-taking information).

Collecting transcripts from 120 high schools in the state is a major undertaking but is critical to establishing the fidelity of the MMC's implementation. Given that course titles can be misleading (Cogan, Schmidt, & Wiley, 2001); we plan to assess the content of courses through a review of school-level course handbooks as well as the end-of-course exams that teachers administer in key subjects. Together, these data will allow us to build sequences of courses that demonstrate whether or not there is a corresponding increase in the rigor of student course-taking.

Transcript data collection will not take place until winter 2011. Our current dataset includes data held by the state on student achievement, student demographics, and school and teacher characteristics. We are working with the National Student Clearinghouse to include data on students' postsecondary enrollment.

Analysis

To answer how the MMC affects student achievement, we will begin with the simplest interrupted time-series research design. In this approach, the effect of the MMC is identified by deviations from the pre-treatment trend in the outcome of interest (11^{th} grade test score, an indicator for high school graduation, or an indicator for college attendance). We take into account student demographic variables, which will control for compositional changes in the population of Michigan's high school students. Additionally, we observe a student's 7^{th} and 8^{th} grade test scores to further control for compositional change as well as for any reforms that affected student achievement during elementary and middle school.

To answer the question of how the MMC affects the courses (especially math and science) taken by students, we will use similar estimation strategies. Our dependent variable will be a measure of courses taken by each student including the number of math or science courses taken (by the senior year, junior year, etc.) as well as dichotomous measures of the courses taken (e.g., trigonometry, chemistry). At the school level, we will use this approach to examine how teacher staffing changed with the implementation of the MMC. Specifically, we plan observe the number of FTE teachers (per student) teaching math and/or science classes in each school.

To estimate the effect of the MPS on student postsecondary attendance we will use a regression-discontinuity model. Students take the MME in the spring of the junior year of high school. High school graduates who meet or exceed Michigan standards on the math, reading, writing and science portions of the MME receive $1,000 at the beginning of the first two years in which they enroll in postsecondary schooling. They are awarded an *additional* $2,000 after completing two years of college if they earned a cumulative college GPA of 2.5. The *initial* award (which plausibly affects college entry and choice) is therefore a discontinuous function of students' scores on the MME. This aspect of the MPS allows us to use a regression-discontinuity design to analyze the program's effects on college entry and choice.

Findings / Results:

We are in the preliminary stages of our data collection and have assembled some basic school level statistics to provide a sense of the current educational environment in Michigan. (Please insert Table B1 here). Table B1 presents the number of Michigan schools from academic year 2000-2001 to 2007-2008, and Table B2 reports the average student enrollment for each academic year. (Please insert Table B2 here). Both the number of Michigan schools and the

average student enrollment per school has decreased over the past ten years. Since 2000-2001, the mean student enrollment has decreased with schools enrolling, on average, ten fewer students in 2007-2008 than in 2000-2001. To examine how a school's student composition varies by year, we observed the mean proportion of students receiving free and reduced lunch as well as race/ethnicity in a school. (Please insert Table B3 here). Table 3 shows a progressively more disadvantaged student population, with the mean proportion of free and reduced lunch in a school increasing from .32 percent in 2000-2001 to .42 percent in 2007-2008. (Please insert Table B4 here). Up until the 2007-2008 school year the general trend in the racial/ethnic composition of Michigan schools was one with increasing proportions of minorities and a decreasing proportion of white students. In particular, Michigan schools saw an increase in the proportion of Asian, Hispanic, and Black students between 2000-2001 and 2006-2007. This trend continues in 2007-2008 for Asians and Hispanics, but there is fairly substantial decrease the proportion of Black students and, correspondingly, there is an increase in the proportion of White students. In summary, Michigan schools experienced a decrease in enrollment during our observation years, an increase in poverty (as measured by free and reduced lunch) and changing trends in racial composition.

Conclusions:

Fulfilling MCER's mission to provide research-based evidence to policymakers and administrators in Michigan and inform national policy initiatives for improving education, the results from this project will provide useful policy feedback to the State of Michigan that will allow them to make any mid-course adjustments that the evaluation suggests would be beneficial. Moreover, since both the MMC and MPS are similar to reforms already enacted or planned in other states, we anticipate that our findings will also inform the national dialogue on high school reform policy.

Appendix A. References

Abraham, K. & Clark, M. (2006). Financial aid and students' college decisions: Evidence from the District of Columbia tuition assistance grant program. *Journal of Human Resources*. 41(3): 578-610.

Achieve, Inc. (2008). *2008 closing the expectations gap: An annual 5—state report on the alignment of high school policies with the demands of college and careers.* Retrieved on June 2, 2009 from: http://www.achieve.org/files/50-state-2008-final02-25-08.pdf

Achieve, Inc. (2009). *Will raising high school graduation requirements cause more students to drop out?* Retrieved on June 2, 2009 from: http://www.achieve.org/node/599

Allensworth, E., Nomi, T., Montgomery, N., & Lee, V. (2008). *College preparatory curriculum for all: Consequences of ninth-grade Course taking in algebra and English on Academic outcomes in Chicago*. Working Paper, Consortium on Chicago School Research at the University of Chicago.

Angrist, J., Oreopoulos, P., & Lang, D. (2009). Incentives and services for college achievement: Evidence from a randomized trial. *American Economic Journal: Applied Economics*. 1(1): 136-163.

Balfanz, R. & West, T.C. (2009). *Raising graduation rates: A series of data briefs.* The Everyone Graduates Center. Retrieved on June 2, 2009 from http://www.every1graduates.org/PDFs/StateProgressReport.pdf.

Bryk, A. S., Lee, V. E., & Holland, P.B. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard University Press.

Cogan L. S., Schmidt W. H., &Wiley D. E. (2001). Who takes what math and in which track? Using TIMSS to characterize U.S. students' eighth-grade mathematics learning opportunities. *Educational Evaluation and Policy Analysis 23*(4):323-341.

Cornwell, C., Mustard, D. & Sridhar, D. (2006). The enrollment effects of merit-based financial aid: evidence from Georgia's HOPE scholarship. *Journal of Labor Economics*. 24(4): 761-786.

Dee, T. S., & Jacob, B. A. (2007). The impact of high school exit exams on educational attainment and labor market outcomes. In A. Gamoran (Ed.), *Standards-based reform and the poverty gap: Lessons for "No Child Left Behind."* Washington, DC: Brookings Institution Press.

Dynarski, S. (2000). Hope for whom? Financial aid for the middle class and its impact on college attendance. *National Tax Journal*. 53(3): 629- 661.

Dynarski, S. (2004). The new merit aid. In Caroline Hoxby, (Ed.), *College choices: The economics of which college, when college, and how to pay for it*. Chicago, IL: University of Chicago Press.

Dynarski, S. (2008). Building the stock of college-educated labor. *Journal of Human Resources. 43*(3): 576-610.

Goodman, J. (Forthcoming). Skills, schools and credit constraints: Evidence from Massachusetts. *Education Finance and Policy.*

Grodsky, E., Warren, J. R., & Kalogrides, D. (2009). State high school exit examinations and NAEP long-term trends in reading and mathematics, 1971-2004. *Educational Policy*. 23(4): 589-614.

Jacob, B. (2001). Getting tough? The impact of mandatory high school graduation exams on student achievement and dropout rates. *Educational Evaluation and Policy Analysis*. 23(2): 99-122.

Kane, T. J. (2007). Evaluating the impact of the D.C. tuition assistance grant program. *Journal of Human Resources*. 42(3): 555–582.

Lee, V. (Ed.). (2002). *Reforming Chicago's high schools: Research perspectives on school and system level change*. Chicago, IL: Consortium on Chicago School Research.

Levine, P. B. & Zimmerman, D. J. (1995). The benefit of additional high school math and science classes for young women: Evidence from longitudinal data. *Journal of Business and Economic Statistics*. 13(2): 137-149.

Lillard, D. R. & DeCicca, P. P. (2001). Higher standards, more dropouts? Evidence within and across time. *Economics of Education Review*. 20(5): 459-473.

Rose, H. & Betts, J. R. (2004). The effect of high school courses on earnings. Review of Economics and Statistics. 86(2): 497-513.

Scott-Clayton, J. (2008). On money and motivation: A quasi-experimental analysis of financial incentives for college achievement. Paper presented at *Association for Public Policy Analysis and Management Conference*, November 5-7, 2009.

Staiger, D. & Stock, J. H. (1997). Instrumental variables regression with weak instruments. *Econometrica*. *65*(3): 557-586.

Warren, J. R., Jenkins, K., & Kulick, R. (2006). High school exit examinations and state-level completion and GED rates, 1975-2002. *Educational Evaluation and Policy Analysis* 28(2): 131-152.

Appendix B. Tables and Figures

Table B1 Number of schools by year

Years	
2000-2001	3553
2001-2002	3625
2002-2003	3671
2003-2004	3745
2004-2005	3763
2005-2006	3722
2006-2007	3702
2007-2008	3633
2008-2009	3603
2009-2010	3478

Table B2 Mean student enrollment by year

Years	Mean
2000-01	465
2001-02	465
2002-03	474
2003-04	468
2004-05	464
2005-06	459
2006-07	460
2007-08	455

Table B3 Mean proportions of FRL students by year

Years	Mean
2000-01	0.32
2001-02	0.37
2002-03	0.37
2003-04	0.39
2004-05	0.41
2005-06	0.39
2006-07	0.40
2007-08	0.42

Table B4 Mean proportions of race/ethnicity by year

Year	% Am. Indian	% Asian	% Hispanic	% Black	% White	% Total
2000-2001	.013	.016	.038	.182	.751	1
2001-2002	.013	.017	.039	.187	.744	1
2002-2003	.018	.018	.041	.187	.734	.999
2003-2004	.013	.019	.043	.190	.733	.998
2004-2005	.013	.020	.044	.193	.727	.996
2005-2006	.013	.021	.046	.198	.718	.995
2006-2007	.012	.021	.046	.202	.710	.992
2007-2008	.013	.027	.054	.138	.759	.992
Total	.014	.019	.043	.188	.733	.997