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# Unmet Need: Evaluating Pell as a Lever for Equitable Dual Enrollment Participation and Outcomes

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*Dual enrollment is an increasingly popular avenue for high school students to earn college credit. However, low-income students are underrepresented among dual enrollment participants. In this study, we use a difference-in-differences design to evaluate a unique federal pilot program that allowed high school students to access Pell Grants to fund their dual enrollment. Generally, we find a negative effect of the pilot program on dual enrollment participation, with no effect on subsequent college attendance. Our qualitative analysis suggests this initiative did not sufficiently meet students' specific needs, required strong partnerships with high schools to ensure high school counselors informed students about the program, and involved substantial financial and administrative burden for participating institutions.*

Keywords: *colleges, community colleges, educational policy, higher education, mixed methods, econometric analysis, qualitative research, quasi-experimental analysis, in-depth interviewing*

As national demand for a more educated workforce increases, many states have sought to expand college access. Likewise, as the cost of college has increased, students have sought ways to complete college more quickly and affordably. One potential avenue to meet both states' and students' needs is dual enrollment, or taking college courses while still in high school. Dual enrollment participation has increased substantially over the past few decades: By 2003, dual enrollment participation was growing faster than participation in other credit-based transition programs, including Advanced Placement (AP), International Baccalaureate (IB), and middle college high schools (Bailey & Karp, 2003). From 2003 to 2011, dual enrollment participation nearly doubled, growing by 80%. Although it has not yet caught up to AP and IB participation—among students who entered high school in 2009, only 11% took at least one dual enrollment course, while 42% took at least one AP or IB course (National Center for Education Statistics [NCES], 2019)—it is still an increasingly popular option among high school students.

Indeed, evidence suggests dual enrollment improves students' postsecondary outcomes. For example, studies have found participating in dual enrollment reduces students' time-to-degree and increases 2- and 4-year college attendance, college grade point averages (GPAs), persistence in college, and college completion (Allen & Dadgar, 2012; Giani et al., 2014; Speroni, 2011). Participating in dual enrollment may be particularly meaningful for low-income students, who tend to enter college less academically prepared than their higher income counterparts. However,

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participation in dual enrollment is stratified by race and class (An, 2013b). The typical dual enrollment student is middle or high income, has parents who went to college, and is White (An, 2013b; NCES, 2019). While dual enrollment may offer an opportunity for elevating low-income students' access to and successful completion of college, it can only do so if they participate in it.

To date, few studies have explored how different funding policies affect dual enrollment participation or how effective initiatives are at increasing low-income students' access to dual enrollment. However, in 2016, the U.S. Department of Education's Office of Federal Student Aid (FSA) launched a pilot program, "Pell Sites," allowing participating colleges to award Pell Grants to income-eligible high school students for dual enrollment coursework. Pell Grants are the largest need-based program in the United States and the primary way in which the federal government attempts to improve affordability (Bettinger et al., 2012). While Pell awards are typically available to low-income students in college, Pell Sites was the first federal effort to expand Pell eligibility to dual enrollment. This program is the focus of our study.

The U.S. Department of Education established the Pell Sites program to increase low-income students' college enrollment and completion. Research suggests financial aid interventions tend to have positive effects on traditional college enrollment and completion, and dual enrollment has fewer barriers (e.g., housing costs, opportunity costs of employment, estrangement from one's home community) than traditional college enrollment (Bettinger, 2015; Daener, 1994; Goldrick-Rab et al., 2016; Morton, 2021). Thus, it is possible an expansion of the Pell Grant program would be enough to support low-income students' dual enrollment participation. However, in many states, dual enrollment is already subsidized (Education Commission of the States [ECS], 2019). This suggests the policy may have little opportunity for impact. In fact, introducing the barriers that come along with administering Pell, including submitting and verifying the Free Application for Federal Student Aid (FAFSA), may impede low-income students' dual enrollment participation, resulting in perverse impacts of the policy.

We present evidence on how the availability of Pell awards affected students' participation in dual enrollment and their subsequent college attendance. We use data from two sources. First, we use student-level data from the ACT. We focus on four states where a Pell Site existed and the ACT college entrance exam is taken by all high school students. We compare dual enrollment and college entry outcomes for students who had access to a Pell Site with those of students who did not. Second, we use qualitative data from Pell Site programs to understand program implementation. In addition to Pell Sites' documentation, institutional data, and websites, we rely on targeted interviews to understand the factors that both facilitated and hindered take-up of the Pell awards.

We find negative effects of the program on Pell-eligible students' dual enrollment participation and no effects on subsequent college outcomes. Our results are driven by low take-up rates among low-income students, which we argue was in part due to the financial and administrative burdens associated with program implementation. Prior to the Pell program, many institutions and states already had policies in place to reduce students' out-of-pocket costs of dual enrollment courses. These policies limited the demand for the newly available Pell Grant awards. Moreover, program administrators found the program costly and confusing, which sometimes resulted in misinformation about the program being shared with students. Students also have limited lifetime eligibility for Pell awards (12 semesters of full-time enrollment). Administrators were reluctant to advise students to draw from their lifetime Pell eligibility, and they frequently overestimated the potential negative impact of the program on students' lifetime Pell eligibility. Our results provide additional insights for the growing empirical literature on dual enrollment, with an eye toward increasing low-income students' postsecondary access. Our study also shows how federal policy could be implemented in an education system with heterogeneous resources.

Our article proceeds as follows. In the "Dual Enrollment and the Pell Sites Intervention" section, we situate the Pell Sites intervention into the larger literatures of dual enrollment and financial aid. We also provide a conceptual framework that guides our quantitative and qualitative inquiries. In the "Data and Method" section, we describe our data collection and empirical strategies. In the

"Results" section, we show our empirical findings and discuss potential explanations for them. In the "Discussion" section, we note a few of the empirical limitations of our study, discuss our findings' implications for dual enrollment access and policy implementation, and offer directions for future work.

## Dual Enrollment and the Pell Sites Intervention

### *Dual Enrollment and Postsecondary Success*

Scholars and policymakers have long posited that dual enrollment may improve affordability and college outcomes for low-income students. However, researchers have focused more extensively on the impact of dual enrollment on general student outcomes. Giani et al. (2014), for example, use propensity score matching to compare students who took at least one dual enrollment course with those who did not. They find that dual enrollment increases college attendance, persistence, and eventual degree completion. Using a difference-in-differences (DID) approach, Allen and Dadgar (2012) show that dual enrollment improves postsecondary time-to-degree, students' GPAs, and persistence. Dual enrollment seems to accelerate students' course-taking behavior and allow students to intensify enrollments.

Thus far, only limited research has demonstrated dual enrollment's potential for improving historically disadvantaged groups' postsecondary outcomes. An (2013a, 2013b) uses propensity score methods to identify positive impacts on first-generation college students' grades and degree completion after participating in dual enrollment. Our work builds on these studies by focusing on how dual enrollment specifically impacts low-income, Pell-eligible students.

While the extant literature refers to dual enrollment as a homogeneous treatment, dual enrollment programs vary widely (see Allen, 2010). Many dual enrollment courses are taught by college faculty on college campuses (Allen, 2010); however, there is substantial variation. Some colleges certify high school faculty to teach college-level courses and offer dual enrollment courses at the high school campus. Others offer courses online. Funding, too, is heterogeneous across places. In some cases, state or local governments finance dual enrollment; in others, students pay, and in others, these stakeholders share the expenses (ECS, 2019). In addition, some dual enrollment programs have restrictive admission requirements while others are open to all applicants. These factors create diverse dual enrollment ecosystems.

Dual enrollment varies at the program level, but there are also state-level factors that impact the dual enrollment ecosystem. Some states have had dual enrollment policies (e.g., who pays, articulation of credit) for decades, while many have no existing policies, indicating substantial variation in how much infrastructure may already exist to support dual enrollment. Mokher and McLendon (2009) find that states with higher proportions of students enrolled in 2-year colleges, centralized state governance structures, and previous adoption of other innovative educational reforms also tend to have higher likelihoods of adopting dual enrollment policies. Karp et al. (2004) find that dual enrollment policies across states address different program features, most frequently student admissions and program finances and least frequently programs' structures. This heterogeneity in state policies and program characteristics means the Pell Sites initiative unevenly met participating colleges' needs.

### *Financial Aid and Postsecondary Success*

One way that policymakers have attempted to overcome disparities in access to higher education is through financial aid interventions. While these interventions have increased low-income students' traditional undergraduate enrollment rates (see Bettinger, 2015; Castleman & Long, 2016; Davidson, 2015; Goldrick-Rab et al., 2016), we argue that dual enrollment offers an especially ripe context for a financial intervention on student outcomes. This is because aside from financial constraints, dual enrollment lacks many of the other barriers that accompany traditional undergraduate enrollment. First, when low-income students are deciding whether to begin traditional undergraduate study, many are simultaneously considering foregoing full-time employment (Daener, 1994). With dual enrollment, however, students' competing opportunities are primarily AP classes or other courses offered at their high school (Allen, 2010). Dual

enrollment, then, involves a lower opportunity cost, in terms of lost wages from employment, than traditional undergraduate study. Second, because many dual enrollment programs allow students to take as few as one or two college courses while completing high school classes, students are still steeped in their high school support networks and have a much lower on-ramp to college than full-time or even part-time traditional undergraduate enrollment. Even if students are dually enrolled full-time at the college campus, they are still assigned to a high school counselor responsible for monitoring their academic progress. Finally, dual enrollment programs are often conducted in partnership with high schools, and students take dual enrollment classes with their school peers and at campuses that are geographically closer on average than the choice set high school seniors might consider for the following fall. This insulation helps to mitigate other barriers to college attendance such as the potential to lose one's connection with family. Such barriers may accompany traditional undergraduate matriculation for historically disadvantaged students (Morton, 2021). Because many barriers to traditional undergraduate enrollment are not as salient for dual enrollment, and because cost can still be a barrier to dual enrollment, dual enrollment is an ideal context for a financial intervention.

Notably, because cost can be a primary barrier to dual enrollment, many states have already begun subsidizing dual enrollment participation. In Georgia, dual enrollment is entirely financed by the state; in Iowa, by the student's school district; in Maryland, by a combination of the student's school district and the student or parent; and in Nevada, by the student or parent (ECS, 2019). A federal policy intervention providing students with financial support to participate in dual enrollment may be more impactful in places where dual enrollment is not already subsidized. Conversely, states where dual enrollment is not subsidized may also be those with limited support for dual enrollment generally—for example, without articulation agreements in which postsecondary institutions across the state accept agreed-upon course credits. In these places, cost may not be the only barrier impeding dual enrollment participation. The ideal context for a financial intervention is a place where cost is the only barrier to dual enrollment participation.

### *The Pell Sites Intervention*

In November 2015, the U.S. Department of Education's FSA announced an extension of the Pell Grant programs. This pilot initiative, the Pell Sites program, allowed low-income high school students to use Pell Grants for dual enrollment. Higher education institutions could apply, and, if accepted, FSA authorized them to award Pell Grants to income-eligible high school students pursuing dual enrollment coursework. The program was taken up by 44 colleges and universities, a mix of 2- and 4-year institutions across 23 states. Pell Sites had four key stipulations:

1. Pell Grants awarded for dual enrollment would count toward students' 6 full-time years of Pell eligibility.

By using the Pell Grant for dual enrollment, students begin depleting their limited Pell dollars. While a full-time schedule might exhaust a substantial portion of students' 6 years of Pell eligibility (colloquially called the "Pell clock"), a part-time schedule—a frequent choice among dual enrollment participants (Allen, 2010)—may exhaust only a small fraction. However, any loss of eligibility could be consequential if students take classes outside of their eventual degree program, have trouble transferring their dual enrollment credits, or earn low grades.

2. If a student is eligible for any amount of Pell, institutions cannot charge that student any amount to enroll.

Students can qualify for different amounts of the Pell Grant, ranging from approximately US$500 to US$6,000 (with the maximum available amount typically increasing each year). The amount for which students can qualify is a function of students' Estimated Family Contribution (EFC), determined when students complete the FAFSA. A students' EFC is largely based on their dependency status, family income, and household size. The amount of the Pell Grant for which students are eligible is based on their EFC and

the number of hours they attempt in college. In the Pell Sites program, if a participating high school student was eligible for any amount of the Pell Grant, the institution *could not* charge them any amount to enroll. In cases when a student's Pell Grant award did not meet enrollment costs, the institution was required to make up the difference. For example, if a college would normally charge a dual enrollment student US$1,500 in tuition, and if that student qualified for a US$1,000 Pell Grant, the institution had to cover the remaining US$500.

3. Institutions had to, at minimum, sustain existing public and institutional funding toward dual enrollment while participating in the program.

In this stipulation, FSA wanted to ensure that Pell funds would not be used to replace any preexisting investments that participating institutions were already making in dual enrollment. This would ensure that the program would add to, rather than supplement, current investments, only making existing programming more robust. While this stipulation was aimed at making the Pell pilot a value-add to institutions, it also came at a cost: In addition to maintaining their existing programming (Stipulation #3), institutions were also required to make up the difference between students' Pell awards and enrollment costs (Stipulation #2, above).

4. Institutions determine the structure for their dual enrollment offerings funded by the Pell Grant and can add supplemental eligibility requirements to those already in place for their existing dual enrollment program.

Colleges sometimes have multiple types of dual enrollment offerings, ranging from one-off courses to full-time, multiyear programs (often termed "Early College"). In addition, colleges could limit participation in the Pell program to students from specific localities they serve. Many institutions chose to create these limitations to restrict student enrollment and ensure they could execute the program given their existing administrative capacity.

### *Theory of Action*

The U.S. Department of Education launched Pell Sites to lower "barriers preventing some students, particularly those from low-income families, from accessing and completing postsecondary education" (Federal Registrar, U.S. Department of Education, 2015, p. 67735). Because students who participate in dual enrollment have higher postsecondary enrollment and completion rates, increasing low-income students' participation in dual enrollment is one way to meet this aim (An, 2013a; Giani et al., 2014).

In this study, we evaluate whether the Pell Sites initiative increased low-income students' participation in dual enrollment as intended. Theoretically, it is possible the Pell Sites initiative would have the intended effect. Studies have shown that financial interventions increase low-income students' traditional undergraduate enrollment rates (Bettinger, 2015; Castleman & Long, 2016; Goldrick-Rab et al., 2016), so it is possible a financial intervention would have a similar impact for dual enrollment. This is especially true considering that many other barriers associated with traditional undergraduate enrollment, including foregone employment, the loss of high school support, and the loss of connection from one's community, are not as salient for dual enrollment (Daener, 1994; Morton, 2021).

Provisions of the program, too, support the idea that the Pell Sites initiative could increase low-income students' participation in dual enrollment. Although many states partially subsidize dual enrollment tuition (ECS, 2019), the provisions of the Pell Sites initiative make dual enrollment free for students eligible for even the minimum amount of Pell. For students on the margins of Pell eligibility, this could mean getting a bigger "bang for their buck" by using Pell for dual enrollment (where eligibility for Pell covers all institutional expenses) rather than for undergraduate enrollment (where eligibility for Pell only covers the Pell amount awarded, and students must provide the rest). A student's Pell eligibility may also change over time due to siblings moving into or out of college or parents earning different incomes in subsequent years. For students on these margins, guaranteed Pell eligibility today may indeed be a better deal than

potential Pell eligibility next year. Because students could only use Pell Grants for courses that "applie[d] towards completion of a postsecondary credential," using Pell Grants for dual enrollment was typically a value-add for students' academic progress (provided students maintained satisfactory grades; Federal Registrar, U.S. Department of Education, 2015, p. 67736). For these reasons, the Pell Sites initiative could spur increases in low-income students' dual enrollment participation.

Conversely, it is possible the Pell Sites initiative could have a null or even negative effect on low-income students' dual enrollment participation. For example, if tuition is not the primary or only barrier to low-income students participating, then a cost-reducing intervention may not be enough to support students' enrollment. Difficulties learning about the program, meeting academic eligibility requirements, or acquiring transportation could all hinder the effect of the Pell initiative. Furthermore, because participating in the Pell initiative draws on students' lifetime Pell eligibility, students may be dissuaded from using this resource. In fact, if guidance counselors or parents are sufficiently afraid that enrolling low-income students in dual enrollment means prematurely drawing on students' lifetime Pell eligibility, these actors may discourage low-income students from participating in dual enrollment altogether. It may also be the case that burdens induced by Pell Sites, such as completing financial aid forms and enduring verification procedures, might discourage low-income students from applying for dual enrollment at all or completing the application process. These possibilities could result in a negative impact of the program.

Finally, as part of the initiative's requirements, participating institutions had to "have an arrangement with one or more LEAs or public secondary schools" to support students' academic eligibility, matriculation, and academic progress (Federal Registrar, U.S. Department of Education, 2015, p. 67736). However, institutions themselves were granted no aid to establish these arrangements or provide these supports. This, paired with the requirement that institutions were not allowed to charge Pell-eligible students any amount (even for students with low Pell awards), meant that implementing the program may have come at substantial cost to institutions. If this is the case, institutions may have been unable to maintain prior levels of support for low-income dual enrollment students, yielding a null or even negative impact of the program.

It is important to understand whether the Pell Sites initiative increased low-income students' dual enrollment participation for a few reasons. First, part of the impetus behind the pilot program was for the U.S. Department of Education to "test alternative methods for administering the title IV, [Higher Education Act] programs" (Federal Registrar, U.S. Department of Education, 2015, p. 67734). However, the implication is that the pilot program could become a permanent extension of the Higher Education Act's Pell Grant affordances. For this reason alone, it is important to understand whether the initiative worked as well as the underlying implementation processes that may have facilitated or hindered its success. Furthermore, given dual enrollment's rapid expansion and the disproportionate share of socioeconomically advantaged participants, it is useful to know whether a financial intervention of this nature is sufficient to support low-income students' participation and, if it is not, what other barriers stand in the way. Finally, our study provides insight into how a federal policy might be implemented in a system with meaningful differences across places.

### *Conceptual Framework*

To motivate our empirical model, we draw on both economic and sociological models of human capital development. The human capital model in economics posits that individuals compare the monetary and nonmonetary net costs of college relative to a noncollege alternative. In our case, Pell Sites potentially reduces the monetary costs of taking dual enrollment classes. While the reduction in cost could be significant, it is not obvious that students' enrollments should increase. Students and those in their support networks may not perceive the costs as being reduced given institutions' strict enrollment requirements and the uncertainty about whether utilizing the Pell Grant during high school crowds out future eligibility for Pell awards.

The human capital model provides a framework for understanding how the Pell program

might increase dual enrollment participation, but it gives us little leverage in understanding how such a policy might be implemented in different contexts. To take into account the heterogeneity across dual enrollment ecosystems and acknowledge the differential impact this program might have across sites, we draw on Perna's (2006) proposed conceptual model of student college choice in which participation in college (here, dual enrollment) is a choice nested in students' habitus (including students' identities and capital), their school and community contexts, their higher education context, and their social, economic, and policy contexts. With Pell Sites, students' choices are not just financial. Their choices are also related to their social, economic, and policy contexts, including the salience of dual enrollment at the state and district levels. The state may already have policies in place supporting dual enrollment, both normalizing dual enrollment participation (potentially increasing the impact of the Pell program) and providing state-sponsored financial support for dual enrollment (potentially decreasing the impact of the Pell program). Moreover, there are competing opportunities that similarly prepared students might consider (e.g., AP; dual enrollment at a different institution). These cheap or free competing options may reduce the efficacy of the program. In addition, the school and community context matters. If the college has a long-standing relationship with the student's high school, the barriers to entry will be lower, and there will be existing infrastructure to address challenges like scheduling, managing transportation, acquiring books, and becoming acclimated to the campus.

## Data and Method

### *Research Questions*

In this study, we aim to answer the following research questions:

- **Research Question 1:** Does allowing students to use the Pell Grant to pay for dual enrollment increase dual enrollment participation?
- **Research Question 2:** Does allowing students to use the Pell Grant to pay for dual enrollment increase postsecondary attendance rates?

To evaluate these questions, we draw on student-level data in four states, comparing the dual enrollment participation and postsecondary attendance rates of Pell-eligible students near Pell Sites with those of Pell-eligible students near other dual enrollment institutions. Theoretically, if real or perceived tuition and fees are key barriers preventing low-income students from accessing dual enrollment, then the availability of the Pell Grant will increase low-income students' participation in dual enrollment. If, however, the program does not adequately reduce students' financial barriers to dual enrollment, then it will not change participation rates for Pell-eligible students living near Pell Sites. Furthermore, if the program introduces new barriers to low-income students' dual enrollment participation, it may even have a negative effect. This is the core question that our quantitative analytic strategy answers: After the Pell program is introduced, how do Pell-eligible students near Pell Sites respond? Are they more likely to participate in dual enrollment because the Pell Grant is available, or are they no more likely (or even less likely) to participate than Pell-eligible students near other dual enrollment institutions?

We also aim to understand how this program was implemented at participating institutions, with particular attention to how the program was understood by key dual enrollment program stakeholders, such as dual enrollment coordinators, admissions counselors, and high school guidance counselors, as well as challenges that accompanied implementation. To evaluate these questions, we draw on interviews conducted at four Pell Sites (three of the same colleges from our quantitative analysis and a fourth site that provides an important information-rich case).

### *Contextualizing the Treatment*

Importantly, we analyze the impact of a federal pilot program, where a uniform treatment—allowing students to use the Pell Grant to pay for dual enrollment—meets heterogeneous local contexts. Dual enrollment program structures vary widely, so it is important to understand the institutional characteristics of the Pell Sites in this analysis. We provide important contextual information in Table 1. For example, each site in our quantitative sample operates under a subsidized tuition model, meaning dual enrollment is already offered at a

TABLE 1

*Pell Site Descriptions*

| | Alpine | Brookdale | Cloudview | Dunwoody | Eastman |
|---|---|---|---|---|---|
| Sample | Qualitative only | Both | Both | Both | Quantitative only |
| Sector | Four-year | Two-year | Two-year | Two-year | Four-year |
| Context | Urban | Suburban | Rural | Rural | Rural |
| Undergraduate enrollment (2018–2019) | 5,000 | 10,000 | 4,000 | 3,000 | 2,000 |
| # Dual enrollment students | Under 20 | 300 | 2,500 | 1,700 | 400 |
| State/local subsidies | None (charged full tuition) | Full (tuition waived) | Partial (tuition lowered) | Partial (tuition lowered) | Partial (tuition lowered) |
| Pell Grants funded . . . | Tuition | Textbooks and course materials | Tuition and textbooks | Tuition and textbooks | Tuition |
| Typical tuition charged for a 3-credit-hour dual enrollment course | US$1,000 | US$0 | US$175 | US$150 (US$200 if online) | US$75 |
| Program offering | Individual Courses | Individual Courses | Early College | Early College | Individual Courses |
| Coursework taken | Transferable credit within state | Transferable credit within state | Associate degree | Associate degree | Transferable credit within state |
| Refunds | No | No | Yes | No | No |

*Note.* Entries in this table are derived from institutions' websites, administrative data, IPEDS, and, for the first four institutions, our interviews with program coordinators and other site personnel. "# Dual enrollment students" refers to the number of dual enrollment students that program served while Pell Sites was ongoing throughout the analysis period, from fall 2016 to spring 2019. "Coursework taken" indicates the coursework or credential with which participating Pell Sites students would exit the program. Programs offering Individual Courses typically meant students participated by taking college coursework part-time, and programs offering Early College meant students took college coursework full-time. It is worth noting that Eastman also allows students to take full-time coursework in pursuit of an associate degree; however, the modal experience is students taking individual courses for transferable credit within the state. In addition, while Dunwoody only charges non-Pell students US$175 per course, it charges Pell students approximately US$600 per course. Notably, students participating in Early College programs typically took a full-time courseload, so their enrollment costs for a semester would be US$750 to US$875 for five on-campus courses.

lower cost than traditional undergraduate enrollment, even for students who do not qualify for the Pell Grant. However, there are still barriers to participation that the Pell Grant lowers: At one site in the quantitative sample, students use the Pell Grant for tuition only; at two sites, tuition and textbooks; and at another, textbooks and course materials. These program characteristics mean the Pell pilot program held different benefits for students attending each institution. It is also worth noting that each site examined in this study typically serves an undergraduate population in which about half of enrolled students are Pell-eligible.

## *Data*

*Sample.* Using data from ACT, Inc., we draw on student-level observations from four states, each with a participating Pell Site, from 2014 to 2017.[1] Because the Pell program was introduced in fall 2016, the graduating cohorts of 2017, 2018, and 2019 would have been eligible to participate. We chose states[2] that administer the ACT to all high school juniors, giving us universal coverage of high school students in these states. This yielded a final dataset of over 1.6 million students. We use home zip-code data from the ACT to identify our analytic sample: Pell-eligible students living near any dual enrollment institution.

*Treatment.* The students in our treatment group are those Pell-eligible students who live near a Pell Site and graduated after 2017. These are the students who could have participated in dual enrollment using the Pell Grant. We compare these students' outcomes—their dual enrollment participation and their postsecondary college attendance—with those of students living near all other dual enrollment institutions. The idea is that offering the Pell Grant to fund dual enrollment may increase dual enrollment participation for Pell-eligible students living near Pell Sites and that it will not impact dual enrollment participation for students living near other institutions.

Note that to benefit from this program, students needed to be Pell-eligible. Because we do not have access to students' financial aid information, we estimate Pell eligibility using a few different student characteristics: students' self-reported family income, mother's education, and zip code. Although students with family incomes greater than US$100,000 can technically qualify for the Pell Grant (depending on household size), we use US$50,000 as a more conservative cutoff.[3] Furthermore, while students may struggle to accurately estimate family income, one report comparing students' self-reported family income on the ACT with their FAFSA data found that students were twice as likely to overestimate their family income than to underestimate it (Anderson & Holt, 2017). The same report found that students expecting to receive financial aid for college were significantly more accurate when reporting family income. Finally, we ran analyses using alternative income cutoffs, and our results are robust to alternative specifications.

In addition to family income, we also consider mother's education and zip code, focusing on outcomes for students who report their mother had no college attendance as well as students living in high-poverty zip codes (where over two thirds of families filing income tax returns earned less than US$50,000). We also combine definitions to identify stricter subsamples, for which our results are strongest.

The fundamental assumption we make here is that a Pell-eligible student's proximity to a dual enrollment institution is related to whether a Pell-eligible student participates in dual enrollment. This assumption is central to our analyses because it helps us identify who potentially gets treated (in our case, Pell-eligible students who live near a Pell Site institution) and who does not get treated (Pell-eligible students who live a similar distance to a non-Pell-Site dual enrollment institution). Because distance is perhaps the most important factor for students when choosing which college to attend (Hillman & Weichman, 2016) and because most dual enrollment students typically take classes on a local college campus (Allen, 2010), this assumption is well-founded. While students typically attend an institution near their home for college, this proves to be even truer for dual enrollment. In our data, we see a strong relationship between students' proximity to a dual enrollment–offering institution and students' likelihood of participating in dual enrollment.[4]

### *Outcomes*

For our outcomes of interest, in collaboration with ACT, we were able to link students' ACT exams to their subsequent college enrollment records as recorded by the National Student Clearinghouse (NSC). The NSC tracks students' college enrollments, including dual enrollment and eventual college attendance, for over 93% of all colleges in the United States (Dynarski et al., 2013). While NSC is the most complete listing of students' college enrollment records, it lacks coverage for many private colleges, particularly vocational colleges. Given that these types of institutions are less likely to offer dual enrollment, we do not view this limitation of the NSC data as being a source of bias for dual enrollment participation.

One limitation of the ACT data is that it did not include students' high school graduation dates. As such, we estimate each student's high school graduation date using the timing of that student's last ACT exam. Our results are robust to alternative definitions of graduation date. For details on how we estimated graduation dates and validated our algorithm, see Supplementary Appendix 2 (online version of the journal).

Our primary outcome is dual enrollment participation, which we define as any college enrollment that takes place prior to a student's projected graduation date. For example, if a student's ACT test date suggests she will graduate in spring 2018, and corresponding NSC records reflect this student is enrolled in college in fall 2017, we define this as dual enrollment. In addition to estimating the impact of this program on students' dual enrollment participation, we also estimate the impact on students' postsecondary enrollment, which we define as any college enrollment that takes place after a student's projected graduation date. For example, if a student's ACT test date suggests he will graduate in spring 2018, and the NSC record reflects this student is enrolled in college in fall 2018, we define this as postsecondary enrollment. We consider overall postsecondary enrollment, 2-year college enrollment, and 4-year college enrollment.

### *Descriptive Statistics*

Table 2 shows descriptive statistics of the sample based on the ACT data. About 25% of students in our sample enrolled in some type of dual enrollment. This is consistent across states. Most students (~70%) lived within 20 miles of a campus that offered a dual enrollment program. Only 2% of students in the sample lived within 20 miles of a Pell Site that was eventually able to offer Pell awards to students.

In terms of student demographics, about 21% of the sample reported they were Black, 6% reported they were Hispanic, and 63% reported they were White (non-Hispanic). In 71% of cases, students reported their mother had at least some college; in 61% of cases, students reported their father had at least some college. Parental education is broadly defined and includes traditional college experiences and any postsecondary vocational training.

Our second source of data came from the participating Pell Sites. We conducted site visits at four colleges that participated in the Pell Sites program. Three of these were in the quantitative sample, and one was not. Participants at each site included the primary dual enrollment program officer, financial aid representatives, college administrators, admissions officers, and high school counselors. This yielded 29 interviews. We conducted additional off-site interviews with program officers at two other participating institutions, resulting in 31 total interviews.

## Empirical Strategy

To identify the impact of Pell Sites, we use a quasi-experimental DID research design. We compare changes over time in dual enrollment participation for Pell-eligible students near a participating Pell Site with the changes over time in dual enrollment participation for Pell-eligible students near another dual enrollment provider within the same state. The identifying assumption is that if both Pell and non-Pell colleges have similar trends in Pell-eligible students' dual enrollment participation before the Pell program, any difference in dual enrollment participation that emerges after the program begins is attributable to the program.

Specifically, we estimate variations of the following DID specification:

$$Y_{ist} = \alpha_s + \beta_t + \gamma \text{Post} \times \text{PellPolicy}_{ist} + \varepsilon_{ist}, \qquad (1)$$

TABLE 2

*Descriptive Statistics of Quantitative Sample*

| | Full sample | State 1 | State 2 | State 3 | State 4 |
|---|---|---|---|---|---|
| Predictors of interest | | | | | |
| Any dual enrollment participation | .249 | .172 | .237 | .266 | .420 |
| Within 10 miles of any dual enrollment institution | .500 | .573 | .509 | .480 | .371 |
| Within 20 miles of any dual enrollment institution | .698 | .871 | .667 | .646 | .565 |
| Within 50 miles of any dual enrollment institution | .958 | .981 | .983 | .941 | .917 |
| Within 10 miles of Pell Site | .011 | .021 | .020 | .004 | .002 |
| Within 20 miles of Pell Site | .020 | .047 | .024 | .007 | .004 |
| Within 50 miles of Pell Site | .080 | .047 | .044 | .071 | .043 |
| Demographic characteristics | | | | | |
| Low income | .240 | .260 | .175 | .264 | .219 |
| Living in high-poverty zip code | .325 | .325 | .274 | .366 | .226 |
| Mother has some college or more | .712 | .696 | .781 | .685 | .725 |
| Father has some college or more | .606 | .600 | .684 | .570 | .612 |
| Asian | .027 | .034 | .027 | .026 | .012 |
| Black | .209 | .210 | .067 | .308 | .030 |
| Hispanic | .062 | .114 | .038 | .054 | .019 |
| Multiracial | .036 | .047 | .033 | .032 | .036 |
| White | .629 | .549 | .805 | .542 | .880 |
| Other race/prefer not to answer | .037 | .046 | .030 | .038 | .023 |
| Female | .558 | .522 | .581 | .559 | .587 |
| Sample size | 1,644,292 | 393,874 | 361,721 | 761,018 | 127,679 |

*Note.* "Low income" refers to students with a reported family income of less than US$50,000. "Living in a high-poverty zip code" refers to students living in a zip code where more than two thirds of tax filings indicated family incomes of less than US$50,000. While we include a broader set of racial/ethnic subgroups here, we focus on Black and Hispanic students in subgroup analysis as these groups each constitute at least 5% of the sample and are disproportionately underrepresented among dual enrollment students. Sex is a binary indicator. The Pell Site in State 1 is Brookdale; State 2, Cloudview; State 3, Dunwoody; and State 4, Eastman.

where $Y_{ist}$ represents the outcome (dual enrollment participation, postsecondary attendance) of student $i$ near institution $s$ at time $t$; $\alpha_s$ represents zip-code fixed effects[5]; $\beta_t$ represents year fixed effects; and $\text{Post} \times \text{PellPolicy}_{ist}$ represents whether student $i$ near site $s$ in time $t$ was in the posttreatment period and student $i$'s home address was within a certain number of miles (10, 20, or 50 miles) from the Pell institution, making $\gamma$ the parameter of interest (the treatment effect for the program in the posttreatment period). $\varepsilon_{ist}$ is the random error. We cluster our standard errors by zip code across specifications. We use this model to assess outcomes including dual enrollment participation, any postsecondary attendance, 2-year college attendance, and 4-year college attendance. We also test whether treatment effects vary by family or student characteristics.

The base DID model includes only a single indicator for the treatment effect of the Pell program, but it is possible that participating institutions could experience different impacts over time (Goodman-Bacon, 2018). For example, as students hear about the program from their more senior peers, participation may increase with each subsequent year. Alternatively, if the first group of students is not successful and word spreads that students may not be using their Pell eligibility efficiently, participation may decline over time. To account for potential time-varying

treatment effects, we specify semidynamic fixed effects DID models that allow the program to have distinct effects each year after adoption. Specifically, we estimate the following model:

$$Y_{ist} = \alpha_s + \beta_t + \sum_{\tau=0}^{3} \gamma_{+\tau} \text{Post} \times \text{PellPolicy}_{is,t+\tau} + \varepsilon_{ist}, \quad (2)$$

where $\tau$ is the number of years after a college has implemented the Pell program ($\tau = 0$ in Year 1) and $\gamma_{+\tau}$ represents the effect of the Pell program $\tau$ years after the institution has implemented it. We also conduct joint *F*-tests to test the null hypothesis of a constant treatment effect.

The DID specification includes, in part, the "parallel trends" assumption, through which we assume that students near participating institutions and students near institutions that did not participate in the Pell program had similar pretreatment patterns of dual enrollment and subsequent college enrollment. This is essential to the DID design because it helps establish that students near non-Pell sites offer a valid counterfactual for what would have happened for students near Pell sites, absent the availability of Pell. To examine the empirical validity of this assumption, we use the Granger causality test ("event study") as a falsification check (Angrist & Pischke, 2009), estimating the effect of the Pell program on the dual enrollment participation before and after the program was introduced:

$$\begin{aligned} Y_{ist} = \alpha_s + \beta_t + \sum_{\tau=0}^{2} \gamma_{-\tau} \text{Post} \times \text{PellPolicy}_{is,t+\tau} \\ + \sum_{\tau=0}^{3} \gamma_{+\tau} \text{Post} \times \text{PellPolicy}_{is,t+\tau} + \varepsilon_{ist}, \end{aligned} \quad (3)$$

where $\tau$ is the number of years before or after the program is introduced and $\gamma_{-\tau}$ indicates the treatment effect of adopting the Pell program on dual enrollment participation $\tau$ years prior to implementation (compared with participation in places that never adopted the program). In keeping with the parallel trends assumption, $\gamma_{-\tau}$ should be equal to zero for all pretreatment years.

In addition to focusing on our analytic sample of Pell-eligible students, we also leverage the full sample to identify the difference in outcomes between Pell-eligible students and non-Pell-eligible students using student-reported family income data from the ACT (this constitutes a third difference, for a difference-in-difference-in-differences or *triple-difference* design). Because high-income students are not eligible for Pell Grants, they are theoretically unaffected by the Pell program; thus, comparing outcomes for low-income students with those of high-income students provides another difference to analyze the impact of this program. In the results discussed here, we focus on the DID results using the Pell-eligible sample, but we report the specification and results from the triple-difference design in Supplementary Appendix 3 (online version of the journal).

We supplement our empirical specifications with the institution-specific data and interviews. For the qualitative analysis, we take a pragmatist approach (Creswell, 2007), with our inquiry aimed at understanding the process of program implementation that led to our quantitative results. We visited three sites in our quantitative data, and we added a fourth site ("Alpine" in our results) because it provides an important, "information-rich" (Patton, 1990) case for our analysis, with characteristics vastly different from those of our other three sites. Following Small (2009), we selected institutions not for their representativeness among institutions that participated but to understand how different types of institutions—considering variation in sector (2-year or 4-year), maturity of dual enrollment offerings, and overall undergraduate enrollment—interpreted and implemented the program. For a description of sites' contextual characteristics, see Table 1.

For this analysis, we collected documents, reviewed program websites, and analyzed site-specific implementation data, but the primary corpus of data is our 31 interviews with key stakeholders at participating programs. In interviews, drawing on the Perna (2006) model of student college choice, we asked participants about the state landscape for dual enrollment, the higher education context (including questions about competition between sites), and the school and community context in which local students were situated. For a full list of interview questions, see Supplementary Appendix 4 (online version of the journal). Interviews lasted between

TABLE 3

*Difference-in-Differences Estimates of the Pell Program's Impact on Dual Enrollment Participation Among Low-Income Students*

| Sample Within × Miles of Any Dual Enrollment College | 10 miles | | 20 miles | | 50 miles |
|---|---|---|---|---|---|
| Post × PellSite | –.025 (.022) | –.014 (.021) | –.033** (.017) | –.024 (.016) | –.001 (.012) |
| Ever PellSite | –.019 (.060) | | –.048 (.040) | | |
| Time FE | Yes | Yes | Yes | Yes | Yes |
| Zip-code FE | No | Yes | No | Yes | Yes |
| *n* | 117,650 | 117,650 | 157,751 | 157,751 | 219,862 |

*Note.* FE is short for fixed effects. The treatment effect, Post × PellSite, is an indicator for whether a student is within the specified number of miles of a Pell Site and whether the student is in the posttreatment period. Ever Pell Site is an indicator for whether a student is within the specified number of miles of a Pell Site. The sample, low-income students, is restricted to those with reported family incomes less than US$50,000.

*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed tests).

15 and 90 minutes, with an average length of 45 minutes. We coded interviews in Dedoose, a qualitative analysis program, employing descriptive codes for first-cycle analysis and structural and eclectic codes for second-cycle analysis (Saldaña, 2016). These data help provide important context for the program's implementation.

## Results

### *Impacts on Dual Enrollment*

We first examine the impact of the Pell program on dual enrollment participation. Specifically, our empirical specifications examine how the Pell program affects the probability that a Pell-eligible student enrolls in dual enrollment. We explore these questions in Table 3. Here we report estimates from our DID analysis (Equation 1) for low-income students, meaning those with reported family incomes under US$50,000. Table 4 reports results from alternative definitions. The first row in each table is the key row. It shows our treatment impacts of the program, and we mark estimates with asterisks if the estimate reaches statistical significance.

In terms of specifications, each column represents a different model. In the first column of Table 3, we estimate the simple DID specification. The sample includes all low-income students who live within 10 miles of a college offering dual enrollment. The comparison is measuring whether dual enrollment increases for Pell-eligible students near Pell Sites relative to other dual-enrollment-offering colleges, conditional on living within 10 miles of a college that offers dual enrollment. In the second column, we add zip-code fixed effects, so we are really focusing on the differential trends within the same zip codes after the first year. The third and fourth columns repeat this exercise for students living within 20 miles of a college offering dual enrollment. The final column replicates the analysis (with zip-code fixed effects) for those living within 50 miles of a university offering dual enrollment.

The first striking result is that the estimated effects are all negative. The estimates themselves suggest a 2- to 3-percentage-point decline in the probability that low-income students near Pell Sites participate in dual enrollment. The estimate is generally not statistically significant. As we move to a larger sampling frame (i.e., the 50-mile radius), our estimated impact becomes close to zero with a small confidence interval. However, in Table 4, with alternative definitions of Pell eligibility and more restrictive sampling frames, the estimate is more negative and consistently statistically significant. For students in the most restrictive sample—those who are low income, whose mother has no college attendance, and who are living in high-poverty zip codes—our analysis indicates the program resulted in a 9-percentage-point decline in dual enrollment participation ($p < .01$).

We also estimate dynamic treatment models which allow the DID impact to vary both before

TABLE 4

*Difference-in-Differences Estimates of the Pell Program's Impact on Dual Enrollment Participation Among Alternative Definitions of Pell Eligibility Students, 20-Mile Radius*

| Sample within 20 miles of any dual enrollment college | Mother no college | Living in high-poverty zip code | Low income and living in high-poverty zip code | Mother no college and high-poverty zip code | Low income, mother no college, and high-poverty zip code |
|---|---|---|---|---|---|
| Post × PellSite | –.023 (.016) | –.051** (.016) | –.067** (.021) | –.047* (.025) | –.090** (.022) |
| Time FE | Yes | Yes | Yes | Yes | Yes |
| Zip-code FE | Yes | Yes | Yes | Yes | Yes |
| *n* | 149,002 | 216,430 | 73,128 | 127,653 | 33,945 |

*Note.* FE is short for fixed effects. The treatment effect, Post × PellSite, is an indicator for whether a student is within the specified number of miles of a Pell Site and whether the student is in the posttreatment period. Ever Pell Site is an indicator for whether a student is within the specified number of miles of a Pell Site. Low-income students are those with reported family incomes less than US$50,000; Mother no college is the impact for students whose mother has no college attendance; those living in a high-poverty zip code are those living in zip codes where more than two thirds of tax filers had family incomes of less than US$50,000.

*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed tests).

and after the program was introduced. The impacts in prior years should be zero and provide a specification check on the fixed-difference assumption. After the program was introduced, the dynamic model (Equation 3) allows us to see whether the impacts change over time. These results appear in Figure 1. None of the pretrends are statistically different from zero, and the posttrends similarly show no statistically significant pattern.

A key question is whether these seemingly negative impacts reported in Table 3 persist with more scrutiny. As such, we also estimate impacts which contrast the enrollment patterns for low- and high-income students. These results, estimated as a difference-in-difference-in-differences ("triple-difference") model (Equation 4), appear in Supplementary Appendix 3 (online version of the journal). In general, these estimates are positive but substantially lower in magnitude. None are statistically significant.

Overall, these results suggest the availability of the Pell Grant to fund dual enrollment had a negative impact on Pell-eligible students' dual enrollment participation. While this result may seem counterintuitive—after all, this program ostensibly added another pool of resources from which students and families could draw—we provide a potential explanation for this result in our qualitative results section. In short, we argue that program stakeholders had to redirect existing resources to implement this program, creating

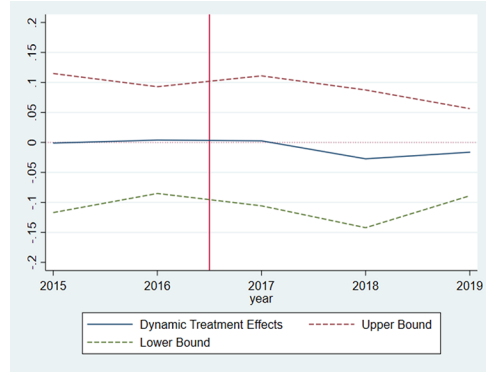


FIGURE 1. *Dynamic treatment effects on dual enrollment participation (20-mile sample).*
Note. Point estimates in these figures are from dynamic difference-in-differences models. 95% confidence intervals are reported. Errors are clustered at zip-code level.

substantial financial and administrative burden on participating sites, and some of the most important stakeholders—high school guidance counselors—hesitated to recommend the program to their students. These results suggest that counselors may have discouraged students not only from applying for the Pell Grant but from participating in dual enrollment at all.

### *Impacts on College Enrollment Rates*

We now turn our attention to whether the Pell program impacted eventual college attendance.

TABLE 5

*College Attendance by Dual Enrollment and Income*

| | Nondual enrollment | Dual enrollment | Low-income dual enrollment | High-income dual enrollment |
|---|---|---|---|---|
| Attended college after HS | .531 | .569 | .451 | .608 |
| Attended 2-year college after HS | .122 | .107 | .128 | .100 |
| Attended 4-year college after HS | .410 | .462 | .323 | .508 |
| *n* | 1,234,361 | 409,931 | 102,319 | 307,612 |

*Note.* Low-income students are those with reported family incomes less than US$50,000. HS = high school.

TABLE 6

*Difference-in-Differences Estimates of the Program's Impact on College Enrollment*

| | 10-mile sample | | | 20-mile sample | | |
|---|---|---|---|---|---|---|
| | College attendance | 2-year college attendance | 4-year college attendance | College attendance | 2-year college attendance | 4-year college attendance |
| Post × PellSite | –.010 (.018) | .019 (.027) | –.030 (.025) | –.002 (.013) | .023 (.018) | –.025 (.017) |
| Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Zip FE | Yes | Yes | Yes | Yes | Yes | Yes |
| *n* | 117,650 | 117,650 | 117,650 | 157,751 | 157,751 | 157,751 |

*Note.* FE is short for fixed effects. The treatment effect, Post × PellSite, is an indicator for whether a student is within the specified number of miles of a Pell Site and whether the student is in the posttreatment period. The sample, low-income students, is restricted to those with reported family incomes less than US$50,000.
*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed tests).

Table 5 shows basic college attendance statistics for our sample. Attendance at 2- and 4-year colleges is measured as the sector of a student's college in that student's final enrollment of record (or as of fall 2019). Dual enrollment students are more likely to attend college after high school, and this is especially true for high-income students. Four-year attendance dominates the attendance patterns, and the gaps between low- and high-income students who previously participated in dual enrollment are much higher for this sector.

To examine the impacts on attendance, we largely replicate the analysis conducted in our examination of dual enrollment patterns. The DID results appear in Table 6. We show the impacts on overall attendance, 2-year attendance, and 4-year attendance.

Our basic DID models show no impact on overall enrollment for low-income students. This is generally the pattern among our alternative sample definitions as well, reported in Table 7. While most estimates are not statistically significant, it is worth noting that all the point estimates for 2-year college attendance are positive (and significant, for students living in high-poverty zip codes), and all those for 4-year college attendance are negative. This is consistent with the triple-difference results as well, reported in Supplementary Appendix 3, Table B (online version of the journal).

As with dual enrollment, we also estimate dynamic treatment models that allow the DID impact on college enrollment to vary both before and after the program was introduced. These results appear in Figure 2. None of the pretrends are statistically different from zero, and the posttrends similarly show no statistically significant pattern.

All told, this suggests that the Pell program had no net impact on college enrollment, with some estimates suggesting the program promoted 2-year college attendance at the cost of 4-year attendance. This is a similar finding to Cohodes

TABLE 7

*Difference-in-Differences Estimates of Impact of the Pell Program on College Enrollment*

| | High poverty zip codes 20-mile sample | | | Mother, no college 20-mile sample | | |
|---|---|---|---|---|---|---|
| | College attendance | 2-year college attendance | 4-year college attendance | College attendance | 2-year college attendance | 4-year college attendance |
| Post × PellSite | .018** (.009) | .037** (.016) | –.019 (.021) | .003 (.013) | .005 (.020) | –.003 (.017) |
| Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Zip FE | Yes | Yes | Yes | Yes | Yes | Yes |
| *n* | 216,430 | 216,430 | 216,430 | 149,002 | 149,002 | 149,002 |

*Note.* FE is short for fixed effects. The treatment effect, Post × PellSite, is an indicator for whether a student is within 20 of a Pell Site and whether the student is in the posttreatment period. Students living in a high-poverty zip code are those living in zip codes where more than two thirds of tax filers had family incomes of less than US$50,000. Mother no college is the impact for students whose mother has no college attendance.

*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed tests).

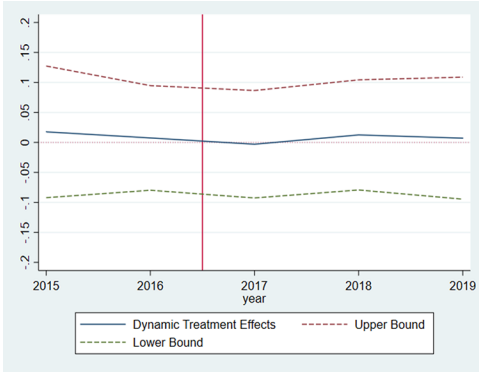


FIGURE 2. *Dynamic treatment effects on college enrollment (20-mile sample).*

Note. Point estimates in these figures are from dynamic difference-in-differences models. 95% confidence intervals are reported. Errors are clustered at zip-code level.

and Goodman (2014). In their work, they found that well-intentioned policies led to declines in productive enrollments. We leave it to additional research to identify the mechanisms by which the Pell program facilitated enrollment at 2-year colleges if indeed the finding represents a causal impact. Two plausible mechanisms include creating a link between students and 2-year colleges or heightening students' awareness of costs and the limitations of financial aid in a way that led them to favor 2-year enrollments.

### *Heterogeneity by Student Characteristics*

In our analysis, we also seek to understand whether particular subgroups drive our results. To do so, we turn our attention to analyzing impacts by subsample. We present two tables. The first focuses on DID estimates (see Table 8), which only examine differential trends between Pell-eligible students who live near participating colleges and Pell-eligible students living near other colleges offering dual enrollment. We focus on the sample of students living within 20 miles of a dual enrollment institution. We only estimate the impacts using specifications that include zip-code fixed effects. Each cell represents a separate regression where the dependent variable is listed for each row and the sample is listed for each column.

The estimated impacts are broadly similar to our initial DID estimates. We generally identify null or negative impacts of the Pell program on dual enrollment. For the Pell-eligible sample of females, of Black and Hispanic students, and of students whose mothers have no college attendance, the estimated effects are negative and statistically significant. Dual enrollment participation seems to decline for these students. We find little net impact on college enrollment, with a few exceptions. Among Black and Hispanic students, 2-year enrollment almost fully explains the increase in enrollment observed for the sample. Males also seem to have small declines in overall college attendance, concentrated in 4-year attendance, and students whose mothers have no college attendance appear to attend 2-year colleges at higher rates. We also present triple-difference estimates by subsample in Supplementary Appendix 3 (online version of the journal).

TABLE 8

*Difference-in-Differences Impacts of the Pell Program for Subsamples of Low-Income Students*

| | Male | Female | Black/Hispanic | White | Mother, no college |
|---|---|---|---|---|---|
| Effects on dual enrollment participation | .022 (.025) | –.048** (.015) | –.053*** (.016) | .010 (.024) | –.028* (.025) |
| Effects on college attendance | –.037* (.022) | .017 (.018) | .029* (.016) | –.021 (.017) | .006 (.016) |
| Effects on 2-year attendance | .042 (.032) | .013 (.017) | .045* (.024) | –.003 (.027) | .044** (.019) |
| Effects on 4-year attendance | –.080*** (.027) | .004 (.022) | –.016 (.028) | –.017 (.030) | –.038** (.018) |
| *n* | 54,476 | 101,603 | 77,979 | 55,791 | 67,857 |

*Note.* In each case, the estimate is from the treatment effect Post × PellSite, an indicator for whether a student is within 20 miles of a Pell Site and whether that student is in the treatment period. Specifications include zip-code fixed effects. Black/Hispanic pools Black and Hispanic students together to identify the impact of the program specifically for underrepresented racial/ethnic minority students. Mother no college is the impact for students whose mother has no college attendance. All estimates are for the low-income subsample, meaning those with reported family incomes less than US$50,000.

*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed tests).

Given the large number of comparisons being made, concerns about multiple hypothesis testing are warranted. Most of the significant results are *t*-statistics just over two and would not achieve significance in more restrictive multiple hypotheses testing. In sum, while future research should examine a potential pattern of 2- versus 4-year attendance, our key findings suggest a negative impact of the Pell Sites program on dual enrollment and no statistically significant impacts on overall college attendance.

## Institutional Context and the Impact of Pell Sites

To supplement our quantitative analyses and explain some of the patterns we observe, we conducted site visits with participating Pell Site institutions. We find that even the institutions with the greatest capacity for dual enrollment faced some challenges in implementing the Pell program, including meeting local needs (and withstanding competition), forging successful partnerships with high schools, and managing the administrative burden. This combination of factors facilitated low take-up of the Pell program and potentially impeded low-income students' participation in dual enrollment more generally.

Our first site, Alpine, is an average-sized 4-year university in an urban setting. It offers the most nascent dual enrollment program in our qualitative sample: Alpine started offering dual enrollment when the Pell program was first introduced in fall 2016. Although this institution and others like it are absent from our quantitative sample, it is worth noting that the Pell program fostered new dual enrollment partnerships with high schools for at least 10 participating colleges (approximately 25% of colleges that took up the program). Alpine is also in a state with no legislated financial support for dual enrollment. Because there were effectively no dual enrollment offerings prior to the program, there were no dual enrollment personnel; at Alpine, the Pell program was implemented entirely by existing staff. Alpine, then, offers a critical case for our analysis.

Brookdale, by contrast, is a sprawling, suburban community college (with about 10,000 undergraduates) in a state that waives dual enrollment tuition, so students' only financial costs are books, tools, and transportation. Although its dual enrollment program is also in an early stage—it was first established in 2012—there is a designated dual enrollment coordinator.

Cloudview, a rural community college, is similarly situated in a state with significant support for dual enrollment, with both partially waived tuition and scholarships to support student participation. Cloudview offers the most established dual enrollment program in our sample: Its program began 2002. As we describe, Cloudview

was able to capitalize on the program infrastructure and relationships developed over more than a decade to implement the Pell program.

Dunwoody shares many of Cloudview's characteristics—it, too, is a rural community college with partially (though not completely) subsidized dual enrollment tuition—but its program is much newer, having only started in 2015. Both Alpine and Brookdale offered the Pell program through a la carte classes, and Cloudview and Dunwoody implemented the Pell program exclusively through their Early College programs (through which students earn an associate degree concurrently with graduating high school). Each of these sites offers a unique combination of characteristics that impacts how the program was implemented.

### *Meeting Local Needs*

The Pell program was a federal initiative; dual enrollment is a primarily local practice. This means that the Pell program met unevenly with local dual enrollment ecosystems, most saliently through different price structures. Dual enrollment tuition is often set by the institution, but tuition may be subsidized or waived altogether by the state or the local school district. Table 1 includes a detailed description of the pricing, costs covered, and programming offered at the four institutions we visited. Due to differences in pricing, Pell Grants administered through this program were used to cover different amounts, indicating significant heterogeneity in what the program could offer students. For Brookdale, the state waived tuition for dual enrollment, so Pell only covered books and fees; for Alpine, there were no preexisting tuition subsidies, so students used Pell to cover full undergraduate tuition prices. At Cloudview, students even received refunds.

In places where Pell only covered small sums, like only for textbooks, high school counselors were not convinced students got enough of a benefit to warrant drawing on their Pell eligibility before graduating high school. For example, one high school guidance counselor near Alpine told us, "I did [have reservations about the Pell program] . . . I just wasn't sold on it. And then I did not like how much of the Pell Grant was being [used]." At each site, counselors were intent on being good stewards of the limited lifetime Pell eligibility available to students. They did not want these funds to be used for classes in which students would not have academic support, for which students may not be emotionally or intellectually mature, or that may not have transferred to the student's eventual postsecondary institution. For these reasons, counselors were sometimes hesitant to recommend the program and, in some cases, discouraged participation.

Although Pell helped students cover tuition (and sometimes books and fees), low-income students still faced other costs that were not covered by Pell to participating in dual enrollment. Depending on the institution, Pell-eligible students sometimes still needed to pay for textbooks, transportation, tools, and fees. Participants expressed that these costs sometimes presented insurmountable burdens for students, limiting the impact Pell was able to have in mitigating low-income students' costs.

Still, our qualitative evidence suggests that the program was marketed to students and families as "free" dual enrollment. For example, according to Dunwoody's website, "Dual enrollment courses are free for students enrolled in Early College who qualify for Pell Grants."[6] This seemed to translate to local high school counselors, as well: When describing the previous year's dual enrollment opportunities, a high school counselor working with Alpine said, "Alpine's dual enrollment program was free, and the [competitor program] is not free." As one Cloudview dual enrollment coordinator noted, "I mean, even now, you know, we'll say to students, did you file a FAFSA? Because even if you're eligible for US$1 of aid, you know, you get that whole thing free." This evidence suggests that while some high school counselors were hesitant to recommend the program due to the impact it could have on students' lifetime Pell eligibility, they still understood the direct costs of the program as "free."

In addition to differences in pricing, there were also substantial differences in program offerings. This means that when students considered whether to participate in dual enrollment, they considered very different costs and rewards depending on their institution. Cloudview and Dunwoody only allowed students to use Pell if they were in or applied for their Early College program, which necessitated full-time enrollment and involved students attaining an associate

degree concurrently with graduating high school. Thus, students at some institutions got a much larger "bang for their buck." Alpine and Brookdale, by contrast, allowed students to use Pell for one-off dual enrollment courses. These latter institutions had the greatest challenge getting buy-in from school counselors, in part because the benefits to students were not as clear.

Local competition differed, too. Institutions with long-established programs and partnerships were the preferred providers in their areas; institutions with newer programs and in places with competing dual enrollment offerings struggled to increase enrollment. This was most salient for Alpine, the newest dual enrollment provider in our sample, which also faced the stiffest competition for students. At this site, students chose between Alpine, which involved using Pell to pay full tuition for online or on-campus classes, and a competitor, which involved paying only US$100 per course for instruction that took place at the high school. Because the competitor was more established, counselors knew what students were getting for their money and much more readily recommended students to that program.

### *Forging Strong Partnerships*

High school counselors are instrumental in initiating and shaping students' dual enrollment experiences, especially in dual enrollment ecosystems with competing opportunities. In addition, sites needed clear and consistent communication with high school counselors to inform them of the program's complexities, assure them of the program's benefits, and convince them to recruit students. Unsurprisingly, institutions with more established partnerships with local high schools faced fewer implementation barriers. At Cloudview, which had the oldest dual enrollment program in our sample, a dual enrollment coordinator describes their partnership this way:

> When someone at [the school district's] Central Office is like, Oh, we need to try to form a partnership with so-and-so, it makes me cringe because we have it going on at [Cloudview]. They are organized, they have everything—like they're meticulous about it. I know, I mean, the contacts are just fantastic out there. Like if I have a question about books, I know who to call. If I have a question about billing, I know who to email . . . At the other colleges, it's like, I don't know, let me check on that. I'll get back with you. Sometimes I never hear back. (HS Dual Enrollment Coordinator, Cloudview Area)

Because this coordinator has such an established partnership with Cloudview, she is less interested in forging partnerships with other postsecondary institutions. Sites that had relationships with local high schools before the Pell program were able to overcome the hurdles of counselor buy-in more easily, in part because counselors trusted the institution. For newer sites, their competitors had the edge, as their competitors already had relationships with local high schools. In these cases, counselors described being unlikely to recommend dual enrollment at the Pell site to interested and eligible students.

Counselors are the primary arbiters of the information students receive about dual enrollment. Generally, high school counselors described dual enrollment as a "good opportunity" for students ready to take on the challenge and independence of college courses. However, in some cases, counselors were not as convinced that the risks were worth the potential rewards. Sometimes these concerns were also framed as a specific lack of support the Pell Site offered:

> I could probably get a lot more students in dual enrollment, but I don't want to set my students up for a program and then you've used your Pell, you've used a semester of your Pell Grant eligibility and you end up with Fs. So that's my biggest concern now . . . So what [Alpine is] doing is exactly what they're supposed to do. They're supposed to treat them like [college] students, which means I'm not contacting [parents], but as a high school counselor, it's my job to do what's most beneficial to students. (HS Counselor, Alpine Area)

This counselor was frustrated with Alpine because she felt the university did not communicate when students faced obstacles. These concerns were magnified by the Pell program because students would be using their Pell eligibility. All counselors with whom we spoke were aware that Pell eligibility is a limited resource for students, which exacerbated counselors' fears. This was certainly the case for this high school counselor working with Brookdale:

> Sometimes students are persuaded not to use the FAFSA because you only have so many years. So if I use my FAFSA for this year, for my senior [year of]

> high school, it might take me an additional four years, that means my last year of college, I won't have financial aid. So do I want to do that now? Or do I want to wait? I think that's the real question . . . So as counselors, we have those conversations . . . we're not doing our students justice. You know, we're setting them up to where they get to their junior, you know, senior year of college, and they don't have any money. That's worse. You're almost at the finish line. But you can't get there because you used your financial aid, technically in high school. Not fair to the kids. So you know, do we push [using Pell for dual enrollment]? Do I push? I don't push it. Because I know what the end result could be. (HS Counselor, Brookdale Area)

These concerns prevented some counselors from prioritizing all the actions needed to successfully enroll students in dual enrollment programs at Pell institutions. Due to counselors' concerns, there were many cases in which they did not inform students of the program at all. This not only may have driven low take-up of the Pell program but also may have caused high school counselors to discourage students they perceived as Pell-eligible from participating in dual enrollment more generally. This is one possible explanation for the negative effect of the program on dual enrollment that we report in our quantitative results.

### *Overcoming Administrative and Financial Burden*

In dual enrollment partnerships prior to the Pell program, colleges relied on counselors to help them recruit students, follow up with students about paperwork, and coordinate logistics for getting students to campus. With the addition of the Pell program, high school students also had to make sense of Pell eligibility, the FAFSA, and their financial aid packages. Participants in our study frequently mentioned that many Pell-eligible dual enrollment students were selected for FAFSA verification. Verification is particularly burdensome for low-income students (Campbell et al., 2015) and community colleges (Guzman-Alvarez & Page, 2021), adding even more hurdles to an already-difficult process. Without strong high school partnerships to facilitate verification, colleges had to follow up with families on their own. The inability to reach students and their families to complete verification and families' frustration with a particularly onerous process was an insurmountable challenge for enrolling some students in Pell Sites' dual enrollment programs.

For many sites, implementing the Pell program required mobilizing many actors and getting buy-in from multiple stakeholders, whether that meant convincing counselors to inform students about the opportunity or getting families to endure the FAFSA verification process. Because of the amount of outreach and coordination needed between high schools and dual enrollment providers, Cloudview, in partnership with the local school district, added personnel specifically to support dual enrollment students' success. These individuals were seen as indispensable to the dual enrollment program's success and to the Pell program. They facilitated student outreach and recruitment, onboarding, and retention, all of which contributed to high school counselors supporting the program, students entering the program, and students remaining in the program.

This level of direct student support and coordination was not as possible at other sites, which largely came down to a lack of personnel. At Brookdale and Dunwoody, the dual enrollment programs relied on a single coordinator who oversaw the whole enterprise. These actors were often too busy with administrative tasks, like processing applications and coordinating bus routes, to support students individually. The situation was even less ideal at Alpine, where dual enrollment was added to the already-full plates of preexisting admissions staff. When we asked participants at each site where they would direct funds to support dual enrollment, nearly all of them said personnel. Interviewees emphasized the need for hiring more staff to maintain relationships with high school partners and consistently support students. Although these supports benefit all students, they are most beneficial for low-income students, for whom financial costs (e.g., transportation), administrative costs (e.g., FAFSA verification), and academic barriers are greatest.

Our interviews show that dual enrollment programs require large investments of time and resources from individuals and institutions. High school students do not simply enroll in college classes but must be integrated into the college environment with active shepherding and protective guardrails to ensure their success. This requires dedicated personnel. Adding federal aid as a complicating factor requires significant

coordination across admissions and recruitment, financial aid offices, the college administrators, and the dual enrollment program administrators to ensure that the program attracts and retains Pell-eligible students.

In addition to the demands on institutions' personnel, this program placed a substantial demand on colleges' finances. For Cloudview, due to the state's pricing policy, their regular dual enrollment offerings already gave "basically zero financial benefit to the college," according to one of the program coordinators. By having to make up for the difference in students' Pell Grants, this program added thousands of dollars in additional costs every semester. This was also a concern for Alpine, as one admissions representative describes: "We've covered some big balances, which has cost . . . cost us more than it has helped us." This shows how it was not just a lack of personnel that challenged implementation; it was also a lack of funds. While colleges did follow the provisions of the program and made up for the difference in students' Pell packages, this caused significant financial strain and limited institutional buy-in. This, too, may have limited students' access to the program. On Eastman's website, for example, the college notes that "Participation in the Pell-for-dual enrollment program is limited due to budget constraints." This suggests that budget constraints may not only have reduced institutional buy-in for the program but may have also been a direct barrier limiting potential take-up.

Although the Pell program did relieve some of the financial costs associated with dual enrollment, it did not help institutions with the resources they needed to meet local needs, establish and maintain partnerships with local high schools, or address added administrative and financial burden. This helps shed some light on why the program did not increase low-income students' dual enrollment participation. It also shows how contextual factors can shape policy implementation more broadly, an increasingly important consideration for policy evaluation.

### Reconciling Our Findings

Our quantitative analyses suggest the Pell initiative had a negative impact on low-income students' dual enrollment participation. This is somewhat surprising given that, at first glance, the initiative was simply a resource infusion: It allowed income-eligible high school students to use Pell Grants to earn college credits. These credits were, at the very least, applicable toward a postsecondary credential at the participating institution. Why would this program decrease low-income students' dual enrollment participation?

We offer the following explanations in light of our qualitative findings. First, it is possible that the program did heighten low-income students' interest in dual enrollment, but the hurdles associated with accessing the Pell Grant led many students to not participate—even those who would have participated in dual enrollment without the availability of the Pell Grant. To qualify for the Pell Grant, students had to submit arduous FAFSA forms, and our interviews suggest most or all students at Pell Sites were selected for verification. Strained partnerships between high schools and colleges, parents' skepticism of the verification requirements, and colleges' strained operating capacities may together have been enough for Pell to become a barrier to, rather than a conduit for, eligible students' participation. Another possibility is that if low-income students near participating colleges understood their dual enrollment participation as exclusively possible through the Pell Grant, and students were sufficiently concerned about or cautioned against drawing on their lifetime Pell eligibility, these students may have decided to forego dual enrollment altogether. In addition, introducing Pell Sites may have spread institutions' resources too thin, limiting the supports they had in place to support low-income students' participation in dual enrollment.

Other potential explanations lie in our empirical approach. The DID estimates compare dual enrollment participation for low-income students near Pell Sites to that of low-income students near other dual enrollment institutions. If other institutions are pursuing alternative methods to spur low-income students' participation, and these methods are more effective than the Pell Sites intervention, this could yield the results we identify here. We think this is unlikely given the breadth of our comparison group, but it is a possibility. Another is the sample we analyze. The effects we report draw on only four Pell Sites, all in states with enough legislative support for postsecondary access that (a) all high school juniors take the ACT and (b) dual enrollment is already

subsidized. It is possible these places had already reached saturation of academically and Pell-eligible high school students, and the burdens of implementing the program introduced barriers that lowered participation. We think this, too, is unlikely given that interviewees motivated their application to participate in Pell Sites by citing the substantial share of students who could benefit, but it is possible they overestimated this group. Finally, there may be a key explanatory variable we were unable to consider in our analysis. In general, we privilege the explanations from our qualitative findings, but all these explanations are possible.

## Discussion

### *Empirical Limitations*

The study has a few key limitations. We did not have perfect data to answer the question at hand. For example, we had to estimate graduation dates using ACT test date. Although our results are robust to different date specifications, this limitation is worth noting, because it determines who gets "treated"—who is considered pregraduation and can therefore benefit from the Pell program—and who does not. Another limitation is that we only track students in the first 3 years of the program, but it is possible that as colleges build capacity, staff build relationships with high school counselors, and students spread the word about the program, it may grow in popularity. In addition, while we only consider whether the program spurred students to participate in dual enrollment, it is possible it allowed students who would have participated anyway to take more credits and participate for more semesters. We are unable to analyze this depth of participation.

Furthermore, we were unable to include every Pell Site in our quantitative sample because we only use data from states with universal ACT testing. We worried about including other states where taking the ACT exam may have been endogenously impacted by the program. Although we track 1.6 million students—a strength of this study—it is possible that state dual enrollment policies or the Pell Sites within these states are not representative of participating institutions or of colleges offering dual enrollment. We were also unable to include every Pell Site in our qualitative sample; however, we selected sites with a diversity of programs to explore different experiences with and constraints of program implementation. This strategy may not have captured every possible implementation experience, but it did allow us to understand the process broadly and how institutional context may have created barriers to students' take-up of the program. Due to our focus on institutional implementation, we also did not interview parents and students at Pell Sites, so these narratives are missing from our analysis. Despite these limitations, our substantial quantitative sample and our rich site visits together craft an important narrative about implementing policies aimed at improving low-income students' dual enrollment participation.

### *Conclusion*

Our results do not provide evidence that offering Pell Grants alone is an effective way of making dual enrollment more accessible to low-income students. We find negative impacts on Pell-eligible students' dual enrollment participation in the years following the implementation of the Pell Sites program. Through our qualitative inquiry, we contextualize this result by exploring the heterogeneous policy rollout. The robustness with which each site was able to implement the program depended on state context and preexisting institutional infrastructure to support dual enrollment. From our observations, factors such as being able to accommodate for nontuition costs (e.g., transportation and books), having strong high school partnerships, and having sufficient personnel helped facilitate stronger implementation. However, the program still failed to meet local needs, and it created substantial burdens for participating high schools and colleges.

Thus far, districts and states have increased dual enrollment participation through policy mechanisms such as dual enrollment scholarships and lowered tuition rates. This has also created an uneven national dual enrollment landscape. Therefore, a blanket federal financial intervention is unlikely to be uniformly effective in increasing equity in dual enrollment participation and outcomes because different programs have different needs. This is an important consideration for future federal policy. In its current

form, we argue that this program—and the potential policy change that could result from it—is unlikely to improve low-income students' participation in dual enrollment; however, if the federal government paired this program with resources to build institutional capacity for more robust implementation, the program could have a better chance of meeting its aims. In addition, a substantial challenge for this program is high school counselors' hesitance to recommend it due to concerns about limited lifetime Pell eligibility. If the federal government had done more to support institutions with alleviating high school counselors' concerns about lifetime Pell eligibility, or if using the Pell Grant for dual enrollment did not begin to deplete students' lifetime eligibility, this program may have had a positive impact.

Our study has implications for both policy and future research. Federal policy is often designed to address broad problems, like low-income students' disproportionately small share of dual enrollees. However, communities have different needs, which means heterogeneous policy contexts. Places with the greatest need are often those with the least ability to scaffold policy implementation; for this reason, these institutions and the students they serve may not be able to benefit from even the most well-intentioned policies. To the extent possible, policy advocates must begin to consider not only what marginalized students' broad barriers are but how those barriers build on one another—and how removing a single brick will not create a doorway to opportunity.

In some senses, this study illustrates the obduracy of socioeconomic disparities in dual enrollment. A simple reallocation of resources, like allowing students to use the Pell Grant while in high school, may not be enough to broaden students' opportunities. Scholars should continue to explore avenues for making dual enrollment more accessible. Because dual enrollment has largely been a state and local endeavor, it may be worth exploring how to replicate, support, and scale effective programs at these levels. This is a rich, timely, and largely untapped area for future work.


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## Supplemental Material

Supplemental material for this article is available online.

## Notes

1. In three of these states, universal testing allowed us to track graduating high school cohorts from 2014 to 2019. In the fourth state, we only track students through 2017, after which the state discontinued universal ACT testing. Students in our sample from this state would have had 1 year in which they could have participated in the Pell program.

2. We do not specify which states are included in our analysis because each had only one Pell Site and naming the states would identify the institutions. While all institutions that participated in the initiative are listed on the program release on the U.S. Department of Education website, the program personnel who agreed

to be interviewed for the qualitative branch of this study did so under the assumption they would not be individually identifiable. To maintain our commitment to confidentiality, we do not name the institutions; however, to support robust understanding of program implementation, we provide substantial context on the sites in Table 1 to situate them in the broader dual enrollment landscape.

3. The Minnesota Office of Higher Education website provides a Pell-by-Income chart using household size and adjusted gross family income to estimate the amount of Pell awards for which dependent students are eligible. US$50,000 is the maximum family income at which a student will be eligible for the Pell Grant regardless of household size, underscoring our decision to use US$50,000 as a conservative cutoff for Pell eligibility.

4. To identify this relationship, we estimate a conditional logit model for all dual enrollment students. We examine how the choice of dual enrollment college of attendance varies by distance to each institution, identifying a strong relationship between distance and attendance. Given that Pell Sites could have affected dual enrollment participation rates, we focus this estimation to the pre-Pell Sites period. The conditional logit results are available in Supplementary Appendix 1 (online version of the journal).

5. In a traditional fixed effects model, we could include fixed effects for the nearest dual enrollment institution. Our use of zip-code fixed effects is collinear with such fixed effects and provides a finer and more robust set of controls. It is also more parsimoniously associated with our primary indicators of treatment (i.e., living within a radius of *X* miles from a Pell Site location) than school fixed effects would be.

6. We slightly alter website quotes so they are not easily searchable in an internet search engine. We only change small wording details that do not alter the meaning of the text.

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