Accelerating College Knowledge:

Examining the Feasibility of a Targeted Early Commitment Pell Grant Program

Robert Kelchen and Sara Goldrick-Rab, University of Wisconsin-Madison

Executive Summary

Despite decades of public and private investment in financial aid, just 30% of children born to families in the bottom income quintile can expect to enroll in college, compared to 80% from the top quintile. Research suggests that insufficient academic and financial preparation to college, partly attributable to the common perception that college is unaffordable and out of reach, is one reason for this gap.

Most of the current discussions regarding financial aid reform focus on issues of equity, efficiency, and efficacy. Research suggests that the financial aid system is very complex and unable to efficiently target funds to students most in need, but the current policy proposals leave out perhaps the most important aspect of financial aid policy: timing. Most students do not receive specific and accurate information about the costs and benefits of college until their junior or senior year of high school, which is too late for many students to properly prepare for college. If the goal is to induce price-sensitive students from low-income families to attend college, then financial aid systems much reach students as early as middle school in order to affect coursetaking habits.

Several states and cities have adopted early commitment or promise programs, in which students are notified that they are eligible for financial aid in middle school or even earlier. Early research on these programs suggests that they do induce students to become better prepared for college and are more likely to enroll in college. A similar program could be done at the federal level using receipt of federal means-tested benefits—primarily receipt of free or reduced price lunch (FRL). Currently, students who receive any benefit in grade 12 automatically receive the maximum Pell Grant.

In this study, we examine the feasibility of a potential federal early commitment program that would give the maximum Pell Grant to students who receive means-tested benefits in grade 8. This program would simplify the financial aid process for eligible students while giving them time to academically prepare for college. We use data from the Panel Study of Income Dynamics to evaluate the following questions:

(1) To what extent does means-tested benefit receipt in 8th grade predict receipt in 12th grade?
(2) How would Pell expenditures change under this program? How many students would receive larger awards under this program?
(3) How might college enrollment rates change as a result of this program?

We find that the proposed program would be well-targeted, with fewer than one in ten students qualifying for the program not receiving a Pell Grant under current rules. We use a Monte Carlo simulation to estimate the net fiscal impacts of the program. We find that in the median simulation, Pell program costs would grow by approximately $1.5 billion annually and the benefits would exceed the costs by approximately $600 million per year.

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Robert Kelchen

Department of Educational Policy Studies

University of Wisconsin-Madison

kelchen@wisc.edu

Sara Goldrick-Rab[1]

Associate Professor of Educational Policy Studies and Sociology

University of Wisconsin-Madison

srab@education.wisc.edu

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Abstract: The persistently low college enrollment and completion rates of youth from poor families are partly attributable to their uncertainty about whether college is affordable. In the current system, concrete information about college costs arrives at the end of high school and is only available to those who complete a complex application. Evidence suggests this timing affects students' motivation and ability to adequately prepare for college. We evaluate the feasibility of addressing this problem by using a simplified eligibility process to make an early commitment of the full Pell Grant to 8th graders from needy families. Our analyses suggest substantial benefits relative to the predicted costs. Our simulation of the estimated fiscal effects suggests that Pell program costs would grow by approximately \$1.5 billion annually and the benefits would exceed the costs by approximately \$600 million.

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Section 1—Introduction

Despite decades of public and private investment in financial aid, just 30% of children born to families in the bottom income quartile can expect to enroll in college, compared to 80% from the top income quartile (Bailey & Dynarski, 2011). Even among high school graduates, the college enrollment gap by family income is 30 percentage points (Aud et al., 2012). The college completion gap is more substantial; students from high-income families are six times more likely than those from low-income families to complete a bachelor's degree by age 25 (Bailey & Dynarski, 2011). There is growing concern that the talent loss among students from low-income families who forgo college or attend less selective colleges may be substantial, affecting the nation's economy and reducing international competitiveness (e.g. Plank & Jordan, 2001; Lee, Jr., Edwards, Menson, & Rawls, 2011; Hoxby & Avery, 2012). Meeting the ambitious college completion goals of policymakers (Obama, 2009), requires more students from low-income families to enroll in college.

Research suggests that insufficient academic and financial preparation for college, partly attributable to the common perception that college is unaffordable and out of reach, is one reason students from low-income families under-enroll in college and often fail to complete degrees (Ellwood & Kane, 2000; Heller, 2002; Goldrick-Rab, Harris, & Trostel, 2009). Specific and accurate information about college costs is provided to students during their junior or senior year of high school, far into the college choice process (Hossler & Gallagher, 1987; Cabrera & La Nasa, 2000). The lateness of this intervention is most consequential for price-sensitive students, overrepresented among low-income families with less "college knowledge" and larger errors in their estimates of college costs (Horn, Chen, & Chapman, 2003; Luna de la Rosa, 2006;

Grodsky & Jones, 2007; Rowan-Kenyon, Bell, & Perna, 2008; Bell, Rowan-Kenyon, & Perna, 2009; Bowen, Chingos, & McPherson, 2009; Deming & Dynarski, 2010).[2]

The failure to plan for college enrollment from an early point in K-12 schooling is also detrimental because the academic and financial pathways to college (especially 4-year college) are structured and sequential (e.g. Cabrera & La Nasa, 2001; Hallinan, 1996). For example, the track to college-level math begins in middle school and fewer students from low-income families engage at that time, even though the benefits of early engagement in such coursework disproportionately accrue to them (Lucas & Berends, 2002; Rees, Argys, & Brewer, 1996; Long, Conger, & Iatarola, 2012). Studies also show that families who begin to save for college from an early age are more likely to exhibit strong college expectations for their children and place them into appropriate academic courses (Destin & Oyserman, 2009; Elliott, Choi, Destin, & Kim, 2011). This information needs to reach students as early as possible: impacts on postsecondary enrollment are detectable for interventions as late as 10th grade (Ford et al., 2012), but are not statistically significant for information provided in 12th grade (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012).

The issue of the *timing* of financial aid has received relatively little attention in discussions about reforming its design and delivery, including the Bill and Melinda Gates Foundation's Reimagining Aid Design and Delivery project.[3] Most efforts are directed at simplifying the process for applying for aid, since Dynarski & Scott-Clayton (2006, 2008) contend that the complexity of the existing financial aid application process reduces the

[2] Net price calculators offer the potential to give students a slightly earlier estimate of their aid packages, but these have yet to be universally implemented (Cheng et al., 2012) and still target high school juniors and seniors. The federal government's FAFSA4caster is also designed to give students an earlier estimate of their aid packages (as early as middle school), but knowledge of this website appears to be very low.
[3] More information on the project can be found at http://www.gatesfoundation.org/press-releases/Pages/Post-Secondary-Financial-Aid-Grants.aspx.

program's efficiency even as it promotes targeting. But awareness of the aid application process is also demonstrably problematic, and early awareness may be key to ensuring that more students engage in the process even once it is simplified (Dynarski & Wiederspan, 2012).[4]

For these reasons, this paper examines the feasibility of committing to provide a maximum Pell Grant (currently $5,550) to a targeted group of 8th grade students from economically disadvantaged families. In particular, we consider whether the program could effectively increase college enrollment rates without greatly inflating program costs or otherwise hampering efficiency. In the remainder of the paper, we describe the current financial aid system with respect to issues of timing and complexity (Section 2) and discuss existing efforts to improve the timing of informational delivery, before then detailing a potential early commitment program (Section 3). Section 4 describes the data and methods, and then we present estimates for the efficiency of program targeting and effects of the commitment (Section 5) along with an assessment of the net fiscal effect for the federal government (Section 6). Finally, a discussion of implications for policy and practice concludes (Section 7).

Section 2—Timing and Eligibility of Federal Financial Aid

The federal system for distributing financial aid has been subjected to much critique and scrutiny. Administrators of large and expensive programs, which include entitlements like the Pell Grant, often struggle with issues of efficiency and targeting, and federal student aid is no exception. An early commitment of the Pell Grant is intended to address two particular concerns:

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[4]Estimates suggest that the number Pell Grant-eligible students who fail to file for financial aid range from at least 500,000 students (Novak & McKinney, 2011) to as many as 1.5 million students annually (King, 2006). At community colleges, at least one-fifth of all students in the lowest income categories (below $20,000 per year) do not file the FAFSA (Advisory Committee on Student Financial Assistance, 2008a), and many file late because they think the FAFSA is complicated and takes too much time to fill out (LaManque, 2009).

the timing of when aid notification is provided, and the eligibility requirements which must be satisfied for a student to receive financial aid. This section reviews the status quo with regard to each issue.

Timing and Eligibility in the Current Financial Aid System

Eligibility calculations for financial aid currently utilize data from families' tax returns and this, along with a desire to ensure the resources are targeted to the neediest students, means that students do not learn about their eligibility for financial aid until the year of their college enrollment. Specifically, in order to be eligible for federal financial aid in a given academic year, a student must complete the Free Application for Federal Student Aid (FAFSA), which consists of 105 questions and includes items on student and parent investments and assets that are not a part of a tax return in addition to the standard income information that is found on a W-2.[5] This information is used to calculate an expected family contribution (EFC) for the upcoming academic year, representing a measure of a family's *short-term* financial ability to pay for college. Eligibility for the Pell Grant and many other grant and loan programs is determined by the EFC. This process is repeated each year that a student wishes to apply for financial aid assistance.

The aid application process is different for students from families with income below $50,000. They can complete a simplified version if they (1) did not have to file the IRS 1040 long tax form, (2) meet dislocated worker criteria, or (3) received a means-tested federal benefit. In addition, if family income is below $23,000, students qualify for an *automatic* zero EFC (and thus the maximum Pell Grant) if they participate in at least one federal means-tested benefit

[5] This is the number of questions as of the 2012-2013 academic year. Over 22 million students submitted the Free Application for Federal Student Aid (FAFSA) for the 2011-2012 academic year, a five percent increase over the prior year. This includes 52% of all graduating high school seniors in the United States (Snyder & Dillow, 2011).

program, by far the largest of which is the federal free and reduced lunch program (FRL).[6] Between 2006-07 and 2007-08 (when the change took place), the number of students receiving an automatic zero EFC increased by nearly one-third, while the number of students receiving a calculated zero EFC dropped by more than ten percent. The automatic zero EFC provision affects about 4.2 million students (45% of Pell recipients) (U.S. Department of Education, 2012). But qualification for the auto zero EFC does not occur until the time the FAFSA is filed, at which point students are usually on the brink of the college enrollment decision and have little time left with which to prepare.

Theory and Research on the Effects of Early Intervention

Since the effects of interventions earlier in a child's life have the potential to compound over time (e.g. Heckman & Masterov, 2007), we would expect that early interventions to improve student and family financial literacy would be more successful than later interventions. A growing body of literature suggests that this is the case. For example, some studies, such as those by Go et al. (2012) and Sherraden, Johnson, Gao, & Elliott (2011), indicate that financial literacy interventions are effective for younger students. Moreover, Mandell (2006) finds that middle school students exposed to a financial literacy seminar received substantial benefits, with the largest gains accruing among the youngest students. But the effects of financial literacy programs in high school are less positive; for example, Peng, Bartholomae, Fox, & Cravener (2007) and Mandell & Klein (2009) find no long-term effects of taking a financial literacy course in high school. However, yet relatively few financial interventions target students before high school, which concerns both researchers and policymakers (McCormick, 2009).

[6] The other programs are Supplemental Security Income, food stamps, Temporary Assistance to Needy Families, special supplemental nutrition programs, and WIC.

Research on the effects of child savings accounts indicate that interventions designed to help students and their families save a small amount toward the cost of college, even an amount less than the cost of a single year of tuition, can help increase educational expectations and aspirations. Elliott (2009) analyzed the Panel Study of Income Dynamics and concluded that children with a savings account were twice as likely to expect to attend college and also had higher levels of academic achievement in school than students without a savings account. Other studies suggest that families who begin to save for college from an early age are more likely to exhibit strong college expectations for their children and place them into appropriate academic courses (Destin & Oyserman, 2009; Elliott, Choi, Destin, & Kim, 2011).

The impacts of early interventions that increase knowledge of the costs and benefits of college attendance might also be more effective for younger students because of the large benefits accruing to academic and financial preparation for college. A recent experimental program providing information about the actual cost of college (tuition and fees less financial aid) to parents of middle school students identified substantial increases in their knowledge of what college would cost them. Most notably, parents provided with the additional information were much more likely to know that students from low-income families would be able to attend college at little or no cost (College Board and College Foundation of North Carolina, 2012). Similarly, using random assignment Oreopoulos & Dunn (2012) find that an intervention consisting of a short video providing information about the costs and benefits of college attendance combined with a financial aid calculator significantly increased low-income Canadian high school students' aspirations. Of course, it is unknown whether increasing aspirations at such a late point will result in an increase in college enrollment rates.

The federal government recognizes the importance of providing students with information about the cost of college as early as sixth grade (Advisory Committee on Student Financial Assistance, 2008b), but has made only modest efforts to do so. The primary federal effort has been the Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) program, which serves students in high-poverty middle and high schools and provides both early information about college and additional financial aid to students upon entering college. Preliminary results from the program suggest improved levels of academic achievement and have greater educational aspirations than control students (ACT, Inc., 2007); however, the decentralized nature of the program and a lack of rigorous evaluations make estimating the effects of the early information component difficult.[7]

Past and Ongoing Efforts to Improve Timing and Eligibility of Federal Aid

Over the last decade, several states and communities have tried to ensure earlier notification of financial aid through early commitment programs associated with particular (often private) grants or scholarships. For example, three states (Indiana, Oklahoma, and Washington) adopted broad early commitment programs targeted toward students from lower-income families.[8] These programs seek to provide middle school and early high school students with the knowledge that college will be affordable if they "do their part," which is generally defined to be meeting a relatively modest GPA requirement in high school, staying out of significant trouble, and attending an in-state college or university while filing the FAFSA each year. St. John and his colleagues (2004) conclude that the Indiana program may have induced students to enroll in college at somewhat higher rates. In addition, dozens of cities and towns have adopted their own

[7] There is currently a rigorous experimental evaluation of GEAR UP in progress; this paper's second author is on the evaluation's technical working group.
[8] More information on these early commitment programs can be found in Blanco (2005) and Harnisch (2009).

version of promise programs in an effort to induce families to stay or relocate to their community.[9] For example, the Kalamazoo Promise guarantees that students living in the school district and attending public schools from elementary through high school would receive a grant equivalent to the cost of tuition and fees at in-state public institutions. Emerging evidence suggests that students who know they will receive a large scholarship to attend college because of the Kalamazoo Promise work harder in high school, and teachers have higher expectations for them (Bartik & Lachowska, 2012; Jones, Miron, & Kelaher-Young, 2012). The availability of the grant may also lead students from low-income families to apply to more selective and expensive public universities in Michigan (Andrews, DesJardins, & Ranchhod, 2010). Of course, these causal claims cannot be fully supported with the kinds of research designs currently used; it is difficult to find appropriate comparison groups to estimate impacts. A randomized trial of one small-scope early commitment program in Milwaukee may produce additional findings, but not for several years (Harris & Orr, 2012).

In lieu of early commitment programs, some have advocated for simplifying keeping the existing FAFSA process but populating the calculation with tax information from two years prior to college enrollment, rather than one year (e.g. Advisory Committee on Student Financial Assistance, 2005; Dynarski & Scott-Clayton, 2006; Dynarski & Wiederspan, 2012). This "prior-prior year" approach would make high school students aware of available federal financial aid for college during their junior year, which may induce them to consider enrolling in college. However, it would not reach students who do not complete the FAFSA and could only affect the university enrollment decisions of students who are capable of being admitted—those who are academically prepared. If the goal is to induce the most price-sensitive students to consider

[9] See Vaade (2009) for a list of these programs.

college *and* prepare for it so that they can gain admission, they need to know about the likelihood of receiving financial aid much earlier in their schooling. Thus, we consider the feasibility of a program targeting students in eighth grade, far earlier than what is being currently discussed.

Section 3—A Targeted Early Commitment Pell Grant Program

National college attainment goals, growing concerns about college affordability, and the stagnation of family income, coupled with recent changes to aid eligibility requirements that simplify the process for needy families, set the stage for a federal effort to target an early commitment Pell Grant program to students in 8th grade (Advisory Committee on Student Financial Assistance, 2005, 2008b; Blanco, 2005; Heller, 2006). Therefore, we next undertake an examination of the feasibility of such a program. The current federal needs analysis automatically awards students a full Pell Grant if their family receives a federal means-tested benefit in grade 12 and they file the FAFSA. We examine the costs and benefits of advancing that timeline from 12th to 8th grade, and waiving the requirement of FAFSA completion for students receiving free or reduced price lunch. This is consistent with proposals offered by others, albeit prior to the revision of aid eligibility rules (Fitzgerald, 2006; Schwartz, 2008).

Program Timing

Advancing the determination for Pell eligibility from 12th to 8th grade, even for some students, creates the potential for greater program inefficiency. If the intent is to compensate students for short-term financial constraints (e.g. low family income) close to the timing of college, then any aid awarded to students who are not as constrained at that time might be poorly spent (if only the most constrained stand to benefit from the resources). Evidence suggests that income volatility (both up and down) is increasing, especially toward the bottom of the income distribution (e.g. Dynan, Elmendorf, & Sichel, 2007; Gottschalk & Moffitt, 2009; Kopczuk, Saez, & Song, 2010), and this is especially common during recessions (Celik, Juhn, McCue, & Thompson, 2012; Shin & Solon, 2011).[10] Additionally, Wagmiller & Smith (2012) show that income volatility has increased sharply over time among low-income families with children. However, trends suggest that poor families remain persistently poor across their children's period of secondary schooling. For example, Heller (2006) estimated that 77% of seventh-graders eligible to receive free or reduced price lunch (a proxy for low-income, see next section) in 1987 were still eligible for FRL as eleventh-graders. He also examined a cohort of entering college students in 2004, finding that 80% of families who were FRL-eligible as eleventh-graders got the Pell Grant upon enrolling in college in fall 2003. Dynarski & Wiederspan (2012) used data from the 2006 and 2007 tax years to examine eligibility over a shorter timeframe and found that for 77% of continuing undergraduates, using income data from two-years prior would result in a Pell Grant award within $500 of the award based on income one year prior. This paper revisits these estimates in order to assess the potential that an early commitment would "over-award" some students.

On the other hand, if the intent of the Pell Grant is to compensate students for longer-term financial constraints—and a lack of family *wealth* rather than income—there is far less risk of increased inefficiency via an early commitment program. Wealth is quite persistent (e.g. Keister & Moller, 2000), and wealth rates have not increased as poverty rates decrease (Caner & Wolff, 2004).

Program Targeting

[10] Using administrative earnings records from the Social Security Administration, Dahl, DeLeire, & Schwabish (2011) found no evidence of increased income volatility since the 1980s.

Determining program eligibility using a proxy for family income is far more desirable that introducing an additional application process, which is likely to reduce the accessibility of the early commitment program. Use of the free or reduced price lunch program (FRL) for targeting an early commitment of the Pell has benefits and drawbacks. On the one hand, FRL receipt is a reasonable way of measuring childhood poverty because it is a means-tested entitlement program that enjoys strong take-up rates (particularly in elementary school). In order to receive a free lunch, a student's household income must be less than 130% of the federal poverty line, while the cutoff is 185% of poverty for reduced price lunch receipt. Moreover, all students who have a family member receiving TANF or food stamps automatically receive FRL. But while 87% of students who are income-eligible for FRL participate in the program, participation rates decline to approximately 70% in middle school and 60% in high school (Gordon & Fox, 2007), and certain high-poverty schools are authorized to offer free lunches to all students.[11] One reason for declining take-up rates in later grades is social stigma associated with receiving government benefits, and the increased availability of outside food options for students. Thus, as Robert Hauser notes, "a free or reduced-price lunch is a treatment, not merely an indicator" of poverty and thus must still be considered a rough measure (2010, p. 4).

Another consideration is that tying an early commitment program to FRL participation might provide students and their families with a stronger incentive to participate in that program. On the one hand increased participation is a positive outcome since it means students receive the food they need. On the other hand, this could create incentives for cheating (e.g. families who shift income from one tax year to the next) which might drive up program costs. Efforts to minimize this behavior, for example by increasing the complexity of the application to receive

[11] For more information, see http://www.fns.usda.gov/cnd/Governance/prov-1-2-3/Prov1_2_3_FactSheet.htm.

FRL, would simultaneously likely reduce the efficacy of both programs by limiting the number of qualified individuals served. In this case, the unintended consequence would be an expansion of FRL program costs and a loss of efficiency to both that program and the early commitment program.

Nevertheless, these tradeoffs may be tolerable given that an early commitment program based on FRL receipt would reach millions of students. In the 2009-10 academic year, 31.7 million children received FRL through the National School Lunch Program (Young et al., 2012), even though approximately five percent of schools do not participate in the program.

Implementation

This program could be straightforward to implement. An initial demonstration program would be advisable, however, to assess implementation challenges and examine program effectiveness across the spectrum of implementation (e.g. are effects stronger where information is more fully disseminated?). Information about the program could be distributed in schools, public assistance offices, libraries, and through the media—many of the same sources that are currently used to provide information about the FAFSA. While eligibility for the program would be based on a family's financial circumstances in eighth grade, it is critical that students and their families know about the program well before that period of time.

Specific Research Questions

To assess the feasibility of this program, our subsequent analyses address the following questions: (1) To what extent does receipt of federal assistance programs in eighth grade predict receipt of federal assistance programs in twelfth grade (the year currently used for Pell eligibility for on-time college goers)? (2) How would the distribution of auto-zero EFCs change if eighth grade program receipt was used in the federal needs analysis instead of using twelfth grade receipt? How many students would be over-awarded (e.g. receiving a full rather than partial Pell)? Correspondingly, how would Pell expenditures change? (3) To what extent might college enrollment rates respond to this change to early notification for a targeted group of students? How would this affect the costs and benefits of the Pell Grant program with respect to the federal government?

Section 4—Data and Methods

We use a sample of students broadly representative of American adolescents to examine our research questions using probit models with marginal effects. The resulting coefficients from these models are then used to estimate the costs of the possible early commitment program.

Data

To examine the extent to which early commitment programs would appropriately and efficiently notify students from needy families about their eligibility for the federal Pell Grant, we use data from the Panel Study of Income Dynamics (PSID) from 1999 through 2009. The biennial survey includes questions on demographics, income and assets, and participation in federal programs such as TANF/AFDC, food stamps, free/reduced price breakfast or lunch, and WIC. The PSID includes a nationally representative sample, along with an oversample of low-income families, and we focus on a subsample of families in the core/immigrant sample. We include families with at least one child between the ages of seven and 14 in 1999, with a child being defined as a biological or adopted child of either the head of the household or the spouse. This restriction results in a sample size of 2,240 children in 1,503 households. With the use of survey weights, the sample is generally representative of the American population in 1999

(Gouskova, Heeringa, McGonagle, & Schoeni, 2008). Nearly three-fourths of the students are white and 18% are black; only ten percent of the students are Hispanic. Nearly half of the parents in the sample attended at least some college, and 27% hold bachelor's degrees.

Since the PSID does not provide information on a child's grade in school on a regular basis, we use a student's age to estimate his or her grade. Students ages 13 and 14 are estimated to be in 8th grade, ages 15 and 16 are estimated to be in 10th grade, and 17 and 18 are estimated to be in 12th grade. There are four cohorts of 8th grade students: 1999, 2001, 2003, and 2005. Table 1 provides summary statistics of the PSID sample in 8th grade.[12]

When in 8th grade, 33% of students in the sample received at least one of four types of public assistance; over 96% of those students received free or reduced price meals at school.[13] At the time, six percent of students had a family member receiving the Women, Infants, and Children nutrition program (WIC) and 10.5% received food stamps, but fewer than three percent of students had a family member receiving assistance through Temporary Aid to Needy Families (TANF). Appendix 1 shows information on federal program receipt in 8th grade, by cohort. Receipt rates are consistent across the cohorts, suggesting that they are fairly similar over time and can be combined for estimation purposes.

Table 2 illustrates rates of public assistance receipt in 10th and 12th grades, family income in 12th grade, and educational attainment levels by 8th grade public assistance receipt. The results indicate that 81% of students receiving means-tested benefits in 8th grade received them again in 10th grade, and 69% of 8th grade recipients were still receiving benefits in 12th

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[12] We use complete cases in the analyses. This excludes three to four percent of students with 8th grade information, as sample attrition from the PSID is very low.

[13] Free and reduced price lunch receipt are combined in the PSID data. We combine free/reduced breakfast with the lunch program because very few additional children participate in the breakfast program without participating in the lunch program. As such, we usually refer to the programs as free/reduced lunch.

grade (which would automatically qualify them for the maximum Pell Grant under current rules). The decline in benefit receipt rates during high school is likely attributable to three factors: reduced take-up among income-eligible students, students who drop out from high school before 12th grade, and increased family income.[14] The last factor appears to be driving some, but not most, of the decline in benefit receipt rates. Just 26.7% of students receiving assistance in 8th grade had a family income of more than 185% of the poverty line when in 12th grade (which would currently qualify them for the automatic zero EFC), and only 7.7% had a family income of more than 300% of poverty at that time (which would likely make them ineligible for a Pell Grant). Only 18% of students who did not receive benefits in 8th grade had a family income of less than 185% of the poverty line in 12th grade.

There is a sharp disparity in college enrollment rates according to likely Pell eligibility. Only 29.6% of students who received federal benefits in 8th grade enrolled in college by 2009 (ages 19-24), compared to 44.0% of students who did not receive benefits. If knowledge of likely aid eligibility plays a role in that disparity, an early commitment to Pell receipt has the potential to narrow that gap.

Methodology

We use several methods to examine the feasibility of an early commitment program based on federal means-tested program receipt. We first predict public assistance receipt for student i in 10th or 12th grade based on 8th grade receipt and student demographic characteristics using a probit model with marginal effects:

$$\Pr\,(Asst_{gi} = 1) = \Phi(\beta_{0i} + \beta_{1i} Asst_{8i} + \beta_{2i} StuDem_i + \beta_{3i} Cohort_i + \epsilon_i), \quad (1)$$

[14] FRL takeup rates are lower in high school than middle school (Gordon & Fox, 2007), which is likely a combination of increased social stigma and the availability of other food options (Mirtcheva & Powell, 2009).

where Φ is the standard normal distribution, $Asst_{gi}$ represents having received assistance in grade g, $StuDem_i$ represents demographic characteristics (race, gender, number of siblings, and parental education, and $Cohort_i$ represents the student's cohort.

The ability of an early commitment program to reach students from low-income families depends on the extent to which families receive means-tested programs if they are income-eligible. To explore this concern, we regress public assistance receipt in a given grade on the income cutoffs for free/reduced price lunch receipt:

$$\Pr\,(Asst_{gi} = 1) = \Phi(\beta_{0i} + \beta_{1i} Income_{gi} + \beta_{2i} StuDem_i + \beta_{3i} Cohort_i + \epsilon_i), \quad (2)$$

where $Income_{gi}$ represents whether a student's family income is less than 130% of the poverty threshold (free lunch) or 185% of the poverty threshold (reduced price lunch) and the rest of the measures are as before. If fewer students are taking up the FRL program, then the relationship between public assistance receipt and income should grow weaker between 8th and 12th grade.

A key concern with early commitment programs is that some students who are eligible in 8th grade are no longer financially needy upon reaching college age, leading to an inefficient over-award of financial aid.[15] Among students who received any public assistance in 8th grade, we regress having a 10th or 12th grade household income of at least 200% or 300% of the poverty line on being below 130% of the poverty line in 8th grade (our best estimate of whether someone was eligible for free lunches) and a vector of other student characteristics:

$$\Pr\,(Income_{gi}) = 1 = \Phi(\beta_{0i} + \beta_{1i} Poverty_{8i} + \beta_{2i} StuDem_i + \beta_{3i} Cohort_i + \epsilon_i), \quad (3)$$

[15] The opposite case, in which a student's family income drops between 8th and 12th grades, is not a concern because s/he could still receive Pell Grants through the traditional financial aid disbursement system.

where $Income_{gi}$represents whether a family has taxable income over 200% or 300% of the poverty threshold and $Poverty_{8i}$ is an estimate of whether a student received FRL in 8th grade. This allows us to examine student characteristics associated with large upward income swings before reaching college-going age.

We then examine the relationships between receiving public assistance in 8th to 12th grades and later educational attainment:

$$\Pr\,(EdAttain_i) = 1 = \Phi(\beta_{0i} + \beta_{1i}Asst_{8i} + \beta_{2i}StuDem_i + \beta_{3i}Cohort_i + \epsilon_i), \quad (4)$$

where $EdAttain_i$ is an indicator in separate regressions for either graduating high school or attending any college (the categories are not mutually exclusive). We are particularly interested in the coefficient on the 8th grade public assistance receipt measure for the regression on having attended college, as this would be the theoretical upper-bound for the effectiveness of an early commitment program.

Limitations

There are several limitations of using the PSID for this purpose. The primary concern is that we cannot perfectly observe means-tested program receipt in this dataset, and as such we are likely understating the rate of program participation by using survey data. Meyer, Mok, & Sullivan (2009) estimate that only about 70% of families receiving FRL (who make up the vast majority of means-tested benefit recipients) actually report it in the PSID; this underreporting is true for most other means-tested programs. It also appears that at least some families whose family income would make them eligible for public assistance programs are not receiving the services due to social stigma (Mirtcheva & Powell, 2009). Both of these factors introduce measurement error into our estimates. Additionally, the measure of educational attainment (years of education completed) is crude, but it does provide a measure of any postsecondary enrollment.

We do not model several important components of the cost-effectiveness of the proposed early commitment program with respect to the federal government. On the benefit side, we exclude the nonmarket benefits of education, such as better health and lower rates of incarceration, that have been shown to significantly increase the returns to education (Wolfe & Haveman, 2002). We also exclude the reduced rate of future means-tested program receipt for more-educated adults. On the cost side, we do not estimate the costs of providing additional financial aid to disadvantaged college students which is contingent on Pell Grant receipt, such as student loan subsidies or through grant programs such as the Supplemental Educational Opportunity Grant. We view our estimated cost-benefit ratios as conservative estimates of the effectiveness of the program, as the omitted benefits are likely much larger than the omitted costs.

Section 5—Results

We first examine the extent to which public assistance receipt in 10^{th} and 12^{th} grade is a function of 8th grade receipt and student and demographic characteristics (Table 3). Not surprisingly, later receipt of federal assistance is highly correlated with 8th grade receipt of that assistance, and this relationship weakens between 10^{th} and 12^{th} grade ($p<.01$). This is not surprising, since take-up of FRL is highest among eligible students in elementary and middle school, before the stigma associated with the program begins to affect students' willingness to participate. Racial/ethnic minority children and those whose parents who did not complete high school were much more likely to continue receiving public assistance in later grades compared to non-Hispanic white children or those whose parents completed some college. The results are similar when examining any form of public assistance receipt or FRL receipt only.

Table 4 shows the relationship between public assistance receipt and household income by grade, examining both the 130% of poverty line (free lunch) and 185% of poverty line (reduce price lunch) thresholds. Again, the relationship between having a low-income and receiving public assistance weakens over time, reiterating the importance of starting an early notification program in 8th grade when participation in public assistance programs is more common among poor families. Again, minority students and those with less-educated parents are more likely to continue to take up the programs, which may be a function of universal eligibility for FRL at high-poverty schools.

Next, we examine family income volatility among students who initially received public assistance in 8th grade, using thresholds of 200% and 300% of the poverty line (Table 5).[16] Only 20% of students who received assistance in 8th grade had a family income of over 200% of poverty by 10th grade, a number that increased to 25% by 12th grade. Fewer than 10% of these students ever had a family income of over 300% of poverty in high school, suggesting that few poor families become well-off while their children go through high school. The multivariate regressions also show that free lunch eligibility continues to act as a strong predictor of continued low-income status in 10th grade, but is somewhat less effective at predicting 12th grade eligibility. In other words, the current system, which relies on 12th grade program receipt, is likely under-awarding some students (or at least subjecting to unnecessary additional needs

[16] These thresholds represent multiples of the official poverty line and can be viewed as measures of being in the middle of the American income distribution.

analyses) who experience childhood poverty and who may still be quite poor, but are not receiving FRL.

Table 6 illustrates the likelihood of educational attainment (high school graduate or above and any college attendance) based on public assistance receipt. Students who received assistance in 8th grade were nearly ten percentage points less likely to attend college than those who did not, net of other demographic characteristics.[17] This differential appears to increase over time, but this could be due to changes in the composition of program participants in later grades; thus ten percentage points may be viewed as an upper-bound estimate of the potential effect of early commitment on college enrollment.

We next use a range of possible enrollment effects to estimate the cost of this early commitment program, assuming that the cost of providing an early commitment is negligible (for example, if it simply became part of the FRL award process). Given that nearly 32 million students participate in the National School Lunch Program, it is reasonable to assume that approximately one-thirteenth of the students, or 2.5 million, are in 8th grade in a given year.[18] This means that up to an additional 250,000 students per year could be induced to enter college under an early commitment program if college enrollment rates were to increase by ten percentage points, a substantial increase in the approximately three million new freshmen who enroll in college each year (Aud, KewalRamani, & Frohlich, 2011).[19]

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[17] In Appendix 2, we estimate the likelihood of educational attainment by being income-eligible for FRL (185% of the poverty line). The gap between students from poor and nonpoor families is even larger, although the estimates are on a smaller number of cohorts with income information.

[18] We have been unable to find an exact number of FRL participants by grade. We would appreciate any information that readers can provide regarding official numbers.

[19] This cost estimates might be understated if FRL participation rates increased dramatically, but middle school participation rates are already fairly high.

Section 6—Fiscal Analysis

We use a Monte Carlo simulation with 10,000 trials to estimate the net fiscal effects of the proposed early commitment program. We estimate the effects assuming a 30% initial enrollment rate of FRL students and an average estimated impact on enrollment of four percentage points.[20] This estimated enrollment effect is based on the findings of prior research examining the effects of college access programs. Bettinger et al. (2012) found a 4.8 percentage point increase in any college enrollment over a three-year period for dependent students in their test of a FAFSA assistance intervention. A meta-analysis conducted by Harvill, Nguyen, Robertson-Kraft, Tognatta, & Maynard (2011) examined the effects of college access programs on college enrollment rates. Among studies which used random assignment, they estimated an impact of approximately four percentage points.[21] All costs and benefits are discounted back to age 19 (a student's first year in college) using a 3.5% discount rate with sensitivity checks at 2% and 5% (Moore, Boardman, Vining, Weimer, & Greenberg, 2004). Table 7 contains the distribution of each of the parameters used in the simulation.

Cost Estimates

To estimate the cost of the additional enrollment to the federal Pell Grant program, we use data from the Beginning Postsecondary Students (BPS) study, a nationally representative sample of first-time college students enrolled in the fall of 2003. There are two ways in which the cost to the program would increase: through increased enrollment rates (Case 1) and the over-awarding of aid to students who would not have been eligible for a full Pell Grant under the

[20] All binary variables are estimated using a binomial distribution with 100 draws, while continuous variables are estimated with specified standard deviations.
[21] They estimate much larger effects (13 percentage points) when including quasi-experimental studies, but many of these programs target much more narrow groups than the federal Pell Grant program. As such, we prefer the more conservative estimates from the random assignment programs.

current aid system (Case 2). We use the distribution of part-time and full-time students for initial full and partial Pell recipients, as well as the average amount of Pell Grant funds received over six years by enrollment status and initial Pell receipt, from the BPS in our estimates.[22] We adjust the estimates to current dollars by multiplying by the percentage increase in the maximum Pell Grant between 2003 and 2012.[23]

The program might be less cost-effective if a substantial number of students who received an early commitment of a maximum Pell Grant then experienced increases in their family income (Case 2). In the prior analysis, we estimated that 26.7% of students who were income-eligible for FRL in 8th grade were no longer income-eligible in 12th grade. However, most of these students likely remained Pell-eligible based on income, as just 29% of students who were no longer income-eligible had family incomes of over 300% of the poverty line by 12th grade. We assume that everyone falling between 185% and 300% of the poverty line is receiving the average Pell Grant for non-zero EFC Pell recipients and no one above 300% of the poverty line receives a Pell Grant.[24] To estimate the net increase in Pell expenditures, we subtract the partial Pell awards that would currently be given to students between 186% and 300% of the poverty line.

We then combine these two cost drivers (increased enrollment of zero-EFC students and over-awarding of some students who would not qualify for Pell Grants under current rules) to estimate the total costs of the early commitment program. Our preferred assumption of a four

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[22] It is difficult to estimate the number of years for which Pell recipients stay enrolled in the public-use datasets. We use the number of years of Pell receipt as a proxy for the number of years of enrollment, although this may slightly understate enrollment. However, it is likely that the additional students induced into attending college by this program may remain enrolled for shorter periods of time, overstating the number of years enrolled.

[23] In 2003, the maximum Pell Grant was $4,050, compared to $5,550 in 2012.

[24] Depending on household size, 300% of household income is approximately $60,000-$75,000 per year. In the 2010-11 academic year, only three percent of all Pell Grant recipients had household incomes of over $60,000 per year (U.S. Department of Education, 2012).

percentage point increase in enrollment would result in a $1.5 billion increase in expenditures per cohort based on our simulation. This is a small fraction of the current Pell Grant expenditures of approximately $36 billion (United States Department of Education, 2012). A program that is effective in reaching students in earlier grades may be able to encourage students to prepare more for college, which could also result in lower remediation costs for students who currently enroll in college.

Benefit Estimates

Estimating the fiscal benefits of this proposed program requires a series of assumptions regarding increased educational attainment and the resulting labor market outcomes as well as labor force participation and tax rates. Some students may be induced to attend college who would have not completed high school in the counterfactual case; we estimate that ten percent of the enrollment increase is from this category, with the other 90% coming from students who would have otherwise graduated from high school. It is likely the case that the students who attend college as a result of the early commitment program are less academically prepared than their peers and have a fairly low probability of completing a degree. Our preferred estimate is that 30% of students induced to enroll in college complete an associate's degree and 20% complete a bachelor's degree, with the remaining students falling into the "some college" category.

The educational benefits of the early commitment program are likely not limited to the students who are induced to enroll in college; the additional financial aid received by students who could be considered "over-awarded" is likely to have some benefits on the persistence and completion margins. The average student who would not have previously qualified for a full Pell

Grant is estimated to receive an additional $4,200 in Pell aid. Some of this additional aid will likely supplant other types of financial aid, so we estimate the additional increase in aid to be approximately $2,000 during a student's time in college. In our prior work, we estimate that an additional $1,000 in total financial aid received results in a 2.8 percentage point increase in retention rates among Pell recipients in Wisconsin (Goldrick-Rab, Harris, Kelchen, & Benson, 2012). Assuming that the average student receives the Pell Grant for approximately two years, an increase on the retention and completion margins of three percentage points seems reasonable.

We use the estimated present discounted value of lifetime earnings by education category (less than a high school diploma, a high school diploma, some college but no degree, an associate's degree, or a bachelor's degree) from Carnevale, Rose, & Cheah (2011) to estimate the returns to receiving additional education. The distributions are estimated using a standard deviation equal to one-third of the mean; this results in a slightly narrower interquartile range than is reported in their analysis, but yields a normal distribution with few implausibly low values. The earnings distributions are jointly estimated in order to preserve the relative returns to education.

The estimates of the labor market returns to education are for full-time workers, so we multiply the estimated (discounted) lifetime earnings by the average labor force participation rate for 25-64 year olds from the Bureau of Labor Statistics (Toossi, 2012). This results in an average labor force participation rate of 78%. We then estimate the amount of tax revenue received by multiplying this number by the average effective federal tax rate paid by individuals in the median income bracket between 1993 and 2009 (Harris, 2012).[25] This results in our preferred

[25] This is more appropriate than the average effective tax rate for the median quintile in 2009 (11%) because this tax rate was temporarily depressed by two percentage points due to a reduced Social Security payroll tax rate and because effective tax rates are likely to increase given a stronger economy and the current fiscal climate.

estimate of a 15% effective tax rate. Benefit estimates are discounted by an additional 0.2% to account for mortality rates during adults' prime earning years (Office of the Chief Actuary, 2012).

Net Fiscal Impacts

We report a range of net benefit and cost-benefit ratio estimates in Table 8. Under the assumptions made in our simulation (based on an average four percentage point increase in enrollment and the cost, benefit, and economic assumptions as discussed in Table 7), we estimate costs of approximately $1.5 billion per cohort and benefits of $2.2 billion in the median simulation. This results in an estimated net benefit of over $600 million and a benefit-cost ratio of 1.41.[26] Figure 1 provides a distribution of the estimated net fiscal benefits across 10,000 simulations with the preferred discount rate of 3.5%. The estimated net benefit is positive in 68.8% of the simulations with a discount rate of 3.5%, compared to 82.1% of simulations with a discount rate of 2% and 52.9% of simulations with a discount rate of 5%. These analyses suggest that the proposed early commitment program is likely to provide positive net fiscal benefits under reasonable assumptions.

Because such a wide variety of program effects and assumptions are plausible, we provide readers with an interactive spreadsheet to test different assumptions. We also provide our Stata code for the Monte Carlo simulation if readers wish to modify either the means or distributions of each of the measures used in our analyses. Both of these are available online at www.finaidstudy.org.

[26] We report the net fiscal impact from the median instead of the mean simulation because the distribution of estimated effects (as shown in Figure 1) is skewed to the right. For example, the mean fiscal impact is approximately $900 million with a 3.5% discount rate, compared to a median impact of about $600 million.

Section 7—Discussion

There are substantial income disparities in college enrollment and completion rates and evidence that some students from low-income families may not be preparing for college-level coursework because they perceive college to be unaffordable. In this paper, we evaluate the feasibility of a targeted early commitment program that would guarantee full Pell Grants to eighth-grade students from families receiving public assistance programs. Changing the timing of financial aid notification for the neediest students would be reasonably well-targeted, as nearly seven in ten students who would receive the maximum Pell Grant under this new approach are already receiving it under the current system. The difference is that instead of waiting until 12^{th} grade to learn that college is affordable, they would learn this information in 8^{th} grade. The level of inefficiency would be low—our estimates suggest that fewer than three in ten students would receive a larger Pell Grant under the new system. Since the current needs analysis would remain intact for all students not involved in the early commitment program, there would be no "losers" in the new system.

The results of our Monte Carlo simulation suggest that such a program is likely to have positive net fiscal benefits under a fairly conservative and robust set of estimates. Given an average estimated program impact of four percentage points (in line with other similar interventions) and a discount rate of 3.5%, we estimate a median net benefit of about $600 million per year. Federal Pell expenditures would increase by approximately $1.5 billion per cohort of students. This would represent a meaningful 4% increase in Pell expenditures, but might be partially offset by reduced costs if students are induced to prepare for college at an earlier age and this diminishes the need for remediation or shortens time-to-degree. The estimated benefits of the program are at least $2.1 billion per cohort, suggesting that the program should be cost-effective under the majority of assumptions.

Would the program overlook needy students? It would not if the early commitment program supplemented rather than supplanted the existing needs analysis. Family income could decline during high school, rendering new students eligible. However, in this study we find that only seven percent of students who did *not* receive federal assistance in 8th grade later received it in 10th or 12th grade. Such students would not be informed of Pell eligibility early on, but would receive it when they filed a FAFSA in 12th grade.

More research should be done on the potential general equilibrium effects of an early commitment program. Currently, many state and institutional need-based grants use Pell eligibility as their eligibility requirements, and thus this might expand their service populations as well. If this program were implemented, providing consistency across programs would mean that ideally states and colleges would also give targeted students automatic eligibility for their need-based grants. It is also possible that the number of additional students induced to attend college by this program (estimated to be approximately 100,000 per year) could result in a decline in the labor market returns to education or an increase in tuition resulting from colleges wishing to capture additional Pell Grant revenues.

It may not be important for an early commitment program to have strict income checks at later grades unless there is evidence that many families are gaming the system. Even if family income rises somewhat while a student is in high school (which is perfectly consistent with the life cycle trajectory of earnings), increased income does not mean that a family has the level of wealth or discretionary income required to make college truly affordable (Conley, 2001).

Ensuring that students do not forgo college opportunities due to short-term income constraints is the express purpose of need-based financial aid, and the current program is far from achieving that goal.

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Table 1: Baseline Characteristics (Grade 8) of the PSID Sample.

Measure	Mean	(SE)
Race (%)		
White	72.0	(1.6)
Black	17.8	(1.4)
Hispanic	9.5	(1.0)
Asian	2.2	(0.4)
Native American	1.1	(0.4)
Gender (% female)	49.7	(1.4)
Number of siblings age 0-17	1.39	(0.04)
Parental education (%)		
Less than high school	15.9	(1.4)
High school	36.9	(1.8)
Some college or AA	20.5	(1.4)
BA or higher	26.8	(1.6)
Family taxable income ($)	$64,087	($1,929)
At or below 100% of poverty (%)	18.6	(1.3)
At or below 200% of poverty (%)	37.1	(1.7)
Received public assistance (%)		
Any assistance	33.0	(1.7)
WIC	6.1	(0.8)
Free/reduced price lunch	31.9	(1.7)
TANF	2.6	(0.4)
Food stamps	10.5	(1.0)
Cohort (%)		
1 (8th grade in 1999)	25.7	(1.1)
2 (8th grade in 2001)	27.0	(1.1)
3 (8th grade in 2003)	24.3	(1.0)
4 (8th grade in 2005)	23.0	(1.0)
Number of children	2240	
Number of households	1503	

Notes:
(1) Family income is trimmed to the 1st and 99th percentiles.
(2) Parental education is for the head of household. In the rare case of multiple households, the highest level of parental education was selected.
(3) Observations are weighted to account for the study's design. Standard errors are clustered at the family level.
(4) The components of assistance add up to more than the overall percentage of families receiving assistance because multiple types of assistance can be simultaneously received.

Table 2: Income Dynamics and Educational Attainment by Initial Public Assistance Receipt.

	8th grade public assistance receipt?			
	Yes		No	
Measure	Mean	(SE)	Mean	(SE)
Public assistance receipt (%)				
10th grade	81.3	(2.0)	6.6	(0.8)
12th grade	69.3	(2.7)	7.8	(1.0)
12th grade income (%)				
Below 130% of poverty	54.7	(2.9)	12.9	(1.3)
131%-185%	18.6	(2.0)	5.1	(0.8)
186%-300%	19.0	(2.3)	17.1	(1.4)
301% or higher	7.7	(1.3)	64.9	(1.8)
Educational attainment (%)				
Did not complete HS	31.2	(2.5)	21.1	(1.4)
High school diploma	39.1	(2.4)	34.9	(1.6)
Any college enrollment	29.6	(2.5)	44.0	(1.8)
Sample Size	913		1248	

Notes:

(1) Public assistance receipt includes FRL, WIC, TANF, and food stamp receipt in the prior year.

(2) 8th grade includes children ages 13 and 14 in the listed year.

(3) Observations are weighted to account for the study's design. Standard errors are clustered at the family level.

(4) Poverty is defined as the ratio of taxable income to the federal need threshold, which takes into account household size.

(5) 130% of the poverty line is the threshold for free lunches and 185% is the threshold for reduced price lunches.

Table 3: Predicting Public Assistance Receipt by 8th Grade Characteristics.

	Any assistance		FRL receipt	
	Grade 10	Grade 12	Grade 10	Grade 12
Grade 8 receipt	0.598***	0.413***	0.576***	0.382***
	(0.038)	(0.041)	(0.039)	(0.043)
Female	0.037	0.023	0.027	-0.007
	(0.026)	(0.025)	(0.025)	(0.024)
Black	0.232***	0.236***	0.202***	0.203***
	(0.046)	(0.040)	(0.043)	(0.041)
Hispanic	0.260***	0.324***	0.240***	0.333***
	(0.083)	(0.078)	(0.077)	(0.079)
Asian	0.363**	0.117	0.191	0.112
	(0.153)	(0.124)	(0.139)	(0.124)
Native American	0.417**	0.288*	0.483***	-0.112***
	(0.176)	(0.158)	(0.167)	(0.016)
Other race	-0.018	-0.006	0.103	-0.004
	(0.064)	(0.080)	(0.064)	(0.073)
Number of siblings	0.033**	0.062***	0.025**	0.061***
	(0.013)	(0.014)	(0.011)	(0.013)
Parent ed: Less than HS	0.237***	0.054	0.236***	0.067
	(0.070)	(0.057)	(0.068)	(0.055)
Parent ed: HS	0.061	0.045	0.069*	0.052
	(0.039)	(0.038)	(0.037)	(0.036)
Parent ed: BA or higher	-0.135***	-0.125***	-0.102***	-0.103***
	(0.037)	(0.034)	(0.036)	(0.033)
Number of observations	1911	1893	1892	1745

Notes:
(1) Coefficients are marginal effects from a probit model. Standard errors appear below the regression coefficients and are clustered at the family level.
(2) Regressions also include cohort fixed effects.
(3) "Any assistance" includes FRL, food stamps, TANF, and WIC.

Table 4: Predicting Public Assistance Receipt by Household Income.

	Grade 8		Grade 10		Grade 12	
130% of poverty line	0.478***	--	0.413***	--	0.398***	--
	(0.044)	--	(0.045)	--	(0.039)	--
185% of poverty line	--	0.469***	--	0.386***	--	0.424***
	--	(0.037)	--	(0.039)	--	(0.032)
Female	-0.018	-0.035	0.017	0.005	0.016	0.008
	(0.030)	(0.028)	(0.027)	(0.026)	(0.025)	(0.023)
Black	0.361***	0.331***	0.368***	0.350***	0.310***	0.279***
	(0.045)	(0.044)	(0.048)	(0.049)	(0.041)	(0.040)
Hispanic	0.307***	0.272***	0.347***	0.315***	0.445***	0.405***
	(0.085)	(0.088)	(0.081)	(0.077)	(0.072)	(0.073)
Asian	-0.099	-0.103	0.138	0.118	-0.010	-0.015
	(0.079)	(0.075)	(0.190)	(0.177)	(0.130)	(0.101)
Native American	0.051	0.077	0.387**	0.408**	0.327**	0.252**
	(0.167)	(0.166)	(0.165)	(0.162)	(0.148)	(0.120)
Other race	0.037	-0.011	-0.052	-0.042	-0.011	-0.014
	(0.100)	(0.098)	(0.086)	(0.091)	(0.086)	(0.084)
Number of siblings	0.073***	0.072***	0.055***	0.061***	0.073***	0.069***
	(0.017)	(.017)	(0.015)	(0.014)	(0.013)	(0.012)
Parent ed: Less than HS	0.327***	0.254***	0.326***	0.276***	0.118**	0.062
	(0.082)	(0.077)	(0.076)	(0.073)	(0.057)	(0.051)
Parent ed: HS	0.134***	0.103**	0.087**	0.059	0.049	0.018
	(0.045)	(0.044)	(0.039)	(0.039)	(0.036)	(0.032)
Parent ed: BA or higher	-0.194***	-0.173***	-0.205***	-0.184***	-0.166***	-0.144***
	(0.037)	(0.037)	(0.031)	(0.032)	(0.030)	(0.028)
Number of observations	1959	1959	1911	1911	1877	1877

Notes:

(1) Coefficients are marginal effects from a probit model. Standard errors appear below the regression coefficients and are clustered at the family level.

(2) Regressions also include cohort fixed effects.

(3) "Any assistance" includes FRL, food stamps, TANF, and WIC.

(4) Poverty is defined as the ratio of taxable income to the federal need threshold, which takes into account household size.

(5) 130% of the poverty line is the threshold for free lunches and 185% is the threshold for reduced price lunches.

Table 5: Predicting Family Income for 8th Grade Assistance Recipients.

	Above poverty threshold			
	200 percent		300 percent	
	Grade 10	Grade 12	Grade 10	Grade 12
Below 130% of poverty in grade 8	-0.451***	-0.209***	-0.121***	-0.079***
	(0.047)	(0.052)	(0.031)	(0.025)
Female	-0.054	0.005	-0.038**	-0.010
	(0.042)	(0.046)	(0.015)	(0.018)
Black	-0.087**	-0.148***	-0.028*	-0.050***
	(0.044)	(0.048)	(0.017)	(0.019)
Hispanic	-0.092*	-0.028	0.005	-0.005
	(0.048)	(0.063)	(0.020)	(0.023)
Asian	--	--	--	--
	--	--	--	--
Native American	--	0.013	--	--
	--	(0.203)	--	--
Other race	0.205	0.159	-0.028***	-0.032**
	(0.172)	(0.234)	(0.011)	(0.015)
Number of siblings	-0.000	-0.033*	-0.005	-0.013
	(0.017)	(0.018)	(0.007)	(0.010)
Parent ed: Less than HS	-0.170***	-0.234***	-0.063***	-0.088***
	(0.052)	(0.052)	(0.021)	(0.022)
Parent ed: HS	-0.123**	-0.141***	-0.012	-0.053**
	(0.052)	(0.053)	(0.019)	(0.023)
Parent ed: BA or higher	-0.110**	-0.159***	-0.012	-0.030*
	(0.043)	(0.040)	(0.022)	(0.016)
Above poverty threshold (%)	22.4	24.2	7.1	7.8
Number of observations	769	762	769	762

Notes:

(1) Coefficients are marginal effects from a probit model. Standard errors appear below the regression coefficients and are clustered at the family level.

(2) Regressions also include cohort fixed effects.

(3) "Any assistance" includes FRL, food stamps, TANF, and WIC.

(4) This table is limited to those receiving any assistance in grade 8.

(5) Poverty is defined as the ratio of taxable income to the federal need threshold, which takes into account household size.

(6) Some racial groups are omitted due to a lack of variation on the outcome measures.

Table 6: Educational Attainment by Public Assistance Receipt.

	Grade 8		Grade 10		Grade 12	
	HS graduate	Any college	HS graduate	Any college	HS graduate	Any college
Received public assistance	-0.055*	-0.102**	-0.032	-0.196***	-0.020	-0.240***
	(0.031)	(0.052)	(0.029)	(0.050)	(0.026)	(0.048)
Female	0.018	0.097***	0.020	0.103***	0.016	0.093***
	(0.022)	(0.035)	(0.022)	(0.035)	(0.022)	(0.035)
Black	-0.020	-0.026	-0.036	-0.018	-0.025	0.037
	(0.029)	(0.049)	(0.032)	(0.050)	(0.029)	(0.050)
Hispanic	-0.001	0.233***	-0.007	0.279***	-0.002	0.312***
	(0.050)	(0.081)	(0.052)	(0.075)	(0.053)	(0.074)
Asian	-0.003	0.248**	0.001	0.277**	-0.020	0.347***
	(0.074)	(0.120)	(0.074)	(0.110)	(0.086)	(0.100)
Native American	-0.369*	-0.441***	-0.362*	-0.419***	-0.372*	-0.436***
	(0.203)	(0.051)	(0.204)	(0.058)	(0.212)	(0.051)
Other race	-0.070	-0.032	-0.070	-0.043	-0.062	-0.035
	(0.082)	(0.123)	(0.082)	(0.128)	(0.079)	(0.134)
Number of siblings	-0.013	-0.001	-0.016	-0.004	-0.014	0.009
	(0.010)	(0.018)	(0.010)	(0.018)	(0.010)	(0.018)
Parent ed: Less than HS	-0.088	-0.296***	-0.094	-0.270***	-0.111*	-0.291***
	(0.058)	(0.055)	(0.059)	(0.058)	(0.061)	(0.057)
Parent ed: HS	-0.061*	-0.170***	-0.066*	-0.172***	-0.064*	-0.170***
	(0.035)	(0.049)	(0.036)	(0.049)	(0.035)	(0.049)
Parent ed: BA or higher	-0.049	0.025	-0.046	0.009	-0.045	0.003
	(0.038)	(0.054)	(0.038)	(0.054)	(0.037)	(0.054)
Number of observations	1421	1421	1401	1401	1398	1398

Notes:
(1) Coefficients are marginal effects from a probit model. Standard errors appear below the regression coefficients and are clustered at the family level.
(2) Regressions also include cohort fixed effects.
(3) "Any assistance" includes FRL, food stamps, TANF, and WIC.
(4) Educational attainment is measured by the total years of completed education.
(5) This table measures cumulative educational attainment through 2009. If observations were missing, the most recent post-high school observation was used.
(6) Only the first three cohorts are included because cohort 4 was in 12th grade in 2009.
(7) The high school graduate and any college categories are not mutually exclusive.

Table 7: Parameters for the Monte Carlo Simulation.

Invariant Assumptions

(1) 2.5 million students receive FRL in grade 8, and 30% enroll in college.
(2) 26.7% of FRL recipients who enroll in college would not have received the maximum Pell Grant under current rules. 19% would receive a partial Pell and 7.7% would not receive a Pell
(3) All costs and benefits are discounted to age 19 at 3.5%, with sensitivity checks at 2% and 5%.
(4) Benefits are discounted by an additional 0.2% to account for mortality rates.

Enrollment and Attainment Assumptions

Variable	Mean	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Case 1: Increased enrollment resulting from the early commitment program.						
Increased enrollment (pct)	4.0	2.0	3.0	4.0	5.0	7.0
Counterfactual attainment						
High school diploma	10.0	6.0	8.0	10.0	12.0	14.0
No high school diploma	90.0	94.0	92.0	90.0	88.0	86.0
Educational attainment (pct)						
Some college	50.0	44.0	47.0	50.0	53.0	56.0
Associate's degree	30.0	25.1	27.3	29.9	32.5	35.0
Bachelor's degree	20.0	16.0	17.8	19.8	22.1	24.0
Case 2: Increased attainment by previously enrolled students.						
Educational attainment (pct)						
Some college to AA	3.0	1.0	2.0	3.0	4.0	5.0
AA to BA	3.0	1.0	2.0	3.0	4.0	5.0

Cost Assumptions

Variable	Mean	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Case 1: Increased enrollment resulting from the early commitment program.						
Enrollment status (pct)						
Full-time	61.0	55.0	58.0	61.0	64.0	67.0
Part-time	39.0	45.0	42.0	39.0	36.0	33.0
Years of Pell receipt						
Full-time	2.50	1.69	2.07	2.49	2.91	3.29
Part-time	1.60	1.07	1.32	1.60	1.87	2.12
Average Pell (undiscounted)						
Full-time	4326.94	2923.05	3577.32	4305.86	5037.35	5690.05
Part-time	1445.43	980.37	1209.75	1450.20	1697.61	1914.36

Table 7: Parameters for the Monte Carlo Simulation (Continued).

Variable	Mean	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Case 2: Increased funding for previously enrolled students not receiving full Pell.						
Enrollment status (pct)						
Full-time	57.0	51.0	54.0	57.0	60.0	63.0
Part-time	43.0	49.0	46.0	43.0	40.0	37.0
Years of Pell receipt						
Full-time	2.30	1.56	1.90	2.30	2.68	3.05
Part-time	1.50	1.03	1.25	1.51	1.76	1.99
Average Pell (undiscounted)						
Full-time	2644.27	1803.41	2208.09	2648.39	3089.89	3482.35
Part-time	873.61	593.87	726.25	877.83	1019.45	1151.19

Benefit Assumptions

Variable	Mean	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Lifetime earnings (undiscounted)						
No high school diploma	969,000	554,324	749,997	968,280	1,184,523	1,380,629
High school diploma	1,304,000	742,897	1,005,135	1,297,675	1,587,480	1,850,298
Some college	1,547,000	881,335	1,192,442	1,539,496	1,883,307	2,195,100
Associate's degree	1,727,000	983,883	1,331,187	1,718,623	2,102,438	2,450,510
Bachelor's degree	2,268,000	1,292,094	1,748,195	2,256,999	2,761,047	3,218,156
Labor force participation rate (pct)	78.0	73.0	75.0	78.0	81.0	83.0
Effective federal tax rate (pct)	15.0	10.0	12.0	15.0	17.0	20.0

Table 8: Estimated Fiscal Impacts of the Early Commitment Program.

Cost Estimates ($mil)	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Increased enrollment (case 1)	232.7	404.8	655.3	969.9	1331.4
Additional awards (case 2)	324.7	570.4	857.3	1195.0	1523.9
Total	707.3	1066.0	1523.5	2103.7	2687.3

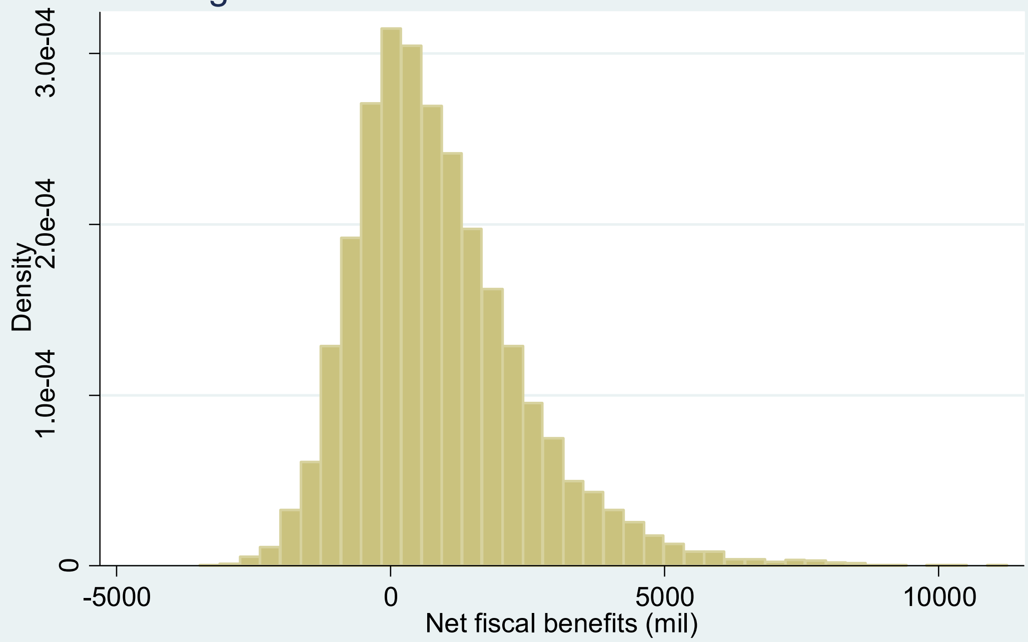
Benefit Estimates ($mil)	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Increased enrollment (case 1)	630.3	1153.4	1968.4	3068.4	4357.4
Additional awards (case 2)	66.3	111.1	181.4	278.3	393.8
Total	777.8	1321.7	2175.2	3310.7	4641.9

Net Fiscal Benefit by Discount Rate ($mil)	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Low (2.0%)	-444.4	326.0	1418.4	2947.1	4628.7
Preferred (3.5%)	-832.6	-201.5	609.1	1682.4	2897.9
High (5.0%)	-1123.3	-562.5	78.0	888.5	1770.3

Benefit-Cost Ratio by Discount Rate	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile
Low (2.0%)	0.73	1.20	1.94	3.15	4.93
Preferred (3.5%)	0.53	0.87	1.41	2.28	3.56
High (5.0%)	0.39	0.64	1.05	1.70	2.65

NOTE: All estimates come from a Monte Carlo simulation with 10,000 trials.

Figure 1: Distribution of Estimated Net Benefits



Result of 10,000 simulations with the parameters from Appendix 3.

Appendix 1: Federal Program Receipt by 8th Grade Cohort.

Cohort 1 (1999)	Mean	(SE)
Any public assistance (%)	32.0	(2.7)
WIC	6.2	(1.1)
Free/reduced price lunch	31.1	(2.7)
TANF	4.1	(1.0)
Food stamps	11.3	(1.7)
Number of children	569	

Cohort 2 (2001)	Mean	(SE)
Any public assistance (%)	31.9	(2.7)
WIC	5.3	(1.4)
Free/reduced price lunch	30.7	(2.6)
TANF	1.4	(0.4)
Food stamps	6.9	(1.3)
Number of children	565	

Cohort 3 (2003)	Mean	(SE)
Any public assistance (%)	30.1	(2.6)
WIC	5.4	(1.6)
Free/reduced price lunch	29.1	(2.6)
TANF	3.1	(1.0)
Food stamps	11.2	(1.9)
Number of children	546	

Cohort 4 (2005)	Mean	(SE)
Any public assistance (%)	38.7	(2.8)
WIC	7.7	(1.8)
Free/reduced price lunch	37.4	(2.8)
TANF	1.9	(0.6)
Food stamps	13.2	(2.1)
Number of children	560	

Notes:

(1) Any aid includes FRL, WIC, TANF, and food stamp receipt in the prior year.

(2) 8th grade includes children ages 13 and 14 in the listed year.

(3) FRL includes both free/reduced lunch and breakfast programs.

(4) Observations are weighted to account for the study's design. Standard errors are clustered at the family level.

Appendix 2: Educational Attainment by Family Income.

	Grade 8		Grade 10		Grade 12	
	HS graduate	Any college	HS graduate	Any college	HS graduate	Any college
Below 185% of poverty line	-0.099***	-0.224***	-0.042	-0.205***	-0.075***	-0.198***
	(0.032)	(0.040)	(0.029)	(0.043)	(0.028)	(0.040)
Female	0.020	0.104***	0.021	0.103***	0.018	0.092***
	(0.021)	(0.035)	(0.022)	(0.035)	(0.022)	(0.035)
Black	-0.012	0.000	-0.035	-0.035	-0.010	0.002
	(0.028)	(0.045)	(0.031)	(0.049)	(0.027)	(0.048)
Hispanic	0.010	0.269***	-0.004	0.273***	0.010	0.265***
	(0.046)	(0.071)	(0.051)	(0.072)	(0.048)	(0.073)
Asian	0.004	0.265**	0.007	0.296**	-0.010	0.354***
	(0.070)	(0.116)	(0.073)	(0.118)	(0.082)	(0.103)
Native American	-0.331*	-0.425***	-0.368*	-0.429***	-0.352*	-0.444***
	(0.185)	(0.057)	(0.202)	(0.051)	(0.207)	(0.047)
Other race	-0.068	-0.019	-0.067	-0.021	-0.064	-0.027
	(0.083)	(0.122)	(0.082)	(0.123)	(0.082)	(0.121)
Number of siblings	-0.013	-0.001	-0.016	-0.010	-0.012	-0.001
	(0.010)	(0.017)	(0.010)	(0.018)	(0.010)	(0.018)
Parent ed: Less than HS	-0.069	-0.260***	-0.090	-0.266***	-0.090	-0.279***
	(0.054)	(0.058)	(0.058)	(0.058)	(0.058)	(0.057)
Parent ed: HS	-0.056	-0.164***	-0.062*	-0.165***	-0.053	-0.155***
	(0.034)	(0.049)	(0.036)	(0.050)	(0.034)	(0.049)
Parent ed: BA or higher	-0.058	0.003	-0.047	0.005	-0.052	0.017
	(0.039)	(0.054)	(0.038)	(0.054)	(0.038)	(0.053)
Number of observations	1421	1421	1401	1401	1398	1398

Notes:
(1) Coefficients are marginal effects from a probit model. Standard errors appear below the regression coefficients and are clustered at the family level.
(2) Regressions also include cohort fixed effects.
(3) 185% of the poverty line is the threshold for FRL eligibility.
(4) Educational attainment is measured by the total years of completed education.
(5) This table measures cumulative educational attainment through 2009. If observations were missing, the most recent post-high school observation was used.
(6) Only the first three cohorts are included because cohort 4 was in 12th grade in 2009.
(7) The high school graduate and any college categories are not mutually exclusive.