Accelerating College Knowledge:

A Fiscal Analysis of a Targeted Early Commitment Pell Grant Program[1]

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Abstract: The persistently low college attainment rates of youth from poor families are partly attributable to their uncertainty about college affordability. The current federal financial aid system does not provide specific information about college costs until just before college enrollment and the information is only available to students completing a complex application. Evidence suggests this late timing reduces their motivation and ability to adequately prepare for college. This paper evaluates the fiscal consequences of instead making an early commitment of the full Pell Grant to eighth graders from needy families, using a simplified eligibility process. Analyses conducted using the Panel Study of Income Dynamics suggest the predicted costs are low relative to the benefits estimated using prior research findings. A simulation of the estimated fiscal effects indicates 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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Despite decades of public and private investment in financial aid, just 30 percent of children born to families in the bottom income quartile are expected to enroll in college, compared to 80 percent 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 completion gap is even 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 there may be substantial talent lost among students from low-income families who forgo college or attend less selective colleges (e.g., Plank & Jordan, 2001; Hoxby & Avery, 2012).

Inequality in college opportunities is linked to intertwined financial and academic difficulties affecting students with few resources. Students from low-income families are overrepresented at k-12 schools with few academic resources, and their families are less likely to push them towards college preparation, seeing few possibilities of affording the costs (Reardon, 2011). In response, states and communities have created "early commitment" or "college promise" programs intended to imbue younger students with the knowledge that college can be affordable if only they take the necessary academic and financial steps to prepare (Andrews, forthcoming). The programs also create a compact between government and families aimed at reducing their anxiety and building trust, in turn inspiring behavioral changes.

Evidence on the effectiveness of early commitment programs is limited and existing evaluations focus on relatively small-scale programs. The generally positive effects of these efforts may understate their potential, since local promises come with limited funding and apply only in specific geographic areas (e.g., Andrews, forthcoming). To date, the federal government has administered a small early commitment program, Gaining Early Awareness and Readiness

for Undergraduate Programs (GEAR UP) and created several net price calculators to promote earlier knowledge of college costs. But over the last decade, interest has emerged in developing an early commitment program associated with the federal Pell Grant program, which currently disburses nearly $34 billion to students annually (Heller, 2006; Huelsman & Cunningham, 2013; National Association of Student Financial Aid Administrators, 2013). Enthusiasm for the idea has been tempered by concerns about costs, yet these have not been estimated.

To help inform discussion and debate of this important policy proposal, this article synthesizes research on the potential benefits of an early commitment Pell effort, and describes a fiscal analysis to estimate the costs. Would an early commitment program effectively increase college enrollment rates without greatly inflating program costs or otherwise hampering efficiency? A hypothetical scenario is considered, in which the maximum Pell Grant ($5,550 in the 2012-13 academic year) would be promised to all eighth grade students from economically-disadvantaged families, providing notice of college costs before the decision about college enrollment is likely to occur.

The results suggest that an early commitment program may increase the enrollment rates of Pell Grant recipients by approximately four percentage points. This impact would come at an estimated additional cost of $1.5 billion per cohort to the federal government, according to the median simulation, but those costs would be more than offset by an additional $2.1 billion in net discounted federal tax revenues resulting from increased enrollment and college completion rates.

Reshaping the Pathway to College

There are at least three critical elements of college preparation—academic, financial, and social— and early commitment programs aim to affect all three (St. John et al., 2004). Each of these factors has direct and indirect influences on a student's readiness for college, but the current aid distribution system does little to positively affect them.

Timing and Eligibility in the Current Financial Aid System

After completing three years of high school, students begin a complex process in order to obtain specific information about the costs of college attendance. While nearly all eighth grade students express a desire to attend college, many give up hope long before this point, never considering applying for financial aid. Figuring that college is out of their financial reach, many high school students from economically fragile families opt for easier high school courses, invest in work or friends rather than school, and stop thinking of themselves as college material (Roderick, Nagaoka, & Coca, 2009).

Students currently receive information about aid eligibility by completing the Free Application for Federal Student Aid (FAFSA). The resulting expected family contribution (EFC) for the upcoming academic year represents the family's short-term financial ability to pay for college and determines eligibility for the Pell Grant and other need-based aid. This process must be repeated each year, making it impossible to project upcoming college costs with much accuracy more than a year in advance (Kelchen & Jones, 2013).[3] Students and families rarely

[3] Students with family income below $50,000 can complete a simplified FAFSA if they did not have to file the IRS 1040 long tax form, meet dislocated worker criteria, or receive a means-tested federal benefit. In addition, if family income is below $23,000, students qualify for an automatic zero EFC (and the maximum Pell Grant) if they participate in at least one federal means-tested benefit program, by far the largest of which is the free and reduced price lunch program (FRL). The automatic zero EFC provision affects about 4.4 million students, or 46 percent of Pell recipients (U.S. Department of Education, 2013).

know with any certainty what they will pay for college until they are on the brink of payment (Cabrera & La Nasa, 2000), and this delay may be most consequential for price-sensitive students, overrepresented among low-income families who are more apt to make sizable errors when estimating college costs (e.g., Luna de la Rosa, 2006; Grodsky & Jones, 2007; Rowan-Kenyon, Bell, & Perna, 2008).

Although the case for simplifying the aid application process has been made repeatedly (Dynarski & Scott-Clayton, 2008; Dynarski, Scott-Clayton, & Wiederspan, 2013) until recently the *timing* of financial aid has received much less attention. This is notable given that poor timing has been linked to paltry rates of FAFSA completion--particularly at impoverished schools (Feeney & Heroff, 2013).[4],[5] Some have argued for advancing the completion timeline by one year, providing somewhat earlier notification (e.g., Advisory Committee on Student Financial Assistance, 2008b; Dynarski & Wiederspan, 2012; Kelchen & Jones, 2013). But this timeline is probably still insufficient if the goal is to increase a sense of college affordability early enough to affect college preparation.

Critical Elements of College Preparation

The road to college is structured and sequential, with a series of high school courses necessary in order to meet most admissions requirements or avoid college remediation (Cabrera & La Nasa, 2001; Klasik, 2012). For example, while the track to college-level math begins in middle school and early engagement disproportionately benefits students from low-income

[4] Many of the papers in the Gates Foundation's Reimagining Aid Design and Delivery series in 2012 and 2013 discussed the timing of financial aid.

[5] Kantrowitz (2009) uses data from the 2007-08 NPSAS to estimate that approximately 2.3 million students would have qualified for a Pell Grant had they only filed the FAFSA; about half of these students would have qualified for the maximum award. At community colleges, at least one-fifth of all students with annual incomes below $20,000 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 long to complete (LaManque, 2009).

families, they are the least likely to be on track at that point (Lucas & Berends, 2002; Long, Conger, & Iatarola, 2012). That may be due to parental or student choices, or likely both—research suggests that parental expectations for college attendance are an especially important predictor of college academic preparation (Cabrera & La Nasa, 2001).

The important role played by parental expectations reflects the need for college knowledge, a function of both social and cultural capital, in order to take and complete the appropriate steps to the college degree (e.g., Conley, 2001; Goldrick-Rab & Pfeiffer, 2009). Examining students in Chicago Public Schools, Roderick, Nagaoka, and Coca (2009) found that limited access to social capital (norms, information, and clear structures of support) prevented high school students from reaching their college potential. Cultural capital—especially as developed by interactions with teachers, counselors, and parents—is likewise recognized as critically impacting college attainment (e.g., Perna & Titus, 2005). But developing social and cultural capital aimed at college success is an evolving process that requires students, families, and schools to have a sense that college is in the future.

A growing body of literature suggests that financial literacy is also an important part of college preparation and enhancing it earlier on the pathway to college is more effective than addressing it later (Elliott, 2013). Mandell (2006) found that middle school students exposed to a financial literacy seminar received substantial benefits, with the largest gains in financial knowledge accruing among the youngest students. The effects of financial literacy programs in high school are less positive; for example, Peng, Bartholomae, Fox, and Cravener (2007) and Mandell and Klein (2009) find no long-term effects of taking a financial literacy course in high school.

Promising, but Cost-Effective?

There is strong theory and some empirical evidence suggesting that early commitment programs could induce more students to enroll in college, but the balance of costs and benefits is unclear.

Current Estimates of Benefits

The likely impacts of an early commitment Pell program are difficult to estimate since such a program has never been enacted, but something can be learned from other early commitment programs, including those targeted to students from lower-income families and adopted in Indiana, Oklahoma, and Washington (Harnisch, 2009) as well as in dozens of cities and towns. For example, the Indiana program appears to have induced students to enroll in college at somewhat higher rates (Toutkoushian, Hossler, DesJardins, McCall, & Canche, 2013). However, not all eligible students participate in statewide promise or covenant programs, and students from low-income schools may participate at lower rates than students at high-income schools (Birkeland & Arney, 2011).

On a local level, 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 quasi-experimental evidence suggests that students who know they will receive a large Kalamazoo Promise scholarship may be less likely to be suspended for long durations and teachers have higher expectations for them, although there are no significant impacts on grades earned (Bartik & Lachowska, 2012; Jones, Miron, & Kelaher-Young, 2012).

A few rigorous evaluations of college access programs estimate impacts on enrollment. One study examined whether automatically transferring tax data to the FAFSA, submitting the application, and providing information about net price would increase college enrollment rates among a low-income sample (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012). The authors estimated a 4.8 percentage point increase (from a base of 48.5%) in any college enrollment over a three-year period for dependent students. A meta-analysis examining the effects of college access programs on overall postsecondary enrollment rates found that among studies using random assignment and meeting What Works Clearinghouse attrition standards, there was an impact of approximately four percentage points (Harvill, Nguyen, Robertson-Kraft, Tognatta, & Maynard, 2011).[6] We assume an effect of a similar magnitude given this evidence.[7]

Hypotheses Regarding Efficiency and Costs

Advancing the determination for Pell eligibility from twelfth to eighth grade, even for some students, creates the potential for greater program inefficiency. If the intention is to compensate students for *short-term* financial constraints due to low family income close to beginning college (the goal under the current aid system), then awarding aid to students who became less constrained during high school would be inefficient. Evidence suggests that upward and downward income volatility is increasing, especially toward the bottom of the income distribution (e.g., Gottschalk & Moffitt, 2009; Shin & Solon, 2011). Income volatility has increased sharply among low-income families with children (Wagmiller & Smith, 2012). But

[6] They estimate much larger effects (13 percentage points) when including quasi-experimental studies, but many of these programs target more narrow groups than the federal Pell Grant program. As such, we prefer the more conservative estimates from the random assignment programs.

[7] It is also possible that an early commitment program could affect the types of colleges students attend. Research by Hoxby and Turner (2013) suggests that providing information about college costs and fee waivers results in high-achieving, low-income students attending colleges with graduation rates six percentage points higher than control students.

most poor families remain persistently poor while their children are in school. Heller (2006) estimated that 77 percent of seventh-graders eligible to receive free or reduced price lunch (FRL) in 1987 were still eligible for FRL as eleventh-graders. He also examined a cohort of entering college students in 2003, finding that 80 percent of families who were FRL-eligible as eleventh-graders got the Pell Grant. Dynarski and Wiederspan (2012) used data from the 2006 and 2007 tax years to examine eligibility over a shorter timeframe and found that for 77 percent 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.

On the other hand, if the intent of the Pell Grant is to compensate students for longer-term financial constraints—a lack of family *wealth* rather than income—there is far less risk of increased inefficiency. Even if family income increases somewhat while a student is in high school (which is consistent with the life cycle trajectory of earnings), increased income does not mean that a family has the level of wealth required to make college truly affordable (Conley, 2001). Wealth is persistent (Keister & Moller, 2000), and does not substantially increase as poverty decreases (Caner & Wolff, 2004).

Research Questions

To assess the potential costs and benefits of an early commitment Pell program, we 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 automatic 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) How would the estimated increase in enrollment as a result of early commitment affect the costs and benefits of the Pell Grant program with respect to the federal government?

A Hypothetical Targeted Early Commitment Pell Grant Program

Under recent changes to aid eligibility rules, students automatically receive a full Pell Grant if their family receives a federal means-tested benefit in grade 12 and they file the FAFSA (U.S. Department of Education, 2012). This, combined with national college attainment goals and growing concerns about college affordability, sets the stage for a federal early commitment Pell Grant program targeted to eighth grade students (Advisory Committee on Student Financial Assistance, 2005, 2008b; Heller, 2006). A fiscal analysis facilitates the examination of the costs and benefits of advancing that timeline from twelfth to eighth 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). Figure 1 provides a summary of our hypothetical approach compared to current law.

Approach to Targeting

Determining early commitment program eligibility using a proxy for family income is more desirable than requiring an additional application, which is likely to reduce its accessibility. Using the FRL program for targeting an early commitment of the Pell has benefits and drawbacks. FRL receipt is a reasonable way of measuring childhood poverty because it is a means-tested entitlement program with reasonably strong take-up rates. In the 2009-2010 academic year, 31.7 million children received FRL through the National School Lunch Program (Young, Diakova, Earley, Carnage, Krome, & Root, 2012) at the 95 percent of schools

participating in the program. A student's household income must be less than 130 percent of the federal poverty line to receive a free lunch, while the cutoff is 185 percent for reduced price lunch receipt. Moreover, all students who have a family member receiving TANF or food stamps automatically receive FRL. But while 87 percent of elementary school students who are income-eligible for FRL participate in the program, participation rates decline to approximately 70 percent in middle school and 60 percent in high school (Gordon & Fox, 2007), and certain high-poverty schools are authorized to offer free lunches to all students. Take-up rates may decline in later grades due to social stigma associated with receiving government benefits and the increased availability of outside food options for students (Mirtcheva & Powell, 2009). However, takeup rates are likely to increase if Pell funds are tied to FRL eligibility.

The Importance of Cost-Benefit Analyses

Policymakers are increasingly interested in whether programs pass a cost-benefit test, which requires the estimated benefits of the intervention to be larger than the estimated costs. Harris (2009) noted the difficulty of estimating long-term costs and benefits of social and educational programs due to challenges in measuring effects, placing monetary values on factors such as health benefits and opportunity costs, and uncertainty about the discount rate (how much future costs and benefits need to be adjusted in order to express them in current dollars)). To account for the uncertainty in estimating long-term costs and benefits, we employed a Monte Carlo simulation (e.g. Rubinstein & Kroese, 2008), allowing for a wide range of values regarding cost and benefit assumptions.

Methodology

We used a sample broadly representative of American adolescents to examine our research questions. Probit models are estimated and the resulting coefficients are then used to estimate the costs of the hypothetical early commitment program.

Data

To examine the extent to which early commitment programs could appropriately and efficiently notify students from needy families about their Pell Grant eligibility, we used data from the Panel Study of Income Dynamics (PSID) from 1999 through 2009.[8] The biennial survey includes questions on demographics, income and assets, and participation in federal means-tested programs such as TANF/AFDC, food stamps, FRL, and Women, Infants, and Children nutrition program (WIC). The PSID includes a nationally representative sample, along with an oversample of low-income families, and this analysis focuses on a subsample of families in the core/immigrant sample.

Sample

We included families with at least one biological or adopted child between the ages of seven and 14 in 1999, resulting 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).[9] Nearly three-fourths of the students are white and 18 percent 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 percent hold bachelor's degrees.

[8] Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.
[9] All estimates in this paper are reported using survey weights and clustered at the household level.

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

When in eighth grade, 33 percent of students in the sample received at least one of four types of public assistance; over 96 percent of those students received free or reduced price meals at school.[11] At the time, six percent of students had a family member receiving WIC assistance and 10.5 percent received food stamps, but fewer than three percent of students had a family member receiving assistance through TANF. Appendix 1 shows information on federal program receipt in eighth grade, by cohort. Receipt rates are consistent across the cohorts, suggesting that they can be combined for estimation purposes.

Table 2 illustrates rates of public assistance receipt in tenth and twelfth grades, family income in twelfth grade, and educational attainment levels by eighth grade public assistance receipt. Fully 81 percent of students receiving means-tested benefits in eighth grade received them again in tenth grade, and 69 percent of eighth grade recipients were still receiving benefits in twelfth grade (which would currently automatically qualify them for the maximum Pell Grant). The decline in benefit receipt rates during high school is likely attributable to reduced take-up among income-eligible students, students who drop out from high school before twelfth grade, and increased family income. The last factor appears to be driving some, but not most, of the decline in benefit receipt rates. Just 27 percent of students receiving assistance in eighth

[10] We use complete cases in the analyses, excluding less than four percent of students with eighth grade information.
[11] Free and reduced price lunch receipt are combined in the PSID data. We combine free/reduced breakfast with the lunch program because very few children participate in the breakfast program without participating in the lunch program. We thus refer to the programs as free/reduced lunch.

grade had a family income of more than 185 percent of the poverty line in twelfth grade (currently qualifying them for the automatic zero EFC), and only eight percent had a family income of more than 300 percent of poverty at that time (likely making them ineligible for a Pell Grant). Only 18 percent of students who did not receive benefits in eighth grade had a family income of less than 185 percent of the poverty line in twelfth grade.

There is a sharp disparity in college enrollment rates according to likely Pell eligibility. Just under 30 percent of students who received federal benefits in eighth grade enrolled in college by 2009 (ages 19-24), compared to 44 percent 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.

Analytic Strategy

We used several methods to examine the feasibility of an early commitment program based on federal means-tested program receipt. First, we predicted public assistance receipt for student *i* in tenth or twelfth grade based on eighth grade receipt and student demographic characteristics using a probit model:

$$\Pr(Asst_{gi} = 1) = \Phi(\beta_0 + \beta_1 Asst_{8i} + \beta_2 StuDem_i + \beta_3 Cohort_i), \quad (1)$$

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, public assistance receipt is regressed for student *i* in a given grade *g* on the income cutoffs for FRL receipt:

$$\Pr(Asst_{gi} = 1) = \Phi(\beta_0 + \beta_1 Income_{gi} + \beta_2 StuDem_i + \beta_3 Cohort_i), \quad (2)$$

where $Income_{gi}$ represents whether a student's family income is less than 130 percent (free lunch) or 185 percent 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 eighth and twelfth grade.

A key concern with early commitment programs is that some students who are eligible in eighth grade are no longer financially needy upon reaching college age, leading to an over-award of financial aid.[12] Among students who received any public assistance in eighth grade, having a tenth or twelfth grade household income of at least 200 percent or 300 percent of the poverty line is regressed on being below 130 percent of the poverty line in eighth grade (our best estimate of free lunch eligibility) and a vector of other student characteristics:

$$\Pr(Income_{gi} = 1) = \Phi(\beta_0 + \beta_1 Poverty_{8i} + \beta_2 StuDem_i + \beta_3 Cohort_i), \quad (3)$$

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

We then examined the relationships between receiving public assistance in eighth to twelfth grades and later educational attainment:

[12] If a student's family income declined between eighth and twelfth grades, the traditional financial aid disbursement system would determine Pell eligibility upon college entry.

$$\Pr(EdAttain_i = 1) = \Phi(\beta_0 + \beta_1 Asst_{8i} + \beta_2 StuDem_i + \beta_3 Cohort_i), \quad (4)$$

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 focus on the eighth 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. We cannot perfectly observe means-tested program receipt in this dataset, and this may contribute to understating the rate of program participation. Meyer, Mok, and Sullivan (2009) estimate that only about 70 percent of families receiving FRL (who are most means-tested benefit recipients) actually report it in the PSID; this introduces error into our estimates. The data do not include students who reached college age during the Great Recession, likely understating the number of eligible students. It also may not accurately reflect their demographic characteristics, which could result in additional income volatility and weaker program targeting. Additionally, the measure of educational attainment (years of education completed) is crude, but it does provide an indicator of postsecondary enrollment.

Examining the Persistence of Poverty

We found that poverty is fairly persistent; later receipt of federal assistance is highly correlated with eighth grade receipt, although this relationship weakens between tenth and twelfth grade (0.6 to 0.4, $p<.01$) (Table 3). It was especially persistent for racial/ethnic minorities and children whose parents who did not complete high school. 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 percent of poverty line (free lunch) and 185 percent of poverty line (reduce price lunch) thresholds. The relationship between low household income and receiving public assistance weakened from 0.48 to 0.40 between grades 8 and 12, confirming the importance of starting an early notification program in eighth grade when participation in public assistance programs is more common. Again, minority students and those with less-educated parents were more likely to continue to take up the programs, which may be a function of universal FRL eligibility at high-poverty schools.

Next, we examined family income volatility among students who initially received public assistance in eighth grade, using thresholds of 200 percent and 300 percent of the poverty line (Table 5). Only 20 percent of students who received assistance in eighth grade had a family income of over 200 percent of poverty by tenth grade, increasing to 25 percent by twelfth grade. Fewer than 10 percent ever had a family income of over 300 percent of poverty in high school, suggesting that few poor families become well-off while their children go through high school and that later income checks may not be necessary. Free lunch eligibility continued to act as a strong predictor of continued low-income status in tenth grade, but was somewhat less effective at predicting twelfth grade eligibility. In other words, the current system, which relies on twelfth grade program receipt, is likely under-awarding some students (or at least subjecting to unnecessary additional needs 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 eighth grade were nearly ten percentage points less likely to attend college than those who did

not, net of other demographic characteristics.[13] This differential increased 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.

Fiscal Analysis

We used a Monte Carlo simulation with 10,000 trials to estimate the net fiscal effects of the proposed early commitment program, assuming that about 2.5 million of the 32 million students enrolled in the National School Lunch program are in eighth grade each year. We then assumed a 30 percent initial enrollment rate of FRL students and an average estimated enrollment impact of four percentage points.[14] All costs and benefits are discounted back to age 19 (a student's first year in college) using a 3.5 percent discount rate with sensitivity checks at two and five percent (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 Pell Grant program, we used 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 program's cost 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 current

[13] We also estimated the likelihood of educational attainment by being income-eligible for FRL (results available upon request from the authors). The gap between students from poor and nonpoor families is even larger, although the estimates are on a smaller number of cohorts.

[14] All binary variables are estimated using a binomial distribution with 100 draws, while continuous variables are estimated with specified standard deviations.

rules (Case 2). The distribution of part-time and full-time students for initial full and partial Pell recipients is used, 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. [15] Estimates are adjusted to current dollars by multiplying by the percentage increase in the maximum Pell Grant between 2003 and 2012 ($4,050 vs. $5,550).

The program might be less cost-effective if many students who received an early commitment of a maximum Pell Grant subsequently experienced increases in their family income (Case 2). We previously estimated that seven percent of students who were income-eligible for FRL in eighth grade were no longer income-eligible in twelfth grade. However, most of these students likely remained Pell-eligible based on income, as just 29 percent of students who were no longer income-eligible had family incomes of over 300 percent of the poverty line by twelfth grade. We assumed that everyone between 185 percent and 300 percent of the poverty line is receiving the average Pell Grant for non-zero EFC Pell recipients and no one above 300 percent of the poverty line receives a Pell Grant.[16] To estimate the net increase in Pell expenditures, the partial Pell awards that would currently be given to students between 186 percent and 300 percent of the poverty line are subtracted from the full Pell award.

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) are then combined to estimate the total costs of the early commitment program. Our preferred assumption of a four

[15] 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.

[16] Depending on household size, 300 percent of household income is approximately $60,000-$75,000 per year. In the 2011-2012 academic year, only three percent of all Pell Grant recipients had household incomes of over $60,000 per year (U.S. Department of Education, 2013).

percentage point increase in enrollment resulted in a $1.5 billion increase in expenditures per cohort in our simulation. This is a small fraction of the current Pell Grant expenditures of approximately $34 billion (U.S. Department of Education, 2013). A program that is effective in reaching students in earlier grades may 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 making 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 estimated that ten percent of the enrollment increase is from this category, with the other 90 percent coming from students who would have otherwise graduated from high school.[17] Students who attend college as a result of the early commitment program are likely to be less academically prepared than their peers and are less likely to complete a degree. Our preferred estimate is that 30 percent of students induced to enroll in college complete an associate's degree and 20 percent complete a bachelor's degree, with the remaining students completing some college. However, the low-income students who do gain admission to college may benefit more than higher-income students (Zimmerman, forthcoming).

In addition to benefiting 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

[17] Alternatively, some students may be induced *not* to attend college after receiving information about the cost of college through the early commitment program. This could be a net benefit to the federal government if they would have briefly attended college, taken out loans, and then defaulted on those loans in the counterfactual scenario. We exclude this group of students from the cost or benefit estimates.

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. Prior quasi-experimental work suggests that an additional $1,000 in total financial aid received results in an approximately three percentage-point increase in retention rates among Pell recipients (Castleman & Long, 2013). Assuming that the average student receives the Pell Grant for approximately two years, a three percentage-point increase in retention and completion seems reasonable.

We used 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, and 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 resulted in a slightly narrower interquartile range than is reported in their analysis, but yielded a normal distribution with few implausibly low values. The earnings distributions were jointly estimated to preserve the relative returns to education.

The estimates of the labor market returns to education are for full-time workers, so the estimated (discounted) lifetime earnings are multiplied by the average labor force participation rate for 25- to 64-year-olds from the Bureau of Labor Statistics (Toossi, 2012). This resulted in an average labor force participation rate of 78 percent. We then estimated 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), resulting in our

preferred estimate of a 15 percent tax rate.[18] Benefit estimates are discounted by an additional 0.2 percent to account for mortality during adults' prime earning years (Office of the Chief Actuary, 2012).

Net Fiscal Impacts

We estimated the net fiscal impacts of the potential early commitment program using the assumptions detailed above and in Table 7, allowing the parameter values to vary across 10,000 simulations. Net benefit and cost-benefit ratio estimates are reported in Table 8 and estimated costs of approximately $1.5 billion per cohort and benefits of $2.2 billion in the median simulation. This resulted in an estimated net benefit of over $600 million and a benefit-cost ratio of 1.41.[19] Figure 2 provides a distribution of the estimated net fiscal benefits across 10,000 simulations with the preferred discount rate of 3.5 percent. The estimated net benefit was positive in 69 percent of the simulations with the preferred discount rate, compared to 82 percent of simulations with a two percent discount rate and 53 percent of simulations with a five percent discount rate. 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, an interactive spreadsheet and Stata simulation code available from the authors allow for the testing of different assumptions.

Several important components of the fiscal analysis are not modeled. On the benefit side, the nonmarket benefits of education, such as better health and lower rates of incarceration and means-tested benefit receipt, are excluded, even though these have been shown to significantly

[18] This is more appropriate than the average effective tax rate for the median quintile in 2009 (11 percent) 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.
[19] We report the net fiscal impact from the median instead of the mean simulation because the distribution of estimated effects (as shown in Figure 2) is skewed to the right. For example, the mean fiscal impact is approximately $900 million with a 3.5 percent discount rate, compared to a median impact of about $600 million.

increase the returns to education (Wolfe & Haveman, 2002; Belfield & Levin, 2007). Also not modeled are 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. Indirect costs and benefits, such as the additional cost to K-12 schools or colleges of administering programs for additional students, are excluded. Thus the estimated cost-benefit ratios are conservative estimates of the effectiveness of the program, as the omitted benefits are likely larger than the omitted costs.

Discussion

There are substantial income disparities in college enrollment and completion rates and prior research suggests that students from low-income families may perceive college as unaffordable and therefore not prepare academically for college. The analysis in this article suggests that 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 already receive it under current rules. The difference is that instead of waiting until twelfth grade to learn that college is affordable, they would learn this information in eighth 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, no students would be "losers" in the new system.

The results of the 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 percent, 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 four percent 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. Even if fewer students than expected are induced to enroll in college by the early commitment, the program is likely to come close to breaking even.

Would the program overlook needy students? 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 only seven percent of students who did *not* receive federal assistance in eighth grade later received it in tenth or twelfth grade. Such students would not be informed of Pell eligibility early on, but would receive it when they filed a FAFSA in twelfth grade.

More research is needed to test the assumptions of the theory of action underlying early commitment programs. In particular, more evidence is needed to indicate that providing a commitment of financial aid effectively relieves the perception that college is unaffordable. Furthermore, the relationship between perceived affordability and the actions undergirding social and academic preparation needs to be explicated. Finally, more direct evidence is needed to show that these processes are critical mechanisms lying between perceived affordability and college outcomes. If the logic model underlying these programs is incorrect, they will fail to change the odds of college attainment and therefore be quite inefficient indeed.

Therefore, before adopting an early commitment program nationally, Congress should authorize and rigorously evaluate a demonstration program over a period of several years to consider impacts on college preparation, high school graduation, college enrollment and retention as well as financial aid receipt. This demonstration should include the random assignment of an early committed Pell to the residents of specified school districts, cities, or regions. It is important to offer the program to *all* eligible students in a given area rather than to some students and not others as the posited impacts are expected to operate through community and school-level processes shaping social and cultural capital. Those shorter-term effects on the accumulation of college knowledge must be assessed via surveys, and academic outcomes tracked via state and National Student Clearinghouse data.

At the pilot stage, it is especially important to examine whether the intervention induces changes in student behavior by reducing the cost of college or changing academic preparation, social, or cultural capital. If the effects are obtained by enhancing affordability—for example, if the impacts occur mainly because more students receive the Pell when they start college, and high school preparation is unaffected—there may be less expensive ways to create the same impacts. Increasing the rate of FAFSA completion, or waiving the FAFSA while keeping the current timing of Pell distribution the same, could have similar impacts. But if the effects arise via changes in academic, social, or cultural preparation for college then this indicates that the timing of the Pell delivery is important. In addition, the demonstration effort should include the collection of a random subsample of families' financial records so as to examine concerns about over-awarding some students. Moreover, the interaction between Pell eligibility rules and state and institutional aid eligibility needs to be explored, since Pell eligibility is used to determine eligibility for other need-based aid programs. Although states and colleges could also give

targeted students automatic eligibility for their need-based grants, they may choose to keep their own criteria, maintaining complexity for students.

There may be alternative approaches to addressing the same problems that early commitment programs are designed to solve. For example, it might be possible to effectively provide information about the cost of college earlier, while not committing to the money itself. A recent experimental program providing parents of middle school students with additional information about the net price of attendance found that students given this information were 24 percentage points more likely (68% vs. 44%) to know that students from the lowest-income families could attend many colleges at no cost (College Board and College Foundation of North Carolina, 2012). Similarly, using random assignment, Oreopoulos and Dunn (2012) found 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 by at least four percentage points. It seems that this information needs to reach students as early as possible: impacts on postsecondary enrollment are detectable for interventions as late as tenth grade (Ford et al., 2012), but are not statistically significant for information provided in twelfth grade (Bettinger et al., 2012). But it is far from clear whether these informational interventions will be sufficient to generate the large-scale changes in college enrollment rates among low-income students needed to improve social mobility. After all, information alone does not provide students with the money necessary to make college more affordable.

College savings accounts are another potential approach to improving educational attainment by making attendance more affordable. Studies show that families who start saving 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). Elliott (2009) concluded that children with savings accounts were twice as likely to expect to attend college and had higher levels of academic achievement in school than students without a savings account. However, strategies based on savings accounts may overestimate the degree to which it is possible or desirable to save in very low-income households.

Whatever the eventual solution, the approach to identifying ways to increase college attainment among any population ought to include careful and empirical estimation of the costs and benefits involved. Too often, policy proposals are swept away by political breezes or given short shrift by those who discount the inherent values involved. Fiscal analyses and simulation studies represent a few of the many tools that can and should be used more often to bring data and light to bear on the difficult quest for effective remedies. As this article illustrates, while the costs associated with popular programs may indeed be high, the benefits could be higher still—and worthy of closer consideration.

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Figure 1: Summary of the proposed early commitment system.

Grade/FRL status	Pell eligibility under current rules	Pell eligibility under early commitment
8th grade, no FRL	No notification	No notification
8th grade, FRL	No notification	Guaranteed maximum Pell Grant for 12 semesters
FRL in 8th and 12th grades	Maximum Pell first year of college if the FAFSA is filed; must refile and meet income requirements each year	Guaranteed maximum Pell Grant for 12 semesters
No FRL in 8th grade, FRL in 12th grade	Maximum Pell first year of college if the FAFSA is filed; must refile and meet income requirements each year	Maximum Pell first year of college if the FAFSA is filed; must refile and meet income requirements each year

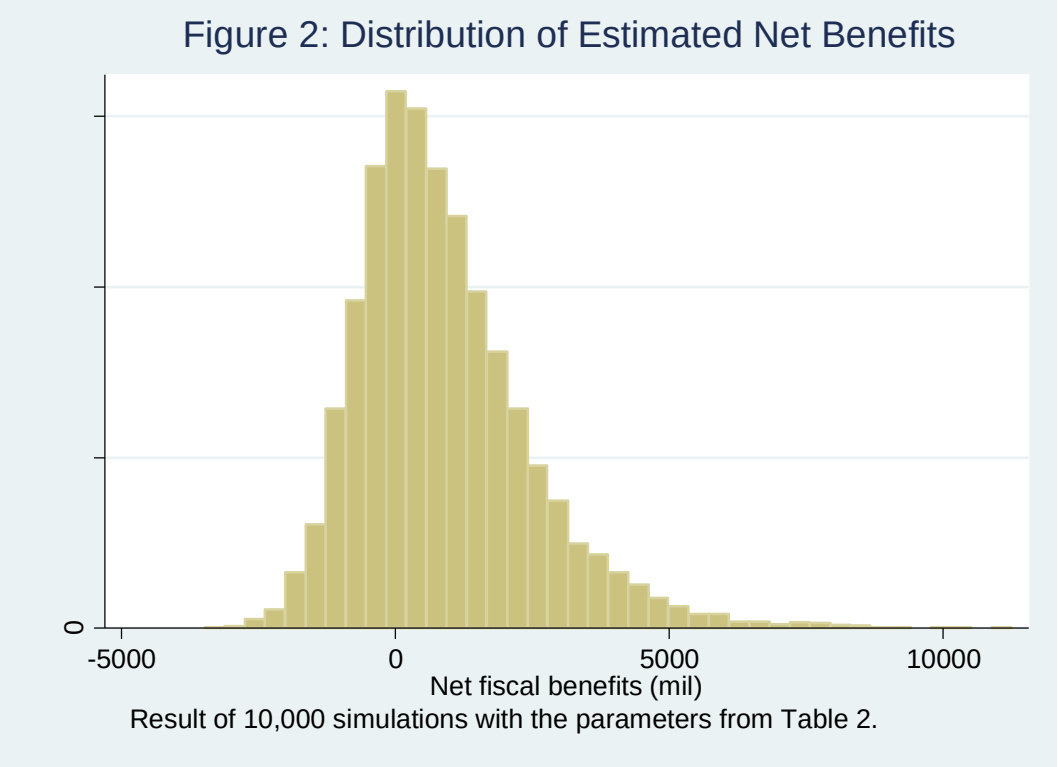

Table 1: Baseline characteristics (grade 8) of the PSID sample.

Measure	Mean	(SE)
Race (percent)		
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 (percent female)	49.7	(1.4)
Number of siblings age 0-17	1.39	(0.04)
Parental education (percent)		
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 (pct)	18.6	(1.3)
At or below 200% of poverty (pct)	37.1	(1.7)
Received public assistance (percent)		
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 (percent)		
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:

(a) Family income is trimmed to the 1st and 99th percentiles.

(b) Parental education is for the head of household. In the rare case of multiple households, the highest level of parental education was selected.

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

(d) 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 (percent)				
10th grade	81.3	(2.0)	6.6	(0.8)
12th grade	69.3	(2.7)	7.8	(1.0)
12th grade income (pct of poverty)				
Below 130%	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 (percent)				
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:
(a) Public assistance receipt includes FRL, WIC, TANF, and food stamp receipt in the prior year.
(b) 8th grade includes children ages 13 and 14 in the listed year.
(c) Observations are weighted to account for the study's design. Standard errors are clustered at the family level.
(d) Poverty is defined as the ratio of taxable income to the federal need threshold, which takes into account household size.
(e) 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:

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

(b) Regressions also include cohort fixed effects.

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

(d) * p<0.10, ** p<0.05, *** p<0.01.

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:

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

(b) Regressions also include cohort fixed effects.

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

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

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

(f) * p<0.10, ** p<0.05, *** p<0.01.

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 (percent)	22.4	24.2	7.1	7.8
Number of observations	769	762	769	762

Notes:

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

(b) Regressions also include cohort fixed effects.

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

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

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

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

(g) * p<0.10, ** p<0.05, *** p<0.01.

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:

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

(b) Regressions also include cohort fixed effects.

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

(d) Educational attainment is measured by the total years of completed education.

(e) This table measures cumulative educational attainment through 2009. If observations were missing, the most recent post-high school observation was used.

(f) Only the first three cohorts are included because cohort 4 was in 12th grade in 2009.

(g) The high school graduate and any college categories are not mutually exclusive.

(h) * p<0.10, ** p<0.05, *** p<0.01.

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 Grant.

(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 percent)	-444.4	326.0	1418.4	2947.1	4628.7
Preferred (3.5 percent)	-832.6	-201.5	609.1	1682.4	2897.9
High (5 percent)	-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:
(a) All estimates come from a Monte Carlo simulation with 10,000 trials.

Appendix 1: Federal program receipt by 8th grade cohort.

Cohort 1 (1999)	Mean	(SE)
Any public assistance (pct)	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 (pct)	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 (pct)	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 (pct)	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:

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

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

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

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